



**paradigm**  
TRANSPORTATION SOLUTIONS LIMITED

**530-540 Exmouth Street,  
Sarnia**

**Transportation Impact  
Assessment**

Paradigm Transportation Solutions Limited

2024-03  
230751

 **ptsl.com**



**Project Number:**

230751

**Date and Version:**

2024-03

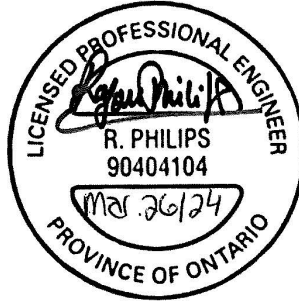
1.0.0

**Client:**

**Farhi Holdings Corp.**  
201-602 Richmond Street  
London ON N6A 5J9

Amir Farahi

## 530-540 Exmouth Street, Sarnia Transportation Impact Assessment



Rajan Philips, P.Eng.

**Consultant Project Team**

Rajan Philips, M.Sc. (PI), P.Eng.  
Patrick Neal, EIT

**Paradigm Transportation  
Solutions Limited**

5A-150 Pinebush Road  
Cambridge ON N1R 8J8

p: 519.896.3163

905.381.2229

416.479.9684

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

**Disclaimer**

This document has been prepared for the titled project or named part thereof (the "project") and except for approval and commenting municipalities and agencies in their review and approval of this project, should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization of Paradigm Transportation Solutions Limited being obtained. Paradigm Transportation Solutions Limited accepts no responsibility or liability for the consequence of this document being used for a purpose other than the project for which it was commissioned. Any person using or relying on the document for such other purpose agrees and will by such use or reliance be taken to confirm their agreement to indemnify Paradigm Transportation Solutions Limited for all loss or damage resulting there from. Paradigm Transportation Solutions Limited accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned and the approval and commenting municipalities and agencies for the project.

To the extent that this report is based on information supplied by other parties, Paradigm Transportation Solutions Limited accepts no liability for any loss or damage suffered by the client, whether through contract or tort, stemming from any conclusions based on data supplied by parties other than Paradigm Transportation Solutions Limited and used by Paradigm Transportation Solutions Limited in preparing this report.

© 1998 Paradigm Transportation Solutions Limited. All rights reserved.

# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for the proposed Residential Development located at 530-540 Exmouth Street in the City of Sarnia.

This TIA includes an analysis of existing traffic conditions, a description of the proposed development, analysis of future traffic conditions, and assessment of development traffic impacts with recommendations as appropriate to accommodate the proposed development.

## Development Concept

The subject lands are located on the north side of Exmouth Street, south of Highway 402, and east of Capel Street. The proposed development is identified as “a large-scale, transit oriented, high-rise residential development,” comprising four, 23-storey apartment buildings and providing 848 dwelling units. A parking supply of 1,042 spaces is proposed, 230 spaces fewer than the required 1,272 spaces.

The four towers are to be located on two vacant parcels, each parcel accommodating two towers. The parcel to the south, along Exmouth Street, will accommodate the two South Towers; and the parcel to the north, along Highway 402, will accommodate the two North Towers.

The two vacant parcels are surrounded by existing commercial properties which share an internal road system with two access connections to Exmouth Street at Cecil Street and at East Street North.

The proposed development would use the existing access arrangement to Exmouth Street.

The development is assumed to be completed by 2033.

## TIA Scope

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

- ▶ **Study Area Intersections:**
  - Highway 402 Ramp Terminal intersection at Indian Road (Lambton Road 29) (signalized);



- Highway 402 Off-Ramp intersection at Exmouth Street (unsignalized);
  - Highway 402 Ramp Terminal intersection at Christina Street, Church Street (signalized);
  - Exmouth Street and Christina Street (signalized);
  - Exmouth Street & Capel Street (signalized);
  - Exmouth Street & Indian Road N (Lambton Road 29) (signalized);
  - Exmouth Street & Cecil Street (potential access) (unsignalized);
  - Exmouth Street & East Street N (potential access) (signalized).
- ▶ **Analysis Periods:** Weekday AM and PM peak hours.
  - ▶ **Background Developments:**
    - 200 Exmouth Street;
    - Exmouth Street Residential Development; and
    - 135 Water Street.
  - ▶ **Traffic Conditions:** Base Year (2024), five years after development (2038), and ten years after development (2043).

## Conclusions

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

- ▶ **Base Year (2024) Traffic Conditions:** All study area intersections are currently operating at acceptable levels of service, except for the following intersection movements:

### Capel Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is exceeding the existing storage of 20 metres during the PM peak hour; and

### Indian Road and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is exceeding the existing storage of 25 metres during the PM peak hour.

The existing site driveway intersections on Exmouth Street are operating at acceptable levels of service.





- ▶ **Development Trip Generation:** The development is forecast to generate 205 and 244 trips during the AM and PM peak hours, respectively.
- ▶ **2038 Background Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under base year traffic conditions, with the following additional critical movements:

#### Christina Street and Highway 402 WB Ramp/Church Street

- the westbound shared through/left-turn movement is forecast to operate at LOS D with a v/c ratio of 0.75 during the AM peak hour and a v/c ratio greater than 0.75 during the PM peak hour;

#### Christina Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 40 metres during the PM peak hour;
- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;

#### Capel Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;

#### Cecil Street/ Driveway A and Exmouth Street

- the northbound movement is forecast to operate at LOS F during the PM peak hour;
- the southbound movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;

#### East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is project to exceed the existing storage of 20 metres during the PM peak hour;

#### Indian Road and Exmouth Street

- the eastbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;
- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and



- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 30 metres during the AM and PM peak hours.
- ▶ **2038 Total Traffic Conditions:** All study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions. The Site Driveway intersections on Exmouth Street are also noted to operate at similar levels of service as under 2038 total traffic conditions. The new development traffic is not creating level of service implications for the study area intersections including the two access intersections. **2043 Background Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions, with the following additional critical movements.

#### Christina Street and Exmouth Street

- the southbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;

#### East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 45 during the PM peak hour; and

#### Indian Road and Exmouth Street

- the eastbound shared through/right-turn movement is forecast to operate at LOS D with a v/c ratio greater than 0.85 during the PM peak hour.
- ▶ **2043 Total Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under 2043 background traffic conditions, with the following additional critical movements:

#### Christina Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and

#### East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 20 metres during the PM peak hour.
- ▶ **Site Driveways:** The Site Driveways are operating at acceptable levels of service under base year traffic conditions.



However, beginning under 2038 background traffic conditions, the southbound (outbound) movement at Cecil Street/ Driveway A and Exmouth Street is forecast to theoretically operate over-capacity during the PM peak hour. It is noted that the outbound traffic volumes at the driveway have the option to use the traffic signal at East Street North/ Driveway B via internal roadways.

Under 2043 total traffic conditions during the PM peak hour, the 95<sup>th</sup> percentile queue length of the eastbound (inbound) left-turn movement at East Street North/ Driveway B and Exmouth Street is noted to exceed the available storage of 20 metres by approximately five metres, or less than one car length. The queueing can be accommodated in the centre two-way left-turn lane.

- ▶ **MTO Queue Length Assessment:** Based on MTO methods for queue length analysis at signalized intersections, all movements at the Highway 402 Ramp intersections at Christina Street and at Indian Road are operating with no queueing issues under base year traffic conditions. However, the westbound left-turn movement at the Highway 402 Westbound Ramp and Indian Road intersection is projected to exceed the existing storage of 85 metres under 2038 and 2043 background and total traffic conditions. It is noted that the Synchro 11 analysis did not identify this queueing issue.

## Recommendations

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



# Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Overview.....	1
1.2	Purpose and Scope .....	1
<b>2</b>	<b>Existing Conditions.....</b>	<b>4</b>
2.1	Existing Roadways.....	4
2.2	Transit Service.....	7
2.3	Traffic Volumes.....	9
2.4	Traffic Operations.....	13
2.5	MTO Queueing Analysis .....	17
<b>3</b>	<b>Development Concept.....</b>	<b>19</b>
3.1	Development Description .....	19
3.2	Development Trip Generation .....	21
3.3	Development Trip Distribution and Assignment .....	21
<b>4</b>	<b>Evaluation of Future Traffic Conditions.....</b>	<b>25</b>
4.1	Background Traffic Forecasts.....	25
4.1.1	Other Area Developments .....	25
4.2	<b>2038 Traffic Forecasts.....</b>	<b>28</b>
4.2.1	Background Traffic Operations.....	28
4.2.2	Total Traffic Operations.....	34
4.2.3	MTO Queueing Analysis.....	39
4.3	<b>2043 Traffic Forecasts.....</b>	<b>41</b>
4.3.1	Background Traffic Operations.....	41
4.3.2	Total Traffic Operations.....	46
4.3.3	MTO Queueing Analysis.....	51
<b>5</b>	<b>Conclusions and Recommendations .....</b>	<b>53</b>
5.1	Conclusions.....	53
5.2	Recommendations .....	56

# Appendices

Appendix A	Pre-Study Consultation
Appendix B	Existing Traffic Data
Appendix C	Existing Traffic Operations Reports
Appendix D	Background Development Traffic Volumes
Appendix E	2038 Background Traffic Operations Reports
Appendix F	2038 Total Traffic Operations Reports
Appendix G	2043 Background Traffic Operations Reports
Appendix H	2043 Total Traffic Operations Reports



## Figures

<b>Figure 1.1: Location of Subject Site .....</b>	<b>3</b>
<b>Figure 2.1: Existing Lane Configuration and Traffic Control .....</b>	<b>6</b>
<b>Figure 2.2: Existing Transit Network.....</b>	<b>8</b>
<b>Figure 2.3a: Base Year (2024) Traffic Volumes – AM Peak Hour ..</b>	<b>11</b>
<b>Figure 2.3b: Base Year (2024) Traffic Volumes – PM Peak Hour ..</b>	<b>12</b>
<b>Figure 3.1: Concept Site Plan .....</b>	<b>20</b>
<b>Figure 3.2a: Site Generated Traffic Volumes – AM Peak Hour .....</b>	<b>23</b>
<b>Figure 3.2b: Site Generated Traffic Volumes – PM Peak Hour.....</b>	<b>24</b>
<b>Figure 4.1: Other Area Development Locations.....</b>	<b>27</b>
<b>Figure 4.2a: 2038 Background Traffic Volumes – AM Peak Hour.</b>	<b>30</b>
<b>Figure 4.2b: 2038 Background Traffic Volumes – PM Peak Hour.</b>	<b>31</b>
<b>Figure 4.3a: 2038 Total Traffic Volumes – AM Peak Hour .....</b>	<b>35</b>
<b>Figure 4.3b: 2038 Total Traffic Volumes – PM Peak Hour .....</b>	<b>36</b>
<b>Figure 4.4a: 2043 Background Traffic Volumes – AM Peak Hour.</b>	<b>42</b>
<b>Figure 4.4b: 2043 Background Traffic Volumes – PM Peak Hour.</b>	<b>43</b>
<b>Figure 4.5a: 2043 Total Traffic Volumes – AM Peak Hour .....</b>	<b>47</b>
<b>Figure 4.5b: 2043 Total Traffic Volumes – PM Peak Hour .....</b>	<b>48</b>



## Tables

<b>Table 2.1:</b>	<b>Traffic Data</b> .....	<b>9</b>
<b>Table 2.2:</b>	<b>Intersection Peak Hours</b> .....	<b>10</b>
<b>Table 2.3a:</b>	<b>Existing Traffic Operations – AM Peak Hour</b> .....	<b>15</b>
<b>Table 2.3b:</b>	<b>Existing Traffic Operations – PM Peak Hour</b> .....	<b>16</b>
<b>Table 2.4a:</b>	<b>Base Year Through and Left-Turn Queue Analysis</b> ..	<b>18</b>
<b>Table 2.4b:</b>	<b>Base Year Right-Turn Queue Analysis</b> .....	<b>18</b>
<b>Table 3.1:</b>	<b>Trip Generation</b> .....	<b>21</b>
<b>Table 3.2:</b>	<b>Estimated Trip Distribution</b> .....	<b>22</b>
<b>Table 4.1a:</b>	<b>2038 Background Traffic Operations – AM Peak Hour</b> .....	<b>32</b>
<b>Table 4.1b:</b>	<b>2038 Background Traffic Operations – PM Peak Hour</b> .....	<b>33</b>
<b>Table 4.2a:</b>	<b>2038 Total Traffic Operations – AM Peak Hour</b> .....	<b>37</b>
<b>Table 4.2b:</b>	<b>2038 Total Traffic Operations – PM Peak Hour</b> .....	<b>38</b>
<b>Table 4.3a:</b>	<b>2038 Through and Left-Turn Queue Analysis</b> .....	<b>40</b>
<b>Table 4.3b:</b>	<b>2038 Right-Turn Queue Analysis</b> .....	<b>40</b>
<b>Table 4.4a:</b>	<b>2043 Background Traffic Operations – AM Peak Hour</b> .....	<b>44</b>
<b>Table 4.4b:</b>	<b>2043 Background Traffic Operations – PM Peak Hour</b> .....	<b>45</b>
<b>Table 4.5a:</b>	<b>2043 Total Traffic Operations – AM Peak Hour</b> .....	<b>49</b>
<b>Table 4.5b:</b>	<b>2043 Total Traffic Operations – PM Peak Hour</b> .....	<b>50</b>
<b>Table 4.6a:</b>	<b>2043 Through and Left-Turn Queue Analysis</b> .....	<b>52</b>
<b>Table 4.6b:</b>	<b>2043 Right-Turn Queue Analysis</b> .....	<b>52</b>



# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for the proposed Residential Development located at 530-540 Exmouth Street in the City of Sarnia. **Figure 1.1** details the subject development location.

The subject lands are located on the north side of Exmouth Street, south of Highway 402, and east of Capel Street. The proposed development is identified as “a large-scale, transit oriented, high-rise residential development,” comprising four, 23-storey apartment buildings and providing 848 dwelling units. A parking supply of 1,042 spaces is proposed, 230 spaces fewer than the required 1,272 spaces.

The four towers are to be located on two vacant parcels, each parcel accommodating two towers. The parcel to the south, along Exmouth Street, will accommodate the two South Towers; and the parcel to the north, along Highway 402, will accommodate the two North Towers.

The two vacant parcels are surrounded by existing commercial properties which share an internal road system with two access connections to Exmouth Street at Cecil Street and at East Street North.

The proposed development would use the existing access arrangement to Exmouth Street.

The development is assumed to be completed by 2033.

## 1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with the Ministry of Transportation Ontario (MTO) and City staff via e-mail in January 2024, includes:

- ▶ assessment of the current traffic and site conditions within the study area;
- ▶ estimates of background traffic growth for five years after development (2038) and ten years after development (2043);
- ▶ the following developments are included in background traffic forecasts:
  - 200 Exmouth Street;



- Exmouth Street Residential Development; and
- 135 Water Street.
- ▶ analyses of the impact of the future traffic on the surrounding road network, including the following study area intersections:
  - Highway 402 Westbound Ramp Terminal intersection at Indian Road (Lambton Road 29) (signalized);
  - Highway 402 Eastbound intersection at Exmouth Street (unsignalized);
  - Highway 402 Westbound Ramp Terminal intersection at Christina Street, Church Street (signalized);
  - Exmouth Street and Christina Street (signalized);
  - Exmouth Street & Capel Street (signalized);
  - Exmouth Street & Indian Road North (Lambton Road 29) (signalized);
  - Exmouth Street & Cecil Street (potential access) (unsignalized);
  - Exmouth Street & East Street North (potential access) (signalized).
- ▶ recommendations, if necessary, to mitigate the site generated traffic in a satisfactory manner.

**Appendix A** contains the pre-study consultation material and responses from the MTO and City of Sarnia.

This study has been prepared in accordance with the requirements detailed by the MTO Traffic Impact Study Guidelines<sup>1</sup> and the City of Sarnia Transportation Impact Study Guidelines<sup>2</sup>.

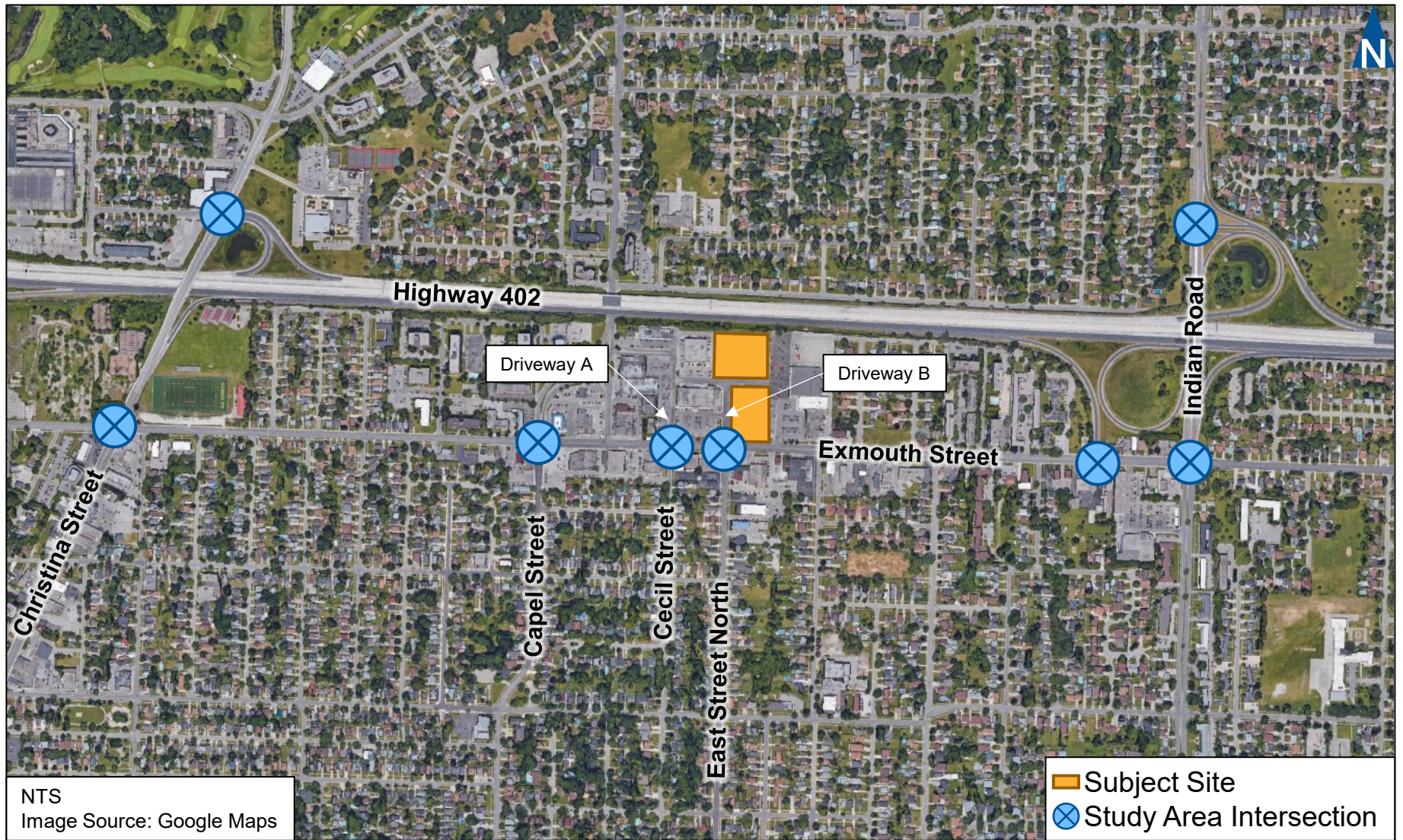
---

<sup>1</sup> MTO, General Guidelines for Preparation of Traffic Impact Studies, March 2023.

<sup>2</sup> City of Sarnia Transportation Master Plan: Transportation Impact Study Guidelines, July 2013.









## 2 Existing Conditions

### 2.1 Existing Roadways

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

- ▶ **Highway 402** is an east-west provincial highway with a four-lane cross-section and interchanges at Christina Street and at Indian Road.
- ▶ **Exmouth Street** is an east-west arterial road<sup>3</sup> with a five-lane cross-section between Capel Street and Indian Road, including two lanes in each direction and a centre lane for exclusive left turns or two-way left-turns. Exmouth Street has a four-lane cross-section east of Indian Road and west of Capel Street. Sidewalks are provided on both sides of the roadway. No cycling facilities are present along Exmouth Street. The assumed speed limit is 50 km/h.
- ▶ **Indian Road (Lambton Road 29)** is a north-south arterial road with a four-lane cross-section. Sidewalks are provided on both sides of the roadway, and no cycling facilities are provided. The posted speed limit is 50 km/h.
- ▶ **Christina Street** is a north-south arterial road with a four-lane cross-section. Sidewalks are provided on the west side of the roadway south of Church Street and on the east side of the roadway north of the Highway 402 Ramp Terminal. No cycling facilities are present on Christina Street. The posted speed limit is 50 km/h.
- ▶ **Capel Street** is a north-south arterial road with a two-lane cross-section. Sidewalks and exclusive cycling lanes are provided on both sides of the roadway. The assumed speed limit is 50 km/h.
- ▶ **East Street North** is a north-south collector road with a two-lane cross-section. East Street North aligns with the easterly access to the subject site at its intersection with Exmouth Street. Sidewalks are provided on both sides of the roadway, and no cycling facilities are provided. The assumed speed limit is 50 km/h.
- ▶ **Cecil Street** is a north-south arterial road with a two-lane cross-section. Cecil Street aligns with the westerly access to the subject site at its intersection with Exmouth Street. Sidewalks

<sup>3</sup> *City of Sarnia Official Plan Map 4: Transportation and Road Widening Plan, June 2014.*



are provided on both sides of the roadway, and no cycling facilities are provided. The assumed speed limit is 50 km/h.

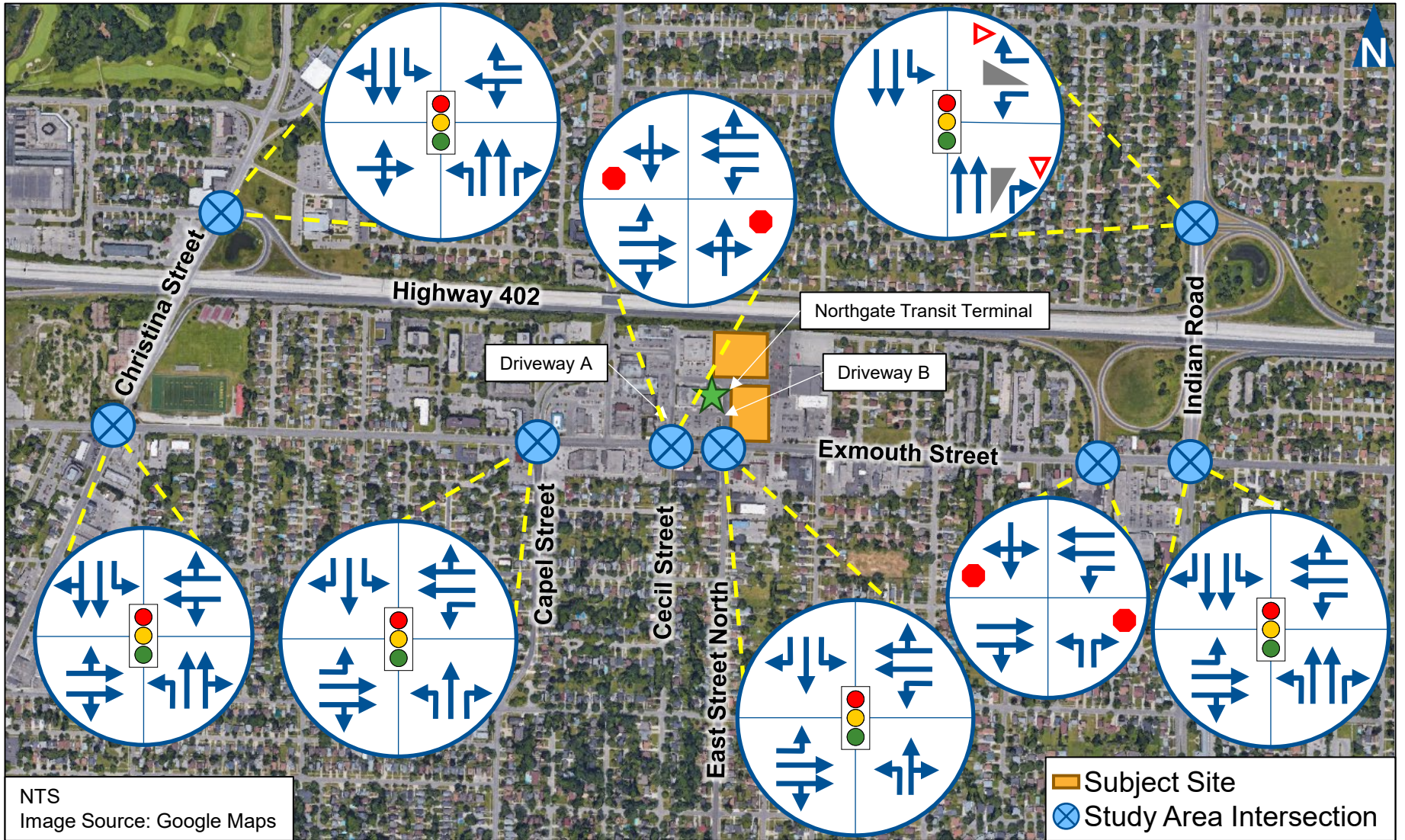
- ▶ **Church Street** is an east-west local road with a two-lane cross-section. Church Street aligns with the Highway 402 Ramp Terminal intersection at Christina Street. Sidewalks are provided on both sides of the roadway, and no cycling facilities are provided. The assumed speed limit is 50 km/h.

Side-street stop-control is provided at the intersections of Exmouth Street and Chapel Street/Westerly Site Access and at the Highway 402 Ramp Terminal and Exmouth Street. Traffic signals are provided at the following intersections:

- ▶ Christina Street and Highway 402 Ramp Terminal/ Church Street;
- ▶ Indian Road and Highway 402 Ramp Terminal;
- ▶ Indian Road and Exmouth Street; and
- ▶ Exmouth Street and East Street North.

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





## Existing Lane Configuration and Traffic Control

## 2.2 Transit Service

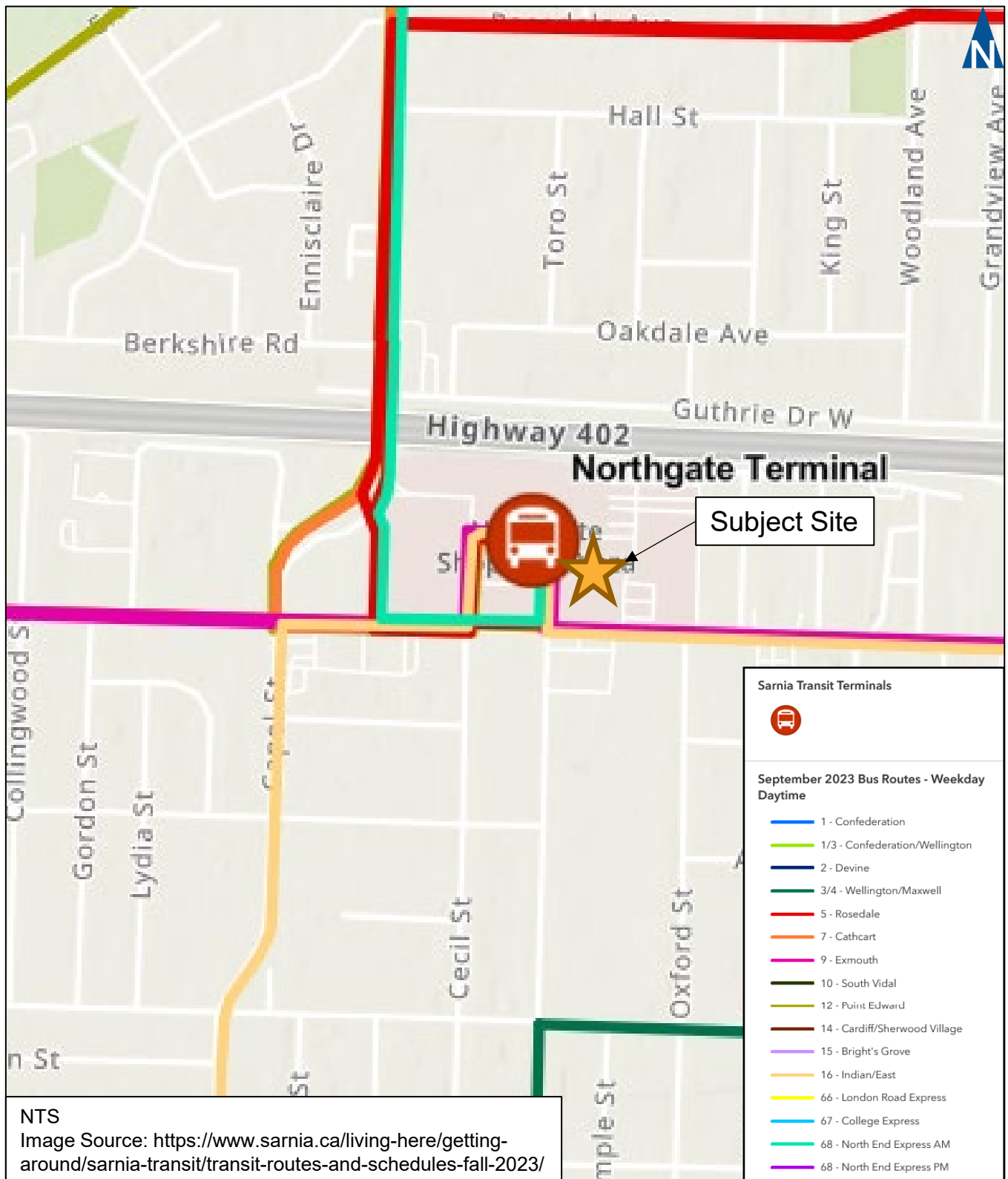
Sarnia Transit operates seven routes within the study area, all of which stop at the Northgate Terminal. The Terminal is located on the west side of East Street North and north of Exmouth Street, opposite the subject site. The seven routes include:

- ▶ **Route 5 (Rosedale)** provides service seven days per week between the Northgate Terminal and the Blackwell Road and Modeland Road intersection. Route 5 has 40-minute headways on weekdays and Saturdays and 80-minute headways on Sundays.
- ▶ **Route 7 (Cathcart)** provides service seven days per week between the Northgate Terminal and Lakeshore Road. Route 7 operates with 40-minute headways on weekdays and Saturdays and 80-minute headways on Sundays.
- ▶ **Route 9 (Exmouth)** provides service seven days per week between the Bayside Mall Terminal and the intersection of Confederation Line and Procor Drive with stops at the Murphy Road Terminal and the Northgate Terminal. Route 9 operates with 20-minute headways on weekdays and 40-minute headways on weekends.
- ▶ **Route 12 (Point Edward)** provides service on weekdays and Saturdays between the Northgate Terminal and River Front Street near Bluewater Bridge. Route 12 operates with 60-minute headways.
- ▶ **Route 16 (Indian/East)** provides service on weekdays and Saturdays between the Northgate Terminal and Confederation Street. Route 16 operates with 60-minute headways.
- ▶ **Route 68 (North End Express AM/PM)** provides service between the Northgate Terminal and Northern High School on weekdays only. Route 68 leaves Northgate Terminal at 7:40 AM and leaves Northern High School at 2:45 PM.

**Figure 2.2** illustrates the existing transit service.







## Existing Transit Network

Figure 2.2

## 2.3 Traffic Volumes

Intersection counts at the Highway 402 Ramp intersections on Indian Road, Christina Street, and Exmouth Street were obtained from data provided by MTO and dated 08 June 2022. Paradigm conducted turning movement counts at the ramp terminal intersections on Indian Road and Exmouth Street and the balance of the study area intersections on 13 October 2022 and on 31 January 2024. It is noted that Paradigm's 2024 counts at the Highway 402 Ramp Terminal intersections at Indian Road and at Exmouth Street are higher than MTO's counts and were used for the existing traffic volumes. **Table 2.1** summarizes the intersection count dates and source of the traffic counts.

**TABLE 2.1: TRAFFIC DATA**

Intersection	Source	Count Date
Hwy 402 WB Ramp and Indian Road	MTO	08 June 2022
	Paradigm	31 January 2024
Hwy 402 EB Ramp and Exmouth Street	MTO	08 June 2022
	Paradigm	31 January 2024
Hwy 402 WB Ramp and Christina Street	MTO	08 June 2022
Christina Street and Exmouth Street	Paradigm	13 October 2022
Exmouth Street and Capel Street	Paradigm	31 January 2024
Exmouth Street and Indian Road	Paradigm	31 January 2024
Exmouth Street and Cecil Street	Paradigm	31 January 2024
Exmouth Street and East Street North	Paradigm	31 January 2024

The 2022 traffic volumes were grown to a base year 2024 using a 2% per annum growth rate.

**Figure 2.3a** and **Figure 2.3b** respectively illustrates the base year (2024) AM and PM weekday peak hour turning movement traffic volumes. **Table 2.2** summarizes the observed peak hours at each intersection.

**Appendix B** contains the detailed traffic counts and signal timings for the study area intersections.



**TABLE 2.2: INTERSECTION PEAK HOURS**

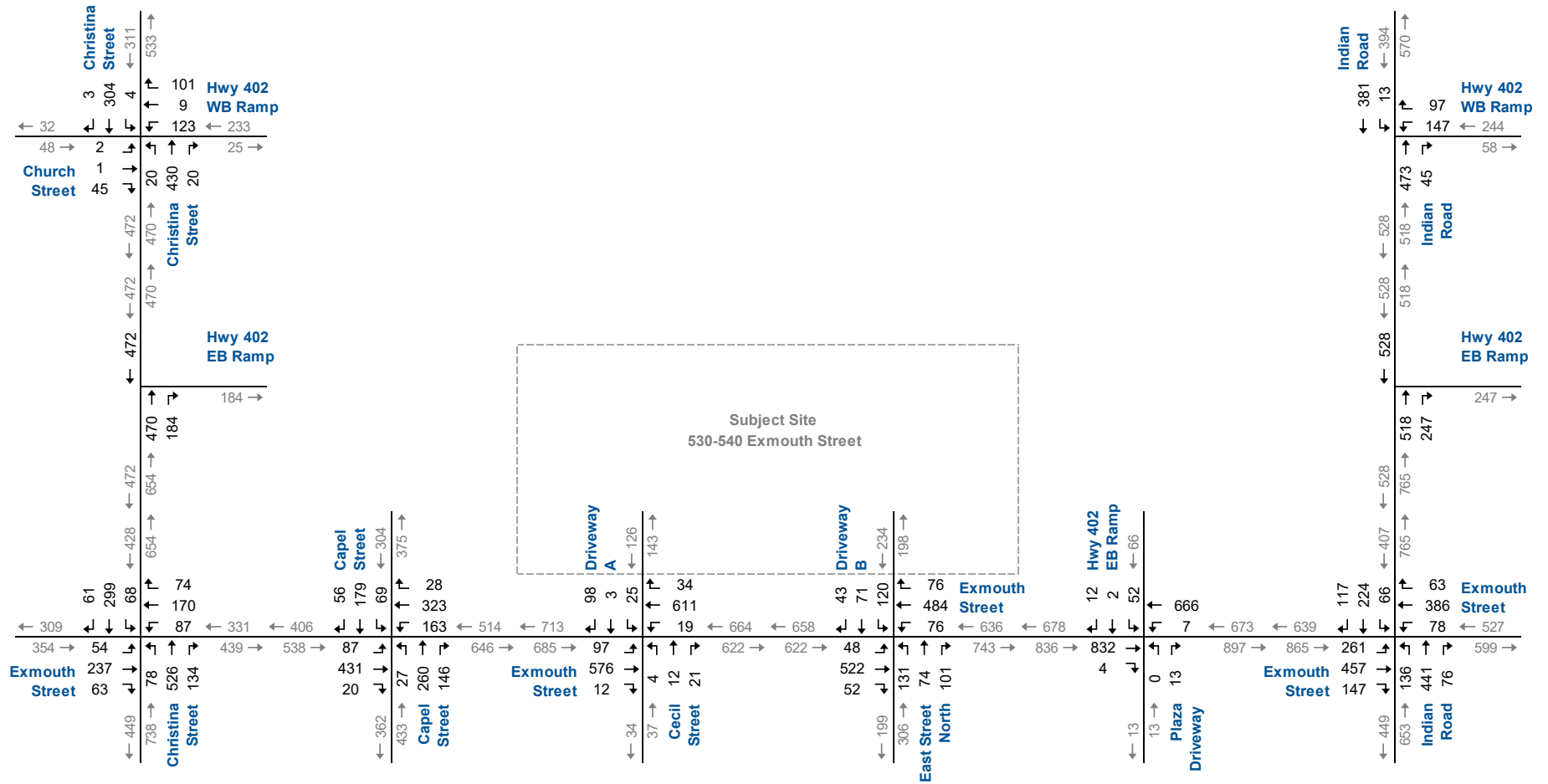
<b>Intersection</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Hwy 402 WB Ramp and Indian Road	7:45 – 8:45	4:15 – 5:15
Hwy 402 EB Ramp and Exmouth Street	8:30 – 9:30	4:00 – 5:00
Hwy 402 WB Ramp and Christina Street	8:00 – 9:00	4:00 – 5:00
Christina Street and Exmouth Street	9:30 – 10:30	4:15 – 5:15
Exmouth Street and Capel Street	8:30 – 9:30	4:00 – 5:00
Exmouth Street and Indian Road	8:30 – 9:30	4:00 – 5:00
Exmouth Street and Cecil Street	9:00 – 10:00	4:00 – 5:00
Exmouth Street and East Street North	8:30 – 9:30	4:00 – 5:00







**PM Peak Hour**



**Base Year (2024) Traffic Volumes  
PM Peak Hour**

## 2.4 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 various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of 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 to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations at the study area intersections have been assessed using Synchro 11. It is noted that the Highway 402 Eastbound On-Ramps on Christina Street and Indian Road operate as free-flow movements and are therefore not included in the analysis. As per City TIS guidelines, movements at City, County and Village intersections are considered critical under the following conditions:

- ▶ Signalized:
  - volume/capacity (v/c) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.85 or above;
  - v/c ratios for dedicated turning movements increased to 0.95 or above; or
  - queues for an individual movement are projected to exceed available turning lane storage or impact upstream transportation facilities.
- ▶ Unsignalized:
  - the overall intersections or individual movements are operating with LOS E or worse.

In addition, MTO guidelines indicate that movements at ramp terminals are considered critical with a v/c ratio greater than 0.75.

It is noted that the signal timing plans were provided for the intersections of Highway 402 and Christina Street; Exmouth Street and



Christina Street; and Exmouth Street and Indian Road. The signal timings for the intersections of Highway 402 and Indian Road; Exmouth Street and Capel Street; and Exmouth Street and East Street North were estimated based on the timings at the other intersections.

**Table 2.3a** and **Table 2.3b** summarize the results of the intersection operational analysis under base year conditions, including the AM and PM peak hour LOS, v/c ratios, and 95<sup>th</sup> percentile queues experienced.

The results indicate that the study area intersections are operating at acceptable levels of service, except for the following critical movements:

- ▶ Capel Street and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is exceeding the existing storage of 20 metres during the PM peak hour.
- ▶ Indian Road and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is exceeding the existing storage of 25 metres during the PM peak hour.

The site driveway intersections on Exmouth Street are operating at acceptable levels of service.

**Appendix C** contains the detailed Synchro 11 reports.



**TABLE 2.3A: EXISTING TRAFFIC OPERATIONS – AM PEAK HOUR**

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	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	B 19 0.11 8 -	> > > > >	B 19	< < < < <	D 39 0.61 56 -	A 4 0.28 7 80 73	C 27	B 16 10 25 15	B 14 22 0 -	A 0 0.01 30 30	B 14	B 11 0.01 2 60 58	> > > > >	B 12 -	B 18	
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay V/C Q Stor. Avail.					C 28 0.64 49 -	A 6 0.17 8 -	C 23		A 10 21 -	> > > >	A 10	A 7 0.04 4 90 86	A 10 29 -			A 9	B 14
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay V/C Q Stor. Avail.		A 0 0.00 0 -	> > > >	A 0	A 0 0.00 0 15 15			A 0	< < < <	B 12 0.00 -	> > > >	B 12	C 16 0.10 2 -	> > > >		C 16	
	Christina Street & Exmouth Street	TCS	LOS Delay V/C Q Stor. Avail.	< < < < <	B 12 0.26 19 -	> > > > >	B 12	< < < < <	B 12 0.34 21 -	> > > >	B 12	B 13 14 40 26	A 10 19 -	> > > >	B 11	B 13 0.17 13 25 12	B 11 0.22 19 -	> > > >	B 11	B 11
	Capel Street & Exmouth Street	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.08 7 40 33	A 13 0.16 18 -	> > > >	B 11	A 6 0.12 10 20 10	B 12 0.17 21 -	> > >	B 11	C 23 8 30 22	C 25 33 -	A 7 11 30 19	B 18	C 25 0.25 18 25 7	C 28 0.51 48 -	A 3 4 25 21	C 23	B 16
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay V/C Q Stor. Avail.	A 9 0.08 2 15 13	A 0 0.00 0 -	> > > >	A 1	A 8 0.01 0 15 15	A 0 0.00 0 -	> > >	A 0	< < < <	C 16 0.08 2 -	> > >	C 16	< < < <	B 15 0.18 5 -	> > >	B 15	
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay V/C Q Stor. Avail.	B 12 0.04 5 20 15	B 12 0.25 28 -	> > > >	B 12	B 13 0.12 11 20 9	B 12 0.28 31 -	> > >	B 12	C 26 0.32 24 45 21	B 12 0.35 20 -	> > >	B 17	B 13 0.12 10 35 25	B 13 0.04 7 -	A 3 0.05 2 35 33	B 11	B 13
	Indian Road & Exmouth Street	TCS	LOS Delay V/C Q Stor. Avail.	B 17 0.29 24 25 1	C 23 0.39 42 -	> > > >	C 21	B 15 0.16 14 30 16	C 24 0.35 36 -	> > >	C 23	B 17 0.29 25 30 5	C 24 0.09 25 -	A 0 0.09 0 30 30	B 19	B 16 0.13 14 50 36	C 6 0.31 35 -	A 6 0.29 14 50 -	B 19	C 20

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



**TABLE 2.3B: EXISTING TRAFFIC OPERATIONS – PM PEAK HOUR**

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						
PM Peak Hour	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < 9 > A 9 V/C < 0.15 > Q < 8 > Stor. < - > Avail. < - >	<	A	>	A	9	<	D	>	A	C	24	B	A	A	A	A	>	A	7	B	12	
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < > V/C < > Q < > Stor. < - > Avail. < - >	<		>			C	26	>	A	B	18		A	>	A	A	>	A	7	B	11	
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < 0 > A 0 V/C < 0.00 > Q < 0 > Stor. < - > Avail. < - >	<	A	>	A	0	B	A	>	A	A	0	<	B	>	B	C	>	C	22			
	Christina Street & Exmouth Street	TCS	LOS Delay < 13 > B 13 V/C < 0.33 > Q < 25 > Stor. < - > Avail. < - >	<	B	>	B	13	<	B	>	B	B	12	B	B	>	B	B	B	>	B	12	B	13
	Capel Street & Exmouth Street	TCS	LOS Delay < 7 > A 15 V/C < 0.14 0.36 > Q < 12 42 > Stor. < 40 - > Avail. < 28 - >	A	B	>	B	15	A	B	>	B	C	B	C	A	C	C	C	C	A	C	22	B	17
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay < 10 > A 1 V/C < 0.12 0.00 > Q < 3 0 > Stor. < 15 - > Avail. < 12 - >	A	A	>	A	1	A	A	>	A	<	D	>	D	<	D	>	D	>	D	28		
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay < 15 > B 15 V/C < 0.16 0.40 > Q < 12 47 > Stor. < 20 - > Avail. < 8 - >	B	B	>	B	15	B	B	>	B	C	B	C	B	C	B	B	A	B	12	B	16	
	Indian Road & Exmouth Street	TCS	LOS Delay < 32 > C 28 V/C < 0.74 0.58 > Q < 59 68 > Stor. < 25 - > Avail. < -34 - >	C	C	>	C	28	B	C	>	C	B	C	A	C	B	B	C	A	B	18	C	24	

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



## 2.5 MTO Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for through and left-turn lanes were carried out on all movements at the Highway 402 Ramp intersections with Christina Street and Indian Road.

This method was completed using the MTO Traffic Signal Operating and Timing Policy<sup>4</sup> Table 1 under Level of Service (LOS) A conditions and assuming a vehicle length of 7.5 metres.

In addition, queue length analysis for right-turn lanes were carried out at the above locations. This was completed using the methodology outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads<sup>5</sup>. The right-turn queue length is calculated by multiplying the average number of vehicles stored per cycle by 1.5, which is the factor for roadways with design speeds of 60 km/h or less.

These methods require the conversion of volumes to Passenger Car Equivalents (PCE) by multiplying the number of heavy vehicles by a conversion factor of 2<sup>6</sup>.

**Table 2.4a** and **Table 2.4b** summarize the results of the queue length analysis under base year traffic conditions. The results indicate that all movements at the two intersections are operating with no queueing issues.

---

<sup>4</sup> Traffic Signal Operating and Timing Policy 2010-02, Ministry of Transportation Ontario, June 2016.

<sup>5</sup> Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, 2017.

<sup>6</sup> Canadian Capacity Guide, February 2008.



**TABLE 2.4A: BASE YEAR THROUGH AND LEFT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Lane	# of Lanes	Cycle Length (s)		Volumes (vph)		m <sub>i</sub> max	Calc'd Length per Lane (m)	Available Length (m)
				AM	PM	AM	PM			
Base Year (2024)	Hwy 402 WB Ramp & Christina Street	EBLTR	1	110	110	23	48	1.5	30.0	-
		WBLT	1			186	135	5.7	75.0	-
		NBL	1			27	20	0.8	15.0	25
		NBT	2			91	217	6.6	82.5	-
		SBL	1			5	4	0.2	7.5	60
		SBT	1			178	184	5.6	75.0	-
		SBTR	1			122	127	3.9	52.5	-
	Hwy 402 WB Ramp & Indian Road	WBL	1	75	75	248	148	5.2	67.5	85
		NBT	2			110	237	4.9	67.5	-
		SBL	1			22	13	0.5	15.0	90
		SBT	2			230	191	4.8	67.5	-

**TABLE 2.4B: BASE YEAR RIGHT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Movement	Cycle Length (s)		Right Turn Volume		Average Arrival		Calc'd Length (m)		Existing Storage (m)
			AM	PM	AM	PM	AM	PM	AM	PM	
Base Year (2024)	Hwy 402 & Christina Street	WBR	110	110	89	65	2.7	2	30.4	22.5	80
		NBR			98	196	3	6	33.8	67.5	30*

\* Calculated length extends beyond length of storage





## 3 Development Concept

### 3.1 Development Description

The subject lands are located on the north side of Exmouth Street, south of Highway 402, and east of Capel Street. The proposed development is identified as “a large-scale, transit oriented, high-rise residential development,” comprising four, 23-storey apartment buildings and providing 848 dwelling units. A parking supply of 1,042 spaces is proposed, 230 spaces fewer than the required 1,272 spaces.

The four towers are to be located on two vacant parcels, each parcel accommodating two towers. The parcel to the south, along Exmouth Street, will accommodate the two South Towers; and the parcel to the north, along Highway 402, will accommodate the two North Towers.

The two vacant parcels are surrounded by existing commercial properties which share an internal road system with two access connections to Exmouth Street at Cecil Street and at East Street North.

The proposed development would use the existing access arrangement to Exmouth Street.

The development is assumed to be completed by 2033.

**Figure 3.1** shows the concept site plan.





### 3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual<sup>7</sup> equations were used to estimate the peak hour traffic volumes generated by the subject development based on the ITE Land Use Code 222, Multifamily Housing (High-Rise).

It is to be noted that although the development is intended to be transit-oriented and located in proximity to the existing Northgate transit terminal, transit modal share reductions have not been applied to vehicle trip generation estimates.

**Table 3.1** summarizes the forecast number of net new vehicle trips generated by the proposed development. With successful transit usage, vehicle traffic volumes can be reduced from what are shown in **Table 3.1**.

**TABLE 3.1: TRIP GENERATION**

Land Use Code	Units	AM Peak Hour			PM Peak Hour				
		Rate	In	Out	Total	Rate	In	Out	Total
<b>222: Multifamily Housing (High-Rise)</b>	848	Eq	53	152	<b>205</b>	Eq	151	93	<b>244</b>
<b>Total Trip Generation</b>			<b>53</b>	<b>152</b>	<b>205</b>		<b>151</b>	<b>93</b>	<b>244</b>

LUC 222 | AM:  $T = 0.22(X) + 18.85$  | PM:  $T = 0.26(X) + 23.12$

### 3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing intersection traffic distribution and the logical directions for home-work travel from and return trips to the development. **Table 3.2** displays the breakdown of trip distributions used in this study.

<sup>7</sup> Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).



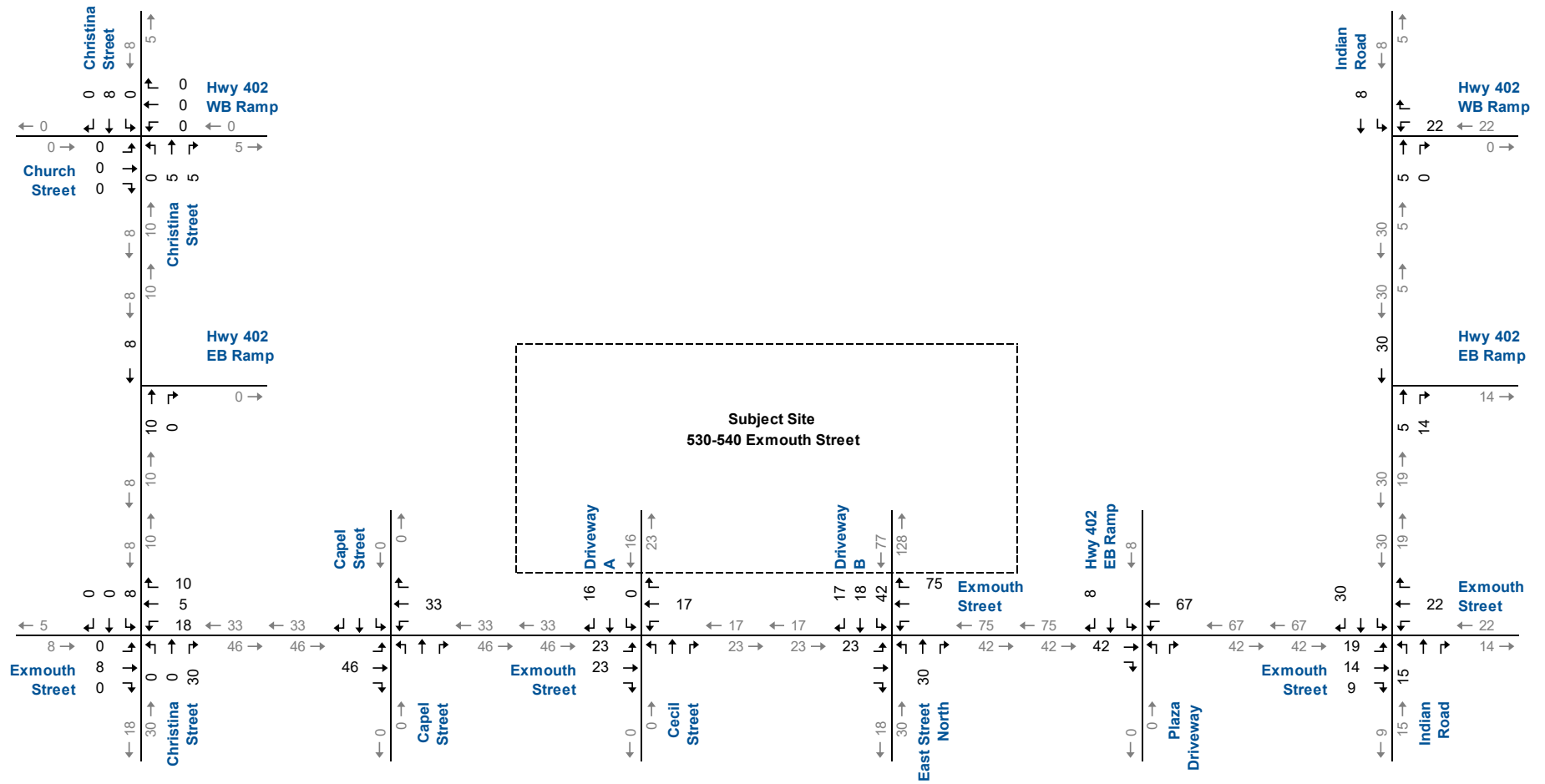
**TABLE 3.2: ESTIMATED TRIP DISTRIBUTION**

<b>Origin/Destination</b>	<b>Distribution</b>
North via Christina Street	5%
North via Indian Road	5%
South via Christina Street	20%
South via East Street North	20%
South via Indian Road	10%
East via Highway 402	15%
East via Exmouth Street	15%
West via Highway 402	5%
West via Exmouth Street	5%
<b>Total</b>	<b>100%</b>

**Figure 3.2a** and **Figure 3.2b** illustrate the site-generated traffic volumes for the AM and PM peak hours, respectively.



**AM Peak Hour**



**Site Generated Traffic Volumes  
AM Peak Hour**



## 4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes, and the analyses for the traffic conditions five years (2038) and ten years from development completion (2043).

### 4.1 Background Traffic Forecasts

In order to derive the generalized background traffic volumes, a growth rate of 2.0% per annum was applied to the existing roadway traffic volumes. This growth rate was confirmed with MTO and the City during the pre-study consultation.

#### 4.1.1 Other Area Developments

The following developments have been included in estimating background traffic volumes:

- ▶ 200 Exmouth Street: A mixed-use development bounded by Exmouth Street to the south, Highway 402 to the north, Christina Street North to the east and Front Street North to the west. A TIS was prepared in February 2024<sup>8</sup> which indicated the development is forecast to generate 638 AM peak hour trips and 739 PM peak hour trips.
- ▶ Exmouth Street Residential Development: A residential development of 156 townhouse units and 90 apartment units proposed on the north side of Exmouth Street west of Harbour Road. A TIS was prepared for the property in June 2022<sup>9</sup> which indicated the development is forecast to generate 129 AM peak hour trips and 151 PM peak hour trips.
- ▶ 135 Water Street: A mixed-use development of 100 units and 740-sq. ft. convenience market proposed on the west side of Water Street between Nelson Street and Maxwell Street. A TIS was prepared for the property in July 2019<sup>10</sup> which indicated the development is forecast to generate 111 AM peak hour trips and 102 PM peak hour trips.

**Figure 4.1** illustrates the location of the background developments.

<sup>8</sup> Paradigm Transportation Solutions Limited, *200 Exmouth Street, Point Edward Transportation Impact Study*, February 2024.

<sup>9</sup> Paradigm Transportation Solutions Limited, *Exmouth Street Residential Development Transportation Impact Study*, June 2022.

<sup>10</sup> Baird Architecture and Engineering, *Traffic Impact Study 135 Water Street Sarnia Ontario*, July 2019.



**Appendix D** contains the traffic volumes for each background development.







## Other Area Development Locations

530-540 Exmouth Street, Sarnia TIA  
230751

Figure 4.1

## 4.2 2038 Traffic Forecasts

### 4.2.1 Background Traffic Operations

**Figure 4.2a** and **Figure 4.2b** illustrate the 2038 background traffic volumes, including road traffic growth and other area development traffic.

The 2038 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

**Table 4.1** summarizes the results of the 2038 background traffic operations. The results indicate that the study area intersections are forecast to operate at similar levels of service as under base year traffic conditions, with the following additional critical movements:

- ▶ Christina Street and Highway 402 WB Ramp/Church Street
  - the westbound shared through/left-turn movement is forecast to operate at LOS D with a v/c ratio of 0.75 during the AM peak hour and a v/c ratio greater than 0.75 during the PM peak hour;
- ▶ Christina Street and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 40 metres during the PM peak hour;
  - the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;
- ▶ Capel Street and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;
- ▶ Cecil Street/ Driveway A and Exmouth Street
  - the northbound movement is forecast to operate at LOS F during the PM peak hour;
  - the southbound movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;
- ▶ East Street North/ Driveway B and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is project to exceed the existing storage of 20 metres during the PM peak hour;



▶ Indian Road and Exmouth Street

- the eastbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;
- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and
- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 30 metres during the AM and PM peak hours.

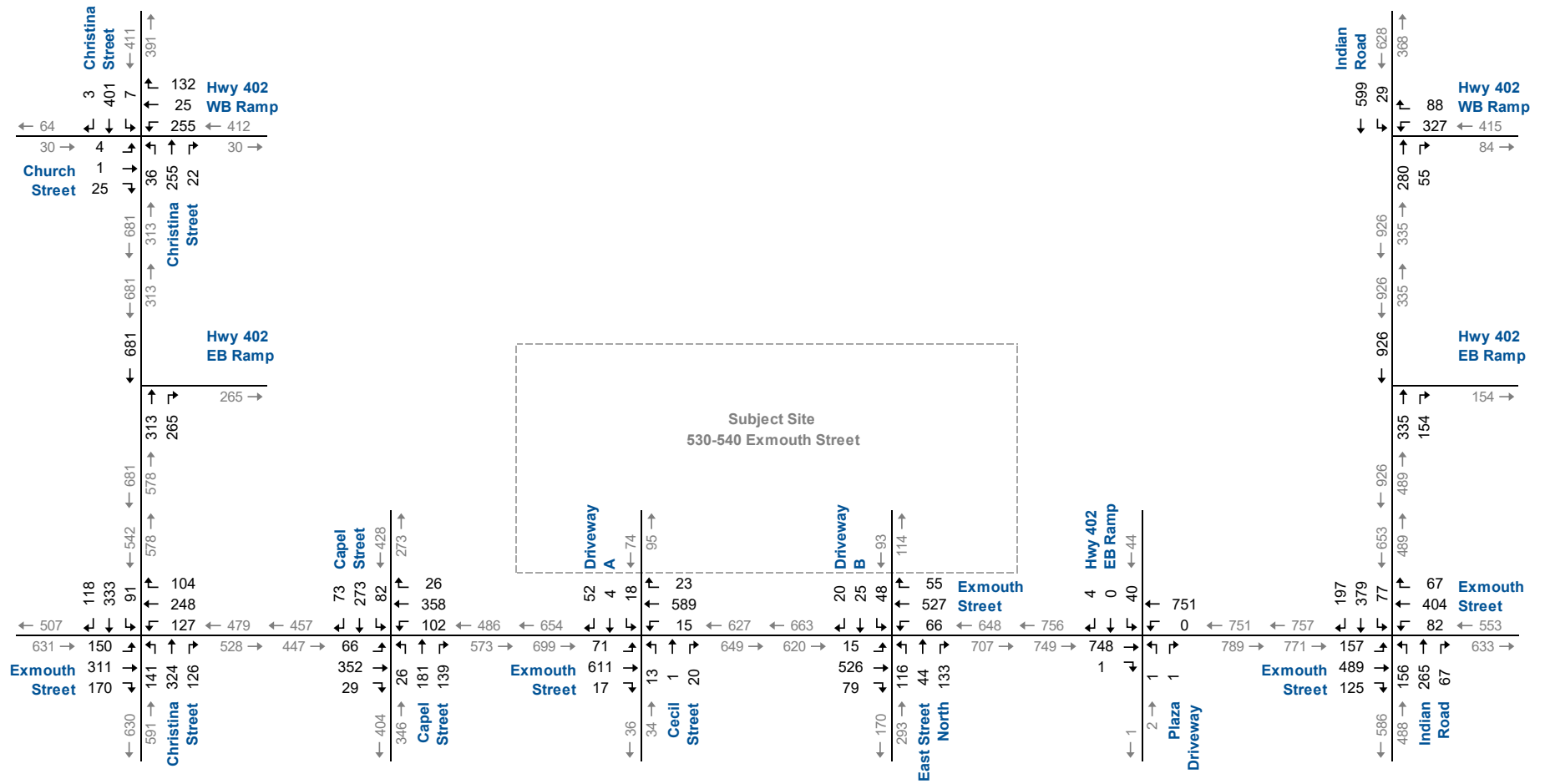
It is noted that the southbound (outbound) movement at Cecil Street/Driveway A and Exmouth Street is forecast to theoretically operate over-capacity during the PM peak hour. High delays and v/c ratios are common at side-street stop control movements on five-lane arterial roadways. The outbound traffic volumes at the driveway have the option to use the traffic signal at Driveway B via internal roadways.

**Appendix E** contains the supporting detailed Synchro 11 reports.





**AM Peak Hour**

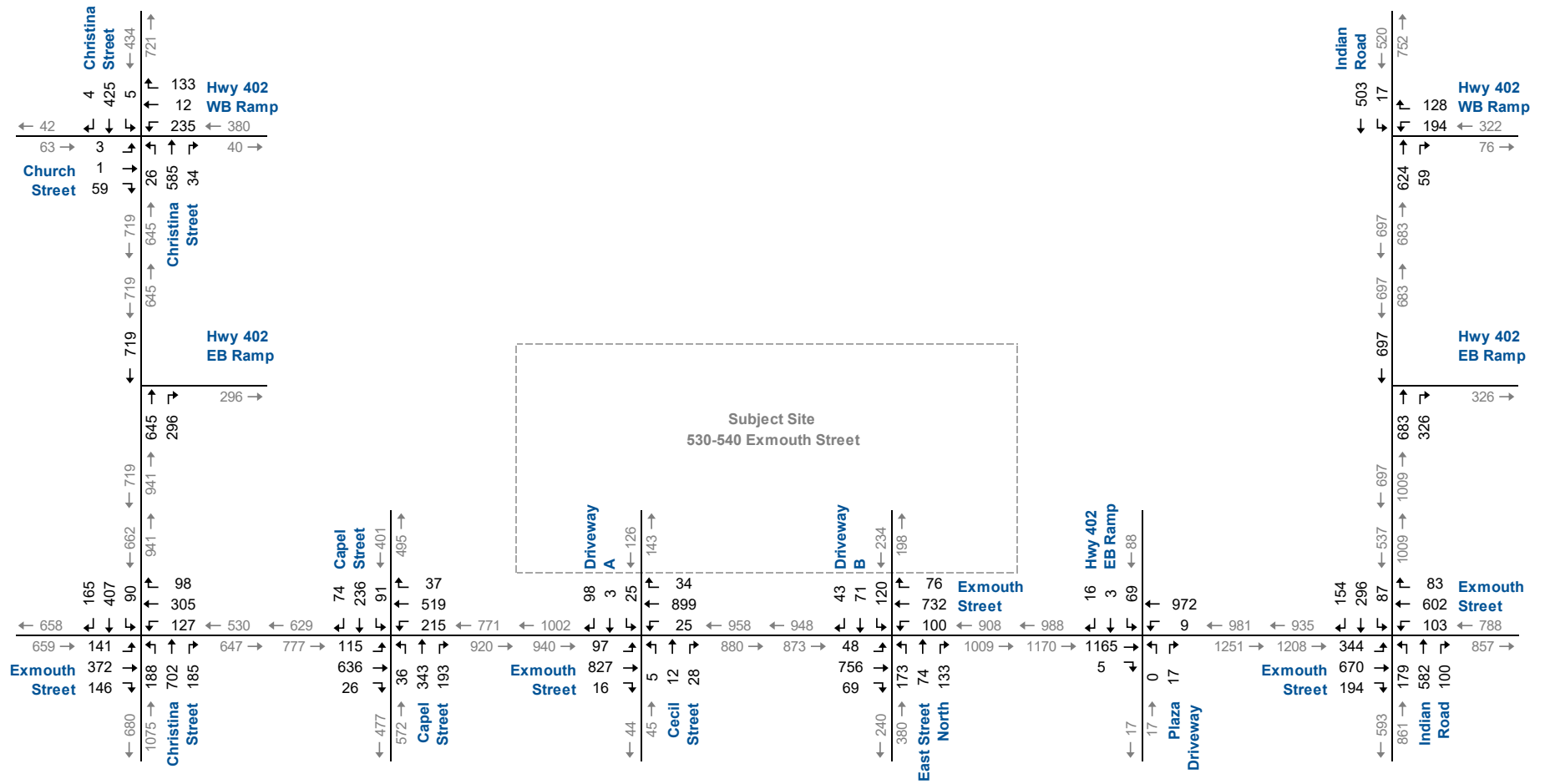


# 2038 Background Traffic Volumes AM Peak Hour

530-540 Exmouth Street, Sarnia TIA  
230751

Figure 4.2a

**PM Peak Hour**



**2038 Background Traffic Volumes  
PM Peak Hour**

**Figure 4.2b**

**TABLE 4.1A: 2038 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR**

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	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < < < < <	C 20 >	>	C 20	<	<	<	<	D 44	A 6	C 32	C 21	B 18	A 0	B 17	B 15	B 16	>	>	B 16	C 22
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < < < < <	<	<	<	<	C 29	0.72	A 5	0.19	C 24	<	B 14	>	B 14	A 8	B 12	>	>	B 12	B 16	
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < < < < <	A 0 >	>	A 0	A 0	<	A 0	<	C 15	>	C 15	<	C 15	>	C 15	C 22	>	>	C 22	>	
	Christina Street & Exmouth Street	TCS	LOS Delay < < < < <	B 18 >	>	B 18	B 17	>	B 17	<	B 17	>	B 17	B 18	B 12	>	B 13	B 15	B 12	>	>	B 12	B 15
	Capel Street & Exmouth Street	TCS	LOS Delay A 7 >	B 15 >	>	B 14	A 7	B 15	>	B 14	C 23	C 25	A 6	B 17	C 26	C 30	A 5	C 25	C 17	>	>	C 25	B 17
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay A 10 >	A 0 >	>	A 1	A 9	A 0	>	A 0	<	C 25	>	C 25	<	C 22	>	C 22	C 22	>	>	C 22	>
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay B 13 >	B 13 >	>	B 13	B 16	B 14	>	B 14	C 28	B 10	>	B 17	B 12	B 13	A 3	B 10	B 14	>	>	B 10	B 14
	Indian Road & Exmouth Street	TCS	LOS Delay B 20 >	C 27 >	>	C 26	B 17	C 27	>	C 25	C 20	C 25	A 0	C 20	B 16	C 28	A 6	B 20	C 23	>	>	B 20	C 23

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement

**TABLE 4.1B: 2038 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR**

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																								
PM Peak Hour	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < 7 > A 7	< A >	< 0.14 >	< 9 >	< - >	< - >	< - >	< 43 >	< 5 >	< 0.28 >	< 65 >	< 12 >	< 80 >	< 68 >	< 14 >	< 14 >	< 0 >	< 13 >	< 9 >	< 11 >	< 2 >	< 34 >	< 60 >	< 58 >	< 11 >	< 16 >															
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < - >	< - >	< - >	< - >	< - >	< - >	< 26 >	< 0.56 >	< 39 >	< - >	< - >	< - >	< - >	< - >	< 6 >	< 12 >	< 0.42 >	< 55 >	< - >	< - >	< 6 >	< 8 >	< 3 >	< 29 >	< 90 >	< 87 >	< 8 >	< 12 >													
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < 0 > A 0	< 0.00 >	< 0 >	< - >	< - >	< 12 >	< 0 >	< 0.02 >	< 0.00 >	< 1 >	< 0 >	< 15 >	< - >	< - >	< - >	< 15 >	< C >	< 15 >	< 0.05 >	< 2 >	< - >	< - >	< 46 >	< 21 >	< - >	< - >	< 46 >	< 20 >													
	Christina Street & Exmouth Street	TCS	LOS Delay < 20 > B 20	< 0.72 >	< 54 >	< - >	< - >	< 20 >	< 18 >	< 0.66 >	< 44 >	< - >	< - >	< - >	< - >	< - >	< 34 >	< 18 >	< 0.71 >	< 61 >	< 80 >	< - >	< - >	< - >	< 44 >	< 38 >	< 44 >	< 25 >	< -13 >	< 14 >	< 20 >												
	Capel Street & Exmouth Street	TCS	LOS Delay 9 21 > B 19	< 0.22 >	< 0.55 >	< 16 >	< 68 >	< 29 >	< 53 >	< 20 >	< - >	< - >	< - >	< 40 >	< - >	< 30 >	< 18 >	< 22 >	< 34 >	< 8 >	< 0.38 >	< 34 >	< 19 >	< 30 >	< 11 >	< 46 >	< 27 >	< 5 >	< 27 >	< 21 >													
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay 12 0 > A 1	< 0.16 >	< 0.00 >	< 4 >	< 0 >	< 15 >	< 11 >	< 0.04 >	< 0.00 >	< 1 >	< 0 >	< 15 >	< - >	< 14 >	< - >	< 10 >	< 0 >	< 0.56 >	< 19 >	< - >	< - >	< - >	< 176 >	< 1.10 >	< 60 >	< - >	< - >	< 176 >	< 20 >												
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay 20 18 > B 18	< 0.27 >	< 0.59 >	< 15 >	< 80 >	< 20 >	< 5 >	< 0.59 >	< 0.58 >	< 40 >	< 78 >	< 20 >	< - >	< -20 >	< 33 >	< 15 >	< 0.58 >	< 44 >	< 31 >	< - >	< - >	< 45 >	< - >	< 1 >	< 22 >	< 32 >	< 3 >	< 23 >	< 13 >	< 13 >	< 4 >	< 0.08 >	< 20 >	< 14 >	< 5 >	< 35 >	< - >	< 30 >	< 12 >	< 19 >	
	Indian Road & Exmouth Street	TCS	LOS Delay 172 32 > E 72	< 1.28 >	< 0.78 >	< 121 >	< 107 >	< 25 >	< -96 >	< 0.46 >	< 0.67 >	< 21 >	< 82 >	< 30 >	< - >	< 9 >	< 22 >	< 32 >	< 0.46 >	< 0.59 >	< 0.19 >	< 40 >	< 76 >	< 6 >	< 30 >	< - >	< -10 >	< 22 >	< 3 >	< 26 >	< 20 >	< 28 >	< 6 >	< 0.31 >	< 0.33 >	< 0.31 >	< 21 >	< 38 >	< 15 >	< 50 >	< - >	< 35 >	< 21 >

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



## 4.2.2 Total Traffic Operations

**Figure 4.3a** and **Figure 4.3b** illustrate the 2038 total traffic volumes, including trips generated by the proposed development.

