

Transportation Impact Study

PROPOSED RESIDENTIAL DEVELOPMENT

63 Albany Street
City of Oshawa, ONTARIO

November 2024
Project No: NT-21-270

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CONSULTING ENGINEERS

NextEng Consulting Group Inc.

November 1, 2024

Albany Street Investments Ltd.

**Re: Transportation Impact Study
 Proposed Residential Development
 63 Albany Street, City of Oshawa
 Our Project No. NT-21-270**

Nexttrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study for the above noted site in support of Official Plan Amendment and Zoning By-law Amendment applications.

The subject site is located at 63 Albany Street, south-east corner of Albany Street and Albert Street, in the City of Oshawa. The proposed development consists of high-rise residential building, with a total of 297 residential dwelling units and 3-storey 18 townhouse units. The proposed development will provide a total of 279 vehicle parking spaces and 248 bicycle parking spaces, inclusive of short-term and long-term spaces. As part of the proposed development, one full move access will be provided via Albert Street.

The transportation study concludes that the proposed development can adequately be accommodated by the existing transportation network, transit service, as well as the Transportation Demand Management measures and incentives recommended in this report.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nexttrans Consulting Engineers

A Division of NextEng Consulting Group Inc.

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Report Submission Record

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Final Report	November 1, 2024	For Client Submission

EXECUTIVE SUMMARY

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Albany Street Investments Ltd. (the 'Client') to undertake a Transportation Impact Study in support of Official Plan Amendment and Zoning By-law Amendment applications. The subject site is located at 63 Albany Street, south-east corner of Albany Street and Albert Street, in the City of Oshawa.

Proposed Development

The existing site is currently occupied by one single house which will be demolished for future redevelopment of the site, and the rest of the land is vacant. The proposed development consists of high-rise residential building, with a total of 297 residential dwelling units, and 3-storey 18 townhouse units.

Capacity Analysis

The proposed development is expected to generate:

- 72 total two-way auto trips (24 inbound and 49 outbound) and 82 total two-way auto trips (47 inbound and 35 outbound) during the AM and PM peak hours, respectively; and
- 54 total two-way walks+bike+transit trips (48 inbound and 6 outbound) and 47 total two-way walk+bike+transit trips (16 inbound and 31 outbound) during the AM and PM peak hours, respectively.

Auto Mode Assessment

Under the existing, all the intersections considered are expected to operate at acceptable levels of service.

Under the 2029 and 2034 future background traffic conditions, and the future total condition, all the intersections considered are expected to operate at acceptable overall levels of service except for the intersection of Simcoe Street South and First Street, the westbound left/right movement, this is the result of increasing of the background development traffics in the area; and the intersection of Simcoe Street and Albany Street which the westbound left/right is expected with critical level of service F, this is typical for the unsignalized intersection, the movement from the minor road to the major road has to wait for clear traffic to make the turn.

It is Nextrans' opinion that physical improvements such as road widenings are not always the best solutions to solve congestion and delay at existing intersections as road widenings may create some capacity, however, this capacity will be utilized as soon as it becomes available to other drivers and support increased traffic usage. This called induced traffic demand. In addition, road widenings will also impact pedestrian and cyclist crossing distance at the intersection, which will result in operational and safety concerns for pedestrian and cyclist. NexTrans only recommends the active transportation to be improved in the future to support the future Go Station.

NexTrans has run the signal warrant for the intersection of Simcoe Street South and Albany Street, the analysis indicates that this intersection is not warranted.

The analysis indicates that the proposed access is expected to operate at acceptable levels of service with minimum delays or queues. The proposed development has negligible impacts on the existing road network.

Active Transportation Mode Assessment

Walking

The area is currently well-served by a sufficient network of sidewalks, with sidewalks are available on both sides of public roads. The sidewalks are reasonably maintained, no improvement is required.

Cycling

Under the existing conditions, there is no available bicycle facility in the vicinity area.

Vehicle Parking Review

Based on the City's Zoning By-Law 60-94, a total of 556 vehicle parking spaces are required for the proposed development (including resident, visitor parking spaces). The proposed development provides 279 parking spaces, it presents a technical shortfall of 277 parking spaces or 49.7% reduction.

Based on Bill 185, the proposed development is located within the MTSA area of Oshawa, which might not require to provide number of the parking spaces complied with the current zoning bylaw. Therefore, the proposed parking rate of **0.88 spaces per unit (or 0.3 spaces per unit for visitor and 0.55 spaces per unit for residential)** is reasonable and justified.

Bicycle Parking Review

Based on the City of Oshawa Parking Study by IBI Group (January 2021) recommended bicycle parking requirement, a total of 247 bicycle parking spaces (including long-term and short-term) are required for the proposed development. The proposed development provides 248 parking spaces which meets this requirement.

Transportation Demand Management Measures and Incentives

The TDM measures and incentives related to the proposed development have been assessed and recommended in Section 9 of this report to support active transportation and transit, to meet the objectives and requirements of the Region and City Transportation Impact Study policy.

Loading Requirement

The City's By-Law 60-94 was reviewed to determine the loading requirement for the proposed development, but there is no loading requirement for the residential. However, the proposed development provides a loading space.

Study Conclusions and Recommendations

Based on the assessment outlined in this Study, the following recommendations are provided:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- Provide direct shared pedestrian and cycling connections from the proposed development to Albert Street, Albany Street, where appropriate. For example, provide the main building entrances directly to the streets;
- The road improvement for active transportation mode is recommended for this area.

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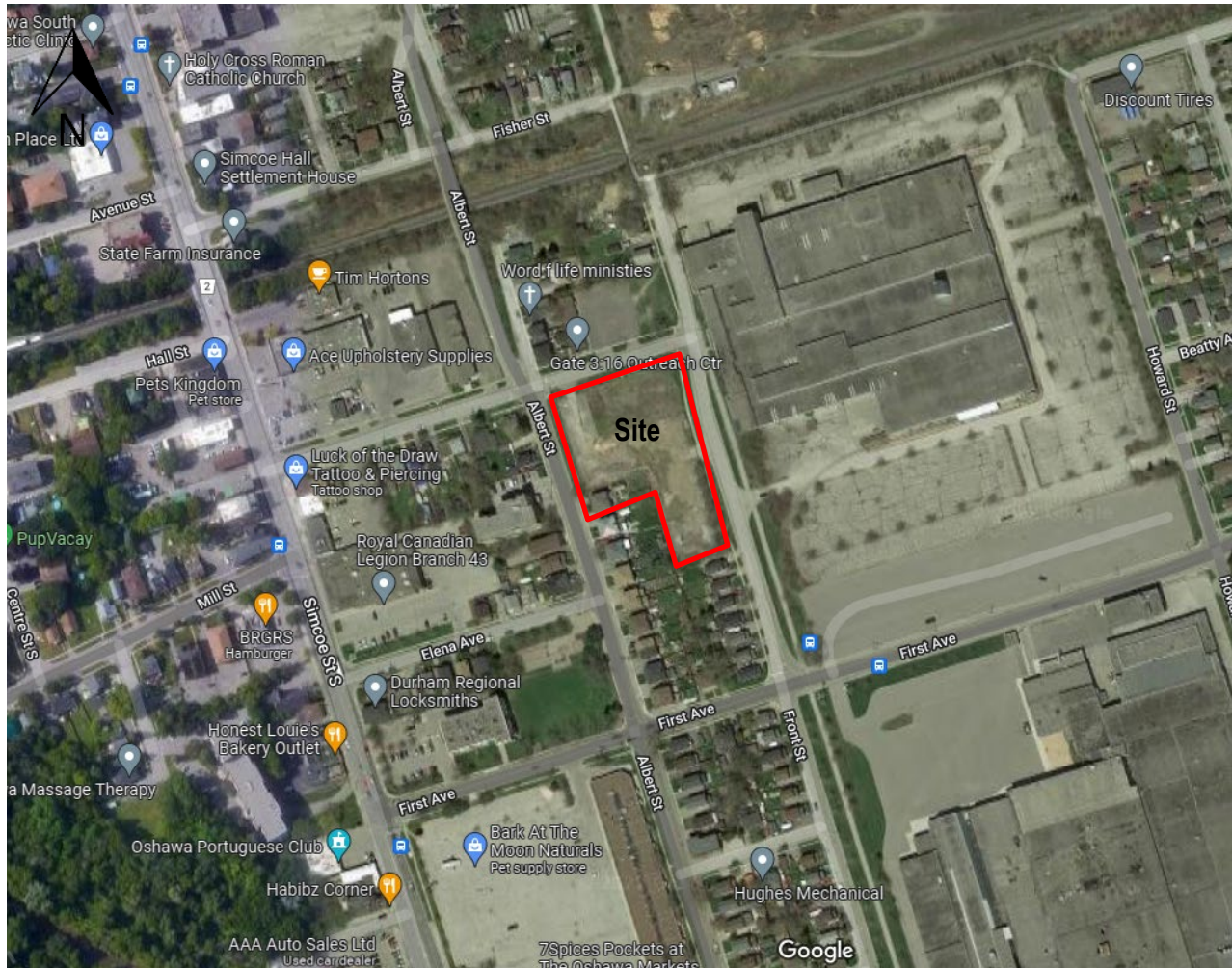
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1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Albany Street Investments Ltd. (the 'Client') to undertake a Transportation Impact Study in support of Official Plan Amendment and Zoning By-law Amendment applications. The subject site is located at 63 Albany Street, south-west corner of Albany Street and Albert Street, in the City of Oshawa.

The location of the proposed development is illustrated in **Figure 1**.

Figure 1 – Proposed Development Location



Source: Google Map

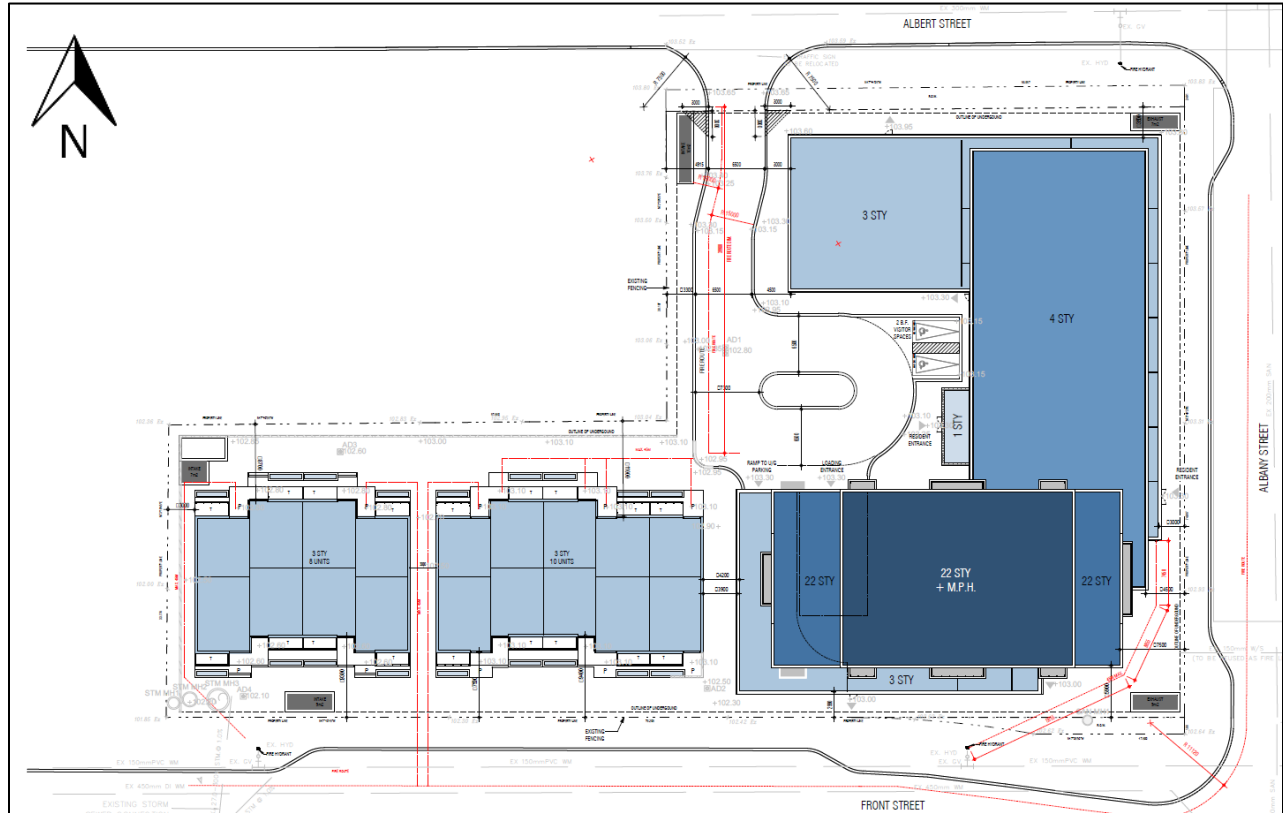
The existing site is currently occupied by one single house which will be demolished for future redevelopment of the site, and the rest of the land is vacant. The proposed development consists of high-rise residential building, with a total of 297 residential dwelling units, and 3-storey 18 townhouse units.

The proposed development will provide a total of 279 vehicle parking spaces and 248 bicycle parking spaces, inclusive of short-term and long-term spaces

As part of the proposed redevelopment of site, one full-movement accesses will be provided via Albert Street.

Figure 2 illustrates the proposed development conceptual site plan.

Figure 2 – Proposed Concept Site Plan



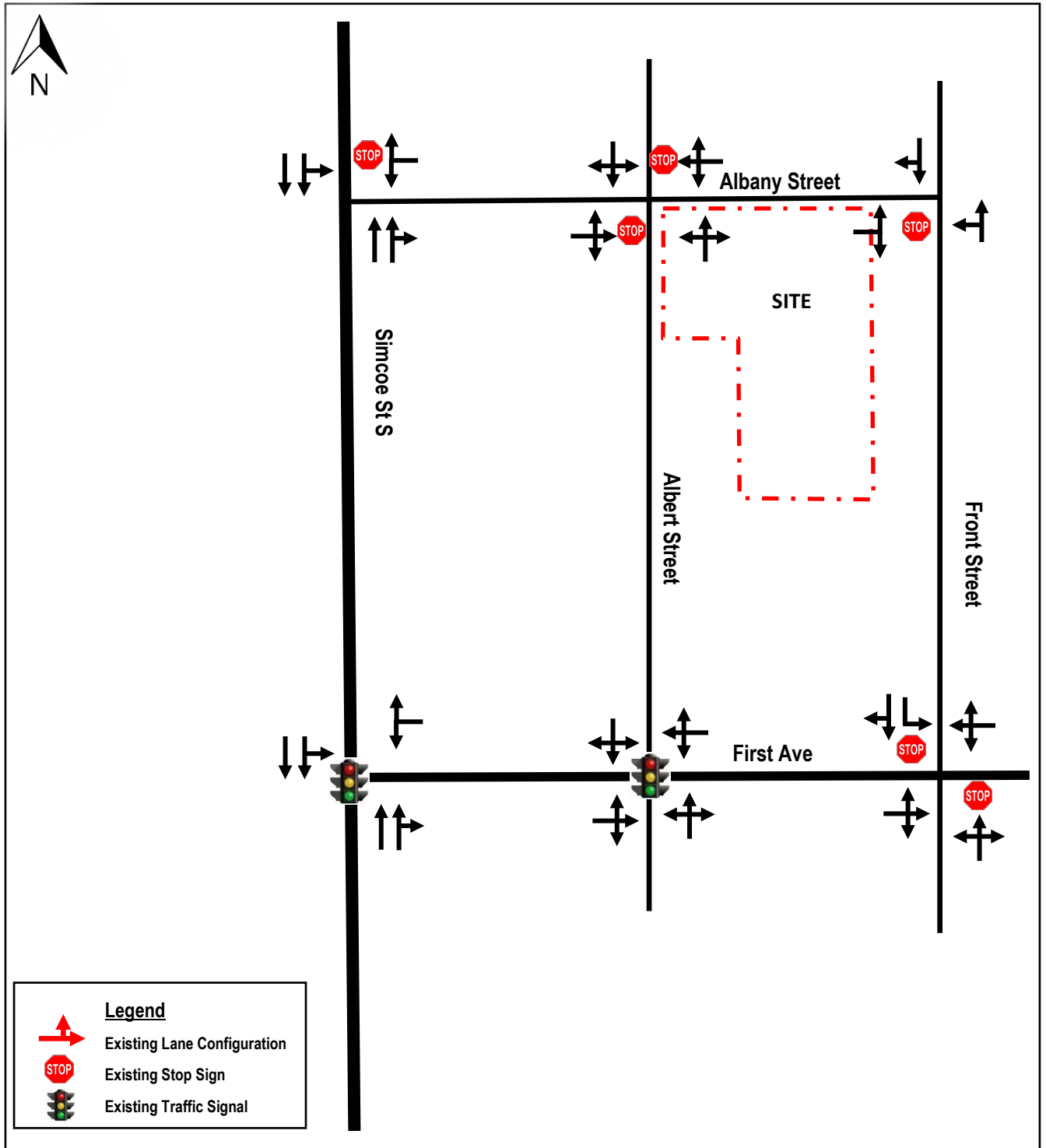
2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

The existing road network, lane configuration and existing traffic control for the study area are shown in **Figure 3** (Existing Lane Configurations). The details area described below:

- **Albert Street:** is a collector road that generally runs north-south near the subject area. It has an existing two-lane cross-section (1 travel lane per direction) and maintains a posted speed limit of 40 km/h near the subject site.
- **Albany Street:** is a local road that generally runs east-west near the subject area. It has an existing two-lane cross-section (1 travel lane per direction) and maintains a posted speed limit of 40 km/h near the subject site.
- **First Avenue:** is a collector road that generally runs east-west near the subject area under the jurisdiction of the City of Oshawa. It has an existing two-lane cross-section (1 travel lane per direction) and maintains a posted speed limit of 50 km/h near the subject site.
- **Simcoe Street South:** is a major arteria road that generally runs north-south near the subject area under the jurisdiction of the Region of Durham. It has an existing four-lane cross-section (2 travel lanes per direction) and maintains a posted speed limit of 50km/h near subject site.
- **Front Street:** is a local road that generally runs north-south near the subject area. It has two-lane cross section (1 travel lane per direction) and maintains a posted speed limit of 40 km/h near the subject site.

Figure 3 – Existing Lane Configuration and Traffic Control



2.2. Existing Active Transportation Network Assessment

Nextrans has conducted a comprehensive review of the existing active transportation network in the study area. **Figure 4** illustrates the existing active transportation network in the study area with a brief description of the network is provided below.

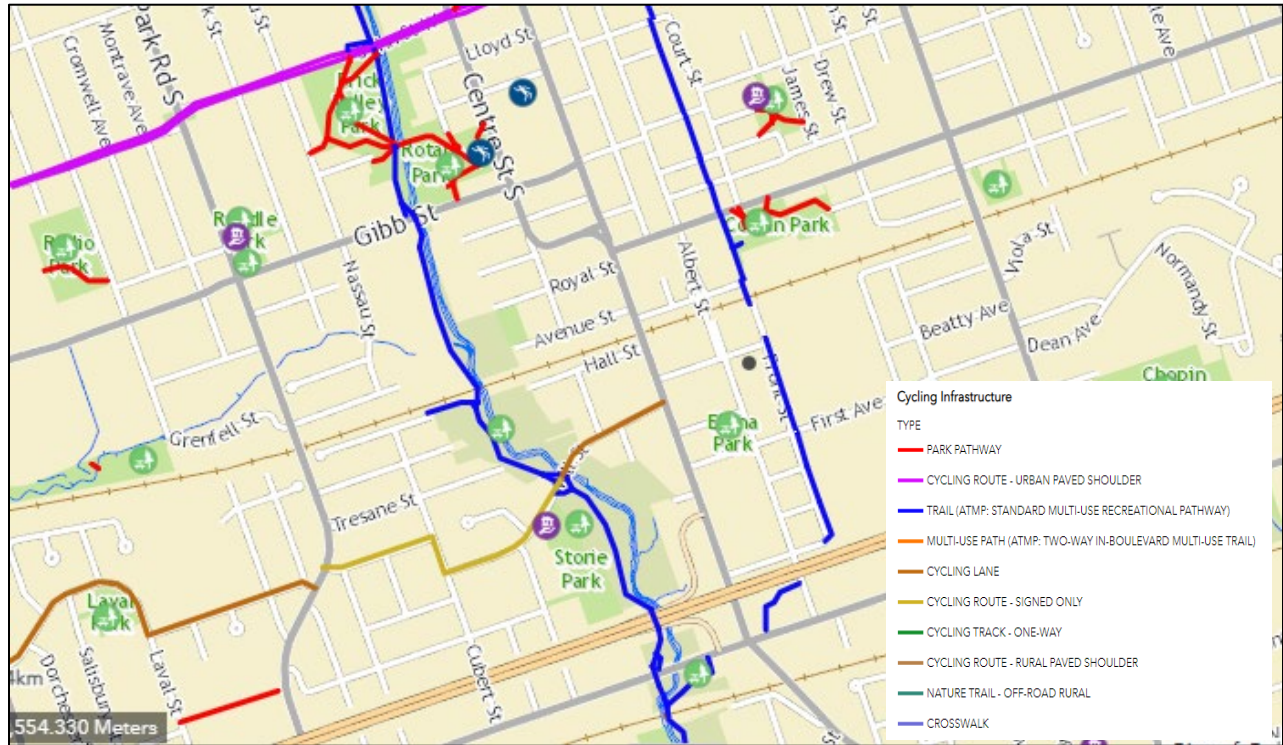
Walking

The area is currently well-served by a sufficient network of sidewalks, with sidewalks are available on both sides of all public roads. The sidewalks are reasonably maintained, no improvement is required.

Cycling

Under the existing conditions, there is the Michael Starr Trail along Front Street, from Bloor Street to Bruce Street.

Figure 4 – Existing Active Transportation Network in the Study Area



2.3. Existing Durham Region Transit System

The proposed development is located about 160m to the Bus 901 Pulse Simcoe, and N2 Blue Night Simcoe-Highway 2 at Simcoe Street S and Albany Street intersection, and about 300m to the GO Bus Route 88-Oshawa at First Avenue and Front Street intersection. The existing transit network in the area is illustrated in **Figure 5**. Durham Transit Service descriptions are provided below:

- **Bus 901 Pulse Simcoe** – 901 Pulse Simcoe bus route generally operates in the north-south direction, between Oshawa Central Terminal and Lakeview Park area. The service frequency is approximately 10 minutes during peak hours.
- **N2 Blue Night Simcoe-Highway 2:** N2 Blue Nigh Simcoe-Highway 2 bus route generally operates in the north-south direction, between Ontario Tech/Durham College North Campus and Simcoe Street & Wentworth Street area. The service frequency is approximately 30 minutes during night time hours.
- **GO Bus Route 88 Oshawa:** GO 88 Oshawa bus route generally operates in the north-south direction, between Peterborough and Toronto. The service frequency is approximately 30 minutes during the day.

Figure 5 – Existing Transit Network in the Study Area



2.3. Existing Traffic Volumes

Existing traffic volumes at the study area intersections were undertaken during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods for study intersections as following:

- Albany Street and Simcoe Street South (April 25, 2019)
- Simcoe Street South and First Street (April 25, 2019)
- Albany Street and Albert Street (December 14, 2021)
- Albert Street and First Avenue (December 14, 2021)
- Albany Street and Front Street (Oct 1, 2024)

- Front Street and First Avenue (Oct 1, 2024)

The signal timing plans for the signalized intersections were obtained from the Durham Region and incorporated into the analysis. Turning movement counts are summarized in **Appendix A**. The existing volumes are illustrated in **Figure 5**.

2.4. Existing Traffic Assessment

The existing volumes in **Figure 6** were analyzed using Synchro Version 11 software. It should be noted that the printouts for signalized intersections are based on Synchro Lanes, Volumes and Timings so that queues and more detailed information are provided. The detailed results are provided in **Appendix B** and summarized in **Table 1**.

Based on the intersection capacity analysis, under the existing traffic conditions, all the intersections considered are currently operating at acceptable levels of service, no improvement is required.

Table 1 – Existing Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue 95 th (m)	LOS (v/c)	Delay (s)	Queue 95 th (m)
Simcoe Street South and First Street (signalized)	Overall	A (0.35)	8.9		C (0.50)	7.4	
	WB – LT	C (0.49)	28.2	31.9	C (0.40)	28.7	27.4
	NB – TR	A (0.31)	5.0	35.1	A (0.29)	3.6	27.2
	SB - LT	A (0.31)	5.0	30.3	A (0.51)	5.1	54.1
Simcoe Street South and Albany Street (Unsignalized)	WB – LR	D (0.35)	29.3	12.1	D (0.27)	28.8	8.6
	SB - LT	A (0.01)	0.6	0.3	A (0.04)	1.1	0.9
Albert Street and Albany Street (Unsignalized)	EB - LTR	A (0.04)	9.5	1.1	A (0.08)	9.9	2.0
	WB – LTR	A (0.04)	9.7	1.1	B (0.04)	10.4	0.9
	NB – LTR	A (0.02)	2.5	0.5	A (0.04)	3.2	0.9
	SB - LTR	A (0.00)	0.7	0.1	A (0.00)	0.4	0.0
Albert Street and First Street (signalized)	Overall	B (0.24)	10.1		B (0.24)	10.1	
	EB - LTR	A (0.08)	8.0	8.0	A (0.11)	8.3	10.6
	WB – LTR	B (0.36)	10.1	29.6	A (0.28)	9.4	23.3
	NB – LTR	B (0.08)	11.2	8.7	B (0.17)	11.9	14.6
	SB - LTR	B (0.08)	11.2	8.5	B (0.13)	11.6	11.7
Front Street and Albany Street (unsignalized)	EB – LR	A (0.02)	8.7	0.4	A (0.03)	8.6	0.9
	NB - LT	A (0.02)	6.3	0.5	A (0.00)	6.7	0.4
Front Street and First Street (unsignalized)	EB – LTR	A (0.00)	0.3	0.1	A (0.00)	0.2	0.1
	WB – LTR	A (0.00)	0.1	0.1	A (0.00)	0.2	0.1
	NB – LTR	B (0.02)	10.7	0.5	B (0.01)	11.1	0.2
	SB – L	B (0.02)	11.8	0.4	B (0.04)	12.7	1.1
	SB - TR	A (0.01)	9.8	0.3	B (0.02)	10.6	0.6

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Central Oshawa GO Station

As part of the Lakeshore East GO Train Extension, a GO Station and multi-modal transportation hub is proposed midway between Simcoe Street South and Ritson Road South, and between Olive Avenue East and First Avenue. This GO station will integrate bus, rail and vehicle travel and spur revitalization of the surrounding active transportation (walking and cycling) neighbourhood. The proposed development is located adjacent to the west of the future GO Station.

3.2. Durham Scarborough Bus Rapid Transit Project

Metrolinx is working with Durham Region, Durham Region Transit (DRT), City of Toronto and the Toronto Transit Commission (TTC) on the planning and design of this rapid transit corridor. With rapid growth in this Region over the past decade, and an expectation for this growth to continue in the future- with approximately 215,000 residents and 66,000 jobs anticipated by 2041-travel demand along the corridor will continue to increase.

As the population grows, so will traffic and congestion. Bus rapid transit provides an alternative to car use, reducing traffic congestion, as well as greenhouse gas emissions.

Bus rapid transit was identified as the preferred transit technology to link Durham Region and the City of Toronto through the Durham-Scarborough Bus Rapid Transit Initial Business Case (IBC) and was identified in the 2041 Regional Transportation Plan.

The Durham-Scarborough Bus Rapid Transit project proposed approximately 36 kilometres of dedicated transit infrastructure, connecting Oshawa, Whitby, Ajax, Pickering and Scarborough and 49 BRT stop location are proposed. Simcoe is one and the last the stop in Oshawa.

3.3. Major Transit Station Area Study

The City of Oshawa has completed the Integrated Major Transit Area Study for Central Oshawa. The Central Oshawa M.T.S.A was identified by the Region of Durham through the Municipal Comprehensive Review of the Durham Regional Official Plan. The Integrated M.T.S.A Study is in response to the announced Lakeshore East GO Rail Corridor extension to Bowmanville and the planned Central Oshawa GO Station, at 500 Howard Stret, located in the core of the M.T.S.A, along the Canadian Pacific Belleville Mainline.

The overall study area is generally bound by John Street and Eulalie Avenue to the north, Ritson Road South to the east, Highway 401 to the south, and the Oshawa Creek Valley to the west.

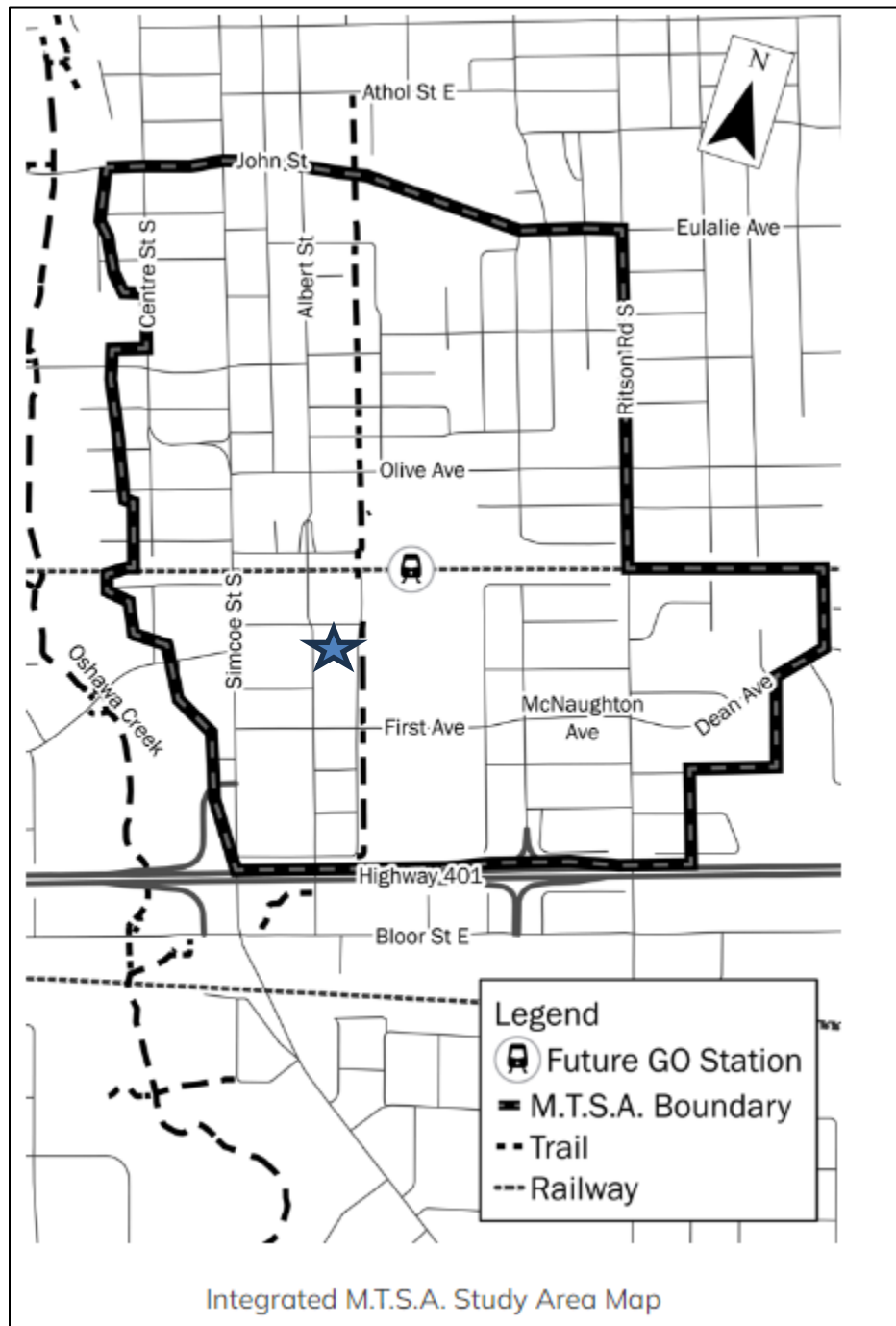
The purpose of the Integrated M.T.S.A study is the undertake:

- A master land use and urban design plan to advance appropriate development and intensification in the M.T.S.A
- An area specific Transportation Master Plan to identify and recommend a preferred transportation option that accommodates future development.

It is important to be noted that the proposed development is located within the MTSA area. The scope of the proposed development is to support the future transit station and other non-auto mode of transportation.

Figure 6 illustrates the MTSA map.

Figure 5 – MTSA Map



4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

For the purposes of this assessment, it is anticipated that the proposed development will be completed in 2029, therefore, horizon year 2029 and 5 horizon year - 2034 after building out will be carried out for the study analysis. This is consistent

with the Durham Region Mobility Plan and City of Oshawa Transportation Impact Study, as well as the direction from the approved term of reference.

The City of Oshawa has been advised that the north of Albert Street will be closed for the construction and will reopen in 2030, therefore the traffic to/from that segment will be reassigned in horizon year of 2029.

4.2. Future Background Corridor Growth

Historical data review and regression analysis were conducted in the area to determine a potential corridor traffic growth for the intersections considered in the analysis. The assessment indicates that there is a stagnant traffic growth trend on Simcoe Street S corridor. Therefore, NexTrans uses 1% growth rate per annum for the study intersections for conservative analysis. **Figure 7 and 8** illustrates the growth traffic of 2029 and 2034 horizon year.

4.3. Background Development Applications

A full review of active developments within the study area was conducted based on the information extracted from the City of Oshawa’s Development Portal and background transportation studies conducted in the area. **Table 2** below summarizes the background developments in the area.

Table 2 – Background Developments in the Area

Proposed Development Location	Development Descriptions
446 Simcoe St S	5 storey residential building with 50 apartment unit
64 Albany Street	100 apartment units
144-155 First Avenue	5450 residential units and 60,764 ft ² GFA of retail

For the purposes of this assessment, the background development traffic volume was provided by the City of Oshawa planner, detailed is in **Appendix C. Figure 9.1** illustrating the background traffic volumes from the background developments. **Figure 9.2** illustrates the estimated traffic volumes from the future GO Station, this traffic volumes has been extracted from 144-155 First Avenue traffic report for conservative analysis. The traffic from the future GO Station will be added in the future background 2034 as the station is expected to complete in 2030.

4.4. Future 2029 Background Traffic Assessment

The estimated 2029 future background traffic volumes are illustrated in **Figure 10** and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix D** and summarized in **Table 3**.