The 2038 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

**Table 4.2** summarizes the results of the 2038 total traffic operations. The results indicate that the study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions.

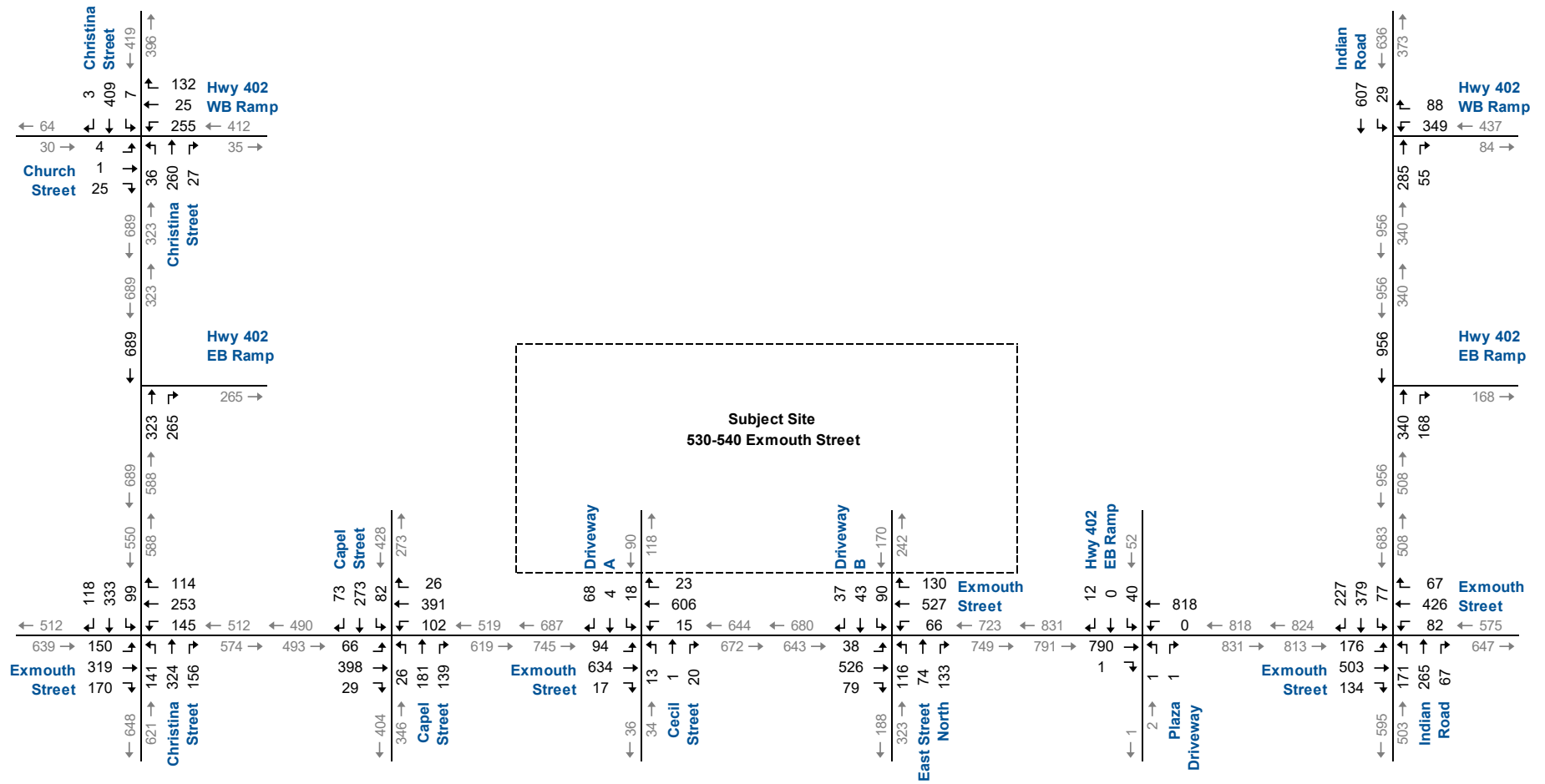
As noted in **Section 4.2.2**, the southbound (outbound) movement at Cecil Street/Driveway A and Exmouth Street is forecast to theoretically operate over-capacity during the PM peak hour. The southbound (outbound) movements at East Street North/Driveway B and Exmouth Street are forecast to operate at LOS A/B and within capacity on all movements during the PM peak hour. Outbound site traffic volumes will likely use Driveway B if the projected delays at Driveway A are realized.

**Appendix F** contains the supporting detailed Synchro 11 reports.





**AM Peak Hour**

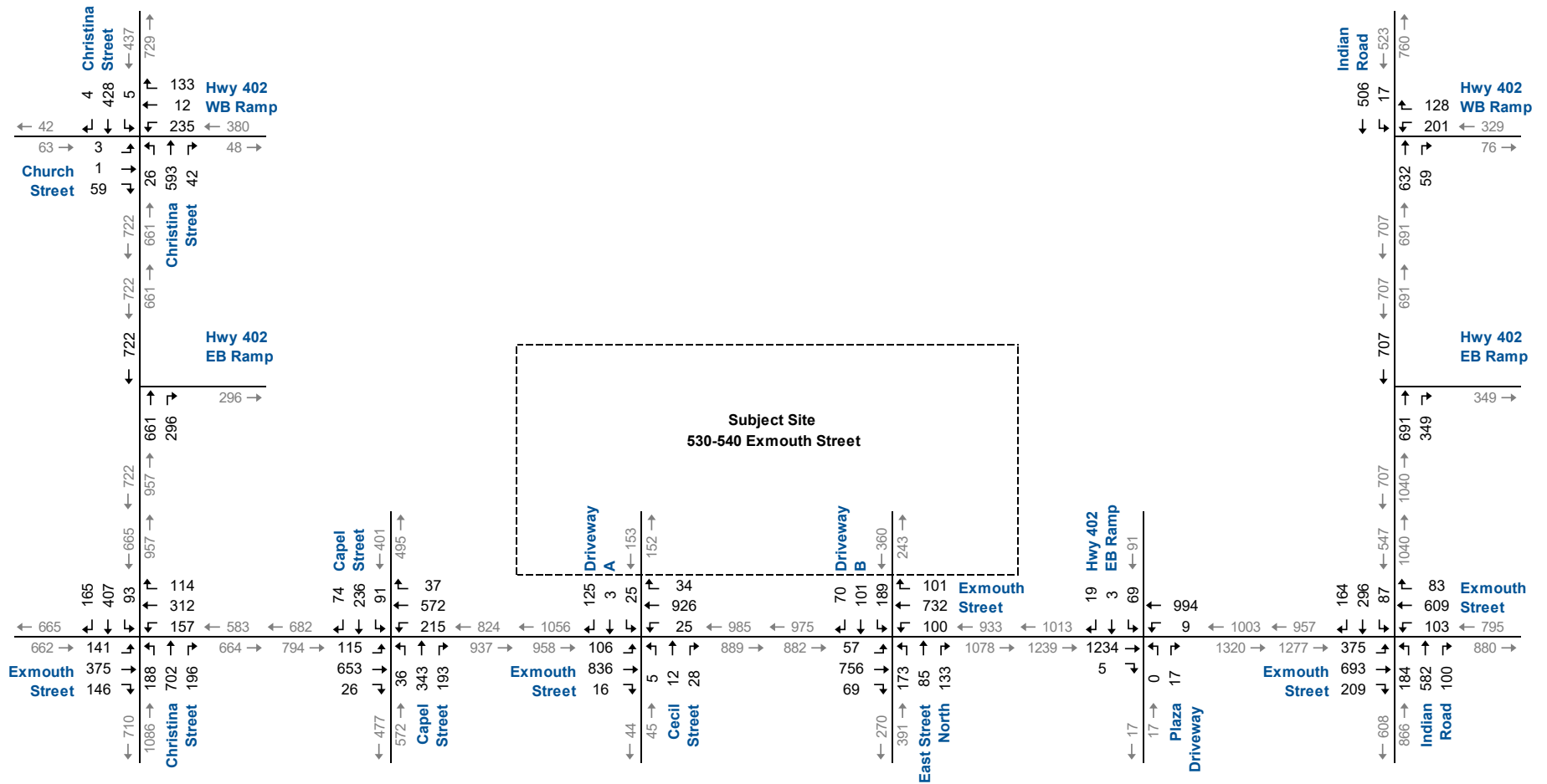


**2038 Total Traffic Volumes  
AM Peak Hour**

530-540 Exmouth Street, Samia TIA  
230751

**Figure 4.3a**

**PM Peak Hour**



**2038 Total Traffic Volumes  
PM Peak Hour**

**TABLE 4.2A: 2038 TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR**

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	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < < < < <	C 20	>	C 20	<	D 44	A 6	C 32	C 21	B 18	A 0	B 17	B 15	B 16	>	B 16	C 22	
	V/C	<	0.15	>	<	0.75	0.31	<	0.09	0.17	0.03	<	0.01	0.26	>	>	>	>	>	
	Q	<	10	>	<	85	13	<	15	35	0	<	4	46	>	>	>	>	>	
	Stor.	<	-	>	<	-	80	<	25	-	30	<	60	-	>	>	>	>	>	
	Avail.	<	-	>	<	-	67	<	10	-	30	<	56	-	>	>	>	>	>	
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay				C 30	A 0.74	A 5	C 25	B 14	B 14	>	B 14	A 9	B 13	>	B 12	B 17	
	V/C																			
	Q																			
Stor.																				
Avail.																				
Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay		A 0	>	A 0	A 0		A 0	<	C 16	>	C 16	C 23		>	>	C 23		
V/C				0.00	>	0.00	0.00		<	0.01	>	<	0.22	>	>	>	>	>	>	
Q				0	>	0	0		<	0	>	<	6	>	>	>	>	>	>	
Stor.				-	>	-	15	>	<	-	>	<	-	>	>	>	>	>	>	
Avail.				-	>	-	15	>	<	-	>	<	-	>	>	>	>	>	>	
Christina Street & Exmouth Street	TCS	LOS Delay	<	B 19	>	B 19	<	B 18	>	B 18	B 19	B 12	>	B 13	B 17	B 12	>	B 13	B 16	
V/C	<	0.70	>	<	0.64	>	<	0.42	0.36	>	<	0.31	0.34	>	>	>	>	>	>	
Q	<	52	>	<	41	>	<	32	33	>	<	23	33	>	>	>	>	>	>	
Stor.	<	-	>	<	-	>	<	40	-	>	<	25	-	>	>	>	>	>	>	
Avail.	<	-	>	<	-	>	<	8	-	>	<	2	-	>	>	>	>	>	>	
Capel Street & Exmouth Street	TCS	LOS Delay	A 7	B 16	>	B 14	A 7	B 16	>	B 14	C 23	C 25	A 6	B 17	C 26	C 30	A 5	C 25	B 17	
V/C	0.12	0.32	>	0.18	0.32	>	0.14	0.41	0.29	>	0.33	0.62	0.17	>	>	>	>	>	>	
Q	10	39	>	14	38	>	9	41	12	>	23	62	7	>	>	>	>	>	>	
Stor.	40	-	>	20	-	>	30	-	30	>	25	-	25	>	>	>	>	>	>	
Avail.	30	-	>	6	-	>	21	-	18	>	2	-	18	>	>	>	>	>	>	
Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay	A 10	A 0	>	A 1	A 9	A 0	>	A 0	<	D 29	>	D 29	<	C 24	>	C 24		
V/C	0.12	0.00	>	0.02	0.00	>	<	0.20	>	<	0.34	>	<	0.11	>	>	>	>	>	
Q	3	0	>	1	0	>	<	5	>	<	11	>	<	-	>	>	>	>	>	
Stor.	15	-	>	15	-	>	<	-	>	<	-	>	<	-	>	>	>	>	>	
Avail.	12	-	>	14	-	>	<	-	>	<	-	>	<	-	>	>	>	>	>	
East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay	B 15	B 15	>	B 15	B 17	B 15	>	B 15	C 29	B 16	>	C 21	B 13	B 13	A 5	B 12	B 16	
V/C	0.15	0.43	>	0.25	0.48	>	0.41	0.48	>	0.22	0.06	0.09	>	>	>	>	>	>	>	
Q	10	48	>	16	52	>	31	32	>	16	10	5	>	>	>	>	>	>	>	
Stor.	20	-	>	20	-	>	45	-	>	35	-	35	>	>	>	>	>	>	>	
Avail.	10	-	>	4	-	>	14	-	>	19	-	30	>	>	>	>	>	>	>	
Indian Road & Exmouth Street	TCS	LOS Delay	C 21	C 28	>	C 26	B 17	C 27	>	C 26	C 21	C 26	A 0	C 21	B 16	C 28	A 6	B 19	C 23	
V/C	0.53	0.62	>	0.28	0.53	>	0.47	0.27	0.12	>	0.18	0.42	0.40	>	>	>	>	>	>	
Q	34	74	>	18	57	>	37	34	0	>	18	48	18	>	>	>	>	>	>	
Stor.	25	-	>	30	-	>	30	-	30	>	50	-	50	>	>	>	>	>	>	
Avail.	-9	-	>	12	-	>	-7	-	30	>	32	-	32	>	>	>	>	>	>	

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



**TABLE 4.2B: 2038 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR**

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	
PM Peak Hour	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < < < < <	A 7 >	> A 7	< < < < <	D 43 >	A 5 >	C 30	B 14 >	B 14 >	A 0 >	B 13	A 9 >	B 11 >	> B 11	B 16			
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < < < < <	< < < < <	< < < < <	C 27 >	A 6 >	B 19	< < < < <	B 12 >	> B 12	< < < < <	A 6 >	A 9 >	> A 9	B 12				
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < < < < <	A 0 >	B 13 >	A 0	< < < < <	C 16 >	F 50 >	> F 50	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <			
	Christina Street & Exmouth Street	TCS	LOS Delay < < < < <	B 20 >	> B 20	< < < < <	B 20 >	B 20	D 38 >	C 20 >	> C 24	< < < < <	E 58 >	B 15 >	> B 15	C 21	C 21			
	Capel Street & Exmouth Street	TCS	LOS Delay < < < < <	A 9 >	C 21 >	B 20	B 12 >	B 18 >	B 16	C 22 >	C 34 >	A 8 >	C 24	D 46 >	C 27 >	A 5 >	C 27	C 21		
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay < < < < <	B 12 >	A 0 >	A 1	B 10 >	A 0 >	A 0	< < < < <	F 106 >	> F 106	< < < < <	F 250 >	> F 250	< < < < <	F 250			
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay < < < < <	C 25 >	B 20 >	C 20	D 42 >	B 20 >	C 22	C 35 >	B 17 >	> C 25	< < < < <	B 15 >	B 13 >	A 6 >	B 13	C 21		
	Indian Road & Exmouth Street	TCS	LOS Delay < < < < <	F 33 >	C 88 >	C 21 >	C 30 >	C 21 >	C 29	C 23 >	C 32 >	A 3 >	C 26	B 20 >	C 28 >	A 6 >	C 20	D 49		
			V/C < < < < <	0.14 >	> 0.79	0.28 >	0.06 >	0.35 >	0.05 >	0.01 >	0.25 >	> 0.01	0.01 >	0.25 >	> 0.01	0.25 >	> 0.01			
			Q < < < < <	9 >	> 65	12 >	9 >	60 >	1 >	2 >	34 >	> 2	34 >	> 2	34 >	> 2	34 >			
			Stor. < < < < <	- >	- >	80 >	25 >	- >	30 >	60 >	- >	29 >	60 >	- >	58 >	- >	60 >			
			Avail. < < < < <	- >	- >	68 >	16 >	- >	29 >	58 >	- >	29 >	58 >	- >	29 >	- >	58 >			
			LOS Delay < < < < <	A 0 >	B 13 >	A 0	< < < < <	C 16 >	F 50 >	> F 50	< < < < <	E 50 >	B 15 >	> B 15	C 21	C 21				
			V/C < < < < <	0.00 >	0.02 >	0.00 >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Q < < < < <	0 >	1 >	0 >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Stor. < < < < <	- >	15 >	0 >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Avail. < < < < <	- >	14 >	- >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			LOS Delay < < < < <	A 21 >	C 20 >	B 12 >	B 18 >	B 16	C 22 >	C 34 >	A 8 >	C 24	D 46 >	C 27 >	A 5 >	C 27	C 21			
			V/C < < < < <	0.24 >	0.57 >	0.50 >	0.45 >	0.15 >	0.74 >	0.38 >	0.66 >	0.51 >	0.16 >	0.66 >	0.51 >	0.16 >	0.66 >			
			Q < < < < <	16 >	70 >	29 >	59 >	12 >	80 >	19 >	34 >	54 >	8 >	34 >	54 >	8 >	34 >			
			Stor. < < < < <	40 >	- >	20 >	- >	30 >	- >	30 >	25 >	- >	25 >	- >	25 >	- >	25 >			
			Avail. < < < < <	24 >	- >	-9 >	- >	18 >	- >	11 >	-9 >	- >	17 >	-9 >	- >	17 >	-9 >			
			LOS Delay < < < < <	B 12 >	A 0 >	A 1	B 10 >	A 0 >	A 0	< < < < <	F 106 >	> F 106	< < < < <	F 250 >	> F 250	< < < < <	F 250			
			V/C < < < < <	0.18 >	0.00 >	0.04 >	0.00 >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Q < < < < <	5 >	0 >	1 >	0 >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Stor. < < < < <	15 >	- >	15 >	- >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			Avail. < < < < <	10 >	- >	14 >	- >	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <	< < < < <				
			LOS Delay < < < < <	C 25 >	B 20 >	C 20	D 42 >	B 20 >	C 22	C 35 >	B 17 >	> C 25	< < < < <	B 15 >	B 13 >	A 6 >	B 13	C 21		
			V/C < < < < <	0.38 >	0.62 >	0.66 >	0.63 >	0.62 >	0.49 >	0.43 >	0.14 >	0.13 >	0.38 >	0.43 >	0.14 >	0.13 >	0.38 >			
			Q < < < < <	19 >	81 >	42 >	82 >	45 >	36 >	31 >	18 >	9 >	31 >	18 >	9 >	31 >				
			Stor. < < < < <	20 >	- >	20 >	- >	45 >	- >	35 >	- >	35 >	- >	35 >	- >	35 >				
			Avail. < < < < <	1 >	- >	-22 >	- >	0 >	- >	4 >	- >	26 >	4 >	- >	26 >	4 >				
			LOS Delay < < < < <	F 33 >	C 88 >	C 21 >	C 30 >	C 21 >	C 29	C 23 >	C 32 >	A 3 >	C 26	B 20 >	C 28 >	A 6 >	C 20	D 49		
			V/C < < < < <	1.40 >	0.81 >	0.48 >	0.67 >	0.47 >	0.59 >	0.19 >	0.31 >	0.33 >	0.32 >	0.31 >	0.33 >	0.32 >	0.31 >			
			Q < < < < <	138 >	116 >	21 >	82 >	41 >	76 >	6 >	21 >	38 >	16 >	21 >	38 >	16 >	21 >			
			Stor. < < < < <	25 >	- >	30 >	- >	30 >	- >	50 >	- >	50 >	- >	50 >	- >	50 >				
			Avail. < < < < <	-113 >	- >	9 >	- >	-11 >	- >	24 >	- >	34 >	- >	34 >	- >	34 >				

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



### 4.2.3 MTO Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2038 background and total traffic conditions were carried out at the Highway 402 Ramp intersections with Christina Street and Indian Road, similar to the analysis under base year traffic conditions.

The queue analysis has been conducted using the same methodology as under base year traffic conditions.

**Table 4.3a** and **Table 4.3b** summarize the results of the queue length analysis for 2038 background and total traffic conditions. The results indicate that no queueing issues are forecast to occur at the two intersections, except for the westbound left-turn movement at the Highway 402 Westbound Ramp and Indian Road intersection, which is projected to exceed the existing storage of 85 metres under 2038 background and total traffic conditions.

It is noted that the Synchro 11 analysis in **Section 4.2.1** and **Section 4.2.2** did not identify this queueing issue.



**TABLE 4.3A: 2038 THROUGH AND LEFT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Lane	# of Lanes	Cycle Length (s)		Volumes (vph)		m <sub>i</sub> max	Calc'd Length per Lane (m)	Available Length (m)	
				AM	PM	AM	PM				
2038 Background	Hwy 402 WB Ramp & Christina Street	EBLTR	1	110	110	30	61	1.9	30.0	-	
		WBLT	1			285	246	8.7	105.0	-	
		NBL	1			36	25	1.1	22.5	25	
		NBT	2			133	285	8.7	105.0	-	
		SBL	1			7	5	0.2	7.5	60	
		SBT	1			243	248	7.6	90.0	-	
		SBTR	1			167	170	5.2	67.5	-	
	Hwy 402 WB Ramp & Indian Road	WBL	1	75	75	335	148	7.0	90.0	85*	
		NBT	2			145	313	6.5	82.5	-	
		SBL	1			29	17	0.6	15.0	90	
		SBT	2			303	253	6.3	82.5	-	
	2038 Total	Hwy 402 WB Ramp & Christina Street	EBLTR	1	110	110	30	61	1.9	30.0	-
			WBLT	1			285	246	8.7	105.0	-
			NBL	1			36	25	1.1	22.5	25
NBT			2	135			289	8.8	105.0	-	
SBL			1	7			5	0.2	7.5	60	
SBT			1	248			250	7.6	90.0	-	
SBTR			1	170			171	5.2	67.5	-	
Hwy 402 WB Ramp & Indian Road		WBL	1	75	75	358	156	7.5	90.0	85*	
		NBT	2			147	317	6.6	82.5	-	
		SBL	1			29	17	0.6	15.0	90	
		SBT	2			307	254	6.4	82.5	-	

\* Calculated length extends beyond length of storage

**TABLE 4.3B: 2038 RIGHT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Movement	Cycle Length (s)		Right Turn Volume		Average Arrival		Calc'd Length (m)		Existing Storage (m)
			AM	PM	AM	PM	AM	PM	AM	PM	
2038 Background	Hwy 402 WB Ramp & Christina Street	WBR	110	110	140	133	4.3	4.1	48.4	46.1	80
		NBR			22	33	0.7	1	7.9	11.3	30
2038 Total	Hwy 402 WB Ramp & Christina Street	WBR	110	110	140	133	4.3	4.1	48.4	46.1	80
		NBR			27	41	0.8	1.3	9.0	14.6	30



## 4.3 2043 Traffic Forecasts

### 4.3.1 Background Traffic Operations

**Figure 4.4a** and **Figure 4.4b** illustrate the 2043 background traffic volumes, including road traffic growth and other area development traffic.

The 2043 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

**Table 4.4** summarizes the results of the 2043 background traffic operations. The results indicate that the study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions, with the following additional critical movements:

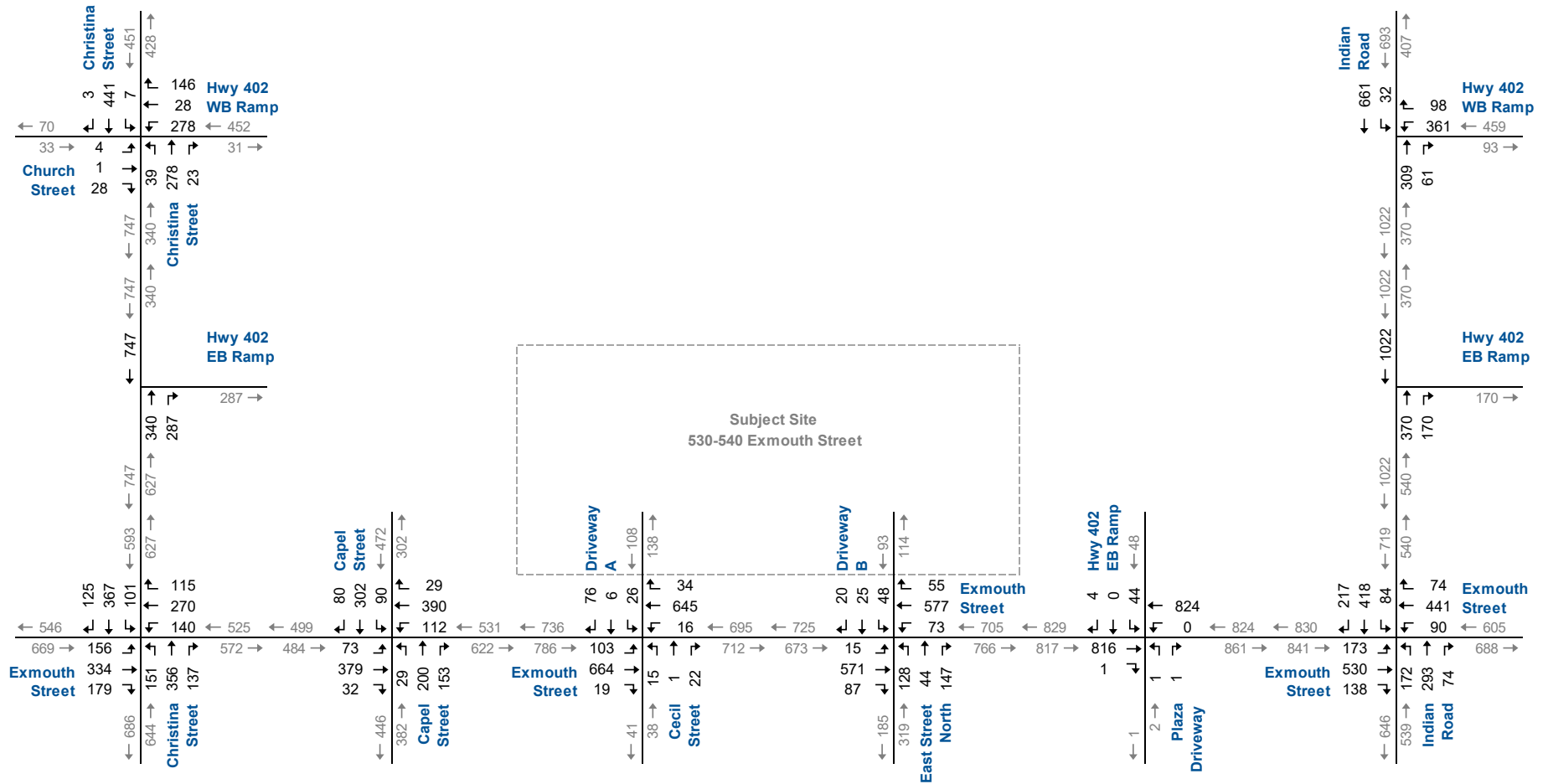
- ▶ Christina Street and Exmouth Street
  - the southbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;
- ▶ East Street North/ Driveway B and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 45 during the PM peak hour; and
- ▶ Indian Road and Exmouth Street
  - the eastbound shared through/right-turn movement is forecast to operate at LOS D with a v/c ratio greater than 0.85 during the PM peak hour.

The Site Driveway intersections on Exmouth Street are forecast to operate at similar levels of service as under 2038 background traffic conditions.

**Appendix G** contains the supporting detailed Synchro 11 reports.



**AM Peak Hour**

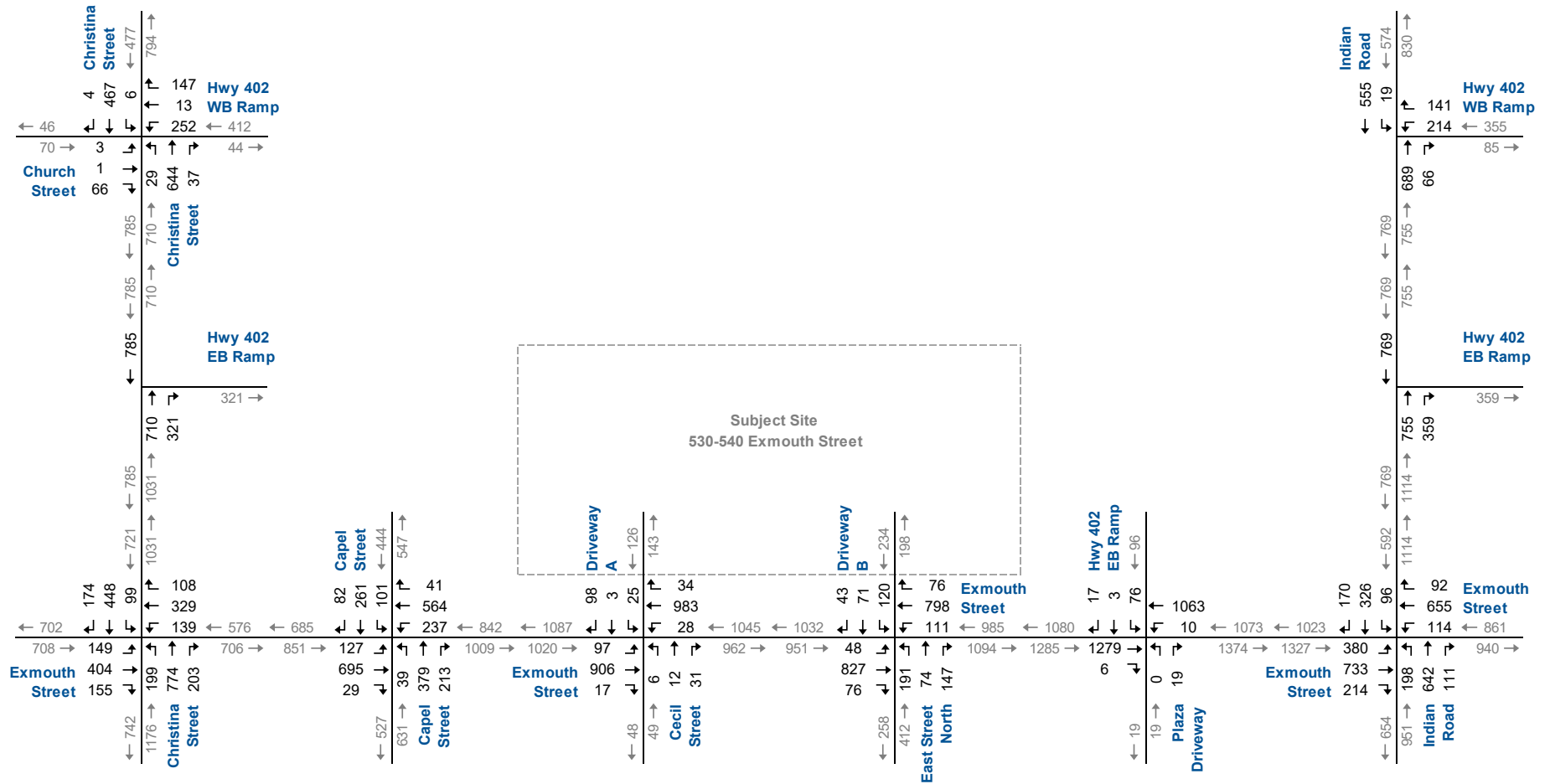


**2043 Background Traffic Volumes  
AM Peak Hour**

**Figure 4.4a**



**PM Peak Hour**



**2043 Background Traffic Volumes  
PM Peak Hour**

**TABLE 4.4A: 2043 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR**

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	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < 20 > C 20 V/C < 0.16 > Q < 11 > Stor. < - > Avail. < - >	< C > 20	< 46 > 7	A 33	C 22	B 19	A 0	B 18	B 16	B 17	> B > 17	C 23						
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < 30 > C 25 V/C < 0.75 > Q < 72 > Stor. < - > Avail. < - >	C 30	A 5	C 25	B 15	> B > 15	A 9	B 13	> B > 13	B 17								
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < 0 > A 0 V/C < 0.00 > Q < 0 > Stor. < - > Avail. < - >	A 0	A 0	A 0	< C > 16	> C > 16	C 25	> C > 25	B 17									
	Christina Street & Exmouth Street	TCS	LOS Delay < 20 > B 20 V/C < 0.73 > Q < 55 > Stor. < - > Avail. < - >	< B > 20	< 18 > > B 18	C 21	B 13	> B > 15	B 18	B 13	> B > 14	B 17								
	Capel Street & Exmouth Street	TCS	LOS Delay < 8 > A 15 V/C < 0.13 0.31 > Q < 11 39 > Stor. < 40 - > Avail. < 29 - >	A 8	B 16	B 15	A 23	B 26	A 6	B 17	C 27	C 31	A 5	C 26	B 18					
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay < 10 > B 1 V/C < 0.14 0.00 > Q < 4 0 > Stor. < 15 - > Avail. < 11 - >	B 10	A 0	A 1	A 9	A 0	> A > 0	< E > 37	> E > 37	< E > 38	> E > 38	E 38						
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay < 14 > B 14 V/C < 0.05 0.44 > Q < 5 54 > Stor. < 20 - > Avail. < 15 - >	B 14	B 14	B 14	C 28	B 10	> B > 17	B 12	B 13	A 3	B 10	B 15						
	Indian Road & Exmouth Street	TCS	LOS Delay < 21 > C 27 V/C < 0.53 0.64 > Q < 34 78 > Stor. < 25 - > Avail. < -9 - >	C 27	B 17	C 26	C 22	C 26	A 0	C 22	B 17	C 29	A 6	C 21	C 24					

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



**TABLE 4.4B: 2043 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR**

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	
PM Peak Hour	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < < < < <	A 7 >	>	A 7	<	D 45 >	A 5 >	C 31	B 15 >	B 15 >	A 0 >	B 14	A 9 >	B 12 >	>	B 12	B 17	
	V/C	0.15	>	<	0.82	0.30	>	0.07	0.39	0.05	>	0.01	0.27	>	>	>	>	>	>	
	Q	9	>	<	71	13	>	10	66	0	>	2	37	>	>	>	>	>	>	
	Stor.	-	>	<	-	80	>	25	-	30	>	60	-	>	>	>	>	>	>	
	Avail.	-	>	<	-	67	>	15	-	30	>	58	-	>	>	>	>	>	>	
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay				C 27 >	A 6 >	B 19	B 12 >	>	A 6 >	A 9 >	>	A 9	A 12 >	>	A 9	B 12	
	V/C				0.59	0.32	>	0.47	>	0.04	0.32	>	4	33	>	90	-	>	86	
	Q				43	12	>	64	>	29	-	>	25	-	>	14	-	>	14	
Stor.				-	-	>	-	>	-	-	>	-	-	>	-	-	>	-		
Avail.				-	-	>	-	>	-	-	>	-	-	>	-	-	>	-		
Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay		A 0 >	>	A 0	B 13 >	A 0 >	A 0	<	C 17 >	>	C 17	F 68 >	>	>	>	F 68		
V/C		0.00	>	0.02	0.00	>	<	0.06	>	0.68	>	29	-	>	25	-	>	25		
Q		0	>	1	0	>	<	2	>	-	>	-	>	-	-	>	-	-		
Stor.		-	>	15	-	>	<	-	>	-	>	-	>	-	-	>	-	-		
Avail.		-	>	14	-	>	<	-	>	-	>	-	>	-	-	>	-	-		
Christina Street & Exmouth Street	TCS	LOS Delay	<	C 21 >	>	C 21	B 20 >	B 20 >	B 20	E 56 >	C 23 >	>	C 28	F 120 >	B 16 >	>	C 30	C 26		
V/C		0.76	>	<	0.71	>	0.86	0.76	>	1.01	0.48	>	51	56	>	25	-	>		
Q		61	>	<	50	>	77	115	>	25	-	>	25	-	>	-	>	-		
Stor.		-	>	<	-	>	40	-	>	-26	-	>	-	-	>	-	>	-		
Avail.		-	>	<	-	>	-37	-	>	-	-	>	-	-	>	-	>	-		
Capel Street & Exmouth Street	TCS	LOS Delay	A 9 >	C 23 >	>	C 21	B 14 >	B 19 >	B 18	C 22 >	D 36 >	A 9 >	C 26	E 72 >	C 27 >	A 5 >	C 34	C 23		
V/C		0.26	0.62	>	0.59	0.45	>	0.17	0.78	0.41	>	0.83	0.55	0.18	>	25	-	25		
Q		18	75	>	32	59	>	13	89	23	>	43	60	9	>	25	-	25		
Stor.		40	-	>	20	-	>	30	-	30	>	25	-	25	>	-	-	16		
Avail.		22	-	>	-12	-	>	17	-	7	>	-18	-	16	>	-	-	16		
Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay	B 12 >	A 0 >	>	A 1	B 10 >	A 0 >	A 0	<	F 150 >	>	F 150	<	F 365 >	>	F 365			
V/C		0.18	0.00	>	0.04	0.00	>	<	0.77	>	<	1.52	>	<	80	>	>	>		
Q		4	0	>	1	0	>	<	27	>	<	80	>	<	-	>	>	>		
Stor.		15	-	>	15	-	>	<	-	>	<	-	>	<	-	>	>	>		
Avail.		11	-	>	14	-	>	<	-	>	<	-	>	<	-	>	>	>		
East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay	C 24 >	C 20 >	>	C 20	E 65 >	B 20 >	C 25	C 33 >	B 14 >	>	C 23	B 13 >	B 12 >	A 5 >	B 12	C 22		
V/C		0.32	0.65	>	0.82	0.63	>	0.62	0.46	>	0.28	0.10	0.08	>	20	14	6	6		
Q		17	95	>	53	91	>	49	32	>	35	-	35	-	35	-	29	29		
Stor.		20	-	>	20	-	>	45	-	>	15	-	29	-	29	-	29	29		
Avail.		3	-	>	-33	-	>	-4	-	>	15	-	29	-	29	-	29	29		
Indian Road & Exmouth Street	TCS	LOS Delay	F 272 >	D 42 >	>	F 108	C 23 >	C 31 >	C 30	C 24 >	C 33 >	A 4 >	C 28	C 21 >	C 29 >	A 6 >	C 21	E 56		
V/C		1.52	0.91	>	0.52	0.71	>	0.53	0.66	0.21	>	0.37	0.36	0.34	>	23	42	16		
Q		146	132	>	23	91	>	44	85	9	>	23	42	16	>	50	-	50		
Stor.		25	-	>	30	-	>	30	-	30	>	50	-	50	>	-	50	50		
Avail.		-121	-	>	7	-	>	-14	-	21	>	27	-	34	>	-	34	34		

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement



### 4.3.2 Total Traffic Operations

**Figure 4.5a** and **Figure 4.5b** illustrate the 2043 total traffic volumes, including trips generated by the proposed development.

The 2043 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

**Table 4.5** summarizes the results of the 2043 total traffic operations. The results indicate that the study area intersections are forecast to operate at similar levels of service as under 2043 background traffic conditions, with the following additional critical movements:

- ▶ Christina Street and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and
- ▶ East Street North/ Driveway B and Exmouth Street
  - the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 20 metres during the PM peak hour.

The Site Driveway intersections on Exmouth Street are forecast to operate at similar levels of service as under 2038 background traffic conditions, with the additional critical inbound movement noted above at Driveway B. The 95<sup>th</sup> percentile queue length is projected to exceed the existing storage by approximately five meters, which is less than one car length. The queueing can be accommodated in the centre two-way left-turn lane.

**Appendix H** contains the supporting detailed Synchro 11 reports.









**TABLE 4.5B: 2043 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR**

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	
PM Peak Hour	Christina Street & Hwy 402 WB Ramp/ Church Street	TCS	LOS Delay < < < < <	A 7 >	> A 7	< < < < <	D 45 >	A 5 >	C 31	B 15 >	B 15 >	A 1 >	B 14	A 9 >	B 12 >	> B 12	B 17			
	Indian Road & Hwy 402 WB Ramp	TCS	LOS Delay < < < < <	< < < < <	< < < < <	C 27 >	A 6 >	B 19	< < < < <	B 13 >	> B 13	< < < < <	A 6 >	A 9 >	> A 9	A 13				
	Hwy 402 EB Ramp/ Plaza Driveway & Exmouth Street	TWSC	LOS Delay < < < < <	A 0 >	> A 0	B 14 >	A 0 >	A 0	< < < < <	C 17 >	> C 17	< < < < <	F 75 >	> F 75	> F 75	F 75				
	Christina Street & Exmouth Street	TCS	LOS Delay < < < < <	C 20 >	> C 20	< < < < <	C 21 >	C 21	E 68 >	C 26 >	> C 26	< < < < <	F 140 >	B 17 >	> B 17	C 34	C 28			
	Capel Street & Exmouth Street	TCS	LOS Delay A 10 >	C 23 >	> C 23	B 15 >	B 19 >	B 18	C 22 >	D 36 >	A 9 >	C 26	E 72 >	C 27 >	A 5 >	C 34	C 23			
	Cecil Street/ Driveway A & Exmouth Street	TWSC	LOS Delay B 13 >	A 0 >	> A 1	B 10 >	A 0 >	A 0	< < < < <	F 197 >	> F 197	< < < < <	F 510 >	F 510 >	> F 510	F 510				
	East Street North/ Driveway B & Exmouth Street	TCS	LOS Delay C 32 >	C 22 >	> C 23	F 87 >	C 22 >	C 29	D 36 >	B 16 >	> B 16	< < < < <	B 15 >	B 13 >	A 8 >	B 13	C 24			
	Indian Road & Exmouth Street	TCS	LOS Delay F 330 >	D 46 >	> F 130	C 23 >	C 31 >	C 30	C 25 >	C 34 >	A 4 >	C 28	C 21 >	C 29 >	A 6 >	C 21	E 64			

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 < / > - Shared with through movement





### 4.3.3 MTO Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2043 background and total traffic conditions were carried out at the Highway 402 Ramp intersections with Christina Street and Indian Road, similar to the analysis under base year traffic conditions.

The queue analysis has been conducted using the same methodology as under base year traffic conditions.

**Table 4.6a** and **Table 4.6b** summarize the results of the queue length analysis for 2043 background and total traffic conditions. The results indicate that the same queueing issues are forecast to occur as under 2038 background and total traffic conditions.



**TABLE 4.6A: 2043 THROUGH AND LEFT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Lane	# of Lanes	Cycle Length (s)		Volumes (vph)		m, max	Calc'd Length per Lane (m)	Available Length (m)				
				AM	PM	AM	PM							
2043 Background	Hwy 402 WB Ramp & Christina Street	EBLTR	1	110	110	33	67	2.0	37.5	-				
		WBLT	1			312	263	9.5	112.5	-				
		NBL	1			39	28	1.2	22.5	25				
		NBT	2			145	313	9.6	112.5	-				
		SBL	1			7	6	0.2	7.5	60				
		SBT	1			267	272	8.3	97.5	-				
		SBTR	1			183	186	5.7	75.0	-				
	Hwy 402 WB Ramp & Indian Road	WBL	1	75	75	370	215	11.3	127.5	85*				
		NBT	2			160	345	10.5	120.0	-				
		SBL	1			32	19	1.0	22.5	90				
		SBT	2			334	279	10.2	120.0	-				
		2043 Total	Hwy 402 WB Ramp & Christina Street			EBLTR	1	110	110	33	67	2.0	37.5	-
						WBLT	1			312	263	9.5	112.5	-
NBL	1			39	28	1.2	22.5			25				
NBT	2			147	317	9.7	112.5			-				
SBL	1			7	6	0.2	7.5			60				
SBT	1			272	274	8.4	97.5			-				
SBTR	1			186	188	5.7	75.0			-				
Hwy 402 WB Ramp & Indian Road	WBL		1	75	75	393	224	12.0	135.0	85*				
	NBT		2			162	349	10.7	120.0	-				
	SBL		1			32	19	1.0	22.5	90				
	SBT		2			338	280	10.3	120.0	-				

\* Calculated extends beyond length of storage

**TABLE 4.6B: 2043 RIGHT-TURN QUEUE ANALYSIS**

Horizon	Intersection	Movement	Cycle Length (s)		Right Turn Volume		Average Arrival		Calc'd Length (m)		Existing Storage (m)
			AM	PM	AM	PM	AM	PM	AM	PM	
2043 Background	Hwy 402 WB Ramp & Christina Street	WBR	110	110	155	147	4.7	4.5	52.9	50.6	80
		NBR			23	36	0.7	1.1	7.9	12.4	30
2043 Total	Hwy 402 WB Ramp & Christina Street	WBR	110	110	155	147	4.7	4.5	52.9	50.6	80
		NBR			28	44	0.9	1.3	10.1	14.6	30



## 5 Conclusions and Recommendations

### 5.1 Conclusions

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

- ▶ **Base Year (2024) Traffic Conditions:** All study area intersections are currently operating at acceptable levels of service, except for the following intersection movements:

#### Capel Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is exceeding the existing storage of 20 metres during the PM peak hour; and

#### Indian Road and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is exceeding the existing storage of 25 metres during the PM peak hour.

The existing site driveway intersections on Exmouth Street are operating at acceptable levels of service.

- ▶ **Development Trip Generation:** The development is forecast to generate 205 and 244 trips during the AM and PM peak hours, respectively.

- ▶ **2038 Background Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under base year traffic conditions, with the following additional critical movements:

#### Christina Street and Highway 402 WB Ramp/Church Street

- the westbound shared through/left-turn movement is forecast to operate at LOS D with a v/c ratio of 0.75 during the AM peak hour and a v/c ratio greater than 0.75 during the PM peak hour;

#### Christina Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 40 metres during the PM peak hour;
- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;



Capel Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the PM peak hour;

Cecil Street/ Driveway A and Exmouth Street

- the northbound movement is forecast to operate at LOS F during the PM peak hour;
- the southbound movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;

East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the westbound left-turn movement is project to exceed the existing storage of 20 metres during the PM peak hour;

Indian Road and Exmouth Street

- the eastbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;
- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and
- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 30 metres during the AM and PM peak hours.

- ▶ **2038 Total Traffic Conditions:** All study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions. The Site Driveway intersections on Exmouth Street are also noted to operate at similar levels of service as under 2038 total traffic conditions. The new development traffic is not creating level of service implications for the study area intersections including the two access intersections. **2043 Background Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under 2038 background traffic conditions, with the following additional critical movements.

Christina Street and Exmouth Street

- the southbound left-turn movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour;



East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the northbound left-turn movement is projected to exceed the existing storage of 45 during the PM peak hour; and

Indian Road and Exmouth Street

- the eastbound shared through/right-turn movement is forecast to operate at LOS D with a v/c ratio greater than 0.85 during the PM peak hour.
- ▶ **2043 Total Traffic Conditions:** The study area intersections are forecast to operate at similar levels of service as under 2043 background traffic conditions, with the following additional critical movements:

Christina Street and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the southbound left-turn movement is projected to exceed the existing storage of 25 metres during the AM peak hour; and

East Street North/ Driveway B and Exmouth Street

- the 95<sup>th</sup> percentile queue length of the eastbound left-turn movement is projected to exceed the existing storage of 20 metres during the PM peak hour.
- ▶ **Site Driveways:** The Site Driveways are operating at acceptable levels of service under base year traffic conditions. However, beginning under 2038 background traffic conditions, the southbound (outbound) movement at Cecil Street/ Driveway A and Exmouth Street is forecast to theoretically operate over-capacity during the PM peak hour. It is noted that the outbound traffic volumes at the driveway have the option to use the traffic signal at East Street North/ Driveway B via internal roadways.

Under 2043 total traffic conditions during the PM peak hour, the 95<sup>th</sup> percentile queue length of the eastbound (inbound) left-turn movement at East Street North/ Driveway B and Exmouth Street is noted to exceed the available storage of 20 metres by approximately five metres, or less than one car length. The queueing can be accommodated in the centre two-way left-turn lane.

- ▶ **MTO Queue Length Assessment:** Based on MTO methods for queue length analysis at signalized intersections, all movements at the Highway 402 Ramp intersections at Christina Street and at Indian Road are operating with no queueing issues under base year traffic conditions. However, the westbound left-turn



movement at the Highway 402 Westbound Ramp and Indian Road intersection is projected to exceed the existing storage of 85 metres under 2038 and 2043 background and total traffic conditions. It is noted that the Synchro 11 analysis did not identify this queueing issue.

## **5.2 Recommendations**

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



# Appendix A

## Pre-Study Consultation





**From:** [Gerald Hawley](#)  
**To:** [Patrick Neal](#)  
**Cc:** [Jay Vanvlymen](#); [Rajan Philips](#)  
**Subject:** RE: (230751) 530-540 Exmouth Street, Sarnia TIA - Pre-Study Consultation  
**Date:** March 5, 2024 8:44:47 AM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.png](#)  
[x\\_32x32\\_d0908717-edff-4150-8314-8e5f359bd4bb.png](#)  
[facebook\\_32x32\\_df540962-6bfe-4284-b3fc-c53ee835199e.png](#)  
[linkedin\\_32x32\\_f161aefd-c5a4-4a48-b7fd-f6a97e9ae49f.png](#)  
[instagaram\\_32x32\\_164612e1-e6ce-496d-ac0c-cd94d84d275e.png](#)  
[exmouth\\_at\\_indian.pdf](#)

---

Good morning

Please find attached the signal timing plan for Exmouth and Indian. I have requested Exmouth/Capel and Exmouth/East and will forward when I receive them. I have reviewed the scope below and that should provide sufficient information.

Thanks



**Gerald Hawley**

Transportation Technologist  
City of Sarnia  
255 Christina Street North  
Sarnia, ON N7T 7N2  
Phone: 519-332-0527 Ext. 3286  
[www.sarnia.ca](http://www.sarnia.ca)



**From:** [Mentley, Ryan \(MTO\)](#)  
**To:** [Patrick Neal](#); [devin.sybenga@sarnia.ca](mailto:devin.sybenga@sarnia.ca)  
**Cc:** [Rajan Philips](#); [Geoff Gerstheimer](#)  
**Subject:** RE: (230751) 530-540 Exmouth Street, Sarnia TIA - Pre-Study Consultation  
**Date:** February 1, 2024 10:31:09 AM  
**Attachments:** [image001.png](#)  
[HWY 402 @ CHRISTINA ST N HWY 402 - RAMP 62.pdf](#)  
[HWY 402 @ INDIAN RD N - RAMP 51.pdf](#)  
[HWY 402 @ INDIAN RD N - RAMP 61.pdf](#)  
[22-080 - Sarnia Towers Exmouth.pdf](#)

---

Good morning Patrick,

MTO does not object to the proposed scope of work for the Transportation Impact Assessment, however, please include both ramps off Highway 402 at Christina Street & Indian Road in the assessment.

Please find attached the traffic data MTO has available for the ramps.

Let me know if you have any questions, etc.

Thanks,

**Ryan Mentley**

*Corridor Management Planner  
Highway Corridor Management Section  
Ministry of Transportation  
659 Exeter Road, London ON, N6E 1L3  
Tel: (519) 878-4026  
Fax: (519) 873-4228  
[Ryan.Mentley@Ontario.ca](mailto:Ryan.Mentley@Ontario.ca)*

---

**From:** Patrick Neal <pneal@ptsl.com>  
**Sent:** January 17, 2024 11:56 AM  
**To:** Mentley, Ryan (MTO) <Ryan.Mentley@ontario.ca>; [devin.sybenga@sarnia.ca](mailto:devin.sybenga@sarnia.ca)  
**Cc:** [Rajan Philips](mailto:rphilips@ptsl.com) <rphilips@ptsl.com>; [Geoff Gerstheimer](mailto:ggerstheimer@bairdae.ca) <ggerstheimer@bairdae.ca>  
**Subject:** (230751) 530-540 Exmouth Street, Sarnia TIA - Pre-Study Consultation

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Ryan and Devin,

We have been retained to complete the Transportation Impact Assessment (TIA) for the proposed Residential Development located at 530-540 Exmouth Street in the City of Sarnia.

The subject lands are located on the north side of Exmouth Street, south of Highway 402, and east of Capel Street. The proposed development is identified as “a large-scale, transit oriented, high-rise residential development,” comprising four, 23-storey apartment buildings and providing 870 dwelling units. A parking supply of 485 spaces is proposed, 111 spaces fewer than the required 596 spaces.

The four towers are to be located on two vacant parcels, each parcel accommodating two towers. The parcel to the south, along Exmouth Street, will accommodate the two South Towers; and the parcel to the north, along Highway 402, will accommodate the two North Towers.

The two vacant parcels are surrounded by existing commercial properties which share an internal road system with two access connections to Exmouth Street at Cecil Street and at East Street North.

The proposed development would use existing access arrangement to Exmouth Street.

A concept site plan is attached.

Based on the above information, we have prepared the following scope of work for review/approval:

- Weekday AM and PM peak hour of adjacent road for analysis.
- Study Area Intersections (**please provide recent traffic counts at the below intersections, if available**):
  - Exmouth Street & Cecil Street (potential access) (unsignalized);
  - Exmouth Street & East Street N (potential access) (signalized);
  - Exmouth Street & Capel Street (signalized);
  - Exmouth Street & Indian Road N (Lambton Road 29) (signalized);
  - Highway 402 Ramp Terminal intersection at Indian Road (Lambton Road 29) (signalized); and
  - Highway 402 Off-Ramp intersection at Exmouth Street (unsignalized).
- **Please provide the signal timing plans for the above signalized intersections.**
- Horizon Years: (1) five-year and (2) ten-year horizon from development completion.
- Background Growth Rate: 2% per annum, **please confirm.**
- Background Developments: **Please confirm and provide TIS report/site statistics.**
- Roadway Improvements: **Please confirm.**
- Trip Generation: ITE Trip Generation Manual 11<sup>th</sup> Edition.
- Trip Distribution: Existing traffic patterns.
- Synchro Parameters: PHF of 0.92 and SFR of 1900.
- Queue and storage lengths for left turn and through movements for the Highway 402 Ramp Terminal intersection at Indian Road will be calculated using the arrival rate method explained on MTO's Signal Timing Policy. For queues/storage lengths for right turn movements, we will use Chapter 9 of TAC's Geometric Design Guide for Canadian Roads.

Please let us know if you have any comments or questions.

Regards,

**Patrick Neal, EIT**  
*Transportation Consultant*



## **Paradigm Transportation Solutions Limited**

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

p: 416.479.9684 x510

m: 416.688.7338

e: [pneal@ptsl.com](mailto:pneal@ptsl.com)

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

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

# Appendix B

## Existing Traffic Data





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Indian Road & Highway 402 Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Highway 402 Ramps Westbound					Indian Road Northbound					Indian Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	18	0	0	0	18	14	0	1	0	15	3	76	0	0	79	112
7:15 AM	32	0	0	0	32	35	0	0	0	35	4	75	0	0	79	146
7:30 AM	50	0	0	0	50	37	0	0	0	37	1	84	1	0	86	173
7:45 AM	73	0	0	1	73	47	0	0	0	47	6	104	0	0	110	230
Hourly Total	173	0	0	1	173	133	0	1	0	134	14	339	1	0	354	661
8:00 AM	59	0	0	0	59	63	0	0	0	63	7	128	0	0	135	257
8:15 AM	59	0	0	0	59	47	0	0	0	47	3	127	1	0	131	237
8:30 AM	57	0	0	1	57	55	0	0	0	55	6	95	0	0	101	213
8:45 AM	49	0	0	0	49	59	0	0	0	59	4	107	0	0	111	219
Hourly Total	224	0	0	1	224	224	0	0	0	224	20	457	1	0	478	926
9:00 AM	30	0	0	0	30	52	0	0	0	52	3	99	0	0	102	184
9:15 AM	40	0	0	0	40	57	0	0	0	57	4	88	1	0	93	190
9:30 AM	40	0	0	0	40	44	0	0	0	44	1	79	0	0	80	164
9:45 AM	34	0	0	1	34	57	0	0	0	57	1	77	0	0	78	169
Hourly Total	144	0	0	1	144	210	0	0	0	210	9	343	1	0	353	707
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	29	0	0	0	29	61	0	0	0	61	2	82	0	0	84	174
11:45 AM	38	0	0	0	38	57	0	0	0	57	2	87	0	0	89	184
Hourly Total	67	0	0	0	67	118	0	0	0	118	4	169	0	0	173	358
12:00 PM	17	0	0	0	17	94	0	0	0	94	4	99	2	0	105	216
12:15 PM	28	0	0	0	28	68	0	0	0	68	2	81	0	0	83	179
12:30 PM	35	0	0	0	35	67	0	1	0	68	6	70	0	0	76	179
12:45 PM	39	0	0	1	39	76	0	0	1	76	3	85	0	0	88	203
Hourly Total	119	0	0	1	119	305	0	1	1	306	15	335	2	0	352	777
1:00 PM	39	0	0	0	39	58	0	0	0	58	0	89	0	2	89	186
1:15 PM	32	0	0	0	32	69	0	1	0	70	1	67	0	0	68	170
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	71	0	0	0	71	127	0	1	0	128	1	156	0	2	157	356
4:00 PM	34	0	0	0	34	132	0	0	0	132	5	89	0	0	94	260
4:15 PM	34	0	0	0	34	121	0	0	0	121	2	94	0	0	96	251
4:30 PM	39	0	0	0	39	120	0	0	0	120	2	85	0	0	87	246
4:45 PM	34	0	0	1	34	106	0	0	0	106	3	107	1	0	111	251
Hourly Total	141	0	0	1	141	479	0	0	0	479	12	375	1	0	388	1008
5:00 PM	40	0	0	0	40	126	0	0	0	126	6	95	0	0	101	267
5:15 PM	34	0	0	0	34	98	0	0	0	98	2	87	0	0	89	221
5:30 PM	30	0	0	0	30	102	0	0	0	102	2	98	0	0	100	232

5:45 PM	38	0	0	0	38	95	0	0	0	95	5	78	0	0	83	216
Hourly Total	142	0	0	0	142	421	0	0	0	421	15	358	0	0	373	936
6:00 PM	34	0	0	0	34	76	0	0	0	76	2	73	0	0	75	185
6:15 PM	36	0	0	0	36	68	0	0	0	68	3	69	1	0	73	177
6:30 PM	28	0	0	0	28	62	0	0	0	62	3	65	0	0	68	158
6:45 PM	29	0	0	0	29	60	0	0	0	60	3	64	0	0	67	156
Hourly Total	127	0	0	0	127	266	0	0	0	266	11	271	1	0	283	676
Grand Total	1208	0	0	5	1208	2283	0	3	1	2286	101	2803	7	2	2911	6405
Approach %	100.0	0.0	0.0	-	-	99.9	0.0	0.1	-	-	3.5	96.3	0.2	-	-	-
Total %	18.9	0.0	0.0	-	18.9	35.6	0.0	0.0	-	35.7	1.6	43.8	0.1	-	45.4	-
Motorcycles	0	0	0	-	0	2	0	0	-	2	0	0	0	-	0	2
% Motorcycles	0.0	-	-	-	0.0	0.1	-	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	1185	0	0	-	1185	2247	0	3	-	2250	100	2776	7	-	2883	6318
% Cars & Light Goods	98.1	-	-	-	98.1	98.4	-	100.0	-	98.4	99.0	99.0	100.0	-	99.0	98.6
Buses	2	0	0	-	2	9	0	0	-	9	1	9	0	-	10	21
% Buses	0.2	-	-	-	0.2	0.4	-	0.0	-	0.4	1.0	0.3	0.0	-	0.3	0.3
Single-Unit Trucks	9	0	0	-	9	22	0	0	-	22	0	16	0	-	16	47
% Single-Unit Trucks	0.7	-	-	-	0.7	1.0	-	0.0	-	1.0	0.0	0.6	0.0	-	0.5	0.7
Articulated Trucks	12	0	0	-	12	2	0	0	-	2	0	2	0	-	2	16
% Articulated Trucks	1.0	-	-	-	1.0	0.1	-	0.0	-	0.1	0.0	0.1	0.0	-	0.1	0.2
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	-	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	5	-	-	-	-	1	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

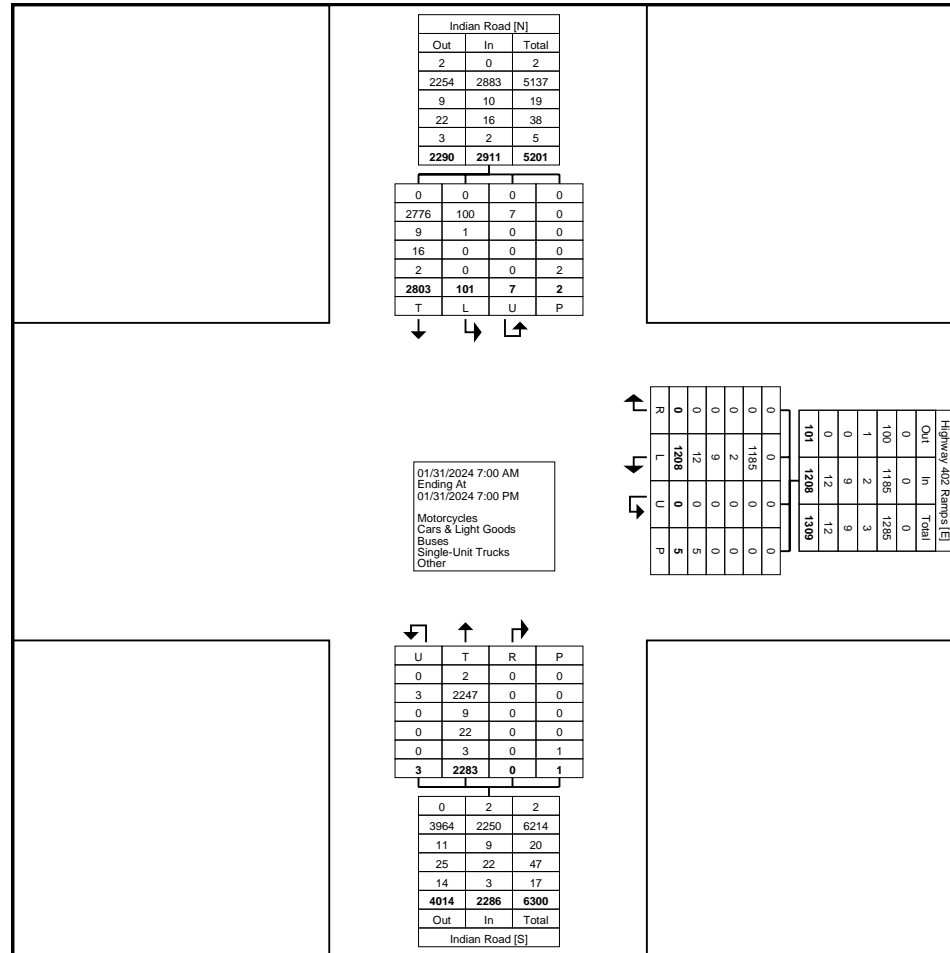




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Indian Road & Highway 402 Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot

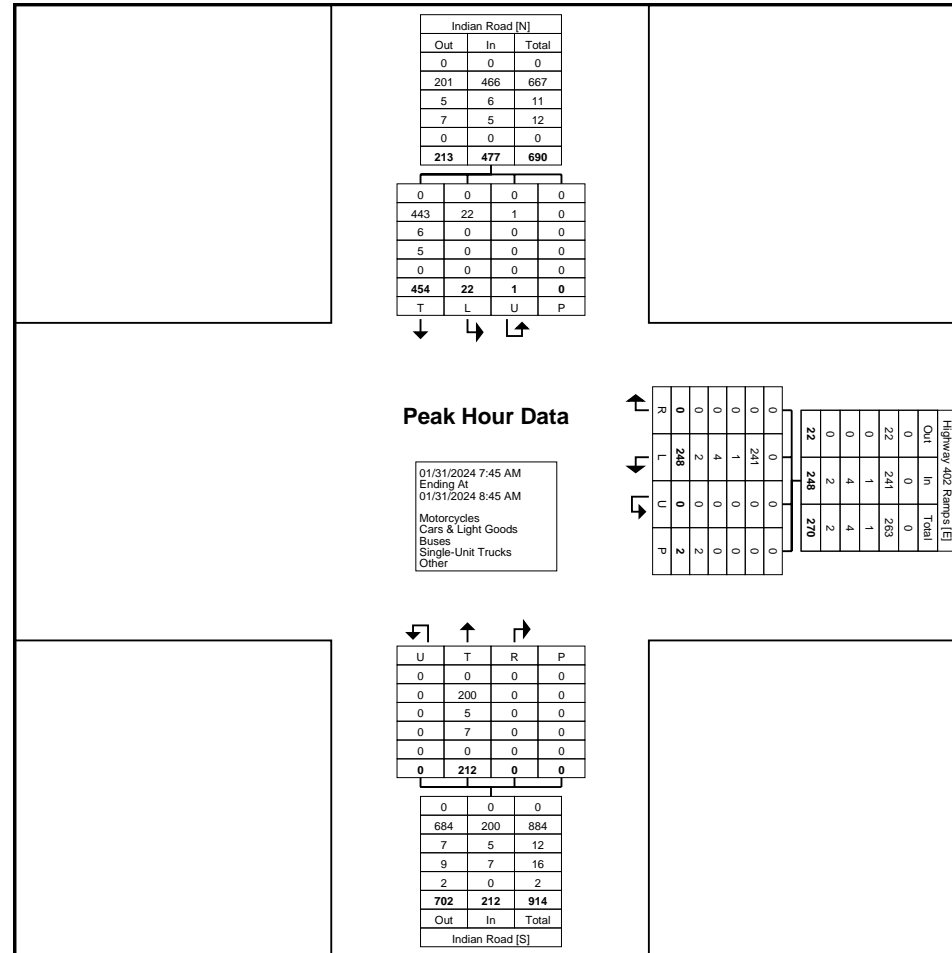




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Indian Road & Highway 402 Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 5



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Indian Road & Highway 402 Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

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

Start Time	Highway 402 Ramps Westbound					Indian Road Northbound					Indian Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:00 PM	17	0	0	0	17	94	0	0	0	94	4	99	2	0	105	216
12:15 PM	28	0	0	0	28	68	0	0	0	68	2	81	0	0	83	179
12:30 PM	35	0	0	0	35	67	0	1	0	68	6	70	0	0	76	179
12:45 PM	39	0	0	1	39	76	0	0	1	76	3	85	0	0	88	203
Total	119	0	0	1	119	305	0	1	1	306	15	335	2	0	352	777
Approach %	100.0	0.0	0.0	-	-	99.7	0.0	0.3	-	-	4.3	95.2	0.6	-	-	-
Total %	15.3	0.0	0.0	-	15.3	39.3	0.0	0.1	-	39.4	1.9	43.1	0.3	-	45.3	-
PHF	0.763	0.000	0.000	-	0.763	0.811	0.000	0.250	-	0.814	0.625	0.846	0.250	-	0.838	0.899
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	-	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	118	0	0	-	118	303	0	1	-	304	14	333	2	-	349	771
% Cars & Light Goods	99.2	-	-	-	99.2	99.3	-	100.0	-	99.3	93.3	99.4	100.0	-	99.1	99.2
Buses	0	0	0	-	0	0	0	0	-	0	1	1	0	-	2	2
% Buses	0.0	-	-	-	0.0	0.0	-	0.0	-	0.0	6.7	0.3	0.0	-	0.6	0.3
Single-Unit Trucks	0	0	0	-	0	2	0	0	-	2	0	1	0	-	1	3
% Single-Unit Trucks	0.0	-	-	-	0.0	0.7	-	0.0	-	0.7	0.0	0.3	0.0	-	0.3	0.4
Articulated Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Articulated Trucks	0.8	-	-	-	0.8	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-











Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Cecil Street Northbound						Plaza Driveway 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	6	38	0	0	0	44	0	43	3	0	0	46	0	0	0	0	2	0	1	0	0	0	1	1	91
7:15 AM	6	46	1	0	0	53	2	54	2	0	0	58	1	0	1	0	1	2	4	0	2	0	1	6	119
7:30 AM	6	40	1	0	1	47	1	67	2	0	0	70	3	1	3	0	0	7	0	0	2	0	1	2	126
7:45 AM	6	67	0	0	0	73	3	78	2	0	0	83	0	0	2	0	1	2	0	0	5	0	0	5	163
Hourly Total	24	191	2	0	1	217	6	242	9	0	0	257	4	1	6	0	4	11	5	0	9	0	3	14	499
8:00 AM	5	69	0	0	0	74	3	72	1	0	0	76	0	0	1	0	5	1	3	0	5	0	2	8	159
8:15 AM	8	65	1	0	0	74	3	93	4	0	0	100	2	2	3	0	0	7	3	0	6	0	0	9	190
8:30 AM	14	95	1	0	0	110	4	129	11	0	0	144	1	0	2	0	0	3	4	1	5	0	0	10	267
8:45 AM	14	95	2	0	0	111	5	139	3	0	1	147	0	1	2	0	1	3	5	0	9	0	1	14	275
Hourly Total	41	324	4	0	0	369	15	433	19	0	1	467	3	3	8	0	6	14	15	1	25	0	3	41	891
9:00 AM	14	85	1	0	1	100	2	91	6	0	1	99	0	0	1	0	3	1	3	2	10	0	2	15	215
9:15 AM	19	97	5	0	1	121	3	89	9	0	0	101	1	0	3	1	2	5	6	1	18	0	2	25	252
9:30 AM	16	89	4	0	1	109	3	104	3	0	0	110	4	0	4	0	4	8	4	0	14	0	1	18	245
9:45 AM	22	119	3	0	3	144	3	126	5	0	0	134	5	1	7	0	3	13	5	1	10	0	0	16	307
Hourly Total	71	390	13	0	6	474	11	410	23	0	1	444	10	1	15	1	12	27	18	4	52	0	5	74	1019
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	24	135	1	0	0	160	2	129	13	0	0	144	4	0	5	0	2	9	5	2	20	0	2	27	340
11:45 AM	26	147	2	0	2	175	5	143	17	0	0	165	0	1	7	0	7	8	6	0	34	1	5	41	389
Hourly Total	50	282	3	0	2	335	7	272	30	0	0	309	4	1	12	0	9	17	11	2	54	1	7	68	729
12:00 PM	25	160	2	0	2	187	7	114	7	0	0	128	0	1	7	0	5	8	6	0	27	0	2	33	356
12:15 PM	26	128	10	0	0	164	2	143	7	0	0	152	1	0	6	0	9	7	6	0	20	0	1	26	349
12:30 PM	17	111	4	0	4	132	1	161	12	0	0	174	3	0	1	0	4	4	8	2	24	0	4	34	344
12:45 PM	22	127	4	0	2	153	4	147	9	0	0	160	5	0	3	0	4	8	6	1	17	0	5	24	345
Hourly Total	90	526	20	0	8	636	14	565	35	0	0	614	9	1	17	0	22	27	26	3	88	0	12	117	1394
1:00 PM	22	112	2	0	1	136	7	130	9	0	0	146	0	1	11	0	6	12	8	3	28	0	3	39	333
1:15 PM	20	125	5	0	0	150	8	142	14	0	0	164	1	0	7	0	4	8	6	1	26	0	2	33	355
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	42	237	7	0	1	286	15	272	23	0	0	310	1	1	18	0	10	20	14	4	54	0	5	72	688
4:00 PM	25	148	2	0	0	175	4	166	7	0	0	177	0	1	7	0	3	8	7	2	22	0	0	31	391
4:15 PM	26	133	6	0	1	165	5	153	8	0	0	166	2	3	3	0	2	8	5	0	28	0	1	33	372
4:30 PM	29	163	2	0	0	194	3	159	10	0	1	172	0	4	8	0	3	12	9	0	21	0	0	30	408
4:45 PM	17	132	2	0	1	151	7	133	9	0	1	149	2	4	3	0	3	9	4	1	27	0	3	32	341
Hourly Total	97	576	12	0	2	685	19	611	34	0	2	664	4	12	21	0	11	37	25	3	98	0	4	126	1512
5:00 PM	25	135	2	0	1	162	8	135	13	0	0	156	2	1	7	0	0	10	8	3	28	0	1	39	367
5:15 PM	16	108	2	0	0	126	4	114	13	0	0	131	0	0	4	0	3	4	12	2	22	0	0	36	297

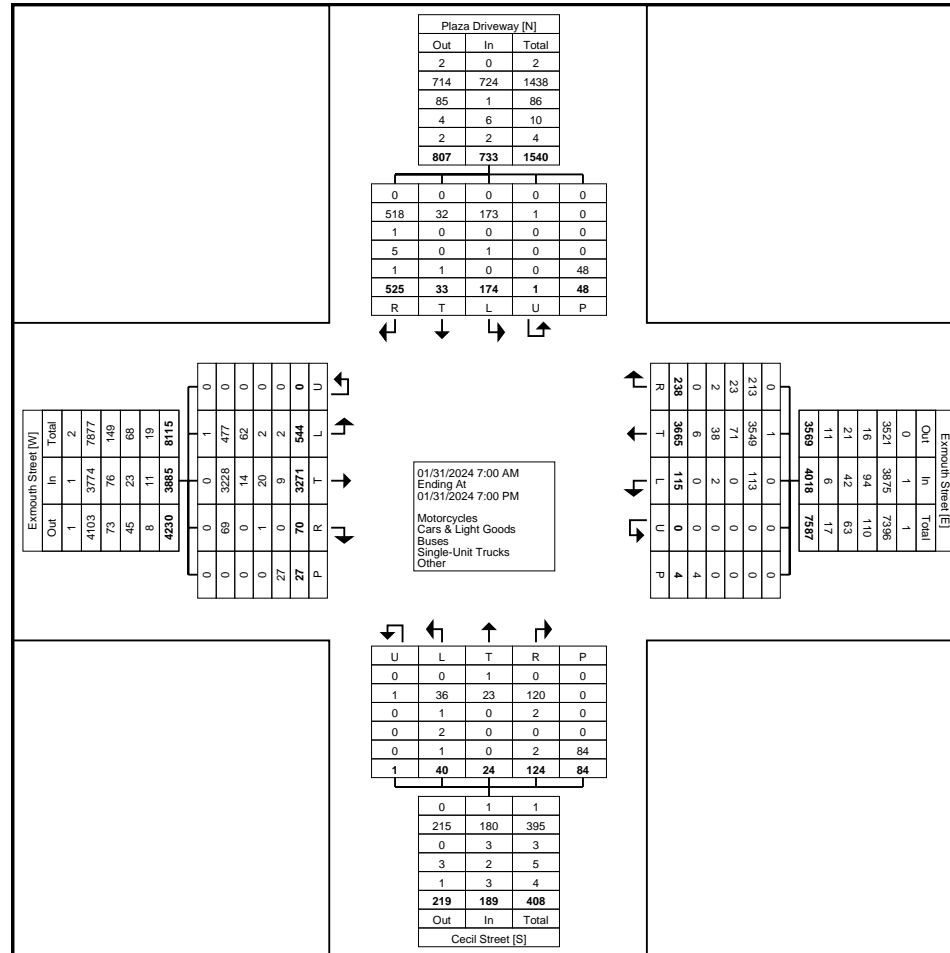
5:30 PM	13	94	0	0	4	107	2	101	6	0	0	109	2	1	6	0	0	9	10	1	15	0	0	26	251
5:45 PM	21	101	0	0	2	122	1	107	5	0	0	113	0	1	4	0	0	5	6	3	17	0	3	26	266
Hourly Total	75	438	4	0	7	517	15	457	37	0	0	509	4	3	21	0	3	28	36	9	82	0	4	127	1181
6:00 PM	19	88	4	0	0	111	3	114	7	0	0	124	0	0	1	0	2	1	8	2	17	0	0	27	263
6:15 PM	10	75	0	0	0	85	2	91	7	0	0	100	0	1	2	0	3	3	6	2	18	0	2	26	214
6:30 PM	15	65	0	0	0	80	4	101	8	0	0	113	1	0	1	0	2	2	6	2	18	0	2	26	221
6:45 PM	10	79	1	0	0	90	4	97	6	0	0	107	0	0	2	0	0	2	4	1	10	0	1	15	214
Hourly Total	54	307	5	0	0	366	13	403	28	0	0	444	1	1	6	0	7	8	24	7	63	0	5	94	912
Grand Total	544	3271	70	0	27	3885	115	3665	238	0	4	4018	40	24	124	1	84	189	174	33	525	1	48	733	8825
Approach %	14.0	84.2	1.8	0.0	-	-	2.9	91.2	5.9	0.0	-	-	21.2	12.7	65.6	0.5	-	-	23.7	4.5	71.6	0.1	-	-	-
Total %	6.2	37.1	0.8	0.0	-	44.0	1.3	41.5	2.7	0.0	-	45.5	0.5	0.3	1.4	0.0	-	2.1	2.0	0.4	5.9	0.0	-	8.3	-
Motorcycles	1	0	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	3
% Motorcycles	0.2	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	4.2	0.0	0.0	-	0.5	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	477	3228	69	0	-	3774	113	3549	213	0	-	3875	36	23	120	1	-	180	173	32	518	1	-	724	8553
% Cars & Light Goods	87.7	98.7	98.6	-	-	97.1	98.3	96.8	89.5	-	-	96.4	90.0	95.8	96.8	100.0	-	95.2	99.4	97.0	98.7	100.0	-	98.8	96.9
Buses	62	14	0	0	-	76	0	71	23	0	-	94	1	0	2	0	-	3	0	0	1	0	-	1	174
% Buses	11.4	0.4	0.0	-	-	2.0	0.0	1.9	9.7	-	-	2.3	2.5	0.0	1.6	0.0	-	1.6	0.0	0.0	0.2	0.0	-	0.1	2.0
Single-Unit Trucks	2	20	1	0	-	23	2	38	2	0	-	42	2	0	0	0	-	2	1	0	5	0	-	6	73
% Single-Unit Trucks	0.4	0.6	1.4	-	-	0.6	1.7	1.0	0.8	-	-	1.0	5.0	0.0	0.0	0.0	-	1.1	0.6	0.0	1.0	0.0	-	0.8	0.8
Articulated Trucks	0	8	0	0	-	8	0	6	0	0	-	6	0	0	0	0	-	0	0	0	0	0	-	0	14
% Articulated Trucks	0.0	0.2	0.0	-	-	0.2	0.0	0.2	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	2	1	0	0	-	3	0	0	0	0	-	0	1	0	2	0	-	3	0	1	1	0	-	2	8
% Bicycles on Road	0.4	0.0	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	2.5	0.0	1.6	0.0	-	1.6	0.0	3.0	0.2	0.0	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-	-	-	-	4.8	-	-	-	-	-	6.3	-	-
Pedestrians	-	-	-	-	27	-	-	-	-	-	2	-	-	-	-	-	80	-	-	-	-	-	45	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-	-	-	-	95.2	-	-	-	-	-	93.8	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 4

### Turning Movement Peak Hour Data (9:00 AM)

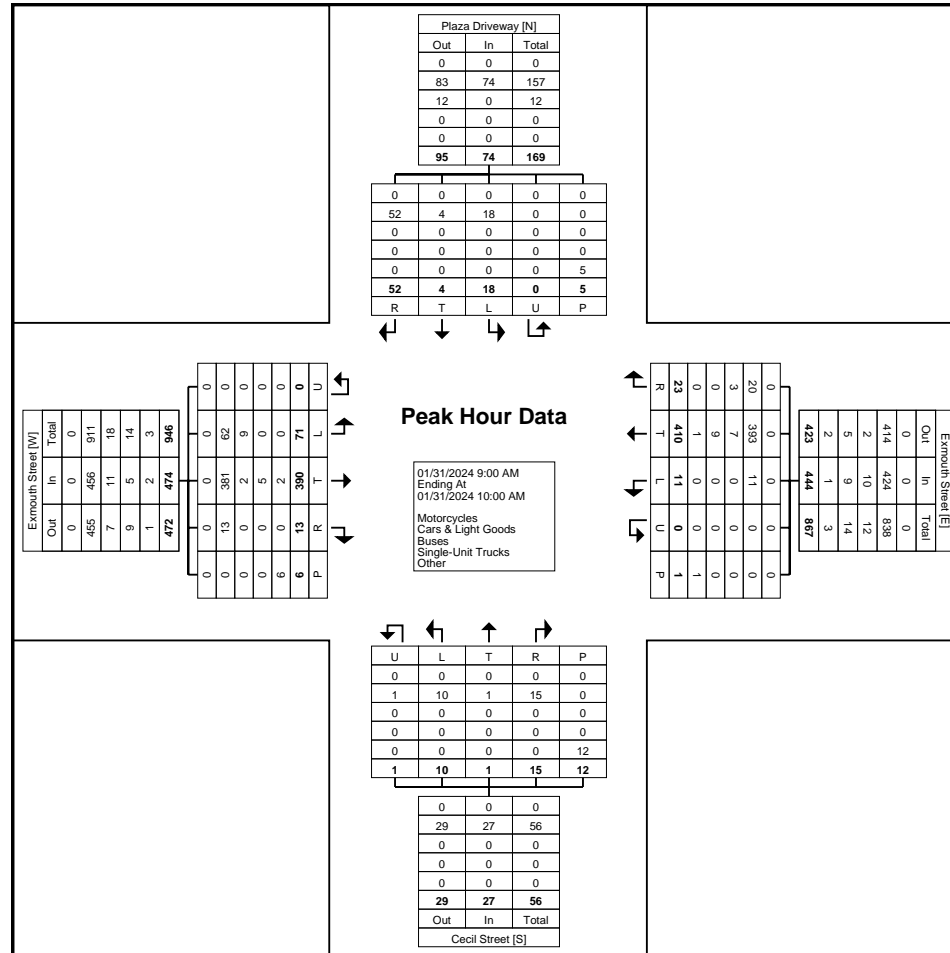
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Cecil Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	14	85	1	0	1	100	2	91	6	0	1	99	0	0	1	0	3	1	3	2	10	0	2	15	215
9:15 AM	19	97	5	0	1	121	3	89	9	0	0	101	1	0	3	1	2	5	6	1	18	0	2	25	252
9:30 AM	16	89	4	0	1	109	3	104	3	0	0	110	4	0	4	0	4	8	4	0	14	0	1	18	245
9:45 AM	22	119	3	0	3	144	3	126	5	0	0	134	5	1	7	0	3	13	5	1	10	0	0	16	307
<b>Total</b>	<b>71</b>	<b>390</b>	<b>13</b>	<b>0</b>	<b>6</b>	<b>474</b>	<b>11</b>	<b>410</b>	<b>23</b>	<b>0</b>	<b>1</b>	<b>444</b>	<b>10</b>	<b>1</b>	<b>15</b>	<b>1</b>	<b>12</b>	<b>27</b>	<b>18</b>	<b>4</b>	<b>52</b>	<b>0</b>	<b>5</b>	<b>74</b>	<b>1019</b>
Approach %	15.0	82.3	2.7	0.0	-	-	2.5	92.3	5.2	0.0	-	-	37.0	3.7	55.6	3.7	-	-	24.3	5.4	70.3	0.0	-	-	-
Total %	7.0	38.3	1.3	0.0	-	46.5	1.1	40.2	2.3	0.0	-	43.6	1.0	0.1	1.5	0.1	-	2.6	1.8	0.4	5.1	0.0	-	7.3	-
PHF	0.807	0.819	0.650	0.000	-	0.823	0.917	0.813	0.639	0.000	-	0.828	0.500	0.250	0.536	0.250	-	0.519	0.750	0.500	0.722	0.000	-	0.740	0.830
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	62	381	13	0	-	456	11	393	20	0	-	424	10	1	15	1	-	27	18	4	52	0	-	74	981
% Cars & Light Goods	87.3	97.7	100.0	-	-	96.2	100.0	95.9	87.0	-	-	95.5	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	-	100.0	96.3
Buses	9	2	0	0	-	11	0	7	3	0	-	10	0	0	0	0	-	0	0	0	0	0	-	0	21
% Buses	12.7	0.5	0.0	-	-	2.3	0.0	1.7	13.0	-	-	2.3	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	2.1
Single-Unit Trucks	0	5	0	0	-	5	0	9	0	0	-	9	0	0	0	0	-	0	0	0	0	0	-	0	14
% Single-Unit Trucks	0.0	1.3	0.0	-	-	1.1	0.0	2.2	0.0	-	-	2.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.3	0.0	-	-	0.2	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.3	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	8.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	91.7	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 5



Turning Movement Peak Hour Data Plot (9:00 AM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

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

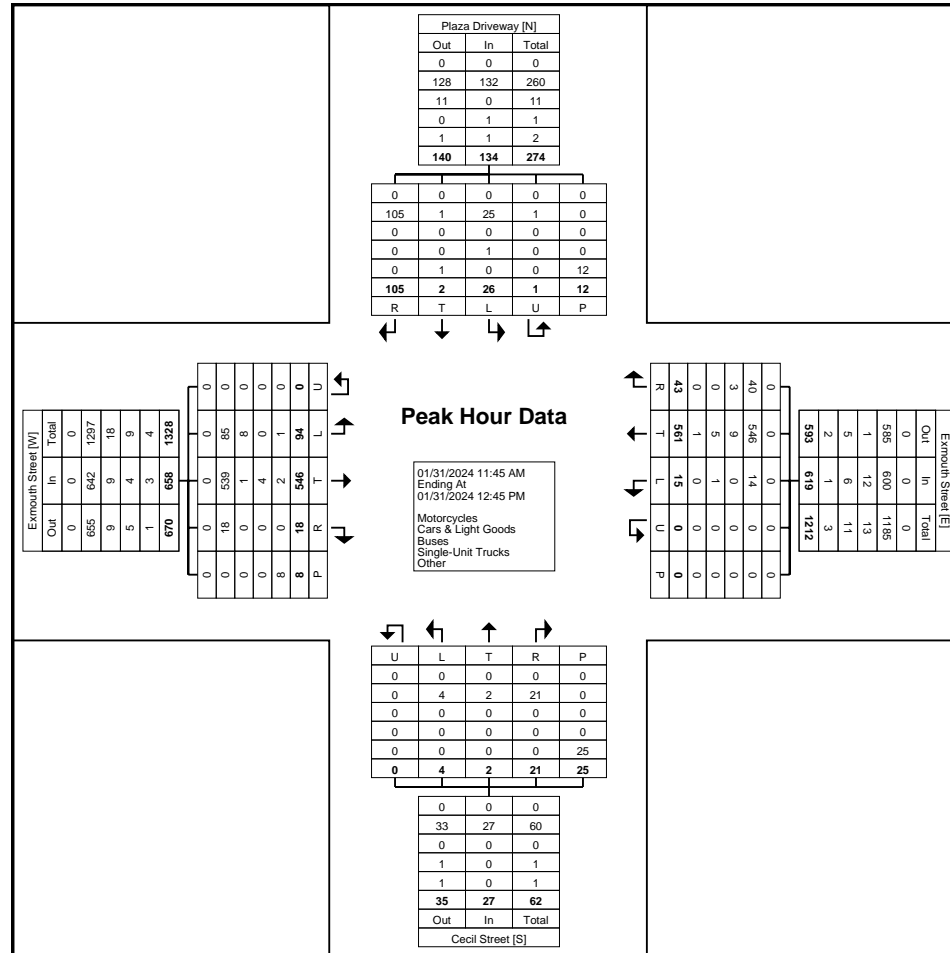
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Cecil Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	26	147	2	0	2	175	5	143	17	0	0	165	0	1	7	0	7	8	6	0	34	1	5	41	389
12:00 PM	25	160	2	0	2	187	7	114	7	0	0	128	0	1	7	0	5	8	6	0	27	0	2	33	356
12:15 PM	26	128	10	0	0	164	2	143	7	0	0	152	1	0	6	0	9	7	6	0	20	0	1	26	349
12:30 PM	17	111	4	0	4	132	1	161	12	0	0	174	3	0	1	0	4	4	8	2	24	0	4	34	344
Total	94	546	18	0	8	658	15	561	43	0	0	619	4	2	21	0	25	27	26	2	105	1	12	134	1438
Approach %	14.3	83.0	2.7	0.0	-	-	2.4	90.6	6.9	0.0	-	-	14.8	7.4	77.8	0.0	-	-	19.4	1.5	78.4	0.7	-	-	-
Total %	6.5	38.0	1.3	0.0	-	45.8	1.0	39.0	3.0	0.0	-	43.0	0.3	0.1	1.5	0.0	-	1.9	1.8	0.1	7.3	0.1	-	9.3	-
PHF	0.904	0.853	0.450	0.000	-	0.880	0.536	0.871	0.632	0.000	-	0.889	0.333	0.500	0.750	0.000	-	0.844	0.813	0.250	0.772	0.250	-	0.817	0.924
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	85	539	18	0	-	642	14	546	40	0	-	600	4	2	21	0	-	27	25	1	105	1	-	132	1401
% Cars & Light Goods	90.4	98.7	100.0	-	-	97.6	93.3	97.3	93.0	-	-	96.9	100.0	100.0	100.0	-	-	100.0	96.2	50.0	100.0	100.0	-	98.5	97.4
Buses	8	1	0	0	-	9	0	9	3	0	-	12	0	0	0	0	-	0	0	0	0	0	-	0	21
% Buses	8.5	0.2	0.0	-	-	1.4	0.0	1.6	7.0	-	-	1.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	1.5
Single-Unit Trucks	0	4	0	0	-	4	1	5	0	0	-	6	0	0	0	0	-	0	1	0	0	0	-	1	11
% Single-Unit Trucks	0.0	0.7	0.0	-	-	0.6	6.7	0.9	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	3.8	0.0	0.0	0.0	-	0.7	0.8
Articulated Trucks	0	2	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.4	0.0	-	-	0.3	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	2
% Bicycles on Road	1.1	0.0	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	50.0	0.0	0.0	-	0.7	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	25	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 7



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





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 8

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

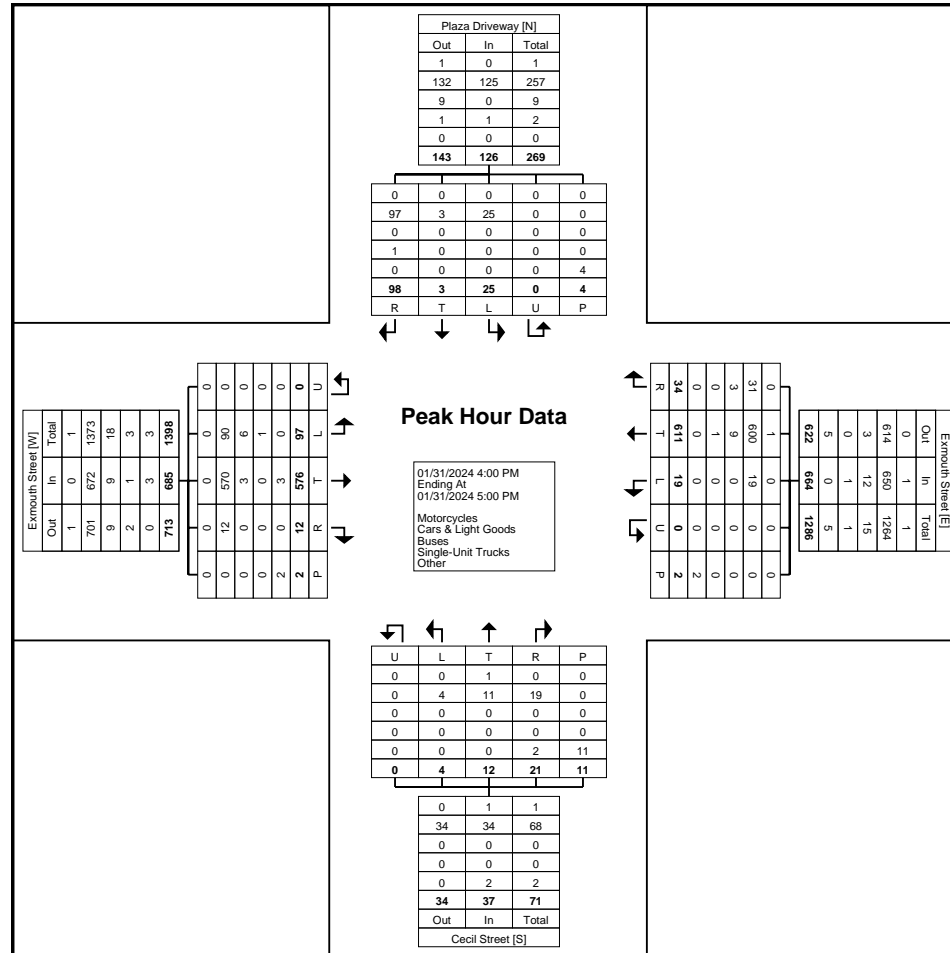
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Cecil Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	25	148	2	0	0	175	4	166	7	0	0	177	0	1	7	0	3	8	7	2	22	0	0	31	391
4:15 PM	26	133	6	0	1	165	5	153	8	0	0	166	2	3	3	0	2	8	5	0	28	0	1	33	372
4:30 PM	29	163	2	0	0	194	3	159	10	0	1	172	0	4	8	0	3	12	9	0	21	0	0	30	408
4:45 PM	17	132	2	0	1	151	7	133	9	0	1	149	2	4	3	0	3	9	4	1	27	0	3	32	341
<b>Total</b>	<b>97</b>	<b>576</b>	<b>12</b>	<b>0</b>	<b>2</b>	<b>685</b>	<b>19</b>	<b>611</b>	<b>34</b>	<b>0</b>	<b>2</b>	<b>664</b>	<b>4</b>	<b>12</b>	<b>21</b>	<b>0</b>	<b>11</b>	<b>37</b>	<b>25</b>	<b>3</b>	<b>98</b>	<b>0</b>	<b>4</b>	<b>126</b>	<b>1512</b>
Approach %	14.2	84.1	1.8	0.0	-	-	2.9	92.0	5.1	0.0	-	-	10.8	32.4	56.8	0.0	-	-	19.8	2.4	77.8	0.0	-	-	-
Total %	6.4	38.1	0.8	0.0	-	45.3	1.3	40.4	2.2	0.0	-	43.9	0.3	0.8	1.4	0.0	-	2.4	1.7	0.2	6.5	0.0	-	8.3	-
PHF	0.836	0.883	0.500	0.000	-	0.883	0.679	0.920	0.850	0.000	-	0.938	0.500	0.750	0.656	0.000	-	0.771	0.694	0.375	0.875	0.000	-	0.955	0.926
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	8.3	0.0	-	-	2.7	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	90	570	12	0	-	672	19	600	31	0	-	650	4	11	19	0	-	34	25	3	97	0	-	125	1481
% Cars & Light Goods	92.8	99.0	100.0	-	-	98.1	100.0	98.2	91.2	-	-	97.9	100.0	91.7	90.5	-	-	91.9	100.0	100.0	99.0	-	-	99.2	97.9
Buses	6	3	0	0	-	9	0	9	3	0	-	12	0	0	0	0	-	0	0	0	0	0	-	0	21
% Buses	6.2	0.5	0.0	-	-	1.3	0.0	1.5	8.8	-	-	1.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.4
Single-Unit Trucks	1	0	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	1	0	-	1	3
% Single-Unit Trucks	1.0	0.0	0.0	-	-	0.1	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.0	-	-	0.8	0.2
Articulated Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.5	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	2	0	-	2	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	9.5	-	-	5.4	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	9.1	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	10	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	90.9	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Cecil Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 9



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Capel Street Northbound						Capel Street 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	3	17	1	0	1	21	5	22	1	0	2	28	1	17	8	0	2	26	8	50	15	0	1	73	148
7:15 AM	5	21	2	0	2	28	14	34	0	0	0	48	2	16	11	0	0	29	4	35	12	1	0	52	157
7:30 AM	10	25	6	0	2	41	18	28	0	0	1	46	6	18	9	0	4	33	7	53	15	0	2	75	195
7:45 AM	8	39	6	0	6	53	17	31	0	0	2	48	8	18	5	0	2	31	17	74	23	0	0	114	246
Hourly Total	26	102	15	0	11	143	54	115	1	0	5	170	17	69	33	0	8	119	36	212	65	1	3	314	746
8:00 AM	11	37	5	0	1	53	16	42	0	0	0	58	3	22	15	0	0	40	6	62	16	0	0	84	235
8:15 AM	13	33	5	0	0	51	18	55	2	0	1	75	5	33	11	0	0	49	9	50	20	0	2	79	254
8:30 AM	10	43	3	0	1	56	17	59	7	0	0	83	6	35	31	0	0	72	17	54	16	0	1	87	298
8:45 AM	11	53	8	0	4	72	28	63	7	0	0	98	9	40	26	0	1	75	15	60	17	0	1	92	337
Hourly Total	45	166	21	0	6	232	79	219	16	0	1	314	23	130	83	0	1	236	47	226	69	0	4	342	1124
9:00 AM	14	43	5	0	4	62	13	52	4	0	1	69	3	40	23	0	2	66	12	51	9	0	5	72	269
9:15 AM	15	55	6	0	1	76	19	61	2	0	0	82	2	22	25	0	1	49	18	42	13	0	1	73	280
9:30 AM	8	65	5	0	2	78	15	74	3	0	1	92	8	23	28	0	1	59	16	34	10	0	0	60	289
9:45 AM	7	78	7	0	4	92	24	64	2	0	1	90	8	28	32	0	1	68	24	52	13	0	3	89	339
Hourly Total	44	241	23	0	11	308	71	251	11	0	3	333	21	113	108	0	5	242	70	179	45	0	9	294	1177
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	12	103	5	0	6	120	35	61	7	0	1	103	7	44	25	0	0	76	14	44	15	0	5	73	372
11:45 AM	19	85	7	0	4	111	30	85	8	0	4	123	9	30	36	0	6	75	24	37	14	0	7	75	384
Hourly Total	31	188	12	0	10	231	65	146	15	0	5	226	16	74	61	0	6	151	38	81	29	0	12	148	756
12:00 PM	15	120	4	0	1	139	39	74	6	0	2	119	10	57	37	0	2	104	23	42	16	0	3	81	443
12:15 PM	8	91	3	0	1	102	39	79	3	0	2	121	9	35	34	0	3	78	15	34	12	0	3	61	362
12:30 PM	17	61	10	0	6	88	34	95	8	0	6	137	12	34	24	0	7	70	22	42	11	0	5	75	370
12:45 PM	17	85	4	0	5	106	29	81	8	0	0	118	13	35	35	1	4	84	20	46	17	0	1	83	391
Hourly Total	57	357	21	0	13	435	141	329	25	0	10	495	44	161	130	1	16	336	80	164	56	0	12	300	1566
1:00 PM	23	74	4	0	6	101	31	80	3	0	3	114	4	27	26	0	1	57	17	35	26	0	4	78	350
1:15 PM	8	89	7	0	2	104	29	82	7	0	3	118	5	35	29	0	5	69	20	48	17	0	2	85	376
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	31	163	11	0	8	205	60	162	10	0	6	232	9	62	55	0	6	126	37	83	43	0	6	163	726
4:00 PM	18	112	4	1	1	135	34	83	10	0	2	127	4	84	44	0	5	132	13	41	15	1	3	70	464
4:15 PM	30	99	7	0	2	136	39	82	5	0	2	126	12	61	37	0	1	110	16	56	17	0	4	89	461
4:30 PM	17	123	4	0	3	144	45	64	7	0	1	116	9	58	36	0	0	103	27	40	15	0	1	82	445
4:45 PM	22	97	5	0	7	124	45	94	6	0	0	145	2	57	29	0	3	88	13	42	9	0	3	64	421
Hourly Total	87	431	20	1	13	539	163	323	28	0	5	514	27	260	146	0	9	433	69	179	56	1	11	305	1791
5:00 PM	22	78	4	0	0	104	37	88	8	0	0	133	6	61	34	0	0	101	16	43	6	0	3	65	403
5:15 PM	20	61	7	0	0	88	22	76	11	0	1	109	7	46	30	0	0	83	10	45	6	0	4	61	341

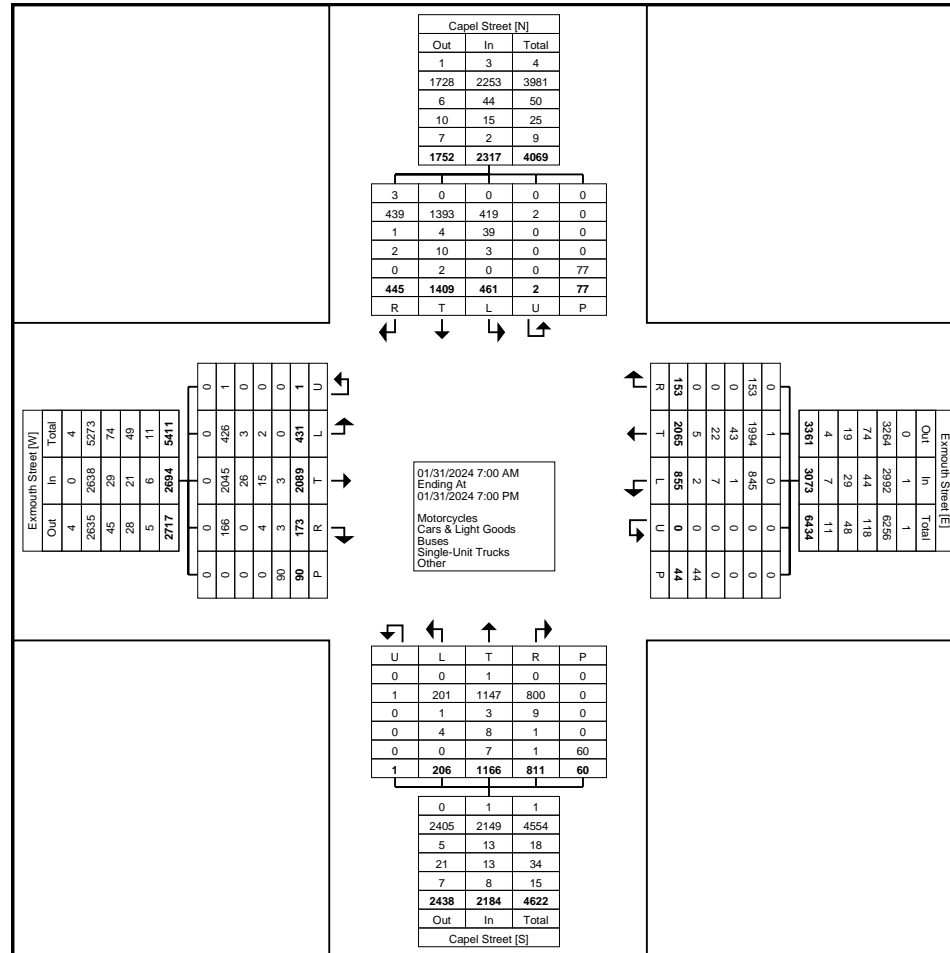
5:30 PM	14	68	8	0	1	90	28	55	5	0	1	88	4	32	17	0	0	53	10	39	10	0	2	59	290
5:45 PM	7	59	3	0	0	69	29	55	4	0	1	88	5	41	27	0	0	73	15	32	12	0	3	59	289
Hourly Total	63	266	22	0	1	351	116	274	28	0	3	418	22	180	108	0	0	310	51	159	34	0	12	244	1323
6:00 PM	16	55	6	0	6	77	28	77	5	0	3	110	8	37	26	0	4	71	8	29	12	0	1	49	307
6:15 PM	3	48	4	0	2	55	26	49	5	0	1	80	6	31	18	0	0	55	5	46	8	0	2	59	249
6:30 PM	18	30	9	0	5	57	27	70	6	0	0	103	7	23	22	0	3	52	12	30	12	0	2	54	266
6:45 PM	10	42	9	0	4	61	25	50	3	0	2	78	6	26	21	0	2	53	8	21	16	0	3	45	237
Hourly Total	47	175	28	0	17	250	106	246	19	0	6	371	27	117	87	0	9	231	33	126	48	0	8	207	1059
Grand Total	431	2089	173	1	90	2694	855	2065	153	0	44	3073	206	1166	811	1	60	2184	461	1409	445	2	77	2317	10268
Approach %	16.0	77.5	6.4	0.0	-	-	27.8	67.2	5.0	0.0	-	-	9.4	53.4	37.1	0.0	-	-	19.9	60.8	19.2	0.1	-	-	-
Total %	4.2	20.3	1.7	0.0	-	26.2	8.3	20.1	1.5	0.0	-	29.9	2.0	11.4	7.9	0.0	-	21.3	4.5	13.7	4.3	0.0	-	22.6	-
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	0	3	0	-	3	5
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.7	0.0	-	0.1	0.0
Cars & Light Goods	426	2045	166	1	-	2638	845	1994	153	0	-	2992	201	1147	800	1	-	2149	419	1393	439	2	-	2253	10032
% Cars & Light Goods	98.8	97.9	96.0	100.0	-	97.9	98.8	96.6	100.0	-	-	97.4	97.6	98.4	98.6	100.0	-	98.4	90.9	98.9	98.7	100.0	-	97.2	97.7
Buses	3	26	0	0	-	29	1	43	0	0	-	44	1	3	9	0	-	13	39	4	1	0	-	44	130
% Buses	0.7	1.2	0.0	0.0	-	1.1	0.1	2.1	0.0	-	-	1.4	0.5	0.3	1.1	0.0	-	0.6	8.5	0.3	0.2	0.0	-	1.9	1.3
Single-Unit Trucks	2	15	4	0	-	21	7	22	0	0	-	29	4	8	1	0	-	13	3	10	2	0	-	15	78
% Single-Unit Trucks	0.5	0.7	2.3	0.0	-	0.8	0.8	1.1	0.0	-	-	0.9	1.9	0.7	0.1	0.0	-	0.6	0.7	0.7	0.4	0.0	-	0.6	0.8
Articulated Trucks	0	2	2	0	-	4	2	1	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	7
% Articulated Trucks	0.0	0.1	1.2	0.0	-	0.1	0.2	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	1	1	0	-	2	0	4	0	0	-	4	0	7	1	0	-	8	0	2	0	0	-	2	16
% Bicycles on Road	0.0	0.0	0.6	0.0	-	0.1	0.0	0.2	0.0	-	-	0.1	0.0	0.6	0.1	0.0	-	0.4	0.0	0.1	0.0	0.0	-	0.1	0.2
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	3.3	-	-	-	-	-	4.5	-	-	-	-	-	0.0	-	-	-	-	-	3.9	-	-
Pedestrians	-	-	-	-	87	-	-	-	-	-	42	-	-	-	-	-	60	-	-	-	-	-	74	-	-
% Pedestrians	-	-	-	-	96.7	-	-	-	-	-	95.5	-	-	-	-	-	100.0	-	-	-	-	-	96.1	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 4

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

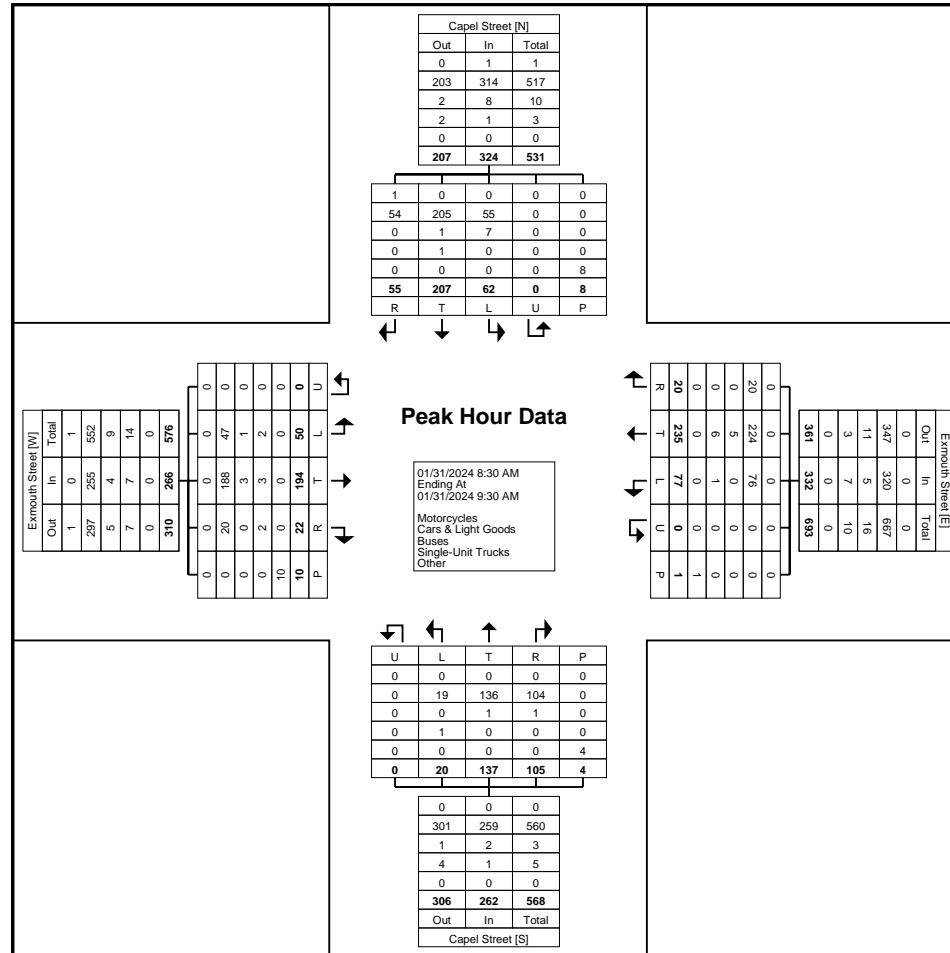
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Capel Street Northbound						Capel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	10	43	3	0	1	56	17	59	7	0	0	83	6	35	31	0	0	72	17	54	16	0	1	87	298
8:45 AM	11	53	8	0	4	72	28	63	7	0	0	98	9	40	26	0	1	75	15	60	17	0	1	92	337
9:00 AM	14	43	5	0	4	62	13	52	4	0	1	69	3	40	23	0	2	66	12	51	9	0	5	72	269
9:15 AM	15	55	6	0	1	76	19	61	2	0	0	82	2	22	25	0	1	49	18	42	13	0	1	73	280
<b>Total</b>	<b>50</b>	<b>194</b>	<b>22</b>	<b>0</b>	<b>10</b>	<b>266</b>	<b>77</b>	<b>235</b>	<b>20</b>	<b>0</b>	<b>1</b>	<b>332</b>	<b>20</b>	<b>137</b>	<b>105</b>	<b>0</b>	<b>4</b>	<b>262</b>	<b>62</b>	<b>207</b>	<b>55</b>	<b>0</b>	<b>8</b>	<b>324</b>	<b>1184</b>
Approach %	18.8	72.9	8.3	0.0	-	-	23.2	70.8	6.0	0.0	-	-	7.6	52.3	40.1	0.0	-	-	19.1	63.9	17.0	0.0	-	-	-
Total %	4.2	16.4	1.9	0.0	-	22.5	6.5	19.8	1.7	0.0	-	28.0	1.7	11.6	8.9	0.0	-	22.1	5.2	17.5	4.6	0.0	-	27.4	-
PHF	0.833	0.882	0.688	0.000	-	0.875	0.688	0.933	0.714	0.000	-	0.847	0.556	0.856	0.847	0.000	-	0.873	0.861	0.863	0.809	0.000	-	0.880	0.878
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.8	-	-	0.3	0.1
Cars & Light Goods	47	188	20	0	-	255	76	224	20	0	-	320	19	136	104	0	-	259	55	205	54	0	-	314	1148
% Cars & Light Goods	94.0	96.9	90.9	-	-	95.9	98.7	95.3	100.0	-	-	96.4	95.0	99.3	99.0	-	-	98.9	88.7	99.0	98.2	-	-	96.9	97.0
Buses	1	3	0	0	-	4	0	5	0	0	-	5	0	1	1	0	-	2	7	1	0	0	-	8	19
% Buses	2.0	1.5	0.0	-	-	1.5	0.0	2.1	0.0	-	-	1.5	0.0	0.7	1.0	-	-	0.8	11.3	0.5	0.0	-	-	2.5	1.6
Single-Unit Trucks	2	3	2	0	-	7	1	6	0	0	-	7	1	0	0	0	-	1	0	1	0	0	-	1	16
% Single-Unit Trucks	4.0	1.5	9.1	-	-	2.6	1.3	2.6	0.0	-	-	2.1	5.0	0.0	0.0	-	-	0.4	0.0	0.5	0.0	-	-	0.3	1.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 5



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





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

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

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Capel Street Northbound						Capel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	15	120	4	0	1	139	39	74	6	0	2	119	10	57	37	0	2	104	23	42	16	0	3	81	443
12:15 PM	8	91	3	0	1	102	39	79	3	0	2	121	9	35	34	0	3	78	15	34	12	0	3	61	362
12:30 PM	17	61	10	0	6	88	34	95	8	0	6	137	12	34	24	0	7	70	22	42	11	0	5	75	370
12:45 PM	17	85	4	0	5	106	29	81	8	0	0	118	13	35	35	1	4	84	20	46	17	0	1	83	391
<b>Total</b>	<b>57</b>	<b>357</b>	<b>21</b>	<b>0</b>	<b>13</b>	<b>435</b>	<b>141</b>	<b>329</b>	<b>25</b>	<b>0</b>	<b>10</b>	<b>495</b>	<b>44</b>	<b>161</b>	<b>130</b>	<b>1</b>	<b>16</b>	<b>336</b>	<b>80</b>	<b>164</b>	<b>56</b>	<b>0</b>	<b>12</b>	<b>300</b>	<b>1566</b>
Approach %	13.1	82.1	4.8	0.0	-	-	28.5	66.5	5.1	0.0	-	-	13.1	47.9	38.7	0.3	-	-	26.7	54.7	18.7	0.0	-	-	-
Total %	3.6	22.8	1.3	0.0	-	27.8	9.0	21.0	1.6	0.0	-	31.6	2.8	10.3	8.3	0.1	-	21.5	5.1	10.5	3.6	0.0	-	19.2	-
PHF	0.838	0.744	0.525	0.000	-	0.782	0.904	0.866	0.781	0.000	-	0.903	0.846	0.706	0.878	0.250	-	0.808	0.870	0.891	0.824	0.000	-	0.904	0.884
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	57	353	20	0	-	430	139	322	25	0	-	486	44	158	129	1	-	332	74	164	56	0	-	294	1542
% Cars & Light Goods	100.0	98.9	95.2	-	-	98.9	98.6	97.9	100.0	-	-	98.2	100.0	98.1	99.2	100.0	-	98.8	92.5	100.0	100.0	-	-	98.0	98.5
Buses	0	3	0	0	-	3	0	4	0	0	-	4	0	0	1	0	-	1	4	0	0	0	-	4	12
% Buses	0.0	0.8	0.0	-	-	0.7	0.0	1.2	0.0	-	-	0.8	0.0	0.0	0.8	0.0	-	0.3	5.0	0.0	0.0	-	-	1.3	0.8
Single-Unit Trucks	0	1	1	0	-	2	2	2	0	0	-	4	0	2	0	0	-	2	2	0	0	0	-	2	10
% Single-Unit Trucks	0.0	0.3	4.8	-	-	0.5	1.4	0.6	0.0	-	-	0.8	0.0	1.2	0.0	0.0	-	0.6	2.5	0.0	0.0	-	-	0.7	0.6
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	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.6	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	10	-	-	-	-	-	16	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 8

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

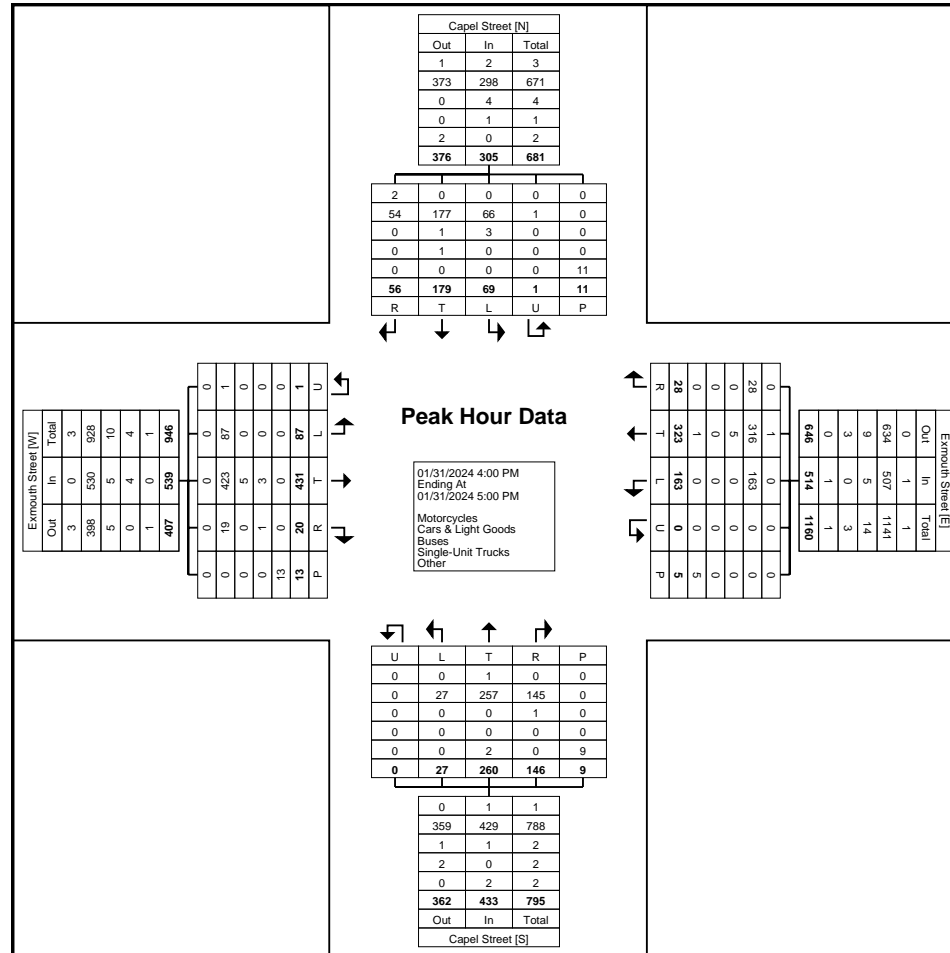
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Capel Street Northbound						Capel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	18	112	4	1	1	135	34	83	10	0	2	127	4	84	44	0	5	132	13	41	15	1	3	70	464
4:15 PM	30	99	7	0	2	136	39	82	5	0	2	126	12	61	37	0	1	110	16	56	17	0	4	89	461
4:30 PM	17	123	4	0	3	144	45	64	7	0	1	116	9	58	36	0	0	103	27	40	15	0	1	82	445
4:45 PM	22	97	5	0	7	124	45	94	6	0	0	145	2	57	29	0	3	88	13	42	9	0	3	64	421
<b>Total</b>	<b>87</b>	<b>431</b>	<b>20</b>	<b>1</b>	<b>13</b>	<b>539</b>	<b>163</b>	<b>323</b>	<b>28</b>	<b>0</b>	<b>5</b>	<b>514</b>	<b>27</b>	<b>260</b>	<b>146</b>	<b>0</b>	<b>9</b>	<b>433</b>	<b>69</b>	<b>179</b>	<b>56</b>	<b>1</b>	<b>11</b>	<b>305</b>	<b>1791</b>
Approach %	16.1	80.0	3.7	0.2	-	-	31.7	62.8	5.4	0.0	-	-	6.2	60.0	33.7	0.0	-	-	22.6	58.7	18.4	0.3	-	-	-
Total %	4.9	24.1	1.1	0.1	-	30.1	9.1	18.0	1.6	0.0	-	28.7	1.5	14.5	8.2	0.0	-	24.2	3.9	10.0	3.1	0.1	-	17.0	-
PHF	0.725	0.876	0.714	0.250	-	0.936	0.906	0.859	0.700	0.000	-	0.886	0.563	0.774	0.830	0.000	-	0.820	0.639	0.799	0.824	0.250	-	0.857	0.965
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	0	0	2	0	-	2	4
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.4	0.0	-	-	0.2	0.0	0.0	3.6	0.0	-	0.7	0.2
Cars & Light Goods	87	423	19	1	-	530	163	316	28	0	-	507	27	257	145	0	-	429	66	177	54	1	-	298	1764
% Cars & Light Goods	100.0	98.1	95.0	100.0	-	98.3	100.0	97.8	100.0	-	-	98.6	100.0	98.8	99.3	-	-	99.1	95.7	98.9	96.4	100.0	-	97.7	98.5
Buses	0	5	0	0	-	5	0	5	0	0	-	5	0	0	1	0	-	1	3	1	0	0	-	4	15
% Buses	0.0	1.2	0.0	0.0	-	0.9	0.0	1.5	0.0	-	-	1.0	0.0	0.0	0.7	-	-	0.2	4.3	0.6	0.0	0.0	-	1.3	0.8
Single-Unit Trucks	0	3	1	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	5
% Single-Unit Trucks	0.0	0.7	5.0	0.0	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	0.0	-	0.3	0.3
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	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.8	0.0	-	-	0.5	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	15.4	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	9.1	-	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	5	-	-	-	-	-	9	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	84.6	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	90.9	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Capel Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 9



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Plaza Driveway Northbound						Highway 402 Off Ramp 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	56	0	0	0	56	0	55	0	0	0	55	0	0	0	0	1	0	5	0	0	0	1	5	116
7:15 AM	0	60	0	0	0	60	1	62	0	0	0	63	0	0	0	0	6	0	3	0	0	0	1	3	126
7:30 AM	0	70	0	0	0	70	0	82	0	0	0	82	0	0	0	0	4	0	9	0	1	0	2	10	162
7:45 AM	0	86	0	0	0	86	0	130	0	0	0	130	0	0	0	0	9	0	6	0	1	0	0	7	223
Hourly Total	0	272	0	0	0	272	1	329	0	0	0	330	0	0	0	0	20	0	23	0	2	0	4	25	627
8:00 AM	0	91	0	0	0	91	0	105	0	0	0	105	0	0	0	0	3	0	8	0	1	0	0	9	205
8:15 AM	0	69	0	0	0	69	1	114	0	0	0	115	0	0	0	0	4	0	7	0	3	0	1	10	194
8:30 AM	0	124	0	0	0	124	0	138	0	0	0	138	0	0	0	0	4	0	7	0	0	0	1	7	269
8:45 AM	0	131	0	0	0	131	0	168	0	0	0	168	0	0	0	0	5	0	8	0	0	0	1	8	307
Hourly Total	0	415	0	0	0	415	1	525	0	0	0	526	0	0	0	0	16	0	30	0	4	0	3	34	975
9:00 AM	0	121	1	0	0	122	0	113	0	0	0	113	0	0	0	0	1	0	10	0	2	0	0	12	247
9:15 AM	0	118	0	0	0	118	0	114	0	0	0	114	1	0	1	0	5	2	5	0	1	0	1	6	240
9:30 AM	0	123	0	0	0	123	0	124	0	0	0	124	1	0	2	0	2	3	8	0	0	0	1	8	258
9:45 AM	0	138	0	0	0	138	2	128	0	0	0	130	0	0	0	0	7	0	6	0	2	0	1	8	276
Hourly Total	0	500	1	0	0	501	2	479	0	0	0	481	2	0	3	0	15	5	29	0	5	0	3	34	1021
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	183	0	0	0	183	0	148	0	0	0	148	1	0	2	0	3	3	8	0	1	0	4	9	343
11:45 AM	0	198	1	0	0	199	1	185	0	0	0	186	0	0	1	0	12	1	9	0	2	0	2	11	397
Hourly Total	0	381	1	0	0	382	1	333	0	0	0	334	1	0	3	0	15	4	17	0	3	0	6	20	740
12:00 PM	0	197	0	0	0	197	3	127	0	0	0	130	0	0	4	0	9	4	8	0	2	1	3	11	342
12:15 PM	0	190	1	0	1	191	1	166	0	0	0	167	0	0	2	0	2	2	6	0	1	0	1	7	367
12:30 PM	0	157	0	0	0	157	2	172	0	0	0	174	0	0	3	0	8	3	16	0	1	0	0	17	351
12:45 PM	0	164	0	0	0	164	0	197	0	0	0	197	0	0	1	0	8	1	15	0	2	0	2	17	379
Hourly Total	0	708	1	0	1	709	6	662	0	0	0	668	0	0	10	0	27	10	45	0	6	1	6	52	1439
1:00 PM	0	175	0	0	0	175	4	149	0	0	2	153	0	0	3	0	15	3	11	0	0	0	4	11	342
1:15 PM	0	191	0	0	0	191	0	156	0	0	0	156	0	0	3	0	7	3	5	0	5	0	0	10	360
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	366	0	0	0	366	4	305	0	0	2	309	0	0	6	0	22	6	16	0	5	0	4	21	702
4:00 PM	0	202	0	0	0	202	1	175	0	0	0	176	0	0	5	0	5	5	14	1	6	0	2	21	404
4:15 PM	0	198	2	0	0	200	1	179	0	0	0	180	0	0	2	0	17	2	9	1	2	0	2	12	394
4:30 PM	0	228	1	0	0	229	0	165	0	1	1	166	0	0	2	0	16	2	16	0	0	0	2	16	413
4:45 PM	0	204	1	0	0	205	5	147	0	0	0	152	0	0	4	0	7	4	13	0	4	0	2	17	378
Hourly Total	0	832	4	0	0	836	7	666	0	1	1	674	0	0	13	0	45	13	52	2	12	0	8	66	1589
5:00 PM	0	210	2	0	0	212	1	158	0	1	1	160	1	0	4	0	5	5	10	0	3	0	1	13	390
5:15 PM	0	179	0	0	0	179	3	164	0	0	0	167	0	0	4	0	6	4	9	0	4	0	1	13	363

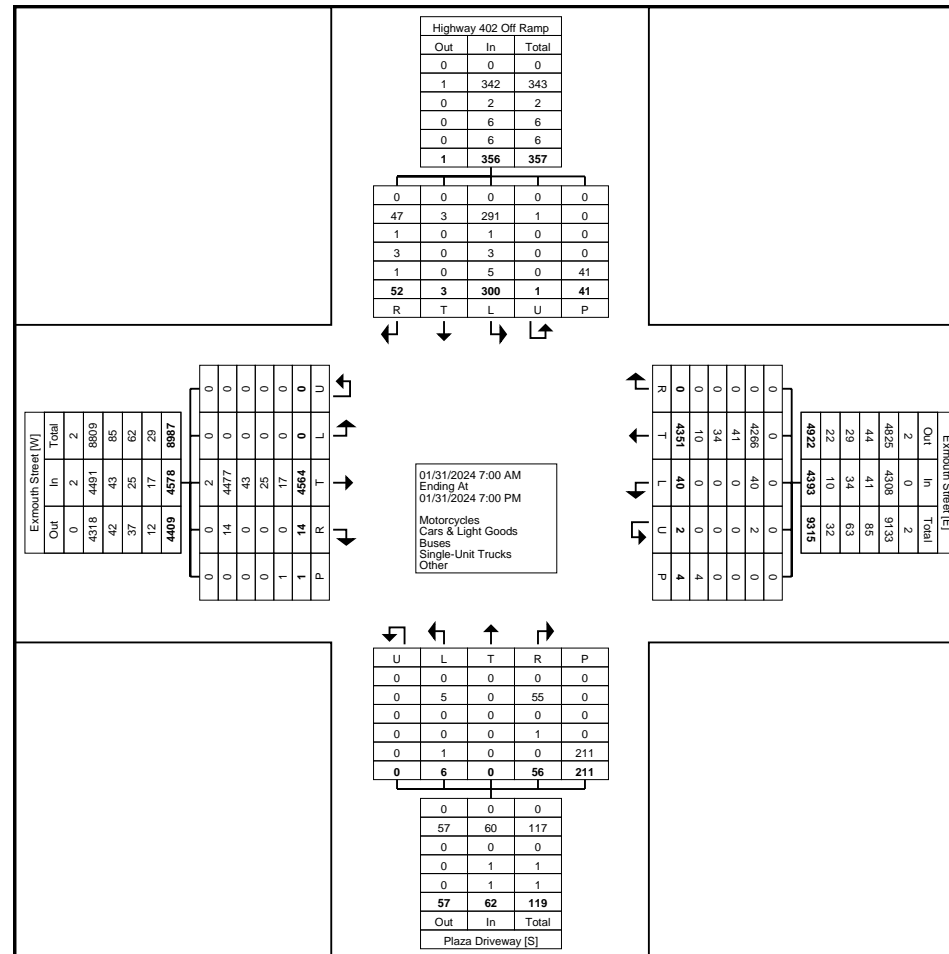
5:30 PM	0	141	2	0	0	143	3	132	0	0	0	135	0	0	2	0	4	2	10	0	3	0	1	13	293
5:45 PM	0	142	1	0	0	143	0	110	0	0	0	110	1	0	5	0	7	6	16	0	2	0	1	18	277
Hourly Total	0	672	5	0	0	677	7	564	0	1	1	572	2	0	15	0	22	17	45	0	12	0	4	57	1323
6:00 PM	0	117	1	0	0	118	1	150	0	0	0	151	1	0	2	0	6	3	13	0	2	0	0	15	287
6:15 PM	0	118	1	0	0	119	4	116	0	0	0	120	0	0	3	0	6	3	6	1	0	0	2	7	249
6:30 PM	0	92	0	0	0	92	4	108	0	0	0	112	0	0	1	0	14	1	9	0	0	0	1	9	214
6:45 PM	0	91	0	0	0	91	2	114	0	0	0	116	0	0	0	0	3	0	15	0	1	0	0	16	223
Hourly Total	0	418	2	0	0	420	11	488	0	0	0	499	1	0	6	0	29	7	43	1	3	0	3	47	973
Grand Total	0	4564	14	0	1	4578	40	4351	0	2	4	4393	6	0	56	0	211	62	300	3	52	1	41	356	9389
Approach %	0.0	99.7	0.3	0.0	-	-	0.9	99.0	0.0	0.0	-	-	9.7	0.0	90.3	0.0	-	-	84.3	0.8	14.6	0.3	-	-	-
Total %	0.0	48.6	0.1	0.0	-	48.8	0.4	46.3	0.0	0.0	-	46.8	0.1	0.0	0.6	0.0	-	0.7	3.2	0.0	0.6	0.0	-	3.8	-
Motorcycles	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	0	4477	14	0	-	4491	40	4266	0	2	-	4308	5	0	55	0	-	60	291	3	47	1	-	342	9201
% Cars & Light Goods	-	98.1	100.0	-	-	98.1	100.0	98.0	-	100.0	-	98.1	83.3	-	98.2	-	-	96.8	97.0	100.0	90.4	100.0	-	96.1	98.0
Buses	0	43	0	0	-	43	0	41	0	0	-	41	0	0	0	0	-	0	1	0	1	0	-	2	86
% Buses	-	0.9	0.0	-	-	0.9	0.0	0.9	-	0.0	-	0.9	0.0	-	0.0	-	-	0.0	0.3	0.0	1.9	0.0	-	0.6	0.9
Single-Unit Trucks	0	25	0	0	-	25	0	34	0	0	-	34	0	0	1	0	-	1	3	0	3	0	-	6	66
% Single-Unit Trucks	-	0.5	0.0	-	-	0.5	0.0	0.8	-	0.0	-	0.8	0.0	-	1.8	-	-	1.6	1.0	0.0	5.8	0.0	-	1.7	0.7
Articulated Trucks	0	9	0	0	-	9	0	9	0	0	-	9	0	0	0	0	-	0	5	0	1	0	-	6	24
% Articulated Trucks	-	0.2	0.0	-	-	0.2	0.0	0.2	-	0.0	-	0.2	0.0	-	0.0	-	-	0.0	1.7	0.0	1.9	0.0	-	1.7	0.3
Bicycles on Road	0	8	0	0	-	8	0	1	0	0	-	1	1	0	0	0	-	1	0	0	0	0	-	0	10
% Bicycles on Road	-	0.2	0.0	-	-	0.2	0.0	0.0	-	0.0	-	0.0	16.7	-	0.0	-	-	1.6	0.0	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	25.0	-	-	-	-	-	0.9	-	-	-	-	-	9.8	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	209	-	-	-	-	-	37	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	75.0	-	-	-	-	-	99.1	-	-	-	-	-	90.2	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 4

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

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Plaza Driveway Northbound						Highway 402 Off Ramp Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	0	124	0	0	0	124	0	138	0	0	0	138	0	0	0	0	4	0	7	0	0	0	1	7	269
8:45 AM	0	131	0	0	0	131	0	168	0	0	0	168	0	0	0	0	5	0	8	0	0	0	1	8	307
9:00 AM	0	121	1	0	0	122	0	113	0	0	0	113	0	0	0	0	1	0	10	0	2	0	0	12	247
9:15 AM	0	118	0	0	0	118	0	114	0	0	0	114	1	0	1	0	5	2	5	0	1	0	1	6	240
Total	0	494	1	0	0	495	0	533	0	0	0	533	1	0	1	0	15	2	30	0	3	0	3	33	1063
Approach %	0.0	99.8	0.2	0.0	-	-	0.0	100.0	0.0	0.0	-	-	50.0	0.0	50.0	0.0	-	-	90.9	0.0	9.1	0.0	-	-	-
Total %	0.0	46.5	0.1	0.0	-	46.6	0.0	50.1	0.0	0.0	-	50.1	0.1	0.0	0.1	0.0	-	0.2	2.8	0.0	0.3	0.0	-	3.1	-
PHF	0.000	0.943	0.250	0.000	-	0.945	0.000	0.793	0.000	0.000	-	0.793	0.250	0.000	0.250	0.000	-	0.250	0.750	0.000	0.375	0.000	-	0.688	0.866
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Cars & Light Goods	0	482	1	0	-	483	0	518	0	0	-	518	1	0	1	0	-	2	29	0	2	0	-	31	1034
% Cars & Light Goods	-	97.6	100.0	-	-	97.6	-	97.2	-	-	-	97.2	100.0	-	100.0	-	-	100.0	96.7	-	66.7	-	-	93.9	97.3
Buses	0	7	0	0	-	7	0	7	0	0	-	7	0	0	0	0	-	0	0	0	0	0	-	0	14
% Buses	-	1.4	0.0	-	-	1.4	-	1.3	-	-	-	1.3	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	1.3
Single-Unit Trucks	0	4	0	0	-	4	0	6	0	0	-	6	0	0	0	0	-	0	1	0	1	0	-	2	12
% Single-Unit Trucks	-	0.8	0.0	-	-	0.8	-	1.1	-	-	-	1.1	0.0	-	0.0	-	-	0.0	3.3	-	33.3	-	-	6.1	1.1
Articulated Trucks	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	-	0.2	0.0	-	-	0.2	-	0.4	-	-	-	0.4	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	15	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-







Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

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

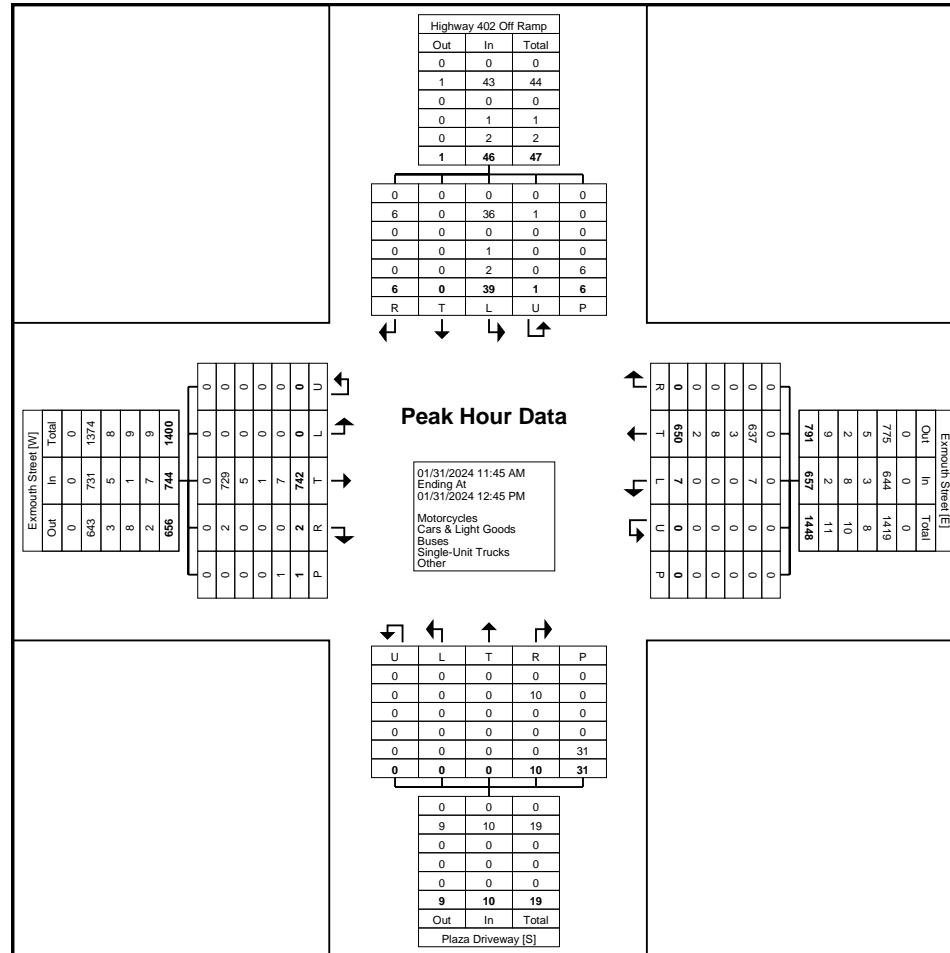
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Plaza Driveway Northbound						Highway 402 Off Ramp Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	0	198	1	0	0	199	1	185	0	0	0	186	0	0	1	0	12	1	9	0	2	0	2	11	397
12:00 PM	0	197	0	0	0	197	3	127	0	0	0	130	0	0	4	0	9	4	8	0	2	1	3	11	342
12:15 PM	0	190	1	0	1	191	1	166	0	0	0	167	0	0	2	0	2	2	6	0	1	0	1	7	367
12:30 PM	0	157	0	0	0	157	2	172	0	0	0	174	0	0	3	0	8	3	16	0	1	0	0	17	351
<b>Total</b>	<b>0</b>	<b>742</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>744</b>	<b>7</b>	<b>650</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>657</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>31</b>	<b>10</b>	<b>39</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>46</b>	<b>1457</b>
Approach %	0.0	99.7	0.3	0.0	-	-	1.1	98.9	0.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	84.8	0.0	13.0	2.2	-	-	-
Total %	0.0	50.9	0.1	0.0	-	51.1	0.5	44.6	0.0	0.0	-	45.1	0.0	0.0	0.7	0.0	-	0.7	2.7	0.0	0.4	0.1	-	3.2	-
PHF	0.000	0.937	0.500	0.000	-	0.935	0.583	0.878	0.000	0.000	-	0.883	0.000	0.000	0.625	0.000	-	0.625	0.609	0.000	0.750	0.250	-	0.676	0.918
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0
Cars & Light Goods	0	729	2	0	-	731	7	637	0	0	-	644	0	0	10	0	-	10	36	0	6	1	-	43	1428
% Cars & Light Goods	-	98.2	100.0	-	-	98.3	100.0	98.0	-	-	-	98.0	-	-	100.0	-	-	100.0	92.3	-	100.0	100.0	-	93.5	98.0
Buses	0	5	0	0	-	5	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	8
% Buses	-	0.7	0.0	-	-	0.7	0.0	0.5	-	-	-	0.5	-	-	0.0	-	-	0.0	0.0	-	0.0	0.0	-	0.0	0.5
Single-Unit Trucks	0	1	0	0	-	1	0	8	0	0	-	8	0	0	0	0	-	0	1	0	0	0	-	1	10
% Single-Unit Trucks	-	0.1	0.0	-	-	0.1	0.0	1.2	-	-	-	1.2	-	-	0.0	-	-	0.0	2.6	-	0.0	0.0	-	2.2	0.7
Articulated Trucks	0	6	0	0	-	6	0	2	0	0	-	2	0	0	0	0	-	0	2	0	0	0	-	2	10
% Articulated Trucks	-	0.8	0.0	-	-	0.8	0.0	0.3	-	-	-	0.3	-	-	0.0	-	-	0.0	5.1	-	0.0	0.0	-	4.3	0.7
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	-	0.1	0.0	-	-	0.1	0.0	0.0	-	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	31	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 7



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 8

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

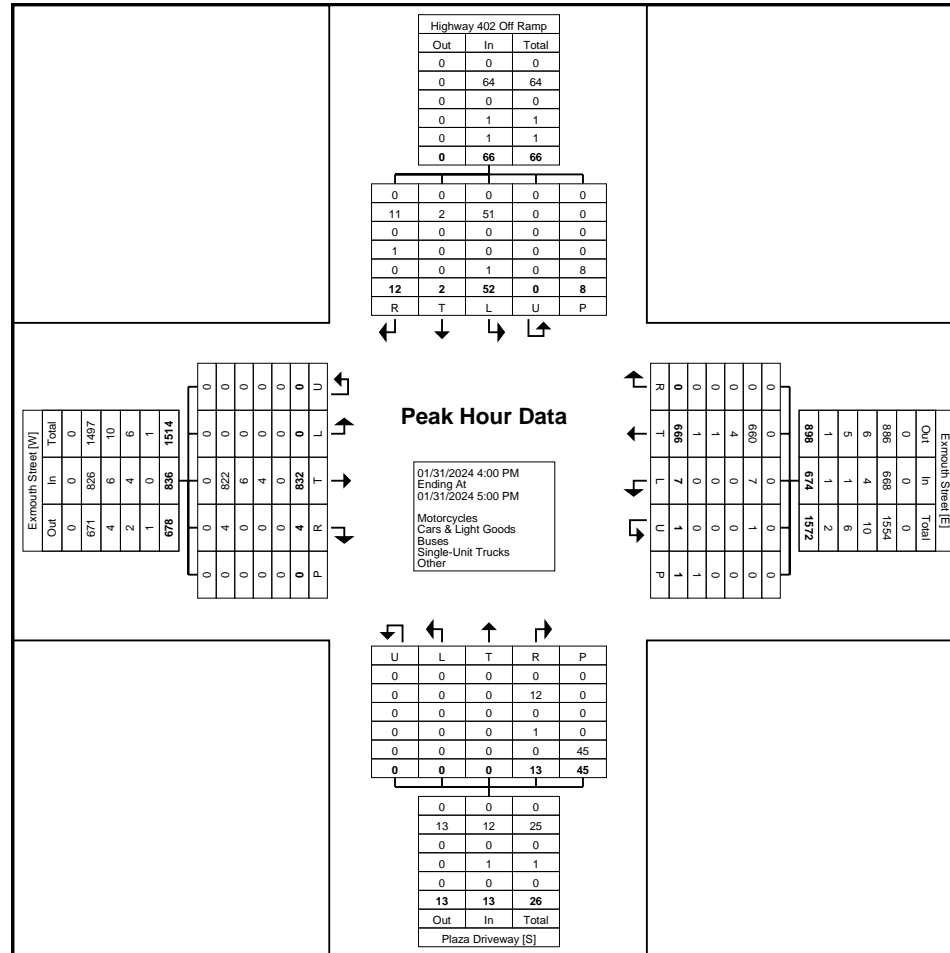
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Plaza Driveway Northbound						Highway 402 Off Ramp Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	0	202	0	0	0	202	1	175	0	0	0	176	0	0	5	0	5	5	14	1	6	0	2	21	404
4:15 PM	0	198	2	0	0	200	1	179	0	0	0	180	0	0	2	0	17	2	9	1	2	0	2	12	394
4:30 PM	0	228	1	0	0	229	0	165	0	1	1	166	0	0	2	0	16	2	16	0	0	0	2	16	413
4:45 PM	0	204	1	0	0	205	5	147	0	0	0	152	0	0	4	0	7	4	13	0	4	0	2	17	378
<b>Total</b>	<b>0</b>	<b>832</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>836</b>	<b>7</b>	<b>666</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>674</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>45</b>	<b>13</b>	<b>52</b>	<b>2</b>	<b>12</b>	<b>0</b>	<b>8</b>	<b>66</b>	<b>1589</b>
Approach %	0.0	99.5	0.5	0.0	-	-	1.0	98.8	0.0	0.1	-	-	0.0	0.0	100.0	0.0	-	-	78.8	3.0	18.2	0.0	-	-	-
Total %	0.0	52.4	0.3	0.0	-	52.6	0.4	41.9	0.0	0.1	-	42.4	0.0	0.0	0.8	0.0	-	0.8	3.3	0.1	0.8	0.0	-	4.2	-
PHF	0.000	0.912	0.500	0.000	-	0.913	0.350	0.930	0.000	0.250	-	0.936	0.000	0.000	0.650	0.000	-	0.650	0.813	0.500	0.500	0.000	-	0.786	0.962
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	0	822	4	0	-	826	7	660	0	1	-	668	0	0	12	0	-	12	51	2	11	0	-	64	1570
% Cars & Light Goods	-	98.8	100.0	-	-	98.8	100.0	99.1	-	100.0	-	99.1	-	-	92.3	-	-	92.3	98.1	100.0	91.7	-	-	97.0	98.8
Buses	0	6	0	0	-	6	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	10
% Buses	-	0.7	0.0	-	-	0.7	0.0	0.6	-	0.0	-	0.6	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Single-Unit Trucks	0	4	0	0	-	4	0	1	0	0	-	1	0	0	1	0	-	1	0	0	1	0	-	1	7
% Single-Unit Trucks	-	0.5	0.0	-	-	0.5	0.0	0.2	-	0.0	-	0.1	-	-	7.7	-	-	7.7	0.0	0.0	8.3	-	-	1.5	0.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Articulated Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	-	-	0.0	-	-	0.0	1.9	0.0	0.0	-	-	1.5	0.1
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.2	-	0.0	-	0.1	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	12.5	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	45	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	87.5	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Highway 402 Off Ramp  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 9



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Indian Road Northbound						Indian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	14	30	16	0	0	60	9	32	5	0	0	46	7	22	7	0	1	36	3	57	11	0	0	71	213
7:15 AM	21	30	14	0	0	65	6	32	8	0	0	46	10	44	7	0	1	61	4	74	21	0	0	99	271
7:30 AM	25	28	20	0	0	73	7	35	15	0	1	57	15	40	8	0	0	63	9	84	35	0	0	128	321
7:45 AM	27	32	26	0	2	85	15	56	8	0	0	79	22	47	5	0	2	74	19	107	57	0	0	183	421
Hourly Total	87	120	76	0	2	283	37	155	36	0	1	228	54	153	27	0	4	234	35	322	124	0	0	481	1226
8:00 AM	25	48	22	0	0	95	11	50	12	0	0	73	17	73	7	0	0	97	19	87	25	0	0	131	396
8:15 AM	21	36	17	0	2	74	10	60	19	0	0	89	12	52	14	0	0	78	16	91	42	0	0	149	390
8:30 AM	31	70	23	0	0	124	14	67	21	0	0	102	37	50	11	0	0	98	15	75	42	0	0	132	456
8:45 AM	29	85	17	0	0	131	12	84	15	0	1	111	38	56	16	0	1	110	16	73	46	0	0	135	487
Hourly Total	106	239	79	0	2	424	47	261	67	0	1	375	104	231	48	0	1	383	66	326	155	0	0	547	1729
9:00 AM	26	74	30	0	0	130	17	62	6	0	0	85	20	45	6	0	2	71	13	64	33	0	0	110	396
9:15 AM	33	69	25	1	0	128	19	57	9	0	0	85	23	50	18	0	2	91	14	75	28	0	1	117	421
9:30 AM	22	80	20	0	5	122	20	60	10	0	0	90	26	37	10	0	0	73	7	66	42	0	2	115	400
9:45 AM	29	80	33	0	0	142	18	77	9	0	0	104	28	56	9	0	2	93	16	54	31	0	0	101	440
Hourly Total	110	303	108	1	5	522	74	256	34	0	0	364	97	188	43	0	6	328	50	259	134	0	3	443	1657
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	36	111	29	0	1	176	34	85	14	0	0	133	24	50	22	1	0	97	9	49	28	0	0	86	492
11:45 AM	38	122	32	0	1	192	25	111	15	0	0	151	29	50	19	0	6	98	9	60	37	0	0	106	547
Hourly Total	74	233	61	0	2	368	59	196	29	0	0	284	53	100	41	1	6	195	18	109	65	0	0	192	1039
12:00 PM	40	109	31	0	1	180	22	82	22	0	0	126	27	82	16	1	1	126	16	58	21	0	0	95	527
12:15 PM	41	119	33	0	2	193	24	112	15	0	0	151	26	55	18	0	4	99	10	57	24	0	0	91	534
12:30 PM	35	106	31	0	0	172	30	113	28	0	0	171	30	57	15	1	1	103	13	58	26	0	0	97	543
12:45 PM	31	99	25	0	0	155	23	115	24	0	0	162	38	74	15	0	0	127	15	57	36	0	0	108	552
Hourly Total	147	433	120	0	3	700	99	422	89	0	0	610	121	268	64	2	6	455	54	230	107	0	0	391	2156
1:00 PM	38	121	42	0	0	201	31	99	21	0	0	151	24	54	11	0	0	89	17	53	27	0	0	97	538
1:15 PM	44	91	37	0	0	172	25	111	15	0	0	151	31	62	15	0	3	108	14	45	18	0	0	77	508
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	82	212	79	0	0	373	56	210	36	0	0	302	55	116	26	0	3	197	31	98	45	0	0	174	1046
4:00 PM	71	111	47	0	2	229	22	92	16	0	1	130	42	122	22	0	3	186	18	58	28	0	1	104	649
4:15 PM	61	104	31	0	1	196	20	119	8	0	1	147	29	123	18	0	1	170	14	49	30	0	2	93	606
4:30 PM	68	129	40	0	14	237	17	86	21	0	0	124	40	99	18	0	9	157	10	57	31	0	6	98	616
4:45 PM	61	113	29	0	10	203	19	89	18	0	2	126	25	97	18	0	2	140	24	60	28	0	3	112	581
Hourly Total	261	457	147	0	27	865	78	386	63	0	4	527	136	441	76	0	15	653	66	224	117	0	12	407	2452
5:00 PM	78	115	36	0	6	229	24	94	17	0	2	135	34	98	24	1	2	157	13	73	31	0	6	117	638
5:15 PM	52	97	35	0	1	184	16	91	18	0	2	125	27	88	14	0	0	129	11	54	40	0	3	105	543

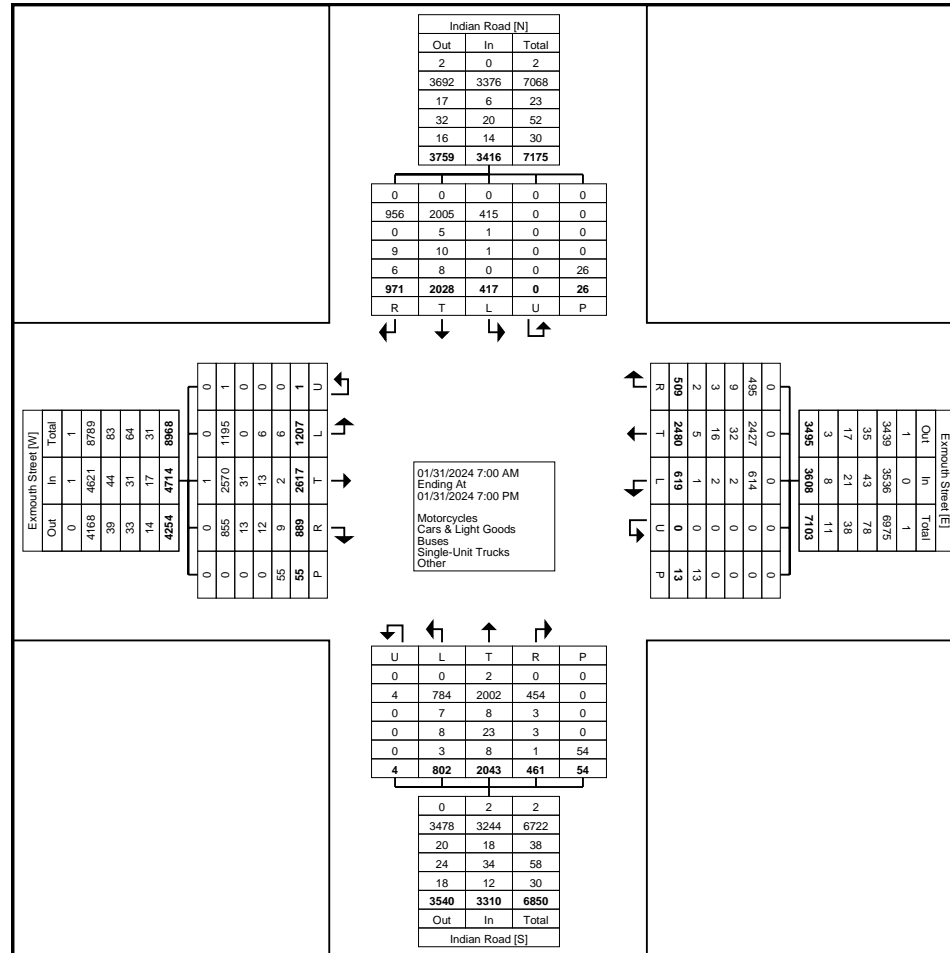
5:30 PM	50	79	23	0	3	152	26	78	28	0	0	132	21	73	18	0	0	112	10	74	30	0	2	114	510
5:45 PM	48	72	36	0	4	156	18	61	22	0	2	101	20	77	22	0	4	119	13	51	32	0	0	96	472
Hourly Total	228	363	130	0	14	721	84	324	85	0	6	493	102	336	78	1	6	517	47	252	133	0	11	432	2163
6:00 PM	34	73	27	0	0	134	21	73	22	0	1	116	28	55	19	0	2	102	15	52	26	0	0	93	445
6:15 PM	32	72	20	0	0	124	23	72	17	0	0	112	15	49	15	0	2	79	8	57	28	0	0	93	408
6:30 PM	26	58	21	0	0	105	15	59	17	0	0	91	18	53	13	0	2	84	15	43	19	0	0	77	357
6:45 PM	20	54	21	0	0	95	26	66	14	0	0	106	19	53	11	0	1	83	12	56	18	0	0	86	370
Hourly Total	112	257	89	0	0	458	85	270	70	0	1	425	80	210	58	0	7	348	50	208	91	0	0	349	1580
Grand Total	1207	2617	889	1	55	4714	619	2480	509	0	13	3608	802	2043	461	4	54	3310	417	2028	971	0	26	3416	15048
Approach %	25.6	55.5	18.9	0.0	-	-	17.2	68.7	14.1	0.0	-	-	24.2	61.7	13.9	0.1	-	-	12.2	59.4	28.4	0.0	-	-	-
Total %	8.0	17.4	5.9	0.0	-	31.3	4.1	16.5	3.4	0.0	-	24.0	5.3	13.6	3.1	0.0	-	22.0	2.8	13.5	6.5	0.0	-	22.7	-
Motorcycles	0	1	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	3
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	1195	2570	855	1	-	4621	614	2427	495	0	-	3536	784	2002	454	4	-	3244	415	2005	956	0	-	3376	14777
% Cars & Light Goods	99.0	98.2	96.2	100.0	-	98.0	99.2	97.9	97.2	-	-	98.0	97.8	98.0	98.5	100.0	-	98.0	99.5	98.9	98.5	-	-	98.8	98.2
Buses	0	31	13	0	-	44	2	32	9	0	-	43	7	8	3	0	-	18	1	5	0	0	-	6	111
% Buses	0.0	1.2	1.5	0.0	-	0.9	0.3	1.3	1.8	-	-	1.2	0.9	0.4	0.7	0.0	-	0.5	0.2	0.2	0.0	-	-	0.2	0.7
Single-Unit Trucks	6	13	12	0	-	31	2	16	3	0	-	21	8	23	3	0	-	34	1	10	9	0	-	20	106
% Single-Unit Trucks	0.5	0.5	1.3	0.0	-	0.7	0.3	0.6	0.6	-	-	0.6	1.0	1.1	0.7	0.0	-	1.0	0.2	0.5	0.9	-	-	0.6	0.7
Articulated Trucks	6	1	9	0	-	16	1	3	2	0	-	6	3	7	1	0	-	11	0	7	6	0	-	13	46
% Articulated Trucks	0.5	0.0	1.0	0.0	-	0.3	0.2	0.1	0.4	-	-	0.2	0.4	0.3	0.2	0.0	-	0.3	0.0	0.3	0.6	-	-	0.4	0.3
Bicycles on Road	0	1	0	0	-	1	0	2	0	0	-	2	0	1	0	0	-	1	0	1	0	0	-	1	5
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	7.4	-	-	-	-	-	23.1	-	-
Pedestrians	-	-	-	-	55	-	-	-	-	-	13	-	-	-	-	-	50	-	-	-	-	-	20	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	92.6	-	-	-	-	-	76.9	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 4

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

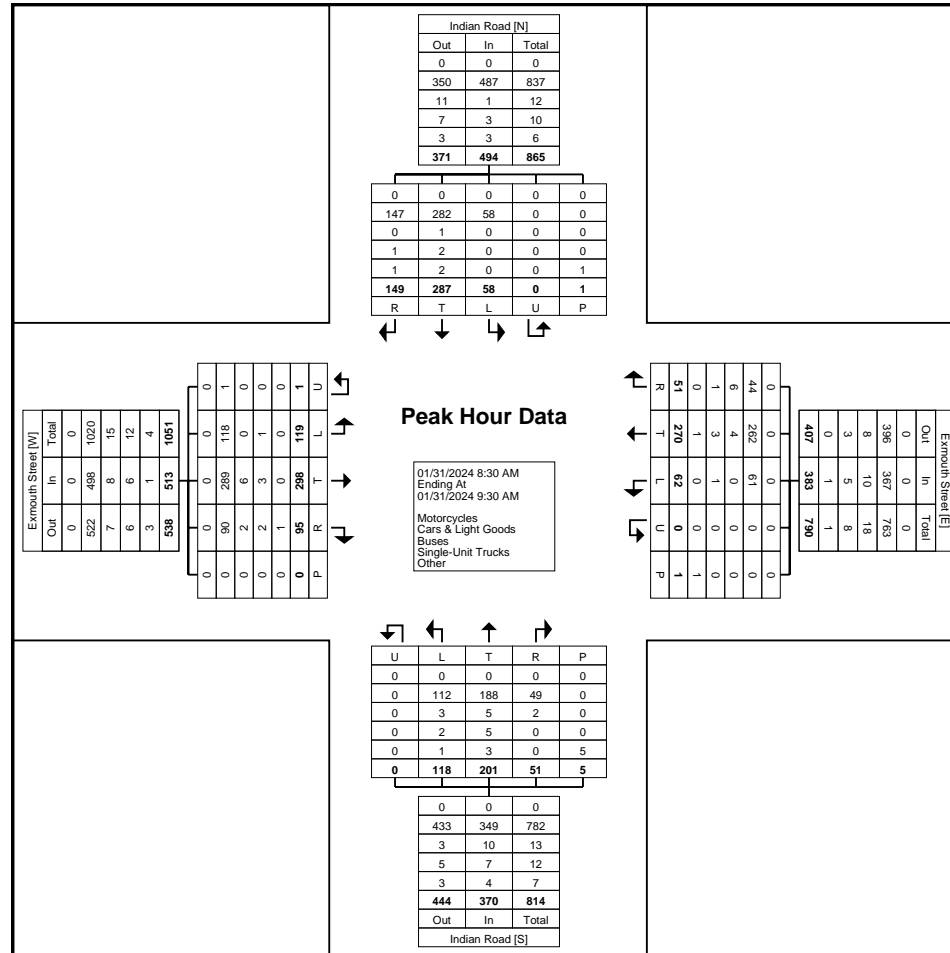
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Indian Road Northbound						Indian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	31	70	23	0	0	124	14	67	21	0	0	102	37	50	11	0	0	98	15	75	42	0	0	132	456
8:45 AM	29	85	17	0	0	131	12	84	15	0	1	111	38	56	16	0	1	110	16	73	46	0	0	135	487
9:00 AM	26	74	30	0	0	130	17	62	6	0	0	85	20	45	6	0	2	71	13	64	33	0	0	110	396
9:15 AM	33	69	25	1	0	128	19	57	9	0	0	85	23	50	18	0	2	91	14	75	28	0	1	117	421
Total	119	298	95	1	0	513	62	270	51	0	1	383	118	201	51	0	5	370	58	287	149	0	1	494	1760
Approach %	23.2	58.1	18.5	0.2	-	-	16.2	70.5	13.3	0.0	-	-	31.9	54.3	13.8	0.0	-	-	11.7	58.1	30.2	0.0	-	-	-
Total %	6.8	16.9	5.4	0.1	-	29.1	3.5	15.3	2.9	0.0	-	21.8	6.7	11.4	2.9	0.0	-	21.0	3.3	16.3	8.5	0.0	-	28.1	-
PHF	0.902	0.876	0.792	0.250	-	0.979	0.816	0.804	0.607	0.000	-	0.863	0.776	0.897	0.708	0.000	-	0.841	0.906	0.957	0.810	0.000	-	0.915	0.903
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	118	289	90	1	-	498	61	262	44	0	-	367	112	188	49	0	-	349	58	282	147	0	-	487	1701
% Cars & Light Goods	99.2	97.0	94.7	100.0	-	97.1	98.4	97.0	86.3	-	-	95.8	94.9	93.5	96.1	-	-	94.3	100.0	98.3	98.7	-	-	98.6	96.6
Buses	0	6	2	0	-	8	0	4	6	0	-	10	3	5	2	0	-	10	0	1	0	0	-	1	29
% Buses	0.0	2.0	2.1	0.0	-	1.6	0.0	1.5	11.8	-	-	2.6	2.5	2.5	3.9	-	-	2.7	0.0	0.3	0.0	-	-	0.2	1.6
Single-Unit Trucks	1	3	2	0	-	6	1	3	1	0	-	5	2	5	0	0	-	7	0	2	1	0	-	3	21
% Single-Unit Trucks	0.8	1.0	2.1	0.0	-	1.2	1.6	1.1	2.0	-	-	1.3	1.7	2.5	0.0	-	-	1.9	0.0	0.7	0.7	-	-	0.6	1.2
Articulated Trucks	0	0	1	0	-	1	0	1	0	0	-	1	1	3	0	0	-	4	0	2	1	0	-	3	9
% Articulated Trucks	0.0	0.0	1.1	0.0	-	0.2	0.0	0.4	0.0	-	-	0.3	0.8	1.5	0.0	-	-	1.1	0.0	0.7	0.7	-	-	0.6	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 5



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

### Turning Movement Peak Hour Data (12:15 PM)

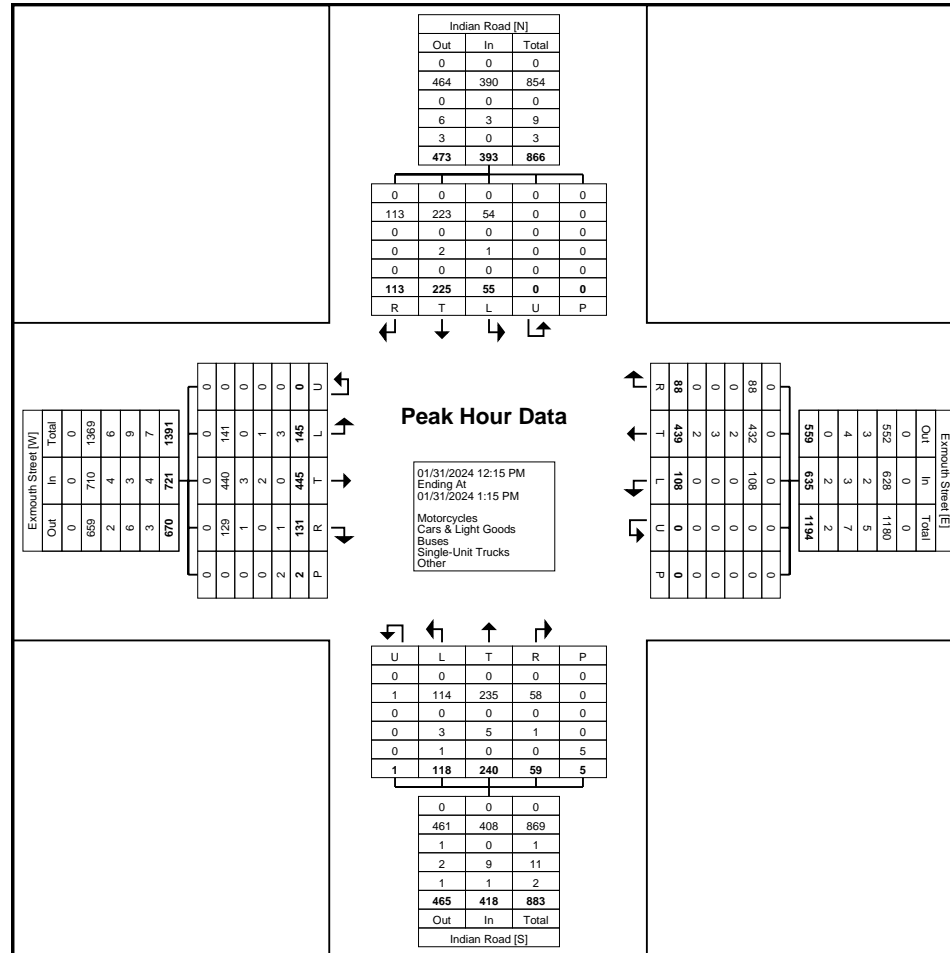
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Indian Road Northbound						Indian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	41	119	33	0	2	193	24	112	15	0	0	151	26	55	18	0	4	99	10	57	24	0	0	91	534
12:30 PM	35	106	31	0	0	172	30	113	28	0	0	171	30	57	15	1	1	103	13	58	26	0	0	97	543
12:45 PM	31	99	25	0	0	155	23	115	24	0	0	162	38	74	15	0	0	127	15	57	36	0	0	108	552
1:00 PM	38	121	42	0	0	201	31	99	21	0	0	151	24	54	11	0	0	89	17	53	27	0	0	97	538
<b>Total</b>	<b>145</b>	<b>445</b>	<b>131</b>	<b>0</b>	<b>2</b>	<b>721</b>	<b>108</b>	<b>439</b>	<b>88</b>	<b>0</b>	<b>0</b>	<b>635</b>	<b>118</b>	<b>240</b>	<b>59</b>	<b>1</b>	<b>5</b>	<b>418</b>	<b>55</b>	<b>225</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>393</b>	<b>2167</b>
Approach %	20.1	61.7	18.2	0.0	-	-	17.0	69.1	13.9	0.0	-	-	28.2	57.4	14.1	0.2	-	-	14.0	57.3	28.8	0.0	-	-	-
Total %	6.7	20.5	6.0	0.0	-	33.3	5.0	20.3	4.1	0.0	-	29.3	5.4	11.1	2.7	0.0	-	19.3	2.5	10.4	5.2	0.0	-	18.1	-
PHF	0.884	0.919	0.780	0.000	-	0.897	0.871	0.954	0.786	0.000	-	0.928	0.776	0.811	0.819	0.250	-	0.823	0.809	0.970	0.785	0.000	-	0.910	0.981
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	141	440	129	0	-	710	108	432	88	0	-	628	114	235	58	1	-	408	54	223	113	0	-	390	2136
% Cars & Light Goods	97.2	98.9	98.5	-	-	98.5	100.0	98.4	100.0	-	-	98.9	96.6	97.9	98.3	100.0	-	97.6	98.2	99.1	100.0	-	-	99.2	98.6
Buses	0	3	1	0	-	4	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	6
% Buses	0.0	0.7	0.8	-	-	0.6	0.0	0.5	0.0	-	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	1	2	0	0	-	3	0	3	0	0	-	3	3	5	1	0	-	9	1	2	0	0	-	3	18
% Single-Unit Trucks	0.7	0.4	0.0	-	-	0.4	0.0	0.7	0.0	-	-	0.5	2.5	2.1	1.7	0.0	-	2.2	1.8	0.9	0.0	-	-	0.8	0.8
Articulated Trucks	3	0	1	0	-	4	0	2	0	0	-	2	1	0	0	0	-	1	0	0	0	0	-	0	7
% Articulated Trucks	2.1	0.0	0.8	-	-	0.6	0.0	0.5	0.0	-	-	0.3	0.8	0.0	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 8

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

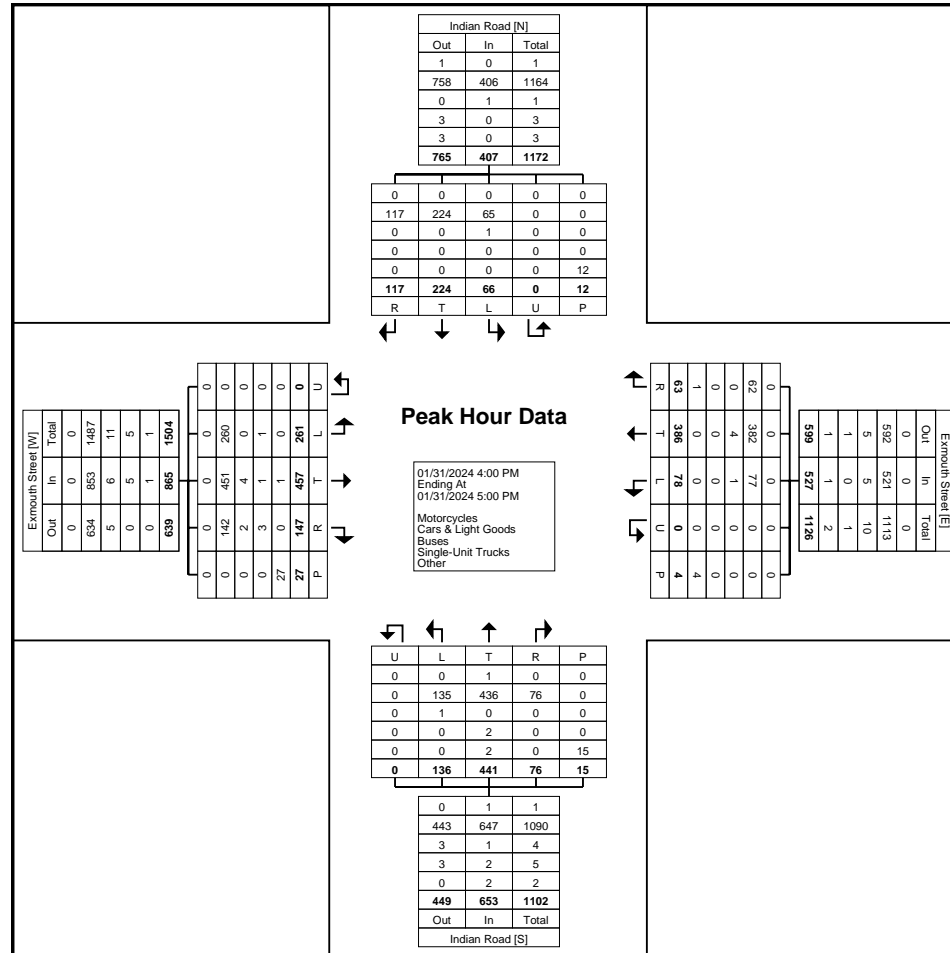
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Indian Road Northbound						Indian Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	71	111	47	0	2	229	22	92	16	0	1	130	42	122	22	0	3	186	18	58	28	0	1	104	649
4:15 PM	61	104	31	0	1	196	20	119	8	0	1	147	29	123	18	0	1	170	14	49	30	0	2	93	606
4:30 PM	68	129	40	0	14	237	17	86	21	0	0	124	40	99	18	0	9	157	10	57	31	0	6	98	616
4:45 PM	61	113	29	0	10	203	19	89	18	0	2	126	25	97	18	0	2	140	24	60	28	0	3	112	581
<b>Total</b>	<b>261</b>	<b>457</b>	<b>147</b>	<b>0</b>	<b>27</b>	<b>865</b>	<b>78</b>	<b>386</b>	<b>63</b>	<b>0</b>	<b>4</b>	<b>527</b>	<b>136</b>	<b>441</b>	<b>76</b>	<b>0</b>	<b>15</b>	<b>653</b>	<b>66</b>	<b>224</b>	<b>117</b>	<b>0</b>	<b>12</b>	<b>407</b>	<b>2452</b>
Approach %	30.2	52.8	17.0	0.0	-	-	14.8	73.2	12.0	0.0	-	-	20.8	67.5	11.6	0.0	-	-	16.2	55.0	28.7	0.0	-	-	-
Total %	10.6	18.6	6.0	0.0	-	35.3	3.2	15.7	2.6	0.0	-	21.5	5.5	18.0	3.1	0.0	-	26.6	2.7	9.1	4.8	0.0	-	16.6	-
PHF	0.919	0.886	0.782	0.000	-	0.912	0.886	0.811	0.750	0.000	-	0.896	0.810	0.896	0.864	0.000	-	0.878	0.688	0.933	0.944	0.000	-	0.908	0.945
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	260	451	142	0	-	853	77	382	62	0	-	521	135	436	76	0	-	647	65	224	117	0	-	406	2427
% Cars & Light Goods	99.6	98.7	96.6	-	-	98.6	98.7	99.0	98.4	-	-	98.9	99.3	98.9	100.0	-	-	99.1	98.5	100.0	100.0	-	-	99.8	99.0
Buses	0	4	2	0	-	6	1	4	0	0	-	5	1	0	0	0	-	1	1	0	0	0	-	1	13
% Buses	0.0	0.9	1.4	-	-	0.7	1.3	1.0	0.0	-	-	0.9	0.7	0.0	0.0	-	-	0.2	1.5	0.0	0.0	-	-	0.2	0.5
Single-Unit Trucks	1	1	3	0	-	5	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	7
% Single-Unit Trucks	0.4	0.2	2.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.3
Articulated Trucks	0	1	0	0	-	1	0	0	1	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.2	0.0	-	-	0.1	0.0	0.0	1.6	-	-	0.2	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	-	27	-	-	-	-	-	4	-	-	-	-	-	15	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	75.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & Indian Road  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 9



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						East Street Northbound						Plaza Driveway 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	1	34	4	0	1	39	4	35	6	0	1	45	4	2	6	0	1	12	4	1	2	0	0	7	103
7:15 AM	1	34	17	0	0	52	8	49	3	0	0	60	7	5	14	0	1	26	1	1	3	0	1	5	143
7:30 AM	0	35	9	0	1	44	11	55	8	0	0	74	14	4	15	0	0	33	3	4	3	0	0	10	161
7:45 AM	0	58	10	0	0	68	9	65	14	0	0	88	15	6	15	0	0	36	2	3	0	0	0	5	197
Hourly Total	2	161	40	0	2	203	32	204	31	0	1	267	40	17	50	0	2	107	10	9	8	0	1	27	604
8:00 AM	2	60	10	0	2	72	10	58	10	0	1	78	15	12	17	0	3	44	5	1	3	0	0	9	203
8:15 AM	1	53	16	0	2	70	17	67	7	0	1	91	23	5	13	0	1	41	5	5	3	0	2	13	215
8:30 AM	2	90	12	0	0	104	13	99	12	0	2	124	26	7	17	0	0	50	9	6	5	0	3	20	298
8:45 AM	4	79	19	0	1	102	16	119	9	1	1	145	19	19	36	0	0	74	11	9	6	0	0	26	347
Hourly Total	9	282	57	0	5	348	56	343	38	1	5	438	83	43	83	0	4	209	30	21	17	0	5	68	1063
9:00 AM	1	70	16	0	0	87	7	74	17	0	0	98	22	10	30	0	4	62	16	6	4	0	2	26	273
9:15 AM	8	87	13	0	1	108	14	71	17	0	1	102	21	8	18	0	1	47	12	4	5	0	1	21	278
9:30 AM	6	84	7	0	2	97	19	83	6	0	0	108	17	10	26	0	1	53	15	3	5	0	2	23	281
9:45 AM	7	103	19	0	4	129	17	107	12	0	2	136	21	14	25	0	2	60	12	9	6	0	2	27	352
Hourly Total	22	344	55	0	7	421	57	335	52	0	3	444	81	42	99	0	8	222	55	22	20	0	7	97	1184
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	8	105	12	0	5	125	15	112	9	0	2	136	23	26	18	0	3	67	16	18	8	0	2	42	370
11:45 AM	7	109	15	0	3	131	17	122	18	0	8	157	24	29	27	0	7	80	22	13	12	0	8	47	415
Hourly Total	15	214	27	0	8	256	32	234	27	0	10	293	47	55	45	0	10	147	38	31	20	0	10	89	785
12:00 PM	15	113	19	0	1	147	7	99	7	0	2	113	25	14	32	0	5	71	37	15	9	0	3	61	392
12:15 PM	17	97	14	0	1	128	9	127	15	0	1	151	14	19	19	1	3	53	22	15	11	0	4	48	380
12:30 PM	6	105	14	0	1	125	10	130	12	0	2	152	23	17	25	0	2	65	20	20	11	0	4	51	393
12:45 PM	3	108	15	0	2	126	14	125	20	0	0	159	14	22	25	0	5	61	18	23	8	0	4	49	395
Hourly Total	41	423	62	0	5	526	40	481	54	0	5	575	76	72	101	1	15	250	97	73	39	0	15	209	1560
1:00 PM	9	116	16	0	6	141	18	101	15	0	3	134	27	24	15	0	5	66	29	17	14	0	5	60	401
1:15 PM	9	113	12	0	2	134	20	122	12	0	4	154	25	23	25	0	3	73	17	21	9	0	3	47	408
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	18	229	28	0	8	275	38	223	27	0	7	288	52	47	40	0	8	139	46	38	23	0	8	107	809
4:00 PM	15	129	21	0	1	165	20	120	23	0	3	163	35	19	28	0	3	82	33	20	13	0	1	66	476
4:15 PM	14	117	5	0	5	136	17	138	23	0	0	178	18	18	22	0	10	58	32	17	9	0	6	58	430
4:30 PM	10	160	14	0	1	184	25	118	19	0	1	162	50	18	29	0	0	97	23	20	7	0	1	50	493
4:45 PM	9	116	12	0	0	137	14	108	11	0	3	133	28	19	22	0	2	69	32	14	14	0	3	60	399
Hourly Total	48	522	52	0	7	622	76	484	76	0	7	636	131	74	101	0	15	306	120	71	43	0	11	234	1798
5:00 PM	7	136	14	0	2	157	18	105	8	0	1	131	31	8	28	0	0	67	25	15	9	0	3	49	404
5:15 PM	10	105	14	0	0	129	22	107	11	0	6	140	19	10	27	0	3	56	15	18	6	0	2	39	364

5:30 PM	8	86	12	0	1	106	14	83	13	0	3	110	21	9	16	0	1	46	18	9	5	0	3	32	294
5:45 PM	5	93	14	0	2	112	12	90	10	0	2	112	18	16	16	0	0	50	10	12	5	0	5	27	301
Hourly Total	30	420	54	0	5	504	66	385	42	0	12	493	89	43	87	0	4	219	68	54	25	0	13	147	1363
6:00 PM	11	73	13	0	2	97	14	94	13	0	0	121	14	6	16	0	3	36	18	8	9	0	2	35	289
6:15 PM	6	70	2	0	2	78	7	81	12	0	2	100	13	13	10	0	2	36	11	8	6	0	2	25	239
6:30 PM	6	59	15	0	0	80	10	86	9	0	3	105	17	7	14	0	2	38	9	9	5	0	1	23	246
6:45 PM	2	70	14	0	0	86	11	89	8	0	3	108	15	6	10	0	1	31	12	8	3	0	1	23	248
Hourly Total	25	272	44	0	4	341	42	350	42	0	8	434	59	32	50	0	8	141	50	33	23	0	6	106	1022
Grand Total	210	2867	419	0	51	3496	439	3039	389	1	58	3868	658	425	656	1	74	1740	514	352	218	0	76	1084	10188
Approach %	6.0	82.0	12.0	0.0	-	-	11.3	78.6	10.1	0.0	-	-	37.8	24.4	37.7	0.1	-	-	47.4	32.5	20.1	0.0	-	-	-
Total %	2.1	28.1	4.1	0.0	-	34.3	4.3	29.8	3.8	0.0	-	38.0	6.5	4.2	6.4	0.0	-	17.1	5.0	3.5	2.1	0.0	-	10.6	-
Motorcycles	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.3	0.0	-	-	0.1	0.0
Cars & Light Goods	209	2833	410	0	-	3452	433	2966	383	1	-	3783	646	424	652	1	-	1723	479	348	161	0	-	988	9946
% Cars & Light Goods	99.5	98.8	97.9	-	-	98.7	98.6	97.6	98.5	100.0	-	97.8	98.2	99.8	99.4	100.0	-	99.0	93.2	98.9	73.9	-	-	91.1	97.6
Buses	0	13	3	0	-	16	2	37	0	0	-	39	2	0	1	0	-	3	32	0	52	0	-	84	142
% Buses	0.0	0.5	0.7	-	-	0.5	0.5	1.2	0.0	0.0	-	1.0	0.3	0.0	0.2	0.0	-	0.2	6.2	0.0	23.9	-	-	7.7	1.4
Single-Unit Trucks	1	16	6	0	-	23	4	28	3	0	-	35	10	0	3	0	-	13	2	1	5	0	-	8	79
% Single-Unit Trucks	0.5	0.6	1.4	-	-	0.7	0.9	0.9	0.8	0.0	-	0.9	1.5	0.0	0.5	0.0	-	0.7	0.4	0.3	2.3	-	-	0.7	0.8
Articulated Trucks	0	4	0	0	-	4	0	7	2	0	-	9	0	0	0	0	-	0	1	1	0	0	-	2	15
% Articulated Trucks	0.0	0.1	0.0	-	-	0.1	0.0	0.2	0.5	0.0	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.2	0.3	0.0	-	-	0.2	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.3	0.0	-	0.0	0.0	0.2	0.0	0.0	-	0.1	0.0	0.3	0.0	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	1.7	-	-	-	-	-	2.7	-	-	-	-	-	5.3	-	-
Pedestrians	-	-	-	-	51	-	-	-	-	-	57	-	-	-	-	-	72	-	-	-	-	-	72	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	98.3	-	-	-	-	-	97.3	-	-	-	-	-	94.7	-	-

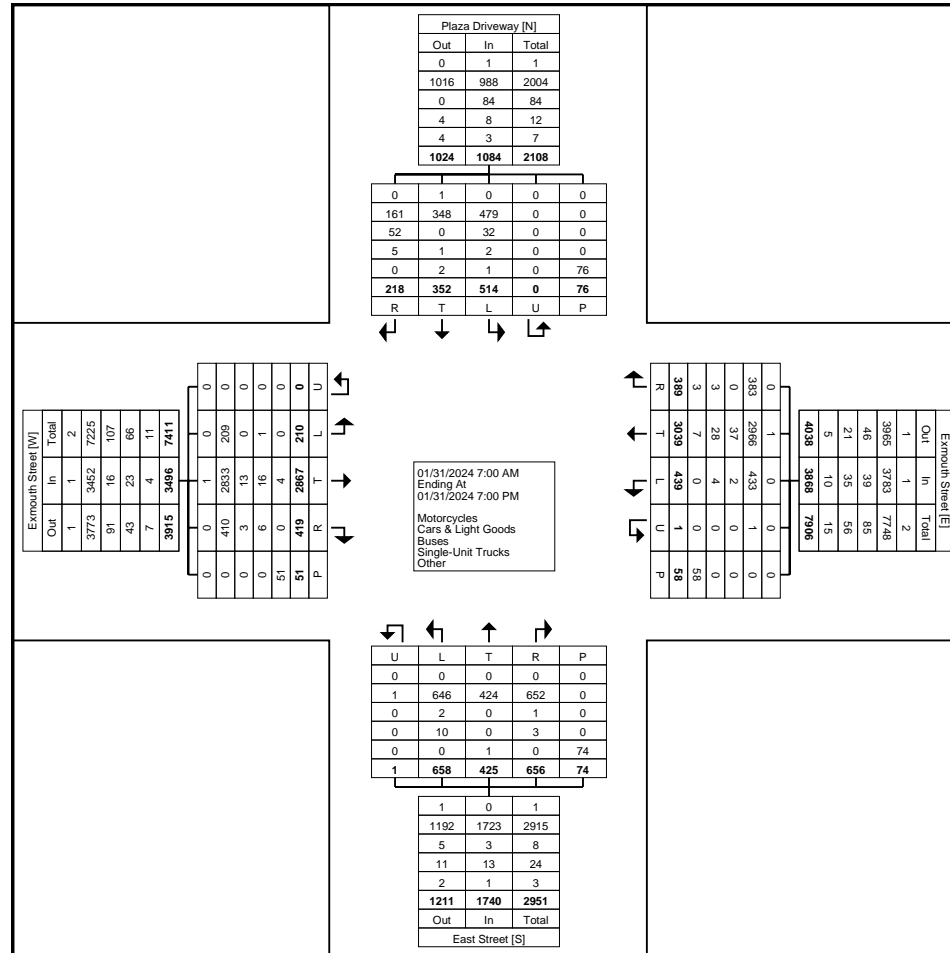




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 4

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

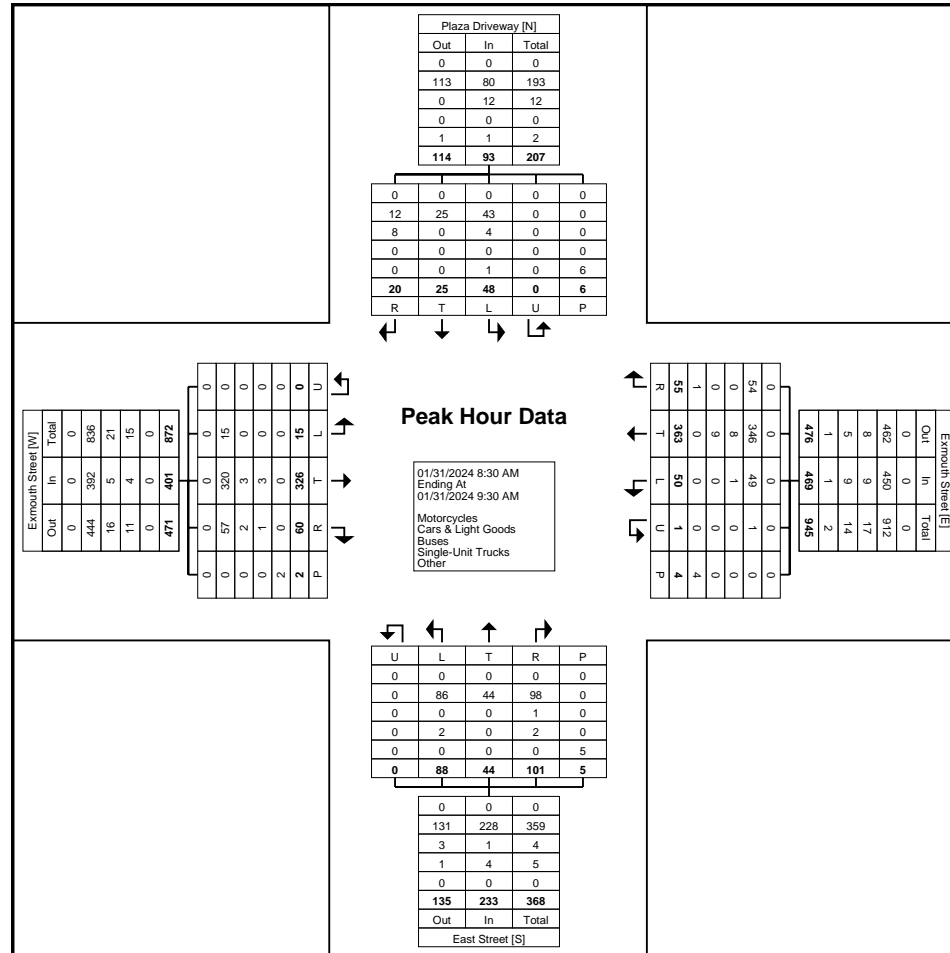
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						East Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	2	90	12	0	0	104	13	99	12	0	2	124	26	7	17	0	0	50	9	6	5	0	3	20	298
8:45 AM	4	79	19	0	1	102	16	119	9	1	1	145	19	19	36	0	0	74	11	9	6	0	0	26	347
9:00 AM	1	70	16	0	0	87	7	74	17	0	0	98	22	10	30	0	4	62	16	6	4	0	2	26	273
9:15 AM	8	87	13	0	1	108	14	71	17	0	1	102	21	8	18	0	1	47	12	4	5	0	1	21	278
<b>Total</b>	<b>15</b>	<b>326</b>	<b>60</b>	<b>0</b>	<b>2</b>	<b>401</b>	<b>50</b>	<b>363</b>	<b>55</b>	<b>1</b>	<b>4</b>	<b>469</b>	<b>88</b>	<b>44</b>	<b>101</b>	<b>0</b>	<b>5</b>	<b>233</b>	<b>48</b>	<b>25</b>	<b>20</b>	<b>0</b>	<b>6</b>	<b>93</b>	<b>1196</b>
Approach %	3.7	81.3	15.0	0.0	-	-	10.7	77.4	11.7	0.2	-	-	37.8	18.9	43.3	0.0	-	-	51.6	26.9	21.5	0.0	-	-	-
Total %	1.3	27.3	5.0	0.0	-	33.5	4.2	30.4	4.6	0.1	-	39.2	7.4	3.7	8.4	0.0	-	19.5	4.0	2.1	1.7	0.0	-	7.8	-
PHF	0.469	0.906	0.789	0.000	-	0.928	0.781	0.763	0.809	0.250	-	0.809	0.846	0.579	0.701	0.000	-	0.787	0.750	0.694	0.833	0.000	-	0.894	0.862
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	15	320	57	0	-	392	49	346	54	1	-	450	86	44	98	0	-	228	43	25	12	0	-	80	1150
% Cars & Light Goods	100.0	98.2	95.0	-	-	97.8	98.0	95.3	98.2	100.0	-	95.9	97.7	100.0	97.0	-	-	97.9	89.6	100.0	60.0	-	-	86.0	96.2
Buses	0	3	2	0	-	5	1	8	0	0	-	9	0	0	1	0	-	1	4	0	8	0	-	12	27
% Buses	0.0	0.9	3.3	-	-	1.2	2.0	2.2	0.0	0.0	-	1.9	0.0	0.0	1.0	-	-	0.4	8.3	0.0	40.0	-	-	12.9	2.3
Single-Unit Trucks	0	3	1	0	-	4	0	9	0	0	-	9	2	0	2	0	-	4	0	0	0	0	-	0	17
% Single-Unit Trucks	0.0	0.9	1.7	-	-	1.0	0.0	2.5	0.0	0.0	-	1.9	2.3	0.0	2.0	-	-	1.7	0.0	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.8	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	2.1	0.0	0.0	-	-	1.1	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 5



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 6

### Turning Movement Peak Hour Data (12:30 PM)

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						East Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	6	105	14	0	1	125	10	130	12	0	2	152	23	17	25	0	2	65	20	20	11	0	4	51	393
12:45 PM	3	108	15	0	2	126	14	125	20	0	0	159	14	22	25	0	5	61	18	23	8	0	4	49	395
1:00 PM	9	116	16	0	6	141	18	101	15	0	3	134	27	24	15	0	5	66	29	17	14	0	5	60	401
1:15 PM	9	113	12	0	2	134	20	122	12	0	4	154	25	23	25	0	3	73	17	21	9	0	3	47	408
<b>Total</b>	<b>27</b>	<b>442</b>	<b>57</b>	<b>0</b>	<b>11</b>	<b>526</b>	<b>62</b>	<b>478</b>	<b>59</b>	<b>0</b>	<b>9</b>	<b>599</b>	<b>89</b>	<b>86</b>	<b>90</b>	<b>0</b>	<b>15</b>	<b>265</b>	<b>84</b>	<b>81</b>	<b>42</b>	<b>0</b>	<b>16</b>	<b>207</b>	<b>1597</b>
Approach %	5.1	84.0	10.8	0.0	-	-	10.4	79.8	9.8	0.0	-	-	33.6	32.5	34.0	0.0	-	-	40.6	39.1	20.3	0.0	-	-	-
Total %	1.7	27.7	3.6	0.0	-	32.9	3.9	29.9	3.7	0.0	-	37.5	5.6	5.4	5.6	0.0	-	16.6	5.3	5.1	2.6	0.0	-	13.0	-
PHF	0.750	0.953	0.891	0.000	-	0.933	0.775	0.919	0.738	0.000	-	0.942	0.824	0.896	0.900	0.000	-	0.908	0.724	0.880	0.750	0.000	-	0.863	0.979
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	27	438	57	0	-	522	61	470	57	0	-	588	87	86	90	0	-	263	80	80	33	0	-	193	1566
% Cars & Light Goods	100.0	99.1	100.0	-	-	99.2	98.4	98.3	96.6	-	-	98.2	97.8	100.0	100.0	-	-	99.2	95.2	98.8	78.6	-	-	93.2	98.1
Buses	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	4	0	8	0	-	12	16
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	4.8	0.0	19.0	-	-	5.8	1.0
Single-Unit Trucks	0	4	0	0	-	4	1	2	1	0	-	4	2	0	0	0	-	2	0	0	1	0	-	1	11
% Single-Unit Trucks	0.0	0.9	0.0	-	-	0.8	1.6	0.4	1.7	-	-	0.7	2.2	0.0	0.0	-	-	0.8	0.0	0.0	2.4	-	-	0.5	0.7
Articulated Trucks	0	0	0	0	-	0	0	2	1	0	-	3	0	0	0	0	-	0	0	1	0	0	-	1	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.4	1.7	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	0.5	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	11.1	-	-	-	-	-	6.7	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	8	-	-	-	-	-	14	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	88.9	-	-	-	-	-	93.3	-	-	-	-	-	100.0	-	-





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 8

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

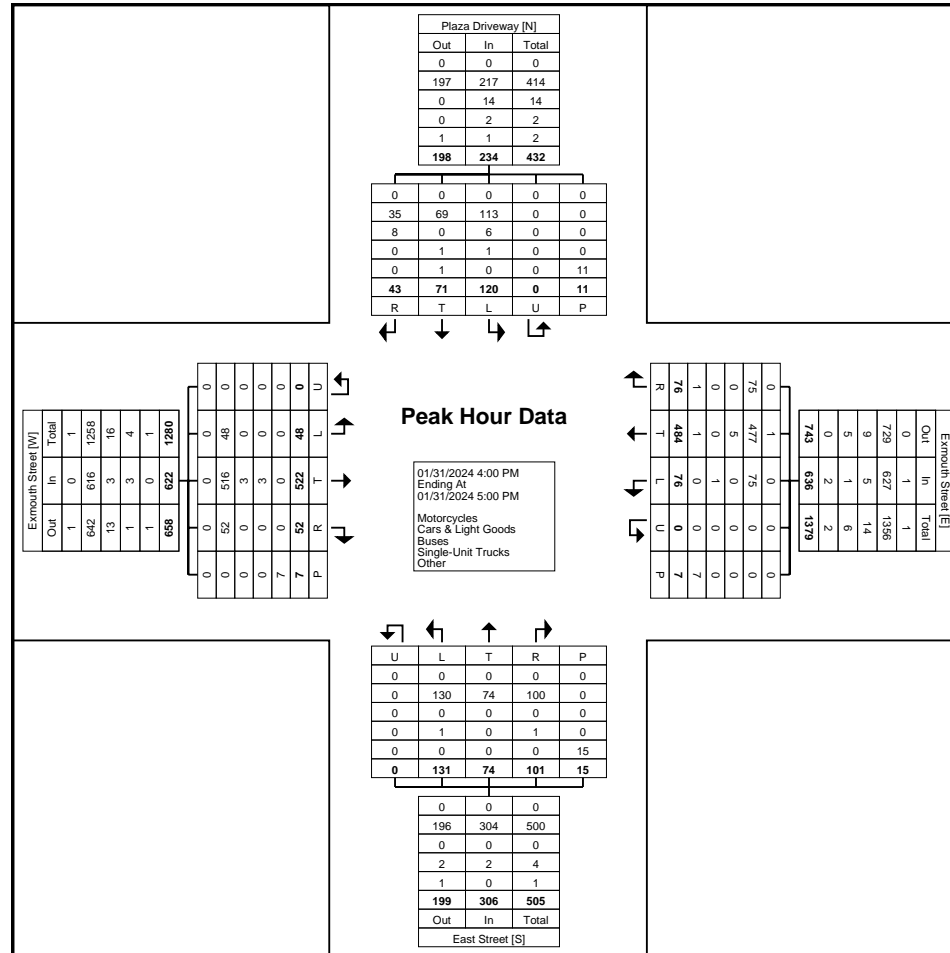
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						East Street Northbound						Plaza Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	15	129	21	0	1	165	20	120	23	0	3	163	35	19	28	0	3	82	33	20	13	0	1	66	476
4:15 PM	14	117	5	0	5	136	17	138	23	0	0	178	18	18	22	0	10	58	32	17	9	0	6	58	430
4:30 PM	10	160	14	0	1	184	25	118	19	0	1	162	50	18	29	0	0	97	23	20	7	0	1	50	493
4:45 PM	9	116	12	0	0	137	14	108	11	0	3	133	28	19	22	0	2	69	32	14	14	0	3	60	399
<b>Total</b>	<b>48</b>	<b>522</b>	<b>52</b>	<b>0</b>	<b>7</b>	<b>622</b>	<b>76</b>	<b>484</b>	<b>76</b>	<b>0</b>	<b>7</b>	<b>636</b>	<b>131</b>	<b>74</b>	<b>101</b>	<b>0</b>	<b>15</b>	<b>306</b>	<b>120</b>	<b>71</b>	<b>43</b>	<b>0</b>	<b>11</b>	<b>234</b>	<b>1798</b>
Approach %	7.7	83.9	8.4	0.0	-	-	11.9	76.1	11.9	0.0	-	-	42.8	24.2	33.0	0.0	-	-	51.3	30.3	18.4	0.0	-	-	-
Total %	2.7	29.0	2.9	0.0	-	34.6	4.2	26.9	4.2	0.0	-	35.4	7.3	4.1	5.6	0.0	-	17.0	6.7	3.9	2.4	0.0	-	13.0	-
PHF	0.800	0.816	0.619	0.000	-	0.845	0.760	0.877	0.826	0.000	-	0.893	0.655	0.974	0.871	0.000	-	0.789	0.909	0.888	0.768	0.000	-	0.886	0.912
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	48	516	52	0	-	616	75	477	75	0	-	627	130	74	100	0	-	304	113	69	35	0	-	217	1764
% Cars & Light Goods	100.0	98.9	100.0	-	-	99.0	98.7	98.6	98.7	-	-	98.6	99.2	100.0	99.0	-	-	99.3	94.2	97.2	81.4	-	-	92.7	98.1
Buses	0	3	0	0	-	3	0	5	0	0	-	5	0	0	0	0	-	0	6	0	8	0	-	14	22
% Buses	0.0	0.6	0.0	-	-	0.5	0.0	1.0	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	5.0	0.0	18.6	-	-	6.0	1.2
Single-Unit Trucks	0	3	0	0	-	3	1	0	0	0	-	1	1	0	1	0	-	2	1	1	0	0	-	2	8
% Single-Unit Trucks	0.0	0.6	0.0	-	-	0.5	1.3	0.0	0.0	-	-	0.2	0.8	0.0	1.0	-	-	0.7	0.8	1.4	0.0	-	-	0.9	0.4
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.3	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	0.4	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	18.2	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	7	-	-	-	-	-	15	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	81.8	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Exmouth Street & East Street  
Site Code: 230751  
Start Date: 01/31/2024  
Page No: 9



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 1

### Turning Movement Data

Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Christina Street Northbound						Christina Street 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	
7:30 AM	2	15	20	0	1	37	12	32	12	0	0	56	11	35	10	0	3	56	12	56	12	0	2	80	229
7:45 AM	8	27	21	0	1	56	15	34	19	0	0	68	17	51	10	0	1	78	9	96	17	0	0	122	324
Hourly Total	10	42	41	0	2	93	27	66	31	0	0	124	28	86	20	0	4	134	21	152	29	0	2	202	553
8:00 AM	17	23	11	0	1	51	15	26	26	0	0	67	14	46	12	0	2	72	13	67	21	0	1	101	291
8:15 AM	11	25	23	0	1	59	16	45	22	0	0	83	15	51	9	0	2	75	11	90	20	0	0	121	338
8:30 AM	11	21	11	0	0	43	13	37	11	0	0	61	20	49	19	0	1	88	14	68	15	0	0	97	289
8:45 AM	13	31	10	0	1	54	21	30	16	0	0	67	22	55	14	0	2	91	21	87	15	0	2	123	335
Hourly Total	52	100	55	0	3	207	65	138	75	0	0	278	71	201	54	0	7	326	59	312	71	0	3	442	1253
9:00 AM	11	31	18	0	1	60	16	26	14	0	0	56	15	52	15	0	1	82	14	51	7	0	1	72	270
9:15 AM	9	51	13	0	1	73	20	26	18	0	0	64	14	56	14	0	3	84	18	52	13	0	1	83	304
9:30 AM	8	39	15	0	0	62	26	41	17	0	1	84	22	46	14	0	0	82	14	54	11	0	0	79	307
9:45 AM	11	40	22	0	1	73	21	40	21	0	2	82	22	61	20	0	1	103	19	68	21	0	1	108	366
Hourly Total	39	161	68	0	3	268	83	133	70	0	3	286	73	215	63	0	5	351	65	225	52	0	3	342	1247
10:00 AM	13	40	9	0	1	62	17	30	22	0	0	69	12	66	27	0	0	105	15	60	9	0	0	84	320
10:15 AM	10	48	17	0	2	75	23	40	16	0	0	79	14	52	20	0	0	86	18	55	12	0	0	85	325
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	23	88	26	0	3	137	40	70	38	0	0	148	26	118	47	0	0	191	33	115	21	0	0	169	645
12:00 PM	11	61	14	0	1	86	29	53	19	0	0	101	27	80	31	0	2	138	20	55	7	0	1	82	407
12:15 PM	10	69	23	0	1	102	32	65	23	0	1	120	26	66	25	0	0	117	18	50	15	0	1	83	422
12:30 PM	13	35	11	0	3	59	30	50	20	0	2	100	25	67	24	0	1	116	18	48	14	0	1	80	355
12:45 PM	15	43	17	0	2	75	22	64	20	0	0	106	14	72	32	0	1	118	18	63	12	0	3	93	392
Hourly Total	49	208	65	0	7	322	113	232	82	0	3	427	92	285	112	0	4	489	74	216	48	0	6	338	1576
1:00 PM	8	40	11	0	2	59	15	48	20	0	0	83	22	65	23	0	0	110	18	58	9	0	2	85	337
1:15 PM	10	43	15	0	1	68	25	54	23	0	1	102	22	77	25	0	4	124	16	49	10	0	2	75	369
1:30 PM	9	48	16	0	0	73	17	45	16	0	2	78	19	75	31	0	3	125	19	48	12	0	2	79	355
1:45 PM	8	49	20	0	1	77	24	44	18	0	1	86	22	77	18	0	0	117	16	60	6	0	4	82	362
Hourly Total	35	180	62	0	4	277	81	191	77	0	4	349	85	294	97	0	7	476	69	215	37	0	10	321	1423
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	14	46	18	0	0	78	15	48	17	0	0	80	20	78	22	0	3	120	21	51	8	0	0	80	358
3:15 PM	13	56	15	0	3	84	18	37	20	0	0	75	20	96	25	0	6	141	19	57	18	0	0	94	394
3:30 PM	11	62	7	0	0	80	19	48	22	0	0	89	24	121	30	0	1	175	20	61	7	0	0	88	432
3:45 PM	10	41	10	0	4	61	23	49	27	0	0	99	15	108	34	0	4	157	18	67	12	0	3	97	414
Hourly Total	48	205	50	0	7	303	75	182	86	0	0	343	79	403	111	0	14	593	78	236	45	0	3	359	1598
4:00 PM	5	65	13	0	1	83	22	49	20	0	1	91	23	134	25	0	3	182	19	51	8	0	2	78	434
4:15 PM	14	53	13	3	0	83	20	40	13	0	3	73	22	124	32	0	6	178	15	69	16	0	1	100	434