Table 3 – 2029 Future Background Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		LOS (v/c)	Delay (s)	Queue 95 th (m)	LOS (v/c)	Delay (s)	Queue 95 th (m)		
Simcoe Street South and First Street (signalized)	Overall	F	0.84	83.5		D	1.06	52.2	
	WB – LT	F	1.41	221.6	207.1	E	1.01	64.8	149.5
	NB – TR	B	0.43	10.7	45.2	B	0.44	10.7	45.1
	SB - LT	B	0.50	11.8	43.5	E	1.09	72.5	150.6
Simcoe Street South and Albany Street (Unsignalized)	WB – LR	D	0.55	34.5	24.4	F	0.69	67.4	32.3
	SB - LT	A	0.11	3.8	2.9	A	0.20	5.2	5.9
Albert Street and Albany Street (Unsignalized)	EB - LTR	A	0.11	9.8	2.9	B	0.20	11.2	6.0
	WB – LTR	B	0.12	11.4	3.4	B	0.12	12.1	3.3
	SB - LTR	A	0.06	7.3	1.6	A	0.09	7.4	2.2
Albert Street and First Street (signalized)	Overall	B	0.75	18.7		B	0.68	18.0	
	EB - LTR	A	0.14	8.5	13.0	B	0.33	10.0	27.1
	WB – LTR	B	0.71	16.2	74.0	B	0.57	12.9	51.6
	NB – LTR	C	0.78	26.9	69.5	C	0.82	29.1	79.2
	SB - LTR	B	0.09	11.3	8.9	B	0.14	11.7	12.1

Front Street and Albany Street (unsignalized)	EB – LR	A	0.04	8.8	1.0	A	0.10	8.9	2.5
	NB - LT	A	0.04	6.3	1.0	A	0.04	5.8	1.0
Front Street and First Street (unsignalized)	EB – LTR	A	0.05	2.4	1.2	A	0.13	3.3	3.5
	WB – LTR	A	0.01	0.4	0.3	A	0.04	1.3	0.9
	NB – LTR	D	0.47	26.4	19.1	F	0.65	63.5	29.1
	SB – L	C	0.04	16.2	1.1	D	0.14	30.2	3.8
	SB - TR	B	0.13	11.0	3.4	B	0.16	11.6	4.5

4.5. Future 2034 Background Traffic Assessment

The estimated 2034 future background traffic volumes are illustrated in **Figure 11** and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix D** and summarized in **Table 3**.

Table 4 – 2034 Future Background Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		LOS (v/c)		Delay (s)	Queue 95 th (m)	LOS (v/c)		Delay (s)	Queue 95 th (m)
Simcoe Street South and First Street (signalized)	Overall	F	0.89	85.5		E	1.11	64.5	
	WB – LT	F	1.44	232.9	211.7	E	1.06	77.3	157.7
	NB – TR	B	0.46	11.0	49.0	B	0.45	10.8	47.0
	SB - LT	B	0.58	13.1	49.6	F	1.14	92.0	159.8
Simcoe Street South and Albany Street (Unsignalized)	WB – LR	F	1.69	450.1	90.5	F	0.77	53.6	45.4
	SB - LT	A	0.45	12.2	18.9	A	0.13	3.6	3.6
Albert Street and Albany Street (Unsignalized)	EB - LTR	B	0.42	13.8	16.7	B	0.19	11.8	5.5
	WB – LTR	B	0.11	10.6	3.0	B	0.27	13.0	8.9
	NB – LTR	A	0.02	2.3	0.5	A	0.04	3.0	0.9
	SB - LTR	A	0.00	0.8	0.1	A	0.01	1.0	0.1
Albert Street and First Street (signalized)	Overall	C	0.82	24.7		B	0.70	18.4	
	EB - LTR	A	0.19	8.8	16.2	B	0.34	10.1	27.5
	WB – LTR	B	0.73	16.8	79.7	B	0.60	13.3	54.8
	NB – LTR	D	0.92	41.2	88.3	C	0.83	30.0	80.3
	SB - LTR	B	0.09	11.3	9.0	B	0.14	11.7	12.4
Front Street and Albany Street (unsignalized)	EB – LR	A	0.04	8.8	1.0	A	0.10	8.9	2.6
	NB - LT	A	0.04	6.2	1.0	A	0.04	5.8	1.0
Front Street and First Street (unsignalized)	EB – LTR	A	0.05	2.3	1.2	A	0.13	3.3	3.5
	WB – LTR	A	0.01	0.4	0.3	A	0.04	1.3	0.9
	NB – LTR	D	0.49	27.8	20.2	F	0.71	76.7	32.9
	SB – L	C	0.05	16.6	1.2	D	0.14	31.5	3.9
	SB - TR	B	0.13	11.2	3.5	B	0.19	12.2	5.6

Under the 2029 and 2034 future background traffic conditions, all the intersections considered are expected to operate at acceptable overall levels of service except for the intersection of Simcoe Street South and First Street, the westbound left/right movement, this is the result of increasing of the background development traffics in the area.

It is Nextrans’ opinion that physical improvements such as road widenings are not always the best solutions to solve congestion and delay at existing intersections as road widenings may create some capacity, however, this capacity will be utilized as soon as it becomes available to other drivers and support increased traffic usage. This called induced traffic demand. In addition, road widenings will also impact pedestrian and cyclist crossing distance at the intersection, which will result in operational and safety concerns for pedestrian and cyclist.

It is Nextrans’ opinion that the City and the Region must invest in public transit for the future transportation sustainability of the City of Oshawa and to shift the mode of transportation from single-occupant-vehicle trips to transit and active transportation trips. This has been effectively proven in larger cities in the Greater Toronto Area such as Toronto and Mississauga.

It is Nextrans’ opinion that the intersection overall levels of service for these intersections will get improve with signal timing plan optimization. In addition, as the traffic conditions are anticipated to change in the next 5 to 10 years, it intuitive that the City and the Region be required to review the signal timing plans periodically to ensure that the intersections are operating at their optimum conditions.

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the proposed development consists of high-rise residential building, with 297 residential dwelling units, and 3-storey 18 townhouse units, in total of 315 units.

The 2016 Transportation Tomorrow Survey (TTS), background transportation study trip rates, *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) were reviewed to estimate the modal split, trip distribution and trip generation for the proposed development.

5.2. Modes of Travel Assessment in the Area

Table 4 summarizes the travel mode split information, based on the review of the 2016 Transportation Tomorrow Survey data, for Traffic Zones 1214 and 1209. Given that not all traffic zones contain residential, and some contain both employment and residential, it is appropriate to review several traffic zones instead of just one Traffic Zone 1214. The detailed 2016 TTS data extraction is included in **Appendix E**.

Table 5 – Modes of Travel based on 2016 TTS Data for Traffic Zones

Type	Time	Trips Made by Traffic Zones 1214 and 1209				
		Auto Driver (including motorcycle)	Auto Passenger (including paid rideshare and taxi)	Transit	Cycle	Walk
Residential	AM Peak Period (6:00 – 9:00)	69%	15%	8%	6%	2%
	PM Peak Period (4:00 – 7:00)	61%	21%	10%	4%	4%

Based on the information outlines in the table above, for the residential land use, the predominant mode of travel in the area is auto mode, which account for nearly 69% during the morning and 61% during the afternoon peak periods.

5.3. Site Trip Generation

Table 5 summarizes the various trip generations in these studies.

It should be noted that for the ITE trip rates, the trip generation forecasts were undertaken using the information contained in the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE). For the purposes of this assessment, the ITE Land Use Codes (LUC) 222 “Multifamily Housing High-Rise Close to Rail Transit General Urban/Suburban” average rates have been utilized.

Table 6 – Site Trip Generation

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) LUC 222 General Urban	315 units	Auto Trip Rates	0.08	0.15	0.23	0.15	0.11	0.26
		Total Auto Trip	23	49	72	47	35	82
		Walk+bike+transit Trip Rate	0.15	0.02	0.17	0.05	0.10	0.15
		Walk+bike+transit Trip	48	6	54	16	31	47

Based on the analysis noted above, the proposed development is expected to generate:

- 72 total two-way auto trips (24 inbound and 49 outbound) and 82 total two-way auto trips (47 inbound and 35 outbound) during the AM and PM peak hours, respectively; and
- 54 total two-way walks+bike+transit trips (48 inbound and 6 outbound) and 47 total two-way walk+bike+transit trips (16 inbound and 31 outbound) during the AM and PM peak hours, respectively.

5.4. Site Trip Distribution and Assignment

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for Traffic Zones 1214 and 1209 in order to estimate the general trip distribution for the proposed development. **Table 6** summarizes the planning district/traffic zones distribution based on the 2016 TTS data, with **Table 7** summarizing the site trip assignment based on the 2016 TTS and existing transportation network in the area for the residential component of proposed development.

Table 7 – Site Trip Distribution

Mode	City of Toronto	York Region	Peel Region	Durham Region	Total
Auto	2%	6%	4%	88%	100%

Table 8 – Site Trip Assignment

General Direction (To/From)	Residential
	Auto
North (Simcoe Street)	45%
South (Simcoe Street)	22%
East (First Street)	6%
West (Simcoe Street to 401)	28%
Total	100%

Figure 12 illustrates the development generated traffic volumes. It should be noted that the auto site trip distribution and assignment have been taken into consideration the TTS information, existing turning restrictions, existing intersection operations and capacity constraints.

6.0 FUTURE TOTAL TRAFFIC CONDITIONS

6.1. Future 2029 Total Traffic Assessment for Auto Mode

The estimated future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 13** and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix G** and summarized in **Table 9** for the study intersections.

Table 9 – 2029 Future Total Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		LOS (v/c)		Delay (s)	Queue 95 th (m)	LOS (v/c)		Delay (s)	Queue 95 th (m)
Simcoe Street South and First Street (signalized)	Overall	F	0.85	89.0	213.0	E	1.08	55.4	155.8
	WB – LT	F	1.45	235.4		E	1.05	74.2	45.7
	NB – TR	B	0.43	10.7	45.6	B	0.44	10.8	45.7
	SB - LT	B	0.51	11.9	43.6	E	1.10	75.0	151.1
Simcoe Street South and Albany Street (Unsignalized)	WB – LR	E	0.65	40.0	33.1	F	0.84	93.3	44.4
	SB - LT	A	0.14	4.5	3.7	A	0.25	6.3	8.0
Albert Street and Albany Street (Unsignalized)	EB - LTR	B	0.13	10.0	3.6	B	0.23	11.4	7.1
	WB – LTR	B	0.14	12.2	3.8	B	0.13	12.7	3.5
	SB - LTR	A	0.08	7.4	2.2	A	0.10	7.4	2.6
Albert Street and First Street (signalized)	Overall	B	0.75	18.9		B	0.69	18.2	
	EB - LTR	A	0.16	8.6	13.9	B	0.36	10.3	28.9
	WB – LTR	B	0.71	16.3	74.4	B	0.57	12.9	52.1
	NB – LTR	C	0.80	27.9	70.3	C	0.83	29.9	79.7

	SB - LTR	B	0.11	11.5	10.0	B	0.15	11.8	12.9
Front Street and Albany Street (unsignalized)	EB - LR	A	0.04	8.8	1.0	A	0.10	8.9	2.5
	NB - LT	A	0.04	6.3	1.0	A	0.04	5.8	1.0
Front Street and First Street (unsignalized)	EB - LTR	A	0.05	2.3	1.2	A	0.13	3.3	3.5
	WB - LTR	A	0.01	0.4	0.3	A	0.04	1.3	0.9
	NB - LTR	D	0.47	26.7	19.4	F	0.66	64.6	29.5
	SB - L	C	0.05	16.3	1.1	D	0.14	30.5	3.8
	SB - TR	B	0.13	11.1	3.5	B	0.16	11.7	4.5
Alber Street and Site Access (unsignalized)	WB - LR	A	0.07	9.8	1.7	B	0.05	10.1	1.3
	SB - LT	A	0.01	1.2	0.3	A	0.03	1.7	0.6

6.2. Future 2034 Total Traffic Assessment for Auto Mode

The estimated future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 14** and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix G** and summarized in **Table 10** for the study intersections.

Table 10 – 2034 Future Total Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		LOS (v/c)	Delay (s)	Queue 95 th (m)	LOS (v/c)	Delay (s)	Queue 95 th (m)		
Simcoe Street South and First Street (signalized)	Overall	F	0.91	91.3		E	1.11	65.7	
	WB - LT	F	1.47	248.1	217.5	E	1.06	77.3	157.7
	NB - TR	B	0.47	11.1	49.6	B	0.45	10.9	47.7
	SB - LT	B	0.58	13.1	49.8	F	1.15	94.9	160.5
Simcoe Street South and Albany Street (Unsignalized)	WB - LR	F	1.92	532.1	114.2	F	0.90	79.0	61.6
	SB - LT	B	0.48	12.9	20.8	A	0.19	4.8	5.4
Albert Street and Albany Street (Unsignalized)	EB - LTR	C	0.48	15.6	20.9	B	0.22	12.1	6.6
	WB - LTR	B	0.12	11.2	3.4	B	0.29	13.7	9.7
	NB - LTR	A	0.04	3.6	1.0	A	0.05	3.6	1.2
	SB - LTR	A	0.00	0.8	0.1	A	0.01	1.0	0.1
Albert Street and First Street (signalized)	Overall	C	0.82	25.4		B	0.71	18.6	
	EB - LTR	A	0.21	8.9	17.2	B	0.37	10.4	29.5
	WB - LTR	B	0.73	16.9	80.5	C	0.60	13.4	55.3
	NB - LTR	D	0.94	43.7	89.1	B	0.84	30.9	80.8
	SB - LTR	B	0.11	11.5	10.2	B	0.16	11.8	13.3
Front Street and Albany Street (unsignalized)	EB - LR	A	0.04	8.8	1.0	A	0.10	8.9	2.6
	NB - LT	A	0.04	6.2	1.0	A	0.04	5.8	1.0
Front Street and First Street (unsignalized)	EB - LTR	A	0.05	2.3	1.2	A	0.13	3.3	3.6
	WB - LTR	A	0.01	0.4	0.3	A	0.04	1.3	0.9
	NB - LTR	D	0.49	28.0	20.4	F	0.72	78.2	33.3
	SB - L	C	0.05	16.7	1.2	D	0.15	31.7	4.0
	SB - TR	B	0.13	11.2	3.5	B	0.19	12.3	5.6
Alber Street and Site Access (unsignalized)	WB - LR	A	0.06	9.4	1.6	B	0.05	10.0	1.3
	SB - LT	A	0.01	1.8	0.3	A	0.03	2.1	0.6

Under the 2029 and 2034 future total traffic conditions, similar to the future background condition, all the intersections considered are expected to operate at acceptable overall levels of service except for the intersection of Simcoe Street South and First Street, the westbound left/right movement, this is the result of increasing of the background development traffics in the area; and the intersection of Simcoe Street and Albany Street which the westbound left/right is expected with critical level of service F, this is typical for the unsignalized intersection, the movement from the minor road to the major road has to wait for clear traffic to make the turn.

It is Nextrans' opinion that physical improvements such as road widenings are not always the best solutions to solve congestion and delay at existing intersections as road widenings may create some capacity, however, this capacity will be utilized as soon as it becomes available to other drivers and support increased traffic usage. This called induced traffic demand. In addition, road widenings will also impact pedestrian and cyclist crossing distance at the intersection, which will result in operational and safety concerns for pedestrian and cyclist. NexTrans only recommends the active transportation to be improved in the future to support the future Go Station.

It is Nextrans’ opinion that the City and the Region must invest in public transit for the future transportation sustainability of the City of Oshawa and to shift the mode of transportation from single-occupant-vehicle trips to transit and active transportation trips. This has been effectively proven in larger cities in the Greater Toronto Area such as Toronto and Mississauga.

It is Nextrans’ opinion that the intersection overall levels of service for these intersections will get improve with signal timing plan optimization. In addition, as the traffic conditions are anticipated to change in the next 5 to 10 years, it intuitive that the City and the Region be required to review the signal timing plans periodically to ensure that the intersections are operating at their optimum conditions.

The analysis indicates that the proposed access is expected to operate at acceptable levels of service with minimum delays or queues. The proposed development has negligible impacts on the existing road network.

NexTrans has run the signal warrant for the intersection of Simcoe Street South and Albany Street, the analysis indicates that this intersection is not warranted, details is in **Appendix G**.

7.0 SITE PLAN REVIEW

7.1. Loading Requirement

As indicated, the proposed development consists of high-rise residential building, with a total of 297 residential dwelling units and 3-storey 18 townhouse units. The City’s By-Law 60-94 was reviewed to determine the loading requirement for the proposed development, but there is no loading requirement for the residential. However, the proposed development provides a loading space.

The vehicle turning templates (AutoTURN software) is provided in to demonstrate the accessibility for the types of vehicles that will access the site.

7.2. Proposed Site Access

As part of the proposed redevelopment of site, one full movement access is provided via Albert Street.

The analysis indicates that the site accesses are expected to operate at acceptable levels of service with minimum delay or queue.

8.0 PARKING ASSESSMENT

8.1. Vehicle Parking Requirement

The parking requirement for the proposed development based on the City of Oshawa’s Zoning By-Law 60-94 is summarized in **Table 11**.

Table 11 – City of Oshawa Zoning By-law No. 60-94 Vehicle Parking Requirements

Land Use	No. of Unit / GFA	Parking Rates	Parking Requirement	Parking Provided
Residential – Apartment Condominium	297 units	1.45 per unit plus 0.3 per unit for visitor	520 spaces	279 spaces
Residential – Block Townhouse	18 units	1.65 per unit plus 0.35 per unit for visitor	36 spaces	

Based on the City’s Zoning By-Law 60-94, a total of 556 vehicle parking spaces are required for the proposed development (including resident, visitor parking spaces). The proposed development provides 279 parking spaces, it presents a technical shortfall of 277 parking spaces or 49.7% reduction.

8.2. Recommended Parking Rates for the Proposed Development

As indicated in Section 3.2, the proposed development is located close to several existing Durham bus service, future GO Train Station. In addition, the proposed development is located within the MTSA area, which illustrates in **Figure 6**.

According to Bill 185, Royal Assent – June 6th, 2024, which indicates that:

“5 (1) Paragraph 6 of subsection 34 (1) of the Act is amended by striking out “For requiring” at the beginning and substituting “Subject to subsection (1.1), for requiring”.

(2) Section 34 of the Act is amended by adding the following subsections: Restriction, parking facilities

(1.1) Despite paragraph 6 of subsection (1), a zoning by-law may not require an owner or occupant of a building or structure to provide and maintain parking facilities, other than parking facilities for bicycles, on land that is not part of a highway and that is located within,

(a) a protected major transit station identified in accordance with subsection 16 (15) or (16);

(b) an area delineated in the official plan of the municipality surrounding and including an existing or planned higher order transit station or stop, within which area the official plan policies identify the minimum number of residents and jobs, collectively, per hectare that are planned to be accommodated, but only if those policies are required to be included in the official plan to conform with a provincial plan or be consistent with a policy statement issued under subsection 3 (1); or

(c) any other area prescribed for the purposes of clause 16 (22) (c).”

The proposed development is located within the MTSA area of Oshawa, which might not require to provide number of the parking spaces complied with the current zoning bylaw. Therefore, the proposed parking rate of **0.88 spaces per unit(or 0.3 spaces per unit for visitor and 0.55 spaces per unit for residential)** is reasonable and justified.

8.3. Bicycle Parking Requirement

NexTrans reviewed the City of Oshawa Parking Study by IBI Group (January 2021) recommended bicycle parking requirement for the proposed development, **Table 12** summarizes the parking requirement details.

Table 12 – City of Oshawa Parking Study by IBI Group (January 2021) Bicycle Parking Requirements

Land Use	No. of Unit / GFA	Parking Rates	Parking Requirement	Parking Provided
Multi – unit Residential	315 units	Long-term: 0.68 space per unit Short-term: 0.1 per unit	215 long-term spaces 32 short-term spaces	210 long-term spaces 38 short-term spaces

Based on the City of Oshawa Parking Study by IBI Group (January 2021) recommended bicycle parking requirement, a total of 247 bicycle parking spaces (including long-term and short-term) are required for the proposed development. The proposed development provides 248 parking spaces which meets this requirement.

9.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. It is intended help reduce single-occupant auto use. Potential TDM measures may include but not limited to: TDM supportive land use, bicycle and pedestrian programs and facilities, public transit improvements, preferential treatments for buses and high occupancy vehicles (if applicable), ridesharing, and employee incentives.

Based on the review of the context of the proposed development in relation to the TDM requirements in the Region and City Transportation Impact Study guidelines, the TDM measures and incentives are recommended for the proposed development and the details are below:

Table 13 – Recommended TDM Measures for the Proposed Development

Category	TDM Measures or NexTrans Recommendations	Recommended Actions	Responsibility
Cycling and Walking	<ul style="list-style-type: none"> • Pedestrian Connections • Cycling Connections • Ped/cycling connections to transit facilities • Internal ped/cycling circulation • Active transportation network/fine-grid • Bicycle parking 	<ul style="list-style-type: none"> • The proposed development provides direct shared pedestrian and cycling connection to public streets. • The proposed development provides bicycle parking space per bylaw requirement and also provide repair station per requirement. 	<ul style="list-style-type: none"> • Applicant
Transit	<ul style="list-style-type: none"> • Transit incentives (i.e. PRESTO cards) • Information packages (DRT maps, GO schedules, cycling maps) • Communication strategy and physical location to deliver PRESTO cards and information packages 	<ul style="list-style-type: none"> • The amount of transit incentive will be provided for 3 months value only per unit, due to transit facility and transit headway in the area is limited. The estimate cost is \$154/ pass • The applicant shall coordinate with York Region to deliver and promote the Transit Incentive and New Resident Information Packages programs. • Provide a television at lobby for real time transit. 	<ul style="list-style-type: none"> • Applicant
Parking	<ul style="list-style-type: none"> • Parking Reduction • Membership with Smart Commute 	<ul style="list-style-type: none"> • Consider unbundle parking sale with unit sale • Provide the Smart Commute information such as website to employee/resident and being membership with approximately cost 1000\$ per year, will provide 1 year membership only. 	<ul style="list-style-type: none"> • Applicant • Applicant
Monitoring Program/ Report	<ul style="list-style-type: none"> • The applicant will undertake the TDM Monitoring Follow-up Survey with residents two years after the Initial Surveys and report back to the City staff. 	<ul style="list-style-type: none"> • The Applicant shall coordinate with City's sustainable Transportation Coordinator for list of follow-up survey question. Securities of \$2,500 are required to undertake the Follow-up Survey. 	<ul style="list-style-type: none"> • Applicant

10.0 CONCLUSIONS / FINDINGS

10.1. Study Conclusions

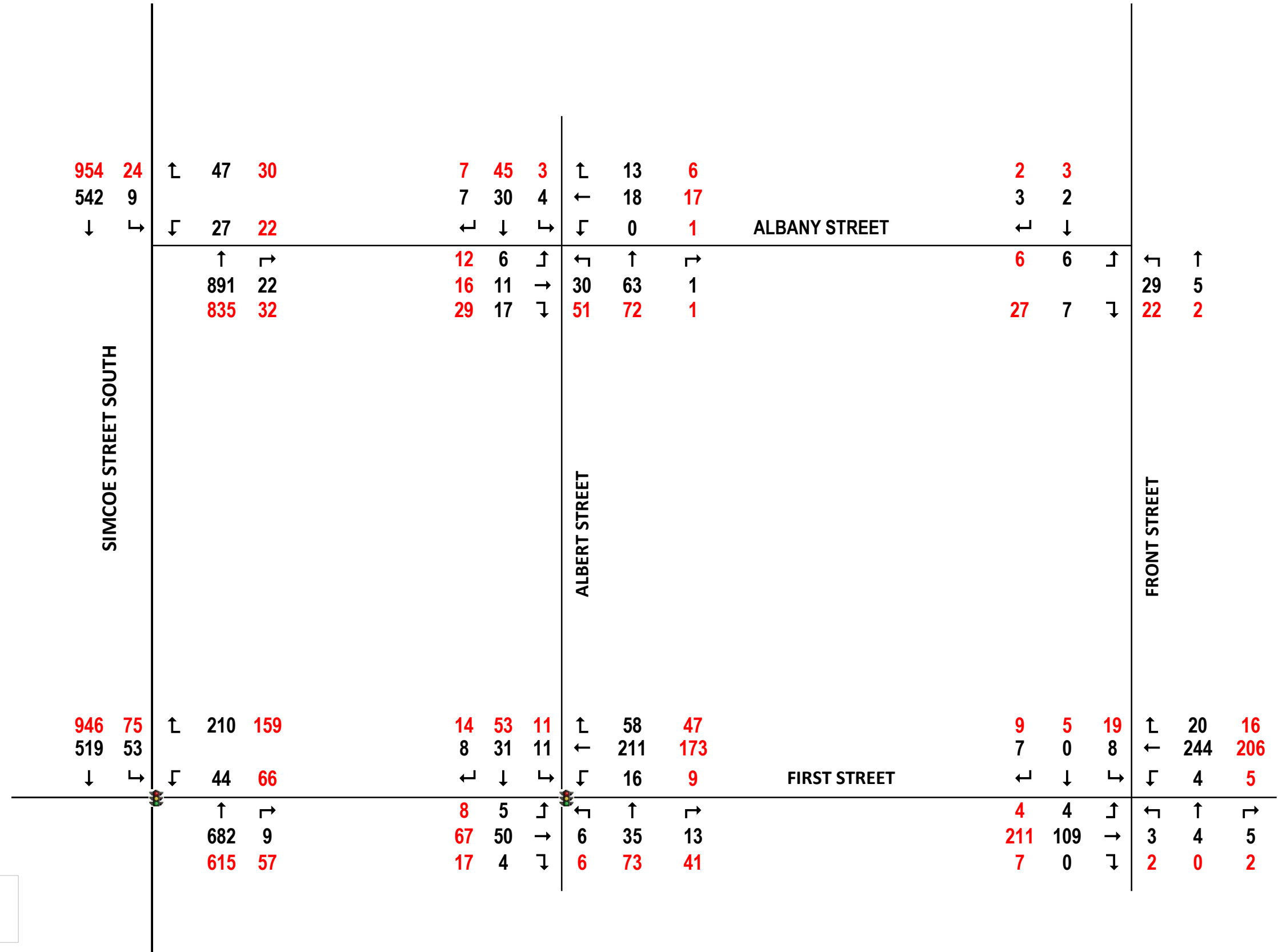
The findings and conclusions of the analysis are as follows:

- The proposed development is expected to generate:
 - 72 total two-way auto trips (24 inbound and 49 outbound) and 82 total two-way auto trips (47 inbound and 35 outbound) during the AM and PM peak hours, respectively; and
 - 54 total two-way walks+bike+transit trips (48 inbound and 6 outbound) and 47 total two-way walk+bike+transit trips (16 inbound and 31 outbound) during the AM and PM peak hours, respectively.
- Under the existing, all the intersections considered are expected to operate at acceptable levels of service.
- Under the 2029 and 2034 future background traffic conditions, and the future total condition, all the intersections considered are expected to operate at acceptable overall levels of service except for the intersection of Simcoe Street South and First Street, the westbound left/right movement, this is the result of increasing of the background development traffics in the area; and the intersection of Simcoe Street and Albany Street which the westbound left/right is expected with critical level of service F, this is typical for the unsignalized intersection, the movement from the minor road to the major road has to wait for clear traffic to make the turn.
- It is Nextrans' opinion that physical improvements such as road widenings are not always the best solutions to solve congestion and delay at existing intersections as road widenings may create some capacity, however, this capacity will be utilized as soon as it becomes available to other drivers and support increased traffic usage. This called induced traffic demand. In addition, road widenings will also impact pedestrian and cyclist crossing distance at the intersection, which will result in operational and safety concerns for pedestrian and cyclist. NexTrans only recommends the active transportation to be improved in the future to support the future Go Station.
- NexTrans has run the signal warrant for the intersection of Simcoe Street South and Albany Street, the analysis indicates that this intersection is not warranted.
- The analysis indicates that the proposed access is expected to operate at acceptable levels of service with minimum delays or queues. The proposed development has negligible impacts on the existing road network.
- Based on the City's Zoning By-Law 60-94, a total of 556 vehicle parking spaces are required for the proposed development (including resident, visitor parking spaces). The proposed development provides 279 parking spaces, it presents a technical shortfall of 277 parking spaces or 49.7% reduction.
- Based on Bill 185, the proposed development is located within the MTSA area of Oshawa, which might not require to provide number of the parking spaces complied with the current zoning bylaw. Therefore, the proposed parking rate of **0.88 spaces per unit(or 0.3 spaces per unit for visitor and 0.55 spaces per unit for residential)** is reasonable and justified.
- Based on the City of Oshawa Parking Study by IBI Group (January 2021) recommended bicycle parking requirement, a total of 247 bicycle parking spaces (including long-term and short-term) are required for the proposed development. The proposed development provides 248 parking spaces which meets this requirement.

10.2. Study Recommendations

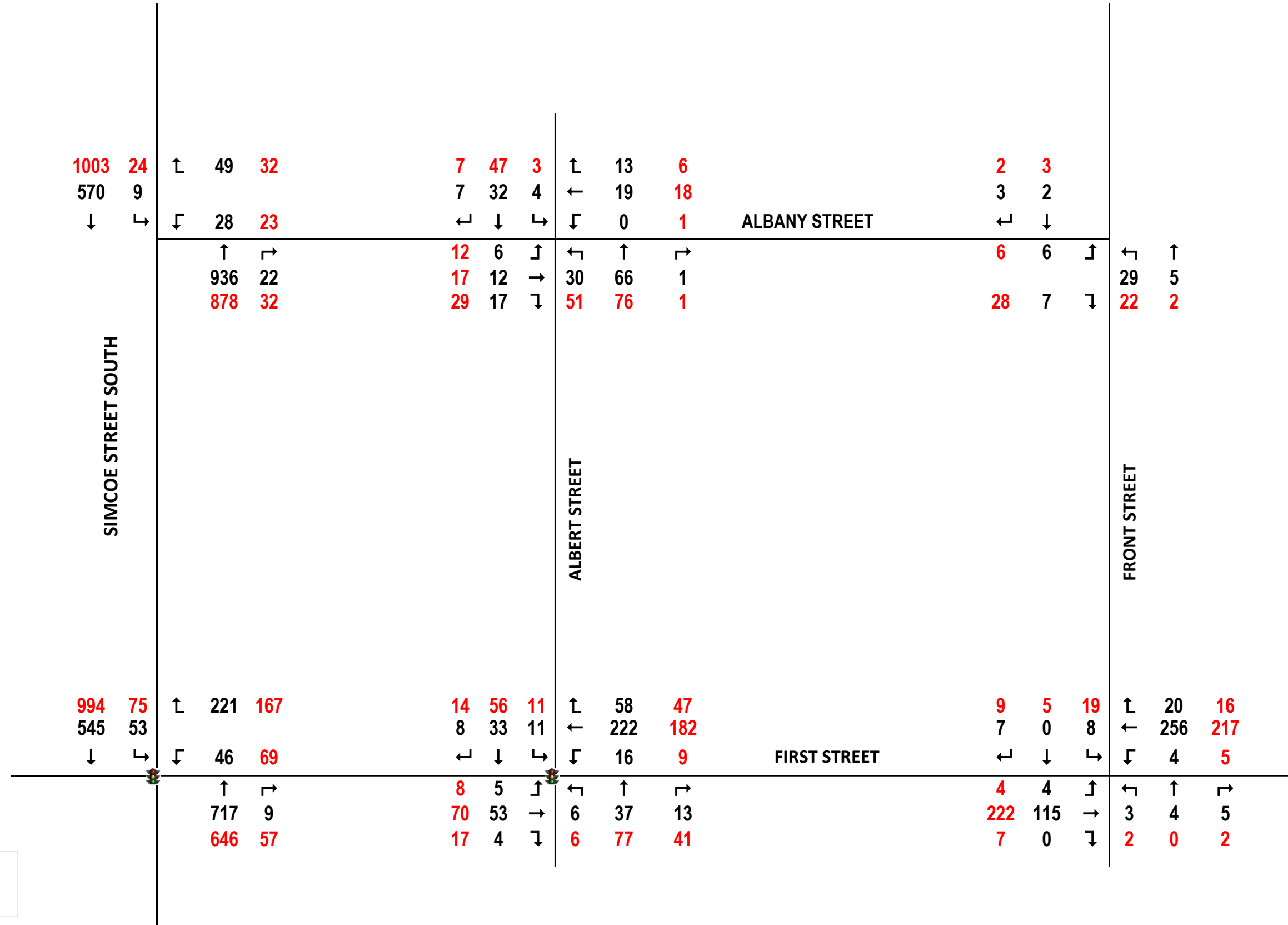
Based on the assessment outlined in this Study, the following recommendations are provided:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- Provide direct shared pedestrian and cycling connections from the proposed development to Albert Street, Albany Street, where appropriate. For example, provide the main building entrances directly to the streets;
- The road improvement for active transportation mode is recommended for this area.