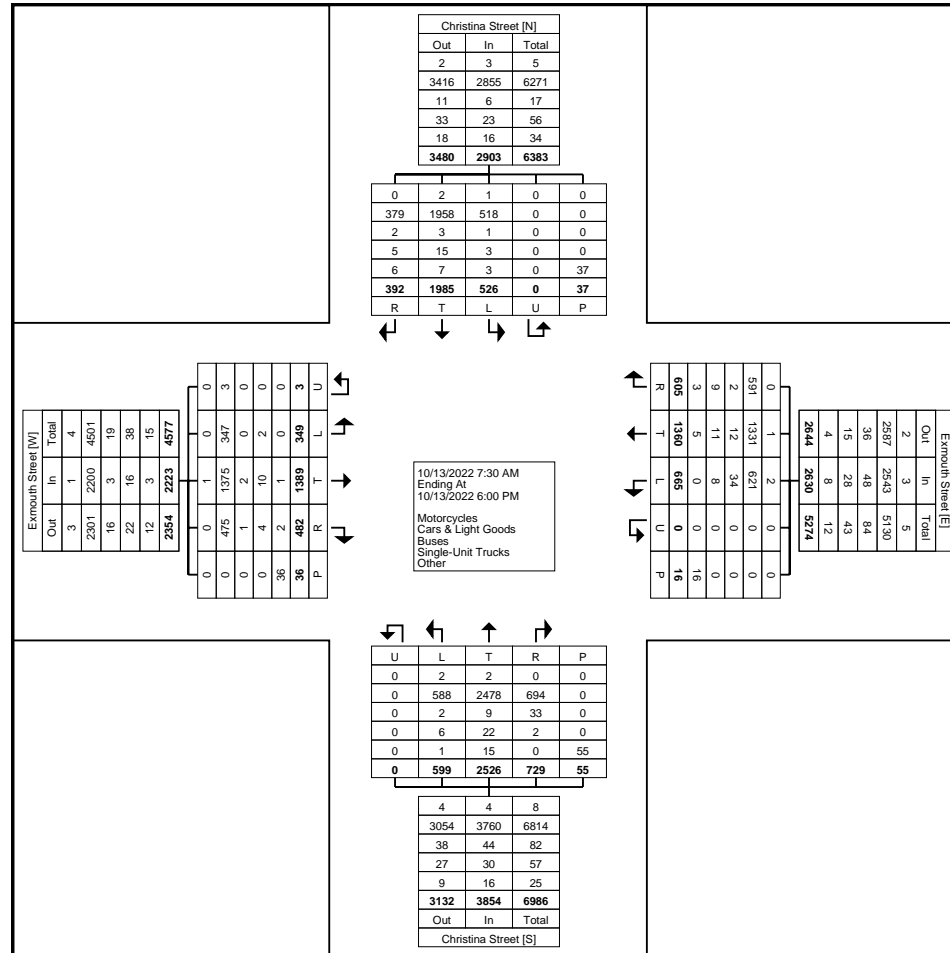
4:30 PM	10	63	16	0	1	89	28	45	17	0	0	90	21	112	38	0	1	171	15	70	12	0	0	97	447
4:45 PM	8	46	17	0	4	71	17	39	25	0	1	81	18	135	27	0	1	180	17	78	18	0	3	113	445
Hourly Total	37	227	59	3	6	326	87	173	75	0	5	335	84	505	122	0	11	711	66	268	54	0	6	388	1760
5:00 PM	20	66	15	0	1	101	19	39	16	0	1	74	14	135	32	0	1	181	18	70	13	0	2	101	457
5:15 PM	16	38	16	0	0	70	20	42	19	0	0	81	18	105	25	0	0	148	11	65	6	0	2	82	381
5:30 PM	10	32	17	0	0	59	26	49	17	0	0	92	16	100	18	0	0	134	14	56	8	0	0	78	363
5:45 PM	10	42	8	0	0	60	29	45	19	0	0	93	13	79	28	0	2	120	18	55	8	0	0	81	354
Hourly Total	56	178	56	0	1	290	94	175	71	0	1	340	61	419	103	0	3	583	61	246	35	0	4	342	1555
Grand Total	349	1389	482	3	36	2223	665	1360	605	0	16	2630	599	2526	729	0	55	3854	526	1985	392	0	37	2903	11610
Approach %	15.7	62.5	21.7	0.1	-	-	25.3	51.7	23.0	0.0	-	-	15.5	65.5	18.9	0.0	-	-	18.1	68.4	13.5	0.0	-	-	-
Total %	3.0	12.0	4.2	0.0	-	19.1	5.7	11.7	5.2	0.0	-	22.7	5.2	21.8	6.3	0.0	-	33.2	4.5	17.1	3.4	0.0	-	25.0	-
Motorcycles	0	1	0	0	-	1	2	1	0	0	-	3	2	2	0	0	-	4	1	2	0	0	-	3	11
% Motorcycles	0.0	0.1	0.0	0.0	-	0.0	0.3	0.1	0.0	-	-	0.1	0.3	0.1	0.0	-	-	0.1	0.2	0.1	0.0	-	-	0.1	0.1
Cars & Light Goods	347	1375	475	3	-	2200	621	1331	591	0	-	2543	588	2478	694	0	-	3760	518	1958	379	0	-	2855	11358
% Cars & Light Goods	99.4	99.0	98.5	100.0	-	99.0	93.4	97.9	97.7	-	-	96.7	98.2	98.1	95.2	-	-	97.6	98.5	98.6	96.7	-	-	98.3	97.8
Buses	0	2	1	0	-	3	34	12	2	0	-	48	2	9	33	0	-	44	1	3	2	0	-	6	101
% Buses	0.0	0.1	0.2	0.0	-	0.1	5.1	0.9	0.3	-	-	1.8	0.3	0.4	4.5	-	-	1.1	0.2	0.2	0.5	-	-	0.2	0.9
Single-Unit Trucks	2	10	4	0	-	16	8	11	9	0	-	28	6	22	2	0	-	30	3	15	5	0	-	23	97
% Single-Unit Trucks	0.6	0.7	0.8	0.0	-	0.7	1.2	0.8	1.5	-	-	1.1	1.0	0.9	0.3	-	-	0.8	0.6	0.8	1.3	-	-	0.8	0.8
Articulated Trucks	0	1	2	0	-	3	0	3	0	0	-	3	1	12	0	0	-	13	1	6	3	0	-	10	29
% Articulated Trucks	0.0	0.1	0.4	0.0	-	0.1	0.0	0.2	0.0	-	-	0.1	0.2	0.5	0.0	-	-	0.3	0.2	0.3	0.8	-	-	0.3	0.2
Bicycles on Road	0	0	0	0	-	0	0	2	3	0	-	5	0	3	0	0	-	3	2	1	3	0	-	6	14
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.5	-	-	0.2	0.0	0.1	0.0	-	-	0.1	0.4	0.1	0.8	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	11	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	16.7	-	-	-	-	-	12.5	-	-	-	-	-	20.0	-	-	-	-	-	5.4	-	-
Pedestrians	-	-	-	-	30	-	-	-	-	-	14	-	-	-	-	-	44	-	-	-	-	-	35	-	-
% Pedestrians	-	-	-	-	83.3	-	-	-	-	-	87.5	-	-	-	-	-	80.0	-	-	-	-	-	94.6	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 4

### Turning Movement Peak Hour Data (9:30 AM)

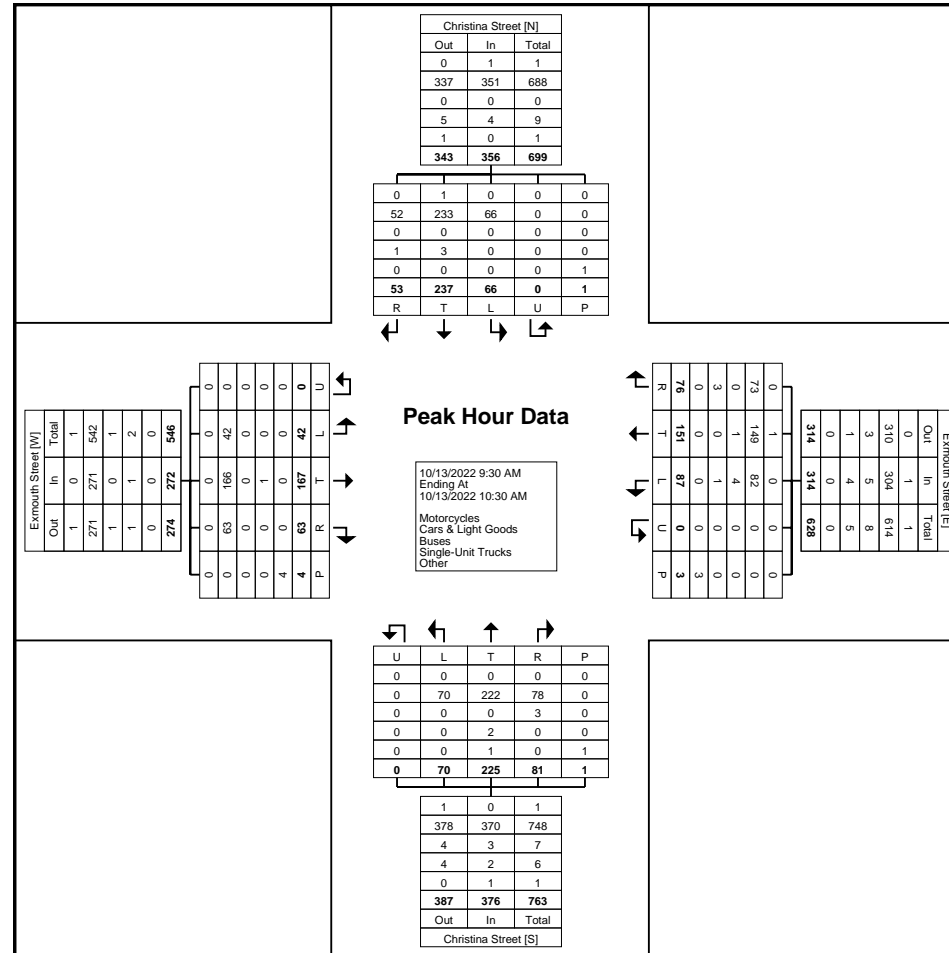
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Christina Street Northbound						Christina Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:30 AM	8	39	15	0	0	62	26	41	17	0	1	84	22	46	14	0	0	82	14	54	11	0	0	79	307
9:45 AM	11	40	22	0	1	73	21	40	21	0	2	82	22	61	20	0	1	103	19	68	21	0	1	108	366
10:00 AM	13	40	9	0	1	62	17	30	22	0	0	69	12	66	27	0	0	105	15	60	9	0	0	84	320
10:15 AM	10	48	17	0	2	75	23	40	16	0	0	79	14	52	20	0	0	86	18	55	12	0	0	85	325
Total	42	167	63	0	4	272	87	151	76	0	3	314	70	225	81	0	1	376	66	237	53	0	1	356	1318
Approach %	15.4	61.4	23.2	0.0	-	-	27.7	48.1	24.2	0.0	-	-	18.6	59.8	21.5	0.0	-	-	18.5	66.6	14.9	0.0	-	-	-
Total %	3.2	12.7	4.8	0.0	-	20.6	6.6	11.5	5.8	0.0	-	23.8	5.3	17.1	6.1	0.0	-	28.5	5.0	18.0	4.0	0.0	-	27.0	-
PHF	0.808	0.870	0.716	0.000	-	0.907	0.837	0.921	0.864	0.000	-	0.935	0.795	0.852	0.750	0.000	-	0.895	0.868	0.871	0.631	0.000	-	0.824	0.900
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.2
Cars & Light Goods	42	166	63	0	-	271	82	149	73	0	-	304	70	222	78	0	-	370	66	233	52	0	-	351	1296
% Cars & Light Goods	100.0	99.4	100.0	-	-	99.6	94.3	98.7	96.1	-	-	96.8	100.0	98.7	96.3	-	-	98.4	100.0	98.3	98.1	-	-	98.6	98.3
Buses	0	0	0	0	-	0	4	1	0	0	-	5	0	0	3	0	-	3	0	0	0	0	-	0	8
% Buses	0.0	0.0	0.0	-	-	0.0	4.6	0.7	0.0	-	-	1.6	0.0	0.0	3.7	0	-	0.8	0.0	0.0	0.0	-	-	0.0	0.6
Single-Unit Trucks	0	1	0	0	-	1	1	0	3	0	-	4	0	2	0	0	-	2	0	3	1	0	-	4	11
% Single-Unit Trucks	0.0	0.6	0.0	-	-	0.4	1.1	0.0	3.9	-	-	1.3	0.0	0.9	0.0	-	-	0.5	0.0	1.3	1.9	-	-	1.1	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	25.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	75.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 5



Turning Movement Peak Hour Data Plot (9:30 AM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 6

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

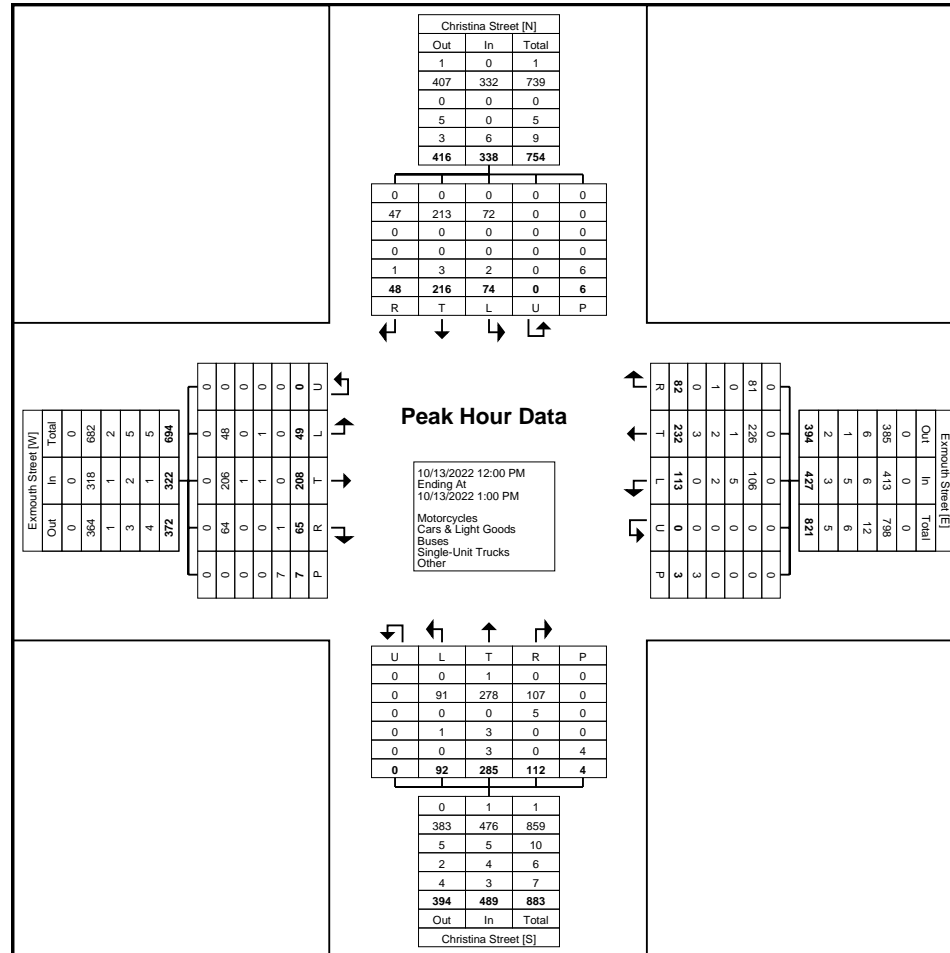
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Christina Street Northbound						Christina Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	11	61	14	0	1	86	29	53	19	0	0	101	27	80	31	0	2	138	20	55	7	0	1	82	407
12:15 PM	10	69	23	0	1	102	32	65	23	0	1	120	26	66	25	0	0	117	18	50	15	0	1	83	422
12:30 PM	13	35	11	0	3	59	30	50	20	0	2	100	25	67	24	0	1	116	18	48	14	0	1	80	355
12:45 PM	15	43	17	0	2	75	22	64	20	0	0	106	14	72	32	0	1	118	18	63	12	0	3	93	392
Total	49	208	65	0	7	322	113	232	82	0	3	427	92	285	112	0	4	489	74	216	48	0	6	338	1576
Approach %	15.2	64.6	20.2	0.0	-	-	26.5	54.3	19.2	0.0	-	-	18.8	58.3	22.9	0.0	-	-	21.9	63.9	14.2	0.0	-	-	-
Total %	3.1	13.2	4.1	0.0	-	20.4	7.2	14.7	5.2	0.0	-	27.1	5.8	18.1	7.1	0.0	-	31.0	4.7	13.7	3.0	0.0	-	21.4	-
PHF	0.817	0.754	0.707	0.000	-	0.789	0.883	0.892	0.891	0.000	-	0.890	0.852	0.891	0.875	0.000	-	0.886	0.925	0.857	0.800	0.000	-	0.909	0.934
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	48	206	64	0	-	318	106	226	81	0	-	413	91	278	107	0	-	476	72	213	47	0	-	332	1539
% Cars & Light Goods	98.0	99.0	98.5	-	-	98.8	93.8	97.4	98.8	-	-	96.7	98.9	97.5	95.5	-	-	97.3	97.3	98.6	97.9	-	-	98.2	97.7
Buses	0	1	0	0	-	1	5	1	0	0	-	6	0	0	5	0	-	5	0	0	0	0	-	0	12
% Buses	0.0	0.5	0.0	-	-	0.3	4.4	0.4	0.0	-	-	1.4	0.0	0.0	4.5	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.8
Single-Unit Trucks	1	1	0	0	-	2	2	2	1	0	-	5	1	3	0	0	-	4	0	0	0	0	-	0	11
% Single-Unit Trucks	2.0	0.5	0.0	-	-	0.6	1.8	0.9	1.2	-	-	1.2	1.1	1.1	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.7
Articulated Trucks	0	0	1	0	-	1	0	1	0	0	-	1	0	3	0	0	-	3	0	3	1	0	-	4	9
% Articulated Trucks	0.0	0.0	1.5	-	-	0.3	0.0	0.4	0.0	-	-	0.2	0.0	1.1	0.0	-	-	0.6	0.0	1.4	2.1	-	-	1.2	0.6
Bicycles on Road	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	2	0	0	0	-	2	4
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	2.7	0.0	0.0	-	-	0.6	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 7



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



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 8

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

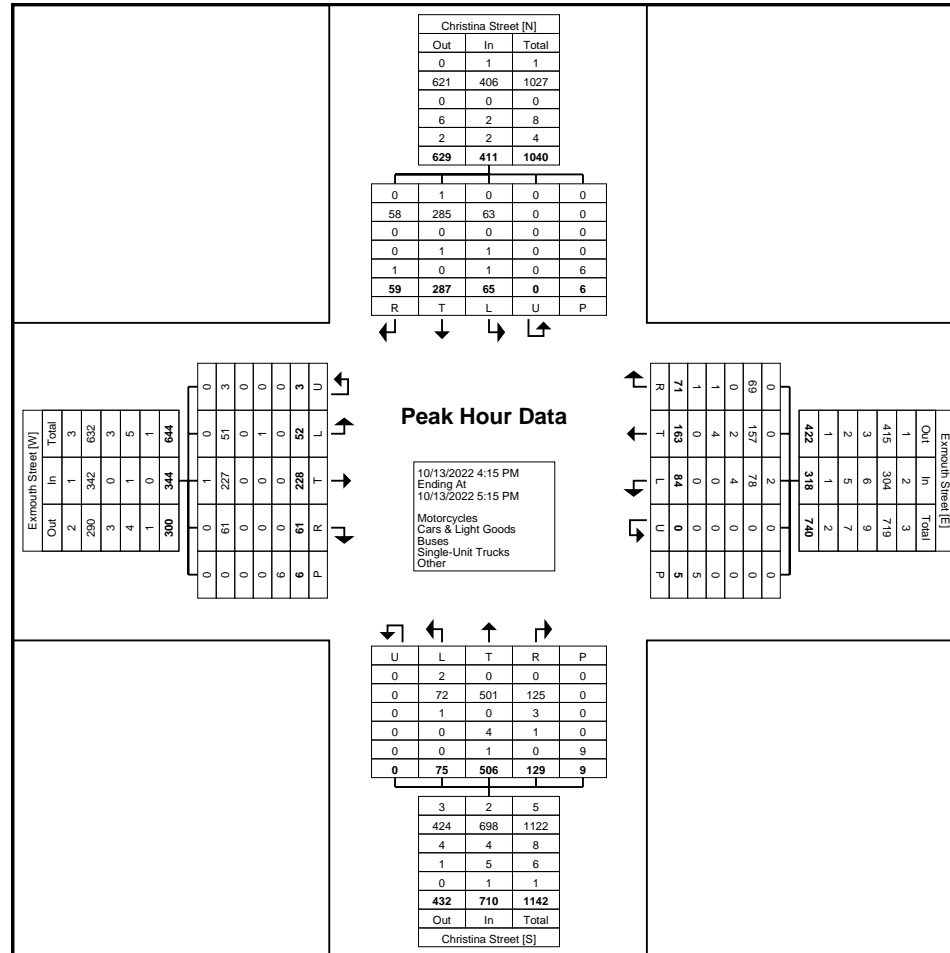
Start Time	Exmouth Street Eastbound						Exmouth Street Westbound						Christina Street Northbound						Christina Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	14	53	13	3	0	83	20	40	13	0	3	73	22	124	32	0	6	178	15	69	16	0	1	100	434
4:30 PM	10	63	16	0	1	89	28	45	17	0	0	90	21	112	38	0	1	171	15	70	12	0	0	97	447
4:45 PM	8	46	17	0	4	71	17	39	25	0	1	81	18	135	27	0	1	180	17	78	18	0	3	113	445
5:00 PM	20	66	15	0	1	101	19	39	16	0	1	74	14	135	32	0	1	181	18	70	13	0	2	101	457
Total	52	228	61	3	6	344	84	163	71	0	5	318	75	506	129	0	9	710	65	287	59	0	6	411	1783
Approach %	15.1	66.3	17.7	0.9	-	-	26.4	51.3	22.3	0.0	-	-	10.6	71.3	18.2	0.0	-	-	15.8	69.8	14.4	0.0	-	-	-
Total %	2.9	12.8	3.4	0.2	-	19.3	4.7	9.1	4.0	0.0	-	17.8	4.2	28.4	7.2	0.0	-	39.8	3.6	16.1	3.3	0.0	-	23.1	-
PHF	0.650	0.864	0.897	0.250	-	0.851	0.750	0.906	0.710	0.000	-	0.883	0.852	0.937	0.849	0.000	-	0.981	0.903	0.920	0.819	0.000	-	0.909	0.975
Motorcycles	0	1	0	0	-	1	2	0	0	0	-	2	2	0	0	0	-	2	0	1	0	0	-	1	6
% Motorcycles	0.0	0.4	0.0	0.0	-	0.3	2.4	0.0	0.0	-	-	0.6	2.7	0.0	0.0	-	-	0.3	0.0	0.3	0.0	-	-	0.2	0.3
Cars & Light Goods	51	227	61	3	-	342	78	157	69	0	-	304	72	501	125	0	-	698	63	285	58	0	-	406	1750
% Cars & Light Goods	98.1	99.6	100.0	100.0	-	99.4	92.9	96.3	97.2	-	-	95.6	96.0	99.0	96.9	-	-	98.3	96.9	99.3	98.3	-	-	98.8	98.1
Buses	0	0	0	0	-	0	4	2	0	0	-	6	1	0	3	0	-	4	0	0	0	0	-	0	10
% Buses	0.0	0.0	0.0	0.0	-	0.0	4.8	1.2	0.0	-	-	1.9	1.3	0.0	2.3	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.6
Single-Unit Trucks	1	0	0	0	-	1	0	4	1	0	-	5	0	4	1	0	-	5	1	1	0	0	-	2	13
% Single-Unit Trucks	1.9	0.0	0.0	0.0	-	0.3	0.0	2.5	1.4	-	-	1.6	0.0	0.8	0.8	-	-	0.7	1.5	0.3	0.0	-	-	0.5	0.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.5	0.0	0.0	-	-	0.2	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	0	0	1	0	-	1	3
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	1.4	-	-	0.3	0.0	0.2	0.0	-	-	0.1	0.0	0.0	1.7	-	-	0.2	0.2
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	16.7	-	-	-	-	-	40.0	-	-	-	-	-	11.1	-	-	-	-	-	16.7	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	83.3	-	-	-	-	-	60.0	-	-	-	-	-	88.9	-	-	-	-	-	83.3	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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

Count Name: Christina Street N & Exmouth  
Street - Weekday  
Site Code: 220083  
Start Date: 10/13/2022  
Page No: 9



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

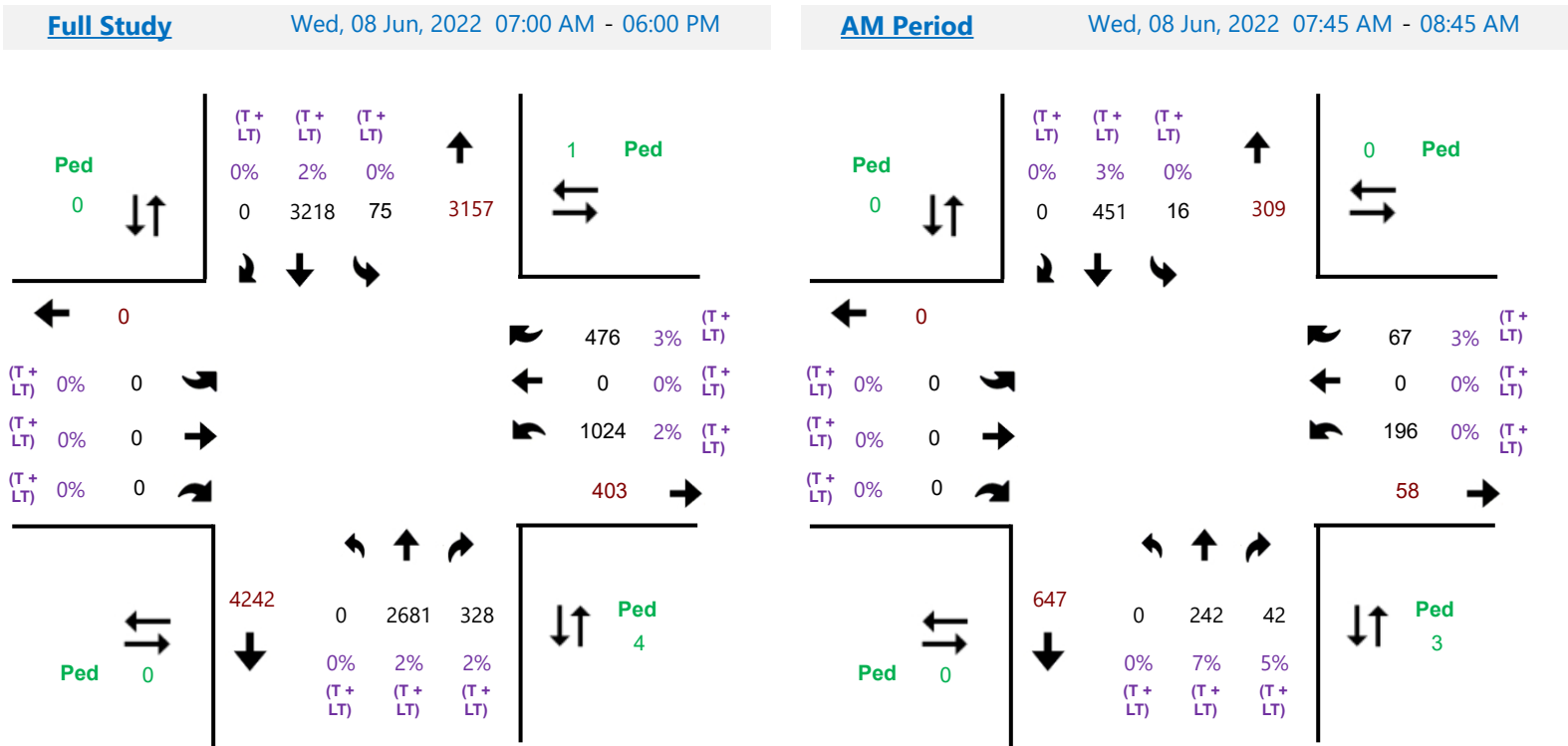




# TES - Traffic Engineering System

## Turning Movement Total Count and Peak Summary Report

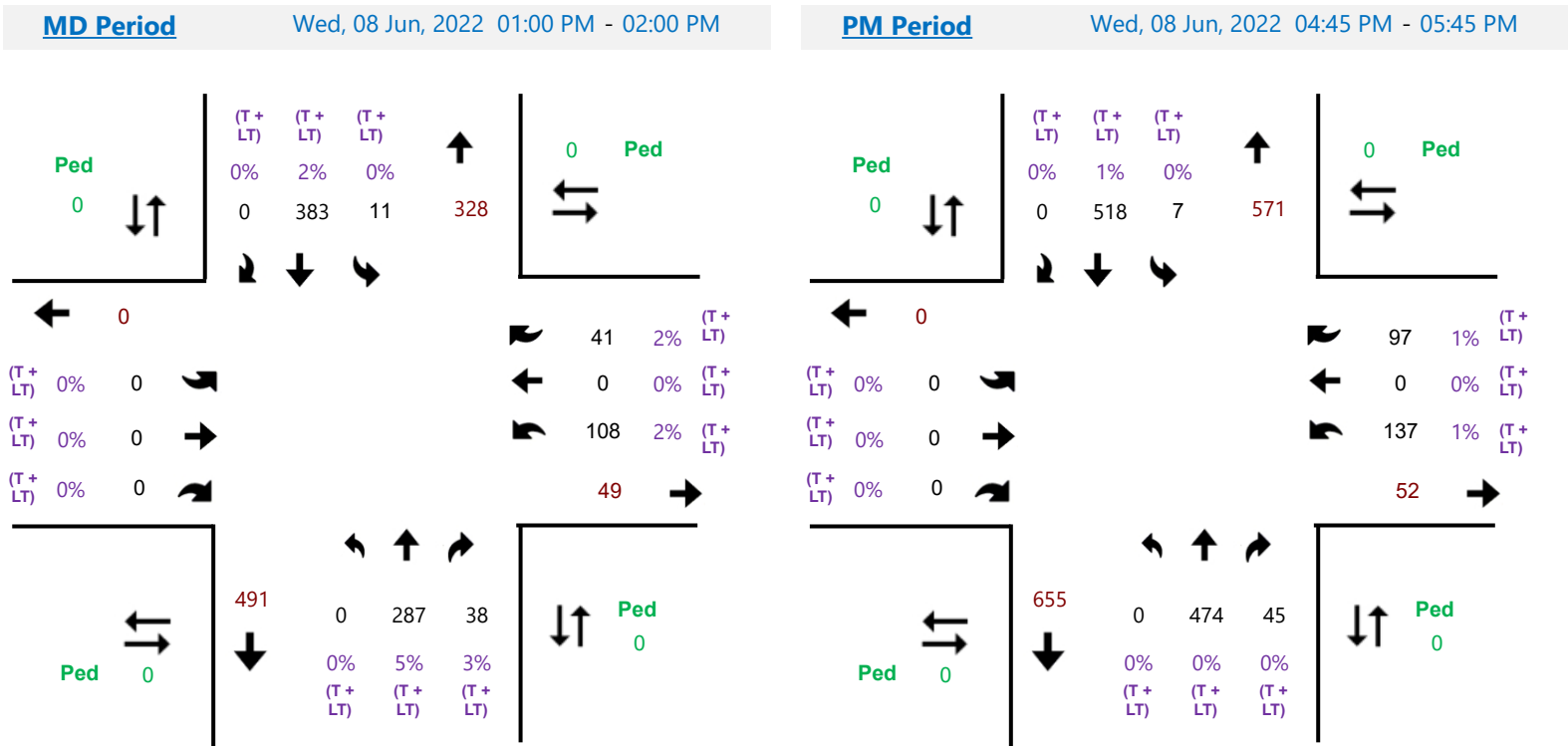
<b>Description:</b>	HWY 402 @ INDIAN RD N - RAMP 61		
<b>Region</b>	WEST	<b>Hwy #:</b>	HWY 402
<b>LHRS_Offset:</b>	48205_0000_61T	<b>Int. Type:</b>	T-Intersection
<b>Count Date:</b>	Wednesday, 08 June, 2022		





## TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

<b>Description:</b>	HWY 402 @ INDIAN RD N - RAMP 61		
<b>Region</b>	WEST	<b>Hwy #:</b>	HWY 402
<b>LHRS_Offset:</b>	48205_0000_61T	<b>Int. Type:</b>	T-Intersection
<b>Count Date:</b>	Wednesday, 08 June, 2022		

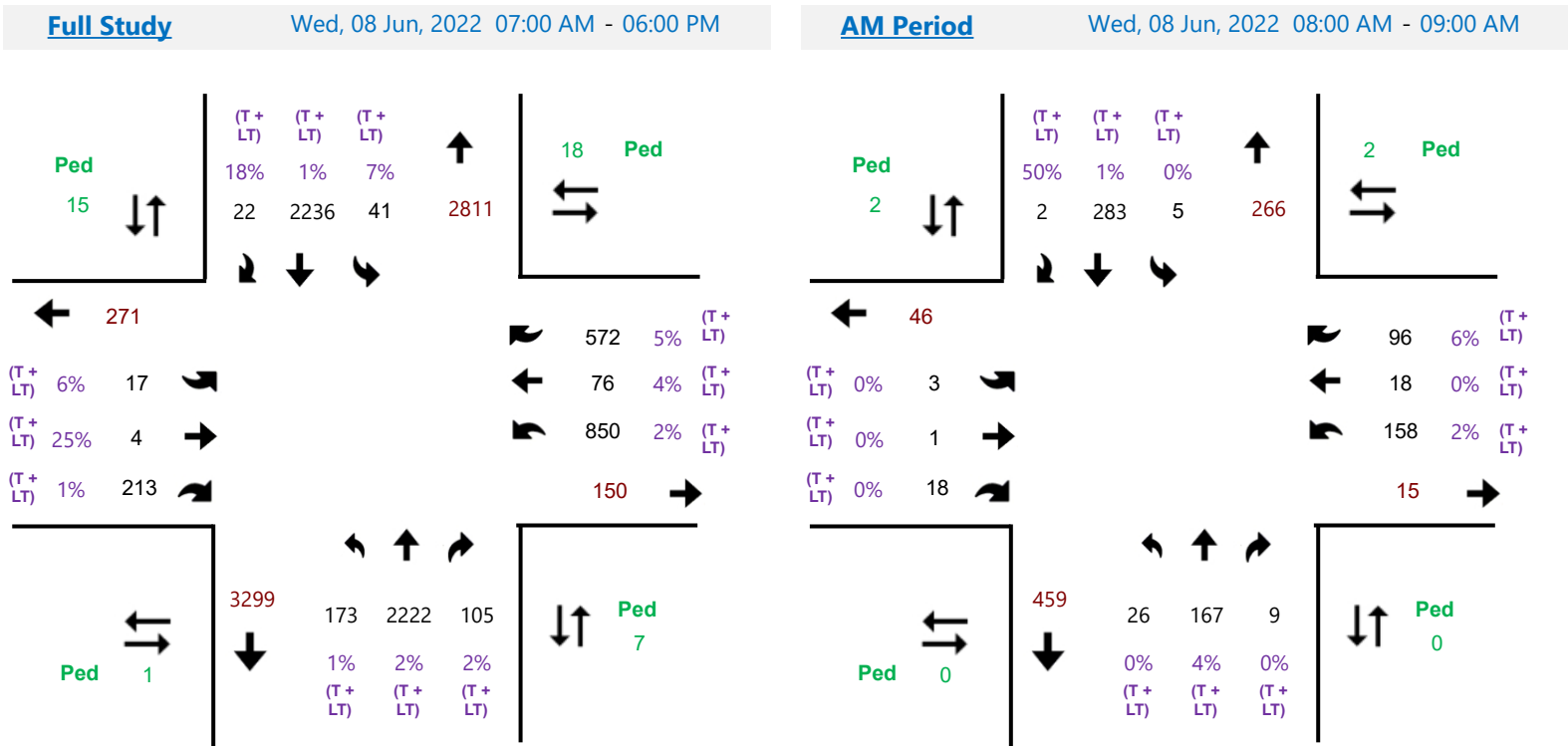




# TES - Traffic Engineering System

## Turning Movement Total Count and Peak Summary Report

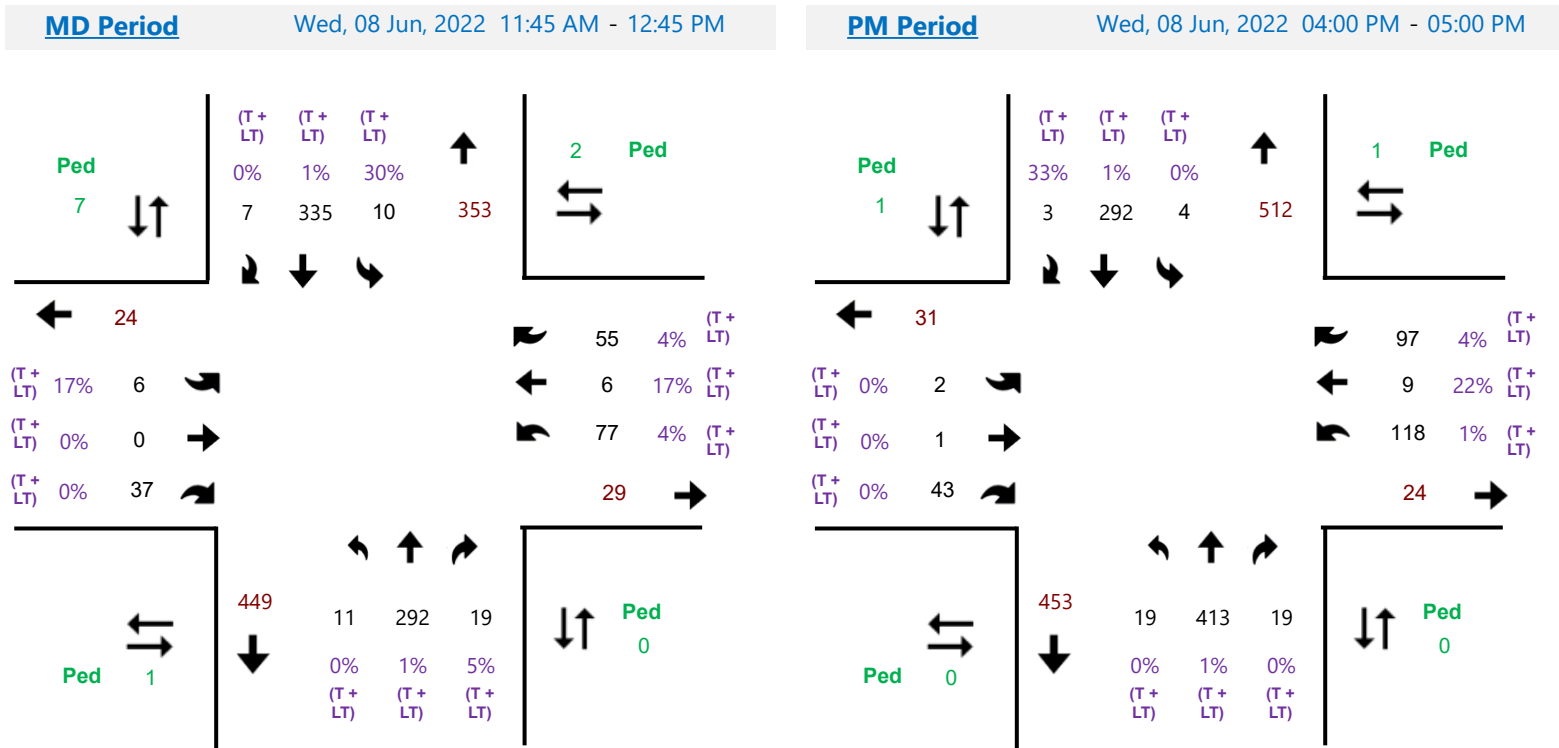
**Description:** HWY 402 @ CHRISTINA ST N\_HWY 402 - RAMP 62  
**Region:** WEST **Hwy #:** HWY 402  
**LHRS\_Offset:** 48215\_0000\_61T **Int. Type:**  
**Count Date:** Wednesday, 08 June, 2022





## TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

**Description:** HWY 402 @ CHRISTINA ST N\_HWY 402 - RAMP 62  
**Region:** WEST **Hwy #:** HWY 402  
**LHRS\_Offset:** 48215\_0000\_61T **Int. Type:**  
**Count Date:** Wednesday, 08 June, 2022

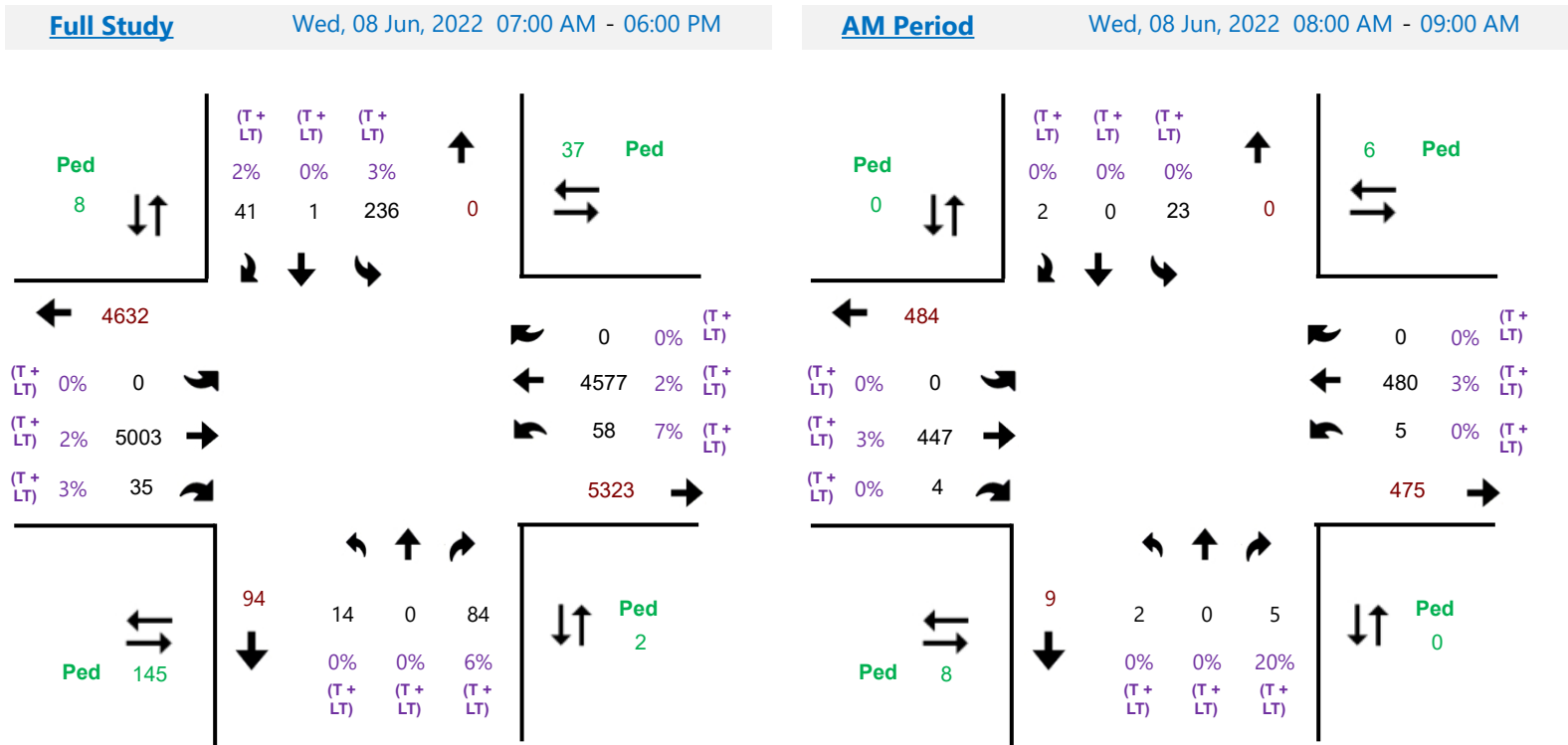




# TES - Traffic Engineering System

## Turning Movement Total Count and Peak Summary Report

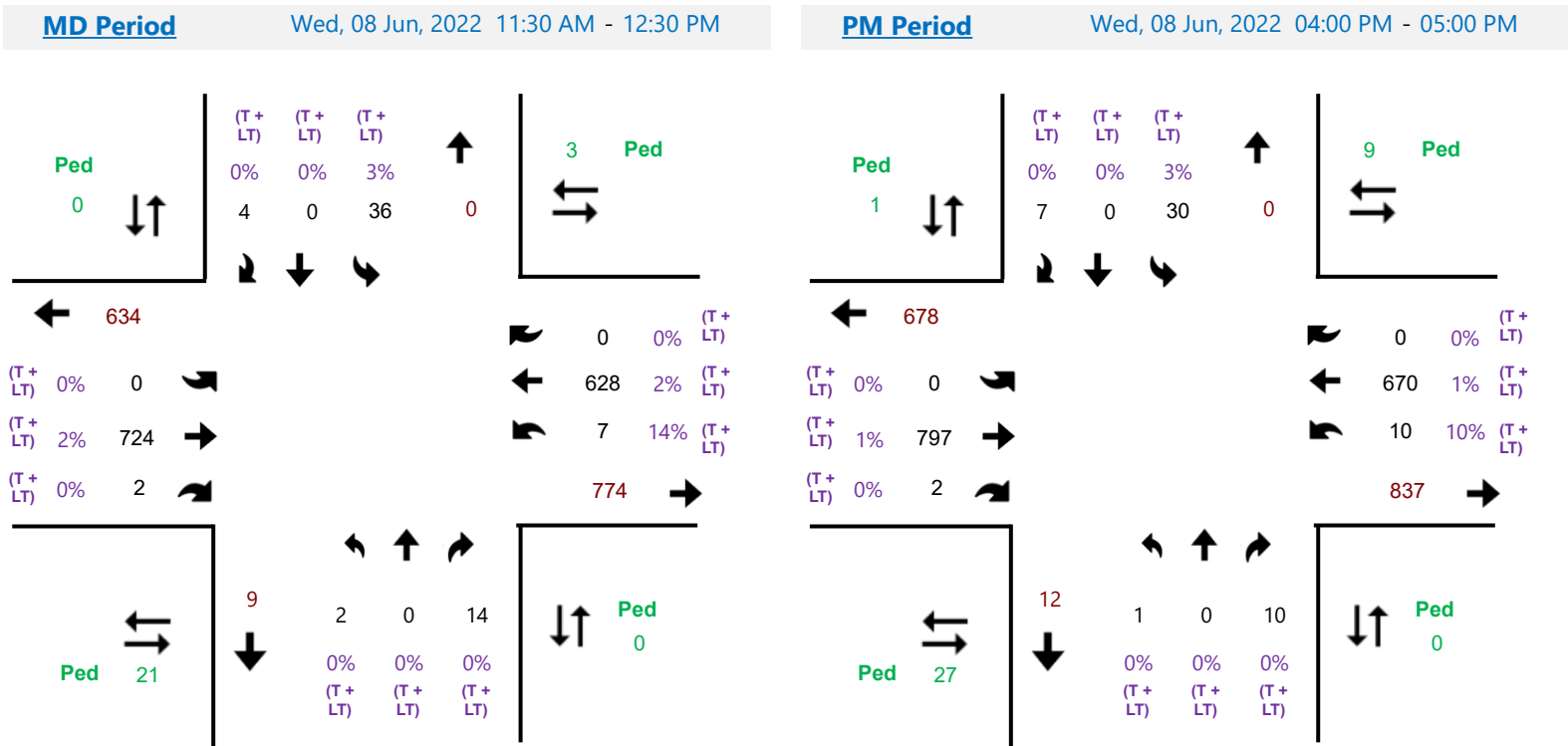
<b>Description:</b>	HWY 402 @ INDIAN RD N - RAMP 51		
<b>Region</b>	WEST	<b>Hwy #:</b>	HWY 402
<b>LHRS_Offset:</b>	48205_0000_51T	<b>Int. Type:</b>	T-Intersection
<b>Count Date:</b>	Wednesday, 08 June, 2022		





## TES - Traffic Engineering System Turning Movement Total Count and Peak Summary Report

<b>Description:</b>	HWY 402 @ INDIAN RD N - RAMP 51		
<b>Region</b>	WEST	<b>Hwy #:</b>	HWY 402
<b>LHRS_Offset:</b>	48205_0000_51T	<b>Int. Type:</b>	T-Intersection
<b>Count Date:</b>	Wednesday, 08 June, 2022		



# Programmed EPAC Data

11/20/201

7:48:46PM

**Intersection Name: Exmouth @ Indian**

**Intersection Alias: 005**

Access Code: 9999 Channel: 7 Address: 0 Revision: 2.34k

**Access Data**

Port 2 Comm :1200 Baud

Port 3 Comm :1200 Baud

## Phase Data

Vehical Basic Timings							Vehical Density Timings				Time B4	Cars	Time To
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap	
1	8	1.0	16	16	4.0	1.0	0.0	0	0	0	0	0.0	
2	22	5.0	35	50	4.0	2.0	0.0	0	0	0	0	0.0	
3	8	1.0	16	16	4.0	1.0	0.0	0	0	0	0	0.0	
4	26	5.0	35	50	4.0	2.0	0.0	0	0	0	0	0.0	
5	8	1.0	16	16	4.0	1.0	0.0	0	0	0	0	0.0	
6	22	5.0	35	50	4.0	2.0	0.0	0	0	0	0	0.0	
7	8	1.0	16	16	4.0	1.0	0.0	0	0	0	0	0.0	
8	26	5.0	35	50	4.0	2.0	0.0	0	0	0	0	0.0	

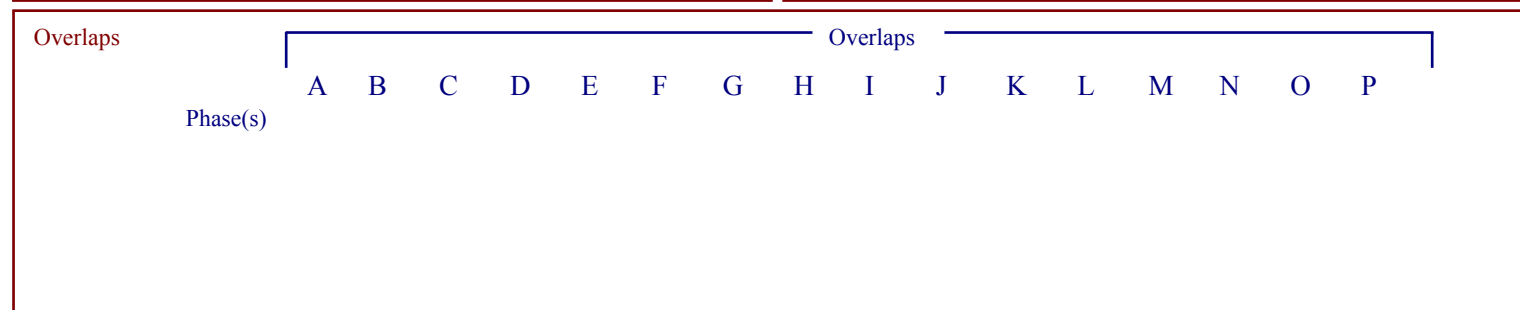
Pedestrian Timing			Extended	Actuated	General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk	Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
1	0	0	No	0	Inactive	None	None	None	0	Yes	No	No	No	No
2	10	15	No	0	Yellow	NonActI	None	Ped	0	Yes	No	No	No	No
3	0	0	No	0	Inactive	None	None	None	0	Yes	No	No	No	No
4	10	21	No	0	Inactive	NonActII	None	Ped	0	Yes	No	No	No	No
5	0	0	No	0	Inactive	None	None	None	0	Yes	No	No	No	No
6	10	15	No	0	Yellow	NonActI	None	Ped	0	Yes	No	No	No	No
7	0	0	No	0	Inactive	None	None	None	0	Yes	No	No	No	No
8	10	21	No	0	Inactive	NonActII	None	Ped	0	Yes	No	No	No	No

Special Sequence	Vehical Detector Phase Assignment				
Default Data	Assigned Phase	Mode	Switched Phase	Extend	Delay
	<b>Default Data</b>				

Pedestrian Detector	Special Detector Phase Assignment				
Default Data	Assign Phase	Mode	Switched Phase	Extend	Delay
	<b>Default Data</b>				

## Unit Data

General Control			Remote Flash		
Startup Time: 5sec	Startup State: Flash	Red Revert: 4sec	Test A = Flash	Channel	Flash Color
Auto Ped Clear: No	Stop Time Reset: No	Alternate Sequence: 0	Flash Entry Phase	Flash Exit Phase	Flash Alternat
ABC connector Input Modes: 0	Input	Output	<b>Default Data - No Flash</b>		
ABC connector Output Modes: 0	Ring	Respons Selection			
D connector Input Modes: 0	1	Ring 1			
D connector Output Modes: 0	2	Ring 2			
	3	None			
	4	None			



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)															
Phase	Ring	Next Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3	5	5	7	7	2	2	4	4								
3	1	4	6	6	8	8	5	6	7	8								
4	1	1																
5	2	6																
6	2	7																
7	2	8																
8	2	5																

**Alternate Sequences**

~ Alternate Sequences

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Phase Pair(s)	1	1	3	1	5	1	3	1	7	1	3	1	5	1	3	1
		2	4	2	6	2	4	2	8	2	4	2	6	2	4	2
2	0	0	3	0	5	5	3	0	7	7	3	7	5	5	3	
	0	0	4	0	6	6	4	0	8	8	4	8	6	6	4	
3	0	0	0	0	0	0	5	0	0	0	7	0	7	7	5	
	0	0	0	0	0	0	6	0	0	0	8	0	8	8	6	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	

**Port 1 Data**

BIU Port Message  
Addr Status 40

**Default Data**

**Channel Assignment**

Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set
Ph.1 Veh	1	1 - Ph.1 RYG	Ph.2 Veh	2	2 - Ph.2 RYG	Ph.3 Veh	3	3 - Ph.3 RYG
Ph.4 Veh	4	4 - Ph.4 RYG	Ph.5 Veh	5	5 - Ph.5 RYG	Ph.6 Veh	6	6 - Ph.6 RYG
Ph.7 Veh	7	7 - Ph.7 RYG	Ph.8 Veh	8	8 - Ph.8 RYG	Ph.2 Ped	9	10 - Ph.2 DPW
Ph.4 Ped	10	12 - Ph.4 DPW	Ph.6 Ped	11	14 - Ph.6 DPW	Ph.8 Ped	12	16 - Ph.8 DPW
Ph.1 OLP	13	17 - Ph.1 RYG	Ph.2 OLP	14	18 - Ph.2 RYG	Ph.3 OLP	15	19 - Ph.3 RYG
Ph.4 OLP	16	20 - Ph.4 RYG	Ph.1 Ped	17	9 - Ph.1 DPW	Ph.3 Ped	18	11 - Ph.3 DPW
Ph.5 Ped	19	13 - Ph.5 DPW	Ph.7 Ped	20	15 - Ph.7 DPW	Ph.5 OLP	21	21 - Ph.5 RYG
Ph.6 OLP	22	22 - Ph.6 RYG	Ph.7 OLP	23	23 - Ph.7 RYG	Ph.8 OLP	24	24 - Ph.8 RYG

**Coordination Data**

**Dial/Split Cycle**

General Coordination Data

Operation Mode: 1=Auto

Offset Mode: 0=Beg Grn

Manual Dial: 1

Coordination Mode: 0=Permissive

Force Mode: 0=Plan

Manual Split: 1

Maximun Mode: 2=Max 2

Max Dwell Time: 0

Manual Offset: 1

Correction Mode: 0=Dwell

Yield Period: 0

**Split Times and Phase Mode**

Dial / Split

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
-----	--------	----------	-----	--------	----------	-----	--------	----------	-----	--------	----------





Preempt	Preempt Timers								Select			Track			Dwell			Return		
	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Green	Ped Clear	Yel	Red		
1	No	0	0	0	10	0	0	8	4.0	2.0	0	8	4.0	2.0	10	8	4.0	2.0		
2	No	0	0	0	10	0	0	8	4.0	2.0	0	0	4.0	2.0	10	8	4.0	2.0		
3	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0		
4	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0		
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0		
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0		

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
3	Yes	No	1	Yes	No	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
7	Yes	No	5	Yes	No	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
						3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
						4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
						5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
						6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
						7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
						8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers									
Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases	
1	No	0	0	0	0	0	0	0=Do not Skip Phases	
2	No	0	0	0	0	0	0	0=Do not Skip Phases	
3	No	0	0	0	0	0	0	0=Do not Skip Phases	
4	No	0	0	0	0	0	0	0=Do not Skip Phases	
5	No	0	0	0	0	0	0	0=Do not Skip Phases	
6	No	0	0	0	0	0	0	0=Do not Skip Phases	

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls

**Preempt 1**

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2 Red	Green	No	<b>Default Data</b>			<b>Default Data</b>		
6 Red	Green	No						

**Preempt 2**

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp. Track	Dwell	Cycle
4 Red	Green	No	<b>Default Data</b>			<b>Default Data</b>		
8 Red	Green	No						

**Preempt 3**

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp. Track	Dwell	Cycle
<b>Default Data</b>			<b>Default Data</b>			<b>Default Data</b>		

Preempt 4

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp. Track	Dwell	Cycle

Default Data

Default Data

Default Data

Preempt 5

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp. Track	Dwell	Cycle

Default Data

Default Data

Default Data

Preempt 6

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp. Track	Dwell	Cycle

Default Data

Default Data

Default Data

System/Detectors Data

Local Critical Alarms

Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Revert to Backup: 5    Remote Flash: No    1st Phone:  
 Local Fash: No    Cycle Fault: No    Coord Fault: No    Preemption: No    Voltage Monitor: No    2nd Phone:  
 Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Average Veh/Hr	Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Weight Detectors	Queue 2 Detectors	System Weight Detectors
1	1	1,200	5	50	50				
3	3	1,200	5	50	50	<b>Default Data</b>		<b>Default Data</b>	
5	5	1,200	5	50	50				
7	7	1,200	5	50	50				

Sample Interval:

Queue: 1    Input Selection: 0=Average    Queue:    Level    Enter    Leave    Dial / Split / Offset  
 Detector Failed Level : 0  
 Queue: 2    Input Selection: 0=Average    Detector Failed Level : 0    **Default Data**

Vehical Detector

Diagnostic Value 0

Max	No	Erratic
Detector Presence	Activity	Count

Default Data - Diag 0 Values

Vehical Detector

Diagnostic Value 1

Max	No	Erratic
Detector Presence	Activity	Count
1	60	120
3	60	120
5	60	120
7	60	120

Special Detector

Diagnostic Value 0

Max	No	Erratic
Detector Presence	Activity	Count

Default Data - No Diag 0 Values

Pedestrian Detector

Diagnostic Value 0

Max	No	Erratic
Detector Presence	Activity	Count

Default Data - No Diag 0 Values

Pedestrian Detector

Diagnostic Value 1

Max	No	Erratic
Detector Presence	Activity	Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 1

Max	No	Erratic
Detector Presence	Activity	Count

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:    Dial/Split/Offset  
 Measurement:  
 Detector 1    Detector\_2    Distance :

Speed Trap    Speed Trap  
 Low Treshold    High Treshold

Default Data

Default Data

## Volume Detector Data

Report Interval

Volume	Controller
Detector	Detector
Number	Channel

## Default Data

**Cover Sheet**

**NOTE: Phases 4 and 8 RESTRICTED**

Location: Hwy 402 @ Christina

Area/District: \_\_\_\_\_

Timing Based On T.M. Dated: \_\_\_\_\_

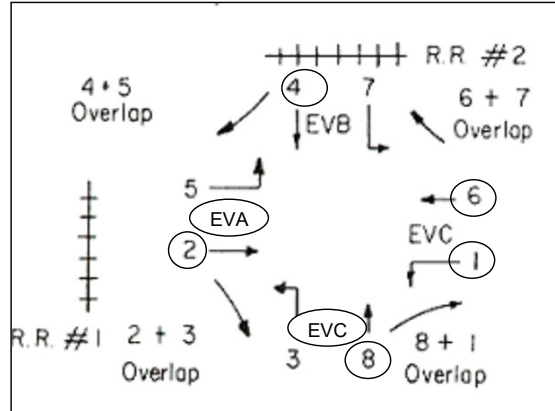
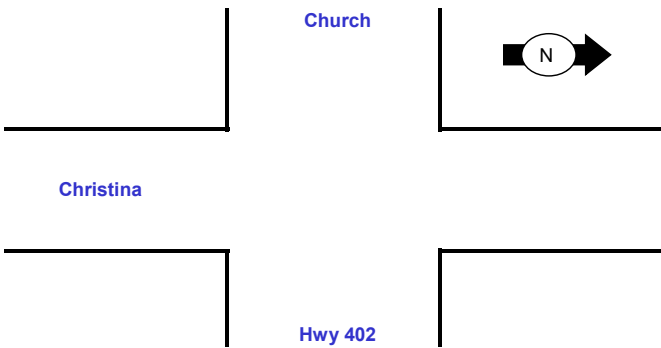
Traffic Signal: 35

Timing Developed By: H Nichols

Approved By: K Plut

Installed By: \_\_\_\_\_

Installation Date: 21-Aug-12



Circle Movements and Operations

**Note: Phase Sequence 1/6, 2/6, 4, 8**

**COMMUNICATIONS ADDRESSING**

COMM ADDRESS  
(C/0 + 0 + 0) = 1

CELL #: \_\_\_\_\_

ZONE ADDRESS  
(C/0 + 0 + 1) = 1

UDP PORT: \_\_\_\_\_

AREA NUMBER  
(C/0 + 0 + 2) = 1

IP ADDRESS: \_\_\_\_\_

AREA ADDRESS 35  
(C/0 + 0 + 3) = \_\_\_\_\_

AMPLIFIER:

PROGRAM: 233ON1.C

**DISABLE ALARM REPORTING**

		Column F							
		1	2	3	4	5	6	7	8
0	OMIT ALARMS					X			

< C + 0 + C = 5 >

- 1 = STOP TIME
- 2 = FLASH SENSE
- 3 = KEYBOARD ENTRY
- 4 = MANUAL PLAN SELECT
- 5 = ENABLE POLICE CNTRL (Not Used)
- 6 = EXTERNAL ALARM (Door Alarm)
- 7 = DETECTOR FAILURE

# ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

		PHASE							
		1	2	3	4	5	6	7	8
0	WALK	-		-		-	14	-	17
1	DON'T WALK	-		-		-	6	-	12
2	MIN INITIAL	7	20		10		20		10
3	TYPE 3 LIMIT	-		-		-		-	
4	ADD PER VEH	-		-		-		-	
5	VEH EXT	3.0	3.2		3.0		3.2		3.0
6	MAX GAP	3.0	3.2		3.0		3.2		3.0
7	MIN GAP	3.0	3.2		3.0		3.2		3.0
8	MAX LIMIT	12	26		16		41		29
9	MAXIMUM 2	-		-		-		-	
A	ADV /DLY WALK	-		-		-		-	
B	SEQUENCE TO	-		-		-		-	
C	COND SRV MIN	-		-		-		-	
D	REDUCE EVERY	-		-		-		-	
E	YELLOW	3.0	4.5		4.5		4.5		4.5
F	RED CLEAR		3.0		3.1		3.0		3.1

**PHASE BANK # 1 < C + O + F = 1 >**

		9	A	B	C	D			E				
0								RR1 DLY					
1	PHASE 1	-						RR1 CLR					
2	PHASE 2							EVA DLY					
3	PHASE 3	-						EVA CLR	3				
4	PHASE 4	-						EV B DLY					
5	PHASE 5	-						EV B CLR					
6	PHASE 6							EVC DLY					
7	PHASE 7	-						EVC CLR	3				
8	PHASE 8	-						EVD DLY					
							MAX INT	ALT WALK	ALT FLH	ALT INT	ALT EXT	EVD CLR	
							D/W					RR2 DLY	
												RR2 CLR	
												EV CLR	
												EV DLY	
												RR CLR	
												RR DLY	

ALL RED START  
( F/1 + C + O ) = **5.0**  
RED REVERT  
( F/1 + O + F ) = **5.0**

## COLUMN F PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X		X		X		X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL						X		
5	PEDESTRIANS							X	
6	YIELD AT FL SH D/W								
7	RED REST								
8	DOUBLE ENTRY		X				X		
9	VEH MAX CALL		X				X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	COND SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES				X				

**< C + O + F = 1 >**

**BI Tran Systems, Inc.**  
510 Bercut Dr., Sacramento, Calif. 95814  
916/441-0260  
Traffic Signal Program **233** Ontario

**Date:** 21-Aug-12

### LOCATION

Hwy: Hwy 402  
At: Christina

		A	B	C
PREEMPT	RR1-2	SP	EMER	
MINIMUMS	SPEV1	EV2	VEH	
A	WLK (DFLT)	4	4	4
B	FD WALK			12
C	INITAL			5

**< C + O + F = 1 >**

### Column E Phases / Bits

		1	2	3	4	5	6	7	8
0	EXCLUSIVE								
1	RR1 CLEAR								
2	RR2 CLEAR								
3	RR2 LTD SRV								
4	PROT/PERM	X							
5	FLH TO PREMT								
6	FLASH ENTRY								
7	DISABL MIN YEL								
8	DISABL OVP YEL								
9	OVP FLH YEL								
A	EM VEH A		X				X		
B	EM VEH B								
C	EM VEH C								X
D	EM VEH D								
E	EXTRA 1	X		X		X			
F	IC SELECT		X						

**< C + O + E = 125 >**

### Column F Phases / Bits

		1	2	3	4	5	6	7	8
0									
1	EXT PERMIT 1								
2	EXT PERMIT 2								
3	EXCLU PED								
4									
5	PED 2P OUT								
6	PED 6P OUT						X		
7	PED 4P OUT								
8	PED 8P OUT								X
9	FLH YELLOW								
A									
B									
C									
D									
E	RESTRICTED				X				X
F	EXTRA 2								

**SPECIALS < C + O + F = 2 >**

### Column F Phases / Bits

		1	2	3	4	5	6	7	8
0	ADV GRN FLH								
1	PHASE FLASH								
2	FLASH WALK								
3	GUAR PASS								
4	SIMUL GAP		X				X		
5	SEQ TIMING								
6	ADV WALK								
7	DELAY WALK								
8	EXT RECALL								
9									
A	MAX EXTEN								
B	INH PED RSRV								
C	SEMI ACTUATED		X				X		
D									
E	STRT VEH CALL	X	X		X				
F	STRT PED CALL						X		X

MANUAL PLAN	0
<b>&lt; C/O + A + 1 &gt;</b>	
MANUAL OFFSET	0
<b>&lt; C/O + B + 1 &gt;</b>	
<b>MANUAL SELECTION</b>	

### MANUAL PLAN

0 = Automatic (Master)  
9 = Control Plan 1 - 9  
14 (E) = Free ( Isolated )  
15 (F) = Software Flash

### MANUAL OFFSET

0 = Automatic (Master)  
1 = Offset A  
2 = Offset B  
3 = Offset C

#### FLASH TO PREEMPT

1 = EVA      5 = RR1      1 = TBC TYPE 1  
2 = EVB      6 = RR2      2 = NEMA EXT. COORD.  
3 = EVC      7 = SE1      3 = DAYLIGHT SAVINGS  
4 = EVD      8 = SE2      4 =