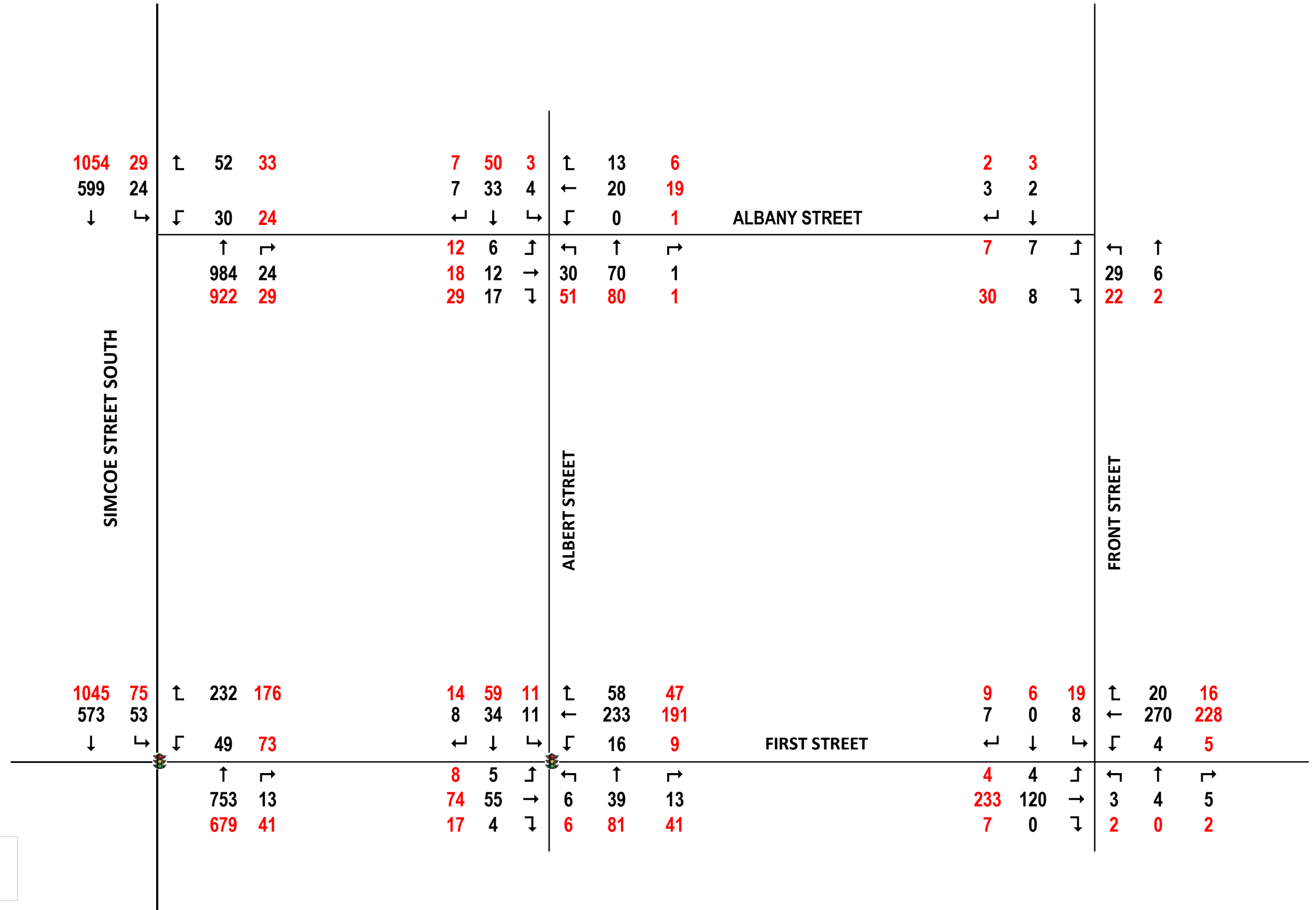
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 XX - PM TRAFFIC VOLUME

Figure 6 - Existing Traffic Volumes



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Figure 7 - 2029 Growth Traffic Volumes



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Figure 8 - 2029 Growth Traffic Volumes

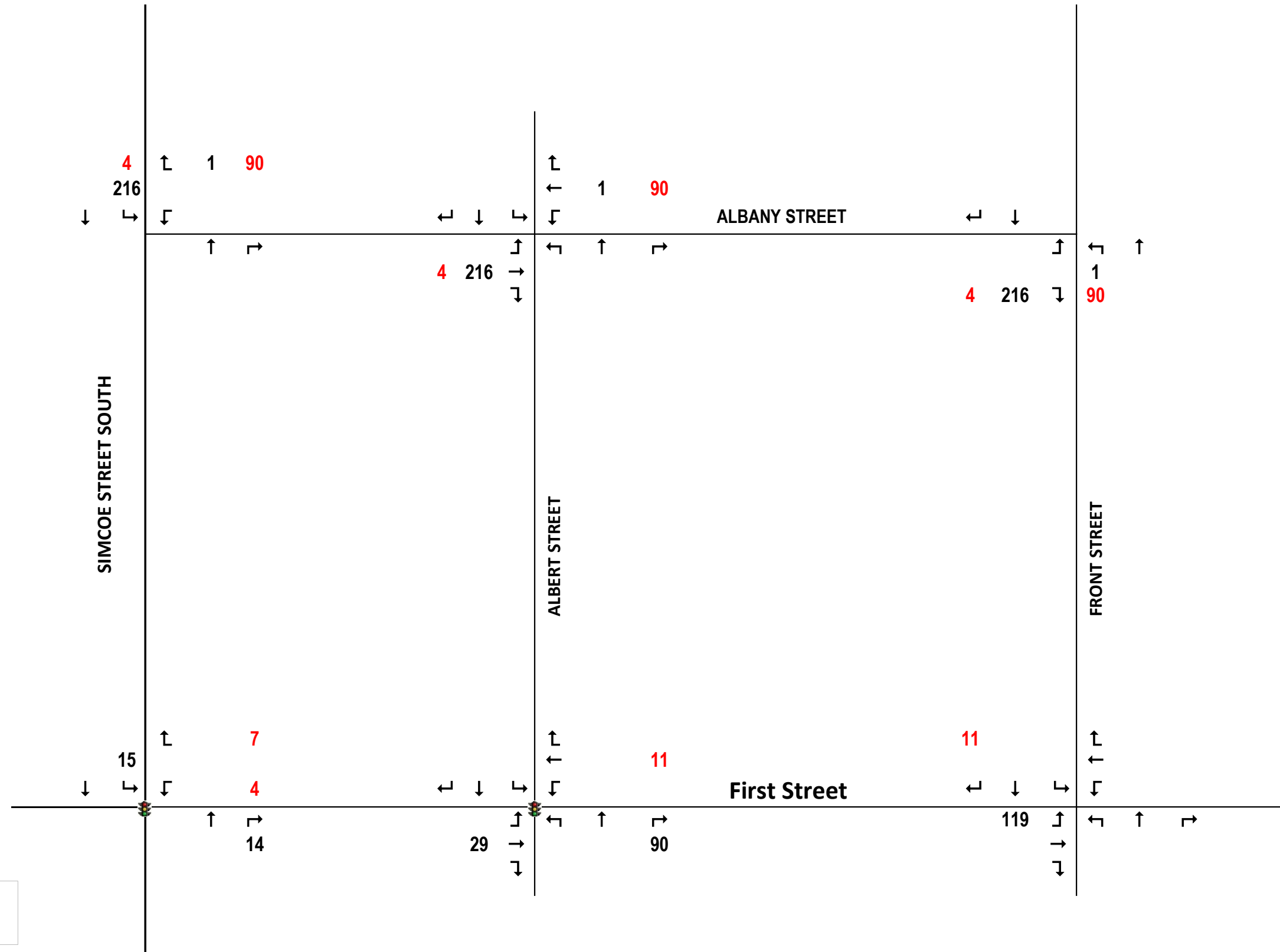


Figure 9.2 - Background Traffic Volumes for Future Go Station

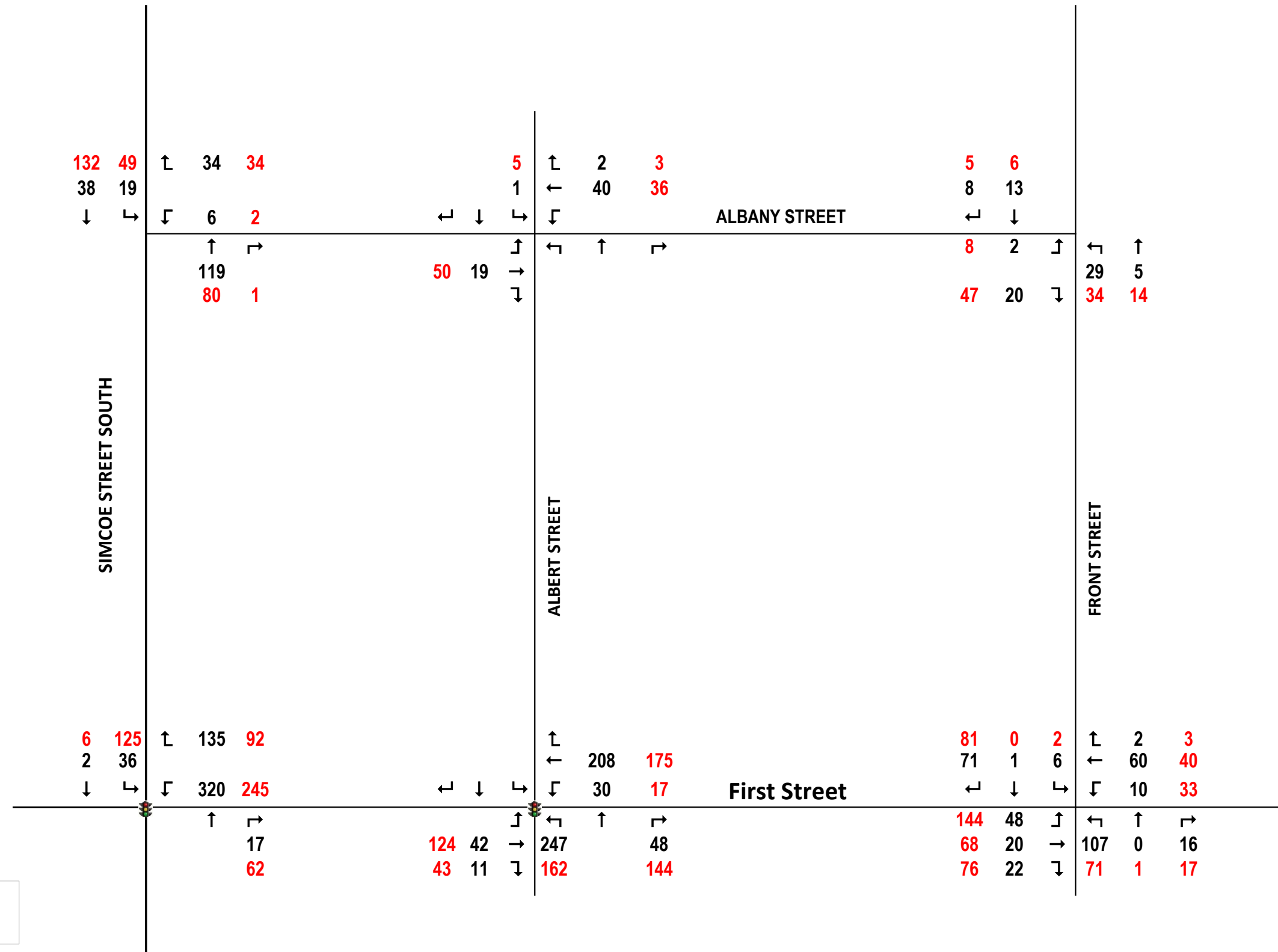
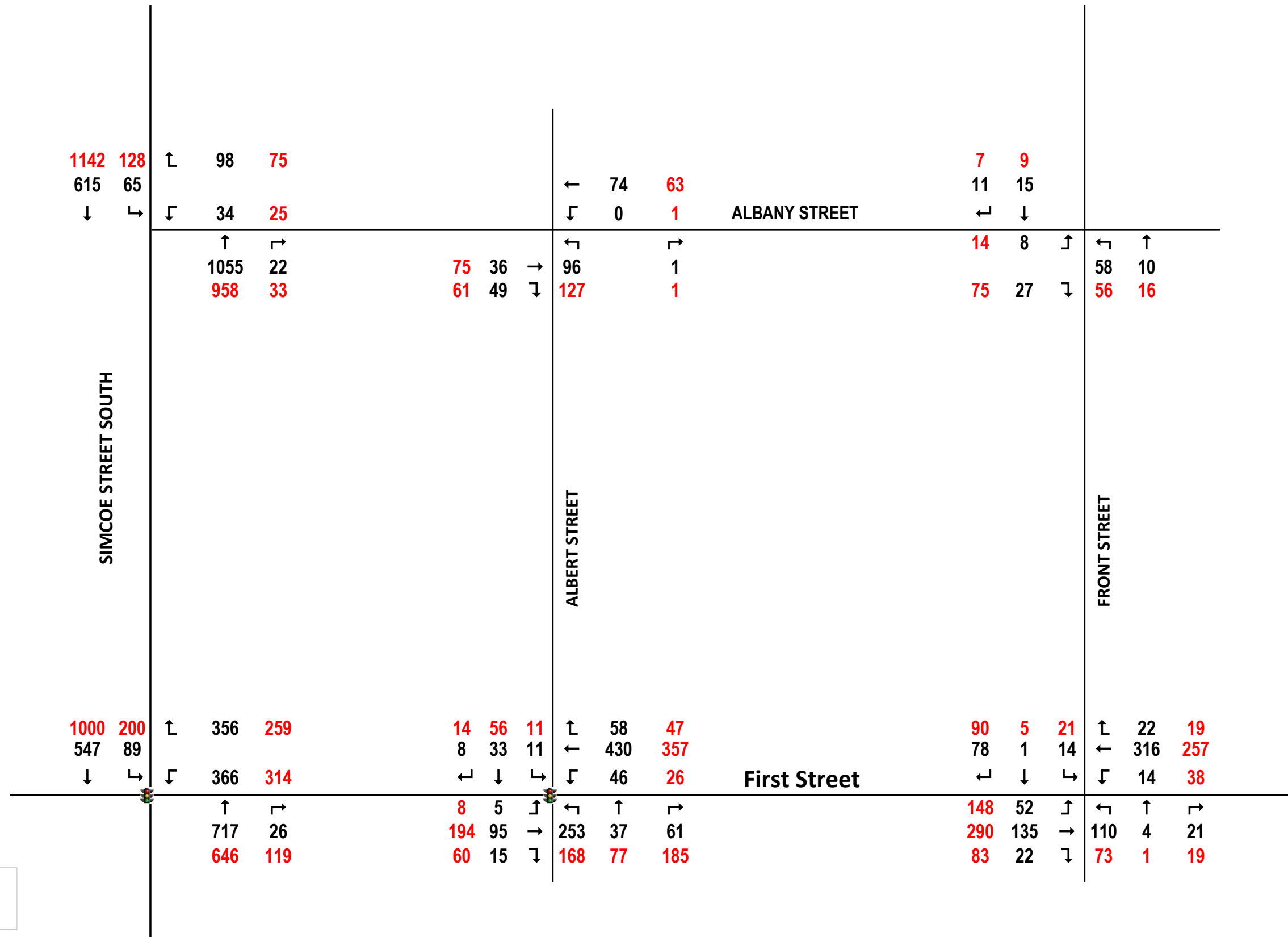
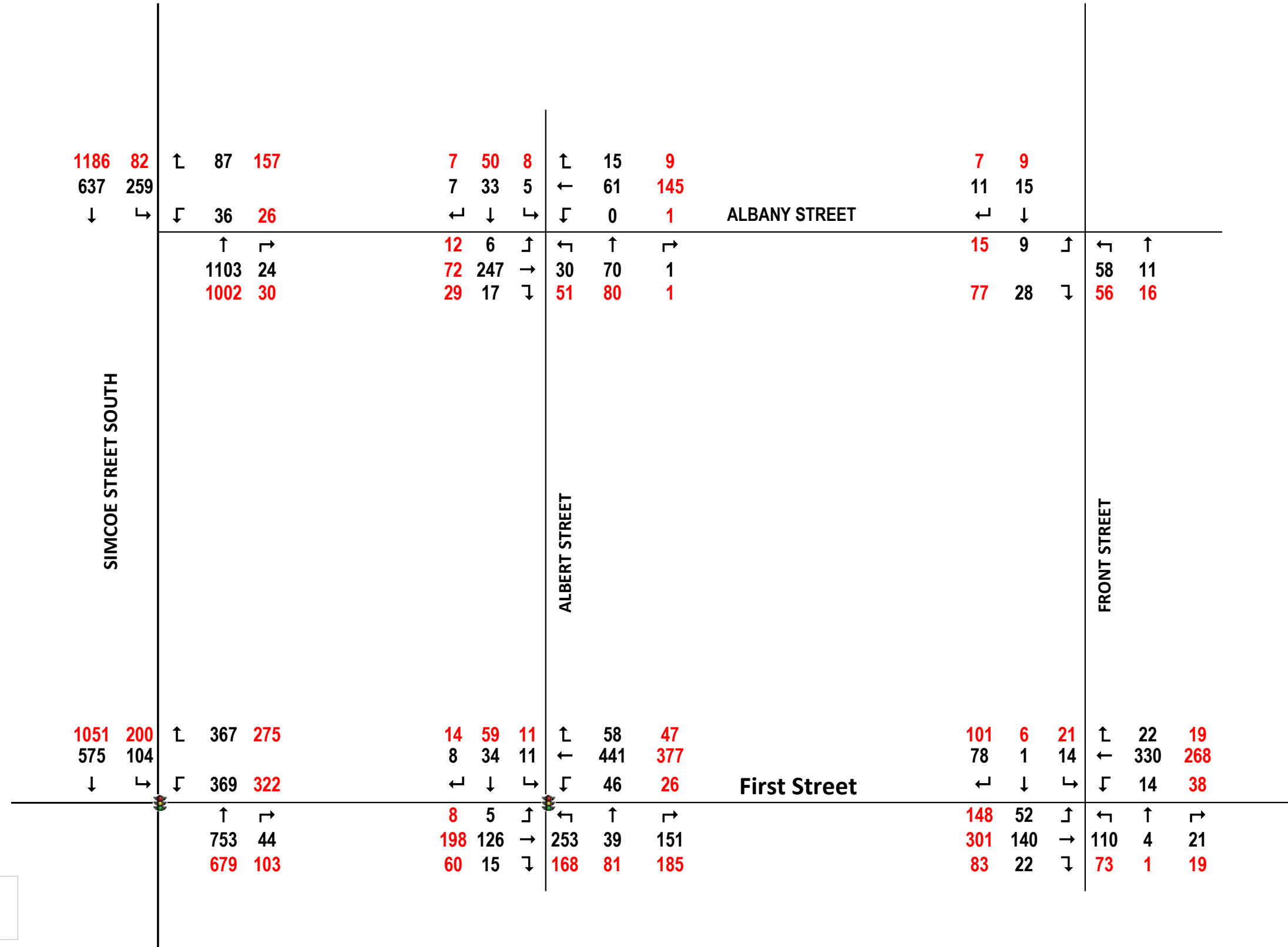


Figure 9.1 - Background Traffic Volumes



LEGEND:
 XX - AM TRAFFIC VOLUME
 XX - PM TRAFFIC VOLUME

Figure 10 - Future Background 2029 Traffic Volumes



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XX - PM TRAFFIC VOLUME

Figure 11 - Future Background 2034 Traffic Volumes

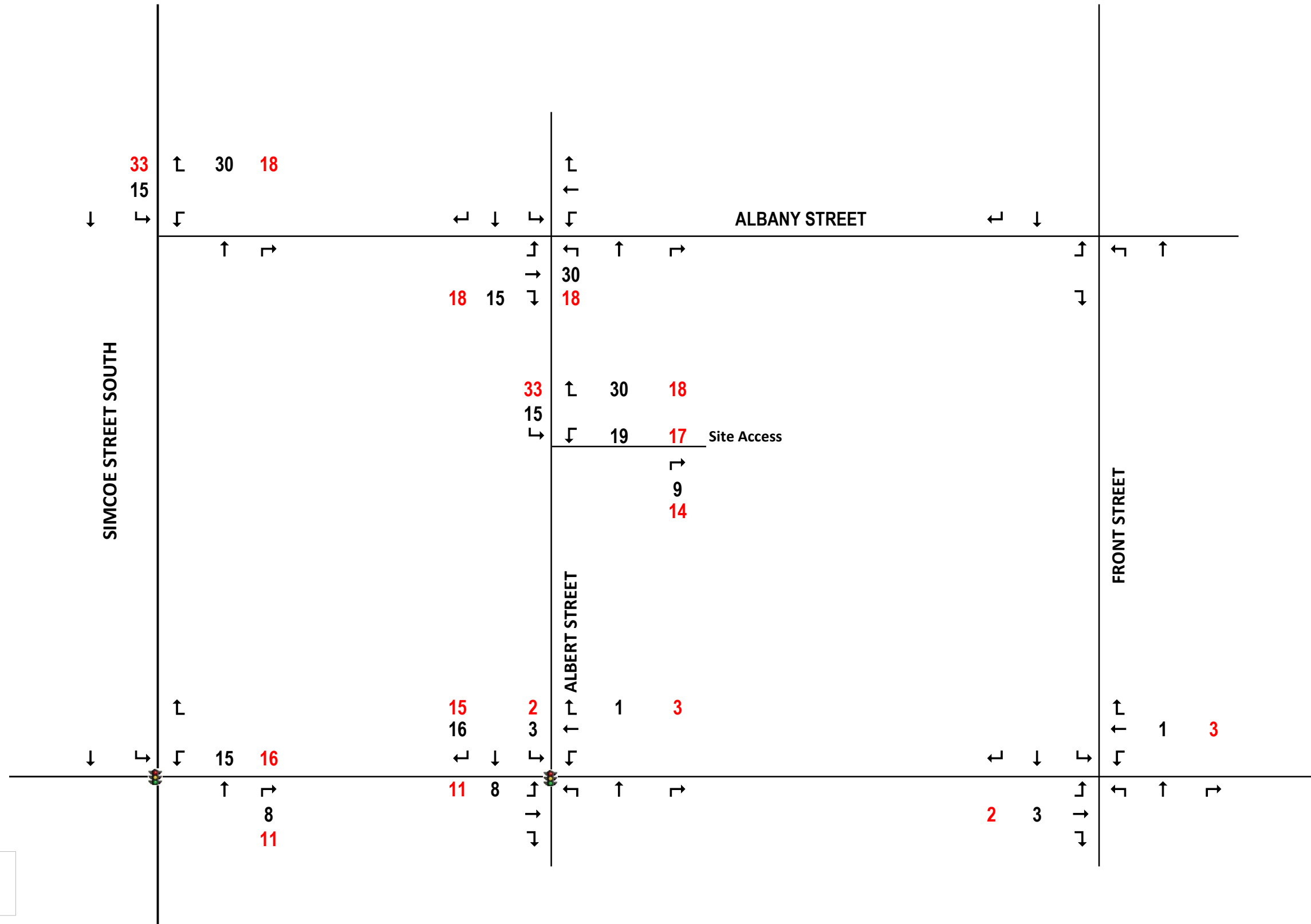
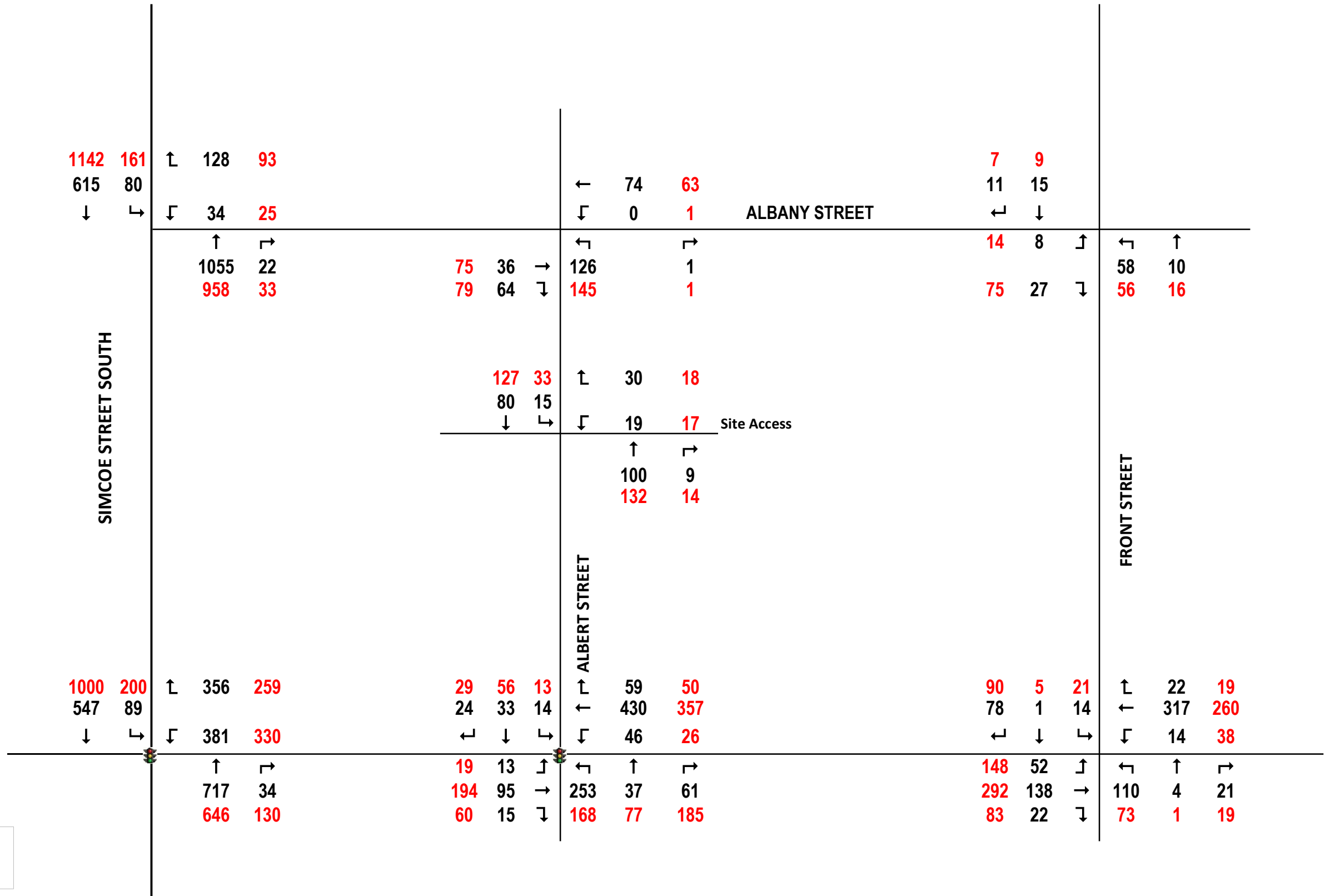
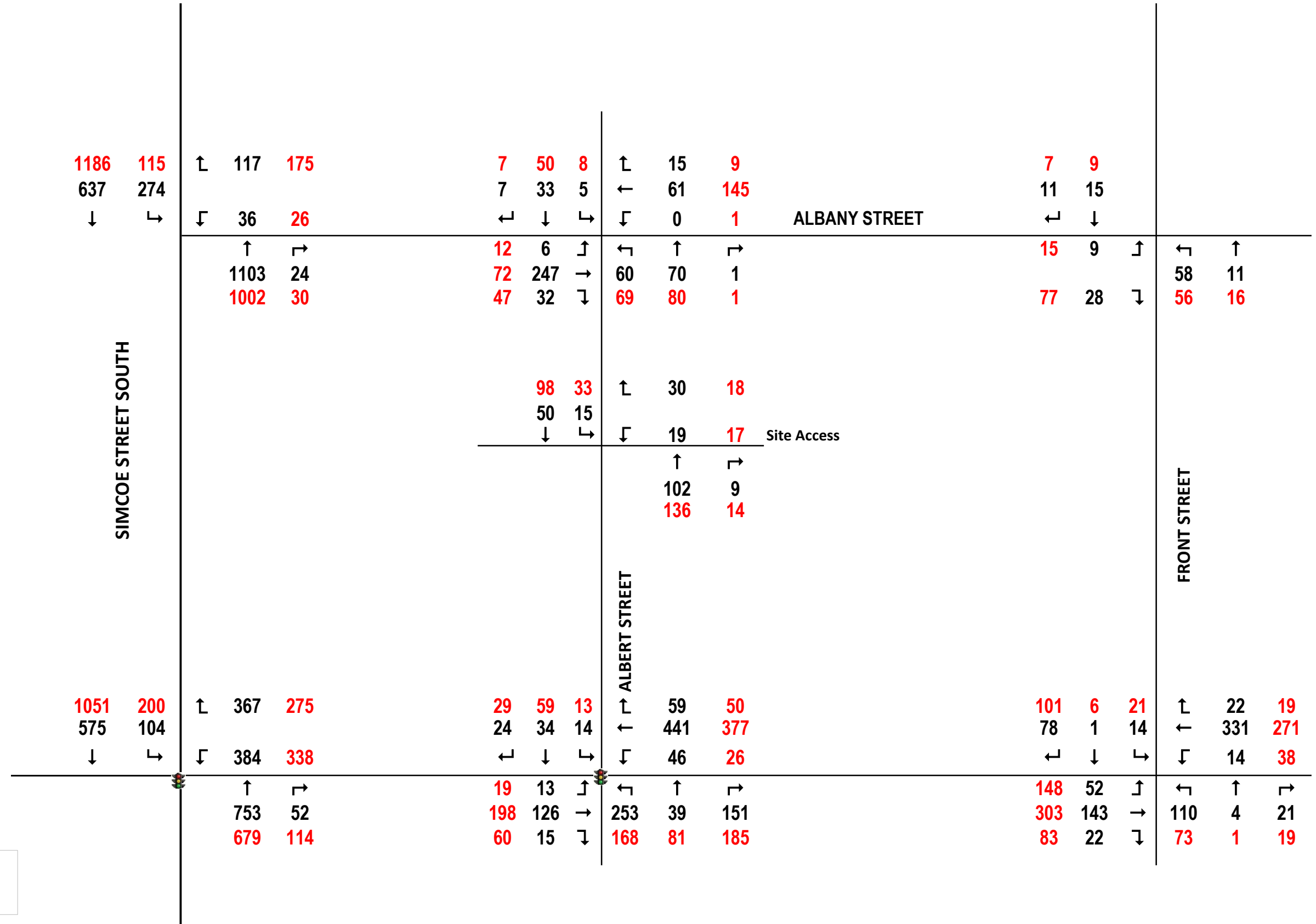


Figure 12 - Site Traffic Volumes



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XX - PM TRAFFIC VOLUME

Figure 13 - Future 2029 Total Traffic Volumes

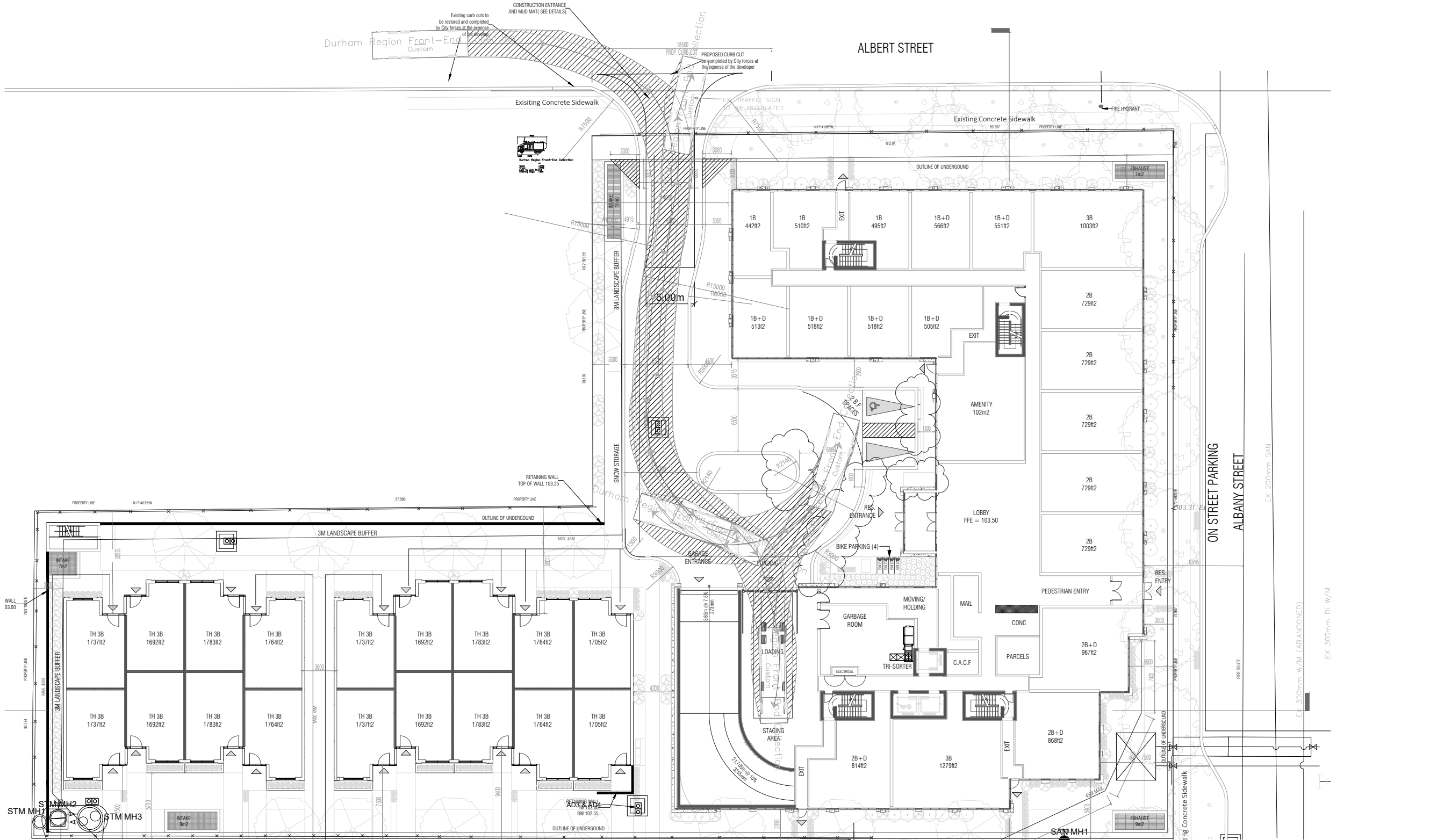


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Figure 14 - Future 2034 Total Traffic Volumes



BENCHMARK



REVISIONS

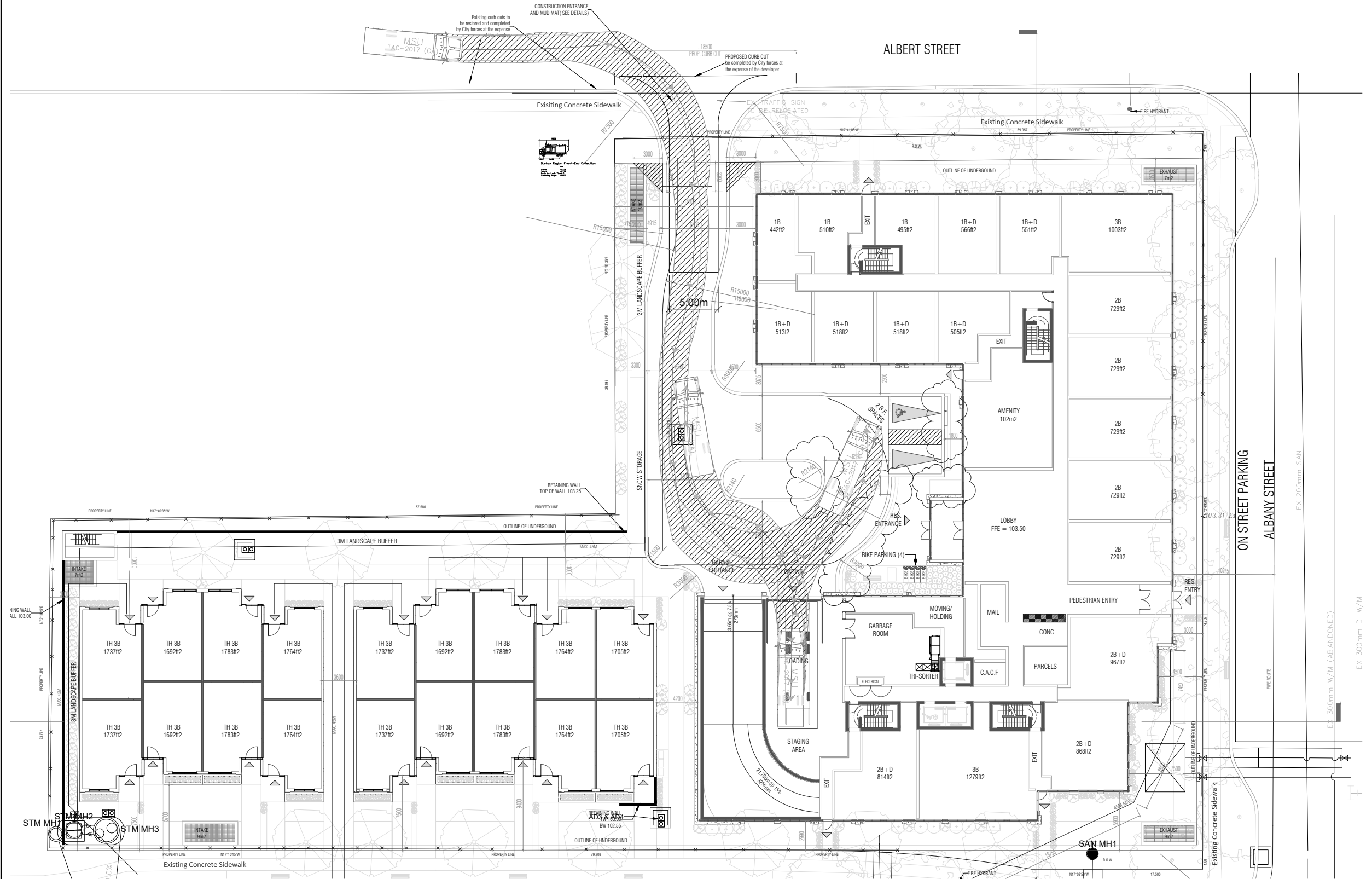
NO	REVISION	DATE	BY

STAMP

PROJECT NAME:
 Residential Development
 63 Albany Street
 City of Oshawa

DRAWING TITLE:
 AutoTURN Analysis
 Garbage Truck Front Load

DESIGN BY: K.A.	DATE: October 2, 2024
CHECKED BY: R.P.	PROJECT NO. NT-21-270
DRAWN BY: K.A.	DRAWING NO. Figure 1
SCALE: NTS	



BENCHMARK

REVISIONS

NO	REVISION	DATE	BY

STAMP

PROJECT NAME:
 Residential Development
 63 Albany Street
 City of Oshawa

DRAWING TITLE:
 AutoTURN Analysis
 MSU TAC 2017

DESIGN BY: K.A.	DATE: October 2, 2024
CHECKED BY: R.P.	PROJECT NO. NT-21-270
DRAWN BY: K.A.	DRAWING NO.
SCALE: NTS	Figure 1

Term of Reference

future conditions for trip distribution and mode share after the GO station is open. Potential changes in travel patterns and modes due to the GO Station should be considered for the ultimate horizon year.

9. Since the proposed development is located immediately adjacent to the future central Oshawa GO station, the study must address how the proposed development will be integrated with the planned station and the surrounding transit-oriented development in the Central Oshawa Major Transit Station Area. The station is currently expected to be in operation by approximately 2030.
10. The sections on transit and active transportation are to document existing and planned networks and services and provide recommendations for safe and effective connectivity to the site for non-auto travel.
11. The Travel Demand Management section is to provide recommendations on infrastructure and programs to minimize travel demand and encourage non-auto travel mode use by the residents of the development. The TDM recommendations are to be site-specific, and the study is to identify who would be responsible for the initial implementation and on-going operation (as applicable) of each recommended facility or program.

If you have any questions on the above, please contact Haben Russom (Project Coordinator for this file) or me.

Regards,
Doug



Doug Robertson, M.A.Sc., P.Eng., PTOE | Senior Project Manager
Works Department | Transportation Infrastructure Division
The Regional Municipality of Durham | **Celebrating 50 years!**
Doug.Robertson@durham.ca | 905-668-4113 extension 3733 | durham.ca
My pronouns are he/him. | durham.ca/50years



Note: I will be away from work Sept. 16 through 30

From: Sam Nguyen <sam@nextrans.ca>
Sent: Tuesday, August 27, 2024 1:47 PM
To: Doug Robertson <Doug.Robertson@Durham.ca>
Subject: RE: 63 Albany Street Traffic Study Term of Reference

Thank you. I look forward to hearing from you.

From: Doug Robertson <Doug.Robertson@Durham.ca>
Sent: Tuesday, August 27, 2024 1:46 PM
To: Sam Nguyen <sam@nextrans.ca>
Subject: RE: 63 Albany Street Traffic Study Term of Reference

Thanks. We'll review and get back to you in about 2 weeks.

Regards,
Doug



Doug Robertson, M.A.Sc., P.Eng., PTOE | Senior Project Manager
Works Department | Transportation Infrastructure Division
The Regional Municipality of Durham | **Celebrating 50 years!**
Doug.Robertson@durham.ca | 905-668-4113 extension 3733 | durham.ca
My pronouns are he/him. | durham.ca/50years



From: Sam Nguyen <sam@nexttrans.ca>
Sent: Tuesday, August 27, 2024 1:24 PM
To: Doug Robertson <Doug.Robertson@Durham.ca>
Subject: RE: 63 Albany Street Traffic Study Term of Reference

You don't often get email from sam@nexttrans.ca. [Learn why this is important](#)

Hi Doug,

I just recently got the site plan, please find attached.
It is a highrise residential building with approximately 319 units.

Thanks

Sam

From: Doug Robertson <Doug.Robertson@Durham.ca>
Sent: Tuesday, August 27, 2024 1:23 PM
To: Sam Nguyen <sam@nexttrans.ca>
Subject: RE: 63 Albany Street Traffic Study Term of Reference

Hi Sam,

Could you please provide a description of the proposed development and a site plan (if available)?

Thanks.
Doug

Doug Robertson, M.A.Sc., P.Eng., PTOE | Senior Project Manager
Works Department | Transportation Infrastructure Division
The Regional Municipality of Durham | **Celebrating 50 years!**
Doug.Robertson@durham.ca | 905-668-4113 extension 3733 | durham.ca
My pronouns are he/him. | durham.ca/50years



From: Sam Nguyen <sam@nexttrans.ca>
Sent: Tuesday, August 27, 2024 12:15 PM
To: Doug Robertson <Doug.Robertson@Durham.ca>
Subject: 63 Albany Street Traffic Study Term of Reference

You don't often get email from sam@nexttrans.ca. [Learn why this is important](#)

Hi Doug,

We have been retained to undertake a TIS to support a proposed development located at 63 Albany Street, in the City of Oshawa. The following is a proposed study terms of reference that takes into consideration of the City and Region Traffic Impact Study Guidelines. If possible, please provide us with your comments at your earliest convenient so that we can complete the study.

The proposed development consists of a residential high-rise building with a full movement access onto Albert Street

1. Study Area intersection:
 - Simcoe Street S and Albany Street
 - Simcoe Street S and First Ave
 - Albert Street and Albany Street
 - Albert Street and Frist Ave
2. Use existing signal timing plan with no optimization
3. We will contact the City for signal timing
4. We will use the City design standards
5. Horizon Year: 5 year horizon
6. Background Developments will be obtained from city of Oshawa development portal.
7. Trip Generation
 - i. ITE Trip Generation Manual 11th Edition
 - ii. Multimodal trip generation using 2016 TTS modal split data (include ITE pages referenced within the TIS appendices)
8. Trip Distribution
 - a. Extract 2016 TTS data based on the surrounding traffic zones where appropriate
Also utilize historic TMC's for trip distribution, where possible.
9. Future Total Assessment

- a. The following tasks will be conducted for the future total conditions:
 - Future Total Traffic Assessment for Auto Mode
 - Future non-auto mode assessment
 - Proposed development access assessment
 - Vehicular and Bicycle Parking Assessment
 - Internal Site Circulation and loading assessment Include Swept-Path analysis where necessary (i.e. –emergency services access, waste vehicle manoeuvres.)
10. Transit, Active Transportation and TDM
 - i. Conduct a review of the existing and proposed future transit network in the area. Based on these findings, appropriate recommendations will be provided to ensure adequate walking distances to/from the proposed development to transit stations/stops.
 - ii. Review the existing and proposed future active transportation network in the area. Based on these findings, Nextrans will identify missing gaps and additional interconnections and connections from the proposed development to adjacent land uses, the City and the Region’s facilities, as well as to transition stations/stops.
 - iii. A Transportation Demand Management (TDM) assessment will be undertaken to identify specific measures and programs to reduce single-occupant-vehicle trips to/from the proposed development. These TDM measures and programs may include but not limited to, Carpooling, Auto Share, Bike racks, Parking management strategies, etc. The TDM report will be completed and included as part of this Study for submission purposes submitted in accordance with the City and the Region requirements.
11. Parking Justification Study (if required) Assess current occupancy rates for the existing buildings with current parking utilization when assessing parking requirements.

Regard,

Trang Nguyen (Sam)
Transportation Analyst

o: 905-503-2563 ext. 207
e: sam@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

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Good afternoon,

Please find attached site plan.

Thanks

Sam

From: Shanthi Sambasivam <SSambasivam@oshawa.ca>
Sent: Tuesday, August 27, 2024 2:12 PM
To: Sam Nguyen <sam@nexttrans.ca>
Cc: Pidenam Bodjona <PBodjona@oshawa.ca>
Subject: RE: 63 Albany Street Traffic Study Term of Reference

Hello,

Please include a copy of the site plan and development stats with your TOR.

Thanks,



Shanthi Sambasivam, Senior Transportation Engineer | City of Oshawa
905-436-3311 ext. 2605 | 1-800-667-4292
SSambasivam@oshawa.ca | www.oshawa.ca
"Committed to delivering exceptional services, spaces, and experiences."



The City of Oshawa is situated on lands and waters within the Williams Treaties Territory, home to seven First Nation communities of the Michi Saagiig and Chippewa Anishinaabeg, who have cared for and maintained these lands from time immemorial and continue to do so to present day. [Learn more.](#)

From: Ranjit Gill <RGill@oshawa.ca>
Sent: Tuesday, August 27, 2024 1:16 PM
To: Shanthi Sambasivam <SSambasivam@oshawa.ca>
Cc: Harshad Patel <HPatel@oshawa.ca>
Subject: Fwd: 63 Albany Street Traffic Study Term of Reference

For your review and comments

Ranjit

Get [Outlook for iOS](#)

From: Sam Nguyen <sam@nexttrans.ca>
Sent: Tuesday, August 27, 2024 12:24:05 PM
To: Ranjit Gill <RGill@oshawa.ca>
Subject: 63 Albany Street Traffic Study Term of Reference

You don't often get email from sam@nexttrans.ca. [Learn why this is important](#)

Good afternoon,

We have been retained to undertake a TIS to support a proposed development located at 63 Albany Street, in the City of Oshawa. The following is a proposed study terms of reference that takes into consideration of the City and Region Traffic Impact Study Guidelines. If possible, please provide us with

your comments at your earliest convenient so that we can complete the study.

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11. Parking Justification Study (if required) Assess current occupancy rates for the existing buildings with current parking utilization when assessing parking requirements.

Regard,

Trang Nguyen (Sam)
Transportation Analyst

o: 905-503-2563 ext. 207

e: sam@nextrans.ca

w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Appendix A – Existing Traffic Data



INTERSECTION SIGNAL TIMING REPORT

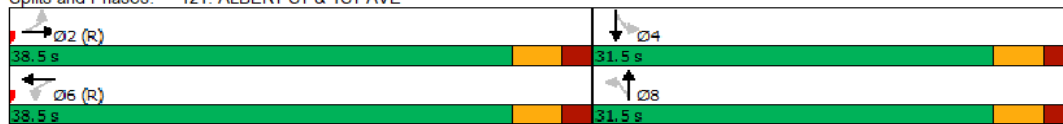
Location	Albert St. and First Ave.		
Date	2022-02-28	C&E No.	34814763
Prepared for	NexTrans Consulting Engineers		
Prepared by	Ibrahim Aftab		

AM peak (06:00-09:00)



Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	26	22	26	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5
Intersection Summary				
Cycle Length	70			
Control Type	Pretimed			
Natural Cycle	50			
Offset: 44.8 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green				

Splits and Phases: 121: ALBERT ST & 1ST AVE

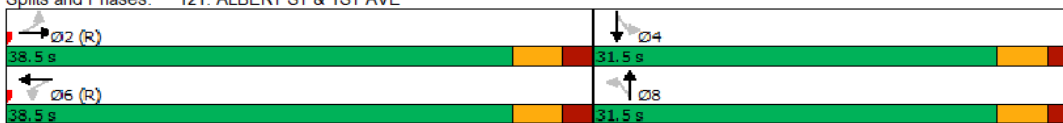


PM Peak 15:00-18:00



Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	26	22	26	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5
Intersection Summary				
Cycle Length	70			
Control Type	Pretimed			
Natural Cycle	50			
Offset: 62.3 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green				

Splits and Phases: 121: ALBERT ST & 1ST AVE

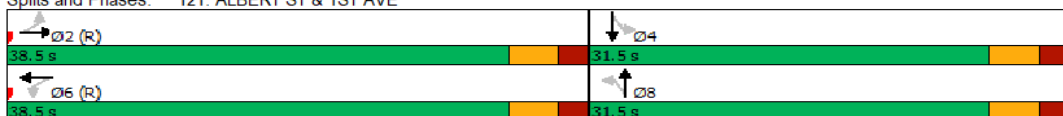


Weekend Peak 09:00 - 19:00



Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	26	22	26	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5
Intersection Summary				
Cycle Length	70			
Control Type	Pretimed			
Natural Cycle	50			
Offset: 17.5 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green				

Splits and Phases: 121: ALBERT ST & 1ST AVE



**Please note a concerted effort has been made to ensure the accuracy and completeness of the data provided, however, inadvertent errors or omissions can still occur. Please bring any errors or omissions to the Region's attention.*

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Oshawa
Site #: 1914000001
Intersection: Simcoe St S & Albany St
TFR File #: 11
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

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

Major Road: Simcoe St S runs N/S

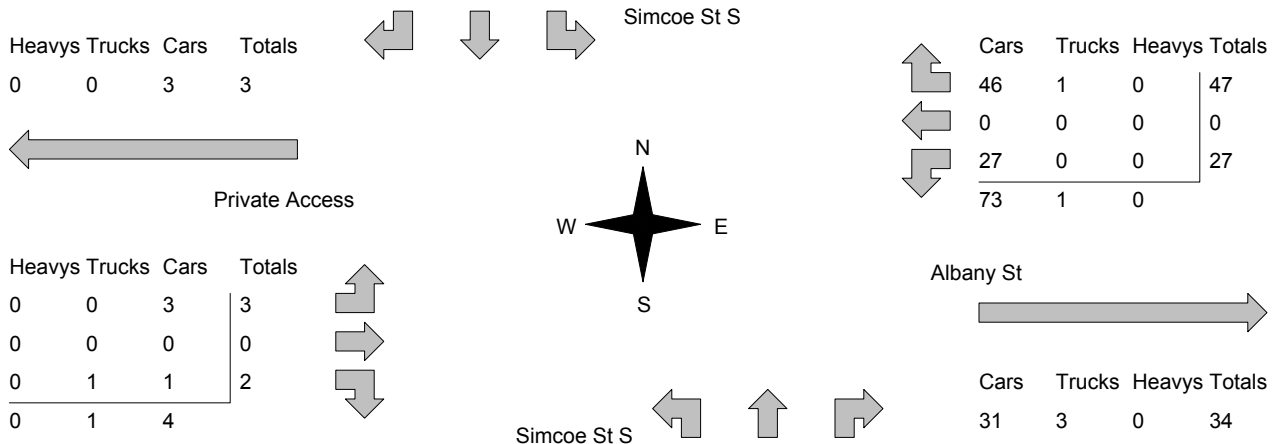
North Leg Total: 1532
 North Entering: 554
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	27	0	27
Cars	3	515	9	527
Totals	3	542	9	



Heavys	0
Trucks	38
Cars	940
Totals	978

East Leg Total: 108
 East Entering: 74
 East Peds: 0
 Peds Cross: \times



Peds Cross: \times
 West Peds: 0
 West Entering: 5
 West Leg Total: 8

Cars	543	Cars	0	891	22	913
Trucks	28	Trucks	0	37	3	40
Heavys	0	Heavys	0	0	0	0
Totals	571	Totals	0	928	25	

Peds Cross: \times
 South Peds: 0
 South Entering: 953
 South Leg Total: 1524

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Municipality: Oshawa
Site #: 1914000001
Intersection: Simcoe St S & Albany St
TFR File #: 11
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

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

Major Road: Simcoe St S runs N/S

North Leg Total: 1848
North Entering: 979
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	24	1	25
Cars	1	930	23	954
Totals	1	954	24	



Heavys	0
Trucks	16
Cars	853
Totals	869

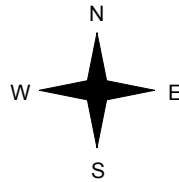
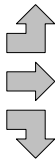
East Leg Total: 108
East Entering: 52
East Peds: 0
Peds Cross: \times

Heavys	0	0	1	1
Trucks	0	0	0	0
Cars	0	0	1	1
Totals	0	0	1	1



Private Access

Heavys	0	0	4	4
Trucks	0	0	0	0
Cars	0	0	3	3
Totals	0	0	7	7



Simcoe St S

Cars	30	0	0	30
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	30	0	0	30

Cars	22	0	0	22
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	22	0	0	22



Albany St



Cars	54	2	0	56
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	56	2	0	58

Peds Cross: \times
West Peds: 0
West Entering: 7
West Leg Total: 8

Cars	955	Cars	0	819	31	850
Trucks	24	Trucks	0	16	1	17
Heavys	0	Heavys	0	0	0	0
Totals	979	Totals	0	835	32	



Peds Cross: \times
South Peds: 0
South Entering: 867
South Leg Total: 1846

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Oshawa
Site #: 1914000001
Intersection: Simcoe St S & Albany St
TFR File #: 11
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

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

Major Road: Simcoe St S runs N/S

North Leg Total: 6304
 North Entering: 2886
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	96	1	97
Cars	6	2723	60	2789
Totals	6	2819	61	



Heavys	0
Trucks	115
Cars	3303
Totals	3418

East Leg Total: 389
 East Entering: 237
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	0	7	7

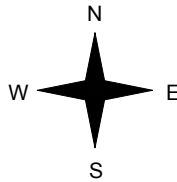


Simcoe St S

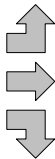
Cars	Trucks	Heavys	Totals
144	2	0	146
1	0	0	1
90	0	0	90
235	2	0	



Private Access



Heavys	Trucks	Cars	Totals
0	0	11	11
0	0	0	0
0	1	12	13
0	1	23	



Albany St



Cars	Trucks	Heavys	Totals
146	6	0	152

Peds Cross: \times
 West Peds: 0
 West Entering: 24
 West Leg Total: 31

Cars	2825
Trucks	97
Heavys	0
Totals	2922



Simcoe St S

Cars	0	3148	86	3234
Trucks	0	113	5	118
Heavys	0	0	0	0
Totals	0	3261	91	

Peds Cross: \times
 South Peds: 0
 South Entering: 3352
 South Leg Total: 6274

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: Simcoe St S & Albany St

Count Date: 25-Apr-19

Municipality: Oshawa

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	5	454	1	460	0	1162	8:00:00	0	688	14	702	0
9:00:00	9	542	3	554	0	1507	9:00:00	0	928	25	953	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	25	940	1	966	0	1838	17:00:00	0	841	31	872	0
18:00:00	22	883	1	906	0	1731	18:00:00	0	804	21	825	0
Totals:	61	2819	6	2886	0	6238		0	3261	91	3352	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	20	1	37	58	0	62	8:00:00	2	0	2	4	0
9:00:00	27	0	47	74	0	79	9:00:00	3	0	2	5	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	21	0	34	55	0	63	17:00:00	4	0	4	8	0
18:00:00	22	0	28	50	0	57	18:00:00	2	0	5	7	0
Totals:	90	1	146	237	0	261		11	0	13	24	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	0:00	7:00	8:00		9:00	16:00	17:00	18:00			
Crossing Values:	0	0	0	23		30	0	25	24			

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Oshawa
Site #: 1914000006
Intersection: Simcoe St S & First Ave
TFR File #: 8
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Simcoe St S runs N/S

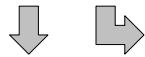
North Leg Total: 1464
 North Entering: 572
 North Peds: 3
 Peds Cross: \times

Heavys	0	0	0
Trucks	28	10	38
Cars	491	43	534
Totals	519	53	

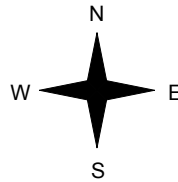


Heavys	0
Trucks	31
Cars	861
Totals	892

East Leg Total: 316
 East Entering: 254
 East Peds: 11
 Peds Cross: \times



Simcoe St S



	Cars	Trucks	Heavys	Totals
	199	11	0	210
	41	3	0	44
	240	14	0	

First Ave



Cars	Trucks	Heavys	Totals
52	10	0	62

Cars	532
Trucks	31
Heavys	0
Totals	563



Simcoe St S

Cars	662	9	671
Trucks	20	0	20
Heavys	0	0	0
Totals	682	9	

Peds Cross: \times
 South Peds: 3
 South Entering: 691
 South Leg Total: 1254

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Municipality: Oshawa
Site #: 1914000006
Intersection: Simcoe St S & First Ave
TFR File #: 8
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Simcoe St S runs N/S

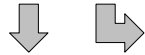
North Leg Total: 1795
North Entering: 1021
North Peds: 7
Peds Cross: \times

Heavys	0	0	0
Trucks	19	7	26
Cars	927	68	995
Totals	946	75	

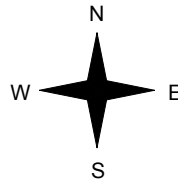


Heavys	0
Trucks	15
Cars	759
Totals	774

East Leg Total: 357
East Entering: 225
East Peds: 17
Peds Cross: \times



Simcoe St S



	Cars	Trucks	Heavys	Totals
Northbound	154	5	0	159
Southbound	61	5	0	66
Totals	215	10	0	

First Ave



	Cars	Trucks	Heavys	Totals
Westbound	124	8	0	132

Cars	988
Trucks	24
Heavys	0
Totals	1012



Simcoe St S

Cars	605	56	661
Trucks	10	1	11
Heavys	0	0	0
Totals	615	57	

Peds Cross: \times
South Peds: 7
South Entering: 672
South Leg Total: 1684

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Oshawa
Site #: 1914000006
Intersection: Simcoe St S & First Ave
TFR File #: 8
Count date: 25-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Simcoe St S runs N/S

North Leg Total: 6072
 North Entering: 2961
 North Peds: 19
 Peds Cross: \times

Heavys	0	0	0
Trucks	85	26	111
Cars	2651	198	2850
Totals	2736	224	

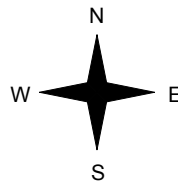


Heavys	0
Trucks	102
Cars	3009
Totals	3111

East Leg Total: 1221
 East Entering: 888
 East Peds: 46
 Peds Cross: \times



Simcoe St S



	Cars	Trucks	Heavys	Totals
Upward arrow	656	33	0	689
Downward arrow	187	12	0	199
Totals	843	45	0	

First Ave



	Cars	Trucks	Heavys	Totals
Upward arrow	302	31	0	333

Cars	2838
Trucks	97
Heavys	0
Totals	2935



Simcoe St S

Cars	2353	104	2457
Trucks	69	5	74
Heavys	0	0	0
Totals	2422	109	

Peds Cross: \times
 South Peds: 16
 South Entering: 2531
 South Leg Total: 5466

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: Simcoe St S & First Ave

Count Date: 25-Apr-19

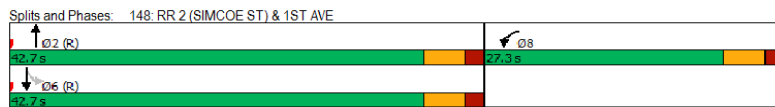
Municipality: Oshawa

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	32	431	0	463	4	972	8:00:00	0	500	9	509	0
9:00:00	53	519	0	572	3	1263	9:00:00	0	682	9	691	3
16:00:00	0	0	0	0	0	1	16:00:00	0	1	0	1	0
17:00:00	75	911	0	986	7	1681	17:00:00	0	626	69	695	11
18:00:00	64	875	1	940	5	1575	18:00:00	0	613	22	635	2
Totals:	224	2736	1	2961	19	5492		0	2422	109	2531	16
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	38	0	182	220	9	220	8:00:00	0	0	0	0	7
9:00:00	44	0	210	254	11	254	9:00:00	0	0	0	0	10
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	64	0	168	232	16	232	17:00:00	0	0	0	0	27
18:00:00	53	0	129	182	10	182	18:00:00	0	0	0	0	16
Totals:	199	0	689	888	46	888		0	0	0	0	60
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	0:00	7:00	8:00		9:00	16:00	17:00	18:00			
Crossing Values:	0	0	0	42		50	0	82	60			

INTERSECTION SIGNAL TIMING REPORT			
Location	Simcoe St & First Ave		
Date	14/05/2019	C&E No.	19742333
Prepared for	Cole Engineering Group - D Liubezni		
Prepared by	L Potvin		

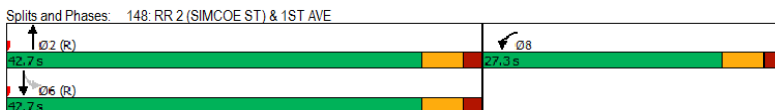
AM Peak 06:00 - 09:00

Phase Number	2	6	8
Movement	NBT	SBTL	WBL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	C-Max	C-Max	None
Maximum Split (s)	42.7	42.7	27.3
Maximum Split (%)	61.0%	61.0%	39.0%
Minimum Split (s)	26	26	26
Yellow Time (s)	3.7	3.7	3.7
All-Red Time (s)	1.8	1.8	2.1
Minimum Initial (s)	20	20	8
Vehicle Extension (s)	3	3	3
Minimum Gap (s)	3	3	3
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	13	13	13
Flash Dont Walk (s)	5	5	5
Intersection Summary			
Cycle Length			70
Control Type	Actuated-Coordinated		
Natural Cycle	55		
Offset: 58.1 (83%), Referenced to phase 2.NBT and 6.SBTL, Start of Green			



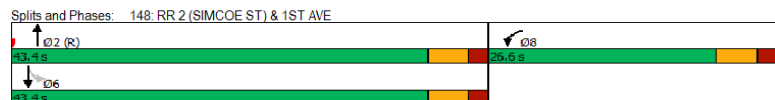
PM Peak 15:00 - 19:00

Phase Number	2	6	8
Movement	NBT	SBTL	WBL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	C-Max	C-Max	None
Maximum Split (s)	42.7	42.7	27.3
Maximum Split (%)	61.0%	61.0%	39.0%
Minimum Split (s)	26	26	26
Yellow Time (s)	3.7	3.7	3.7
All-Red Time (s)	1.8	1.8	2.1
Minimum Initial (s)	20	20	8
Vehicle Extension (s)	3	3	3
Minimum Gap (s)	3	3	3
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	13	13	13
Flash Dont Walk (s)	5	5	5
Intersection Summary			
Cycle Length			70
Control Type	Actuated-Coordinated		
Natural Cycle	60		
Offset: 11.2 (16%), Referenced to phase 2.NBT and 6.SBTL, Start of Green			



Weekend Peak 09:00 - 19:00

Phase Number	2	6	8
Movement	NBT	SBTL	WBL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	C-Max	None	None
Maximum Split (s)	43.4	43.4	26.6
Maximum Split (%)	62.0%	62.0%	38.0%
Minimum Split (s)	26	26	26
Yellow Time (s)	3.7	3.7	3.7
All-Red Time (s)	1.8	1.8	2.1
Minimum Initial (s)	20	20	8
Vehicle Extension (s)	3	3	3
Minimum Gap (s)	3	3	3
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	13	13	13
Flash Dont Walk (s)	5	5	5
Intersection Summary			
Cycle Length			70
Control Type	Actuated-Coordinated		
Natural Cycle	120		
Offset: 58.1 (83%), Referenced to phase 2.NBT, Start of Green			



*Please note a concerted effort has been made to ensure the accuracy and completeness of the data provided, however, inadvertent errors or omissions can still occur. Please bring any errors or omissions to the Region's attention.

INTERSECTION SIGNAL TIMING REPORT					
Location	Albert St & First Ave				
Date	May 22/ 2019	C&E No.	19742333	Prepared by	L Potvin
Prepared for	Dumitru Liubezni - Cole engineering				

AM Peak 06:00 - 09:00



Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	28	22	28	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5

Intersection Summary

Cycle Length	70
Control Type	Pretimed
Natural Cycle	50
Offset: 44.8 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	

Splits and Phases: 121: ALBERT ST & 1ST AVE



PM Peak 15:00 - 18:00

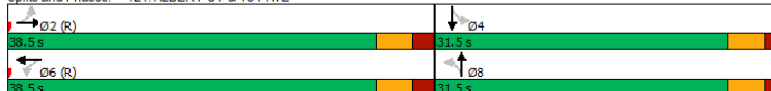


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	28	22	28	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5

Intersection Summary

Cycle Length	70
Control Type	Pretimed
Natural Cycle	50
Offset: 62.3 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	

Splits and Phases: 121: ALBERT ST & 1ST AVE



Weekend Peak 09:00 - 19:00

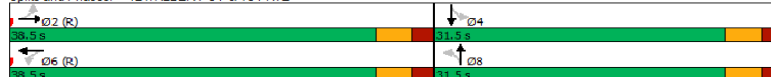


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	38.5	31.5
Maximum Split (%)	55.0%	45.0%	55.0%	45.0%
Minimum Split (s)	28	22	28	22
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2	1.8	2	1.8
Minimum Initial (s)	20	8	20	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	11	11	11	11
Flash Dont Walk (s)	5	5	5	5

Intersection Summary

Cycle Length	70
Control Type	Pretimed
Natural Cycle	50
Offset: 42.7 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	

Splits and Phases: 121: ALBERT ST & 1ST AVE



*Please note a concerted effort has been made to ensure the accuracy and completeness of the data provided, however, inadvertent errors or omissions can still occur. Please bring any errors or omissions to the Region's attention.



Turning Movement Count (1 . ALBANY ST & ALBERT ST)

Start Time	N Approach ALBERT ST						E Approach ALBANY ST						S Approach ALBERT ST						W Approach ALBANY ST						NE Approach ALBERT ST		Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total	UTurn NE:NE	Approach Total		
07:00:00	0	4	2	0	0	6	0	3	0	0	0	3	0	4	5	0	0	9	2	0	1	0	0	3	0	0	21	
07:15:00	0	6	0	0	0	6	0	3	0	0	0	3	1	8	9	0	0	18	2	2	0	0	0	4	0	0	31	
07:30:00	2	3	0	0	0	5	1	6	0	0	0	7	0	7	9	0	0	16	3	1	2	0	0	6	0	0	34	
07:45:00	1	4	0	0	2	5	3	3	0	0	3	6	0	10	11	0	1	21	10	0	1	0	1	11	0	0	43	129
08:00:00	1	6	0	0	2	7	2	5	0	0	0	7	0	9	8	0	0	17	3	2	0	0	1	5	0	0	36	144
08:15:00	0	7	0	0	7	7	4	2	0	0	0	6	1	25	5	0	1	31	3	1	1	0	1	5	0	0	49	162
08:30:00	2	9	1	0	5	12	5	7	0	0	3	12	0	11	7	0	0	18	4	4	3	0	1	11	0	0	53	181
08:45:00	4	6	1	0	4	11	4	4	0	0	1	8	0	17	8	0	0	25	6	2	2	0	2	10	0	0	54	192
09:00:00	1	8	2	0	5	11	0	5	0	0	1	5	0	10	10	0	1	20	4	4	0	0	1	8	0	0	44	200
09:15:00	3	3	0	0	4	6	2	4	0	0	0	6	0	16	8	0	1	24	2	1	3	0	1	6	0	0	42	193
09:30:00	2	8	0	0	1	10	2	3	1	0	1	6	1	9	4	0	0	14	4	2	0	0	0	6	0	0	36	176
09:45:00	2	5	0	0	3	7	1	2	1	0	2	4	0	14	9	0	1	23	4	2	0	0	1	6	0	0	40	162
BREAK																												
16:00:00	4	9	2	0	1	15	4	3	1	0	4	8	0	28	12	0	1	40	8	4	4	0	0	16	0	0	79	
16:15:00	2	15	0	0	2	17	1	5	0	0	2	6	1	12	9	0	0	22	10	3	4	0	1	17	0	0	62	
16:30:00	0	7	1	0	2	8	0	7	0	0	2	7	0	16	14	0	1	30	1	5	2	0	1	8	0	0	53	
16:45:00	1	14	0	0	1	15	1	2	0	0	0	3	0	16	16	0	1	32	10	4	2	0	0	16	0	0	66	260
17:00:00	2	9	0	0	1	11	1	2	2	0	0	5	1	10	13	0	0	24	10	2	1	0	2	13	0	0	53	234
17:15:00	0	13	0	0	2	13	1	0	0	0	1	1	0	10	11	0	0	21	7	4	0	0	1	11	0	0	46	218
17:30:00	1	5	0	0	2	6	1	3	0	0	0	4	0	13	5	0	1	18	7	0	0	0	2	7	0	0	35	200
17:45:00	1	9	2	0	0	12	0	1	0	0	0	1	0	3	6	0	1	9	7	0	0	0	2	7	0	0	29	163
18:00:00	2	4	0	0	0	6	1	1	0	0	0	2	0	6	7	0	0	13	7	3	3	0	3	13	0	0	34	144
18:15:00	2	8	0	0	0	10	1	5	0	0	1	6	0	10	8	0	0	18	6	3	1	0	1	10	0	0	44	142
18:30:00	1	6	1	0	0	8	0	0	0	0	0	0	1	11	10	0	0	22	4	6	0	0	2	10	0	0	40	147
18:45:00	0	6	0	0	0	6	1	3	0	0	0	4	1	3	10	0	0	14	9	2	1	0	0	12	0	0	36	154
Grand Total	34	174	12	0	44	220	36	79	5	0	21	120	7	278	214	0	10	499	133	57	31	0	24	221	0	0	1060	-
Approach%	15.5%	79.1%	5.5%	0%	-	-	30%	65.8%	4.2%	0%	-	-	1.4%	55.7%	42.9%	0%	-	-	60.2%	25.8%	14%	0%	-	-	0%	-	-	
Totals %	3.2%	16.4%	1.1%	0%	20.8%	20.8%	3.4%	7.5%	0.5%	0%	11.3%	11.3%	0.7%	26.2%	20.2%	0%	47.1%	12.5%	5.4%	2.9%	0%	20.8%	20.8%	0%	0%	-	-	
Heavy	1	1	0	0	-	-	0	0	0	0	-	-	0	8	4	0	-	-	2	1	0	0	-	-	0	-	-	
Heavy %	2.9%	0.6%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	2.9%	1.9%	0%	-	-	1.5%	1.8%	0%	0%	-	-	0%	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:15 AM - 09:15 AM Weather: Broken Clouds (0.8 °C)