#### EXTRA 1

5 = EXPANDED STATUS REPORTING  
6 = INTERNATIONAL PED  
7 = CLEAR OUTPUTS DURING FLASH  
8 = SPLIT RING

#### EXTRA 2

1 = AWR ON DURING PHASE INITIAL      2 = 2 WAY MODEM  
2 = LMU INSTALLED      3 = 7 WIRE SLAVE

#### IC SELECT

4 = FLASH / FREE      5 = SIMPLEX MASTER  
7 = 7 WIRE MASTER  
8 = OFFSET INTURP

# Programmed EPAC Data

11/20/201

7:42:52PM

**Intersection Name: Exmouth @ Christina**

**Intersection Alias: 050**

Access Code: 9999 Channel: 7 Address: 0 Revision: 3.33e

**Access Data**

Port 2 Comm :1200 Baud

Port 3 Comm :1200 Baud

**Phase Data**

<u>Vehical Basic Timings</u>							<u>Vehical Density Timings</u>			Time B4	Cars	Time To
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap
2	23	5.0	27	50	4.0	2.0	0.0	0	0	0	0	0.0
4	25	5.0	29	50	4.0	2.0	0.0	0	0	0	0	0.0
7	10	4.0	10	30	3.0	1.0	0.0	0	0	0	0	0.0
8	25	5.0	35	50	4.0	2.0	0.0	0	0	0	0	0.0

<u>Pedestrian Timing</u>						<u>General Control</u>					<u>Miscellaneous</u>				
Phase	Walk	Ped Clear	Flashing Walk	Extended Ped Clear	Actuated Rest in Walk	Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
2	15	12	No	0	No	Yellow	NonActI	None	Ped	0	Yes	Yes	No	No	No
4	15	14	No	0	No	Inactive	NonActII	None	Ped	0	Yes	Yes	No	No	No
7	0	0	No	0	No	Inactive	None	Min	None	0	Yes	No	No	No	No
8	15	14	No	0	No	Inactive	NonActII	None	Ped	0	Yes	Yes	No	No	No

<u>Special Sequence</u>	<u>Vehical Detector Phase Assignment</u>				
<b>Default Data</b>	Assigned Phase	Mode	Switched Phase	Extend	Delay
	<b>Default Data</b>				

<u>Pedestrian Detector</u>	<u>Special Detector Phase Assignment</u>				
<b>Default Data</b>	Assign Phase	Mode	Switched Phase	Extend	Delay
	<b>Default Data</b>				

**Unit Data**

<u>General Control</u>				<u>Remote Flash</u>			
Startup Time: 5sec	Startup State: Flash	Red Revert: 4sec		Test A = Flash	Flash Channel	Flash Color	Flash Alternat
Auto Ped Clear: No	Stop Time Reset: No	Alternate Sequence: 0		Flash Phase	Flash Phase	Flash Exit Phase	
ABC connector Input Modes: 0		Input Ring	Output Selection	<b>Default Data - No Flash</b>			
ABC connector Output Modes: 0		1 Ring 1	Ring 1	<b>Default Data - No Flash</b>			
D connector Input Modes: 0		2 Ring 2	Ring 2	<b>Default Data - No Flash</b>			
D connector Output Modes: 0		3 None	None	<b>Default Data - No Flash</b>			
		4 None	None	<b>Default Data - No Flash</b>			

Overlaps	Overlaps															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)															
Phase	Ring	Next Phase																
2	1	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4	1	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	2	8	6	6	8	8	5	6	7	8								
8	2	5																

**Alternate Sequences**

Alternate Sequences

**Port 1 Data**

BIU Port Message  
 Addr Status 40

Phase  
 Pair(s)

**Default Data**

No Alternate  
 Sequences  
 Programmed

**Channel Assignment**

Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set
Ph.1 Veh	1	1 - Ph.1 RYG	Ph.2 Veh	2	2 - Ph.2 RYG	Ph.3 Veh	3	3 - Ph.3 RYG
Ph.4 Veh	4	4 - Ph.4 RYG	Ph.5 Veh	5	5 - Ph.5 RYG	Ph.6 Veh	6	6 - Ph.6 RYG
Ph.7 Veh	7	7 - Ph.7 RYG	Ph.8 Veh	8	8 - Ph.8 RYG	Ph.2 Ped	9	10 - Ph.2 DPW
Ph.4 Ped	10	12 - Ph.4 DPW	Ph.6 Ped	11	14 - Ph.6 DPW	Ph.8 Ped	12	16 - Ph.8 DPW
Ph.1 OLP	13	17 - Ph.1 RYG	Ph.2 OLP	14	18 - Ph.2 RYG	Ph.3 OLP	15	19 - Ph.3 RYG
Ph.4 OLP	16	20 - Ph.4 RYG	Ph.1 Ped	17	9 - Ph.1 DPW	Ph.3 Ped	18	11 - Ph.3 DPW
Ph.5 Ped	19	13 - Ph.5 DPW	Ph.7 Ped	20	15 - Ph.7 DPW			

**Coordination Data**

Dial/Split Cycle

General Coordination Data

1/1 70

Operation Mode: 1=Auto

Offset Mode: 0=Beg Grn

Manual Dial: 1

Coordination Mode: 0=Permissive

Force Mode: 0=Plan

Manual Split: 1

Maximun Mode: 0=Inhibit

Max Dwell Time: 0

Manual Offset: 1

Correction Mode: 2=Short Way

Yield Period: 0

**Split Times and Phase Mode**

Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	34	1=Coordinate	4	36	0=Actuated						

**Traffic Plan Data**

Plan: 1/1/1	Offset Time: 26	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/1/2	Offset Time: 36	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/1/3	Offset Time: 21	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0

**Local TBC Data**

Start of Daylight Saving Month: 0 Week: 0 Cycle Zero Reference Hours: 0 Min: 0  
 End of Daylight Saving Month: 0 Week: 0

Source	Equate Days						
Day	1	2	3	4	5	6	7

**Traffic Data**

Event	Day	Time	D/S/O	flash	PHASE FUNCTION															
		:	//		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



### AUX. Events

Event	Program Day	Hour	Min.	Aux Outputs			Det. Diag.	Det. Rpt.	Det. Mult100	Dimming	Special Function Outputs								
				1	2	3	D1	D2	D3		1	2	3	4	5	6	7	8	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

### Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Special Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 2 Max2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 3 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 4 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 5 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 6 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 7 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 8 Max2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 1 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 2 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 3 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 4 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 5 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 6 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phase 7 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Phase 8 Phase Omit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Dimming Data

Channel Red Yellow Green Alternate

Default Data - No Dimming Programmed

## Preemption Data

### General Preemption Data

Ring Min Grn/Walk Time

1	10
2	10
3	10
4	10

Flash > Preempt 1      Preempt 2 = Preempt 3      Preempt 4 = Preempt 5  
 Preempt 1 > Preempt 2      Preempt 3 = Preempt 4      Preempt 5 = Preempt 6

### Preempt Timers

Preempt	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Select			Track			Dwell Green	Return			
								Ped Clear	Yel	Red	Grn	Ped	Yel		Red	Ped Clear	Yel	Red
1	No	0	0	0	10	0	0	8	4.0	2.0	0	8	4.0	2.0	10	8	4.0	2.0
2	No	0	0	0	10	0	0	8	4.0	2.0	0	8	4.0	2.0	10	8	4.0	2.0
3	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0
4	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls
4	Yes	No	2	Yes	No												

### Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls

### Preempt 1

Vehical Phases				Pedestrian Phases				Overlaps			
Ph	Track	Dwell	Cycle	Ph	Track	Dwell	Cycle	Ovlp	Track	Dwell	Cycle
2	Red	Green	No								
<b>Default Data</b>						<b>Default Data</b>					



**Speed Trap Data**

Speed Trap:

Measurement:

Detector 1    Detector\_2    Distance :

Dial/Split/Offset  
//

Speed Trap  
Low Treshold

Speed Trap  
High Treshold

**Default Data**

**Default Data**

**Volume Detector Data**

Report Interval

Volume    Controller  
Detector    Detector  
Number    Channel

**Default Data**

# Appendix C

## Existing Traffic Operations Reports



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	19	164	19	100	27	174	9	5	294	2
Future Volume (vph)	3	1	19	164	19	100	27	174	9	5	294	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99	1.00				1.00	
Frt	0.887					0.850			0.850		0.999	
Flt Protected	0.994				0.957		0.950			0.950		
Satd. Flow (prot)	0	1675	0	0	1786	1524	1805	3471	1615	1805	3559	0
Flt Permitted	0.994				0.957		0.557			0.590		
Satd. Flow (perm)	0	1675	0	0	1786	1502	1055	3471	1615	1121	3559	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		21				150			151		1	
Link Speed (k/h)		50			41			50			50	
Link Distance (m)		148.3			216.9			429.5			162.9	
Travel Time (s)		10.7			19.0			30.9			11.7	
Confl. Peds. (#/hr)	2					2	2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	6%	0%	4%	0%	0%	1%	50%
Adj. Flow (vph)	3	1	21	178	21	109	29	189	10	5	320	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	199	109	29	189	10	5	322	0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	17.6	17.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	24.0	24.0		37.0	37.0	37.0	34.0	34.0	34.0	15.0	49.0	
Total Split (%)	21.8%	21.8%		33.6%	33.6%	33.6%	30.9%	30.9%	30.9%	13.6%	44.5%	
Maximum Green (s)	16.4	16.4		29.4	29.4	29.4	26.5	26.5	26.5	12.0	41.5	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)				17.0	17.0	17.0					14.0	
Flash Dont Walk (s)				12.0	12.0	12.0					6.0	
Pedestrian Calls (#/hr)				0	0	0					0	
Act Effct Green (s)		10.2			14.2	14.2	40.9	40.9	40.9	47.1	42.5	
Actuated g/C Ratio		0.13			0.18	0.18	0.52	0.52	0.52	0.60	0.54	
v/c Ratio		0.11			0.61	0.28	0.05	0.10	0.01	0.01	0.17	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.4					39.3	4.0	16.4	13.8	0.0	11.4	11.6
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4					39.3	4.0	16.4	13.8	0.0	11.4	11.6
LOS	B					D	A	B	B	A	B	B
Approach Delay	19.4					26.8			13.5			11.6
Approach LOS	B					C			B			B
Queue Length 50th (m)	0.5					25.2	0.0	1.5	5.1	0.0	0.3	9.0
Queue Length 95th (m)	8.5					56.4	6.9	10.4	21.8	0.0	2.4	28.9
Internal Link Dist (m)	124.3					192.9			405.5			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	376					688	671	551	1816	917	784	1937
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.07					0.29	0.16	0.05	0.10	0.01	0.01	0.17
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	78.1											
Natural Cycle:	95											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.61											
Intersection Signal Delay:	17.6						Intersection LOS: B					
Intersection Capacity Utilization:	53.3%						ICU Level of Service A					
Analysis Period (min):	15											
<b>Splits and Phases: 1: Christina Street &amp; Church Street/Hwy 402 WB Ramp</b>												

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↖
Traffic Volume (vph)	248	67	212	42	22	454
Future Volume (vph)	248	67	212	42	22	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Frt		0.850	0.975			
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1770	1568	3393	0	1805	3574
Flt Permitted	0.950			0.527		
Satd. Flow (perm)	1770	1568	3393	0	999	3574
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		73	31			
Link Speed (k/h)	50		50		50	
Link Distance (m)	170.6		431.4		194.2	
Travel Time (s)	12.3		31.1		14.0	
Conf. Peds. (#/hr)				2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	5%	0%	1%
Adj. Flow (vph)	270	73	230	46	24	493
Shared Lane Traffic (%)						
Lane Group Flow (vph)	270	73	276	0	24	493
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	37.0	37.0	28.0		10.0	38.0
Total Split (%)	49.3%	49.3%	37.3%		13.3%	50.7%
Maximum Green (s)	29.5	29.5	20.5		7.0	30.5
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	14.4	14.4	28.8		35.1	30.6
Actuated g/C Ratio	0.24	0.24	0.48		0.58	0.51
v/c Ratio	0.64	0.17	0.17		0.04	0.27

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

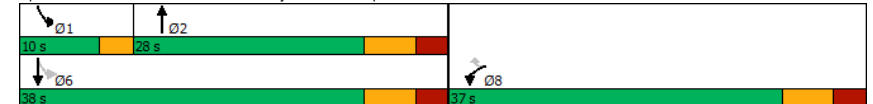
Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	27.7	6.0	10.0		6.6	9.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	27.7	6.0	10.0		6.6	9.5
LOS	C	A	A		A	A
Approach Delay	23.1		10.0			9.4
Approach LOS	C		A			A
Queue Length 50th (m)	27.9	0.0	7.1		1.0	15.4
Queue Length 95th (m)	48.7	8.0	20.7		4.4	29.0
Internal Link Dist (m)	146.6		407.4			170.2
Turn Bay Length (m)					90.0	
Base Capacity (vph)	872	810	1642		678	1822
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.31	0.09	0.17		0.04	0.27

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 60  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 13.7  
 Intersection Capacity Utilization 44.5%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	494	1	0	533	0	1	0	1	30	0	3
Future Volume (vph)	0	494	1	0	533	0	1	0	1	30	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt							0.932				0.989	
Flt Protected							0.976				0.956	
Satd. Flow (prot)	0	3574	0	1900	3539	0	0	1728	0	0	1703	0
Flt Permitted							0.976				0.956	
Satd. Flow (perm)	0	3574	0	1900	3539	0	0	1728	0	0	1703	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	3		15	15		3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	3%	0%	33%
Adj. Flow (vph)	0	537	1	0	579	0	1	0	1	33	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	538	0	0	579	0	0	2	0	0	36	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	494	1	0	533	0	1	0	1	30	0	3
Future Vol, veh/h	0	494	1	0	533	0	1	0	1	30	0	3
Conflicting Peds, #/hr	3	0	15	15	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	3	0	33
Mvmt Flow	0	537	1	0	579	0	1	0	1	33	0	3

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	553
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	1027	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	1014	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	12.4	15.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	489	-	-	1014	-	377
HCM Lane V/C Ratio	0.004	-	-	-	-	0.095
HCM Control Delay (s)	12.4	-	-	0	-	15.6
HCM Lane LOS	B	-	-	A	-	C
HCM 95th %tile Q(veh)	0	-	-	0	-	0.3



Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	44	174	66	91	157	79	73	234	84	69	247	55
Future Volume (vph)	44	174	66	91	157	79	73	234	84	69	247	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0			40.0			25.0		
Storage Lanes	0			0			1			1		
Taper Length (m)	7.5			7.5			70.0			95.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt	0.965			0.964			0.960			0.973		
Fit Protected	0.992			0.986			0.950			0.950		
Satd. Flow (prot)	0	3425	0	0	3317	0	1805	3391	0	1805	3462	0
Fit Permitted	0.850			0.767			0.554			0.545		
Satd. Flow (perm)	0	2934	0	0	2580	0	1050	3391	0	1034	3462	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	54			79			65			35		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	181.4			765.8			149.4			429.5		
Travel Time (s)	13.1			55.1			10.8			30.9		
Confl. Peds. (#/hr)	1		1	1		1	4		3	3		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	6%	1%	4%	0%	1%	4%	0%	1%	2%
Adj. Flow (vph)	48	189	72	99	171	86	79	254	91	75	268	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	309	0	0	356	0	79	345	0	75	328	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0	
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0	
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0	
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%	
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	6.0			6.0			6.0			6.0		
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.0			25.0			27.0			27.0		
Actuated g/C Ratio	0.39			0.39			0.42			0.42		
v/c Ratio	0.26			0.34			0.18			0.24		

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	11.5				11.5		13.0		10.0		12.9	
Queue Delay	0.0				0.0		0.0		0.0		0.0	
Total Delay	11.5				11.5		13.0		10.0		12.9	
LOS	B				B		B		B		B	
Approach Delay	11.5				11.5		10.6				11.3	
Approach LOS	B				B		B				B	
Queue Length 50th (m)	10.7				12.0		5.9		11.1		5.6	
Queue Length 95th (m)	18.8				21.2		14.0		18.9		13.4	
Internal Link Dist (m)	157.4				741.8		125.4				405.5	
Turn Bay Length (m)					40.0						25.0	
Base Capacity (vph)	1359				1759		442		1468		436	
Starvation Cap Reductn	0				0		0		0		0	
Spillback Cap Reductn	0				0		0		0		0	
Storage Cap Reductn	0				0		0		0		0	
Reduced v/c Ratio	0.23				0.20		0.18		0.24		0.17	
Intersection Summary												
Area Type:	Other											
Cycle Length:	82											
Actuated Cycle Length:	64											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.34											
Intersection Signal Delay:	11.2					Intersection LOS: B						
Intersection Capacity Utilization:	103.6%					ICU Level of Service G						
Analysis Period (min):	15											
Splits and Phases:	4: Christina Street & Exmouth Street											

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	50	194	22	77	235	20	20	137	105	62	207	55
Future Volume (vph)	50	194	22	77	235	20	20	137	105	62	207	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.99	1.00		0.98
Fit		0.985			0.988				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3423	0	1787	3401	0	1719	1881	1599	1626	1881	1615
Fit Permitted	0.581			0.567			0.556			0.662		
Satd. Flow (perm)	1032	3423	0	1062	3401	0	999	1881	1578	1132	1881	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	17				12				114			95
Link Speed (k/h)	50				50				50			50
Link Distance (m)	765.8			242.4			117.0			146.0		
Travel Time (s)	55.1			17.5			8.4			10.5		
Conf. Peds. (#/hr)	8		4	4		8	10		1	1		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	9%	1%	5%	0%	5%	1%	1%	11%	1%	0%
Adj. Flow (vph)	54	211	24	84	255	22	22	149	114	67	225	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	235	0	84	277	0	22	149	114	67	225	60
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.5	33.0		14.5	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	14.5	34.5		14.5	34.5		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	18.1%	43.1%		18.1%	43.1%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	10.5	28.5		10.5	28.5		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)	10.0			10.0			10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	15.0			15.0			15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0			0			0	0	0	0	0	0
Act Effct Green (s)	38.5	28.8		39.2	31.5		15.9	15.9	15.9	15.9	15.9	15.9
Actuated g/C Ratio	0.57	0.43		0.58	0.47		0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.08	0.16		0.12	0.17		0.09	0.34	0.25	0.25	0.51	0.14

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	5.6	12.6		5.8	12.1		22.6	25.2	6.6	25.2	28.2	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	12.6		5.8	12.1		22.6	25.2	6.6	25.2	28.2	3.0
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		11.3			10.6			17.6			23.3	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	2.4	9.5		3.7	11.7		2.4	17.4	0.0	7.7	27.6	0.0
Queue Length 95th (m)	6.8	17.8		9.6	21.1		7.9	32.7	11.4	17.9	47.7	4.3
Internal Link Dist (m)		741.8			218.4			93.0			122.0	
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	699	1468		735	1593		373	703	661	423	703	650
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.16		0.11	0.17		0.06	0.21	0.17	0.16	0.32	0.09

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	67.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	15.8
Intersection Capacity Utilization:	74.9%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔		↕	↔	↔	↕	↔
Traffic Volume (vph)	71	390	13	11	410	23	10	1	15	18	4	52
Future Volume (vph)	71	390	13	11	410	23	10	1	15	18	4	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.992			0.923			0.905	
Flt Protected	0.950			0.950				0.981			0.988	
Satd. Flow (prot)	1597	3524	0	1805	3428	0	0	1720	0	0	1699	0
Flt Permitted	0.950			0.950				0.981			0.988	
Satd. Flow (perm)	1597	3524	0	1805	3428	0	0	1720	0	0	1699	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	5		12	12		5	6		1	1		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	4%	13%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	77	424	14	12	446	25	11	1	16	20	4	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	438	0	12	471	0	0	28	0	0	81	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.1%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔		↕	↔	↔	↕	↔
Traffic Vol, veh/h	71	390	13	11	410	23	10	1	15	18	4	52
Future Vol, veh/h	71	390	13	11	410	23	10	1	15	18	4	52
Conflicting Peds, #/hr	5	0	12	12	0	5	6	0	1	1	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	0	0	4	13	0	0	0	0	0	0
Mvmt Flow	77	424	14	12	446	25	11	1	16	20	4	57

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	476	0	0	450
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.36	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.33	-	-	2.2
Pot Cap-1 Maneuver	1009	-	-	1121
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1005	-	-	1110
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	15.7	15
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	364	1005	-	-	1110	-	-	441
HCM Lane V/C Ratio	0.078	0.077	-	-	0.011	-	-	0.182
HCM Control Delay (s)	15.7	8.9	-	-	8.3	-	-	15
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.2	-	-	0	-	-	0.7

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	15	326	60	50	363	55	88	44	101	48	25	20
Future Volume (vph)	15	326	60	50	363	55	88	44	101	48	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	1.00	0.99		1.00		0.99
Fit		0.977			0.980			0.896				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3427	0	1770	3369	0	1770	1649	0	1641	1900	1154
Fit Permitted	0.490			0.507			0.740			0.519		
Satd. Flow (perm)	926	3427	0	940	3369	0	1376	1649	0	894	1900	1137
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			22			110				39
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	6		5	5		6	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	2%	5%	2%	2%	0%	3%	10%	0%	40%
Adj. Flow (vph)	16	354	65	54	395	60	96	48	110	52	27	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	419	0	54	455	0	96	158	0	52	27	22
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	33.1	33.1		33.1	33.1		15.1	15.1		25.2	23.2	23.2
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.22	0.22		0.37	0.34	0.34
v/c Ratio	0.04	0.25		0.12	0.28		0.32	0.35		0.12	0.04	0.05

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

Base Year (2024) AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	12.5	11.5		13.1	11.9		26.4	11.5		12.7	13.0	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.5	11.5		13.1	11.9		26.4	11.5		12.7	13.0	2.9
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		11.5			12.0			17.1				10.6
Approach LOS		B			B			B				B
Queue Length 50th (m)	1.3	18.1		4.5	20.3		11.5	5.5		4.1	2.2	0.0
Queue Length 95th (m)	4.7	27.7		11.3	30.6		24.5	20.4		10.0	6.6	2.5
Internal Link Dist (m)		76.1			653.3			83.1				102.1
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	448	1671		454	1641		588	767		439	1203	734
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.04	0.25		0.12	0.28		0.16	0.21		0.12	0.02	0.03
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85											
Actuated Cycle Length:	68.4											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.35											
Intersection Signal Delay:	12.7						Intersection LOS: B					
Intersection Capacity Utilization:	82.1%						ICU Level of Service E					
Analysis Period (min):	15											
<b>Splits and Phases: 7: East Street North/Driveway B &amp; Exmouth Street</b>												

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	119	298	95	62	270	51	118	201	51	58	287	149
Future Volume (vph)	119	298	95	62	270	51	118	201	51	58	287	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99	1.00		1.00	
Fit		0.964			0.976				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3350	0	1770	3357	0	1752	3471	1615	1805	3539	1599
Fit Permitted	0.489			0.479			0.519			0.615		
Satd. Flow (perm)	919	3350	0	890	3357	0	957	3471	1594	1168	3539	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			25				151			162
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Confl. Peds. (#/hr)	1		5	5		1			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	5%	2%	3%	14%	3%	4%	0%	0%	2%	1%
Adj. Flow (vph)	129	324	103	67	293	55	128	218	55	63	312	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	427	0	67	348	0	128	218	55	63	312	162
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	36.0	28.6		35.0	26.0		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.40	0.32		0.39	0.29		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.29	0.39		0.16	0.35		0.29	0.20	0.09	0.13	0.31	0.29

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

Base Year (2024) AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	16.6	22.8		15.2	24.1		17.2	24.4	0.3	15.5	26.3	5.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	22.8		15.2	24.1		17.2	24.4	0.3	15.5	26.3	5.7
LOS	B	C		B	C		B	C	A	B	C	A
Approach Delay		21.4			22.7			18.8				18.8
Approach LOS		C			C			B				B
Queue Length 50th (m)	13.3	28.5		6.7	23.8		13.5	15.7	0.0	6.4	23.2	0.0
Queue Length 95th (m)	24.4	42.4		14.3	36.0		24.7	25.1	0.0	13.8	34.6	14.4
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0			30.0			30.0		30.0	50.0		50.0
Base Capacity (vph)	449	1257		429	1185		448	1076	598	503	994	565
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.34		0.16	0.29		0.29	0.20	0.09	0.13	0.31	0.29
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	94											
Actuated Cycle Length:	89											
Natural Cycle:	95											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.39											
Intersection Signal Delay:	20.4						Intersection LOS: C					
Intersection Capacity Utilization:	74.8%						ICU Level of Service D					
Analysis Period (min):	15											
<b>Splits and Phases: 8: Indian Road &amp; Exmouth Street</b>												

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1	45	123	9	101	20	430	20	4	304	3
Future Volume (vph)	2	1	45	123	9	101	20	430	20	4	304	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Flt		0.873				0.850			0.850		0.999	
Flt Protected		0.998			0.956		0.950			0.950		
Satd. Flow (prot)	0	1655	0	0	1773	1553	1805	3574	1615	1805	3560	0
Flt Permitted		0.985			0.703		0.551			0.452		
Satd. Flow (perm)	0	1634	0	0	1304	1533	1045	3574	1615	859	3560	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		49				110			97		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		148.3			216.9			437.4			162.9	
Travel Time (s)		10.7			15.6			31.5			11.7	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	22%	4%	0%	1%	0%	0%	1%	33%
Adj. Flow (vph)	2	1	49	134	10	110	22	467	22	4	330	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	144	110	22	467	22	4	333	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			8		2		6
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.6	36.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	36.6	36.6		36.6	36.6	36.6	33.5	33.5	33.5	15.0	48.5	
Total Split (%)	43.0%	43.0%		43.0%	43.0%	43.0%	39.4%	39.4%	39.4%	17.6%	57.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	26.0	26.0	26.0	12.0	41.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	17.0	17.0		17.0	17.0	17.0	14.0	14.0	14.0	14.0	14.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	6.0	6.0	6.0		6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		13.5			13.5	13.5	41.9	41.9	41.9	48.4	43.9	
Actuated g/C Ratio		0.19			0.19	0.19	0.58	0.58	0.58	0.67	0.61	
v/c Ratio		0.15			0.60	0.29	0.04	0.23	0.02	0.01	0.15	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.1					36.5	7.4	10.1	9.2	0.1	5.2	7.0
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1					36.5	7.4	10.1	9.2	0.1	5.2	7.0
LOS	A					D	A	B	A	A	A	A
Approach Delay	9.1					23.9			8.8			7.0
Approach LOS	A					C			A			A
Queue Length 50th (m)	0.3					18.0	0.0	1.1	13.6	0.0	0.2	9.3
Queue Length 95th (m)	8.4					35.0	11.6	6.1	34.7	0.0	1.3	18.4
Internal Link Dist (m)	124.3					192.9			413.4			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	685					523	681	604	2066	974	730	2153
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.08					0.28	0.16	0.04	0.23	0.02	0.01	0.15
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85.1											
Actuated Cycle Length:	72.5											
Natural Cycle:	75											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.60											
Intersection Signal Delay:	11.6						Intersection LOS: B					
Intersection Capacity Utilization:	52.8%						ICU Level of Service A					
Analysis Period (min):	15											
<b>Splits and Phases: 1: Christina Street &amp; Church Street/Hwy 402 WB Ramp</b>												

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↕	↗	↘	↓
Traffic Volume (vph)	147	97	473	45	13	381
Future Volume (vph)	147	97	473	45	13	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	90.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				65.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00		1.00	
Fit		0.850	0.987			
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1787	1599	3556	0	1805	3610
Fit Permitted	0.950				0.402	
Satd. Flow (perm)	1787	1599	3556	0	763	3610
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		105	13			
Link Speed (k/h)	50		50		50	
Link Distance (m)	186.3		431.4		211.7	
Travel Time (s)	13.4		31.1		15.2	
Conf. Peds. (#/hr)				1	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	160	105	514	49	14	414
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	105	563	0	14	414
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	36.5	36.5	28.5		10.0	38.5
Total Split (%)	48.7%	48.7%	38.0%		13.3%	51.3%
Maximum Green (s)	29.0	29.0	21.0		7.0	31.0
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	11.3	11.3	31.2		37.7	33.1
Actuated g/C Ratio	0.19	0.19	0.52		0.63	0.56
v/c Ratio	0.47	0.27	0.30		0.02	0.21

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

Base Year (2024) PM Peak Hour

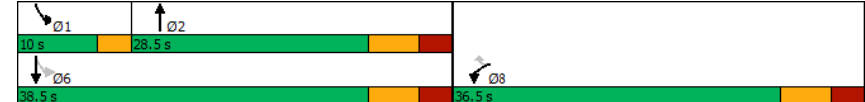
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	25.6	6.8	9.6		4.8	7.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	25.6	6.8	9.6		4.8	7.2
LOS	C	A	A		A	A
Approach Delay	18.1		9.6			7.2
Approach LOS	B		A			A
Queue Length 50th (m)	15.6	0.0	14.6		0.5	10.4
Queue Length 95th (m)	30.7	10.2	38.0		2.4	19.7
Internal Link Dist (m)	162.3		407.4			187.7
Turn Bay Length (m)					90.0	
Base Capacity (vph)	874	836	1869		606	2011
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.18	0.13	0.30		0.02	0.21

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	59.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.47
Intersection Signal Delay:	10.6
Intersection Capacity Utilization:	37.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	832	4	7	666	0	0	0	13	52	2	12
Future Volume (vph)	0	832	4	7	666	0	0	0	13	52	2	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.865			0.976	
Flt Protected				0.950							0.962	
Satd. Flow (prot)	0	3571	0	1805	3610	0	0	1522	0	0	1732	0
Flt Permitted				0.950							0.962	
Satd. Flow (perm)	0	3571	0	1805	3610	0	0	1522	0	0	1732	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	8		45	45		8			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	8%	2%	0%	8%	8%
Adj. Flow (vph)	0	904	4	8	724	0	0	0	14	57	2	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	908	0	8	724	0	0	14	0	0	72	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	832	4	7	666	0	0	0	13	52	2	12
Future Vol, veh/h	0	832	4	7	666	0	0	0	13	52	2	12
Conflicting Peds, #/hr	8	0	45	45	0	8	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	8	2	0	8
Mvmt Flow	0	904	4	8	724	0	0	0	14	57	2	13

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	953
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	729
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	701
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	12.7	21.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	482	-	-	701	-	288
HCM Lane V/C Ratio	0.029	-	-	0.011	-	0.249
HCM Control Delay (s)	12.7	-	-	10.2	-	21.6
HCM Lane LOS	B	-	-	B	-	C
HCM 95th %tile Q(veh)	0.1	-	-	0	-	1



Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↕↕				↕↕		↕↕			↕↕				
Traffic Volume (vph)	54	237	63	87	170	74	78	526	134	68	299	61		
Future Volume (vph)	54	237	63	87	170	74	78	526	134	68	299	61		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0		
Storage Lanes	0		0	0		0	1		0	1		0		
Taper Length (m)	7.5			7.5			70.0			95.0				
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		1.00					1.00	1.00		1.00	1.00			
Frt		0.974					0.967	0.969			0.975			
Flt Protected		0.992					0.987	0.950			0.950			
Satd. Flow (prot)	0	3465	0	0	3313	0	1787	3438	0	1752	3509	0		
Flt Permitted		0.841					0.753	0.521			0.325			
Satd. Flow (perm)	0	2937	0	0	2525	0	977	3438	0	599	3509	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		34			68			41			31			
Link Speed (k/h)		50			50			50			50			
Link Distance (m)		227.9			772.6			202.5			437.4			
Travel Time (s)		16.4			55.6			14.6			31.5			
Conf. Peds. (#/hr)	6		9	9		6	6		5	5		6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	5%	4%	1%	1%	1%	3%	3%	0%	0%		
Adj. Flow (vph)	59	258	68	95	185	80	85	572	146	74	325	66		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	385	0	0	360	0	85	718	0	74	391	0		
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA			
Protected Phases		4		3	8			2			6			
Permitted Phases	4			8			2				6			
Detector Phase	4	4		3	8		2	2			6	6		
Switch Phase														
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0			
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0			
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0			
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%			
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0			
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0			
All-Red Time (s)	2.0	2.0		1.0	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		0.0	0.0			
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0			
Lead/Lag	Lag	Lag		Lead										
Lead-Lag Optimize?	Yes	Yes		Yes										
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0			
Recall Mode	None	None		None	None		Max	Max		Max	Max			
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0			
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		12.0	12.0		12.0	12.0			
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0			
Act Effect Green (s)		25.0			25.0		27.0	27.0		27.0	27.0			
Actuated g/C Ratio		0.39			0.39		0.42	0.42		0.42	0.42			
v/c Ratio		0.33			0.35		0.21	0.49		0.29	0.26			

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

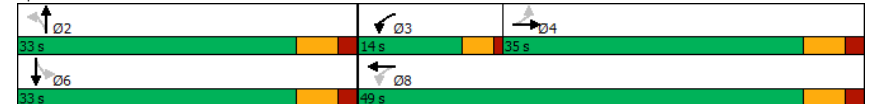
Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Control Delay	13.3				12.2		13.4	14.0		16.2	11.6			
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0			
Total Delay	13.3				12.2		13.4	14.0		16.2	11.6			
LOS	B				B		B	B		B	B			
Approach Delay	13.3				12.2		13.9			12.3				
Approach LOS	B				B		B			B				
Queue Length 50th (m)	15.3				12.7		6.4	30.6		5.8	14.5			
Queue Length 95th (m)	25.0				22.2		15.1	44.7		15.3	23.2			
Internal Link Dist (m)	203.9				748.6		178.5			413.4				
Turn Bay Length (m)							40.0			25.0				
Base Capacity (vph)	1349				1718		412	1474		252	1498			
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	0.29				0.21		0.21	0.49		0.29	0.26			

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	64
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	13.1
Intersection Capacity Utilization:	104.8%
ICU Level of Service:	G
Intersection LOS:	B
Analysis Period (min):	15

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	87	431	20	163	323	28	27	260	146	69	179	56
Future Volume (vph)	87	431	20	163	323	28	27	260	146	69	179	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		0.99	1.00	0.98	1.00		0.98
Fit		0.993			0.988				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3504	0	1805	3492	0	1805	1900	1599	1736	1881	1615
Fit Permitted	0.526			0.416			0.613			0.445		
Satd. Flow (perm)	989	3504	0	785	3492	0	1154	1900	1572	811	1881	1576
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			12				159			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		772.6			242.4				117.0			146.0
Travel Time (s)		55.6			17.5				8.4			10.5
Confl. Peds. (#/hr)	11		9	9		11	13		5	5		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	2%	0%	0%	0%	1%	4%	1%	0%
Adj. Flow (vph)	95	468	22	177	351	30	29	283	159	75	195	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	490	0	177	381	0	29	283	159	75	195	61
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	20.0%	41.3%		20.0%	41.3%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	12.0	27.0		12.0	27.0		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	39.1	27.1		40.6	30.3		17.1	17.1	17.1	17.1	17.1	17.1
Actuated g/C Ratio	0.55	0.38		0.58	0.43		0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.14	0.36		0.29	0.25		0.10	0.62	0.32	0.38	0.43	0.13

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.9	16.9		7.8	14.6		21.5	30.1	5.8	28.6	25.7	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	16.9		7.8	14.6		21.5	30.1	5.8	28.6	25.7	2.8
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		15.3			12.5			21.4				22.1
Approach LOS		B			B			C				C
Queue Length 50th (m)	4.3	23.1		8.4	17.0		3.1	34.8	0.0	8.6	22.7	0.0
Queue Length 95th (m)	12.4	42.5		21.2	31.3		9.3	59.2	13.0	20.8	41.2	4.2
Internal Link Dist (m)		748.6			218.4			93.0				122.0
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	715	1347		639	1506		410	674	660	288	668	620
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.36		0.28	0.25		0.07	0.42	0.24	0.26	0.29	0.10

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	70.6
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	17.1
Intersection Capacity Utilization:	76.1%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 5: Capel Street & Exmouth Street

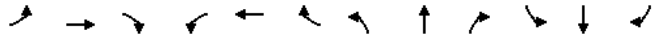


Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	97	576	12	19	611	34	4	12	21	25	3	98
Future Volume (vph)	97	576	12	19	611	34	4	12	21	25	3	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.992			0.922			0.895	
Flt Protected	0.950			0.950				0.995			0.990	
Satd. Flow (prot)	1687	3564	0	1805	3498	0	0	1743	0	0	1670	0
Flt Permitted	0.950			0.950				0.995			0.990	
Satd. Flow (perm)	1687	3564	0	1805	3498	0	0	1743	0	0	1670	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	4		11	11		4	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	1%	0%	0%	2%	9%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	105	626	13	21	664	37	4	13	23	27	3	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	639	0	21	701	0	0	40	0	0	137	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.2%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	97	576	12	19	611	34	4	12	21	25	3	98
Future Vol, veh/h	97	576	12	19	611	34	4	12	21	25	3	98
Conflicting Peds, #/hr	4	0	11	11	0	4	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	7	1	0	0	2	9	0	0	0	0	0	1
Mvmt Flow	105	626	13	21	664	37	4	13	23	27	3	107

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	705	0	0	650
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.24	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.27	-	-	2.2
Pot Cap-1 Maneuver	856	-	-	946
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	853	-	-	937
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.3	30.5	28.5
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	181	853	-	-	937	-	-	287
HCM Lane V/C Ratio	0.222	0.124	-	-	0.022	-	-	0.477
HCM Control Delay (s)	30.5	9.8	-	-	8.9	-	-	28.5
HCM Lane LOS	D	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.8	0.4	-	-	0.1	-	-	2.4

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	48	522	52	76	484	76	131	74	101	120	71	43
Future Volume (vph)	48	522	52	76	484	76	131	74	101	120	71	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99	0.99	0.99	0.99	1.00	1.00		0.98
Frt		0.986			0.980			0.913				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3513	0	1787	3489	0	1787	1716	0	1703	1881	1357
Flt Permitted	0.386			0.377			0.707			0.497		
Satd. Flow (perm)	728	3513	0	703	3489	0	1321	1716	0	886	1881	1331
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			23			88				47
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	11		15	15		11	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	0%	0%	6%	1%	19%
Adj. Flow (vph)	52	567	57	83	526	83	142	80	110	130	77	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	624	0	83	609	0	142	190	0	130	77	47
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.3	30.3		30.3	30.3		15.8	15.8		28.5	26.5	26.5
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.23	0.23		0.41	0.38	0.38
v/c Ratio	0.16	0.40		0.27	0.39		0.47	0.41		0.27	0.11	0.09

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

Base Year (2024) PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	15.2	14.8		17.2	14.5		30.2	16.4		13.7	13.3	4.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	15.2	14.8		17.2	14.5		30.2	16.4		13.7	13.3	4.7
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		14.9			14.8			22.3				11.9
Approach LOS		B			B			C				B
Queue Length 50th (m)	4.4	30.2		7.3	28.8		17.7	12.1		10.7	6.4	0.0
Queue Length 95th (m)	12.4	47.1		18.9	45.3		34.3	29.2		20.5	13.9	5.6
Internal Link Dist (m)		76.1			653.3			83.1				102.1
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	319	1551		309	1545		561	779		486	1184	855
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.16	0.40		0.27	0.39		0.25	0.24		0.27	0.07	0.05
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85											
Actuated Cycle Length:	68.9											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.47											
Intersection Signal Delay:	15.7						Intersection LOS: B					
Intersection Capacity Utilization:	84.2%						ICU Level of Service E					
Analysis Period (min):	15											
<b>Splits and Phases: 7: East Street North/Driveway B &amp; Exmouth Street</b>												

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	261	457	147	78	386	63	136	441	76	66	224	117
Future Volume (vph)	261	457	147	78	386	63	136	441	76	66	224	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		1.00		1.00	0.98		0.98	1.00		0.96
Flt		0.963			0.979				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3404	0	1787	3483	0	1787	3574	1615	1770	3610	1615
Flt Permitted	0.372			0.295			0.566			0.427		
Satd. Flow (perm)	703	3404	0	552	3483	0	1042	3574	1588	794	3610	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	49				21				151			151
Link Speed (k/h)	50				50			50				50
Link Distance (m)	173.0			169.7			174.8			431.4		
Travel Time (s)	12.5			12.2			12.6			31.1		
Conf. Peds. (#/hr)	12		15	15		12	27		4	4		27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	1%	1%	2%	1%	1%	0%	2%	0%	0%
Adj. Flow (vph)	284	497	160	85	420	68	148	479	83	72	243	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	284	657	0	85	488	0	148	479	83	72	243	127
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	36.3	28.9		35.3	26.3		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.41	0.32		0.40	0.29		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.74	0.58		0.26	0.47		0.31	0.43	0.14	0.18	0.24	0.23

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

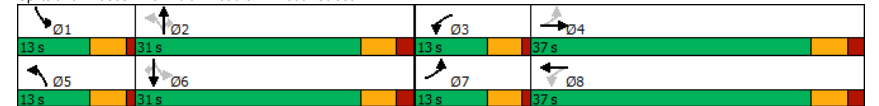
Base Year (2024) PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	31.5	26.5		16.4	26.4		17.7	27.1	0.8	16.3	25.7	4.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	26.5		16.4	26.4		17.7	27.1	0.8	16.3	25.7	4.1
LOS	C	C		B	C		B	C	A	B	C	A
Approach Delay		28.0			24.9			22.1				18.0
Approach LOS		C			C			C				B
Queue Length 50th (m)	32.2	49.8		8.5	36.0		15.8	37.5	0.0	7.4	17.6	0.0
Queue Length 95th (m)	#58.7	68.5		17.2	50.9		28.9	53.5	1.2	15.8	28.1	9.5
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0			30.0			30.0		30.0	50.0		50.0
Base Capacity (vph)	384	1274		329	1223		475	1105	595	390	1011	542
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.52		0.26	0.40		0.31	0.43	0.14	0.18	0.24	0.23

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	89.3
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	24.1
Intersection Capacity Utilization:	84.2%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Indian Road & Exmouth Street

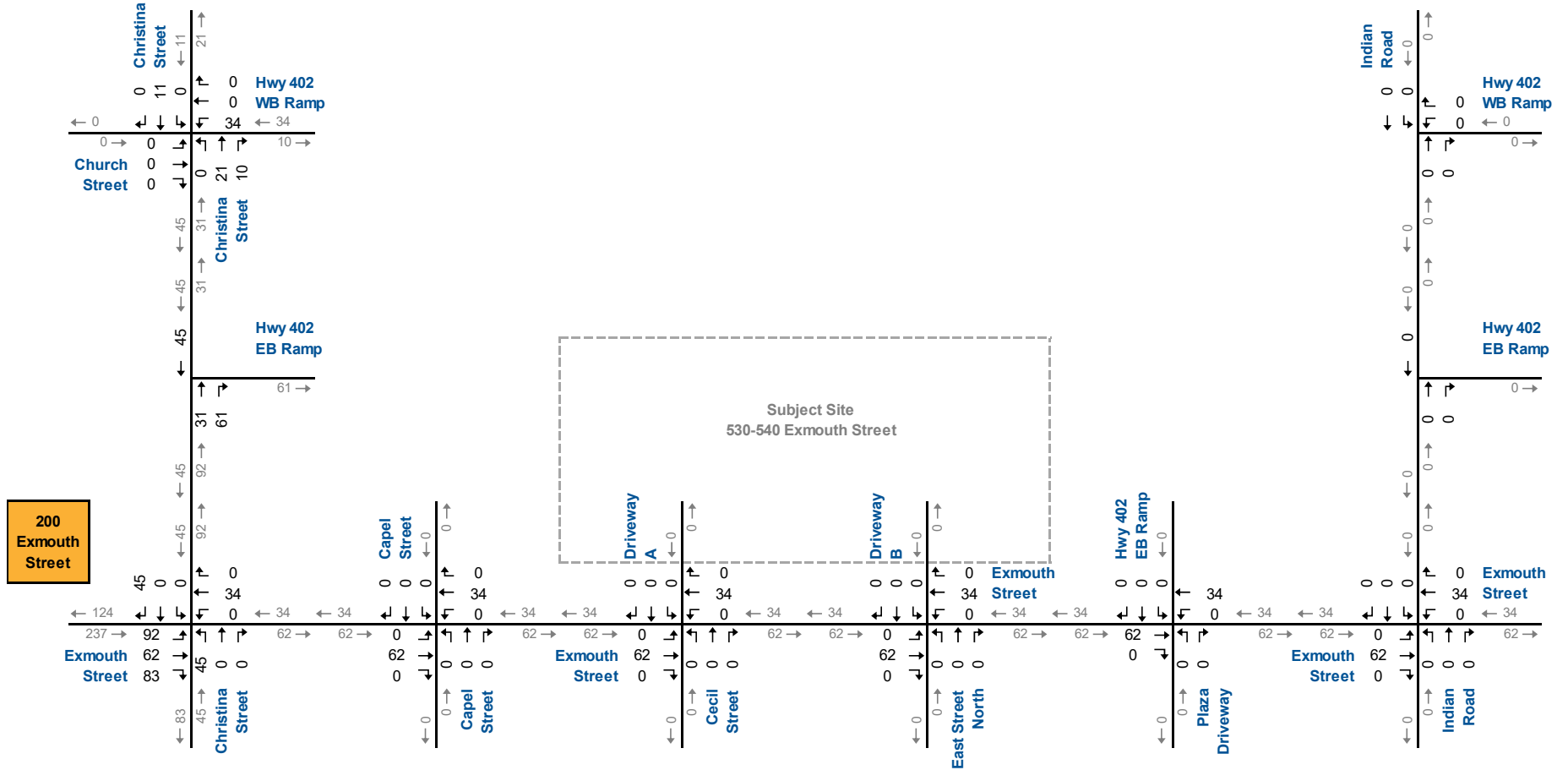


# Appendix D

## Background Development Traffic Volumes



**AM Peak Hour**

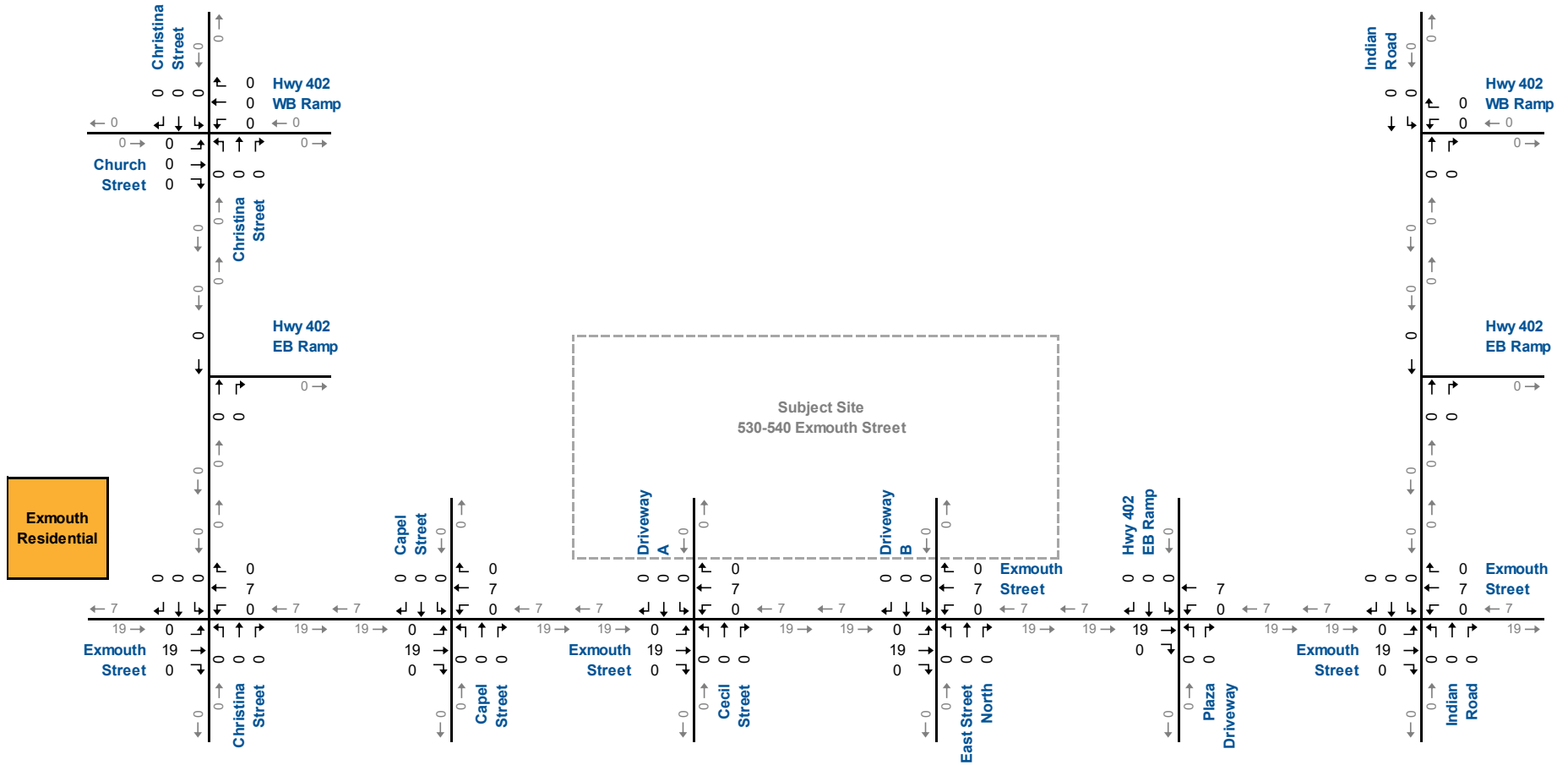


**Background Development Traffic Volumes  
200 Exmouth Street  
AM Peak Hour**





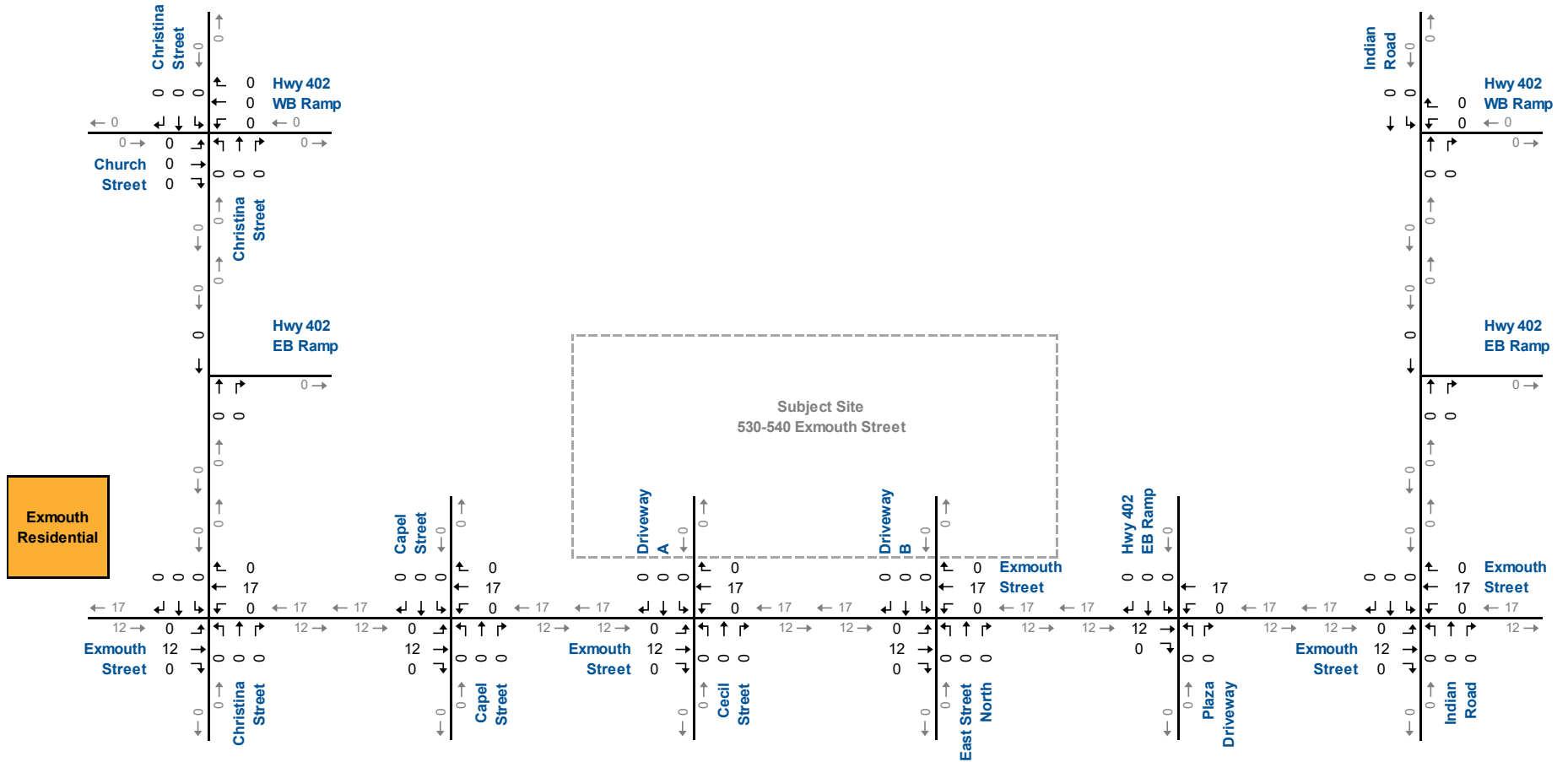
**AM Peak Hour**



**Background Development Traffic Volumes  
Exmouth Street Residential Development  
AM Peak Hour**



**PM Peak Hour**

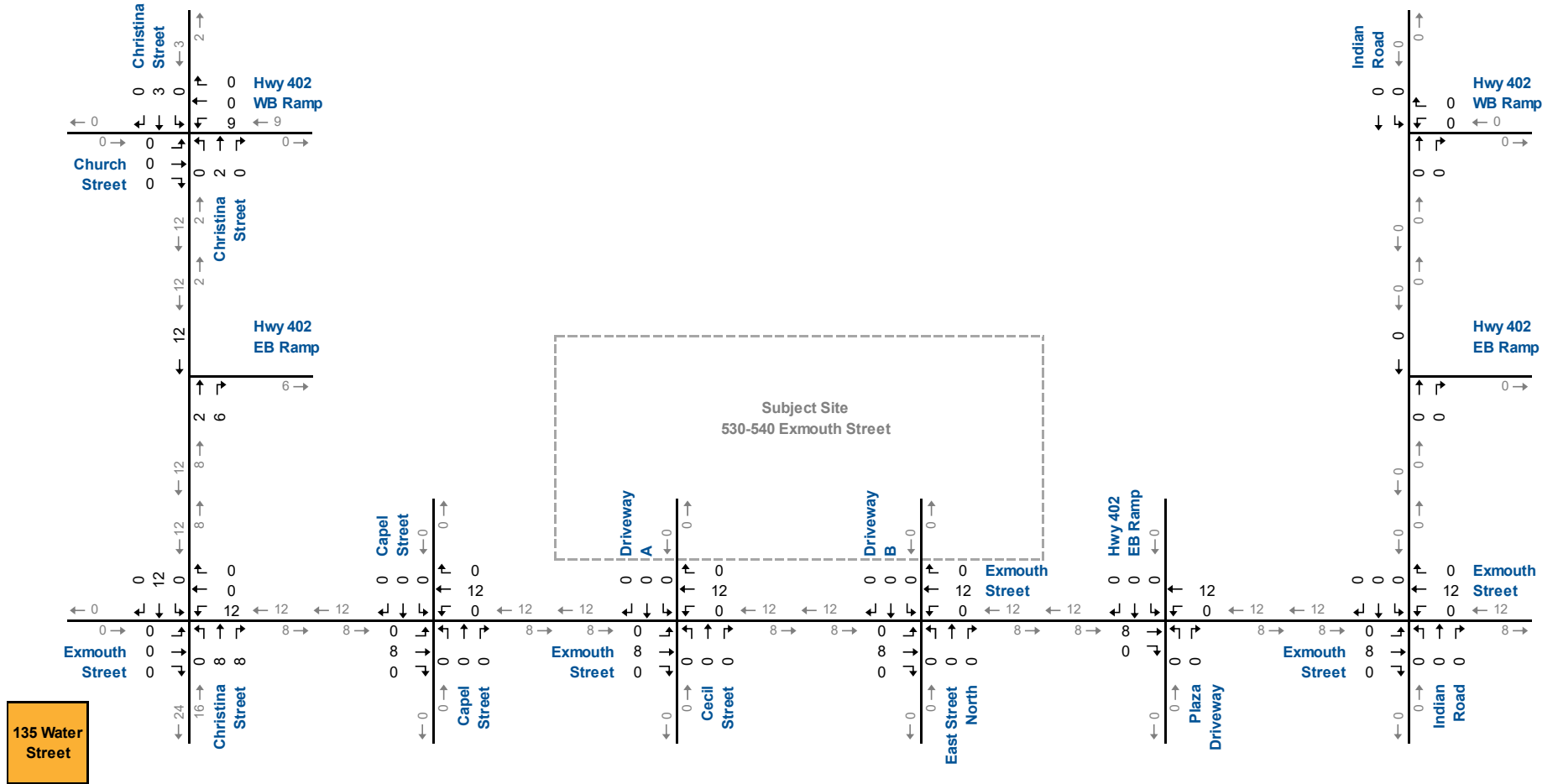


**Background Development Traffic Volumes  
Exmouth Street Residential Development  
PM Peak Hour**





**PM Peak Hour**



**Background Development Traffic Volumes  
135 Water Street  
PM Peak Hour**

# Appendix E

## 2038 Background Traffic Operations Reports



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	4	1	25	255	25	132	36	255	22	7	401	3
Future Volume (vph)	4	1	25	255	25	132	36	255	22	7	401	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.886				0.850			0.850		0.999	
Flt Protected		0.994			0.956		0.950			0.950		
Satd. Flow (prot)	0	1673	0	0	1784	1524	1805	3471	1615	1805	3558	0
Flt Permitted		0.994			0.956		0.497			0.542		
Satd. Flow (perm)	0	1673	0	0	1784	1502	941	3471	1615	1030	3558	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		27				150			151		1	
Link Speed (k/h)		50			41			50			50	
Link Distance (m)		148.3			216.9			429.5			162.9	
Travel Time (s)		10.7			19.0			30.9			11.7	
Confl. Peds. (#/hr)	2					2	2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	6%	0%	4%	0%	0%	1%	50%
Adj. Flow (vph)	4	1	27	277	27	143	39	277	24	8	436	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	304	143	39	277	24	8	439	0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	17.6	17.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	24.0	24.0		37.0	37.0	37.0	34.0	34.0	34.0	15.0	49.0	
Total Split (%)	21.8%	21.8%		33.6%	33.6%	33.6%	30.9%	30.9%	30.9%	13.6%	44.5%	
Maximum Green (s)	16.4	16.4		29.4	29.4	29.4	26.5	26.5	26.5	12.0	41.5	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)				17.0	17.0	17.0					14.0	
Flash Dont Walk (s)				12.0	12.0	12.0					6.0	
Pedestrian Calls (#/hr)				0	0	0					0	
Act Effect Green (s)		10.3			20.0	20.0	41.0	41.0	41.0	47.4	42.7	
Actuated g/C Ratio		0.12			0.23	0.23	0.47	0.47	0.47	0.54	0.49	
v/c Ratio		0.15			0.75	0.31	0.09	0.17	0.03	0.01	0.25	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.5					44.4	6.5	21.1	18.2	0.0	15.1	16.5
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5					44.4	6.5	21.1	18.2	0.0	15.1	16.5
LOS	C					D	A	C	B	A	B	B
Approach Delay	20.5					32.3			17.2			16.4
Approach LOS	C					C			B			B
Queue Length 50th (m)	0.9					55.6	0.0	4.3	16.8	0.0	0.8	28.0
Queue Length 95th (m)	10.2					84.8	13.3	14.7	34.3	0.0	3.7	45.2
Internal Link Dist (m)	124.3					192.9			405.5			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	344					616	617	441	1626	836	666	1736
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.09					0.49	0.23	0.09	0.17	0.03	0.01	0.25
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	87.6											
Natural Cycle:	95											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.75											
Intersection Signal Delay:	22.4						Intersection LOS: C					
Intersection Capacity Utilization:	64.7%						ICU Level of Service C					
Analysis Period (min):	15											
<b>Splits and Phases: 1: Christina Street &amp; Church Street/Hwy 402 WB Ramp</b>												

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↖
Traffic Volume (vph)	327	88	280	55	29	599
Future Volume (vph)	327	88	280	55	29	599
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Frt		0.850	0.975			
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1770	1568	3393	0	1805	3574
Flt Permitted	0.950			0.481		
Satd. Flow (perm)	1770	1568	3393	0	912	3574
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		96	30			
Link Speed (k/h)	50		50		50	
Link Distance (m)	170.6		431.4		194.2	
Travel Time (s)	12.3		31.1		14.0	
Conf. Peds. (#/hr)				2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	5%	0%	1%
Adj. Flow (vph)	355	96	304	60	32	651
Shared Lane Traffic (%)						
Lane Group Flow (vph)	355	96	364	0	32	651
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	37.0	37.0	28.0		10.0	38.0
Total Split (%)	49.3%	49.3%	37.3%		13.3%	50.7%
Maximum Green (s)	29.5	29.5	20.5		7.0	30.5
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effect Green (s)	17.6	17.6	27.0		35.2	30.7
Actuated g/C Ratio	0.28	0.28	0.43		0.56	0.48
v/c Ratio	0.72	0.19	0.25		0.05	0.38

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

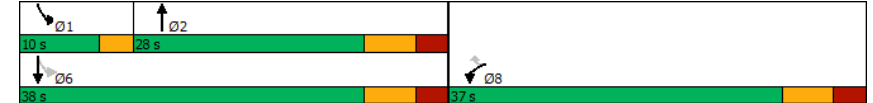
2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	29.4	5.1	13.8		8.3	12.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	29.4	5.1	13.8		8.3	12.0
LOS	C	A	B		A	B
Approach Delay	24.3		13.8			11.8
Approach LOS	C		B			B
Queue Length 50th (m)	39.0	0.0	11.4		1.6	24.7
Queue Length 95th (m)	64.3	8.8	30.4		6.2	45.3
Internal Link Dist (m)	146.6		407.4			170.2
Turn Bay Length (m)					90.0	
Base Capacity (vph)	828	784	1461		605	1729
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.43	0.12	0.25		0.05	0.38

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 63.4  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.72  
 Intersection Signal Delay: 16.1  
 Intersection Capacity Utilization 54.7%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	748	1	0	751	0	1	0	1	40	0	4
Future Volume (vph)	0	748	1	0	751	0	1	0	1	40	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt							0.932				0.989	
Flt Protected							0.976				0.956	
Satd. Flow (prot)	0	3574	0	1900	3539	0	0	1728	0	0	1702	0
Flt Permitted							0.976				0.956	
Satd. Flow (perm)	0	3574	0	1900	3539	0	0	1728	0	0	1702	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	3		15	15		3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	3%	0%	33%
Adj. Flow (vph)	0	813	1	0	816	0	1	0	1	43	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	814	0	0	816	0	0	2	0	0	47	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.5%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	748	1	0	751	0	1	0	1	40	0	4
Future Vol, veh/h	0	748	1	0	751	0	1	0	1	40	0	4
Conflicting Peds, #/hr	3	0	15	15	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	3	0	33
Mvmt Flow	0	813	1	0	816	0	1	0	1	43	0	4

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	-	0	0	829	0	0	1237	1645	422	1223	1645	408
Stage 1	-	-	-	-	-	-	829	829	-	816	816	-
Stage 2	-	-	-	-	-	-	408	816	-	407	829	-
Critical Hdwy	-	-	-	4.1	-	-	7.5	6.5	6.9	7.56	6.5	7.56
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.56	5.5	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	4	3.3	3.53	4	3.63
Pot Cap-1 Maneuver	0	-	-	811	-	0	134	101	586	134	101	514
Stage 1	0	-	-	-	-	0	335	388	-	335	393	-
Stage 2	0	-	-	-	-	0	596	393	-	589	388	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	801	-	-	131	100	579	134	100	514
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	223	-	249	223	-
Stage 1	-	-	-	-	-	-	335	383	-	335	393	-
Stage 2	-	-	-	-	-	-	591	393	-	588	383	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.4	21.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	348	-	-	801	-	261
HCM Lane V/C Ratio	0.006	-	-	-	-	0.183
HCM Control Delay (s)	15.4	-	-	0	-	21.9
HCM Lane LOS	C	-	-	A	-	C
HCM 95th %tile Q(veh)	0	-	-	0	-	0.7



Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕			↕↕			↕↕		↕	↕↕		
Traffic Volume (vph)	150	311	170	127	248	104	141	324	126	91	333	118	
Future Volume (vph)	150	311	170	127	248	104	141	324	126	91	333	118	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0	
Storage Lanes	0		0	0		0	1		0	1		0	
Taper Length (m)	7.5			7.5			70.0			95.0			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	
Ped Bike Factor		1.00					1.00	1.00		1.00	1.00		
Frt		0.960			0.967			0.958			0.961		
Flt Protected		0.988			0.987		0.950			0.950			
Satd. Flow (prot)	0	3395	0	0	3337	0	1805	3382	0	1805	3412	0	
Flt Permitted		0.704			0.622		0.468			0.468			
Satd. Flow (perm)	0	2419	0	0	2103	0	888	3382	0	888	3412	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			65			75			64		
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		181.4			765.8			149.4			429.5		
Travel Time (s)		13.1			55.1			10.8			30.9		
Confl. Peds. (#/hr)	1		1	1		1	4		3	3		4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	1%	0%	6%	1%	4%	0%	1%	4%	0%	1%	2%	
Adj. Flow (vph)	163	338	185	138	270	113	153	352	137	99	362	128	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	686	0	0	521	0	153	489	0	99	490	0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases		4		3	8			2			6		
Permitted Phases		4		8				2			6		
Detector Phase	4	4		3	8		2	2			6	6	
Switch Phase													
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0		
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0		
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0		
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%		
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0		
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0		
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0		
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		6.0			6.0			6.0			6.0		
Lead/Lag	Lag	Lag		Lead									
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None		None	None		Max	Max		Max	Max		
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		12.0	12.0		12.0	12.0		
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0		
Act Effct Green (s)		25.8			25.8			27.0			27.0		
Actuated g/C Ratio		0.40			0.40			0.42			0.42		
v/c Ratio		0.68			0.60			0.41			0.34		

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

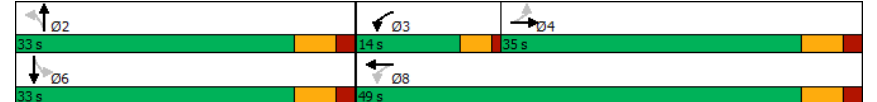
2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Control Delay	18.4				16.6		18.0	11.7		15.3	12.0		
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0		
Total Delay	18.4				16.6		18.0	11.7		15.3	12.0		
LOS	B				B		B	B		B	B		
Approach Delay	18.4				16.6		13.2			12.5			
Approach LOS	B				B		B			B			
Queue Length 50th (m)	32.4				22.8		12.8	17.1		7.7	17.6		
Queue Length 95th (m)	50.2				37.4		30.3	30.2		19.5	30.8		
Internal Link Dist (m)	157.4				741.8		125.4			405.5			
Turn Bay Length (m)					40.0					25.0			
Base Capacity (vph)	1122				1418		370	1454		370	1460		
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	0.61				0.37		0.41	0.34		0.27	0.34		

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	64.8
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	15.2
Intersection Capacity Utilization:	103.6%
Intersection LOS:	B
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	66	352	29	102	358	26	26	181	139	82	273	73
Future Volume (vph)	66	352	29	102	358	26	26	181	139	82	273	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.99	1.00		0.98
Fit		0.988			0.990				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3440	0	1787	3407	0	1719	1881	1599	1626	1881	1615
Fit Permitted	0.508			0.509			0.436			0.618		
Satd. Flow (perm)	904	3440	0	954	3407	0	784	1881	1578	1057	1881	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			10				151			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		765.8			242.4				117.0			146.0
Travel Time (s)		55.1			17.5				8.4			10.5
Conf. Peds. (#/hr)	8		4	4		8	10		1	1		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	9%	1%	5%	0%	5%	1%	1%	11%	1%	0%
Adj. Flow (vph)	72	383	32	111	389	28	28	197	151	89	297	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	415	0	111	417	0	28	197	151	89	297	79
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.5	33.0		14.5	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	14.5	34.5		14.5	34.5		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	18.1%	43.1%		18.1%	43.1%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	10.5	28.5		10.5	28.5		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	38.6	28.9		38.6	28.9		17.8	17.8	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.56	0.42		0.56	0.42		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.12	0.29		0.17	0.29		0.14	0.41	0.29	0.33	0.62	0.17