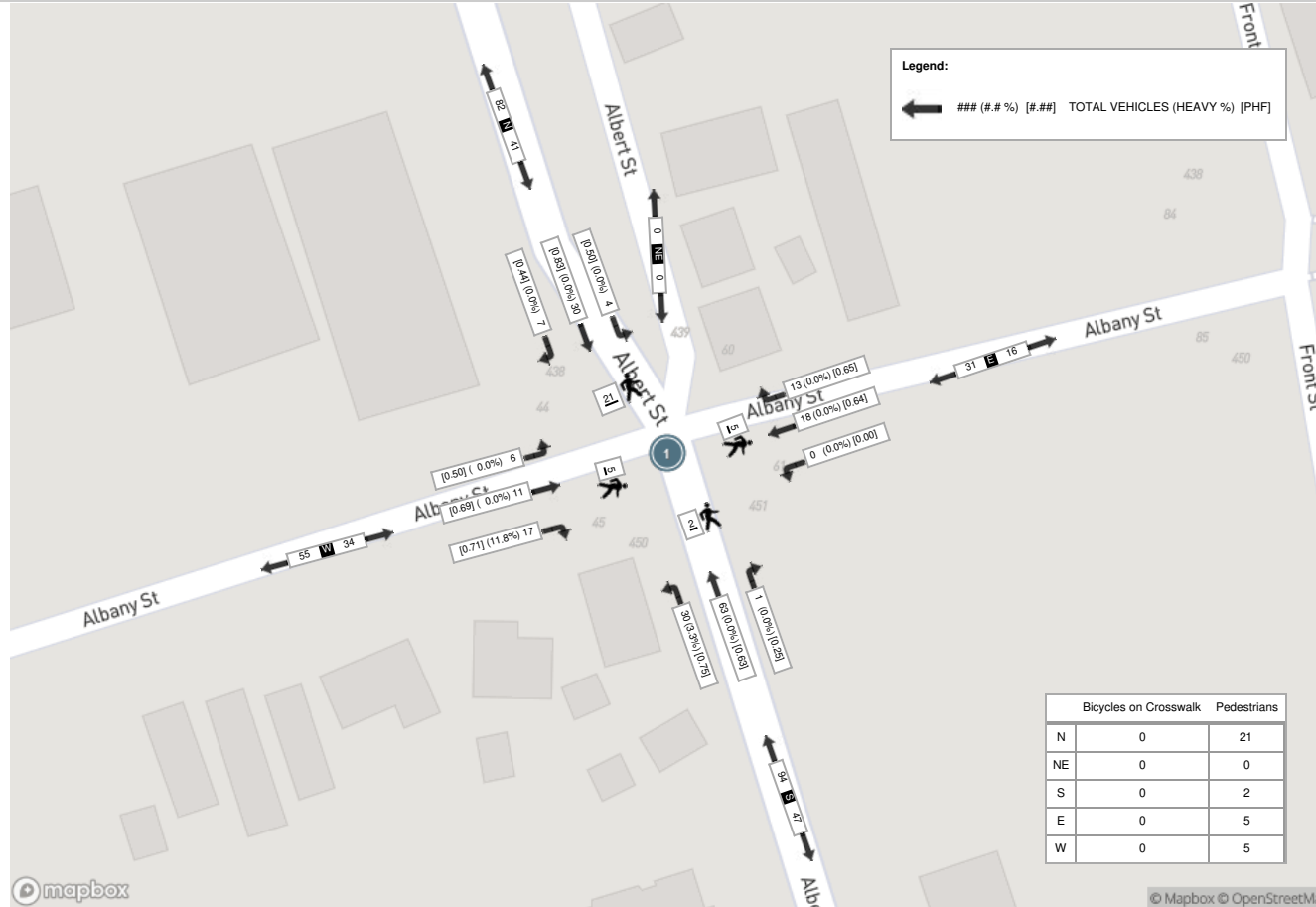
Start Time	N Approach ALBERT ST						E Approach ALBANY ST						S Approach ALBERT ST						W Approach ALBANY ST						NE Approach ALBERT ST		Int. Total (15 min)	
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	UTurn	Approach Total		
08:15:00	0	7	0	0	7	7	4	2	0	0	0	6	1	25	5	0	1	31	3	1	1	0	1	5	0	0	49	
08:30:00	2	9	1	0	5	12	5	7	0	0	3	12	0	11	7	0	0	18	4	4	3	0	1	11	0	0	53	
08:45:00	4	6	1	0	4	11	4	4	0	0	1	8	0	17	8	0	0	25	6	2	2	0	2	10	0	0	54	
09:00:00	1	8	2	0	5	11	0	5	0	0	1	5	0	10	10	0	1	20	4	4	0	0	1	8	0	0	44	
Grand Total	7	30	4	0	21	41	13	18	0	0	5	31	1	63	30	0	2	94	17	11	6	0	5	34	0	0	200	
Approach%	17.1%	73.2%	9.8%	0%	-	-	41.9%	58.1%	0%	0%	-	-	1.1%	67%	31.9%	0%	-	50%	32.4%	17.6%	0%	-	0%	-	0%	-	-	
Totals %	3.5%	15%	2%	0%	20.5%	-	6.5%	9%	0%	0%	15.5%	-	0.5%	31.5%	15%	0%	47%	8.5%	5.5%	3%	0%	17%	0%	0%	0%	0%	-	
PHF	0.44	0.83	0.5	0	0.85	-	0.65	0.64	0	0	0.65	-	0.25	0.63	0.75	0	0.76	0.71	0.69	0.5	0	0.77	0	0	0	0	-	
Heavy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	2	0	0	0	-	
Heavy %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3.3%	0%	1.1%	11.8%	0%	0%	0%	0%	5.9%	0%	0%	0%	-	
Lights	7	30	4	0	41	41	13	18	0	0	31	31	1	63	29	0	93	15	11	6	0	32	0	0	0	0	-	
Lights %	100%	100%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%	96.7%	0%	0%	98.9%	88.2%	100%	100%	0%	94.1%	0%	0%	0%	0%	-	
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	-	
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3.3%	0%	1.1%	5.9%	0%	0%	0%	2.9%	0%	0%	0%	0%	-	
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	-	
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5.9%	0%	0%	0%	2.9%	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	-	
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%	-	
Pedestrians	-	-	-	-	21	-	-	-	-	-	5	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	-
Pedestrians %	-	-	-	-	63.6%	-	-	-	-	-	15.2%	-	-	-	-	6.1%	-	-	-	-	-	15.2%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-



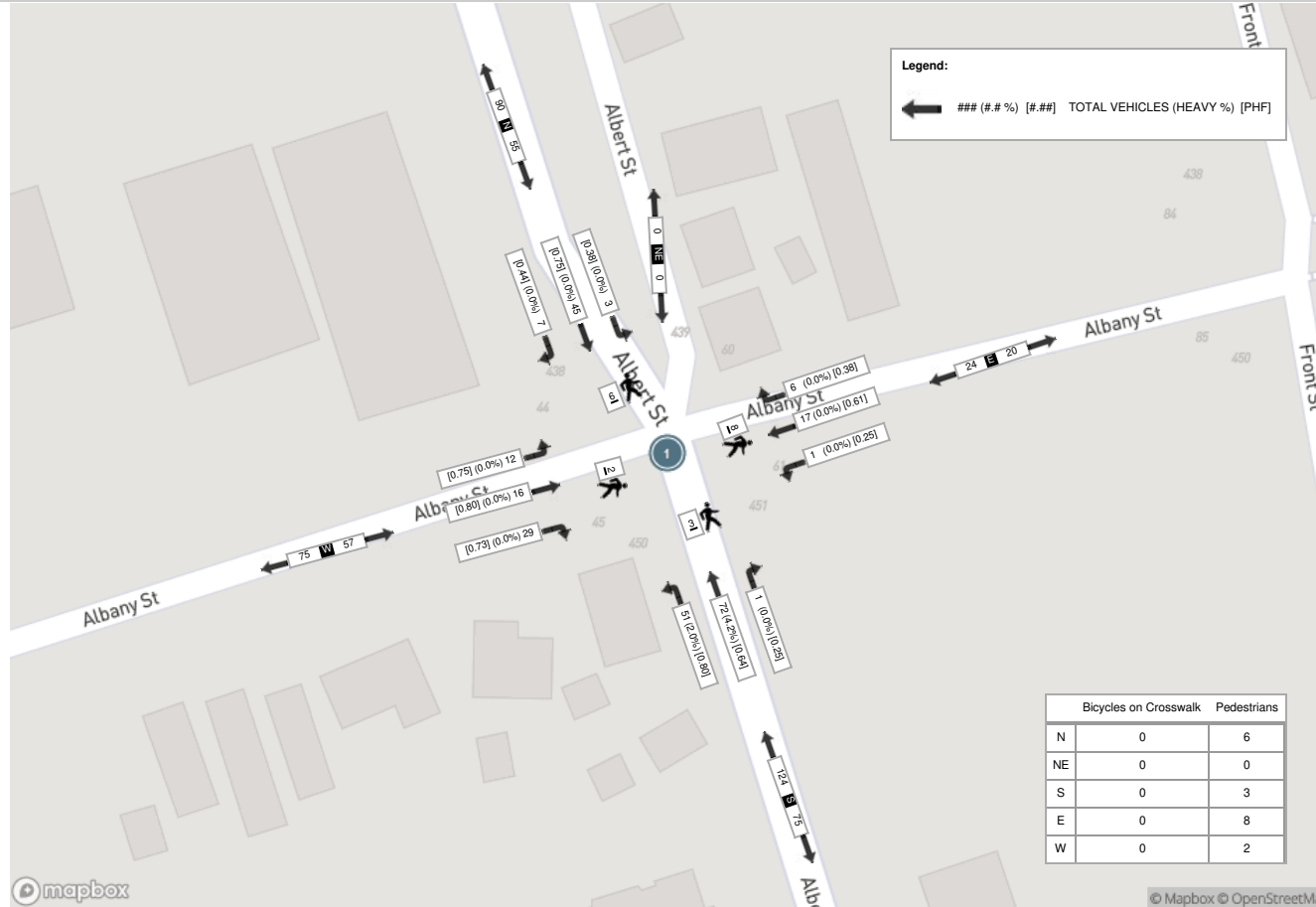
Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (5.12 °C)

Start Time	N Approach ALBERT ST						E Approach ALBANY ST						S Approach ALBERT ST						W Approach ALBANY ST						NE Approach ALBERT ST		Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	UTurn	Approach Total	
16:00:00	4	9	2	0	1	15	4	3	1	0	4	8	0	28	12	0	1	40	8	4	4	0	0	16	0	0	79
16:15:00	2	15	0	0	2	17	1	5	0	0	2	6	1	12	9	0	0	22	10	3	4	0	1	17	0	0	62
16:30:00	0	7	1	0	2	8	0	7	0	0	2	7	0	16	14	0	1	30	1	5	2	0	1	8	0	0	53
16:45:00	1	14	0	0	1	15	1	2	0	0	0	3	0	16	16	0	1	32	10	4	2	0	0	16	0	0	66
Grand Total	7	45	3	0	6	55	6	17	1	0	8	24	1	72	51	0	3	124	29	16	12	0	2	57	0	0	260
Approach%	12.7%	81.8%	5.5%	0%	-	-	25%	70.8%	4.2%	0%	-	-	0.8%	58.1%	41.1%	0%	-	-	50.9%	28.1%	21.1%	0%	-	-	0%	-	-
Totals %	2.7%	17.3%	1.2%	0%	21.2%	-	2.3%	6.5%	0.4%	0%	9.2%	-	0.4%	27.7%	19.6%	0%	47.7%	-	11.2%	6.2%	4.6%	0%	21.9%	-	0%	0%	-
PHF	0.44	0.75	0.38	0	0.81	-	0.38	0.61	0.25	0	0.75	-	0.25	0.64	0.8	0	0.78	-	0.73	0.8	0.75	0	0.84	-	0	0	-
Heavy	0	0	0	0	0	-	0	0	0	0	0	-	0	0	3	1	0	4	-	0	0	0	0	0	-	0	-
Heavy %	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	4.2%	2%	0%	3.2%	-	0%	0%	0%	0%	0%	-	0%	-
Lights	7	44	2	0	53	-	6	17	1	0	24	-	1	69	50	0	120	-	29	16	12	0	57	-	0	-	
Lights %	100%	97.8%	66.7%	0%	96.4%	-	100%	100%	100%	0%	100%	-	100%	95.8%	98%	0%	96.8%	-	100%	100%	100%	0%	100%	-	0%	0%	-
Single-Unit Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	3	0	0	3	-	0	0	0	0	0	-	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	4.2%	0%	0%	2.4%	-	0%	0%	0%	0%	0%	-	0%	0%	-
Buses	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	1	-	0	0	0	0	0	-	0	0	-
Buses %	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	2%	0%	0.8%	-	0%	0%	0%	0%	0%	-	0%	0%	-
Bicycles on Road	0	1	1	0	2	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	-
Bicycles on Road %	0%	2.2%	33.3%	0%	3.6%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	-
Pedestrians	-	-	-	-	6	-	-	-	-	8	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-	-
Pedestrians%	-	-	-	-	31.6%	-	-	-	-	42.1%	-	-	-	-	15.8%	-	-	-	-	-	-	-	10.5%	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Broken Clouds (0.8 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (5.12 °C)





Turning Movement Count (1 . ALBANY STREET & FRONT STREET)

Start Time	Southbound FRONT STREET					Northbound FRONT STREET					Eastbound ALBANY STREET					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	2	0	0	2	1	5	0	0	6	4	1	0	0	5	13	
07:15:00	0	1	0	0	1	0	7	0	0	7	3	0	0	0	3	11	
07:30:00	0	0	0	0	0	1	7	0	0	8	3	0	0	0	3	11	
07:45:00	0	0	0	1	0	1	7	0	0	8	2	0	1	0	3	11	46
08:00:00	1	2	0	0	3	3	6	0	0	9	3	1	1	3	5	17	50
08:15:00	1	0	0	0	1	1	7	0	0	8	1	1	0	1	2	11	50
08:30:00	1	0	0	0	1	0	9	0	0	9	1	1	1	0	3	13	52
08:45:00	2	1	0	0	3	0	3	0	0	3	3	0	0	1	3	9	50
09:00:00	1	0	0	0	1	0	6	0	0	6	3	1	0	0	4	11	44
09:15:00	0	0	0	0	0	0	3	0	2	3	7	1	1	2	9	12	45
09:30:00	0	0	0	0	0	0	1	0	0	1	6	0	0	1	6	7	39
09:45:00	0	1	0	0	1	0	5	0	0	5	3	0	0	1	3	9	39
BREAK																	
16:00:00	0	1	0	0	1	0	1	0	0	1	8	1	0	1	9	11	
16:15:00	0	0	0	0	0	0	4	0	0	4	6	0	0	1	6	10	
16:30:00	1	2	0	0	3	0	5	0	0	5	6	1	0	1	7	15	
16:45:00	0	0	0	0	0	0	5	0	0	5	7	2	0	3	9	14	50
17:00:00	0	2	0	0	2	0	2	0	1	2	8	0	0	1	8	12	51
17:15:00	0	0	0	0	0	0	4	0	0	4	6	2	0	1	8	12	53
17:30:00	1	1	0	0	2	0	9	0	0	9	6	2	0	0	8	19	57
17:45:00	1	2	0	0	3	1	5	0	1	6	9	0	0	1	9	18	61
18:00:00	0	0	0	0	0	1	4	0	0	5	6	2	0	2	8	13	62
18:15:00	0	1	0	0	1	1	3	0	0	4	5	0	0	4	5	10	60
18:30:00	0	0	0	0	0	0	3	0	0	3	5	1	0	0	6	9	50
18:45:00	3	3	0	0	6	1	4	0	0	5	3	1	0	0	4	15	47
Grand Total	12	19	0	1	31	11	115	0	4	126	114	18	4	24	136	293	-
Approach%	38.7%	61.3%	0%	-	-	8.7%	91.3%	0%	-	-	83.8%	13.2%	2.9%	-	-	-	-
Totals %	4.1%	6.5%	0%	-	10.6%	3.8%	39.2%	0%	-	43%	38.9%	6.1%	1.4%	-	46.4%	-	-
Heavy	1	0	0	-	-	0	1	0	-	-	0	1	0	-	-	-	-
Heavy %	8.3%	0%	0%	-	-	0%	0.9%	0%	-	-	0%	5.6%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (16.23 °C)

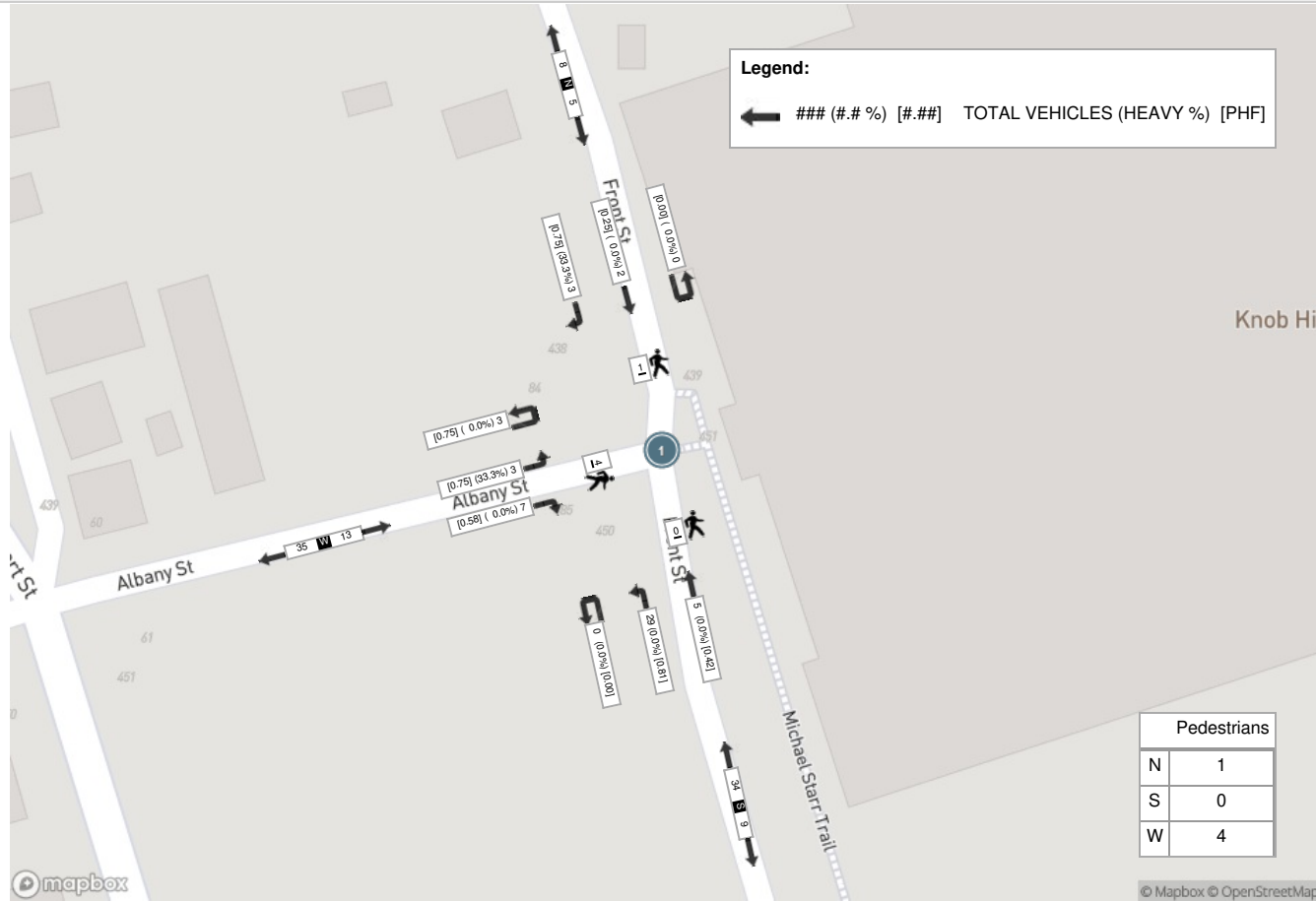
Start Time	Southbound FRONT STREET					Northbound FRONT STREET					Eastbound ALBANY STREET					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
07:45:00	0	0	0	1	0	1	7	0	0	8	2	0	1	0	3	11
08:00:00	1	2	0	0	3	3	6	0	0	9	3	1	1	3	5	17
08:15:00	1	0	0	0	1	1	7	0	0	8	1	1	0	1	2	11
08:30:00	1	0	0	0	1	0	9	0	0	9	1	1	1	0	3	13
Grand Total	3	2	0	1	5	5	29	0	0	34	7	3	3	4	13	52
Approach%	60%	40%	0%		-	14.7%	85.3%	0%		-	53.8%	23.1%	23.1%		-	-
Totals %	5.8%	3.8%	0%		9.6%	9.6%	55.8%	0%		65.4%	13.5%	5.8%	5.8%		25%	-
PHF	0.75	0.25	0		0.42	0.42	0.81	0		0.94	0.58	0.75	0.75		0.65	-
Heavy	1	0	0		1	0	0	0		0	0	1	0		1	-
Heavy %	33.3%	0%	0%		20%	0%	0%	0%		0%	0%	33.3%	0%		7.7%	-
Lights	1	2	0		3	5	29	0		34	7	0	3		10	-
Lights %	33.3%	100%	0%		60%	100%	100%	0%		100%	100%	0%	100%		76.9%	-
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	1	0		1	-
Single-Unit Trucks %	33.3%	0%	0%		20%	0%	0%	0%		0%	0%	33.3%	0%		7.7%	-
Bicycles on Road	1	0	0		1	0	0	0		0	0	2	0		2	-
Bicycles on Road %	33.3%	0%	0%		20%	0%	0%	0%		0%	0%	66.7%	0%		15.4%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	4	-	-
Pedestrians%	-	-	-	20%	-	-	-	-	0%	-	-	-	-	80%	-	-



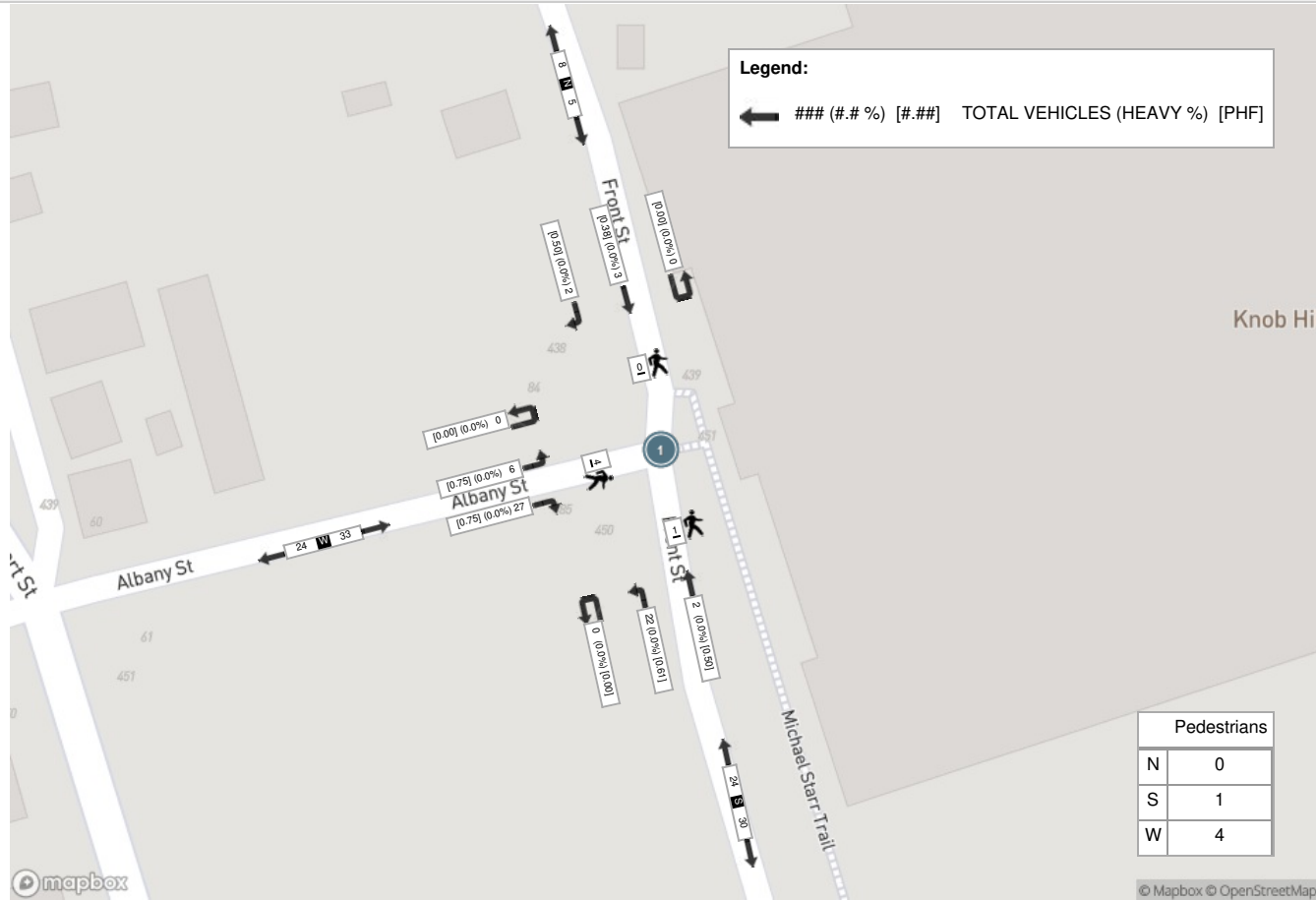
Peak Hour: 05:15 PM - 06:15 PM Weather: Overcast Clouds (21.23 °C)

Start Time	Southbound FRONT STREET					Northbound FRONT STREET					Eastbound ALBANY STREET					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
17:15:00	0	0	0	0	0	0	4	0	0	4	6	2	0	1	8	12
17:30:00	1	1	0	0	2	0	9	0	0	9	6	2	0	0	8	19
17:45:00	1	2	0	0	3	1	5	0	1	6	9	0	0	1	9	18
18:00:00	0	0	0	0	0	1	4	0	0	5	6	2	0	2	8	13
Grand Total	2	3	0	0	5	2	22	0	1	24	27	6	0	4	33	62
Approach%	40%	60%	0%		-	8.3%	91.7%	0%		-	81.8%	18.2%	0%		-	-
Totals %	3.2%	4.8%	0%		8.1%	3.2%	35.5%	0%		38.7%	43.5%	9.7%	0%		53.2%	-
PHF	0.5	0.38	0		0.42	0.5	0.61	0		0.67	0.75	0.75	0		0.92	-
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	-
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	2	1	0		3	0	20	0		20	26	5	0		31	-
Lights %	100%	33.3%	0%		60%	0%	90.9%	0%		83.3%	96.3%	83.3%	0%		93.9%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	0	2	0		2	2	2	0		4	1	1	0		2	-
Bicycles on Road %	0%	66.7%	0%		40%	100%	9.1%	0%		16.7%	3.7%	16.7%	0%		6.1%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	4	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	20%	-	-	-	-	80%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (16.23 °C)



Peak Hour: 05:15 PM - 06:15 PM Weather: Overcast Clouds (21.23 °C)





Turning Movement Count (3 . ALBERT ST & FIRST AVE)

Start Time	N Approach ALBERT ST						E Approach FIRST AVE						S Approach ALBERT ST						W Approach FIRST AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	3	5	0	0	0	8	4	31	4	0	0	39	2	5	1	0	0	8	2	7	0	0	2	9	64	
07:15:00	0	5	2	0	1	7	8	50	4	0	1	62	5	10	2	0	0	17	1	3	0	0	1	4	90	
07:30:00	2	3	1	0	1	6	9	49	3	0	1	61	1	6	4	0	1	11	1	8	2	0	1	11	89	
07:45:00	1	10	5	0	0	16	14	64	8	0	1	86	2	7	0	0	0	9	0	7	1	0	2	8	119	362
08:00:00	1	8	1	0	0	10	12	54	3	0	0	69	0	5	0	0	1	5	0	8	3	0	3	11	95	393
08:15:00	1	4	3	0	0	8	18	60	3	0	5	81	4	11	1	0	1	16	4	11	1	0	1	16	121	424
08:30:00	2	11	2	0	1	15	12	50	6	0	2	68	6	7	3	0	0	16	0	13	0	0	0	13	112	447
08:45:00	4	8	5	0	0	17	16	47	4	0	1	67	3	12	2	0	0	17	0	18	1	0	1	19	120	448
09:00:00	2	9	1	0	0	12	10	33	5	0	0	48	2	7	1	0	0	10	1	20	0	0	0	21	91	444
09:15:00	5	7	1	0	0	13	11	30	2	0	1	43	4	14	0	0	2	18	2	15	0	0	0	17	91	414
09:30:00	2	9	3	0	0	14	10	44	5	0	1	59	6	5	1	0	1	12	1	20	3	0	0	24	109	411
09:45:00	0	6	2	0	0	8	9	34	3	0	0	46	5	9	5	0	0	19	2	5	4	0	1	11	84	375
BREAK																										
16:00:00	4	13	2	0	3	19	12	34	0	0	1	46	13	27	3	0	4	43	6	14	1	0	6	21	129	
16:15:00	2	20	1	0	2	23	10	51	5	0	1	66	10	12	0	0	0	22	5	15	2	0	4	22	133	
16:30:00	0	7	4	0	0	11	13	50	1	0	0	64	7	19	1	0	0	27	3	15	1	0	0	19	121	
16:45:00	8	13	4	0	0	25	12	38	3	0	2	53	11	15	2	0	0	28	3	23	4	0	0	30	136	519
17:00:00	1	16	10	0	2	27	7	35	1	0	0	43	12	20	1	0	0	33	5	5	1	0	0	11	114	504
17:15:00	1	13	4	0	2	18	16	35	2	0	0	53	7	9	3	0	1	19	1	20	1	0	2	22	112	483
17:30:00	2	11	1	0	1	14	12	26	0	0	2	38	6	10	4	0	2	20	5	15	1	0	0	21	93	455
17:45:00	5	15	3	0	0	23	4	32	3	0	0	39	8	5	3	0	0	16	3	13	2	0	0	18	96	415
18:00:00	0	9	3	0	1	12	4	26	0	0	0	30	3	8	0	0	1	11	1	14	1	0	2	16	69	370
18:15:00	2	10	6	0	1	18	4	27	1	0	0	32	9	13	4	0	0	26	2	12	2	0	0	16	92	350
18:30:00	2	6	4	0	1	12	6	23	2	0	1	31	4	15	2	0	0	21	3	12	1	0	1	16	80	337
18:45:00	2	11	2	0	0	15	7	21	2	0	0	30	6	9	2	0	1	17	1	17	1	0	0	19	81	322
Grand Total	52	229	70	0	16	351	240	944	70	0	20	1254	136	260	45	0	15	441	52	310	33	0	27	395	2441	-
Approach%	14.8%	65.2%	19.9%	0%	-	-	19.1%	75.3%	5.6%	0%	-	-	30.8%	59%	10.2%	0%	-	-	13.2%	78.5%	8.4%	0%	-	-	-	-
Totals %	2.1%	9.4%	2.9%	0%	14.4%	-	9.8%	38.7%	2.9%	0%	51.4%	-	5.6%	10.7%	1.8%	0%	18.1%	-	2.1%	12.7%	1.4%	0%	16.2%	-	-	-
Heavy	1	1	1	0	-	-	5	20	1	0	-	-	7	5	2	0	-	-	1	11	2	0	-	-	-	-
Heavy %	1.9%	0.4%	1.4%	0%	-	-	2.1%	2.1%	1.4%	0%	-	-	5.1%	1.9%	4.4%	0%	-	-	1.9%	3.5%	6.1%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (0.8 °C)

Start Time	N Approach ALBERT ST						E Approach FIRST AVE						S Approach ALBERT ST						W Approach FIRST AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	1	8	1	0	0	10	12	54	3	0	0	69	0	5	0	0	1	5	0	8	3	0	3	11	95
08:15:00	1	4	3	0	0	8	18	60	3	0	5	81	4	11	1	0	1	16	4	11	1	0	1	16	121
08:30:00	2	11	2	0	1	15	12	50	6	0	2	68	6	7	3	0	0	16	0	13	0	0	0	13	112
08:45:00	4	8	5	0	0	17	16	47	4	0	1	67	3	12	2	0	0	17	0	18	1	0	1	19	120
Grand Total	8	31	11	0	1	50	58	211	16	0	8	285	13	35	6	0	2	54	4	50	5	0	5	59	448
Approach%	16%	62%	22%	0%	-	-	20.4%	74%	5.6%	0%	-	-	24.1%	64.8%	11.1%	0%	-	-	6.8%	84.7%	8.5%	0%	-	-	-
Totals %	1.8%	6.9%	2.5%	0%	11.2%	11.2%	12.9%	47.1%	3.6%	0%	63.6%	63.6%	2.9%	7.8%	1.3%	0%	12.1%	12.1%	0.9%	11.2%	1.1%	0%	13.2%	13.2%	-
PHF	0.5	0.7	0.55	0	0.74	0.74	0.81	0.88	0.67	0	0.88	0.88	0.54	0.73	0.5	0	0.79	0.79	0.25	0.69	0.42	0	0.78	0.78	-
Heavy	0	0	0	0	0	0	0	9	0	0	9	9	2	0	1	0	3	3	0	4	0	0	4	4	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	4.3%	0%	0%	3.2%	3.2%	15.4%	0%	16.7%	0%	5.6%	5.6%	0%	8%	0%	0%	6.8%	6.8%	-
Lights	8	31	11	0	50	50	58	202	16	0	276	276	11	35	5	0	51	51	4	46	5	0	55	55	-
Lights %	100%	100%	100%	0%	100%	100%	100%	95.7%	100%	0%	96.8%	96.8%	84.6%	100%	83.3%	0%	94.4%	94.4%	100%	92%	100%	0%	93.2%	93.2%	-
Single-Unit Trucks	0	0	0	0	0	0	0	3	0	0	3	3	0	0	1	0	1	1	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	1.4%	0%	0%	1.1%	1.1%	0%	0%	16.7%	0%	1.9%	1.9%	0%	0%	0%	0%	0%	0%	-
Buses	0	0	0	0	0	0	0	6	0	0	6	6	2	0	0	0	2	2	0	4	0	0	4	4	-
Buses %	0%	0%	0%	0%	0%	0%	0%	2.8%	0%	0%	2.1%	2.1%	15.4%	0%	0%	0%	3.7%	3.7%	0%	8%	0%	0%	6.8%	6.8%	-
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	-
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%	-
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 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%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	5	-	-
Pedestrians %	-	-	-	-	6.3%	-	-	-	-	-	50%	-	-	-	-	-	12.5%	-	-	-	-	-	31.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (5.12 °C)

Start Time	N Approach ALBERT ST						E Approach FIRST AVE						S Approach ALBERT ST						W Approach FIRST AVE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	4	13	2	0	3	19	12	34	0	0	1	46	13	27	3	0	4	43	6	14	1	0	6	21	129
16:15:00	2	20	1	0	2	23	10	51	5	0	1	66	10	12	0	0	0	22	5	15	2	0	4	22	133
16:30:00	0	7	4	0	0	11	13	50	1	0	0	64	7	19	1	0	0	27	3	15	1	0	0	19	121
16:45:00	8	13	4	0	0	25	12	38	3	0	2	53	11	15	2	0	0	28	3	23	4	0	0	30	136
Grand Total	14	53	11	0	5	78	47	173	9	0	4	229	41	73	6	0	4	120	17	67	8	0	10	92	519
Approach%	17.9%	67.9%	14.1%	0%	-	-	20.5%	75.5%	3.9%	0%	-	-	34.2%	60.8%	5%	0%	-	-	18.5%	72.8%	8.7%	0%	-	-	-
Totals %	2.7%	10.2%	2.1%	0%	15%	9.1%	33.3%	1.7%	0%	44.1%	7.9%	14.1%	1.2%	0%	23.1%	3.3%	12.9%	1.5%	0%	17.7%	-	-	-		
PHF	0.44	0.66	0.69	0	0.78	0.9	0.85	0.45	0	0.87	0.79	0.68	0.5	0	0.7	0.71	0.73	0.5	0	0.77	-	-	-		
Heavy	0	0	0	0	0	2	4	1	0	7	0	2	0	0	2	1	3	0	0	4	-	-	-		
Heavy %	0%	0%	0%	0%	0%	4.3%	2.3%	11.1%	0%	3.1%	0%	2.7%	0%	0%	1.7%	5.9%	4.5%	0%	0%	4.3%	-	-	-		
Lights	14	53	11	0	78	45	169	8	0	222	41	71	6	0	118	16	64	8	0	88	-	-	-		
Lights %	100%	100%	100%	0%	100%	95.7%	97.7%	88.9%	0%	96.9%	100%	97.3%	100%	0%	98.3%	94.1%	95.5%	100%	0%	95.7%	-	-	-		
Single-Unit Trucks	0	0	0	0	0	2	1	0	0	3	0	1	0	0	1	1	0	0	0	1	-	-	-		
Single-Unit Trucks %	0%	0%	0%	0%	0%	4.3%	0.6%	0%	0%	1.3%	0%	1.4%	0%	0%	0.8%	5.9%	0%	0%	0%	1.1%	-	-	-		
Buses	0	0	0	0	0	0	2	1	0	3	0	1	0	0	1	0	3	0	0	3	-	-	-		
Buses %	0%	0%	0%	0%	0%	0%	1.2%	11.1%	0%	1.3%	0%	1.4%	0%	0%	0.8%	0%	4.5%	0%	0%	3.3%	-	-	-		
Articulated Trucks	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	-	-	-		
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0.4%	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 Road %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-		
Pedestrians	-	-	-	-	5	-	-	-	-	4	-	-	-	-	-	4	-	-	-	9	-	-	-		
Pedestrians %	-	-	-	-	21.7%	-	-	-	-	17.4%	-	-	-	-	-	17.4%	-	-	-	39.1%	-	-	-		
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	1	-	-	-		
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	4.3%	-	-	-		

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (0.8 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (5.12 °C)





Turning Movement Count (2 . FRONT STREET & FIRST AVENUE)

Start Time	Southbound FRONT STREET						Westbound FIRST AVENUE						Northbound FRONT STREET						Eastbound FIRST AVENUE						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	2	0	4	0	1	6	4	57	0	0	2	61	2	1	0	0	0	3	2	19	1	0	0	22	92		
07:15:00	1	0	4	0	0	5	6	46	1	0	1	53	1	2	1	0	1	4	1	13	0	0	0	14	76		
07:30:00	1	0	2	0	0	3	5	52	1	0	1	58	2	0	2	0	1	4	2	19	2	0	0	23	88		
07:45:00	0	0	4	0	4	4	9	59	0	0	0	68	0	1	0	0	3	1	0	24	1	0	0	25	98	354	
08:00:00	0	0	4	0	2	4	5	53	0	0	0	58	0	1	0	0	0	1	0	26	2	0	2	28	91	353	
08:15:00	3	0	2	0	3	5	6	69	1	0	0	76	1	2	3	0	2	6	0	23	0	0	1	23	110	387	
08:30:00	1	0	0	0	1	1	7	66	0	0	0	73	2	1	0	0	2	3	0	28	1	0	0	29	106	405	
08:45:00	3	0	2	0	4	5	2	56	3	0	2	61	2	0	0	0	1	2	0	32	1	0	0	33	101	408	
09:00:00	1	0	1	0	0	2	4	42	3	0	0	49	1	1	1	0	1	3	2	29	1	0	0	32	86	403	
09:15:00	4	0	3	0	2	7	1	46	1	0	0	48	1	0	0	0	0	1	1	17	3	0	0	21	77	370	
09:30:00	3	0	4	0	0	7	3	43	0	0	0	46	0	0	1	0	2	1	1	38	0	0	0	39	93	357	
09:45:00	1	0	2	0	0	3	3	37	0	0	0	40	2	0	1	0	1	3	0	29	0	0	0	29	75	331	
BREAK																											
16:00:00	0	1	7	0	3	8	0	35	1	0	2	36	0	1	1	0	2	2	1	43	1	0	2	45	91		
16:15:00	0	0	7	0	3	7	3	37	1	0	1	41	2	0	0	0	6	2	2	39	2	0	0	43	93		
16:30:00	2	2	4	0	3	8	5	46	2	0	1	53	0	0	0	0	4	0	2	53	1	0	0	56	117		
16:45:00	2	1	6	0	1	9	6	62	1	0	0	69	0	0	0	0	5	0	2	53	2	0	1	57	135	436	
17:00:00	2	1	7	0	3	10	2	43	0	0	1	45	0	0	2	0	1	2	2	58	0	0	1	60	117	462	
17:15:00	3	1	2	0	2	6	3	55	2	0	0	60	2	0	0	0	1	2	1	47	1	0	0	49	117	486	
17:30:00	4	0	3	0	2	7	3	39	0	0	2	42	1	1	0	0	5	2	1	59	5	0	1	65	116	485	
17:45:00	4	3	1	0	3	8	0	42	1	0	4	43	1	1	1	0	1	3	2	46	2	0	3	50	104	454	
18:00:00	0	2	5	0	5	7	2	41	1	0	2	44	1	1	0	0	1	2	2	46	1	0	1	49	102	439	
18:15:00	3	2	2	0	4	7	3	44	0	0	5	47	0	0	0	0	3	0	2	31	2	0	3	35	89	411	
18:30:00	0	1	4	0	2	5	2	48	3	0	0	53	2	1	0	0	7	3	2	42	0	0	0	44	105	400	
18:45:00	1	0	5	0	1	6	3	41	1	0	0	45	0	1	1	0	3	2	2	28	2	0	0	32	85	381	
Grand Total	41	14	85	0	49	140	87	1159	23	0	24	1269	23	15	14	0	53	52	30	842	31	0	15	903	2364	-	
Approach%	29.3%	10%	60.7%	0%	-	-	6.9%	91.3%	1.8%	0%	-	-	44.2%	28.8%	26.9%	0%	-	-	3.3%	93.2%	3.4%	0%	-	-	-	-	
Totals %	1.7%	0.6%	3.6%	0%	5.9%	5.9%	3.7%	49%	1%	0%	53.7%	53.7%	1%	0.6%	0.6%	0%	2.2%	2.2%	1.3%	35.6%	1.3%	0%	38.2%	38.2%	-	-	
Heavy	0	0	0	0	-	-	1	62	0	0	-	-	0	0	0	0	-	-	1	28	0	0	-	-	-	-	
Heavy %	0%	0%	0%	0%	-	-	1.1%	5.3%	0%	0%	-	-	0%	0%	0%	0%	-	-	3.3%	3.3%	0%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (16.23 °C)

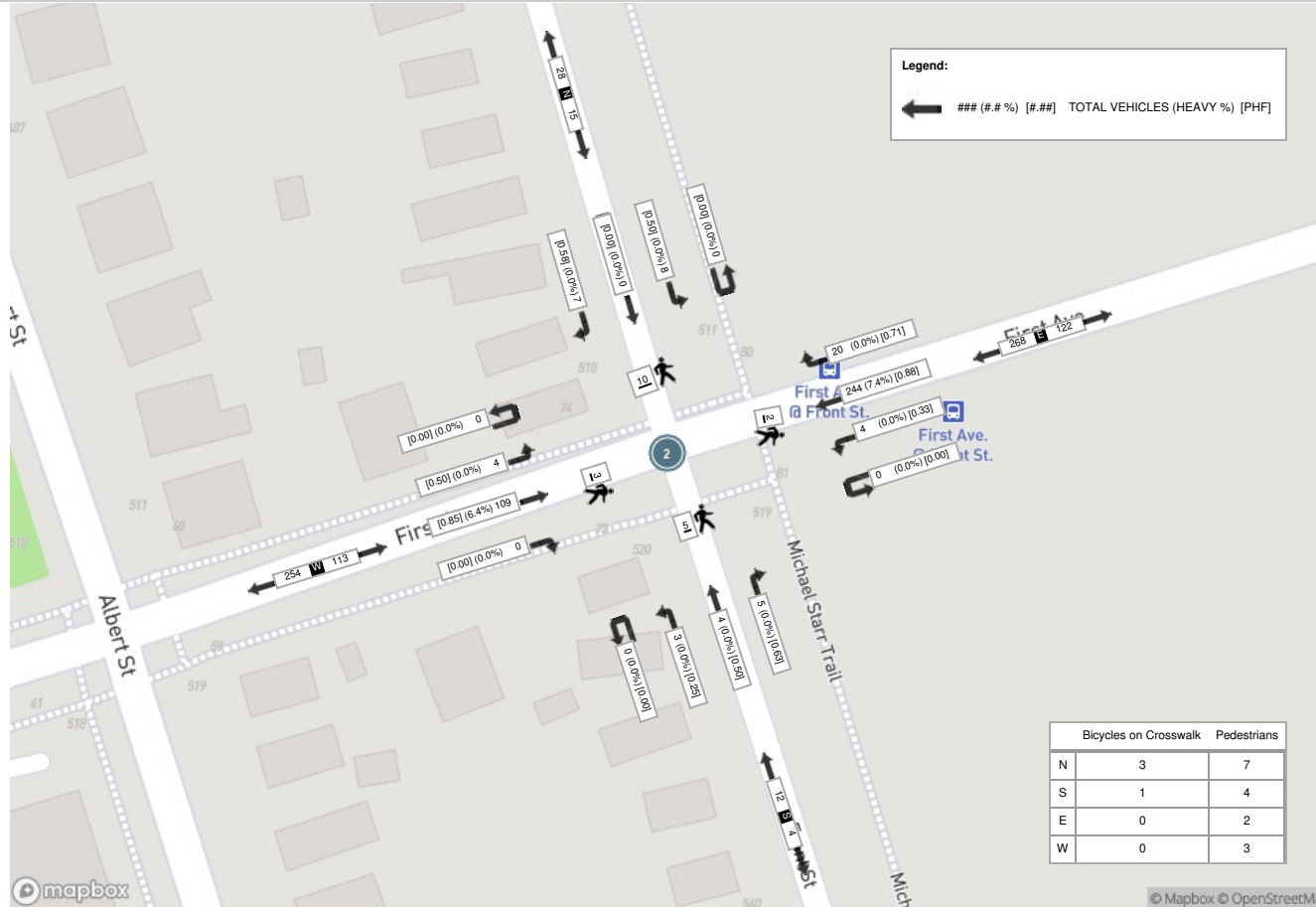
Start Time	Southbound FRONT STREET						Westbound FIRST AVENUE						Northbound FRONT STREET						Eastbound FIRST AVENUE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	0	0	4	0	2	4	5	53	0	0	0	58	0	1	0	0	0	1	0	26	2	0	2	28	91
08:15:00	3	0	2	0	3	5	6	69	1	0	0	76	1	2	3	0	2	6	0	23	0	0	1	23	110
08:30:00	1	0	0	0	1	1	7	66	0	0	0	73	2	1	0	0	2	3	0	28	1	0	0	29	106
08:45:00	3	0	2	0	4	5	2	56	3	0	2	61	2	0	0	0	1	2	0	32	1	0	0	33	101
Grand Total	7	0	8	0	10	15	20	244	4	0	2	268	5	4	3	0	5	12	0	109	4	0	3	113	408
Approach%	46.7%	0%	53.3%	0%	-	-	7.5%	91%	1.5%	0%	-	-	41.7%	33.3%	25%	0%	-	-	0%	96.5%	3.5%	0%	-	-	-
Totals %	1.7%	0%	2%	0%	3.7%	3.7%	4.9%	59.8%	1%	0%	65.7%	65.7%	1.2%	1%	0.7%	0%	2.9%	2.9%	0%	26.7%	1%	0%	27.7%	27.7%	-
PHF	0.58	0	0.5	0	0.75	0.75	0.71	0.88	0.33	0	0.88	0.88	0.63	0.5	0.25	0	0.5	0.5	0	0.85	0.5	0	0.86	0.86	-
Heavy	0	0	0	0	0	0	0	18	0	0	18	18	0	0	0	0	0	0	0	7	0	0	7	7	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	7.4%	0%	0%	6.7%	6.7%	0%	0%	0%	0%	0%	0%	0%	6.4%	0%	0%	6.2%	6.2%	-
Lights	6	0	8	0	14	14	20	225	4	0	249	249	5	4	3	0	12	12	0	102	3	0	105	105	-
Lights %	85.7%	0%	100%	0%	93.3%	93.3%	100%	92.2%	100%	0%	92.9%	92.9%	100%	100%	100%	0%	100%	100%	0%	93.6%	75%	0%	92.9%	92.9%	-
Single-Unit Trucks	0	0	0	0	0	0	0	11	0	0	11	11	0	0	0	0	0	0	0	1	0	0	1	1	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	4.5%	0%	0%	4.1%	4.1%	0%	0%	0%	0%	0%	0%	0%	0.9%	0%	0%	0.9%	0.9%	-
Buses	0	0	0	0	0	0	0	7	0	0	7	7	0	0	0	0	0	0	0	6	0	0	6	6	-
Buses %	0%	0%	0%	0%	0%	0%	0%	2.9%	0%	0%	2.6%	2.6%	0%	0%	0%	0%	0%	0%	0%	5.5%	0%	0%	5.3%	5.3%	-
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	-
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%	-
Bicycles on Road	1	0	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	-
Bicycles on Road %	14.3%	0%	0%	0%	6.7%	6.7%	0%	0.4%	0%	0%	0.4%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0.9%	0.9%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians %	-	-	-	-	35%	-	-	-	-	-	10%	-	-	-	-	-	20%	-	-	-	-	-	15%	-	-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	-	15%	-	-	-	-	-	0%	-	-	-	-	-	5%	-	-	-	-	-	0%	-	-



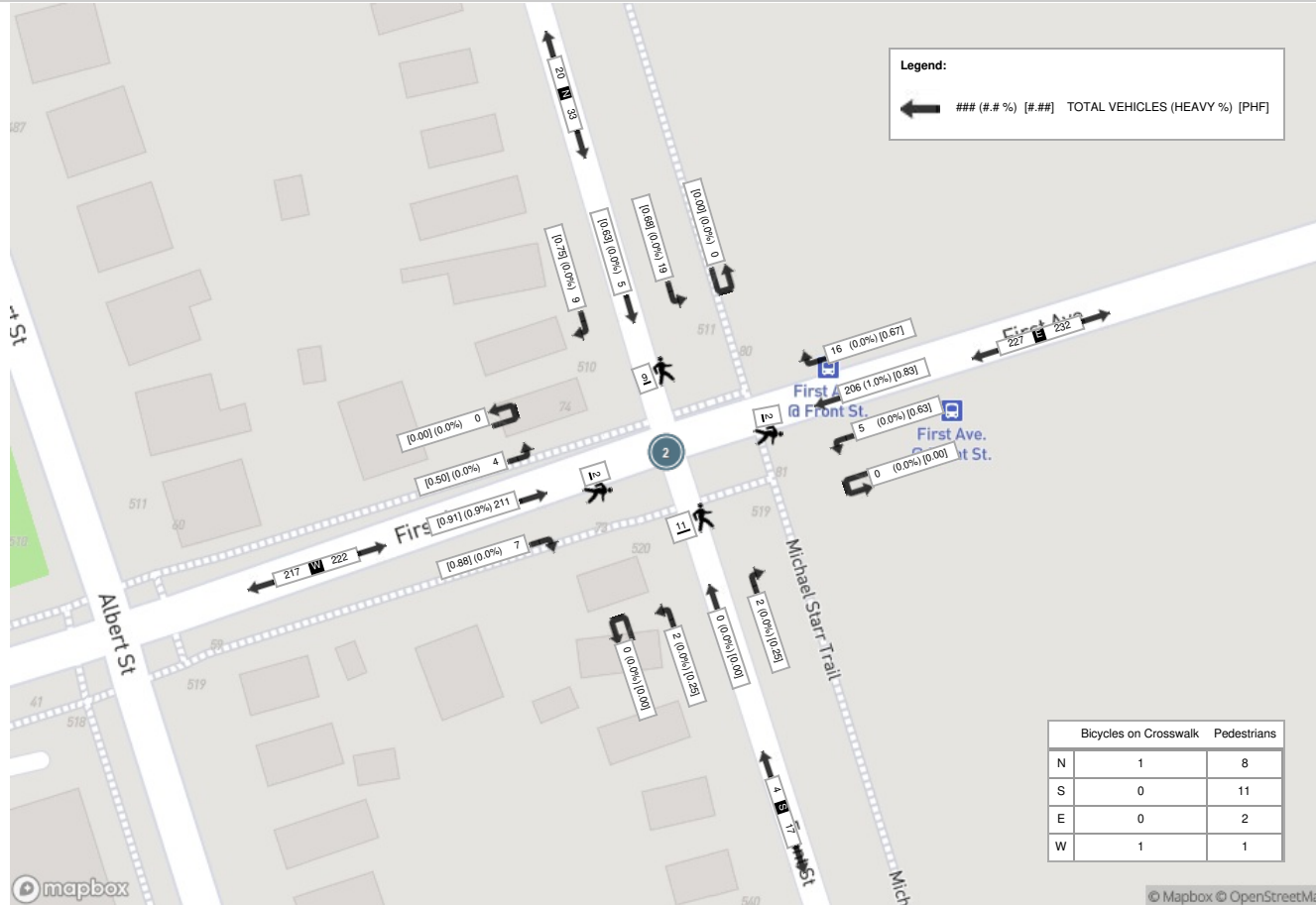
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (21.23 °C)

Start Time	Southbound FRONT STREET						Westbound FIRST AVENUE						Northbound FRONT STREET						Eastbound FIRST AVENUE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	2	2	4	0	3	8	5	46	2	0	1	53	0	0	0	0	4	0	2	53	1	0	0	56	117
16:45:00	2	1	6	0	1	9	6	62	1	0	0	69	0	0	0	0	5	0	2	53	2	0	1	57	135
17:00:00	2	1	7	0	3	10	2	43	0	0	1	45	0	0	2	0	1	2	2	58	0	0	1	60	117
17:15:00	3	1	2	0	2	6	3	55	2	0	0	60	2	0	0	0	1	2	1	47	1	0	0	49	117
Grand Total	9	5	19	0	9	33	16	206	5	0	2	227	2	0	2	0	11	4	7	211	4	0	2	222	486
Approach%	27.3%	15.2%	57.6%	0%	-	-	7%	90.7%	2.2%	0%	-	-	50%	0%	50%	0%	-	-	3.2%	95%	1.8%	0%	-	-	-
Totals %	1.9%	1%	3.9%	0%	6.8%	6.8%	3.3%	42.4%	1%	0%	46.7%	46.7%	0.4%	0%	0.4%	0%	0.8%	0.8%	1.4%	43.4%	0.8%	0%	45.7%	45.7%	-
PHF	0.75	0.63	0.68	0	0.83	0.83	0.67	0.83	0.63	0	0.82	0.82	0.25	0	0.25	0	0.5	0.5	0.88	0.91	0.5	0	0.93	0.93	-
Heavy	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	2	0	0	2	2	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.9%	0.9%	0%	0%	0%	0%	0%	0%	0%	0.9%	0%	0%	0.9%	0.9%	-
Lights	7	4	18	0	29	29	16	204	5	0	225	225	2	0	2	0	4	4	7	209	4	0	220	220	-
Lights %	77.8%	80%	94.7%	0%	87.9%	87.9%	100%	99%	100%	0%	99.1%	99.1%	100%	0%	100%	0%	100%	100%	100%	99.1%	100%	0%	99.1%	99.1%	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	2	0	0	2	2	-
Buses %	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.9%	0.9%	0%	0%	0%	0%	0%	0%	0%	0.9%	0%	0%	0.9%	0.9%	-
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	-
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%	-
Bicycles on Road	2	1	1	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Bicycles on Road %	22.2%	20%	5.3%	0%	12.1%	12.1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	8	8	-	-	-	-	2	2	-	-	-	-	11	11	-	-	-	-	1	1	-
Pedestrians %	-	-	-	-	33.3%	33.3%	-	-	-	-	8.3%	8.3%	-	-	-	-	45.8%	45.8%	-	-	-	-	4.2%	4.2%	-
Bicycles on Crosswalk	-	-	-	-	1	1	-	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	1	1	-
Bicycles on Crosswalk %	-	-	-	-	4.2%	4.2%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	4.2%	4.2%	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (16.23 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (21.23 °C)



Appendix B – Existing Traffic Level of Service Calculations

Queues

1: Simcoe St S & First Street

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	276	751	622
Act Effct Green (s)	11.3	47.4	47.4
Actuated g/C Ratio	0.16	0.68	0.68
v/c Ratio	0.67	0.31	0.31
Control Delay	18.8	5.6	5.7
Queue Delay	0.0	0.0	0.0
Total Delay	18.8	5.6	5.7
LOS	B	A	A
Approach Delay	18.8	5.6	5.7
Approach LOS	B	A	A
Queue Length 50th (m)	12.9	17.1	14.2
Queue Length 95th (m)	31.9	35.1	30.3
Internal Link Dist (m)	137.3	52.0	196.6
Turn Bay Length (m)			
Base Capacity (vph)	624	2392	1991
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.44	0.31	0.31

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	

HCM Signalized Intersection Capacity Analysis

1: Simcoe St S & First Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	44	210	682	9	53	519
Future Volume (vph)	44	210	682	9	53	519
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8		5.5			5.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.89		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1641		3532			3523
Flt Permitted	0.99		1.00			0.83
Satd. Flow (perm)	1641		3532			2940
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	228	741	10	58	564
RTOR Reduction (vph)	147	0	1	0	0	0
Lane Group Flow (vph)	129	0	750	0	0	622
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.3		47.4			47.4
Effective Green, g (s)	11.3		47.4			47.4
Actuated g/C Ratio	0.16		0.68			0.68
Clearance Time (s)	5.8		5.5			5.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	264		2391			1990
v/s Ratio Prot	c0.08		c0.21			
v/s Ratio Perm						0.21
v/c Ratio	0.49		0.31			0.31
Uniform Delay, d1	26.7		4.6			4.6
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	1.4		0.3			0.4
Delay (s)	28.2		5.0			5.0
Level of Service	C		A			A
Approach Delay (s)	28.2		5.0			5.0
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Simcoe St S & Albany Street

10-16-2024












Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	27	891	22	9	542
Future Volume (Veh/h)	47	27	891	22	9	542
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	29	968	24	10	589
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			221			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	1294	496			992	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1195	350			875	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	95			99	
cM capacity (veh/h)	167	611			725	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	80	645	347	206	393	
Volume Left	51	0	0	10	0	
Volume Right	29	0	24	0	0	
cSH	227	1700	1700	725	1700	
Volume to Capacity	0.35	0.38	0.20	0.01	0.23	
Queue Length 95th (m)	12.1	0.0	0.0	0.3	0.0	
Control Delay (s)	29.3	0.0	0.0	0.6	0.0	
Lane LOS	D		A			
Approach Delay (s)	29.3	0.0		0.2		
Approach LOS	D					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			36.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

















10-16-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	7	29	5	2	3
Future Volume (Veh/h)	6	7	29	5	2	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	8	32	5	2	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	72	4	5			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	72	4	5			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	98			
cM capacity (veh/h)	913	1080	1616			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	15	37	5			
Volume Left	7	32	0			
Volume Right	8	0	3			
cSH	995	1616	1700			
Volume to Capacity	0.02	0.02	0.00			
Queue Length 95th (m)	0.4	0.5	0.0			
Control Delay (s)	8.7	6.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	6.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.4			
Intersection Capacity Utilization			18.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis


















7: Albert Street & Albany Street

10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	11	17	0	18	13	30	63	1	4	30	7
Future Volume (Veh/h)	6	11	17	0	18	13	30	63	1	4	30	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	12	18	0	20	14	33	68	1	4	33	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (m)												
								216				
pX, platoon unblocked												
vC, conflicting volume	204	180	37	204	184	68	41			69		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204	180	37	204	184	68	41			69		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	98	100	97	99	98			100		
cM capacity (veh/h)	715	697	1035	719	694	995	1568			1532		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	37	34	102	45								
Volume Left	7	0	33	4								
Volume Right	18	14	1	8								
cSH	833	793	1568	1532								
Volume to Capacity	0.04	0.04	0.02	0.00								
Queue Length 95th (m)	1.1	1.1	0.5	0.1								
Control Delay (s)	9.5	9.7	2.5	0.7								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.5	9.7	2.5	0.7								
Approach LOS	A	A										
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			25.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 10: Front Street & First Street

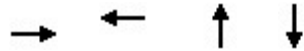
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	109	0	4	244	20	3	4	5	8	0	7
Future Volume (Veh/h)	4	109	0	4	244	20	3	4	5	8	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	118	0	4	265	22	3	4	5	9	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (m)	96											
pX, platoon unblocked												
vC, conflicting volume	287			118			418	421	118	417	410	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	287			118			418	421	118	417	410	276
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	98	100	99
cM capacity (veh/h)	1275			1470			537	521	934	538	528	763
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	122	291	12	9	8							
Volume Left	4	4	3	9	0							
Volume Right	0	22	5	0	8							
cSH	1275	1470	644	538	763							
Volume to Capacity	0.00	0.00	0.02	0.02	0.01							
Queue Length 95th (m)	0.1	0.1	0.5	0.4	0.3							
Control Delay (s)	0.3	0.1	10.7	11.8	9.8							
Lane LOS	A	A	B	B	A							
Approach Delay (s)	0.3	0.1	10.7	10.8								
Approach LOS				B	B							
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			25.6%	ICU Level of Service	A							
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	63	309	59	55
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.08	0.37	0.10	0.09
Control Delay	7.8	9.5	9.6	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.8	9.5	9.6	10.2
LOS	A	A	A	B
Approach Delay	7.8	9.5	9.6	10.2
Approach LOS	A	A	A	B
Queue Length 50th (m)	2.9	15.2	2.7	2.8
Queue Length 95th (m)	8.0	29.6	8.7	8.5
Internal Link Dist (m)	137.3	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	804	826	611	599
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	0.08	0.37	0.10	0.09

Intersection Summary

Cycle Length: 49.3	
Actuated Cycle Length: 49.3	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 33.7%	ICU Level of Service A
Analysis Period (min) 15	

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	5	50	4	16	211	58	6	35	13	11	31	8
Future Volume (vph)	5	50	4	16	211	58	6	35	13	11	31	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.97			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1839			1807			1792			1802	
Flt Permitted		0.97			0.99			0.98			0.95	
Satd. Flow (perm)		1799			1788			1758			1731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	54	4	17	229	63	7	38	14	12	34	9
RTOR Reduction (vph)	0	2	0	0	19	0	0	9	0	0	6	0
Lane Group Flow (vph)	0	61	0	0	290	0	0	50	0	0	49	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		802			808			602			593	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.16			0.03			c0.03	
v/c Ratio		0.08			0.36			0.08			0.08	
Uniform Delay, d1		7.8			8.8			11.0			11.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			1.2			0.3			0.3	
Delay (s)		8.0			10.1			11.2			11.2	
Level of Service		A			B			B			B	
Approach Delay (s)		8.0			10.1			11.2			11.2	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			10.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)			10.4		
Intersection Capacity Utilization			33.7%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 3: Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	30	835	32	24	954
Future Volume (Veh/h)	22	30	835	32	24	954
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	33	908	35	26	1037
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			226			
pX, platoon unblocked	0.99	0.99			0.99	
vC, conflicting volume	1496	472			943	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1476	437			915	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	94			96	
cM capacity (veh/h)	111	560			731	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	57	605	338	372	691	
Volume Left	24	0	0	26	0	
Volume Right	33	0	35	0	0	
cSH	208	1700	1700	731	1700	
Volume to Capacity	0.27	0.36	0.20	0.04	0.41	
Queue Length 95th (m)	8.6	0.0	0.0	0.9	0.0	
Control Delay (s)	28.8	0.0	0.0	1.1	0.0	
Lane LOS	D		A			
Approach Delay (s)	28.8	0.0		0.4		
Approach LOS	D					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			53.6%		ICU Level of Service	A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	27	22	2	3	2
Future Volume (Veh/h)	6	27	22	2	3	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	29	24	2	3	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	54	4	5			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54	4	5			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	99			
cM capacity (veh/h)	940	1080	1616			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	36	26	5			
Volume Left	7	24	0			
Volume Right	29	0	2			
cSH	1049	1616	1700			
Volume to Capacity	0.03	0.01	0.00			
Queue Length 95th (m)	0.9	0.4	0.0			
Control Delay (s)	8.6	6.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.6	6.7	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization		18.0%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	16	29	1	17	6	51	72	1	3	45	7
Future Volume (Veh/h)	12	16	29	1	17	6	51	72	1	3	45	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	17	32	1	18	7	55	78	1	3	49	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage (veh)												
Upstream signal (m)												
								216				
pX, platoon unblocked												
vC, conflicting volume	264	248	53	288	252	78	57			79		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264	248	53	288	252	78	57			79		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	97	100	97	99	96			100		
cM capacity (veh/h)	650	630	1014	612	627	982	1547			1519		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	26	134	60								
Volume Left	13	1	55	3								
Volume Right	32	7	1	8								
cSH	790	694	1547	1519								
Volume to Capacity	0.08	0.04	0.04	0.00								
Queue Length 95th (m)	2.0	0.9	0.9	0.0								
Control Delay (s)	9.9	10.4	3.2	0.4								
Lane LOS	A	B	A	A								
Approach Delay (s)	9.9	10.4	3.2	0.4								
Approach LOS	A	B										
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			28.1%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

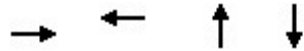
10-16-2024

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	4	211	7	5	206	16	2	0	2	19	5	9	
Future Volume (Veh/h)	4	211	7	5	206	16	2	0	2	19	5	9	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	4	229	8	5	224	17	2	0	2	21	5	10	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None					None							
Median storage veh													
Upstream signal (m)	96												
pX, platoon unblocked													
vC, conflicting volume	241			237				496	492	233	486	488	232
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	241			237				496	492	233	486	488	232
tC, single (s)	4.1			4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100				100	100	100	96	99	99
cM capacity (veh/h)	1326			1330				472	474	806	488	477	807
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2								
Volume Total	241	246	4	21	15								
Volume Left	4	5	2	21	0								
Volume Right	8	17	2	0	10								
cSH	1326	1330	595	488	656								
Volume to Capacity	0.00	0.00	0.01	0.04	0.02								
Queue Length 95th (m)	0.1	0.1	0.2	1.1	0.6								
Control Delay (s)	0.2	0.2	11.1	12.7	10.6								
Lane LOS	A	A	B	B	B								
Approach Delay (s)	0.2	0.2	11.1	11.8									
Approach LOS			B	B									
Intersection Summary													
Average Delay			1.1										
Intersection Capacity Utilization			24.5%	ICU Level of Service	A								
Analysis Period (min)			15										

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	100	249	131	85
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.13	0.30	0.21	0.14
Control Delay	7.4	8.5	9.1	10.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.4	8.5	9.1	10.4
LOS	A	A	A	B
Approach Delay	7.4	8.5	9.1	10.4
Approach LOS	A	A	A	B
Queue Length 50th (m)	4.1	11.4	5.3	4.3
Queue Length 95th (m)	10.6	23.3	14.6	11.7
Internal Link Dist (m)	148.5	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	796	830	630	607
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	0.13	0.30	0.21	0.14

















Intersection Summary

Cycle Length: 49.3	
Actuated Cycle Length: 49.3	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 33.1%	ICU Level of Service A
Analysis Period (min) 15	

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	67	17	9	173	47	6	73	41	11	53	14
Future Volume (vph)	8	67	17	9	173	47	6	73	41	11	53	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.97			0.95			0.98	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1809			1808			1772			1806	
Flt Permitted		0.97			0.99			0.99			0.96	
Satd. Flow (perm)		1764			1795			1754			1744	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	73	18	10	188	51	7	79	45	12	58	15
RTOR Reduction (vph)	0	10	0	0	19	0	0	30	0	0	10	0
Lane Group Flow (vph)	0	90	0	0	230	0	0	101	0	0	75	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		787			811			601			597	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.13			c0.06			0.04	
v/c Ratio		0.11			0.28			0.17			0.13	
Uniform Delay, d1		8.0			8.5			11.3			11.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.9			0.6			0.4	
Delay (s)		8.3			9.4			11.9			11.6	
Level of Service		A			A			B			B	
Approach Delay (s)		8.3			9.4			11.9			11.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			10.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)			10.4		
Intersection Capacity Utilization			33.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

12: First Street & Simcoe St S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	245	730	1110
Act Effct Green (s)	10.4	51.8	51.8
Actuated g/C Ratio	0.15	0.73	0.73
v/c Ratio	0.63	0.29	0.51
Control Delay	16.8	3.9	5.7
Queue Delay	0.0	0.0	0.0
Total Delay	16.8	3.9	5.7
LOS	B	A	A
Approach Delay	16.8	3.9	5.7
Approach LOS	B	A	A
Queue Length 50th (m)	9.4	12.3	24.4
Queue Length 95th (m)	27.4	27.2	54.1
Internal Link Dist (m)	148.5	57.6	201.5
Turn Bay Length (m)			
Base Capacity (vph)	674	2548	2158
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.29	0.51

Intersection Summary

Cycle Length: 71.2

Actuated Cycle Length: 71.2

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 6.4 Intersection LOS: A

Intersection Capacity Utilization 71.8% ICU Level of Service C

Analysis Period (min) 15

HCM Signalized Intersection Capacity Analysis

12: First Street & Simcoe St S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↓			↑↑
Traffic Volume (vph)	66	159	615	57	75	946
Future Volume (vph)	66	159	615	57	75	946
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.90		0.99			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1661		3494			3526
Flt Permitted	0.99		1.00			0.84
Satd. Flow (perm)	1661		3494			2966
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	173	668	62	82	1028
RTOR Reduction (vph)	148	0	6	0	0	0
Lane Group Flow (vph)	97	0	724	0	0	1110
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	10.4		51.8			51.8
Effective Green, g (s)	10.4		51.8			51.8
Actuated g/C Ratio	0.15		0.73			0.73
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	242		2541			2157
v/s Ratio Prot	c0.06		0.21			
v/s Ratio Perm						c0.37
v/c Ratio	0.40		0.29			0.51
Uniform Delay, d1	27.6		3.3			4.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	1.1		0.3			0.9
Delay (s)	28.7		3.6			5.1
Level of Service	C		A			A
Approach Delay (s)	28.7		3.6			5.1
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