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.0	15.3		7.3	15.4		22.7	25.3	5.7	26.0	30.0	4.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	15.3		7.3	15.4		22.7	25.3	5.7	26.0	30.0	4.7
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		14.1			13.7			17.2				24.9
Approach LOS		B			B			B				C
Queue Length 50th (m)	3.4	19.3		5.3	19.5		3.1	23.7	0.0	10.5	38.1	0.0
Queue Length 95th (m)	10.2	35.0		14.5	35.4		9.4	41.2	12.5	22.6	61.9	7.3
Internal Link Dist (m)		741.8			218.4			93.0			122.0	
Turn Bay Length (m)	40.0				20.0			30.0		30.0	25.0	25.0
Base Capacity (vph)	628	1436		661	1422		286	686	671	385	686	636
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.29		0.17	0.29		0.10	0.29	0.23	0.23	0.43	0.12

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	69.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	17.3
Intersection Capacity Utilization:	76.2%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	71	611	17	15	589	23	13	1	20	18	4	52
Future Volume (vph)	71	611	17	15	589	23	13	1	20	18	4	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.994			0.920			0.905	
Flt Protected	0.950			0.950				0.981			0.988	
Satd. Flow (prot)	1597	3527	0	1805	3439	0	0	1715	0	0	1699	0
Flt Permitted	0.950			0.950				0.981			0.988	
Satd. Flow (perm)	1597	3527	0	1805	3439	0	0	1715	0	0	1699	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	5		12	12		5	6		1	1		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	4%	13%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	77	664	18	16	640	25	14	1	22	20	4	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	682	0	16	665	0	0	37	0	0	81	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	71	611	17	15	589	23	13	1	20	18	4	52
Future Vol, veh/h	71	611	17	15	589	23	13	1	20	18	4	52
Conflicting Peds, #/hr	5	0	12	12	0	5	6	0	1	1	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	0	0	4	13	0	0	0	0	0	0
Mvmt Flow	77	664	18	16	640	25	14	1	22	20	4	57

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	670	0	0	694	0	0	1199	1541	354	1178	1538	344
Stage 1	-	-	-	-	-	-	839	839	-	690	690	-
Stage 2	-	-	-	-	-	-	360	702	-	488	848	-
Critical Hdwy	4.36	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.33	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	846	-	-	911	-	-	143	116	648	148	117	658
Stage 1	-	-	-	-	-	-	331	384	-	406	449	-
Stage 2	-	-	-	-	-	-	636	443	-	535	380	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	842	-	-	902	-	-	114	102	641	130	103	652
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	102	-	130	103	-
Stage 1	-	-	-	-	-	-	298	346	-	367	439	-
Stage 2	-	-	-	-	-	-	562	433	-	468	342	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.2	24.7	22.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	842	-	-	902	-	-	288
HCM Lane V/C Ratio	0.169	0.092	-	-	0.018	-	-	0.279
HCM Control Delay (s)	24.7	9.7	-	-	9.1	-	-	22.3
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.3	-	-	0.1	-	-	1.1

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	15	526	79	66	527	55	116	44	133	48	25	20
Future Volume (vph)	15	526	79	66	527	55	116	44	133	48	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00	1.00	0.99		1.00		0.99
Frt		0.980			0.986			0.887				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3442	0	1770	3390	0	1770	1628	0	1641	1900	1154
Flt Permitted	0.380			0.366			0.740			0.492		
Satd. Flow (perm)	719	3442	0	680	3390	0	1376	1628	0	847	1900	1137
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			14			145				39
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	6		5	5		6	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	2%	5%	2%	2%	0%	3%	10%	0%	40%
Adj. Flow (vph)	16	572	86	72	573	60	126	48	145	52	27	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	658	0	72	633	0	126	193	0	52	27	22
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases		2			6			4		8		8
Detector Phase		2			6			4		3		8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	31.6	31.6		31.6	31.6		15.4	15.4		25.3	23.3	23.3
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.23	0.23		0.38	0.35	0.35
v/c Ratio	0.05	0.40		0.23	0.39		0.40	0.40		0.12	0.04	0.05

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	13.1	13.4		15.5	13.5		27.6	10.5		12.5	12.9	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	13.1	13.4		15.5	13.5		27.6	10.5		12.5	12.9	2.8
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		13.4			13.7			17.3			10.5	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.3	32.0		6.3	31.0		15.4	5.5		4.1	2.2	0.0
Queue Length 95th (m)	4.9	47.6		16.1	46.3		30.7	21.7		10.0	6.5	2.4
Internal Link Dist (m)		76.1			653.3			83.1			102.1	
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	338	1634		320	1605		601	792		439	1230	750
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.05	0.40		0.23	0.39		0.21	0.24		0.12	0.02	0.03
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85											
Actuated Cycle Length:	67											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.40											
Intersection Signal Delay:	14.0						Intersection LOS: B					
Intersection Capacity Utilization:	83.0%						ICU Level of Service E					
Analysis Period (min):	15											
<b>Splits and Phases: 7: East Street North/Driveway B &amp; Exmouth Street</b>												

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	157	489	125	82	404	67	156	265	67	77	379	197
Future Volume (vph)	157	489	125	82	404	67	156	265	67	77	379	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00		0.99		1.00		
Fit	0.969		0.979		0.950		0.850		0.850		0.850	
Fit Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1787	3371	0	1770	3374	0	1752	3471	1615	1805	3539	1599
Fit Permitted	0.354		0.289		0.426		0.575		0.575		0.575	
Satd. Flow (perm)	666	3371	0	538	3374	0	786	3471	1594	1092	3539	1599
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	36		21		151		214		214		214	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	173.0		169.7		174.8		431.4		431.4		431.4	
Travel Time (s)	12.5		12.2		12.6		31.1		31.1		31.1	
Confl. Peds. (#/hr)	1		5	5		1		1	1		1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	5%	2%	3%	14%	3%	0%	0%	2%	1%	1%
Adj. Flow (vph)	171	532	136	89	439	73	170	288	73	84	412	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	668	0	89	512	0	170	288	73	84	412	214
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)	10.0		10.0		10.0		10.0		10.0		10.0	
Flash Dont Walk (s)	21.0		21.0		15.0		15.0		15.0		15.0	
Pedestrian Calls (#/hr)	0		0		0		0		0		0	
Act Effect Green (s)	36.5	29.1		35.5	26.5		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.41	0.33		0.40	0.30		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.46	0.60		0.28	0.51		0.43	0.27	0.12	0.18	0.42	0.36

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

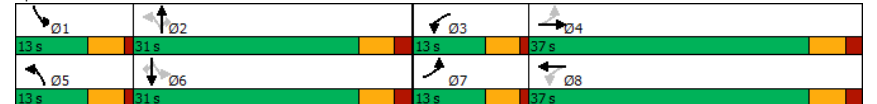
2038 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.5	27.4		16.6	27.0		20.2	25.4	0.4	16.4	28.0	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	27.4		16.6	27.0		20.2	25.4	0.4	16.4	28.0	5.6
LOS	B	C		B	C		C	C	A	B	C	A
Approach Delay	25.8		25.4		20.3		19.9		19.9		19.9	
Approach LOS	C		C		C		B		B		B	
Queue Length 50th (m)	18.1	52.2		9.0	38.4		18.4	21.3	0.0	8.6	31.6	0.0
Queue Length 95th (m)	31.1	71.2		17.7	53.8		33.7	33.4	0.0	18.2	47.0	16.7
Internal Link Dist (m)	149.0		145.7		150.8		407.4		407.4		407.4	
Turn Bay Length (m)	25.0		30.0		30.0		50.0		50.0		50.0	
Base Capacity (vph)	371	1251		323	1182		394	1071	596	478	989	601
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.53		0.28	0.43		0.43	0.27	0.12	0.18	0.42	0.36

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	89.5
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	23.0
Intersection Capacity Utilization:	76.3%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	D

Splits and Phases: 8: Indian Road & Exmouth Street



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	59	235	12	133	26	585	34	5	425	4
Future Volume (vph)	3	1	59	235	12	133	26	585	34	5	425	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.873				0.850			0.850		0.999	
Flt Protected		0.998			0.955		0.950			0.950		
Satd. Flow (prot)	0	1655	0	0	1779	1553	1805	3574	1615	1805	3560	0
Flt Permitted		0.982			0.687		0.484			0.366		
Satd. Flow (perm)	0	1629	0	0	1279	1533	919	3574	1615	695	3560	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		64				145			97		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		148.3			216.9			437.4			162.9	
Travel Time (s)		10.7			15.6			31.5			11.7	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	22%	4%	0%	1%	0%	0%	1%	33%
Adj. Flow (vph)	3	1	64	255	13	145	28	636	37	5	462	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	268	145	28	636	37	5	466	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.6	36.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	36.6	36.6		36.6	36.6	36.6	33.5	33.5	33.5	15.0	48.5	
Total Split (%)	43.0%	43.0%		43.0%	43.0%	43.0%	39.4%	39.4%	39.4%	17.6%	57.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	26.0	26.0	26.0	12.0	41.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	17.0	17.0		17.0	17.0	17.0	14.0	14.0	14.0	14.0	14.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	6.0	6.0	6.0		6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effect Green (s)		20.6			20.6	20.6	39.4	39.4	39.4	45.8	41.2	
Actuated g/C Ratio		0.27			0.27	0.27	0.51	0.51	0.51	0.59	0.54	
v/c Ratio		0.14			0.79	0.28	0.06	0.35	0.04	0.01	0.24	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Background PM Peak Hour

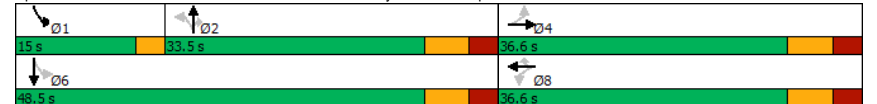
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		6.9			42.7	5.3	14.0	13.7	0.1	8.6	10.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		6.9			42.7	5.3	14.0	13.7	0.1	8.6	10.9	
LOS		A			D	A	B	B	A	A	B	
Approach Delay		6.9			29.6			13.0			10.9	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		0.5			37.7	0.0	1.9	27.2	0.0	0.4	18.8	
Queue Length 95th (m)		8.9			64.6	12.2	9.0	59.4	0.0	2.0	33.8	
Internal Link Dist (m)		124.3			192.9			413.4			138.9	
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)		657			484	670	470	1830	874	587	1907	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.10			0.55	0.22	0.06	0.35	0.04	0.01	0.24	

Intersection Summary

Area Type:	Other
Cycle Length:	85.1
Actuated Cycle Length:	77
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	16.3
Intersection Capacity Utilization:	54.6%
Intersection LOS:	B
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 1: Christina Street & Church Street/Hwy 402 WB Ramp



Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕	↘	↗
Traffic Volume (vph)	194	128	624	59	17	503
Future Volume (vph)	194	128	624	59	17	503
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Fit		0.850	0.987			
Fit Protected	0.950			0.950		
Satd. Flow (prot)	1787	1599	3556	0	1805	3610
Fit Permitted	0.950			0.320		
Satd. Flow (perm)	1787	1599	3556	0	608	3610
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		139	13			
Link Speed (k/h)	50		50		50	
Link Distance (m)	186.3		431.4		211.7	
Travel Time (s)	13.4		31.1		15.2	
Conf. Peds. (#/hr)				1	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	211	139	678	64	18	547
Shared Lane Traffic (%)						
Lane Group Flow (vph)	211	139	742	0	18	547
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	36.5	36.5	28.5		10.0	38.5
Total Split (%)	48.7%	48.7%	38.0%		13.3%	51.3%
Maximum Green (s)	29.0	29.0	21.0		7.0	31.0
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	12.5	12.5	29.2		35.6	31.1
Actuated g/C Ratio	0.21	0.21	0.50		0.61	0.53
v/c Ratio	0.56	0.31	0.42		0.04	0.29

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

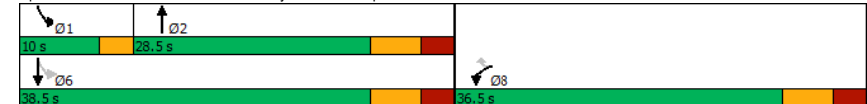
2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	26.4	6.1	11.5		5.6	8.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	26.4	6.1	11.5		5.6	8.5
LOS	C	A	B		A	A
Approach Delay	18.4		11.5			8.4
Approach LOS	B		B			A
Queue Length 50th (m)	21.3	0.0	22.4		0.7	15.7
Queue Length 95th (m)	39.1	11.3	55.3		3.2	28.6
Internal Link Dist (m)	162.3		407.4			187.7
Turn Bay Length (m)					90.0	
Base Capacity (vph)	886	863	1779		512	1914
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.16	0.42		0.04	0.29

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	58.6
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	11.9
Intersection Capacity Utilization:	42.4%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	1165	5	9	972	0	0	0	17	69	3	16
Future Volume (vph)	0	1165	5	9	972	0	0	0	17	69	3	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.865			0.976	
Flt Protected				0.950							0.962	
Satd. Flow (prot)	0	3571	0	1805	3610	0	0	1522	0	0	1732	0
Flt Permitted				0.950							0.962	
Satd. Flow (perm)	0	3571	0	1805	3610	0	0	1522	0	0	1732	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	8		45	45		8			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	8%	2%	0%	8%
Adj. Flow (vph)	0	1266	5	10	1057	0	0	0	18	75	3	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1271	0	10	1057	0	0	18	0	0	95	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.7%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	1165	5	9	972	0	0	0	17	69	3	16
Future Vol, veh/h	0	1165	5	9	972	0	0	0	17	69	3	16
Conflicting Peds, #/hr	8	0	45	45	0	8	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	8	2	0	8
Mvmt Flow	0	1266	5	10	1057	0	0	0	18	75	3	17

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	1316
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	532
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	512
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	15.4	46.5
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	364	-	-	512	-	178
HCM Lane V/C Ratio	0.051	-	-	0.019	-	0.537
HCM Control Delay (s)	15.4	-	-	12.2	-	46.5
HCM Lane LOS	C	-	-	B	-	E
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	2.8

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕	↕↕	
Traffic Volume (vph)	141	372	146	127	305	98	188	702	185	90	407	165
Future Volume (vph)	141	372	146	127	305	98	188	702	185	90	407	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			95.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00					1.00	1.00		1.00	0.99	
Frt		0.967			0.972			0.969			0.957	
Flt Protected		0.989			0.988		0.950			0.950		
Satd. Flow (prot)	0	3423	0	0	3333	0	1787	3437	0	1752	3437	0
Flt Permitted		0.690			0.621		0.376			0.196		
Satd. Flow (perm)	0	2387	0	0	2094	0	706	3437	0	361	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			47			43			79	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		227.9			772.6			202.5			437.4	
Travel Time (s)		16.4			55.6			14.6			31.5	
Conf. Peds. (#/hr)	6		9	9		6	6		5	5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	5%	4%	1%	1%	1%	3%	3%	0%	0%
Adj. Flow (vph)	153	404	159	138	332	107	204	763	201	98	442	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	716	0	0	577	0	204	964	0	98	621	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0	
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0	
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0	
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%	
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		26.8			26.8		27.1	27.1		27.1	27.1	
Actuated g/C Ratio		0.41			0.41		0.41	0.41		0.41	0.41	
v/c Ratio		0.72			0.66		0.71	0.67		0.66	0.43	

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.8				18.5		33.8	18.3		43.6	13.5	
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0	
Total Delay	19.8				18.5		33.8	18.3		43.6	13.5	
LOS	B				B		C	B		D	B	
Approach Delay	19.8				18.5		21.0			17.6		
Approach LOS	B				B		C			B		
Queue Length 50th (m)	36.2				27.7		19.8	46.0		9.3	23.3	
Queue Length 95th (m)	54.4				43.6		#61.1	80.4		#37.9	43.9	
Internal Link Dist (m)	203.9				748.6		178.5			413.4		
Turn Bay Length (m)							40.0			25.0		
Base Capacity (vph)	1108				1386		289	1437		148	1458	
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	0.65				0.42		0.71	0.67		0.66	0.43	

Intersection Summary

Area Type: Other

Cycle Length: 82

Actuated Cycle Length: 65.9

Natural Cycle: 85

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.5

Intersection LOS: B

Intersection Capacity Utilization 107.7%

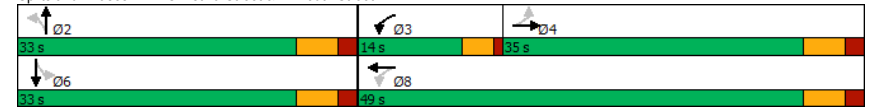
ICU Level of Service G

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	115	636	26	215	519	37	36	343	193	91	236	74
Future Volume (vph)	115	636	26	215	519	37	36	343	193	91	236	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.98	1.00		0.98
Fit		0.994			0.990				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3509	0	1805	3500	0	1805	1900	1599	1736	1881	1615
Fit Permitted	0.417			0.265			0.505			0.311		
Satd. Flow (perm)	787	3509	0	501	3500	0	952	1900	1572	567	1881	1576
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			10				175			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		772.6			242.4				117.0			146.0
Travel Time (s)		55.6			17.5				8.4			10.5
Conf. Peds. (#/hr)	11		9	9		11	13		5	5		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	2%	0%	0%	0%	1%	4%	1%	0%
Adj. Flow (vph)	125	691	28	234	564	40	39	373	210	99	257	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	719	0	234	604	0	39	373	210	99	257	80
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	20.0%	41.3%		20.0%	41.3%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	12.0	27.0		12.0	27.0		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	39.2	27.1		41.4	30.8		19.6	19.6	19.6	19.6	19.6	19.6
Actuated g/C Ratio	0.53	0.37		0.56	0.42		0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.22	0.55		0.50	0.41		0.15	0.74	0.38	0.66	0.51	0.16

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	8.6	21.1		11.6	17.6		21.9	34.1	7.7	45.9	26.7	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	21.1		11.6	17.6		21.9	34.1	7.7	45.9	26.7	4.6
LOS	A	C		B	B		C	C	A	D	C	A
Approach Delay		19.3			15.9			24.4				27.1
Approach LOS		B			B			C				C
Queue Length 50th (m)	6.9	41.1		13.9	32.8		4.3	48.5	3.8	12.5	31.1	0.0
Queue Length 95th (m)	16.4	67.5		29.3	53.2		11.8	79.5	19.2	#33.6	53.7	7.5
Internal Link Dist (m)		748.6			218.4			93.0				122.0
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	607	1296		501	1471		324	648	651	193	641	600
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.55		0.47	0.41		0.12	0.58	0.32	0.51	0.40	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	73.6
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	20.7
Intersection Capacity Utilization:	82.1%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	97	827	16	25	899	34	5	12	28	25	3	98
Future Volume (vph)	97	827	16	25	899	34	5	12	28	25	3	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.995			0.916				0.895
Flt Protected	0.950			0.950				0.995				0.990
Satd. Flow (prot)	1687	3564	0	1805	3513	0	0	1732	0	0	1670	0
Flt Permitted	0.950			0.950				0.995				0.990
Satd. Flow (perm)	1687	3564	0	1805	3513	0	0	1732	0	0	1670	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		242.4			100.1			107.2				121.2
Travel Time (s)		17.5			7.2			7.7				8.7
Confl. Peds. (#/hr)	4		11	11		4	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	1%	0%	0%	2%	9%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	105	899	17	27	977	37	5	13	30	27	3	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	916	0	27	1014	0	0	48	0	0	137	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.1%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	13.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	97	827	16	25	899	34	5	12	28	25	3	98
Future Vol, veh/h	97	827	16	25	899	34	5	12	28	25	3	98
Conflicting Peds, #/hr	4	0	11	11	0	4	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	7	1	0	0	2	9	0	0	0	0	0	1
Mvmt Flow	105	899	17	27	977	37	5	13	30	27	3	107

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1018	0	0	927
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.24	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.27	-	-	2.2
Pot Cap-1 Maneuver	648	-	-	746
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	646	-	-	739
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.3	88.2	176.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	88	646	-	-	739	-	-	125
HCM Lane V/C Ratio	0.556	0.163	-	-	0.037	-	-	1.096
HCM Control Delay (s)	88.2	11.7	-	-	10.1	-	-	176.4
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2.5	0.6	-	-	0.1	-	-	8

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	48	756	69	100	732	76	173	74	133	120	71	43
Future Volume (vph)	48	756	69	100	732	76	173	74	133	120	71	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99	1.00		0.99	0.99		1.00		0.98
Frt		0.987			0.986			0.903				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3517	0	1787	3515	0	1787	1695	0	1703	1881	1357
Flt Permitted	0.237			0.229			0.707			0.451		
Satd. Flow (perm)	448	3517	0	428	3515	0	1321	1695	0	805	1881	1331
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			14			117				47
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	11		15	15		11	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	0%	0%	6%	1%	19%
Adj. Flow (vph)	52	822	75	109	796	83	188	80	145	130	77	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	897	0	109	879	0	188	225	0	130	77	47
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		4		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)	30.4	30.4		30.4	30.4		17.2	17.2		29.9	27.9	27.9
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.24	0.24		0.42	0.40	0.40
v/c Ratio	0.27	0.59		0.59	0.58		0.58	0.45		0.28	0.10	0.08

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Background PM Peak Hour

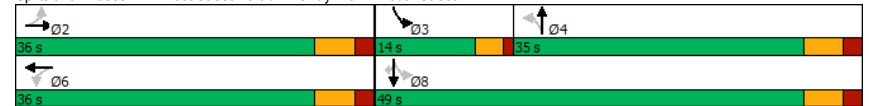
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.4	18.4		35.7	18.1		32.6	14.8		13.4	12.8	4.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	20.4	18.4		35.7	18.1		32.6	14.8		13.4	12.8	4.3
LOS	C	B		D	B		C	B		B	B	A
Approach Delay		18.5			20.1			22.9				11.5
Approach LOS		B			C			C				B
Queue Length 50th (m)	4.6	48.8		11.5	47.4		24.3	12.8		10.7	6.4	0.0
Queue Length 95th (m)	15.4	79.8		#40.4	77.6		44.2	31.1		20.2	13.8	5.4
Internal Link Dist (m)		76.1			653.3			83.1				102.1
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	193	1523		184	1523		550	774		471	1162	840
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.59		0.59	0.58		0.34	0.29		0.28	0.07	0.06

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	70.4
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	19.1
Intersection Capacity Utilization:	86.6%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖		→		↗		↖		→		↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗	↖	↖↗	↖↗	↖
Traffic Volume (vph)	344	670	194	103	602	83	179	582	100	87	296	154
Future Volume (vph)	344	670	194	103	602	83	179	582	100	87	296	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		0.98		0.98	1.00		0.96
Fit		0.966			0.982				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3418	0	1787	3496	0	1787	3574	1615	1770	3610	1615
Fit Permitted	0.213			0.144			0.501			0.295		
Satd. Flow (perm)	403	3418	0	270	3496	0	925	3574	1588	549	3610	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			17				151			167
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Conf. Peds. (#/hr)	12		15	15		12	27		4	4		27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	1%	1%	2%	1%	1%	0%	2%	0%	0%
Adj. Flow (vph)	374	728	211	112	654	90	195	633	109	95	322	167
Shared Lane Traffic (%)												
Lane Group Flow (vph)	374	939	0	112	744	0	195	633	109	95	322	167
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.2	31.8		38.2	29.1		35.1	27.7	27.7	34.0	25.0	25.0
Actuated g/C Ratio	0.43	0.34		0.41	0.32		0.38	0.30	0.30	0.37	0.27	0.27
v/c Ratio	1.28	0.78		0.46	0.67		0.46	0.59	0.19	0.31	0.33	0.31

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

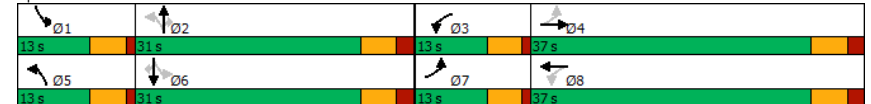
2038 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖		→		↗		↖		→		↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	171.7	31.9		20.5	30.0		22.3	31.5	2.7	19.8	28.3	6.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	171.7	31.9		20.5	30.0		22.3	31.5	2.7	19.8	28.3	6.2
LOS	F	C		C	C		C	C	A	B	C	A
Approach Delay		71.7			28.7			26.2				20.6
Approach LOS		E			C			C				C
Queue Length 50th (m)	~62.2	82.0		11.4	61.4		23.9	56.6	0.0	11.0	26.0	0.0
Queue Length 95th (m)	#120.8	107.2		21.3	81.5		39.8	75.9	6.2	21.2	38.3	15.3
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0				30.0			30.0		30.0	50.0	50.0
Base Capacity (vph)	292	1239		243	1187		426	1074	583	308	979	541
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.76		0.46	0.63		0.46	0.59	0.19	0.31	0.33	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	92.2
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.28
Intersection Signal Delay:	42.1
Intersection Capacity Utilization:	91.2%
ICU Level of Service:	F
Analysis Period (min):	15
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Indian Road & Exmouth Street



# Appendix F

## 2038 Total Traffic Operations Reports



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	25	255	25	132	36	260	27	7	409	3
Future Volume (vph)	4	1	25	255	25	132	36	260	27	7	409	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.886				0.850			0.850		0.999	
Flt Protected		0.994				0.956			0.950		0.950	
Satd. Flow (prot)	0	1673	0	0	1784	1524	1805	3471	1615	1805	3559	0
Flt Permitted		0.994				0.956			0.493		0.539	
Satd. Flow (perm)	0	1673	0	0	1784	1502	934	3471	1615	1024	3559	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		27				150			151		1	
Link Speed (k/h)		50			41			50			50	
Link Distance (m)		148.3			216.9			429.5			162.9	
Travel Time (s)		10.7			19.0			30.9			11.7	
Confl. Peds. (#/hr)	2					2	2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	6%	0%	4%	0%	0%	1%	50%
Adj. Flow (vph)	4	1	27	277	27	143	39	283	29	8	445	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	304	143	39	283	29	8	448	0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2		6	
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	17.6	17.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	24.0	24.0		37.0	37.0	37.0	34.0	34.0	34.0	15.0	49.0	
Total Split (%)	21.8%	21.8%		33.6%	33.6%	33.6%	30.9%	30.9%	30.9%	13.6%	44.5%	
Maximum Green (s)	16.4	16.4		29.4	29.4	29.4	26.5	26.5	26.5	12.0	41.5	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)				17.0	17.0	17.0					14.0	
Flash Dont Walk (s)				12.0	12.0	12.0					6.0	
Pedestrian Calls (#/hr)				0	0	0					0	
Act Effct Green (s)		10.3			20.0	20.0	41.0	41.0	41.0	47.4	42.7	
Actuated g/C Ratio		0.12			0.23	0.23	0.47	0.47	0.47	0.54	0.49	
v/c Ratio		0.15			0.75	0.31	0.09	0.17	0.03	0.01	0.26	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Total AM Peak Hour

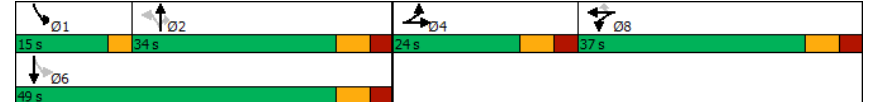
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.5				44.4	6.5	21.1	18.2	0.1	15.1	16.5	
Queue Delay	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.5				44.4	6.5	21.1	18.2	0.1	15.1	16.5	
LOS	C				D	A	C	B	A	B	B	
Approach Delay	20.5				32.3			17.0			16.5	
Approach LOS	C				C			B			B	
Queue Length 50th (m)	0.9				55.6	0.0	4.3	17.2	0.0	0.8	28.6	
Queue Length 95th (m)	10.2				84.8	13.3	14.7	35.0	0.0	3.7	46.1	
Internal Link Dist (m)	124.3				192.9			405.5			138.9	
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	344				616	617	437	1626	836	663	1736	
Starvation Cap Reductn	0				0	0	0	0	0	0	0	
Spillback Cap Reductn	0				0	0	0	0	0	0	0	
Storage Cap Reductn	0				0	0	0	0	0	0	0	
Reduced v/c Ratio	0.09				0.49	0.23	0.09	0.17	0.03	0.01	0.26	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	87.6
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	22.2
Intersection Capacity Utilization:	64.7%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Christina Street & Church Street/Hwy 402 WB Ramp



Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑	↗	↖	↘
Traffic Volume (vph)	349	88	285	55	29	607
Future Volume (vph)	349	88	285	55	29	607
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Frt		0.850	0.976			
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1770	1568	3397	0	1805	3574
Flt Permitted	0.950			0.478		
Satd. Flow (perm)	1770	1568	3397	0	906	3574
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		96	29			
Link Speed (k/h)	50		50		50	
Link Distance (m)	170.6		431.4		194.2	
Travel Time (s)	12.3		31.1		14.0	
Conf. Peds. (#/hr)				2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	5%	0%	1%
Adj. Flow (vph)	379	96	310	60	32	660
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	96	370	0	32	660
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	37.0	37.0	28.0		10.0	38.0
Total Split (%)	49.3%	49.3%	37.3%		13.3%	50.7%
Maximum Green (s)	29.5	29.5	20.5		7.0	30.5
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	18.7	18.7	27.0		35.2	30.7
Actuated g/C Ratio	0.29	0.29	0.42		0.55	0.48
v/c Ratio	0.74	0.18	0.26		0.05	0.39

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

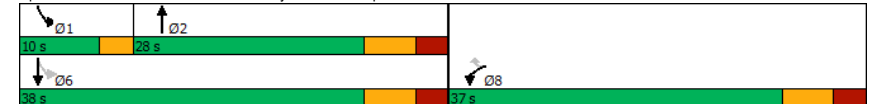
2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	29.8	4.9	14.4		8.9	12.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	29.8	4.9	14.4		8.9	12.7
LOS	C	A	B		A	B
Approach Delay	24.8		14.4			12.5
Approach LOS	C		B			B
Queue Length 50th (m)	42.3	0.0	12.2		1.7	26.0
Queue Length 95th (m)	69.0	8.6	32.1		6.5	48.0
Internal Link Dist (m)	146.6		407.4			170.2
Turn Bay Length (m)					90.0	
Base Capacity (vph)	815	773	1439		593	1701
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.47	0.12	0.26		0.05	0.39

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 64.5  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 16.8  
 Intersection Capacity Utilization 55.9%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp





Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	790	1	0	818	0	1	0	1	40	0	12
Future Volume (vph)	0	790	1	0	818	0	1	0	1	40	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt							0.932				0.969	
Flt Protected							0.976				0.963	
Satd. Flow (prot)	0	3574	0	1900	3539	0	0	1728	0	0	1612	0
Flt Permitted							0.976				0.963	
Satd. Flow (perm)	0	3574	0	1900	3539	0	0	1728	0	0	1612	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	3		15	15		3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	3%	0%	33%
Adj. Flow (vph)	0	859	1	0	889	0	1	0	1	43	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	860	0	0	889	0	0	2	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	790	1	0	818	0	1	0	1	40	0	12
Future Vol, veh/h	0	790	1	0	818	0	1	0	1	40	0	12
Conflicting Peds, #/hr	3	0	15	15	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	3	0	33
Mvmt Flow	0	859	1	0	889	0	1	0	1	43	0	13

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	875
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	780
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	770	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.2	22.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	325	-	-	770	-	258
HCM Lane V/C Ratio	0.007	-	-	-	-	0.219
HCM Control Delay (s)	16.2	-	-	0	-	22.8
HCM Lane LOS	C	-	-	A	-	C
HCM 95th %tile Q(veh)	0	-	-	0	-	0.8

Lanes, Volumes, Timings

2038 Total AM Peak Hour  
4: Christina Street & Exmouth Street (230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕	↕↕	
Traffic Volume (vph)	150	319	170	145	253	114	141	324	156	99	333	118
Future Volume (vph)	150	319	170	145	253	114	141	324	156	99	333	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			95.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					1.00		1.00		1.00		1.00
Frt	0.960			0.967			0.951			0.961		
Flt Protected	0.988			0.986			0.950			0.950		
Satd. Flow (prot)	0	3395	0	0	3329	0	1805	3350	0	1805	3412	0
Flt Permitted	0.689			0.612			0.466			0.444		
Satd. Flow (perm)	0	2368	0	0	2066	0	884	3350	0	843	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	69			68			106			64		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	181.4			765.8			149.4			429.5		
Travel Time (s)	13.1			55.1			10.8			30.9		
Confl. Peds. (#/hr)	1		1	1		1	4		3	3		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	6%	1%	4%	0%	1%	4%	0%	1%	2%
Adj. Flow (vph)	163	347	185	158	275	124	153	352	170	108	362	128
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	695	0	0	557	0	153	522	0	108	490	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0	
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0	
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0	
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%	
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	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		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	26.2	26.2		26.2	27.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.41		0.41	0.41		0.41	0.41	
v/c Ratio	0.70	0.70		0.64	0.42		0.42	0.36		0.31	0.34	

Lanes, Volumes, Timings

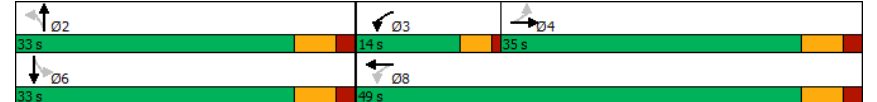
2038 Total AM Peak Hour  
4: Christina Street & Exmouth Street (230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	18.9				17.5		18.7	11.5		16.7	12.3	
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9				17.5		18.7	11.5		16.7	12.3	
LOS	B				B		B	B		B	B	
Approach Delay	18.9				17.5		13.1			13.1		
Approach LOS	B				B		B			B		
Queue Length 50th (m)	33.4				25.2		12.8	17.2		8.6	17.6	
Queue Length 95th (m)	51.5				40.6		32.1	32.7		22.9	32.8	
Internal Link Dist (m)	157.4				741.8		125.4			405.5		
Turn Bay Length (m)							40.0			25.0		
Base Capacity (vph)	1107				1385		365	1449		348	1450	
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	0.63				0.40		0.42	0.36		0.31	0.34	

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	65.3
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	15.7
Intersection Capacity Utilization:	103.6%
Intersection LOS:	B
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	66	398	29	102	391	26	26	181	139	82	273	73
Future Volume (vph)	66	398	29	102	391	26	26	181	139	82	273	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99		0.99	1.00		0.98
Fit		0.990			0.991				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3450	0	1787	3410	0	1719	1881	1599	1626	1881	1615
Fit Permitted	0.485			0.476			0.436			0.618		
Satd. Flow (perm)	864	3450	0	893	3410	0	784	1881	1578	1057	1881	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			9				151			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		765.8			242.4				117.0			146.0
Travel Time (s)		55.1			17.5				8.4			10.5
Conf. Peds. (#/hr)	8		4	4		8	10		1	1		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	9%	1%	5%	0%	5%	1%	1%	11%	1%	0%
Adj. Flow (vph)	72	433	32	111	425	28	28	197	151	89	297	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	465	0	111	453	0	28	197	151	89	297	79
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.5	33.0		14.5	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	14.5	34.5		14.5	34.5		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	18.1%	43.1%		18.1%	43.1%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	10.5	28.5		10.5	28.5		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	38.6	28.9		38.6	28.9		17.8	17.8	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.56	0.42		0.56	0.42		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.12	0.32		0.18	0.32		0.14	0.41	0.29	0.33	0.62	0.17

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.0	15.7		7.3	15.7		22.7	25.3	5.7	26.0	30.0	4.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	15.7		7.3	15.7		22.7	25.3	5.7	26.0	30.0	4.7
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		14.5			14.0			17.2				24.9
Approach LOS		B			B			B				C
Queue Length 50th (m)	3.4	22.1		5.3	21.5		3.1	23.7	0.0	10.5	38.1	0.0
Queue Length 95th (m)	10.2	39.4		14.5	38.5		9.4	41.2	12.5	22.6	61.9	7.3
Internal Link Dist (m)		741.8			218.4			93.0			122.0	
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	612	1440		637	1422		286	686	671	385	686	636
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.32		0.17	0.32		0.10	0.29	0.23	0.23	0.43	0.12

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	69.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	17.4
Intersection Capacity Utilization:	76.2%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2038 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔		↕	↔		↕	↔
Traffic Volume (vph)	94	634	17	15	606	23	13	1	20	18	4	68
Future Volume (vph)	94	634	17	15	606	23	13	1	20	18	4	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.995			0.920			0.898	
Flt Protected	0.950			0.950				0.981			0.990	
Satd. Flow (prot)	1597	3527	0	1805	3443	0	0	1715	0	0	1689	0
Flt Permitted	0.950			0.950				0.981			0.990	
Satd. Flow (perm)	1597	3527	0	1805	3443	0	0	1715	0	0	1689	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	5		12	12		5	6		1	1		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	4%	13%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	102	689	18	16	659	25	14	1	22	20	4	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	707	0	16	684	0	0	37	0	0	98	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2038 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔		↕	↔		↕	↔
Traffic Vol, veh/h	94	634	17	15	606	23	13	1	20	18	4	68
Future Vol, veh/h	94	634	17	15	606	23	13	1	20	18	4	68
Conflicting Peds, #/hr	5	0	12	12	0	5	6	0	1	1	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	0	0	4	13	0	0	0	0	0	0
Mvmt Flow	102	689	18	16	659	25	14	1	22	20	4	74

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	689	0	0	719
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.36	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.33	-	-	2.2
Pot Cap-1 Maneuver	831	-	-	892
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	827	-	-	883
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	29.1	24.1
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	186	827	-	-	883	-	-	285
HCM Lane V/C Ratio	0.199	0.124	-	-	0.018	-	-	0.343
HCM Control Delay (s)	29.1	10	-	-	9.2	-	-	24.1
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0.4	-	-	0.1	-	-	1.5

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	38	526	79	66	527	130	116	74	133	90	43	37
Future Volume (vph)	38	526	79	66	527	130	116	74	133	90	43	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00		0.99	1.00	0.99		1.00		0.99
Frt		0.980			0.970			0.903				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3442	0	1770	3334	0	1770	1666	0	1641	1900	1154
Fit Permitted	0.326			0.357			0.726			0.437		
Satd. Flow (perm)	617	3442	0	663	3334	0	1350	1666	0	753	1900	1137
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			39			117				40
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	6		5	5		6	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	2%	5%	2%	2%	0%	3%	10%	0%	40%
Adj. Flow (vph)	41	572	86	72	573	141	126	80	145	98	47	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	658	0	72	714	0	126	225	0	98	47	40
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases		2			6			4		8		8
Detector Phase		2			6			4		4		8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.3	30.3		30.3	30.3		15.5	15.5		28.2	26.2	26.2
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.23	0.23		0.41	0.38	0.38
v/c Ratio	0.15	0.43		0.25	0.48		0.41	0.48		0.22	0.06	0.09

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Total AM Peak Hour

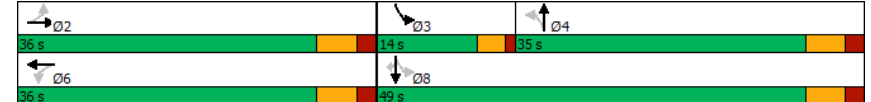
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	15.0	14.7		16.6	15.0		29.0	16.2		13.3	13.0	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	15.0	14.7		16.6	15.0		29.0	16.2		13.3	13.0	5.1
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		14.7			15.1			20.8				11.5
Approach LOS		B			B			C				B
Queue Length 50th (m)	3.4	32.0		6.3	34.8		15.5	12.8		7.9	3.9	0.0
Queue Length 95th (m)	10.2	47.8		16.3	52.0		30.9	32.3		16.5	9.6	5.3
Internal Link Dist (m)		76.1			653.3			83.1				102.1
Turn Bay Length (m)	20.0				20.0			45.0				25.0
Base Capacity (vph)	272	1531		292	1492		575	777		440	1201	733
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.15	0.43		0.25	0.48		0.22	0.29		0.22	0.04	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	68.6
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.48
Intersection Signal Delay:	15.6
Intersection Capacity Utilization:	83.0%
Intersection LOS:	B
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	503	134	82	426	67	171	265	67	77	379	227
Future Volume (vph)	176	503	134	82	426	67	171	265	67	77	379	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00		0.99		1.00		
Fit		0.968			0.980				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3367	0	1770	3380	0	1752	3471	1615	1805	3539	1599
Fit Permitted	0.337			0.272			0.425			0.575		
Satd. Flow (perm)	634	3367	0	506	3380	0	784	3471	1594	1092	3539	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			20				151			247
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.0			169.7			174.8			431.4	
Travel Time (s)		12.5			12.2			12.6			31.1	
Confl. Peds. (#/hr)	1		5	5		1		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	5%	2%	3%	14%	3%	0%	0%	0%	2%	1%
Adj. Flow (vph)	191	547	146	89	463	73	186	288	73	84	412	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	693	0	89	536	0	186	288	73	84	412	247
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	36.7	29.3		35.7	26.7		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.41	0.33		0.40	0.30		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.53	0.62		0.28	0.53		0.47	0.27	0.12	0.18	0.42	0.40

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

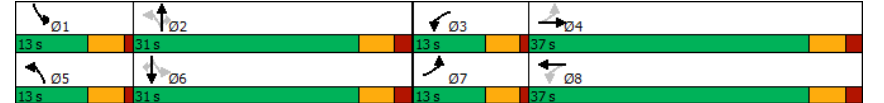
2038 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	21.3	27.7		16.7	27.3		21.3	25.6	0.4	16.5	28.1	5.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	27.7		16.7	27.3		21.3	25.6	0.4	16.5	28.1	5.7
LOS	C	C		B	C		C	C	A	B	C	A
Approach Delay		26.3			25.8			20.8				19.4
Approach LOS		C			C			C				B
Queue Length 50th (m)	20.4	54.6		9.0	40.7		20.4	21.3	0.0	8.6	31.6	0.0
Queue Length 95th (m)	34.5	74.1		17.7	56.6		37.1	33.9	0.0	18.5	47.6	17.7
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0			30.0			30.0		30.0	50.0		50.0
Base Capacity (vph)	361	1248		313	1181		392	1069	595	477	987	623
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.56		0.28	0.45		0.47	0.27	0.12	0.18	0.42	0.40

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	89.7
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	23.3
Intersection Capacity Utilization:	77.7%
Intersection LOS:	C
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 8: Indian Road & Exmouth Street



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	59	235	12	133	26	593	42	5	428	4
Future Volume (vph)	3	1	59	235	12	133	26	593	42	5	428	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Flt		0.873				0.850			0.850		0.999	
Flt Protected		0.998			0.955		0.950			0.950		
Satd. Flow (prot)	0	1655	0	0	1779	1553	1805	3574	1615	1805	3560	0
Flt Permitted		0.982			0.687		0.483			0.361		
Satd. Flow (perm)	0	1629	0	0	1279	1533	917	3574	1615	686	3560	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		64				145			97		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		148.3			216.9			437.4			162.9	
Travel Time (s)		10.7			15.6			31.5			11.7	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	22%	4%	0%	1%	0%	0%	1%	33%
Adj. Flow (vph)	3	1	64	255	13	145	28	645	46	5	465	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	268	145	28	645	46	5	469	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.6	36.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	36.6	36.6		36.6	36.6	36.6	33.5	33.5	33.5	15.0	48.5	
Total Split (%)	43.0%	43.0%		43.0%	43.0%	43.0%	39.4%	39.4%	39.4%	17.6%	57.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	26.0	26.0	26.0	12.0	41.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	17.0	17.0		17.0	17.0	17.0	14.0	14.0	14.0	14.0	14.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	6.0	6.0	6.0		6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effect Green (s)		20.6			20.6	20.6	39.4	39.4	39.4	45.8	41.2	
Actuated g/C Ratio		0.27			0.27	0.27	0.51	0.51	0.51	0.59	0.54	
v/c Ratio		0.14			0.79	0.28	0.06	0.35	0.05	0.01	0.25	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.9					42.7	5.3	14.0	13.8	0.5	8.6	10.9
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9					42.7	5.3	14.0	13.8	0.5	8.6	10.9
LOS	A					D	A	B	B	A	A	B
Approach Delay	6.9					29.6			13.0			10.9
Approach LOS	A					C			B			B
Queue Length 50th (m)	0.5					37.7	0.0	1.9	27.7	0.0	0.4	18.9
Queue Length 95th (m)	8.9					64.6	12.2	9.0	60.3	1.1	2.0	34.1
Internal Link Dist (m)	124.3					192.9			413.4			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	657					484	670	469	1830	874	583	1907
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.10					0.55	0.22	0.06	0.35	0.05	0.01	0.25

Intersection Summary

Area Type:	Other
Cycle Length:	85.1
Actuated Cycle Length:	77
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	16.2
Intersection Capacity Utilization:	54.6%
Intersection LOS:	B
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 1: Christina Street & Church Street/Hwy 402 WB Ramp



Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕	↘	↗
Traffic Volume (vph)	201	128	632	59	17	506
Future Volume (vph)	201	128	632	59	17	506
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Frt		0.850	0.987			
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1787	1599	3556	0	1805	3610
Flt Permitted	0.950			0.315		
Satd. Flow (perm)	1787	1599	3556	0	598	3610
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		139	13			
Link Speed (k/h)	50		50		50	
Link Distance (m)	186.3		431.4		211.7	
Travel Time (s)	13.4		31.1		15.2	
Conf. Peds. (#/hr)				1	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	218	139	687	64	18	550
Shared Lane Traffic (%)						
Lane Group Flow (vph)	218	139	751	0	18	550
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	36.5	36.5	28.5		10.0	38.5
Total Split (%)	48.7%	48.7%	38.0%		13.3%	51.3%
Maximum Green (s)	29.0	29.0	21.0		7.0	31.0
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	12.7	12.7	29.2		35.6	31.1
Actuated g/C Ratio	0.22	0.22	0.50		0.61	0.53
v/c Ratio	0.56	0.31	0.42		0.04	0.29

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2038 Total PM Peak Hour

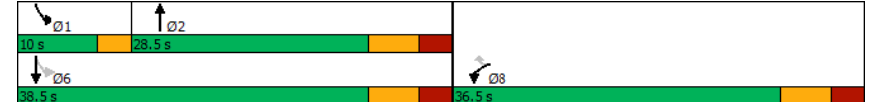
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖ ↗		↑		↘ ↙	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	26.6	6.0	11.7		5.8	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	26.6	6.0	11.7		5.8	8.7
LOS	C	A	B		A	A
Approach Delay	18.6		11.7			8.6
Approach LOS	B		B			A
Queue Length 50th (m)	22.1	0.0	23.1		0.7	16.1
Queue Length 95th (m)	40.3	11.3	56.4		3.2	29.3
Internal Link Dist (m)	162.3		407.4			187.7
Turn Bay Length (m)					90.0	
Base Capacity (vph)	882	860	1772		505	1906
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.25	0.16	0.42		0.04	0.29

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 58.8  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.56  
 Intersection Signal Delay: 12.1  
 Intersection Capacity Utilization 43.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp





Lanes, Volumes, Timings

2038 Total PM Peak Hour

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	1234	5	9	994	0	0	0	17	69	3	19
Future Volume (vph)	0	1234	5	9	994	0	0	0	17	69	3	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.865				0.971
Flt Protected				0.950								0.964
Satd. Flow (prot)	0	3571	0	1805	3610	0	0	1522	0	0	1723	0
Flt Permitted				0.950								0.964
Satd. Flow (perm)	0	3571	0	1805	3610	0	0	1522	0	0	1723	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		677.3			173.0			136.9				111.9
Travel Time (s)		48.8			12.5			9.9				8.1
Confl. Peds. (#/hr)	8		45	45		8			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	8%	2%	0%	8%	8%
Adj. Flow (vph)	0	1341	5	10	1080	0	0	0	18	75	3	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1346	0	10	1080	0	0	18	0	0	99	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

2038 Total PM Peak Hour

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	1234	5	9	994	0	0	0	17	69	3	19
Future Vol, veh/h	0	1234	5	9	994	0	0	0	17	69	3	19
Conflicting Peds, #/hr	8	0	45	45	0	8	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	8	2	0	8
Mvmt Flow	0	1341	5	10	1080	0	0	0	18	75	3	21

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	1391
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	498
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	479
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	16.1	50.4
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	344	-	-	479	-	173
HCM Lane V/C Ratio	0.054	-	-	0.02	-	0.572
HCM Control Delay (s)	16.1	-	-	12.7	-	50.4
HCM Lane LOS	C	-	-	B	-	F
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	3

Notes

--: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined \*: All major volume in platoon

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕				↕↕		↕↕			↕↕		
Traffic Volume (vph)	141	375	146	157	312	114	188	702	196	93	407	165
Future Volume (vph)	141	375	146	157	312	114	188	702	196	93	407	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0			40.0			25.0		
Storage Lanes	0			0			1			1		
Taper Length (m)	7.5			7.5			70.0			95.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt	0.967			0.971			0.967			0.957		
Flt Protected	0.989			0.987			0.950			0.950		
Satd. Flow (prot)	0	3423	0	0	3326	0	1787	3429	0	1752	3437	0
Flt Permitted	0.667			0.609			0.370			0.183		
Satd. Flow (perm)	0	2308	0	0	2051	0	695	3429	0	337	3437	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	49			47			46			79		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	227.9			772.6			202.5			437.4		
Travel Time (s)	16.4			55.6			14.6			31.5		
Conf. Peds. (#/hr)	6		9	9		6	6		5	5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	5%	4%	1%	1%	1%	3%	3%	0%	0%
Adj. Flow (vph)	153	408	159	171	339	124	204	763	213	101	442	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	720	0	0	634	0	204	976	0	101	621	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0	
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0	
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0	
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%	
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	6.0			6.0			6.0			6.0		
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	28.7			28.7			27.2			27.2		
Actuated g/C Ratio	0.42			0.42			0.40			0.40		
v/c Ratio	0.72			0.71			0.73			0.70		

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2038 Total PM Peak Hour

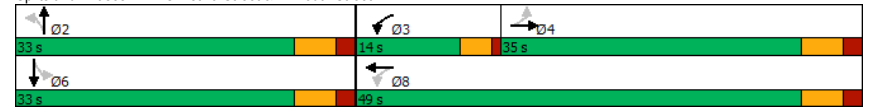
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.5				19.7		38.3	20.3		57.7	14.7	
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0	
Total Delay	19.5				19.7		38.3	20.3		57.7	14.7	
LOS	B			B			D			C		
Approach Delay	19.5			19.7			23.5			20.8		
Approach LOS	B			B			C			C		
Queue Length 50th (m)	37.1			32.3			19.9			46.6		
Queue Length 95th (m)	55.1			49.5			#67.9			91.6		
Internal Link Dist (m)	203.9			748.6			178.5			413.4		
Turn Bay Length (m)				40.0			25.0					
Base Capacity (vph)	1087			1324			278			1399		
Starvation Cap Reductn	0			0			0			0		
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	0.66			0.48			0.73			0.70		

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	67.9
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	21.3
Intersection Capacity Utilization:	108.1%
ICU Level of Service:	G
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2038 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↘	↖↗		↖	↖	↖	↘	↖	↖
Traffic Volume (vph)	115	653	26	215	572	37	36	343	193	91	236	74
Future Volume (vph)	115	653	26	215	572	37	36	343	193	91	236	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.98	1.00		0.98
Fit		0.994			0.991				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3510	0	1805	3504	0	1805	1900	1599	1736	1881	1615
Fit Permitted	0.378			0.255			0.505			0.311		
Satd. Flow (perm)	714	3510	0	482	3504	0	952	1900	1572	567	1881	1576
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			9				175			95
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		772.6			242.4			117.0		146.0		
Travel Time (s)		55.6			17.5			8.4		10.5		
Conf. Peds. (#/hr)	11		9	9		11	13		5	5		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	2%	0%	0%	0%	1%	4%	1%	0%
Adj. Flow (vph)	125	710	28	234	622	40	39	373	210	99	257	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	738	0	234	662	0	39	373	210	99	257	80
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	20.0%	41.3%		20.0%	41.3%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	12.0	27.0		12.0	27.0		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	39.2	27.1		41.4	30.8		19.6	19.6	19.6	19.6	19.6	19.6
Actuated g/C Ratio	0.53	0.37		0.56	0.42		0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.24	0.57		0.50	0.45		0.15	0.74	0.38	0.66	0.51	0.16

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

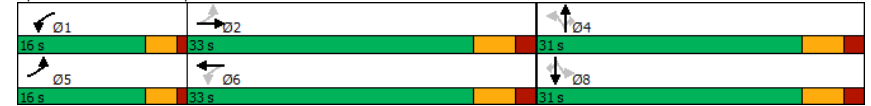
2038 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	8.7	21.4		11.8	18.2		21.9	34.1	7.7	45.9	26.7	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	21.4		11.8	18.2		21.9	34.1	7.7	45.9	26.7	4.6
LOS	A	C		B	B		C	C	A	D	C	A
Approach Delay		19.5			16.5			24.4				27.1
Approach LOS		B			B			C				C
Queue Length 50th (m)	6.9	42.5		13.9	36.7		4.3	48.5	3.8	12.5	31.1	0.0
Queue Length 95th (m)	16.4	69.5		29.3	58.8		11.8	79.5	19.2	#33.6	53.7	7.5
Internal Link Dist (m)		748.6			218.4			93.0			122.0	
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	578	1296		493	1472		324	648	651	193	641	600
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.57		0.47	0.45		0.12	0.58	0.32	0.51	0.40	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	73.6
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	20.8
Intersection Capacity Utilization:	82.1%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	106	836	16	25	926	34	5	12	28	25	3	125
Future Volume (vph)	106	836	16	25	926	34	5	12	28	25	3	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.995			0.916				0.889
Flt Protected	0.950			0.950				0.995				0.992
Satd. Flow (prot)	1687	3564	0	1805	3513	0	0	1732	0	0	1662	0
Flt Permitted	0.950			0.950				0.995				0.992
Satd. Flow (perm)	1687	3564	0	1805	3513	0	0	1732	0	0	1662	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		242.4			100.1			107.2				121.2
Travel Time (s)		17.5			7.2			7.7				8.7
Confl. Peds. (#/hr)	4		11	11		4	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	1%	0%	0%	2%	9%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	115	909	17	27	1007	37	5	13	30	27	3	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	926	0	27	1044	0	0	48	0	0	166	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 56.8%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	20.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	106	836	16	25	926	34	5	12	28	25	3	125
Future Vol, veh/h	106	836	16	25	926	34	5	12	28	25	3	125
Conflicting Peds, #/hr	4	0	11	11	0	4	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	7	1	0	0	2	9	0	0	0	0	0	1
Mvmt Flow	115	909	17	27	1007	37	5	13	30	27	3	136

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1048	0	0	937
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.24	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.27	-	-	2.2
Pot Cap-1 Maneuver	631	-	-	739
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	629	-	-	732
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.3	106.4	249.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	79	629	-	-	732	-	-	127
HCM Lane V/C Ratio	0.619	0.183	-	-	0.037	-	-	1.309
HCM Control Delay (s)	106.4	12	-	-	10.1	-	-	249.8
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2.8	0.7	-	-	0.1	-	-	10.7

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	57	756	69	100	732	101	173	85	133	189	101	70
Future Volume (vph)	57	756	69	100	732	101	173	85	133	189	101	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99	1.00		0.99	0.99		1.00		0.98
Frt		0.987			0.982			0.908				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3517	0	1787	3498	0	1787	1705	0	1703	1881	1357
Flt Permitted	0.214			0.218			0.686			0.425		
Satd. Flow (perm)	405	3517	0	408	3498	0	1283	1705	0	758	1881	1331
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			20			101				49
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	11		15	15		11	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	0%	0%	6%	1%	19%
Adj. Flow (vph)	62	822	75	109	796	110	188	92	145	205	110	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	897	0	109	906	0	188	237	0	205	110	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.0	30.0		30.0	30.0		17.4	17.4		33.4	31.4	31.4
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.24	0.24		0.45	0.43	0.43
v/c Ratio	0.38	0.62		0.66	0.63		0.62	0.49		0.43	0.14	0.13

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2038 Total PM Peak Hour

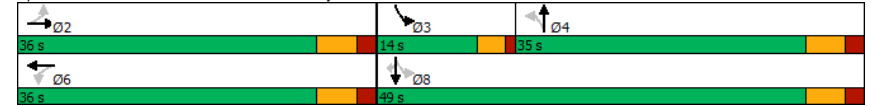
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	24.8	19.8		41.7	19.8		34.6	17.2		15.3	13.1	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	24.8	19.8		41.7	19.8		34.6	17.2		15.3	13.1	6.5
LOS	C	B		D	B		C	B		B	B	A
Approach Delay		20.1			22.1			24.9				13.0
Approach LOS		C			C			C				B
Queue Length 50th (m)	5.8	49.3		11.8	49.4		24.5	16.4		17.6	9.4	2.2
Queue Length 95th (m)	19.4	81.1		#42.3	81.5		44.6	35.8		30.6	18.2	9.3
Internal Link Dist (m)		76.1			653.3			83.1			102.1	
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	165	1444		166	1441		507	735		473	1102	800
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.62		0.66	0.63		0.37	0.32		0.43	0.10	0.10

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	73.5
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	20.6
Intersection Capacity Utilization:	87.0%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2038 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	375	693	209	103	609	83	184	582	100	87	296	164
Future Volume (vph)	375	693	209	103	609	83	184	582	100	87	296	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00		1.00	0.98		0.98	1.00		0.96
Fit		0.965			0.982				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3413	0	1787	3496	0	1787	3574	1615	1770	3610	1615
Fit Permitted	0.210			0.131			0.500			0.293		
Satd. Flow (perm)	398	3413	0	246	3496	0	923	3574	1588	545	3610	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			17				151			178
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Conf. Peds. (#/hr)	12		15	15		12	27		4	4		27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	1%	1%	2%	1%	1%	0%	2%	0%	0%
Adj. Flow (vph)	408	753	227	112	662	90	200	633	109	95	322	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	408	980	0	112	752	0	200	633	109	95	322	178
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.5	32.2		38.5	29.5		35.0	27.7	27.7	34.0	25.0	25.0
Actuated g/C Ratio	0.43	0.35		0.42	0.32		0.38	0.30	0.30	0.37	0.27	0.27
v/c Ratio	1.40	0.81		0.48	0.67		0.47	0.59	0.19	0.31	0.33	0.32

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2038 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	221.1	33.2		21.1	30.0		22.7	31.7	2.7	19.9	28.5	6.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	221.1	33.2		21.1	30.0		22.7	31.7	2.7	19.9	28.5	6.1
LOS	F	C		C	C		C	C	A	B	C	A
Approach Delay		88.4			28.8			26.4			20.4	
Approach LOS		F			C			C			C	
Queue Length 50th (m)	~78.2	87.0		11.4	62.3		24.5	56.6	0.0	11.0	26.0	0.0
Queue Length 95th (m)	#137.5	#115.7		21.3	82.5		40.9	75.9	6.2	21.2	38.3	15.8
Internal Link Dist (m)		149.0			145.7			150.8			407.4	
Turn Bay Length (m)	25.0				30.0			30.0		30.0	50.0	50.0
Base Capacity (vph)	292	1234		235	1183		424	1070	581	306	976	548
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.40	0.79		0.48	0.64		0.47	0.59	0.19	0.31	0.33	0.32
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	94											
Actuated Cycle Length:	92.5											
Natural Cycle:	95											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.40											
Intersection Signal Delay:	48.7											
Intersection Capacity Utilization:	93.2%											
ICU Level of Service:	F											
Analysis Period (min):	15											
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
<b>Splits and Phases: 8: Indian Road &amp; Exmouth Street</b>												

# Appendix G

## 2043 Background Traffic Operations Reports



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	28	278	28	146	39	278	23	7	441	3
Future Volume (vph)	4	1	28	278	28	146	39	278	23	7	441	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.884				0.850			0.850		0.999	
Flt Protected		0.994				0.956			0.950		0.950	
Satd. Flow (prot)	0	1670	0	0	1784	1524	1805	3471	1615	1805	3559	0
Flt Permitted		0.994			0.956		0.477		0.529			
Satd. Flow (perm)	0	1669	0	0	1784	1502	904	3471	1615	1005	3559	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		30				159			151		1	
Link Speed (k/h)		50			41			50			50	
Link Distance (m)		148.3			216.9			429.5			162.9	
Travel Time (s)		10.7			19.0			30.9			11.7	
Confl. Peds. (#/hr)	2					2	2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	6%	0%	4%	0%	0%	1%	50%
Adj. Flow (vph)	4	1	30	302	30	159	42	302	25	8	479	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	332	159	42	302	25	8	482	0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2		6	
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	17.6	17.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	24.0	24.0		37.0	37.0	37.0	34.0	34.0	34.0	15.0	49.0	
Total Split (%)	21.8%	21.8%		33.6%	33.6%	33.6%	30.9%	30.9%	30.9%	13.6%	44.5%	
Maximum Green (s)	16.4	16.4		29.4	29.4	29.4	26.5	26.5	26.5	12.0	41.5	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)				17.0	17.0	17.0					14.0	
Flash Dont Walk (s)				12.0	12.0	12.0					6.0	
Pedestrian Calls (#/hr)				0	0	0					0	
Act Effct Green (s)		10.3			21.2	21.2	41.0	41.0	41.0	47.4	42.7	
Actuated g/C Ratio		0.12			0.24	0.24	0.46	0.46	0.46	0.53	0.48	
v/c Ratio		0.16			0.78	0.33	0.10	0.19	0.03	0.01	0.28	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Background AM Peak Hour

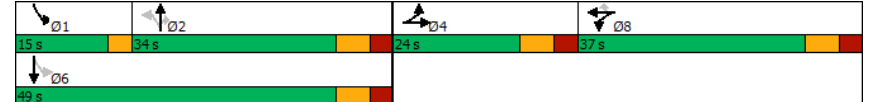
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.1					46.0	6.9	21.7	18.7	0.1	15.6	17.2
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1					46.0	6.9	21.7	18.7	0.1	15.6	17.2
LOS	C					D	A	C	B	A	B	B
Approach Delay	20.1					33.3			17.8			17.2
Approach LOS	C					C			B			B
Queue Length 50th (m)	0.9					61.9	0.0	4.9	19.2	0.0	0.8	32.3
Queue Length 95th (m)	10.7					93.5	15.2	15.6	37.3	0.0	3.7	49.7
Internal Link Dist (m)	124.3					192.9			405.5			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	341					608	616	417	1603	827	647	1713
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.10					0.55	0.26	0.10	0.19	0.03	0.01	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	88.8
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	23.2
Intersection Capacity Utilization:	68.6%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Christina Street & Church Street/Hwy 402 WB Ramp





Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑	↗	↖	↘
Traffic Volume (vph)	361	98	309	61	32	661
Future Volume (vph)	361	98	309	61	32	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	
Ped Bike Factor			1.00	1.00		
Fit		0.850	0.975			
Fit Protected	0.950			0.950		
Satd. Flow (prot)	1770	1568	3393	0	1805	3574
Fit Permitted	0.950			0.464		
Satd. Flow (perm)	1770	1568	3393	0	880	3574
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		107	30			
Link Speed (k/h)	50		50		50	
Link Distance (m)	170.6		431.4		194.2	
Travel Time (s)	12.3		31.1		14.0	
Conf. Peds. (#/hr)				2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	5%	0%	1%
Adj. Flow (vph)	392	107	336	66	35	718
Shared Lane Traffic (%)						
Lane Group Flow (vph)	392	107	402	0	35	718
Turn Type	Prot	Perm	NA	pm+pt	NA	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	37.0	37.0	28.0		10.0	38.0
Total Split (%)	49.3%	49.3%	37.3%		13.3%	50.7%
Maximum Green (s)	29.5	29.5	20.5		7.0	30.5
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	19.3	19.3	27.1		35.3	30.7
Actuated g/C Ratio	0.30	0.30	0.42		0.54	0.47
v/c Ratio	0.75	0.20	0.28		0.06	0.43

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

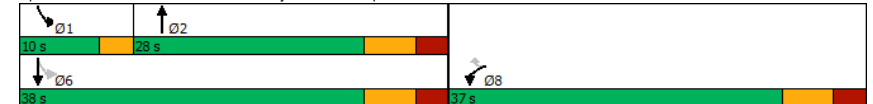
2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	30.1	4.7	14.9		9.2	13.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	30.1	4.7	14.9		9.2	13.3
LOS	C	A	B		A	B
Approach Delay	24.6		14.9			13.1
Approach LOS	C		B			B
Queue Length 50th (m)	44.2	0.0	13.7		1.9	29.5
Queue Length 95th (m)	71.6	9.0	35.5		7.1	54.0
Internal Link Dist (m)	146.6		407.4			170.2
Turn Bay Length (m)					90.0	
Base Capacity (vph)	808	774	1427		577	1687
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.49	0.14	0.28		0.06	0.43

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 65.1  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 17.0  
 Intersection Capacity Utilization 58.3%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↓			↑↓	
Traffic Volume (vph)	0	816	1	0	824	0	1	0	1	44	0	4
Future Volume (vph)	0	816	1	0	824	0	1	0	1	44	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt							0.932				0.990	
Flt Protected							0.976				0.956	
Satd. Flow (prot)	0	3574	0	1900	3539	0	0	1728	0	0	1708	0
Flt Permitted							0.976				0.956	
Satd. Flow (perm)	0	3574	0	1900	3539	0	0	1728	0	0	1708	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	3		15	15		3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	3%	0%	33%
Adj. Flow (vph)	0	887	1	0	896	0	1	0	1	48	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	888	0	0	896	0	0	2	0	0	52	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↓			↑↓	
Traffic Vol, veh/h	0	816	1	0	824	0	1	0	1	44	0	4
Future Vol, veh/h	0	816	1	0	824	0	1	0	1	44	0	4
Conflicting Peds, #/hr	3	0	15	15	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	3	0	33
Mvmt Flow	0	887	1	0	896	0	1	0	1	48	0	4

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	903
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	761
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	751	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.4	25
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	317	-	-	751	-	232
HCM Lane V/C Ratio	0.007	-	-	-	-	0.225
HCM Control Delay (s)	16.4	-	-	0	-	25
HCM Lane LOS	C	-	-	A	-	D
HCM 95th %tile Q(veh)	0	-	-	0	-	0.8

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↕↕			↕↕			↕↕			↕	↕↕			
Traffic Volume (vph)	156	334	179	140	270	115	151	356	137	101	367	125		
Future Volume (vph)	156	334	179	140	270	115	151	356	137	101	367	125		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0		
Storage Lanes	0		0	0		0	1		0	1		0		
Taper Length (m)	7.5			7.5			70.0			95.0				
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		1.00				1.00		1.00		1.00		1.00		
Frt		0.960			0.967			0.958			0.962			
Flt Protected		0.988			0.987		0.950			0.950				
Satd. Flow (prot)	0	3395	0	0	3336	0	1805	3382	0	1805	3416	0		
Flt Permitted		0.683			0.606		0.433			0.432				
Satd. Flow (perm)	0	2347	0	0	2048	0	821	3382	0	820	3416	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		70			66			73			61			
Link Speed (k/h)		50			50			50			50			
Link Distance (m)		181.4			765.8			149.4			429.5			
Travel Time (s)		13.1			55.1			10.8			30.9			
Confl. Peds. (#/hr)	1		1	1		1	4		3	3		4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	0%	1%	0%	6%	1%	4%	0%	1%	4%	0%	1%	2%		
Adj. Flow (vph)	170	363	195	152	293	125	164	387	149	110	399	136		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	728	0	0	570	0	164	536	0	110	535	0		
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA			
Protected Phases		4		3	8			2			6			
Permitted Phases	4			8			2				6			
Detector Phase	4	4		3	8		2	2			6	6		
Switch Phase														
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0			
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0			
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0			
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%			
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0			
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0			
All-Red Time (s)	2.0	2.0		1.0	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	Lag	Lag		Lead										
Lead-Lag Optimize?														
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0			
Recall Mode	None	None		None	None		Max	Max		Max	Max			
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0			
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		12.0	12.0		12.0	12.0			
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0			
Act Effect Green (s)		26.9			26.9		27.1	27.1		27.1	27.1			
Actuated g/C Ratio		0.41			0.41		0.41	0.41		0.41	0.41			
v/c Ratio		0.73			0.65		0.49	0.38		0.33	0.37			

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

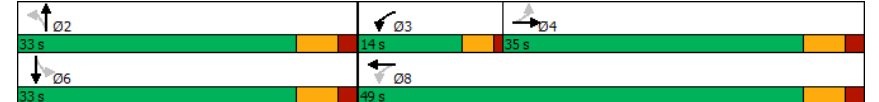
2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Control Delay	19.7				17.8		21.4	12.9		17.7	13.2			
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0			
Total Delay	19.7				17.8		21.4	12.9		17.7	13.2			
LOS	B				B		C	B		B	B			
Approach Delay	19.7				17.8		14.9			14.0				
Approach LOS	B				B		B			B				
Queue Length 50th (m)	36.1				26.3		14.1	19.4		8.8	19.9			
Queue Length 95th (m)	55.1				42.2		37.3	37.2		24.3	37.8			
Internal Link Dist (m)	157.4				741.8		125.4			405.5				
Turn Bay Length (m)							40.0			25.0				
Base Capacity (vph)	1098				1360		336	1429		336	1437			
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	0.66				0.42		0.49	0.38		0.33	0.37			