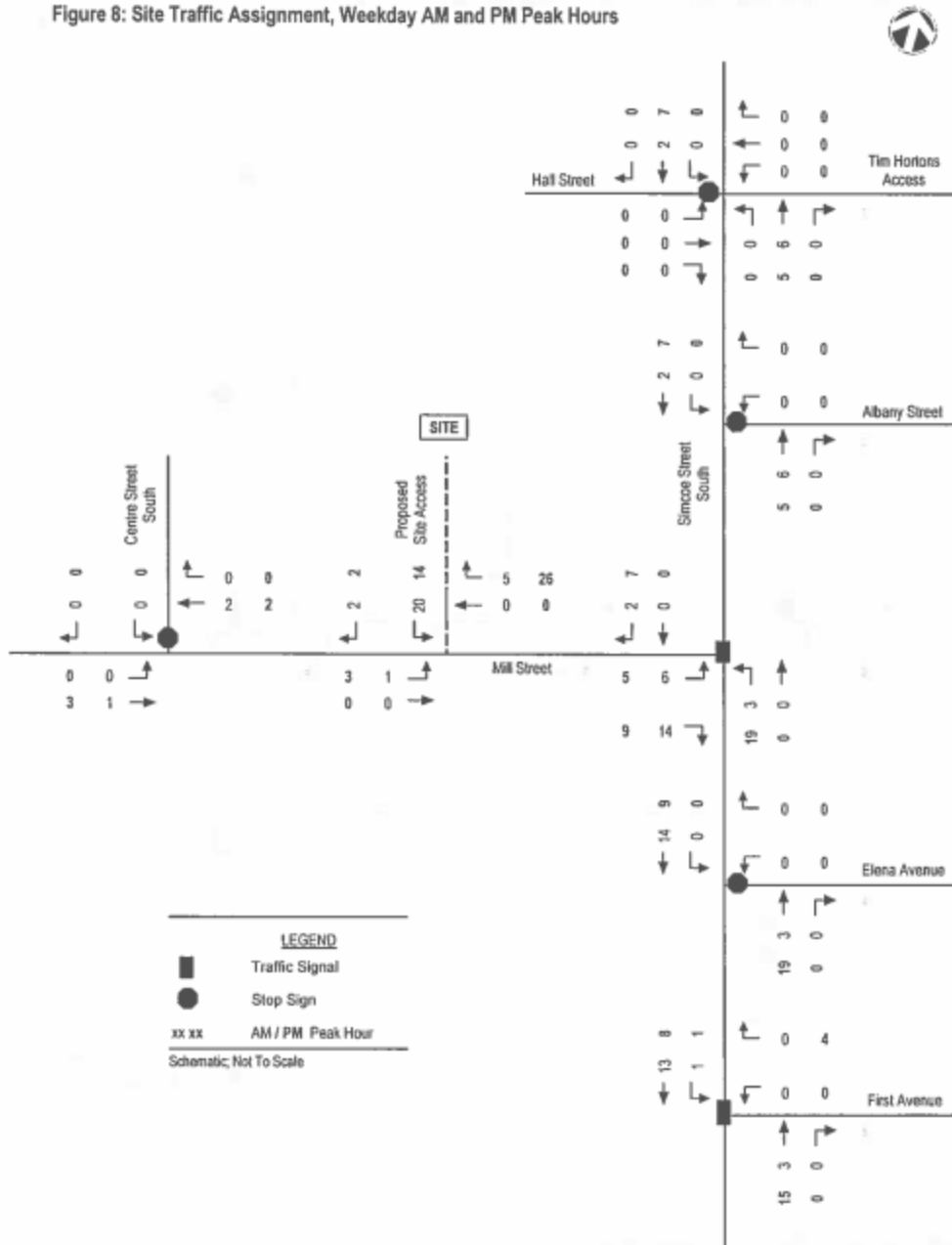
c Critical Lane Group

Appendix C – Background Development Traffic Volumes



TRAFFIC IMPACT / MANAGEMENT STUDY
 Proposed 5-storey Residential Development
 446 Simcoe Street South, Oshawa, ON

Figure 8: Site Traffic Assignment, Weekday AM and PM Peak Hours



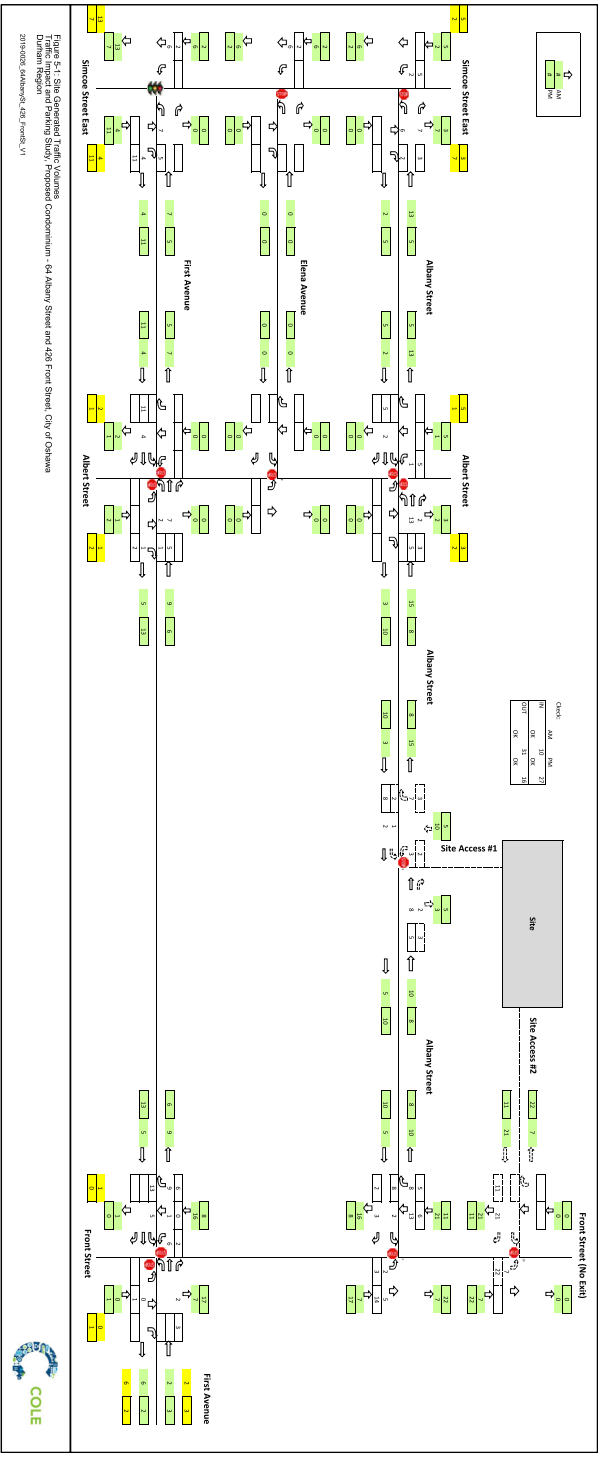
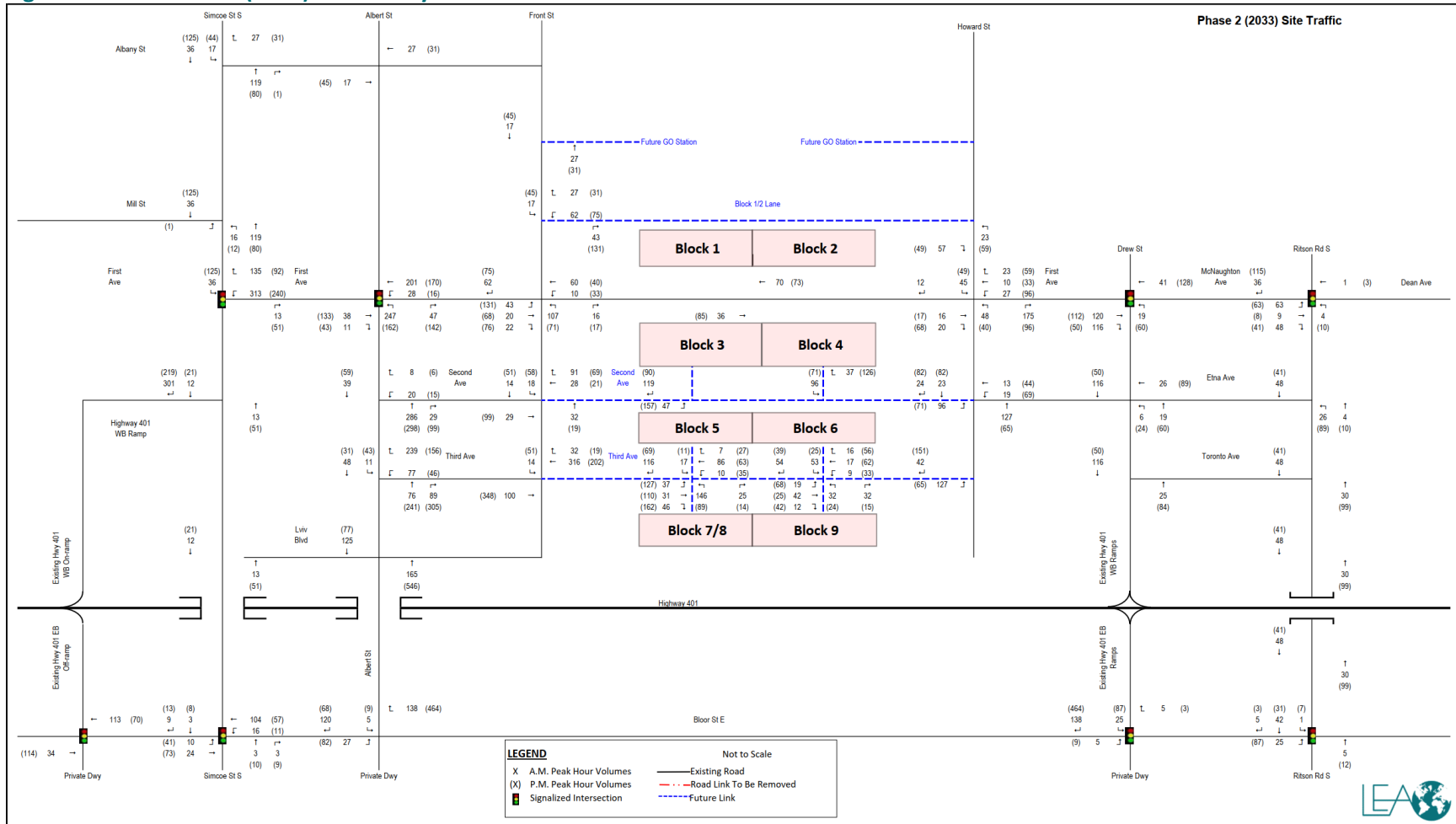


Figure 5-1 Site Standard Form of Approval
 Typical Inspection Planning Study, Proposed Condominium - 64 Albany Street and 428 Front Street, City of Ottawa
 2019-02-06, Drawing# CAD_Plan02_01

Figure 5-4: Site Vehicle (2033) – Weekday Peak Hour Traffic Volumes



Appendix D – Future Background Traffic Level of Service Calculations

Queues

1: Simcoe St S & First Street

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	785	807	692
Act Effct Green (s)	21.5	37.2	37.2
Actuated g/C Ratio	0.31	0.53	0.53
v/c Ratio	1.38	0.43	0.50
Control Delay	203.9	10.7	12.1
Queue Delay	0.0	0.0	0.0
Total Delay	203.9	10.7	12.1
LOS	F	B	B
Approach Delay	203.9	10.7	12.1
Approach LOS	F	B	B
Queue Length 50th (m)	~140.9	32.4	29.6
Queue Length 95th (m)	#207.1	45.2	43.5
Internal Link Dist (m)	137.3	52.0	196.6
Turn Bay Length (m)			
Base Capacity (vph)	570	1875	1371
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.38	0.43	0.50

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.38

Intersection Signal Delay: 77.5

Intersection LOS: E

Intersection Capacity Utilization 94.5%

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.

HCM Signalized Intersection Capacity Analysis

1: Simcoe St S & First Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	366	356	717	26	89	547
Future Volume (vph)	366	356	717	26	89	547
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8		5.5			5.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.93		0.99			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1696		3521			3515
Flt Permitted	0.98		1.00			0.73
Satd. Flow (perm)	1696		3521			2582
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	387	779	28	97	595
RTOR Reduction (vph)	50	0	4	0	0	0
Lane Group Flow (vph)	735	0	803	0	0	692
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	21.5		37.2			37.2
Effective Green, g (s)	21.5		37.2			37.2
Actuated g/C Ratio	0.31		0.53			0.53
Clearance Time (s)	5.8		5.5			5.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	520		1871			1372
v/s Ratio Prot	c0.43		0.23			
v/s Ratio Perm						c0.27
v/c Ratio	1.41		0.43			0.50
Uniform Delay, d1	24.2		10.0			10.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	197.3		0.7			1.3
Delay (s)	221.6		10.7			11.8
Level of Service	F		B			B
Approach Delay (s)	221.6		10.7			11.8
Approach LOS	F		B			B

Intersection Summary

HCM 2000 Control Delay	83.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 2: Simcoe St S/Simcoe Street S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	34	98	1055	22	65	615
Future Volume (Veh/h)	34	98	1055	22	65	615
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	107	1147	24	71	668
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			221			
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1635	586			1171	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1449	256			922	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	61	84			89	
cM capacity (veh/h)	96	654			648	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	144	765	406	294	445	
Volume Left	37	0	0	71	0	
Volume Right	107	0	24	0	0	
cSH	261	1700	1700	648	1700	
Volume to Capacity	0.55	0.45	0.24	0.11	0.26	
Queue Length 95th (m)	24.4	0.0	0.0	2.9	0.0	
Control Delay (s)	34.5	0.0	0.0	3.8	0.0	
Lane LOS	D		A			
Approach Delay (s)	34.5	0.0		1.5		
Approach LOS	D					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			66.7%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	27	58	10	15	11
Future Volume (Veh/h)	8	27	58	10	15	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	29	63	11	16	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	159	22	28			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	159	22	28			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	96			
cM capacity (veh/h)	799	1055	1585			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	38	74	28			
Volume Left	9	63	0			
Volume Right	29	0	12			
cSH	981	1585	1700			
Volume to Capacity	0.04	0.04	0.02			
Queue Length 95th (m)	1.0	1.0	0.0			
Control Delay (s)	8.8	6.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	6.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization			20.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	36	49	0	74	0	96	0	1	0	0	0
Future Volume (Veh/h)	0	36	49	0	74	0	96	0	1	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	39	53	0	80	0	104	0	1	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
None												
Median storage (veh)												
Upstream signal (m)												
216												
pX, platoon unblocked												
vC, conflicting volume	248	209	0	281	208	0	0			1		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	248	209	0	281	208	0	0			1		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	94	95	100	88	100	94			100		
cM capacity (veh/h)	607	644	1085	579	644	1084	1623			1622		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	92	80	105	0								
Volume Left	0	0	104	0								
Volume Right	53	0	1	0								
cSH	841	644	1623	1700								
Volume to Capacity	0.11	0.12	0.06	0.00								
Queue Length 95th (m)	2.9	3.4	1.6	0.0								
Control Delay (s)	9.8	11.4	7.3	0.0								
Lane LOS	A	B	A									
Approach Delay (s)	9.8	11.4	7.3	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			9.3									
Intersection Capacity Utilization			16.9%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

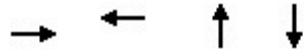
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	135	22	14	316	22	110	4	21	14	1	78
Future Volume (Veh/h)	52	135	22	14	316	22	110	4	21	14	1	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	147	24	15	343	24	120	4	23	15	1	85
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		96										
pX, platoon unblocked												
vC, conflicting volume	367			171			744	670	159	683	670	355
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	367			171			744	670	159	683	670	355
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			57	99	97	96	100	88
cM capacity (veh/h)	1192			1406			277	356	886	335	356	689
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	228	382	147	15	86							
Volume Left	57	15	120	15	0							
Volume Right	24	24	23	0	85							
cSH	1192	1406	312	335	682							
Volume to Capacity	0.05	0.01	0.47	0.04	0.13							
Queue Length 95th (m)	1.2	0.3	19.1	1.1	3.4							
Control Delay (s)	2.4	0.4	26.4	16.2	11.0							
Lane LOS	A	A	D	C	B							
Approach Delay (s)	2.4	0.4	26.4	11.8								
Approach LOS			D	B								
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			53.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	124	580	381	57
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.15	0.72	0.79	0.10
Control Delay	7.9	17.1	29.0	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.9	17.1	29.0	10.3
LOS	A	B	C	B
Approach Delay	7.9	17.1	29.0	10.3
Approach LOS	A	B	C	B
Queue Length 50th (m)	5.4	38.8	28.7	2.9
Queue Length 95th (m)	13.0	#74.0	#69.5	8.9
Internal Link Dist (m)	137.3	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	808	811	483	569
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	0.15	0.72	0.79	0.10

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 19.7

Intersection LOS: B

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	5	95	15	46	430	58	253	37	61	11	33	8
Future Volume (vph)	5	95	15	46	430	58	253	37	61	11	33	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.98	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		1827			1828			1756			1804	
Flt Permitted		0.98			0.97			0.75			0.90	
Satd. Flow (perm)		1790			1774			1365			1645	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	103	16	50	467	63	275	40	66	12	36	9
RTOR Reduction (vph)	0	9	0	0	9	0	0	15	0	0	6	0
Lane Group Flow (vph)	0	115	0	0	571	0	0	366	0	0	51	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		798			802			467			563	
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.32			0.27			0.03	
v/c Ratio		0.14			0.71			0.78			0.09	
Uniform Delay, d1		8.1			10.9			14.6			11.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.4			5.3			12.4			0.3	
Delay (s)		8.5			16.2			26.9			11.3	
Level of Service		A			B			C			B	
Approach Delay (s)		8.5			16.2			26.9			11.3	
Approach LOS		A			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)			10.4		
Intersection Capacity Utilization			70.1%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 3: Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕		↔	
Traffic Volume (veh/h)	25	75	958	33	128	1142
Future Volume (Veh/h)	25	75	958	33	128	1142
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	82	1041	36	139	1241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	226					
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1958	538			1077	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1847	277			873	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	44	87			80	
cM capacity (veh/h)	48	651			695	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	109	694	383	553	827	
Volume Left	27	0	0	139	0	
Volume Right	82	0	36	0	0	
cSH	158	1700	1700	695	1700	
Volume to Capacity	0.69	0.41	0.23	0.20	0.49	
Queue Length 95th (m)	32.3	0.0	0.0	5.9	0.0	
Control Delay (s)	67.4	0.0	0.0	5.2	0.0	
Lane LOS	F		A			
Approach Delay (s)	67.4	0.0	2.1			
Approach LOS	F					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			78.8%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	75	56	16	9	7
Future Volume (Veh/h)	14	75	56	16	9	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	82	61	17	10	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	153	14	18			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153	14	18			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	96			
cM capacity (veh/h)	807	1066	1599			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	97	78	18			
Volume Left	15	61	0			
Volume Right	82	0	8			
cSH	1015	1599	1700			
Volume to Capacity	0.10	0.04	0.01			
Queue Length 95th (m)	2.5	1.0	0.0			
Control Delay (s)	8.9	5.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	5.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			22.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	75	61	1	63	0	127	0	1	0	0	0
Future Volume (Veh/h)	0	75	61	1	63	0	127	0	1	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	82	66	1	68	0	138	0	1	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								216				
pX, platoon unblocked												
vC, conflicting volume	310	277	0	384	276	0	0			1		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	310	277	0	384	276	0	0			1		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	86	94	100	88	100	91			100		
cM capacity (veh/h)	547	577	1085	450	577	1084	1623			1622		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	148	69	139	0								
Volume Left	0	1	138	0								
Volume Right	66	0	1	0								
cSH	729	575	1623	1700								
Volume to Capacity	0.20	0.12	0.09	0.00								
Queue Length 95th (m)	6.0	3.3	2.2	0.0								
Control Delay (s)	11.2	12.1	7.4	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.2	12.1	7.4	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			9.9									
Intersection Capacity Utilization			21.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

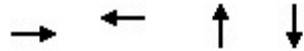
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	290	83	38	257	19	73	1	19	21	5	90
Future Volume (Veh/h)	148	290	83	38	257	19	73	1	19	21	5	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	315	90	41	279	21	79	1	21	23	5	98
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		96										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	0.97
vC, conflicting volume	300			405			1154	1064	360	1075	1098	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300			372			1144	1051	326	1062	1087	290
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			96			38	99	97	86	97	87
cM capacity (veh/h)	1261			1152			128	185	694	166	177	750
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	566	341	101	23	103							
Volume Left	161	41	79	23	0							
Volume Right	90	21	21	0	98							
cSH	1261	1152	155	166	648							
Volume to Capacity	0.13	0.04	0.65	0.14	0.16							
Queue Length 95th (m)	3.5	0.9	29.1	3.8	4.5							
Control Delay (s)	3.3	1.3	63.5	30.2	11.6							
Lane LOS	A	A	F	D	B							
Approach Delay (s)	3.3	1.3	63.5	15.0								
Approach LOS			F	C								
Intersection Summary												
Average Delay			9.4									
Intersection Capacity Utilization			67.2%		ICU Level of Service					C		
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	285	467	468	88
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.35	0.57	0.84	0.15
Control Delay	9.2	13.1	29.7	10.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.2	13.1	29.7	10.5
LOS	A	B	C	B
Approach Delay	9.2	13.1	29.7	10.5
Approach LOS	A	B	C	B
Queue Length 50th (m)	13.5	28.3	31.6	4.5
Queue Length 95th (m)	27.1	51.6	#79.2	12.1
Internal Link Dist (m)	148.5	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	813	814	556	587
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	0.35	0.57	0.84	0.15

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

















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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	194	60	26	357	47	168	77	185	11	56	14
Future Volume (vph)	8	194	60	26	357	47	168	77	185	11	56	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.94			0.98	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1803			1830			1721			1808	
Flt Permitted		0.98			0.97			0.83			0.93	
Satd. Flow (perm)		1775			1782			1463			1685	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	211	65	28	388	51	183	84	201	12	61	15
RTOR Reduction (vph)	0	22	0	0	9	0	0	55	0	0	10	0
Lane Group Flow (vph)	0	263	0	0	458	0	0	413	0	0	78	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		792			806			501			577	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.26			c0.28			0.05	
v/c Ratio		0.33			0.57			0.82			0.14	
Uniform Delay, d1		8.9			10.0			14.8			11.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			2.9			14.3			0.5	
Delay (s)		10.0			12.9			29.1			11.7	
Level of Service		B			B			C			B	
Approach Delay (s)		10.0			12.9			29.1			11.7	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			73.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

12: First Street & Simcoe St S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	623	831	1304
Act Effct Green (s)	24.0	38.2	38.2
Actuated g/C Ratio	0.34	0.54	0.54
v/c Ratio	1.01	0.44	1.10
Control Delay	63.8	10.3	75.9
Queue Delay	0.0	0.0	0.0
Total Delay	63.8	10.3	75.9
LOS	E	B	E
Approach Delay	63.8	10.3	75.9
Approach LOS	E	B	E
Queue Length 50th (m)	~81.5	32.2	~111.5
Queue Length 95th (m)	#149.5	45.1	#150.6
Internal Link Dist (m)	148.5	57.6	201.5
Turn Bay Length (m)			
Base Capacity (vph)	615	1876	1190
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.01	0.44	1.10

Intersection Summary

Cycle Length: 71.2

Actuated Cycle Length: 71.2

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 53.4

Intersection LOS: D

Intersection Capacity Utilization 99.6%

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.

HCM Signalized Intersection Capacity Analysis
 12: First Street & Simcoe St S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		TB			TB
Traffic Volume (vph)	314	259	646	119	200	1000
Future Volume (vph)	314	259	646	119	200	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.98			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1702		3457			3510
Flt Permitted	0.97		1.00			0.63
Satd. Flow (perm)	1702		3457			2220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	341	282	702	129	217	1087
RTOR Reduction (vph)	42	0	21	0	0	0
Lane Group Flow (vph)	581	0	810	0	0	1304
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	24.0		38.2			38.2
Effective Green, g (s)	24.0		38.2			38.2
Actuated g/C Ratio	0.34		0.54			0.54
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	573		1854			1191
v/s Ratio Prot	c0.34		0.23			
v/s Ratio Perm						c0.59
v/c Ratio	1.01		0.44			1.09
Uniform Delay, d1	23.6		10.0			16.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	41.2		0.8			56.0
Delay (s)	64.8		10.7			72.5
Level of Service	E		B			E
Approach Delay (s)	64.8		10.7			72.5
Approach LOS	E		B			E

Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Simcoe St S & First Street

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	800	866	738
Act Effct Green (s)	21.5	37.2	37.2
Actuated g/C Ratio	0.31	0.53	0.53
v/c Ratio	1.40	0.46	0.58
Control Delay	213.0	11.0	13.4
Queue Delay	0.0	0.0	0.0
Total Delay	213.0	11.0	13.4
LOS	F	B	B
Approach Delay	213.0	11.0	13.4
Approach LOS	F	B	B
Queue Length 50th (m)~	144.9	35.4	33.4
Queue Length 95th (m)#	211.7	49.0	49.6
Internal Link Dist (m)	137.3	52.0	196.6
Turn Bay Length (m)			
Base Capacity (vph)	572	1871	1271
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.40	0.46	0.58

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.40

Intersection Signal Delay: 79.0

Intersection LOS: E

Intersection Capacity Utilization 98.1%

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.

HCM Signalized Intersection Capacity Analysis

1: Simcoe St S & First Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	369	367	753	44	104	575
Future Volume (vph)	369	367	753	44	104	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8		5.5			5.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.93		0.99			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1695		3510			3512
Flt Permitted	0.98		1.00			0.68
Satd. Flow (perm)	1695		3510			2393
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	399	818	48	113	625
RTOR Reduction (vph)	51	0	6	0	0	0
Lane Group Flow (vph)	749	0	860	0	0	738
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	21.5		37.2			37.2
Effective Green, g (s)	21.5		37.2			37.2
Actuated g/C Ratio	0.31		0.53			0.53
Clearance Time (s)	5.8		5.5			5.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	520		1865			1271
v/s Ratio Prot	c0.44		0.25			
v/s Ratio Perm						c0.31
v/c Ratio	1.44		0.46			0.58
Uniform Delay, d1	24.2		10.2			11.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	208.7		0.8			1.9
Delay (s)	232.9		11.0			13.1
Level of Service	F		B			B
Approach Delay (s)	232.9		11.0			13.1
Approach LOS	F		B			B

Intersection Summary

HCM 2000 Control Delay	85.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 2: Simcoe St S & Albany Street

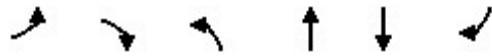
10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	36	87	1103	24	259	637
Future Volume (Veh/h)	36	87	1103	24	259	637
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	95	1199	26	282	692
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			221			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	2122	612			1225	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1988	247			953	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	85			55	
cM capacity (veh/h)	25	653			621	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	134	799	426	513	461	
Volume Left	39	0	0	282	0	
Volume Right	95	0	26	0	0	
cSH	79	1700	1700	621	1700	
Volume to Capacity	1.69	0.47	0.25	0.45	0.27	
Queue Length 95th (m)	90.5	0.0	0.0	18.9	0.0	
Control Delay (s)	450.1	0.0	0.0	12.2	0.0	
Lane LOS	F		B			
Approach Delay (s)	450.1	0.0		6.4		
Approach LOS	F					
Intersection Summary						
Average Delay			28.5			
Intersection Capacity Utilization			73.7%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	28	58	11	15	11
Future Volume (Veh/h)	9	28	58	11	15	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	30	63	12	16	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	160	22	28			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160	22	28			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	96			
cM capacity (veh/h)	798	1055	1585			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	40	75	28			
Volume Left	10	63	0			
Volume Right	30	0	12			
cSH	976	1585	1700			
Volume to Capacity	0.04	0.04	0.02			
Queue Length 95th (m)	1.0	1.0	0.0			
Control Delay (s)	8.8	6.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	6.2	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization		20.5%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	247	17	0	61	15	30	70	1	5	33	7
Future Volume (Veh/h)	6	247	17	0	61	15	30	70	1	5	33	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	268	18	0	66	16	33	76	1	5	36	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (m)												
								216				
pX, platoon unblocked												
vC, conflicting volume	242	193	40	344	196	76	44			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242	193	40	344	196	76	44			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	61	98	100	90	98	98			100		
cM capacity (veh/h)	637	685	1031	409	682	985	1564			1522		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	293	82	110	49								
Volume Left	7	0	33	5								
Volume Right	18	16	1	8								
cSH	698	726	1564	1522								
Volume to Capacity	0.42	0.11	0.02	0.00								
Queue Length 95th (m)	16.7	3.0	0.5	0.1								
Control Delay (s)	13.8	10.6	2.3	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	13.8	10.6	2.3	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			36.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

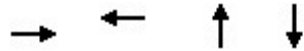
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	140	22	14	330	22	110	4	21	14	1	78
Future Volume (Veh/h)	52	140	22	14	330	22	110	4	21	14	1	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	152	24	15	359	24	120	4	23	15	1	85
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		96										
pX, platoon unblocked												
vC, conflicting volume	383			176			764	691	164	704	691	371
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	383			176			764	691	164	704	691	371
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			55	99	97	95	100	87
cM capacity (veh/h)	1175			1400			267	346	881	324	346	675
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	233	398	147	15	86							
Volume Left	57	15	120	15	0							
Volume Right	24	24	23	0	85							
cSH	1175	1400	302	324	667							
Volume to Capacity	0.05	0.01	0.49	0.05	0.13							
Queue Length 95th (m)	1.2	0.3	20.2	1.2	3.5							
Control Delay (s)	2.3	0.4	27.8	16.6	11.2							
Lane LOS	A	A	D	C	B							
Approach Delay (s)	2.3	0.4	27.8	12.0								
Approach LOS			D	B								
Intersection Summary												
Average Delay			6.8									
Intersection Capacity Utilization			53.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	158	592	481	58
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.19	0.73	0.93	0.10
Control Delay	8.3	17.9	43.3	10.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	17.9	43.3	10.4
LOS	A	B	D	B
Approach Delay	8.3	17.9	43.3	10.4
Approach LOS	A	B	D	B
Queue Length 50th (m)	7.4	40.0	36.7	3.0
Queue Length 95th (m)	16.2	#79.7	#88.3	9.0
Internal Link Dist (m)	137.3	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	813	809	519	567
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	0.19	0.73	0.93	0.10

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 25.8

Intersection LOS: C

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.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	126	15	46	441	58	253	39	151	11	34	8
Future Volume (vph)	5	126	15	46	441	58	253	39	151	11	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.95			0.98	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		1834			1828			1728			1805	
Flt Permitted		0.98			0.96			0.79			0.90	
Satd. Flow (perm)		1805			1770			1405			1639	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	137	16	50	479	63	275	42	164	12	37	9
RTOR Reduction (vph)	0	8	0	0	9	0	0	37	0	0	6	0
Lane Group Flow (vph)	0	150	0	0	583	0	0	444	0	0	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		805			800			481			561	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.33			c0.32			0.03	
v/c Ratio		0.19			0.73			0.92			0.09	
Uniform Delay, d1		8.2			11.0			15.6			11.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			5.8			25.6			0.3	
Delay (s)		8.8			16.8			41.2			11.3	
Level of Service		A			B			D			B	
Approach Delay (s)		8.8			16.8			41.2			11.3	
Approach LOS		A			B			D			B	
Intersection Summary												
HCM 2000 Control Delay			24.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)			10.4		
Intersection Capacity Utilization			87.0%				ICU Level of Service				E	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 3: Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	157	1002	30	82	1186
Future Volume (Veh/h)	26	157	1002	30	82	1186
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	171	1089	33	89	1289
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			226			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	1928	561			1122	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1798	266			895	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	49	74			87	
cM capacity (veh/h)	55	653			673	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	199	726	396	519	859	
Volume Left	28	0	0	89	0	
Volume Right	171	0	33	0	0	
cSH	259	1700	1700	673	1700	
Volume to Capacity	0.77	0.43	0.23	0.13	0.51	
Queue Length 95th (m)	45.4	0.0	0.0	3.6	0.0	
Control Delay (s)	53.6	0.0	0.0	3.6	0.0	
Lane LOS	F		A			
Approach Delay (s)	53.6	0.0		1.3		
Approach LOS	F					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			84.9%		ICU Level of Service E	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	77	56	16	9	7
Future Volume (Veh/h)	15	77	56	16	9	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	84	61	17	10	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	153	14	18			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153	14	18			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	96			
cM capacity (veh/h)	807	1066	1599			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	100	78	18			
Volume Left	16	61	0			
Volume Right	84	0	8			
cSH	1014	1599	1700			
Volume to Capacity	0.10	0.04	0.01			
Queue Length 95th (m)	2.6	1.0	0.0			
Control Delay (s)	8.9	5.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	5.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization			22.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	72	29	1	145	9	51	80	1	8	50	7
Future Volume (Veh/h)	12	72	29	1	145	9	51	80	1	8	50	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	78	32	1	158	10	55	87	1	9	54	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (m)												
								216				
pX, platoon unblocked												
vC, conflicting volume	362	274	58	344	278	88	62			88		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362	274	58	344	278	88	62			88		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	87	97	100	74	99	96			99		
cM capacity (veh/h)	455	607	1008	516	604	971	1541			1508		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	123	169	143	71								
Volume Left	13	1	55	9								
Volume Right	32	10	1	8								
cSH	651	617	1541	1508								
Volume to Capacity	0.19	0.27	0.04	0.01								
Queue Length 95th (m)	5.5	8.9	0.9	0.1								
Control Delay (s)	11.8	13.0	3.0	1.0								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.8	13.0	3.0	1.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			8.2									
Intersection Capacity Utilization			34.8%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

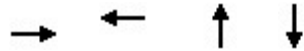
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	301	83	38	268	19	73	1	19	21	6	101
Future Volume (Veh/h)	148	301	83	38	268	19	73	1	19	21	6	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	327	90	41	291	21	79	1	21	23	7	110
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		96										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	0.97
vC, conflicting volume	312			417			1191	1088	372	1099	1122	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312			381			1181	1074	334	1086	1110	302
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			96			32	99	97	86	96	85
cM capacity (veh/h)	1248			1140			117	179	685	159	170	738
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	578	353	101	23	117							
Volume Left	161	41	79	23	0							
Volume Right	90	21	21	0	110							
cSH	1248	1140	142	159	615							
Volume to Capacity	0.13	0.04	0.71	0.14	0.19							
Queue Length 95th (m)	3.5	0.9	32.9	3.9	5.6							
Control Delay (s)	3.3	1.3	76.7	31.5	12.2							
Lane LOS	A	A	F	D	B							
Approach Delay (s)	3.3	1.3	76.7	15.4								
Approach LOS			F	C								
Intersection Summary												
Average Delay			10.5									
Intersection Capacity Utilization			68.4%		ICU Level of Service				C			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	289	489	472	91
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.36	0.60	0.85	0.15
Control Delay	9.3	13.6	30.7	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.3	13.6	30.7	10.6
LOS	A	B	C	B
Approach Delay	9.3	13.6	30.7	10.6
Approach LOS	A	B	C	B
Queue Length 50th (m)	13.9	30.2	32.2	4.7
Queue Length 95th (m)	27.5	54.8	#80.3	12.4
Internal Link Dist (m)	148.5	72.1	84.2	191.7
Turn Bay Length (m)				
Base Capacity (vph)	813	816	555	589
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	0.36	0.60	0.85	0.15

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 74.3%

ICU Level of Service D

Analysis Period (min) 15

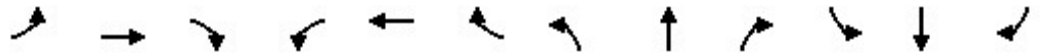
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	8	198	60	26	377	47	168	81	185	11	59	14
Future Volume (vph)	8	198	60	26	377	47	168	81	185	11	59	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.94			0.98	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1803			1831			1722			1809	
Flt Permitted		0.98			0.97			0.83			0.93	
Satd. Flow (perm)		1775			1785			1463			1691	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	215	65	28	410	51	183	88	201	12	64	15
RTOR Reduction (vph)	0	21	0	0	9	0	0	54	0	0	10	0
Lane Group Flow (vph)	0	268	0	0	480	0	0	418	0	0	81	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		792			807			501			579	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.27			c0.29			0.05	
v/c Ratio		0.34			0.60			0.83			0.14	
Uniform Delay, d1		8.9			10.1			14.9			11.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			3.2			15.1			0.5	
Delay (s)		10.1			13.3			30.0			11.7	
Level of Service		B			B			C			B	
Approach Delay (s)		10.1			13.3			30.0			11.7	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			74.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

12: First Street & Simcoe St S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	649	850	1359
Act Effct Green (s)	24.0	38.2	38.2
Actuated g/C Ratio	0.34	0.54	0.54
v/c Ratio	1.05	0.45	1.14
Control Delay	75.3	10.6	95.0
Queue Delay	0.0	0.0	0.0
Total Delay	75.3	10.6	95.0
LOS	E	B	F
Approach Delay	75.3	10.6	95.0
Approach LOS	E	B	F
Queue Length 50th (m)	~95.3	33.7	~120.2
Queue Length 95th (m)	#157.7	47.0	#159.8
Internal Link Dist (m)	148.5	57.6	201.5
Turn Bay Length (m)			
Base Capacity (vph)	616	1877	1188
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.05	0.45	1.14

Intersection Summary

Cycle Length: 71.2

Actuated Cycle Length: 71.2

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 65.4

Intersection LOS: E

Intersection Capacity Utilization 102.9%

ICU Level of Service G

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.