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	66
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	16.6
Intersection Capacity Utilization:	103.6%
Intersection LOS:	B
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	73	379	32	112	390	29	29	200	153	90	302	80
Future Volume (vph)	73	379	32	112	390	29	29	200	153	90	302	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.99	1.00		0.98
Fit		0.988			0.989				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3440	0	1787	3404	0	1719	1881	1599	1626	1881	1615
Fit Permitted	0.483			0.486			0.389			0.582		
Satd. Flow (perm)	860	3440	0	911	3404	0	700	1881	1578	996	1881	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	12				11				166			95
Link Speed (k/h)	50				50				50			50
Link Distance (m)	765.8			242.4			117.0			146.0		
Travel Time (s)	55.1			17.5			8.4			10.5		
Conf. Peds. (#/hr)	8		4	4		8	10		1	1		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	9%	1%	5%	0%	5%	1%	1%	11%	1%	0%
Adj. Flow (vph)	79	412	35	122	424	32	32	217	166	98	328	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	447	0	122	456	0	32	217	166	98	328	87
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		4		4	8		8
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.5	33.0		14.5	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	14.5	34.5		14.5	34.5		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	18.1%	43.1%		18.1%	43.1%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	10.5	28.5		10.5	28.5		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)	10.0			10.0			10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	15.0			15.0			15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0			0			0	0	0	0	0	0
Act Effect Green (s)	38.6	29.0		38.7	29.0		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.55	0.41		0.55	0.41		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.13	0.31		0.19	0.32		0.17	0.44	0.31	0.37	0.66	0.18

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.5	16.0		7.8	16.1		23.4	25.5	5.5	27.0	31.1	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	16.0		7.8	16.1		23.4	25.5	5.5	27.0	31.1	5.4
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		14.7			14.3			17.3			26.0	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	4.0	21.8		6.3	22.4		3.6	26.5	0.0	11.7	42.9	0.0
Queue Length 95th (m)	11.3	38.6		16.2	39.3		10.6	45.4	12.9	24.8	69.0	8.7
Internal Link Dist (m)		741.8			218.4			93.0			122.0	
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	604	1421		637	1409		252	678	675	359	678	630
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.31		0.19	0.32		0.13	0.32	0.25	0.27	0.48	0.14

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	70.4
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	18.0
Intersection Capacity Utilization:	77.3%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	103	664	19	16	645	34	15	1	22	26	6	76
Future Volume (vph)	103	664	19	16	645	34	15	1	22	26	6	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.992			0.921			0.905	
Flt Protected	0.950			0.950				0.981			0.988	
Satd. Flow (prot)	1597	3527	0	1805	3429	0	0	1717	0	0	1699	0
Flt Permitted	0.950			0.950				0.981			0.988	
Satd. Flow (perm)	1597	3527	0	1805	3429	0	0	1717	0	0	1699	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	5		12	12		5	6		1	1		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	4%	13%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	112	722	21	17	701	37	16	1	24	28	7	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	743	0	17	738	0	0	41	0	0	118	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.4%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	103	664	19	16	645	34	15	1	22	26	6	76
Future Vol, veh/h	103	664	19	16	645	34	15	1	22	26	6	76
Conflicting Peds, #/hr	5	0	12	12	0	5	6	0	1	1	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	0	0	4	13	0	0	0	0	0	0
Mvmt Flow	112	722	21	17	701	37	16	1	24	28	7	83

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	743	0	0	755
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.36	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.33	-	-	2.2
Pot Cap-1 Maneuver	791	-	-	865
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	788	-	-	856
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.2	36.7	37.8
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	154	788	-	-	856	-	-	223
HCM Lane V/C Ratio	0.268	0.142	-	-	0.02	-	-	0.526
HCM Control Delay (s)	36.7	10.3	-	-	9.3	-	-	37.8
HCM Lane LOS	E	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1	0.5	-	-	0.1	-	-	2.8

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	15	571	87	73	577	55	128	44	147	48	25	20
Future Volume (vph)	15	571	87	73	577	55	128	44	147	48	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00	1.00	0.99		1.00		0.99
Frt		0.980			0.987			0.885				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3442	0	1770	3393	0	1770	1623	0	1641	1900	1154
Fit Permitted	0.348			0.332			0.740			0.472		
Satd. Flow (perm)	659	3442	0	617	3393	0	1376	1623	0	813	1900	1137
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			13			160				39
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Confl. Peds. (#/hr)	6		5	5		6	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	2%	5%	2%	2%	0%	3%	10%	0%	40%
Adj. Flow (vph)	16	621	95	79	627	60	139	48	160	52	27	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	716	0	79	687	0	139	208	0	52	27	22
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.9	30.9		30.9	30.9		15.6	15.6		25.4	23.4	23.4
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.23	0.23		0.38	0.35	0.35
v/c Ratio	0.05	0.44		0.28	0.43		0.43	0.41		0.12	0.04	0.05

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Background AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	13.5	14.0		17.0	14.1		28.1	10.1		12.5	12.8	2.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	13.5	14.0		17.0	14.1		28.1	10.1		12.5	12.8	2.7
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		14.0			14.4			17.3			10.4	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.3	35.6		7.1	34.5		17.2	5.5		4.1	2.2	0.0
Queue Length 95th (m)	5.1	53.8		18.5	52.1		33.7	22.2		10.0	6.5	2.4
Internal Link Dist (m)		76.1			653.3			83.1			102.1	
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	306	1613		286	1585		607	805		436	1242	756
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.05	0.44		0.28	0.43		0.23	0.26		0.12	0.02	0.03
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85											
Actuated Cycle Length:	66.5											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.44											
Intersection Signal Delay:	14.6						Intersection LOS: B					
Intersection Capacity Utilization:	83.0%						ICU Level of Service E					
Analysis Period (min):	15											
<b>Splits and Phases: 7: East Street North/Driveway B &amp; Exmouth Street</b>												

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	173	530	138	90	441	74	172	293	74	84	418	217
Future Volume (vph)	173	530	138	90	441	74	172	293	74	84	418	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00			0.99	1.00		
Fit		0.969			0.979				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3371	0	1770	3373	0	1752	3471	1615	1805	3539	1599
Fit Permitted	0.322			0.253			0.389			0.559		
Satd. Flow (perm)	606	3371	0	471	3373	0	718	3471	1594	1061	3539	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			21				151			236
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Conf. Peds. (#/hr)	1		5	5		1			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	5%	2%	3%	14%	3%	4%	0%	0%	2%	1%
Adj. Flow (vph)	188	576	150	98	479	80	187	318	80	91	454	236
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	726	0	98	559	0	187	318	80	91	454	236
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	37.1	29.7		36.1	27.1		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.41	0.33		0.40	0.30		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.53	0.64		0.32	0.54		0.50	0.30	0.13	0.19	0.46	0.38

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

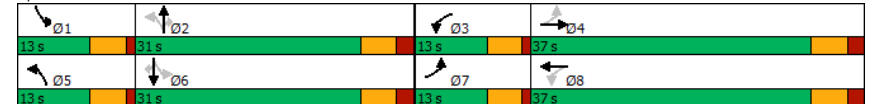
2043 Background AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	21.3	28.2		17.2	27.5		22.5	26.2	0.5	17.0	29.1	5.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	28.2		17.2	27.5		22.5	26.2	0.5	17.0	29.1	5.7
LOS	C	C		B	C		C	C	A	B	C	A
Approach Delay		26.7			26.0			21.5			20.6	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	20.1	58.2		9.9	42.8		20.5	23.7	0.0	9.4	35.3	0.0
Queue Length 95th (m)	33.8	78.1		19.0	59.0		38.3	38.1	0.4	20.3	53.6	17.7
Internal Link Dist (m)		149.0			145.7			150.8			407.4	
Turn Bay Length (m)	25.0			30.0			30.0		30.0	50.0		50.0
Base Capacity (vph)	354	1244		303	1175		371	1065	593	467	982	614
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.58		0.32	0.48		0.50	0.30	0.13	0.19	0.46	0.38

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	90.1
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	23.9
Intersection Capacity Utilization:	77.6%
Intersection LOS:	C
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 8: Indian Road & Exmouth Street



Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	3	1	66	252	13	147	29	644	37	6	467	4
Future Volume (vph)	3	1	66	252	13	147	29	644	37	6	467	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.872				0.850			0.850		0.999	
Flt Protected		0.998			0.955		0.950			0.950		
Satd. Flow (prot)	0	1653	0	0	1779	1553	1805	3574	1615	1805	3561	0
Flt Permitted		0.984			0.681		0.463			0.330		
Satd. Flow (perm)	0	1630	0	0	1268	1533	879	3574	1615	627	3561	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		72				160		97			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		148.3			216.9			437.4			162.9	
Travel Time (s)		10.7			15.6			31.5			11.7	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	22%	4%	0%	1%	0%	0%	1%	33%
Adj. Flow (vph)	3	1	72	274	14	160	32	700	40	7	508	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	288	160	32	700	40	7	512	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.6	36.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	36.6	36.6		36.6	36.6	36.6	33.5	33.5	33.5	15.0	48.5	
Total Split (%)	43.0%	43.0%		43.0%	43.0%	43.0%	39.4%	39.4%	39.4%	17.6%	57.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	26.0	26.0	26.0	12.0	41.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	17.0	17.0		17.0	17.0	17.0	14.0	14.0	14.0	14.0	14.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	6.0	6.0	6.0		6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	
Act Effect Green (s)		21.8			21.8	21.8	39.4	39.4	39.4	45.8	41.2	
Actuated g/C Ratio		0.28			0.28	0.28	0.50	0.50	0.50	0.59	0.53	
v/c Ratio		0.15			0.82	0.30	0.07	0.39	0.05	0.01	0.27	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.6				44.8	5.1	14.6	14.6	0.1	8.8	11.6	
Queue Delay	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.6				44.8	5.1	14.6	14.6	0.1	8.8	11.6	
LOS	A				D	A	B	B	A	A	B	
Approach Delay	6.6				30.7			13.9			11.6	
Approach LOS	A				C			B			B	
Queue Length 50th (m)	0.4				41.5	0.0	2.4	32.3	0.0	0.4	22.2	
Queue Length 95th (m)	9.4				70.7	12.7	9.9	66.2	0.0	2.4	37.3	
Internal Link Dist (m)	124.3				192.9			413.4			138.9	
Turn Bay Length (m)					80.0		25.0		30.0		60.0	
Base Capacity (vph)	652				472	671	442	1799	861	548	1878	
Starvation Cap Reductn	0				0	0	0	0	0	0	0	
Spillback Cap Reductn	0				0	0	0	0	0	0	0	
Storage Cap Reductn	0				0	0	0	0	0	0	0	
Reduced v/c Ratio	0.12				0.61	0.24	0.07	0.39	0.05	0.01	0.27	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85.1											
Actuated Cycle Length:	78.2											
Natural Cycle:	75											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.82											
Intersection Signal Delay:	17.1						Intersection LOS: B					
Intersection Capacity Utilization:	58.1%						ICU Level of Service B					
Analysis Period (min):	15											
<b>Splits and Phases: 1: Christina Street &amp; Church Street/Hwy 402 WB Ramp</b>												



Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕	↘	↗
Traffic Volume (vph)	214	141	689	66	19	555
Future Volume (vph)	214	141	689	66	19	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	90.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				65.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00		1.00	
Fit		0.850	0.987			
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1787	1599	3556	0	1805	3610
Fit Permitted	0.950				0.281	
Satd. Flow (perm)	1787	1599	3556	0	534	3610
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		153	13			
Link Speed (k/h)	50		50		50	
Link Distance (m)	186.3		431.4		211.7	
Travel Time (s)	13.4		31.1		15.2	
Conf. Peds. (#/hr)				1	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	233	153	749	72	21	603
Shared Lane Traffic (%)						
Lane Group Flow (vph)	233	153	821	0	21	603
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	36.5	36.5	28.5		10.0	38.5
Total Split (%)	48.7%	48.7%	38.0%		13.3%	51.3%
Maximum Green (s)	29.0	29.0	21.0		7.0	31.0
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	13.2	13.2	29.2		35.6	31.1
Actuated g/C Ratio	0.22	0.22	0.49		0.60	0.52
v/c Ratio	0.59	0.32	0.47		0.04	0.32

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2043 Background PM Peak Hour

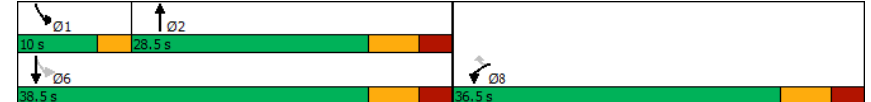
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	27.0	5.8	12.4		6.1	9.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	27.0	5.8	12.4		6.1	9.1
LOS	C	A	B		A	A
Approach Delay	18.6		12.4			9.0
Approach LOS	B		B			A
Queue Length 50th (m)	23.8	0.0	26.5		0.8	18.3
Queue Length 95th (m)	42.7	11.8	64.4		3.6	33.4
Internal Link Dist (m)	162.3		407.4			187.7
Turn Bay Length (m)					90.0	
Base Capacity (vph)	876	862	1759		471	1892
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.27	0.18	0.47		0.04	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	59.3
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	12.5
Intersection Capacity Utilization:	45.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↓			↑↓	
Traffic Volume (vph)	0	1279	6	10	1063	0	0	0	19	76	3	17
Future Volume (vph)	0	1279	6	10	1063	0	0	0	19	76	3	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.865				0.977
Flt Protected				0.950								0.962
Satd. Flow (prot)	0	3571	0	1805	3610	0	0	1522	0	0	1734	0
Flt Permitted				0.950								0.962
Satd. Flow (perm)	0	3571	0	1805	3610	0	0	1522	0	0	1734	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		677.3			173.0			136.9				111.9
Travel Time (s)		48.8			12.5			9.9				8.1
Confl. Peds. (#/hr)	8		45	45		8			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	8%	2%	0%	8%
Adj. Flow (vph)	0	1390	7	11	1155	0	0	0	21	83	3	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1397	0	11	1155	0	0	21	0	0	104	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↓			↑↓	
Traffic Vol, veh/h	0	1279	6	10	1063	0	0	0	19	76	3	17
Future Vol, veh/h	0	1279	6	10	1063	0	0	0	19	76	3	17
Conflicting Peds, #/hr	8	0	45	45	0	8	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	8	2	0	8
Mvmt Flow	0	1390	7	11	1155	0	0	0	21	83	3	18

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	1442
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	476
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	458
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	16.6	68.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	331	-	-	458	-	153
HCM Lane V/C Ratio	0.062	-	-	0.024	-	0.682
HCM Control Delay (s)	16.6	-	-	13.1	-	68.1
HCM Lane LOS	C	-	-	B	-	F
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	3.9

Notes

--: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕				
Traffic Volume (vph)	149	404	155	139	329	108	199	774	203	99	448	174			
Future Volume (vph)	149	404	155	139	329	108	199	774	203	99	448	174			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0			
Storage Lanes	0		0	0		0	1		0	1		0			
Taper Length (m)	7.5			7.5			70.0			95.0					
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95			
Ped Bike Factor		1.00					1.00	1.00		1.00	1.00				
Frt		0.967			0.972			0.969			0.958				
Flt Protected		0.990			0.988		0.950		0.950						
Satd. Flow (prot)	0	3427	0	0	3333	0	1787	3437	0	1752	3442	0			
Flt Permitted		0.671			0.603		0.335		0.147						
Satd. Flow (perm)	0	2322	0	0	2033	0	629	3437	0	271	3442	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)		48			33			43			74				
Link Speed (k/h)		50			50			50			50				
Link Distance (m)		227.9			772.6			202.5			437.4				
Travel Time (s)		16.4			55.6			14.6			31.5				
Conf. Peds. (#/hr)	6		9	9		6	6		5	5		6			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	2%	0%	0%	5%	4%	1%	1%	1%	3%	3%	0%	0%			
Adj. Flow (vph)	162	439	168	151	358	117	216	841	221	108	487	189			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	769	0	0	626	0	216	1062	0	108	676	0			
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA				
Protected Phases		4		3	8			2			6				
Permitted Phases	4			8			2			6					
Detector Phase	4	4		3	8		2	2		6	6				
Switch Phase															
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0				
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0				
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0				
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%				
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0				
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0				
All-Red Time (s)	2.0	2.0		1.0	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		0.0	0.0				
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0				
Lead/Lag	Lag	Lag		Lead											
Lead-Lag Optimize?	Yes	Yes		Yes											
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0				
Recall Mode	None	None		None	None		Max	Max		Max	Max				
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0				
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0				
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0				
Act Effect Green (s)		29.1			29.1		27.2	27.2		27.2	27.2				
Actuated g/C Ratio		0.43			0.43		0.40	0.40		0.40	0.40				
v/c Ratio		0.76			0.71		0.86	0.76		1.01	0.48				

Lanes, Volumes, Timings  
4: Christina Street & Exmouth Street

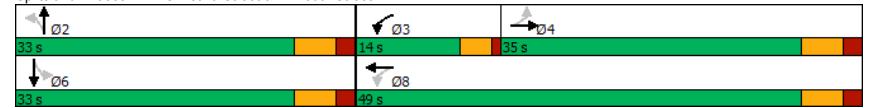
2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Control Delay	20.8				20.0		56.1	22.8		119.5	15.7				
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0				
Total Delay	20.8				20.0		56.1	22.8		119.5	15.7				
LOS	C				C		E	C		F	B				
Approach Delay	20.8				20.0		28.5			30.0					
Approach LOS	C				C		C			C					
Queue Length 50th (m)	41.2				32.7		23.5	55.0		12.8	27.5				
Queue Length 95th (m)	60.6				50.0		#77.2	#115.3		#51.3	55.6				
Internal Link Dist (m)	203.9				748.6		178.5			413.4					
Turn Bay Length (m)							40.0			25.0					
Base Capacity (vph)	1092				1299		250	1392		107	1413				
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	0.70				0.48		0.86	0.76		1.01	0.48				

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	68.3
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	25.6
Intersection Capacity Utilization:	110.3%
ICU Level of Service:	H
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	127	695	29	237	564	41	39	379	213	101	261	82
Future Volume (vph)	127	695	29	237	564	41	39	379	213	101	261	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.98	1.00		0.98
Flt		0.994			0.990				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3509	0	1805	3500	0	1805	1900	1599	1736	1881	1615
Flt Permitted	0.378			0.225			0.464			0.262		
Satd. Flow (perm)	714	3509	0	426	3500	0	875	1900	1572	478	1881	1576
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			10				175			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		772.6			242.4				117.0			146.0
Travel Time (s)		55.6			17.5				8.4			10.5
Conf. Peds. (#/hr)	11		9	9		11	13		5	5		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	2%	0%	0%	0%	1%	4%	1%	0%
Adj. Flow (vph)	138	755	32	258	613	45	42	412	232	110	284	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	787	0	258	658	0	42	412	232	110	284	89
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	20.0%	41.3%		20.0%	41.3%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	12.0	27.0		12.0	27.0		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	39.3	27.1		41.7	31.0		20.8	20.8	20.8	20.8	20.8	20.8
Actuated g/C Ratio	0.52	0.36		0.56	0.41		0.28	0.28	0.28	0.28	0.28	0.28
v/c Ratio	0.26	0.62		0.59	0.45		0.17	0.78	0.41	0.83	0.55	0.18

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

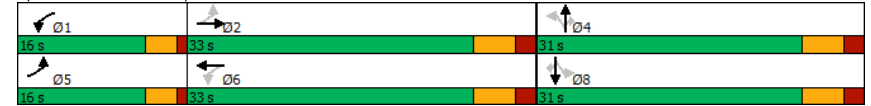
2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.3	22.9		14.4	18.8		22.3	36.4	8.8	72.3	27.3	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	22.9		14.4	18.8		22.3	36.4	8.8	72.3	27.3	5.4
LOS	A	C		B	B		C	D	A	E	C	A
Approach Delay		20.9			17.5			26.2			33.5	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	8.7	50.6		17.5	39.2		4.7	56.0	6.3	15.2	35.6	0.0
Queue Length 95th (m)	17.9	75.0		32.4	59.1		12.7	89.2	23.1	#43.4	59.5	9.1
Internal Link Dist (m)		748.6			218.4			93.0			122.0	
Turn Bay Length (m)	40.0				20.0			30.0		30.0	25.0	25.0
Base Capacity (vph)	567	1273		462	1452		293	636	642	160	630	591
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.62		0.56	0.45		0.14	0.65	0.36	0.69	0.45	0.15

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	74.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	23.1
Intersection Capacity Utilization:	84.9%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	97	906	17	28	983	34	6	12	31	25	3	98
Future Volume (vph)	97	906	17	28	983	34	6	12	31	25	3	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.995			0.915				0.895
Flt Protected	0.950			0.950				0.994				0.990
Satd. Flow (prot)	1687	3564	0	1805	3513	0	0	1728	0	0	1670	0
Flt Permitted	0.950			0.950				0.994				0.990
Satd. Flow (perm)	1687	3564	0	1805	3513	0	0	1728	0	0	1670	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		242.4			100.1			107.2				121.2
Travel Time (s)		17.5			7.2			7.7				8.7
Confl. Peds. (#/hr)	4		11	11		4	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	1%	0%	0%	2%	9%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	105	985	18	30	1068	37	7	13	34	27	3	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	1003	0	30	1105	0	0	54	0	0	137	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.0%
ICU Level of Service	B
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	24.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	97	906	17	28	983	34	6	12	31	25	3	98
Future Vol, veh/h	97	906	17	28	983	34	6	12	31	25	3	98
Conflicting Peds, #/hr	4	0	11	11	0	4	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	7	1	0	0	2	9	0	0	0	0	0	1
Mvmt Flow	105	985	18	30	1068	37	7	13	34	27	3	107

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1109	0	0	1014
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.24	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.27	-	2.2	-
Pot Cap-1 Maneuver	597	-	692	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	595	-	686	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.3	149.9	\$ 365.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	69	595	-	-	686	-	-	90
HCM Lane V/C Ratio	0.772	0.177	-	-	0.044	-	-	1.522
HCM Control Delay (s)	149.9	12.3	-	-	10.5	-	-	\$ 365.3
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	3.6	0.6	-	-	0.1	-	-	10.7

Notes

--: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined \*: All major volume in platoon

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Background PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	48	827	76	111	798	76	191	74	147	120	71	43
Future Volume (vph)	48	827	76	111	798	76	191	74	147	120	71	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00	1.00	0.99	0.99		1.00		0.98
Frt		0.987			0.987			0.900				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3517	0	1787	3519	0	1787	1688	0	1703	1881	1357
Flt Permitted	0.201			0.187			0.707			0.437		
Satd. Flow (perm)	381	3517	0	350	3519	0	1321	1688	0	780	1881	1331
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			13			129				39
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	11		15	15		11	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	0%	0%	6%	1%	19%
Adj. Flow (vph)	52	899	83	121	867	83	208	80	160	130	77	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	982	0	121	950	0	208	240	0	130	77	47
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		4		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.5	30.5		30.5	30.5		18.3	18.3		31.0	29.0	29.0
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.26	0.26		0.43	0.41	0.41
v/c Ratio	0.32	0.65		0.82	0.63		0.62	0.46		0.28	0.10	0.08

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Background PM Peak Hour

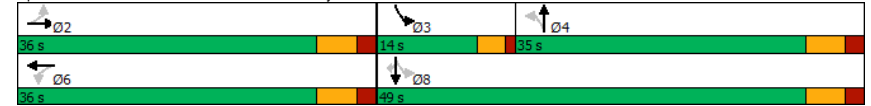
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	24.0	20.3		65.4	19.9		33.3	14.1		13.2	12.5	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	24.0	20.3		65.4	19.9		33.3	14.1		13.2	12.5	5.4
LOS	C	C		E	B		C	B		B	B	A
Approach Delay		20.5			25.0			23.0			11.5	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	4.9	57.2		15.0	54.5		27.4	13.2		10.7	6.4	0.7
Queue Length 95th (m)	17.4	95.4		#52.9	91.1		48.7	31.8		20.0	13.6	6.0
Internal Link Dist (m)		76.1			653.3			83.1			102.1	
Turn Bay Length (m)	20.0				20.0		45.0			25.0		25.0
Base Capacity (vph)	161	1503		148	1504		543	770		468	1146	826
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.65		0.82	0.63		0.38	0.31		0.28	0.07	0.06

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	71.6
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	21.8
Intersection Capacity Utilization:	88.8%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖		→		↗		↖		→		↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗	↖	↖↗	↖	↖
Traffic Volume (vph)	380	733	214	114	655	92	198	642	111	96	326	170
Future Volume (vph)	380	733	214	114	655	92	198	642	111	96	326	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00		1.00	0.98		0.98	1.00		0.96
Fit		0.966			0.982				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3418	0	1787	3496	0	1787	3574	1615	1770	3610	1615
Fit Permitted	0.185			0.133			0.471			0.248		
Satd. Flow (perm)	351	3418	0	250	3496	0	870	3574	1588	461	3610	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			17				151			185
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Conf. Peds. (#/hr)	12		15	15		12	27		4	4		27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	1%	1%	2%	1%	1%	0%	2%	0%	0%
Adj. Flow (vph)	413	797	233	124	712	100	215	698	121	104	354	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	413	1030	0	124	812	0	215	698	121	104	354	185
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.0	30.0		39.0	30.0		35.1	27.7	27.7	34.0	25.0	25.0
Actuated g/C Ratio	0.42	0.32		0.42	0.32		0.38	0.30	0.30	0.37	0.27	0.27
v/c Ratio	1.52	0.91		0.52	0.71		0.53	0.66	0.21	0.37	0.36	0.34

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Background PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↖		→		↗		↖		→		↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	272.3	42.0		22.6	31.2		24.5	33.3	3.6	21.2	29.1	6.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	272.3	42.0		22.6	31.2		24.5	33.3	3.6	21.2	29.1	6.1
LOS	F	D		C	C		C	C	A	C	C	A
Approach Delay		107.9			30.0			28.0				21.2
Approach LOS		F			C			C				C
Queue Length 50th (m)	~86.9	93.7		12.8	68.8		26.6	63.8	0.0	12.0	28.9	0.0
Queue Length 95th (m)	#146.2	#132.5		23.1	90.6		43.8	84.8	8.6	22.8	41.8	15.9
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0				30.0			30.0		30.0	50.0	50.0
Base Capacity (vph)	272	1168		237	1177		406	1065	579	281	971	551
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.52	0.88		0.52	0.69		0.53	0.66	0.21	0.37	0.36	0.34
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	94											
Actuated Cycle Length:	93											
Natural Cycle:	95											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.52											
Intersection Signal Delay:	55.8											
Intersection Capacity Utilization:	94.2%											
ICU Level of Service:	F											
Analysis Period (min):	15											
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
<b>Splits and Phases: 8: Indian Road &amp; Exmouth Street</b>												
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
13 s	31 s	13 s	37 s	13 s	37 s	13 s	37 s	13 s	37 s	13 s	37 s	37 s
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
13 s	31 s	13 s	37 s	13 s	37 s	13 s	37 s	13 s	37 s	13 s	37 s	37 s

# Appendix H

## 2043 Total Traffic Operations Reports





Lanes, Volumes, Timings

2043 Total AM Peak Hour

1: Christina Street & Church Street/Hwy 402 WB Ramp

(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	28	278	28	146	39	283	28	7	449	3
Future Volume (vph)	4	1	28	278	28	146	39	283	28	7	449	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.884				0.850			0.850		0.999	
Flt Protected		0.994				0.956			0.950		0.950	
Satd. Flow (prot)	0	1670	0	0	1784	1524	1805	3471	1615	1805	3560	0
Flt Permitted		0.994			0.956		0.473		0.526			
Satd. Flow (perm)	0	1669	0	0	1784	1502	896	3471	1615	999	3560	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		30				159		151			1	
Link Speed (k/h)		50			41			50			50	
Link Distance (m)		148.3			216.9			429.5			162.9	
Travel Time (s)		10.7			19.0			30.9			11.7	
Confl. Peds. (#/hr)	2					2	2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	6%	0%	4%	0%	0%	1%	50%
Adj. Flow (vph)	4	1	30	302	30	159	42	308	30	8	488	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	332	159	42	308	30	8	491	0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2		6	
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	17.6	17.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	24.0	24.0		37.0	37.0	37.0	34.0	34.0	34.0	15.0	49.0	
Total Split (%)	21.8%	21.8%		33.6%	33.6%	33.6%	30.9%	30.9%	30.9%	13.6%	44.5%	
Maximum Green (s)	16.4	16.4		29.4	29.4	29.4	26.5	26.5	26.5	12.0	41.5	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)				17.0	17.0	17.0					14.0	
Flash Dont Walk (s)				12.0	12.0	12.0					6.0	
Pedestrian Calls (#/hr)				0	0	0					0	
Act Effct Green (s)		10.3			21.2	21.2	41.0	41.0	41.0	47.4	42.7	
Actuated g/C Ratio		0.12			0.24	0.24	0.46	0.46	0.46	0.53	0.48	
v/c Ratio		0.16			0.78	0.33	0.10	0.19	0.04	0.01	0.29	

Lanes, Volumes, Timings

2043 Total AM Peak Hour

1: Christina Street & Church Street/Hwy 402 WB Ramp

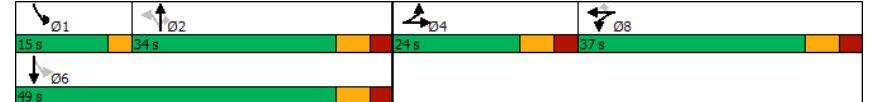
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.1					46.0	6.9	21.8	18.8	0.1	15.6	17.3
Queue Delay	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1					46.0	6.9	21.8	18.8	0.1	15.6	17.3
LOS	C					D	A	C	B	A	B	B
Approach Delay	20.1					33.3			17.6			17.2
Approach LOS	C					C			B			B
Queue Length 50th (m)	0.9					61.9	0.0	4.9	19.6	0.0	0.8	33.0
Queue Length 95th (m)	10.7					93.5	15.2	15.6	37.9	0.0	3.7	50.6
Internal Link Dist (m)	124.3					192.9			405.5			138.9
Turn Bay Length (m)						80.0	25.0		30.0	60.0		
Base Capacity (vph)	341					608	616	413	1603	827	645	1713
Starvation Cap Reductn	0					0	0	0	0	0	0	0
Spillback Cap Reductn	0					0	0	0	0	0	0	0
Storage Cap Reductn	0					0	0	0	0	0	0	0
Reduced v/c Ratio	0.10					0.55	0.26	0.10	0.19	0.04	0.01	0.29

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	88.8
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	23.0
Intersection Capacity Utilization:	68.6%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Christina Street & Church Street/Hwy 402 WB Ramp



Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑	↗	↖	↘
Traffic Volume (vph)	383	98	314	61	32	669
Future Volume (vph)	383	98	314	61	32	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0	90.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5			65.0		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00	1.00		
Frt		0.850	0.976			
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1770	1568	3397	0	1805	3574
Flt Permitted	0.950			0.462		
Satd. Flow (perm)	1770	1568	3397	0	876	3574
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		107	29			
Link Speed (k/h)	50		50		50	
Link Distance (m)	170.6		431.4		194.2	
Travel Time (s)	12.3		31.1		14.0	
Conf. Peds. (#/hr)				2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	5%	0%	1%
Adj. Flow (vph)	416	107	341	66	35	727
Shared Lane Traffic (%)						
Lane Group Flow (vph)	416	107	407	0	35	727
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	37.0	37.0	28.0		10.0	38.0
Total Split (%)	49.3%	49.3%	37.3%		13.3%	50.7%
Maximum Green (s)	29.5	29.5	20.5		7.0	30.5
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effect Green (s)	20.3	20.3	27.0		35.2	30.7
Actuated g/C Ratio	0.31	0.31	0.41		0.53	0.46
v/c Ratio	0.77	0.19	0.29		0.06	0.44

Lanes, Volumes, Timings  
2: Indian Road & Hwy 402 WB Ramp

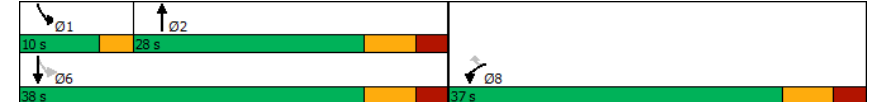
2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙ ↘		↑		↗ ↖	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	30.5	4.5	15.5		9.7	14.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	30.5	4.5	15.5		9.7	14.0
LOS	C	A	B		A	B
Approach Delay	25.2		15.5			13.8
Approach LOS	C		B			B
Queue Length 50th (m)	47.8	0.0	14.5		2.0	31.1
Queue Length 95th (m)	76.4	9.0	36.8		7.3	56.6
Internal Link Dist (m)	146.6		407.4			170.2
Turn Bay Length (m)					90.0	
Base Capacity (vph)	795	763	1406		566	1660
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.52	0.14	0.29		0.06	0.44

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	66.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	17.7
Intersection Capacity Utilization:	59.6%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	858	1	0	891	0	1	0	1	44	0	12
Future Volume (vph)	0	858	1	0	891	0	1	0	1	44	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt							0.932				0.971	
Flt Protected							0.976				0.962	
Satd. Flow (prot)	0	3574	0	1900	3539	0	0	1728	0	0	1622	0
Flt Permitted							0.976				0.962	
Satd. Flow (perm)	0	3574	0	1900	3539	0	0	1728	0	0	1622	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		677.3			173.0			136.9			111.9	
Travel Time (s)		48.8			12.5			9.9			8.1	
Confl. Peds. (#/hr)	3		15	15		3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	3%	0%	33%
Adj. Flow (vph)	0	933	1	0	968	0	1	0	1	48	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	934	0	0	968	0	0	2	0	0	61	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	858	1	0	891	0	1	0	1	44	0	12
Future Vol, veh/h	0	858	1	0	891	0	1	0	1	44	0	12
Conflicting Peds, #/hr	3	0	15	15	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	3	0	33
Mvmt Flow	0	933	1	0	968	0	1	0	1	48	0	13

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	949
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	732
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	723
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.3	26.4
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	295	-	-	723	-	228
HCM Lane V/C Ratio	0.007	-	-	-	-	0.267
HCM Control Delay (s)	17.3	-	-	0	-	26.4
HCM Lane LOS	C	-	-	A	-	D
HCM 95th %tile Q(veh)	0	-	-	0	-	1

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	156	342	179	158	275	125	151	356	167	109	367	125
Future Volume (vph)	156	342	179	158	275	125	151	356	167	109	367	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0			40.0			25.0		
Storage Lanes	0			0			1			1		
Taper Length (m)	7.5			7.5			70.0			95.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt	0.960			0.966			0.952			0.962		
Fit Protected	0.989			0.986			0.950			0.950		
Satd. Flow (prot)	0	3399	0	0	3326	0	1805	3355	0	1805	3416	0
Fit Permitted	0.669			0.598			0.430			0.407		
Satd. Flow (perm)	0	2299	0	0	2017	0	816	3355	0	772	3416	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	69			69			102			61		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	181.4			765.8			149.4			429.5		
Travel Time (s)	13.1			55.1			10.8			30.9		
Confl. Peds. (#/hr)	1		1	1		1	4		3	3		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	6%	1%	4%	0%	1%	4%	0%	1%	2%
Adj. Flow (vph)	170	372	195	172	299	136	164	387	182	118	399	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	737	0	0	607	0	164	569	0	118	535	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0	
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0	
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0	
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%	
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	6.0			6.0			6.0			6.0		
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	27.8			27.8			27.1			27.1		
Actuated g/C Ratio	0.41			0.41			0.40			0.40		
v/c Ratio	0.74			0.69			0.50			0.40		

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.9				18.7		22.7	13.1			20.0	13.9
Queue Delay	0.0				0.0		0.0	0.0			0.0	0.0
Total Delay	19.9				18.7		22.7	13.1			20.0	13.9
LOS	B			B			C			B		
Approach Delay	19.9			18.7			15.2			15.0		
Approach LOS	B			B			B			B		
Queue Length 50th (m)	37.2			29.0			14.2			19.6		
Queue Length 95th (m)	56.2			45.7			39.8			40.8		
Internal Link Dist (m)	157.4			741.8			125.4			405.5		
Turn Bay Length (m)							40.0			25.0		
Base Capacity (vph)	1081			1324			330			1418		
Starvation Cap Reductn	0			0			0			0		
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	0.68			0.46			0.50			0.40		
0.38	0.38			0.38			0.38			0.38		
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	82											
Actuated Cycle Length:	67											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.74											
Intersection Signal Delay:	17.2						Intersection LOS: B					
Intersection Capacity Utilization:	103.6%						ICU Level of Service G					
Analysis Period (min):	15											
<b>Splits and Phases: 4: Christina Street &amp; Exmouth Street</b>												

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	73	425	32	112	423	29	29	200	153	90	302	80
Future Volume (vph)	73	425	32	112	423	29	29	200	153	90	302	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.99	1.00		0.98
Fit		0.989			0.990				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3446	0	1787	3407	0	1719	1881	1599	1626	1881	1615
Fit Permitted	0.456			0.449			0.389			0.582		
Satd. Flow (perm)	812	3446	0	842	3407	0	700	1881	1578	996	1881	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			10				166			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		765.8			242.4				117.0			146.0
Travel Time (s)		55.1			17.5				8.4			10.5
Conf. Peds. (#/hr)	8		4	4		8	10		1	1		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	9%	1%	5%	0%	5%	1%	1%	11%	1%	0%
Adj. Flow (vph)	79	462	35	122	460	32	32	217	166	98	328	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	497	0	122	492	0	32	217	166	98	328	87
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.5	33.0		14.5	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	14.5	34.5		14.5	34.5		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	18.1%	43.1%		18.1%	43.1%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	10.5	28.5		10.5	28.5		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	38.6	29.0		38.7	29.0		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.55	0.41		0.55	0.41		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.14	0.35		0.20	0.35		0.17	0.44	0.31	0.37	0.66	0.18

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.5	16.4		7.9	16.4		23.4	25.5	5.5	27.0	31.1	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	16.4		7.9	16.4		23.4	25.5	5.5	27.0	31.1	5.4
LOS	A	B		A	B		C	C	A	C	C	A
Approach Delay		15.2			14.7			17.3			26.0	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	4.0	24.8		6.3	24.6		3.6	26.5	0.0	11.7	42.9	0.0
Queue Length 95th (m)	11.3	43.2		16.2	42.6		10.6	45.4	12.9	24.8	69.0	8.7
Internal Link Dist (m)		741.8			218.4			93.0			122.0	
Turn Bay Length (m)	40.0				20.0			30.0		30.0	25.0	25.0
Base Capacity (vph)	584	1423		610	1409		252	678	675	359	678	630
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.35		0.20	0.35		0.13	0.32	0.25	0.27	0.48	0.14

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	70.4
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	18.1
Intersection Capacity Utilization:	77.3%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	126	687	19	16	662	34	15	1	22	26	6	92
Future Volume (vph)	126	687	19	16	662	34	15	1	22	26	6	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	0	0	0	0	0	0	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.993			0.921			0.900	
Flt Protected	0.950			0.950				0.981			0.990	
Satd. Flow (prot)	1597	3527	0	1805	3432	0	0	1717	0	0	1693	0
Flt Permitted	0.950			0.950				0.981			0.990	
Satd. Flow (perm)	1597	3527	0	1805	3432	0	0	1717	0	0	1693	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	5		12	12		5	6		1	1		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	4%	13%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	137	747	21	17	720	37	16	1	24	28	7	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	768	0	17	757	0	0	41	0	0	135	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	126	687	19	16	662	34	15	1	22	26	6	92
Future Vol, veh/h	126	687	19	16	662	34	15	1	22	26	6	92
Conflicting Peds, #/hr	5	0	12	12	0	5	6	0	1	1	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	0	0	4	13	0	0	0	0	0	0
Mvmt Flow	137	747	21	17	720	37	16	1	24	28	7	100

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	762	0	0	780
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.36	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.33	-	-	2.2
Pot Cap-1 Maneuver	778	-	-	846
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	775	-	-	837
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0.2	46.4	47.2
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	127	775	-	-	837	-	-	213
HCM Lane V/C Ratio	0.325	0.177	-	-	0.021	-	-	0.633
HCM Control Delay (s)	46.4	10.6	-	-	9.4	-	-	47.2
HCM Lane LOS	E	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.3	0.6	-	-	0.1	-	-	3.7

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Total AM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	38	571	87	73	577	130	128	74	147	90	43	37
Future Volume (vph)	38	571	87	73	577	130	128	74	147	90	43	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00		0.99	1.00	0.99		1.00		0.99
Fit		0.980			0.972			0.900				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3442	0	1770	3341	0	1770	1659	0	1641	1900	1154
Fit Permitted	0.296			0.324			0.726			0.414		
Satd. Flow (perm)	561	3442	0	602	3341	0	1350	1659	0	713	1900	1137
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			35			129				40
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Confl. Peds. (#/hr)	6		5	5		6	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	2%	5%	2%	2%	0%	3%	10%	0%	40%
Adj. Flow (vph)	41	621	95	79	627	141	139	80	160	98	47	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	716	0	79	768	0	139	240	0	98	47	40
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		3		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.3	30.3		30.3	30.3		15.7	15.7		28.4	26.4	26.4
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.23	0.23		0.41	0.38	0.38
v/c Ratio	0.17	0.47		0.30	0.52		0.45	0.50		0.23	0.06	0.09

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Total AM Peak Hour

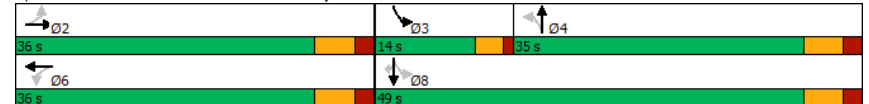
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	15.7	15.4		18.3	15.8		29.7	15.9		13.3	12.9	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	15.7	15.4		18.3	15.8		29.7	15.9		13.3	12.9	5.1
LOS	B	B		B	B		C	B		B	B	A
Approach Delay		15.4			16.0			21.0				11.4
Approach LOS		B			B			C				B
Queue Length 50th (m)	3.4	35.6		7.1	38.6		17.2	13.2		7.9	3.9	0.0
Queue Length 95th (m)	10.8	54.2		18.8	58.7		33.6	33.3		16.3	9.6	5.3
Internal Link Dist (m)		76.1			653.3			83.1				102.1
Turn Bay Length (m)	20.0				20.0			45.0			25.0	25.0
Base Capacity (vph)	247	1527		264	1489		574	779		431	1198	731
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.17	0.47		0.30	0.52		0.24	0.31		0.23	0.04	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	68.8
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	16.3
Intersection Capacity Utilization:	83.0%
Intersection LOS:	B
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗			↖ ↗			↖ ↗			↖ ↗		
Traffic Volume (vph)	192	544	147	90	463	74	187	293	74	84	418	247
Future Volume (vph)	192	544	147	90	463	74	187	293	74	84	418	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		1.00		0.99		1.00		
Fit		0.968			0.979				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3367	0	1770	3376	0	1752	3471	1615	1805	3539	1599
Fit Permitted	0.305			0.237			0.388			0.559		
Satd. Flow (perm)	574	3367	0	441	3376	0	716	3471	1594	1061	3539	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	39				20				151			268
Link Speed (k/h)	50			50		50		50		50		50
Link Distance (m)	173.0			169.7		174.8		431.4				
Travel Time (s)	12.5			12.2		12.6		31.1				
Confl. Peds. (#/hr)	1		5	5		1		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	5%	2%	3%	14%	3%	4%	0%	0%	2%	1%
Adj. Flow (vph)	209	591	160	98	503	80	203	318	80	91	454	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	209	751	0	98	583	0	203	318	80	91	454	268
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)	10.0			10.0			10.0		10.0		10.0	
Flash Dont Walk (s)	21.0			21.0			15.0		15.0		15.0	
Pedestrian Calls (#/hr)	0			0			0		0		0	
Act Effect Green (s)	37.2	29.8		36.2	27.2		35.0	27.6	27.6	34.0	25.0	25.0
Actuated g/C Ratio	0.41	0.33		0.40	0.30		0.39	0.31	0.31	0.38	0.28	0.28
v/c Ratio	0.61	0.66		0.33	0.56		0.55	0.30	0.13	0.20	0.46	0.42

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

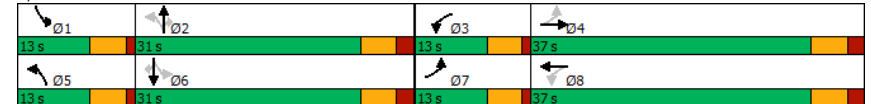
2043 Total AM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	24.1	28.5		17.4	28.0		24.1	26.3	0.5	17.1	29.2	5.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	28.5		17.4	28.0		24.1	26.3	0.5	17.1	29.2	5.8
LOS	C	C		B	C		C	C	A	B	C	A
Approach Delay		27.6			26.4			22.1				20.1
Approach LOS		C			C			C				C
Queue Length 50th (m)	22.6	60.7		9.9	45.2		22.4	23.7	0.0	9.4	35.3	0.0
Queue Length 95th (m)	37.2	81.3		19.0	61.9		41.5	38.1	0.4	20.3	53.6	18.8
Internal Link Dist (m)		149.0			145.7			150.8				407.4
Turn Bay Length (m)	25.0			30.0		30.0		50.0		50.0		50.0
Base Capacity (vph)	344	1242		294	1173		369	1063	593	466	981	636
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.60		0.33	0.50		0.55	0.30	0.13	0.20	0.46	0.42

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	90.2
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	24.2
Intersection Capacity Utilization:	79.5%
Intersection LOS:	C
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 8: Indian Road & Exmouth Street





Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	66	252	13	147	29	652	45	6	470	4
Future Volume (vph)	3	1	66	252	13	147	29	652	45	6	470	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		80.0	25.0		30.0	60.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00				0.99	1.00				1.00	
Frt		0.872				0.850			0.850		0.999	
Flt Protected		0.998			0.955		0.950			0.950		
Satd. Flow (prot)	0	1653	0	0	1779	1553	1805	3574	1615	1805	3561	0
Flt Permitted		0.984			0.681		0.462			0.326		
Satd. Flow (perm)	0	1630	0	0	1268	1533	877	3574	1615	619	3561	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		72				160			97		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		148.3			216.9			437.4			162.9	
Travel Time (s)		10.7			15.6			31.5			11.7	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	22%	4%	0%	1%	0%	0%	1%	33%
Adj. Flow (vph)	3	1	72	274	14	160	32	709	49	7	511	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	288	160	32	709	49	7	515	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.6	36.6		36.6	36.6	36.6	27.5	27.5	27.5	10.0	27.5	
Total Split (s)	36.6	36.6		36.6	36.6	36.6	33.5	33.5	33.5	15.0	48.5	
Total Split (%)	43.0%	43.0%		43.0%	43.0%	43.0%	39.4%	39.4%	39.4%	17.6%	57.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	26.0	26.0	26.0	12.0	41.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	3.0	4.5	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	3.0	3.0	3.0	0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.6			7.6	7.6	7.5	7.5	7.5	3.0	7.5	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.2	3.2	3.2	3.0	3.2	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	17.0	17.0		17.0	17.0	17.0	14.0	14.0	14.0	14.0	14.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	6.0	6.0	6.0		6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effect Green (s)		21.8			21.8	21.8	39.4	39.4	39.4	45.8	41.2	
Actuated g/C Ratio		0.28			0.28	0.28	0.50	0.50	0.50	0.59	0.53	
v/c Ratio		0.15			0.82	0.30	0.07	0.39	0.06	0.01	0.27	

Lanes, Volumes, Timings

1: Christina Street & Church Street/Hwy 402 WB Ramp

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.6											
Queue Delay	0.0											
Total Delay	6.6											
LOS	A											
Approach Delay	6.6											
Approach LOS	A											
Queue Length 50th (m)	0.4											
Queue Length 95th (m)	9.4											
Internal Link Dist (m)	124.3											
Turn Bay Length (m)	80.0											
Base Capacity (vph)	652											
Starvation Cap Reductn	0											
Spillback Cap Reductn	0											
Storage Cap Reductn	0											
Reduced v/c Ratio	0.12											
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	85.1											
Actuated Cycle Length:	78.2											
Natural Cycle:	75											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.82											
Intersection Signal Delay:	17.0											
Intersection Capacity Utilization:	58.1%											
Intersection LOS:	B											
ICU Level of Service:	B											
Analysis Period (min):	15											
<b>Splits and Phases: 1: Christina Street &amp; Church Street/Hwy 402 WB Ramp</b>												

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Sarnia TIA

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↕	↗	↘	↓
Traffic Volume (vph)	221	141	697	66	19	558
Future Volume (vph)	221	141	697	66	19	558
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	90.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				65.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor			1.00		1.00	
Fit		0.850	0.987			
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1787	1599	3556	0	1805	3610
Fit Permitted	0.950				0.276	
Satd. Flow (perm)	1787	1599	3556	0	524	3610
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		153	13			
Link Speed (k/h)	50		50		50	
Link Distance (m)	186.3		431.4		211.7	
Travel Time (s)	13.4		31.1		15.2	
Conf. Peds. (#/hr)				1	1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	240	153	758	72	21	607
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	153	830	0	21	607
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		7.0	20.0
Minimum Split (s)	36.5	36.5	27.5		10.0	27.5
Total Split (s)	36.5	36.5	28.5		10.0	38.5
Total Split (%)	48.7%	48.7%	38.0%		13.3%	51.3%
Maximum Green (s)	29.0	29.0	21.0		7.0	31.0
Yellow Time (s)	4.5	4.5	4.5		3.0	4.5
All-Red Time (s)	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5		3.0	7.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	17.0	17.0				14.0
Flash Dont Walk (s)	12.0	12.0				6.0
Pedestrian Calls (#/hr)	0	0				0
Act Effct Green (s)	13.4	13.4	29.2		35.6	31.1
Actuated g/C Ratio	0.23	0.23	0.49		0.60	0.52
v/c Ratio	0.60	0.32	0.47		0.05	0.32

Lanes, Volumes, Timings

2: Indian Road & Hwy 402 WB Ramp

2043 Total PM Peak Hour

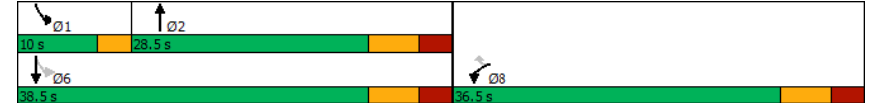
(230751) 530-540 Exmouth Street, Sarnia TIA

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay	27.1	5.7	12.6		6.2	9.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	27.1	5.7	12.6		6.2	9.3
LOS	C	A	B		A	A
Approach Delay	18.8		12.6			9.2
Approach LOS	B		B			A
Queue Length 50th (m)	24.7	0.0	27.3		0.8	18.7
Queue Length 95th (m)	44.0	11.8	65.8		3.7	34.1
Internal Link Dist (m)	162.3		407.4			187.7
Turn Bay Length (m)					90.0	
Base Capacity (vph)	873	859	1753		464	1885
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.27	0.18	0.47		0.05	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	59.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	12.7
Intersection Capacity Utilization:	46.1%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 2: Indian Road & Hwy 402 WB Ramp



Lanes, Volumes, Timings

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	1348	6	10	1085	0	0	0	19	76	3	20
Future Volume (vph)	0	1348	6	10	1085	0	0	0	19	76	3	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999						0.865				0.972
Flt Protected				0.950								0.963
Satd. Flow (prot)	0	3571	0	1805	3610	0	0	1522	0	0	1724	0
Flt Permitted				0.950								0.963
Satd. Flow (perm)	0	3571	0	1805	3610	0	0	1522	0	0	1724	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		677.3			173.0			136.9				111.9
Travel Time (s)		48.8			12.5			9.9				8.1
Confl. Peds. (#/hr)	8		45	45		8			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	8%	2%	0%	8%
Adj. Flow (vph)	0	1465	7	11	1179	0	0	0	21	83	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1472	0	11	1179	0	0	21	0	0	108	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.4%
ICU Level of Service	B
Analysis Period (min)	15

HCM 6th TWSC

3: Plaza Driveway/Hwy 402 EB Ramp & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↓	↑↑			↑↑			↑↑	
Traffic Vol, veh/h	0	1348	6	10	1085	0	0	0	19	76	3	20
Future Vol, veh/h	0	1348	6	10	1085	0	0	0	19	76	3	20
Conflicting Peds, #/hr	8	0	45	45	0	8	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	8	2	0	8
Mvmt Flow	0	1465	7	11	1179	0	0	0	21	83	3	22

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	-	0	0	1517
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.2	-
Pot Cap-1 Maneuver	0	-	-	446
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	429
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	17.4	75.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	311	-	-	429	-	149
HCM Lane V/C Ratio	0.066	-	-	0.025	-	0.722
HCM Control Delay (s)	17.4	-	-	13.6	-	75.1
HCM Lane LOS	C	-	-	B	-	F
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	4.3

Notes

--: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined \*: All major volume in platoon

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕			
Traffic Volume (vph)	149	407	155	169	336	124	199	774	214	102	448	174		
Future Volume (vph)	149	407	155	169	336	124	199	774	214	102	448	174		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	25.0		0.0		
Storage Lanes	0		0	0		0	1		0	1		0		
Taper Length (m)	7.5			7.5			70.0			95.0				
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		1.00					1.00	1.00		1.00	1.00			
Frt		0.967			0.970			0.967			0.958			
Flt Protected		0.990			0.987		0.950			0.950				
Satd. Flow (prot)	0	3427	0	0	3322	0	1787	3429	0	1752	3442	0		
Flt Permitted		0.649			0.593		0.327			0.147				
Satd. Flow (perm)	0	2246	0	0	1995	0	614	3429	0	271	3442	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		48			33			46			74			
Link Speed (k/h)		50			50			50			50			
Link Distance (m)		227.9			772.6			202.5			437.4			
Travel Time (s)		16.4			55.6			14.6			31.5			
Conf. Peds. (#/hr)	6		9	9		6	6		5	5		6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	5%	4%	1%	1%	1%	3%	3%	0%	0%		0%
Adj. Flow (vph)	162	442	168	184	365	135	216	841	233	111	487	189		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	772	0	0	684	0	216	1074	0	111	676	0		
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA			
Protected Phases		4		3	8			2			6			
Permitted Phases	4			8			2				6			
Detector Phase	4	4		3	8		2	2			6	6		
Switch Phase														
Minimum Initial (s)	25.0	25.0		10.0	25.0		23.0	23.0		23.0	23.0			
Minimum Split (s)	35.0	35.0		14.0	35.0		33.0	33.0		33.0	33.0			
Total Split (s)	35.0	35.0		14.0	49.0		33.0	33.0		33.0	33.0			
Total Split (%)	42.7%	42.7%		17.1%	59.8%		40.2%	40.2%		40.2%	40.2%			
Maximum Green (s)	29.0	29.0		10.0	43.0		27.0	27.0		27.0	27.0			
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0			
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0			
Lost Time Adjust (s)		0.0			0.0			0.0			0.0			
Total Lost Time (s)		6.0			6.0			6.0			6.0			
Lead/Lag	Lag	Lag		Lead										
Lead-Lag Optimize?	Yes	Yes		Yes										
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0			
Recall Mode	None	None		None	None		Max	Max		Max	Max			
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0			
Flash Dont Walk (s)	14.0	14.0		14.0	12.0		12.0	12.0		12.0	12.0			
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0			
Act Effect Green (s)		31.4			31.4		27.3	27.3		27.3	27.3			
Actuated g/C Ratio		0.44			0.44		0.39	0.39		0.39	0.39			
v/c Ratio		0.75			0.76		0.92	0.80		1.07	0.49			

Lanes, Volumes, Timings

4: Christina Street & Exmouth Street

2043 Total PM Peak Hour

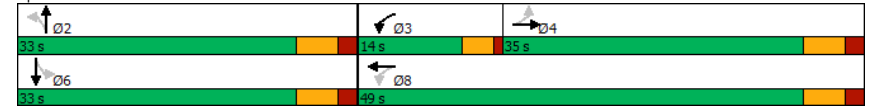
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Control Delay	20.4				21.4		68.0	25.7		139.8	17.2			
Queue Delay	0.0				0.0		0.0	0.0		0.0	0.0			
Total Delay	20.4				21.4		68.0	25.7		139.8	17.2			
LOS	C				C		E	C		F	B			
Approach Delay	20.4				21.4			32.8			34.5			
Approach LOS	C				C			C			C			
Queue Length 50th (m)	42.1				37.8		26.8	62.7		-16.8	31.0			
Queue Length 95th (m)	61.8				57.2		#82.2	#126.8		#54.9	59.6			
Internal Link Dist (m)	203.9				748.6			178.5			413.4			
Turn Bay Length (m)							40.0				25.0			
Base Capacity (vph)	1078				1236		236	1348		104	1370			
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	0.72				0.55		0.92	0.80		1.07	0.49			

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	70.8
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	28.2
Intersection Capacity Utilization:	110.6%
ICU Level of Service:	H
Intersection LOS:	C
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Christina Street & Exmouth Street



Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

2043 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	127	712	29	237	617	41	39	379	213	101	261	82
Future Volume (vph)	127	712	29	237	617	41	39	379	213	101	261	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	20.0		0.0	30.0		30.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	75.0			35.0			40.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		1.00	0.99		0.98	1.00		0.98
Fit		0.994			0.991				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3509	0	1805	3503	0	1805	1900	1599	1736	1881	1615
Fit Permitted	0.341			0.216			0.464			0.262		
Satd. Flow (perm)	644	3509	0	409	3503	0	875	1900	1572	478	1881	1576
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			9				175			95
Link Speed (k/h)		50			50				50			50
Link Distance (m)		772.6			242.4				117.0			146.0
Travel Time (s)		55.6			17.5				8.4			10.5
Conf. Peds. (#/hr)	11		9	9		11	13		5	5		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	2%	0%	0%	0%	1%	4%	1%	0%
Adj. Flow (vph)	138	774	32	258	671	45	42	412	232	110	284	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	806	0	258	716	0	42	412	232	110	284	89
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	10.0	20.0		10.0	20.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	16.0	33.0		16.0	33.0		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	20.0%	41.3%		20.0%	41.3%		38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	12.0	27.0		12.0	27.0		25.0	25.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max		None	Max		None	None	None	None	None	None
Walk Time (s)		10.0			10.0		10.0	10.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	39.3	27.1		41.7	31.0		20.8	20.8	20.8	20.8	20.8	20.8
Actuated g/C Ratio	0.52	0.36		0.56	0.41		0.28	0.28	0.28	0.28	0.28	0.28
v/c Ratio	0.28	0.63		0.60	0.49		0.17	0.78	0.41	0.83	0.55	0.18

Lanes, Volumes, Timings  
5: Capel Street & Exmouth Street

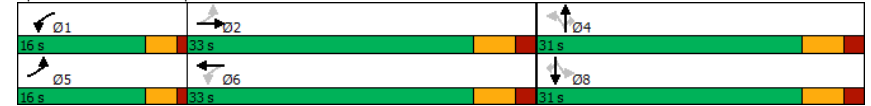
2043 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Samia TIA

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.5	23.2		15.0	19.4		22.3	36.4	8.8	72.3	27.3	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	23.2		15.0	19.4		22.3	36.4	8.8	72.3	27.3	5.4
LOS	A	C		B	B		C	D	A	E	C	A
Approach Delay		21.2			18.2			26.2			33.5	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	8.7	52.3		17.5	43.8		4.7	56.0	6.3	15.2	35.6	0.0
Queue Length 95th (m)	17.9	77.2		33.7	65.0		12.7	89.2	23.1	#43.4	59.5	9.1
Internal Link Dist (m)		748.6			218.4			93.0			122.0	
Turn Bay Length (m)	40.0			20.0			30.0		30.0	25.0		25.0
Base Capacity (vph)	540	1273		455	1453		293	636	642	160	630	591
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.63		0.57	0.49		0.14	0.65	0.36	0.69	0.45	0.15

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	74.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	23.3
Intersection Capacity Utilization:	84.9%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Capel Street & Exmouth Street



Lanes, Volumes, Timings

6: Cecil Street/Driveway A & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	106	915	17	28	1010	34	6	12	31	25	3	125
Future Volume (vph)	106	915	17	28	1010	34	6	12	31	25	3	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5		7.5			7.5			7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.995			0.915			0.889	
Flt Protected	0.950			0.950				0.994			0.992	
Satd. Flow (prot)	1687	3564	0	1805	3514	0	0	1728	0	0	1662	0
Flt Permitted	0.950			0.950				0.994			0.992	
Satd. Flow (perm)	1687	3564	0	1805	3514	0	0	1728	0	0	1662	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		242.4			100.1			107.2			121.2	
Travel Time (s)		17.5			7.2			7.7			8.7	
Confl. Peds. (#/hr)	4		11	11		4	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	1%	0%	0%	2%	9%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	115	995	18	30	1098	37	7	13	34	27	3	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	1013	0	30	1135	0	0	54	0	0	166	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.6%
ICU Level of Service	B
Analysis Period (min)	15

HCM 6th TWSC

6: Cecil Street/Driveway A & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Intersection												
Int Delay, s/veh	38.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Vol, veh/h	106	915	17	28	1010	34	6	12	31	25	3	125
Future Vol, veh/h	106	915	17	28	1010	34	6	12	31	25	3	125
Conflicting Peds, #/hr	4	0	11	11	0	4	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	15	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	7	1	0	0	2	9	0	0	0	0	0	1
Mvmt Flow	115	995	18	30	1098	37	7	13	34	27	3	136

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1139	0	0	1024
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.24	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.27	-	-	2.2
Pot Cap-1 Maneuver	581	-	-	686
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	579	-	-	680
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.3	196.6	\$ 509.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	60	579	-	-	680	-	-	89
HCM Lane V/C Ratio	0.888	0.199	-	-	0.045	-	-	1.869
HCM Control Delay (s)	196.6	12.8	-	-	10.5	-	-	\$ 509.6
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	4.1	0.7	-	-	0.1	-	-	14.1

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Total PM Peak Hour

(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	57	827	76	111	798	101	191	85	147	189	101	70
Future Volume (vph)	57	827	76	111	798	101	191	85	147	189	101	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	20.0		0.0	45.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	15.0			15.0			40.0			60.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00		0.98
Frt		0.987			0.983			0.905				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3517	0	1787	3502	0	1787	1699	0	1703	1881	1357
Flt Permitted	0.178			0.176			0.686			0.412		
Satd. Flow (perm)	337	3517	0	330	3502	0	1283	1699	0	735	1881	1331
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			18			112				39
Link Speed (k/h)		50			50			50				50
Link Distance (m)		100.1			677.3			107.1				126.1
Travel Time (s)		7.2			48.8			7.7				9.1
Conf. Peds. (#/hr)	11		15	15		11	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	0%	0%	6%	1%	19%
Adj. Flow (vph)	62	899	83	121	867	110	208	92	160	205	110	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	982	0	121	977	0	208	252	0	205	110	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			4		4		8
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6		4	4		3	8	8
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		10.0	15.0	15.0
Minimum Split (s)	33.0	33.0		33.0	33.0		35.0	35.0		14.0	35.0	35.0
Total Split (s)	36.0	36.0		36.0	36.0		35.0	35.0		14.0	49.0	49.0
Total Split (%)	42.4%	42.4%		42.4%	42.4%		41.2%	41.2%		16.5%	57.6%	57.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		29.0	29.0		10.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	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		4.0	6.0	6.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	30.1	30.1		30.1	30.1		18.5	18.5		34.6	32.6	32.6
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.25	0.25		0.46	0.44	0.44
v/c Ratio	0.46	0.69		0.91	0.69		0.65	0.50		0.44	0.13	0.13

Lanes, Volumes, Timings

7: East Street North/Driveway B & Exmouth Street

2043 Total PM Peak Hour

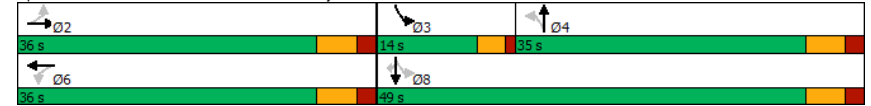
(230751) 530-540 Exmouth Street, Samia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	32.2	22.0		86.9	21.8		35.5	16.4		15.2	12.8	7.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	32.2	22.0		86.9	21.8		35.5	16.4		15.2	12.8	7.5
LOS	C	C		F	C		D	B		B	B	A
Approach Delay		22.6			29.0			25.1				13.0
Approach LOS		C			C			C				B
Queue Length 50th (m)	6.2	57.7		15.6	57.1		27.6	17.0		17.6	9.4	3.1
Queue Length 95th (m)	#25.1	96.7		#54.8	95.8		49.3	37.0		30.4	18.1	10.1
Internal Link Dist (m)		76.1			653.3			83.1			102.1	
Turn Bay Length (m)	20.0			20.0			45.0			25.0		25.0
Base Capacity (vph)	135	1425		133	1422		499	730		470	1086	785
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.46	0.69		0.91	0.69		0.42	0.35		0.44	0.10	0.10

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	74.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	24.1
Intersection Capacity Utilization:	88.8%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: East Street North/Driveway B & Exmouth Street



Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	411	756	229	114	662	92	203	642	111	96	326	180
Future Volume (vph)	411	756	229	114	662	92	203	642	111	96	326	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	30.0		30.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	15.0			80.0			45.0			35.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00		1.00	0.98		0.98	1.00		0.96
Fit		0.965			0.982				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3413	0	1787	3496	0	1787	3574	1615	1770	3610	1615
Fit Permitted	0.182			0.132			0.472			0.245		
Satd. Flow (perm)	345	3413	0	248	3496	0	872	3574	1588	456	3610	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			17				151			196
Link Speed (k/h)		50			50				50			50
Link Distance (m)		173.0			169.7				174.8			431.4
Travel Time (s)		12.5			12.2				12.6			31.1
Conf. Peds. (#/hr)	12		15	15		12	27		4	4		27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	1%	2%	1%	1%	0%	2%	0%	0%	0%
Adj. Flow (vph)	447	822	249	124	720	100	221	698	121	104	354	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	447	1071	0	124	820	0	221	698	121	104	354	196
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			2	6	
Detector Phase	7	4		3	8		5	2		2	1	6
Switch Phase												
Minimum Initial (s)	8.0	26.0		8.0	26.0		8.0	22.0	22.0	8.0	22.0	22.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (s)	13.0	37.0		13.0	37.0		13.0	31.0	31.0	13.0	31.0	31.0
Total Split (%)	13.8%	39.4%		13.8%	39.4%		13.8%	33.0%	33.0%	13.8%	33.0%	33.0%
Maximum Green (s)	8.0	31.0		8.0	31.0		8.0	25.0	25.0	8.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0			10.0	10.0		10.0	10.0
Flash Dont Walk (s)		21.0			21.0			15.0	15.0		15.0	15.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.4	30.4		39.4	30.4		35.0	27.7	27.7	34.0	25.0	25.0
Actuated g/C Ratio	0.42	0.33		0.42	0.33		0.37	0.30	0.30	0.36	0.27	0.27
v/c Ratio	1.66	0.94		0.53	0.71		0.55	0.66	0.21	0.37	0.37	0.35

Lanes, Volumes, Timings  
8: Indian Road & Exmouth Street

2043 Total PM Peak Hour  
(230751) 530-540 Exmouth Street, Sarnia TIA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	330.4	45.6		22.6	31.2		25.1	33.5	3.6	21.4	29.2	6.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	330.4	45.6		22.6	31.2		25.1	33.5	3.6	21.4	29.2	6.1
LOS	F	D		C	C		C	C	A	C	C	A
Approach Delay		129.5			30.0			28.2			21.1	
Approach LOS		F			C			C			C	
Queue Length 50th (m)	-101.7	99.2		12.8	69.8		27.5	63.8	0.0	12.0	28.9	0.0
Queue Length 95th (m)	#162.6	#141.7		23.1	91.7		44.9	84.8	8.6	22.8	41.8	16.4
Internal Link Dist (m)		149.0			145.7			150.8			407.4	
Turn Bay Length (m)	25.0				30.0			30.0		30.0	50.0	50.0
Base Capacity (vph)	270	1162		236	1171		405	1058	576	278	966	557
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.66	0.92		0.53	0.70		0.55	0.66	0.21	0.37	0.37	0.35

Intersection Summary

Area Type:	Other
Cycle Length:	94
Actuated Cycle Length:	93.4
Natural Cycle:	105
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.66
Intersection Signal Delay:	64.5
Intersection Capacity Utilization:	96.2%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Indian Road & Exmouth Street