HCM Signalized Intersection Capacity Analysis

12: First Street & Simcoe St S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↓			↑↑
Traffic Volume (vph)	322	275	679	103	200	1051
Future Volume (vph)	322	275	679	103	200	1051
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.98			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1701		3469			3511
Flt Permitted	0.97		1.00			0.63
Satd. Flow (perm)	1701		3469			2214
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	299	738	112	217	1142
RTOR Reduction (vph)	43	0	17	0	0	0
Lane Group Flow (vph)	606	0	833	0	0	1359
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	24.0		38.2			38.2
Effective Green, g (s)	24.0		38.2			38.2
Actuated g/C Ratio	0.34		0.54			0.54
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	573		1861			1187
v/s Ratio Prot	c0.36		0.24			
v/s Ratio Perm						c0.61
v/c Ratio	1.06		0.45			1.14
Uniform Delay, d1	23.6		10.1			16.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	53.7		0.8			75.5
Delay (s)	77.3		10.8			92.0
Level of Service	E		B			F
Approach Delay (s)	77.3		10.8			92.0
Approach LOS	E		B			F

Intersection Summary

HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Appendix E – 2016 TTS Data Analysis

Fri Mar 04 2022 12:30:52 GMT-0500 (Eastern Standard Time) - Run Time: 1914ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone 1209

and

Primary travel mode d g j m p t u w

and

Start time of trip - start_time In 600-900

Trip 2016

Table:

	Transit excl	Cycle	Auto driver	Auto passe	Taxi passer	Walk	
1209	104	102	426	44	32	13	
1214	24	0	671	170	0	13	
	128	102	1097	214	32	26	1599
	8%	6%	69%	13%	2%	2%	

Fri Mar 04 2022 13:22:05 GMT-0500 (Eastern Standard Time) - Run Time: 2176ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone 1209

and

Primary travel mode d g j m p t u w

and

Start time of trip - start_time In 1500-1800

Trip 2016

Table:

	Transit excl	Cycle	Auto driver	GO rail only	Auto passe	Walk	
1209	175	72	660	31	237	69	
1214	0	0	521	0	169	13	
	175	72	1181	31	406	82	1947
	9.0%	3.7%	60.7%	1.6%	20.9%	4.2%	

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
 Column: Planning district of destination - pd_dest

Filters:

2006 GTA zone of household = 1209

and

Primary travel mode = M p t u

and

Start time of trip - start_time In 600-900

Trip 2016

Table:

	PD 11 of Toronto	Pickering	Ajax	Whitby	Oshawa	Clarington	Markham	Mississauga	St. Catharines	Peterborough	Haliburton	
1209		25	36	60	16	288	0	68	0	0	0	9
1214		0	0	54	63	587	87	15	19	9	7	0
		25	36	114	79	875	87	83	19	9	7	9
		2%	3%	8%	6%	65%	6%	6%	1%	1%	1%	1%

1343

General Direction (To/From)	Residential
	Auto
North	43%
South	22%
East	6%
West	28%
Total	100%



2006 TRAFFIC ZONES
DURHAM REGION

Appendix F – Future Total Traffic Level of Service Calculations



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	801	816	692
Act Effct Green (s)	21.5	37.2	37.2
Actuated g/C Ratio	0.31	0.53	0.53
v/c Ratio	1.41	0.44	0.51
Control Delay	217.0	10.8	12.2
Queue Delay	0.0	0.0	0.0
Total Delay	217.0	10.8	12.2
LOS	F	B	B
Approach Delay	217.0	10.8	12.2
Approach LOS	F	B	B
Queue Length 50th (m)~	146.2	32.7	29.6
Queue Length 95th (m)#	213.0	45.6	43.6
Internal Link Dist (m)	137.3	52.0	196.6
Turn Bay Length (m)			
Base Capacity (vph)	569	1872	1365
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.41	0.44	0.51

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.41

Intersection Signal Delay: 82.7

Intersection LOS: F

Intersection Capacity Utilization 95.5%

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.

HCM Signalized Intersection Capacity Analysis

1: First Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	381	356	717	34	89	547
Future Volume (vph)	381	356	717	34	89	547
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8		5.5			5.5
Lane Util. Factor	1.00		0.95			0.95
Fr _t	0.93		0.99			1.00
Fl _t Protected	0.97		1.00			0.99
Satd. Flow (prot)	1697		3515			3515
Fl _t Permitted	0.97		1.00			0.73
Satd. Flow (perm)	1697		3515			2571
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	414	387	779	37	97	595
RTOR Reduction (vph)	48	0	5	0	0	0
Lane Group Flow (vph)	753	0	811	0	0	692
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	21.5		37.2			37.2
Effective Green, g (s)	21.5		37.2			37.2
Actuated g/C Ratio	0.31		0.53			0.53
Clearance Time (s)	5.8		5.5			5.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	521		1867			1366
v/s Ratio Prot	c0.44		0.23			
v/s Ratio Perm						c0.27
v/c Ratio	1.45		0.43			0.51
Uniform Delay, d ₁	24.2		10.0			10.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d ₂	211.2		0.7			1.3
Delay (s)	235.4		10.7			11.9
Level of Service	F		B			B
Approach Delay (s)	235.4		10.7			11.9
Approach LOS	F		B			B

Intersection Summary

HCM 2000 Control Delay	89.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	34	128	1055	22	80	615
Future Volume (Veh/h)	34	128	1055	22	80	615
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	139	1147	24	87	668
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			221			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	1667	586			1171	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1505	292			949	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	57	78			86	
cM capacity (veh/h)	86	628			641	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	176	765	406	310	445	
Volume Left	37	0	0	87	0	
Volume Right	139	0	24	0	0	
cSH	271	1700	1700	641	1700	
Volume to Capacity	0.65	0.45	0.24	0.14	0.26	
Queue Length 95th (m)	33.1	0.0	0.0	3.7	0.0	
Control Delay (s)	40.0	0.0	0.0	4.5	0.0	
Lane LOS	E		A			
Approach Delay (s)	40.0	0.0		1.9		
Approach LOS	E					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			69.0%		ICU Level of Service C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	27	58	10	15	11
Future Volume (Veh/h)	8	27	58	10	15	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	29	63	11	16	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	159	22	28			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	159	22	28			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	96			
cM capacity (veh/h)	799	1055	1585			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	38	74	28			
Volume Left	9	63	0			
Volume Right	29	0	12			
cSH	981	1585	1700			
Volume to Capacity	0.04	0.04	0.02			
Queue Length 95th (m)	1.0	1.0	0.0			
Control Delay (s)	8.8	6.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	6.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization			20.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	36	64	0	74	0	126	0	1	0	0	0
Future Volume (Veh/h)	0	36	64	0	74	0	126	0	1	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	39	70	0	80	0	137	0	1	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	314	275	0	364	274	0	0			1		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314	275	0	364	274	0	0			1		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	93	94	100	86	100	92			100		
cM capacity (veh/h)	535	579	1085	492	579	1084	1623			1622		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	109	80	138	0								
Volume Left	0	0	137	0								
Volume Right	70	0	1	0								
cSH	827	579	1623	1700								
Volume to Capacity	0.13	0.14	0.08	0.00								
Queue Length 95th (m)	3.6	3.8	2.2	0.0								
Control Delay (s)	10.0	12.2	7.4	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	10.0	12.2	7.4	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			9.4									
Intersection Capacity Utilization			19.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

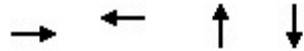
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	138	22	14	317	22	110	4	21	14	1	78
Future Volume (Veh/h)	52	138	22	14	317	22	110	4	21	14	1	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	150	24	15	345	24	120	4	23	15	1	85
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		96										
pX, platoon unblocked												
vC, conflicting volume	369			174			748	675	162	688	675	357
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			174			748	675	162	688	675	357
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			56	99	97	95	100	88
cM capacity (veh/h)	1190			1403			274	354	883	333	354	687
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	231	384	147	15	86							
Volume Left	57	15	120	15	0							
Volume Right	24	24	23	0	85							
cSH	1190	1403	310	333	680							
Volume to Capacity	0.05	0.01	0.47	0.05	0.13							
Queue Length 95th (m)	1.2	0.3	19.4	1.1	3.5							
Control Delay (s)	2.3	0.4	26.7	16.3	11.1							
Lane LOS	A	A	D	C	B							
Approach Delay (s)	2.3	0.4	26.7	11.8								
Approach LOS			D	B								
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			53.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	133	581	381	77
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.17	0.72	0.80	0.14
Control Delay	8.0	17.2	30.3	9.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.0	17.2	30.3	9.0
LOS	A	B	C	A
Approach Delay	8.0	17.2	30.3	9.0
Approach LOS	A	B	C	A
Queue Length 50th (m)	6.0	38.8	29.0	3.1
Queue Length 95th (m)	13.9	#74.4	#70.3	10.0
Internal Link Dist (m)	137.3	72.1	84.2	152.9
Turn Bay Length (m)				
Base Capacity (vph)	771	810	475	567
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	0.17	0.72	0.80	0.14

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.9

Intersection LOS: B

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	13	95	15	46	430	59	253	37	61	14	33	24
Future Volume (vph)	13	95	15	46	430	59	253	37	61	14	33	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.95	
Flt Protected		0.99			1.00			0.97			0.99	
Satd. Flow (prot)		1823			1827			1756			1761	
Flt Permitted		0.93			0.97			0.74			0.90	
Satd. Flow (perm)		1707			1772			1342			1606	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	103	16	50	467	64	275	40	66	15	36	26
RTOR Reduction (vph)	0	9	0	0	9	0	0	15	0	0	17	0
Lane Group Flow (vph)	0	124	0	0	572	0	0	366	0	0	60	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		761			801			460			550	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.32			c0.27			0.04	
v/c Ratio		0.16			0.71			0.80			0.11	
Uniform Delay, d1		8.2			10.9			14.6			11.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			5.4			13.3			0.4	
Delay (s)		8.6			16.3			27.9			11.5	
Level of Service		A			B			C			B	
Approach Delay (s)		8.6			16.3			27.9			11.5	
Approach LOS		A			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			70.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

12: Albert Street & site access

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	19	100	9	15	80
Future Volume (Veh/h)	30	19	100	9	15	80
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	21	109	10	16	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			177			
pX, platoon unblocked						
vC, conflicting volume	233	114			119	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	114			119	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	747	939			1469	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	54	119	103			
Volume Left	33	0	16			
Volume Right	21	10	0			
cSH	811	1700	1469			
Volume to Capacity	0.07	0.07	0.01			
Queue Length 95th (m)	1.7	0.0	0.3			
Control Delay (s)	9.8	0.0	1.2			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	1.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			21.7%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	93	958	33	161	1142
Future Volume (Veh/h)	25	93	958	33	161	1142
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	101	1041	36	175	1241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			226			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	2030	538			1077	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1927	278			873	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	32	84			75	
cM capacity (veh/h)	40	651			695	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	128	694	383	589	827	
Volume Left	27	0	0	175	0	
Volume Right	101	0	36	0	0	
cSH	153	1700	1700	695	1700	
Volume to Capacity	0.84	0.41	0.23	0.25	0.49	
Queue Length 95th (m)	44.4	0.0	0.0	8.0	0.0	
Control Delay (s)	93.3	0.0	0.0	6.3	0.0	
Lane LOS	F		A			
Approach Delay (s)	93.3	0.0		2.6		
Approach LOS	F					
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			80.9%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	75	56	16	9	7
Future Volume (Veh/h)	14	75	56	16	9	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	82	61	17	10	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	153	14	18			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153	14	18			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	96			
cM capacity (veh/h)	807	1066	1599			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	97	78	18			
Volume Left	15	61	0			
Volume Right	82	0	8			
cSH	1015	1599	1700			
Volume to Capacity	0.10	0.04	0.01			
Queue Length 95th (m)	2.5	1.0	0.0			
Control Delay (s)	8.9	5.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	5.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization		22.7%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	75	79	1	63	0	145	0	1	0	0	0
Future Volume (Veh/h)	0	75	79	1	63	0	145	0	1	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	82	86	1	68	0	158	0	1	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	350	317	0	444	316	0	0			1		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	350	317	0	444	316	0	0			1		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	85	92	100	87	100	90			100		
cM capacity (veh/h)	506	541	1085	396	541	1084	1623			1622		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	168	69	159	0								
Volume Left	0	1	158	0								
Volume Right	86	0	1	0								
cSH	728	538	1623	1700								
Volume to Capacity	0.23	0.13	0.10	0.00								
Queue Length 95th (m)	7.1	3.5	2.6	0.0								
Control Delay (s)	11.4	12.7	7.4	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.4	12.7	7.4	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			10.0									
Intersection Capacity Utilization			23.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

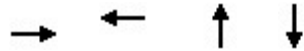
10-16-2024

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	148	292	83	38	260	19	73	1	19	21	5	90			
Future Volume (Veh/h)	148	292	83	38	260	19	73	1	19	21	5	90			
Sign Control		Free			Free			Stop			Stop				
Grade		0%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Hourly flow rate (vph)	161	317	90	41	283	21	79	1	21	23	5	98			
Pedestrians															
Lane Width (m)															
Walking Speed (m/s)															
Percent Blockage															
Right turn flare (veh)															
Median type	None					None									
Median storage veh															
Upstream signal (m)	96														
pX, platoon unblocked				0.98			0.98			0.98			0.98		
vC, conflicting volume	304			407			1160			1070			362		
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	304			380			1151			1059			334		
tC, single (s)	4.1			4.1			7.1			6.5			6.2		
tC, 2 stage (s)															
tF (s)	2.2			2.2			3.5			4.0			3.3		
p0 queue free %	87			96			38			99			97		
cM capacity (veh/h)	1257			1150			127			184			691		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2										
Volume Total	568	345	101	23	103										
Volume Left	161	41	79	23	0										
Volume Right	90	21	21	0	98										
cSH	1257	1150	154	164	644										
Volume to Capacity	0.13	0.04	0.66	0.14	0.16										
Queue Length 95th (m)	3.5	0.9	29.5	3.8	4.5										
Control Delay (s)	3.3	1.3	64.6	30.5	11.7										
Lane LOS	A	A	F	D	B										
Approach Delay (s)	3.3	1.3	64.6	15.1											
Approach LOS				F	C										
Intersection Summary															
Average Delay				9.5											
Intersection Capacity Utilization				67.5%	ICU Level of Service	C									
Analysis Period (min)				15											

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	297	470	468	107
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.38	0.58	0.85	0.18
Control Delay	9.6	13.2	30.7	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.6	13.2	30.7	9.5
LOS	A	B	C	A
Approach Delay	9.6	13.2	30.7	9.5
Approach LOS	A	B	C	A
Queue Length 50th (m)	14.5	28.5	31.7	4.6
Queue Length 95th (m)	28.9	52.1	#79.7	12.9
Internal Link Dist (m)	148.5	72.1	84.2	149.1
Turn Bay Length (m)				
Base Capacity (vph)	790	813	551	591
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	0.38	0.58	0.85	0.18

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 18.2

Intersection LOS: B

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	19	194	60	26	357	50	168	77	185	13	56	29
Future Volume (vph)	19	194	60	26	357	50	168	77	185	13	56	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.98			0.94			0.96	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1801			1828			1721			1776	
Flt Permitted		0.95			0.97			0.83			0.93	
Satd. Flow (perm)		1726			1779			1448			1662	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	211	65	28	388	54	183	84	201	14	61	32
RTOR Reduction (vph)	0	20	0	0	9	0	0	55	0	0	21	0
Lane Group Flow (vph)	0	277	0	0	461	0	0	413	0	0	86	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		770			804			496			569	
v/s Ratio Prot												
v/s Ratio Perm		0.16			0.26			0.29			0.05	
v/c Ratio		0.36			0.57			0.83			0.15	
Uniform Delay, d1		9.0			10.0			14.9			11.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.3			3.0			15.0			0.6	
Delay (s)		10.3			12.9			29.9			11.8	
Level of Service		B			B			C			B	
Approach Delay (s)		10.3			12.9			29.9			11.8	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			68.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

12: First Street & Simcoe St S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	641	843	1304
Act Effct Green (s)	24.0	38.2	38.2
Actuated g/C Ratio	0.34	0.54	0.54
v/c Ratio	1.04	0.45	1.10
Control Delay	72.6	10.3	78.0
Queue Delay	0.0	0.0	0.0
Total Delay	72.6	10.3	78.0
LOS	E	B	E
Approach Delay	72.6	10.3	78.0
Approach LOS	E	B	E
Queue Length 50th (m)	~93.6	32.6	~111.9
Queue Length 95th (m)	#155.8	45.7	#151.1
Internal Link Dist (m)	148.5	57.6	201.5
Turn Bay Length (m)			
Base Capacity (vph)	614	1875	1184
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.04	0.45	1.10

Intersection Summary

Cycle Length: 71.2

Actuated Cycle Length: 71.2

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 56.3

Intersection LOS: E

Intersection Capacity Utilization 100.8%

ICU Level of Service G

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.

HCM Signalized Intersection Capacity Analysis
 12: First Street & Simcoe St S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↑			↑↑
Traffic Volume (vph)	330	259	646	130	200	1000
Future Volume (vph)	330	259	646	130	200	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.97			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1704		3450			3510
Flt Permitted	0.97		1.00			0.62
Satd. Flow (perm)	1704		3450			2207
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	282	702	141	217	1087
RTOR Reduction (vph)	40	0	24	0	0	0
Lane Group Flow (vph)	601	0	819	0	0	1304
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	24.0		38.2			38.2
Effective Green, g (s)	24.0		38.2			38.2
Actuated g/C Ratio	0.34		0.54			0.54
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	574		1850			1184
v/s Ratio Prot	c0.35		0.24			
v/s Ratio Perm						c0.59
v/c Ratio	1.05		0.44			1.10
Uniform Delay, d1	23.6		10.0			16.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	50.6		0.8			58.5
Delay (s)	74.2		10.8			75.0
Level of Service	E		B			E
Approach Delay (s)	74.2		10.8			75.0
Approach LOS	E		B			E

Intersection Summary

HCM 2000 Control Delay	55.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: Albert Street & site access

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	17	18	132	14	33	127
Future Volume (Veh/h)	17	18	132	14	33	127
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	20	143	15	36	138
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			173			
pX, platoon unblocked						
vC, conflicting volume	360	150			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	150			158	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			97	
cM capacity (veh/h)	622	896			1422	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	158	174			
Volume Left	18	0	36			
Volume Right	20	15	0			
cSH	741	1700	1422			
Volume to Capacity	0.05	0.09	0.03			
Queue Length 95th (m)	1.3	0.0	0.6			
Control Delay (s)	10.1	0.0	1.7			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	1.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			29.6%	ICU Level of Service		A
Analysis Period (min)	15					

Queues

1: First Street & Simcoe Street S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	816	875	738
Act Effct Green (s)	21.5	37.2	37.2
Actuated g/C Ratio	0.31	0.53	0.53
v/c Ratio	1.43	0.47	0.58
Control Delay	227.2	11.1	13.5
Queue Delay	0.0	0.0	0.0
Total Delay	227.2	11.1	13.5
LOS	F	B	B
Approach Delay	227.2	11.1	13.5
Approach LOS	F	B	B
Queue Length 50th (m)~	150.4	35.7	33.5
Queue Length 95th (m)#	217.5	49.6	49.8
Internal Link Dist (m)	137.3	52.0	196.6
Turn Bay Length (m)			
Base Capacity (vph)	570	1869	1265
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.43	0.47	0.58

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.43

Intersection Signal Delay: 84.4

Intersection LOS: F

Intersection Capacity Utilization 99.2%

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.

HCM Signalized Intersection Capacity Analysis

1: First Street & Simcoe Street S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑	↑		↓
Traffic Volume (vph)	384	367	753	52	104	575
Future Volume (vph)	384	367	753	52	104	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8		5.5			5.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.93		0.99			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1696		3505			3512
Flt Permitted	0.98		1.00			0.67
Satd. Flow (perm)	1696		3505			2383
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	417	399	818	57	113	625
RTOR Reduction (vph)	49	0	7	0	0	0
Lane Group Flow (vph)	767	0	868	0	0	738
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	21.5		37.2			37.2
Effective Green, g (s)	21.5		37.2			37.2
Actuated g/C Ratio	0.31		0.53			0.53
Clearance Time (s)	5.8		5.5			5.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	520		1862			1266
v/s Ratio Prot	c0.45		0.25			
v/s Ratio Perm						c0.31
v/c Ratio	1.47		0.47			0.58
Uniform Delay, d1	24.2		10.2			11.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	223.8		0.8			2.0
Delay (s)	248.1		11.1			13.1
Level of Service	F		B			B
Approach Delay (s)	248.1		11.1			13.1
Approach LOS	F		B			B

Intersection Summary

HCM 2000 Control Delay	91.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 2: Simcoe Street S/Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	36	117	1103	24	274	637
Future Volume (Veh/h)	36	117	1103	24	274	637
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	127	1199	26	298	692
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			221			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	2154	612			1225	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2024	245			952	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			52	
cM capacity (veh/h)	23	655			622	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	166	799	426	529	461	
Volume Left	39	0	0	298	0	
Volume Right	127	0	26	0	0	
cSH	87	1700	1700	622	1700	
Volume to Capacity	1.92	0.47	0.25	0.48	0.27	
Queue Length 95th (m)	114.2	0.0	0.0	20.8	0.0	
Control Delay (s)	532.1	0.0	0.0	12.9	0.0	
Lane LOS	F		B			
Approach Delay (s)	532.1	0.0		6.9		
Approach LOS	F					
Intersection Summary						
Average Delay			40.0			
Intersection Capacity Utilization			76.0%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	28	58	11	15	11
Future Volume (Veh/h)	9	28	58	11	15	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	30	63	12	16	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	160	22	28			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160	22	28			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	96			
cM capacity (veh/h)	798	1055	1585			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	40	75	28			
Volume Left	10	63	0			
Volume Right	30	0	12			
cSH	976	1585	1700			
Volume to Capacity	0.04	0.04	0.02			
Queue Length 95th (m)	1.0	1.0	0.0			
Control Delay (s)	8.8	6.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	6.2	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization			20.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	247	32	0	61	15	60	70	1	5	33	7
Future Volume (Veh/h)	6	247	32	0	61	15	60	70	1	5	33	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	268	35	0	66	16	65	76	1	5	36	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (m)												
								216				
pX, platoon unblocked												
vC, conflicting volume	306	257	40	426	260	76	44			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306	257	40	426	260	76	44			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	57	97	100	89	98	96			100		
cM capacity (veh/h)	565	618	1031	333	615	985	1564			1522		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	310	82	142	49								
Volume Left	7	0	65	5								
Volume Right	35	16	1	8								
cSH	646	664	1564	1522								
Volume to Capacity	0.48	0.12	0.04	0.00								
Queue Length 95th (m)	20.9	3.4	1.0	0.1								
Control Delay (s)	15.6	11.2	3.6	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.6	11.2	3.6	0.8								
Approach LOS	C	B										
Intersection Summary												
Average Delay			10.8									
Intersection Capacity Utilization			40.2%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

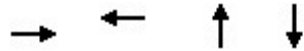
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	143	22	14	331	22	110	4	21	14	1	78
Future Volume (Veh/h)	52	143	22	14	331	22	110	4	21	14	1	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	155	24	15	360	24	120	4	23	15	1	85
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		96										
pX, platoon unblocked												
vC, conflicting volume	384			179			768	695	167	708	695	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	384			179			768	695	167	708	695	372
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			55	99	97	95	100	87
cM capacity (veh/h)	1174			1397			265	344	877	322	344	674
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	236	399	147	15	86							
Volume Left	57	15	120	15	0							
Volume Right	24	24	23	0	85							
cSH	1174	1397	300	322	667							
Volume to Capacity	0.05	0.01	0.49	0.05	0.13							
Queue Length 95th (m)	1.2	0.3	20.4	1.2	3.5							
Control Delay (s)	2.3	0.4	28.0	16.7	11.2							
Lane LOS	A	A	D	C	B							
Approach Delay (s)	2.3	0.4	28.0	12.0								
Approach LOS			D	B								
Intersection Summary												
Average Delay			6.8									
Intersection Capacity Utilization			53.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	167	593	481	78
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.21	0.73	0.94	0.14
Control Delay	8.5	18.0	45.9	9.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.5	18.0	45.9	9.0
LOS	A	B	D	A
Approach Delay	8.5	18.0	45.9	9.0
Approach LOS	A	B	D	A
Queue Length 50th (m)	8.0	40.2	36.9	3.2
Queue Length 95th (m)	17.2	#80.5	#89.1	10.2
Internal Link Dist (m)	137.3	72.1	84.2	146.9
Turn Bay Length (m)				
Base Capacity (vph)	781	808	512	568
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	0.21	0.73	0.94	0.14

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 26.4

Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024












Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	13	126	15	46	441	59	253	39	151	14	34	24
Future Volume (vph)	13	126	15	46	441	59	253	39	151	14	34	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.95			0.95	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		1831			1828			1728			1762	
Flt Permitted		0.94			0.96			0.78			0.90	
Satd. Flow (perm)		1734			1768			1385			1610	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	137	16	50	479	64	275	42	164	15	37	26
RTOR Reduction (vph)	0	8	0	0	9	0	0	37	0	0	17	0
Lane Group Flow (vph)	0	159	0	0	584	0	0	444	0	0	61	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		773			799			474			551	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.33			c0.32			0.04	
v/c Ratio		0.21			0.73			0.94			0.11	
Uniform Delay, d1		8.3			11.0			15.7			11.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			5.8			28.1			0.4	
Delay (s)		8.9			16.9			43.7			11.5	
Level of Service		A			B			D			B	
Approach Delay (s)		8.9			16.9			43.7			11.5	
Approach LOS		A			B			D			B	
Intersection Summary												
HCM 2000 Control Delay			25.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			78.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

12: Albert Street & site access

10-16-2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	30	102	9	15	50
Future Volume (Veh/h)	19	30	102	9	15	50
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	33	111	10	16	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	171					
pX, platoon unblocked						
vC, conflicting volume	202	116			121	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	202	116			121	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	96			99	
cM capacity (veh/h)	778	936			1467	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	54	121	70			
Volume Left	21	0	16			
Volume Right	33	10	0			
cSH	868	1700	1467			
Volume to Capacity	0.06	0.07	0.01			
Queue Length 95th (m)	1.6	0.0	0.3			
Control Delay (s)	9.4	0.0	1.8			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	1.8			
Approach LOS	A					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			20.1%	ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Simcoe St S & Albany Street

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	175	1002	30	115	1186
Future Volume (Veh/h)	26	175	1002	30	115	1186
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	190	1089	33	125	1289
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			226			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	2000	561			1122	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1879	266			895	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	39	71			81	
cM capacity (veh/h)	46	654			673	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	218	726	396	555	859	
Volume Left	28	0	0	125	0	
Volume Right	190	0	33	0	0	
cSH	241	1700	1700	673	1700	
Volume to Capacity	0.90	0.43	0.23	0.19	0.51	
Queue Length 95th (m)	61.6	0.0	0.0	5.4	0.0	
Control Delay (s)	79.0	0.0	0.0	4.8	0.0	
Lane LOS	F		A			
Approach Delay (s)	79.0	0.0		1.9		
Approach LOS	F					
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			87.0%		ICU Level of Service	E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 4: Front Street & Albany Street

10-16-2024



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	77	56	16	9	7
Future Volume (Veh/h)	15	77	56	16	9	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	84	61	17	10	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	153	14	18			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153	14	18			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	96			
cM capacity (veh/h)	807	1066	1599			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	100	78	18			
Volume Left	16	61	0			
Volume Right	84	0	8			
cSH	1014	1599	1700			
Volume to Capacity	0.10	0.04	0.01			
Queue Length 95th (m)	2.6	1.0	0.0			
Control Delay (s)	8.9	5.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	5.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization		22.9%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Albert Street & Albany Street



















10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	72	47	1	145	9	69	80	1	8	50	7
Future Volume (Veh/h)	12	72	47	1	145	9	69	80	1	8	50	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	78	51	1	158	10	75	87	1	9	54	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	402	314	58	404	318	88	62			88		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402	314	58	404	318	88	62			88		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	86	95	100	72	99	95			99		
cM capacity (veh/h)	416	569	1008	454	566	971	1541			1508		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	142	169	163	71								
Volume Left	13	1	75	9								
Volume Right	51	10	1	8								
cSH	649	580	1541	1508								
Volume to Capacity	0.22	0.29	0.05	0.01								
Queue Length 95th (m)	6.6	9.7	1.2	0.1								
Control Delay (s)	12.1	13.7	3.6	1.0								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.1	13.7	3.6	1.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			8.6									
Intersection Capacity Utilization			37.0%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Front Street & First Street

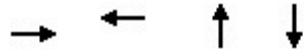
10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	303	83	38	271	19	73	1	19	21	6	101
Future Volume (Veh/h)	148	303	83	38	271	19	73	1	19	21	6	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	329	90	41	295	21	79	1	21	23	7	110
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		96										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	0.97
vC, conflicting volume	316			419			1197	1094	374	1105	1128	306
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316			387			1188	1082	341	1093	1118	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			96			32	99	97	85	96	85
cM capacity (veh/h)	1244			1138			116	177	681	157	169	734
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	580	357	101	23	117							
Volume Left	161	41	79	23	0							
Volume Right	90	21	21	0	110							
cSH	1244	1138	141	157	612							
Volume to Capacity	0.13	0.04	0.72	0.15	0.19							
Queue Length 95th (m)	3.6	0.9	33.3	4.0	5.6							
Control Delay (s)	3.3	1.3	78.2	31.7	12.3							
Lane LOS	A	A	F	D	B							
Approach Delay (s)	3.3	1.3	78.2	15.5								
Approach LOS			F	C								
Intersection Summary												
Average Delay			10.6									
Intersection Capacity Utilization			68.6%		ICU Level of Service				C			
Analysis Period (min)			15									

Queues

11: Albert Street & First Street

10-16-2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	301	492	472	110
Act Effct Green (s)	22.0	22.3	16.9	16.9
Actuated g/C Ratio	0.45	0.45	0.34	0.34
v/c Ratio	0.38	0.60	0.86	0.19
Control Delay	9.7	13.7	31.7	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.7	13.7	31.7	9.7
LOS	A	B	C	A
Approach Delay	9.7	13.7	31.7	9.7
Approach LOS	A	B	C	A
Queue Length 50th (m)	14.8	30.4	32.3	4.8
Queue Length 95th (m)	29.5	55.3	#80.8	13.3
Internal Link Dist (m)	148.5	72.1	84.2	142.4
Turn Bay Length (m)				
Base Capacity (vph)	790	814	550	592
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	0.38	0.60	0.86	0.19

Intersection Summary

Cycle Length: 49.3

Actuated Cycle Length: 49.3

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 18.7

Intersection LOS: B

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

















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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Albert Street & First Street

10-16-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	198	60	26	377	50	168	81	185	13	59	29
Future Volume (vph)	19	198	60	26	377	50	168	81	185	13	59	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.3			5.0			5.1			5.1	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.94			0.96	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1802			1830			1722			1778	
Flt Permitted		0.95			0.97			0.83			0.93	
Satd. Flow (perm)		1725			1782			1449			1668	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	215	65	28	410	54	183	88	201	14	64	32
RTOR Reduction (vph)	0	20	0	0	9	0	0	54	0	0	21	0
Lane Group Flow (vph)	0	281	0	0	483	0	0	418	0	0	89	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		22.0			22.3			16.9			16.9	
Effective Green, g (s)		22.0			22.3			16.9			16.9	
Actuated g/C Ratio		0.45			0.45			0.34			0.34	
Clearance Time (s)		5.3			5.0			5.1			5.1	
Lane Grp Cap (vph)		769			806			496			571	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.27			c0.29			0.05	
v/c Ratio		0.37			0.60			0.84			0.16	
Uniform Delay, d1		9.0			10.1			15.0			11.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.3			3.3			15.9			0.6	
Delay (s)		10.4			13.4			30.9			11.8	
Level of Service		B			B			C			B	
Approach Delay (s)		10.4			13.4			30.9			11.8	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)		10.4			
Intersection Capacity Utilization			70.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

12: First Street & Simcoe St S

10-16-2024



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	649	862	1359
Act Effct Green (s)	24.0	38.2	38.2
Actuated g/C Ratio	0.34	0.54	0.54
v/c Ratio	1.05	0.46	1.15
Control Delay	75.3	10.6	98.2
Queue Delay	0.0	0.0	0.0
Total Delay	75.3	10.6	98.2
LOS	E	B	F
Approach Delay	75.3	10.6	98.2
Approach LOS	E	B	F
Queue Length 50th (m)	~95.3	34.1	~120.8
Queue Length 95th (m)	#157.7	47.7	#160.5
Internal Link Dist (m)	148.5	57.6	201.5
Turn Bay Length (m)			
Base Capacity (vph)	616	1875	1180
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.05	0.46	1.15

Intersection Summary

Cycle Length: 71.2

Actuated Cycle Length: 71.2

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 66.7

Intersection LOS: E

Intersection Capacity Utilization 103.2%

ICU Level of Service G

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.

HCM Signalized Intersection Capacity Analysis
 12: First Street & Simcoe St S

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↓			↑↑
Traffic Volume (vph)	322	275	679	114	200	1051
Future Volume (vph)	322	275	679	114	200	1051
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.98			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1701		3463			3511
Flt Permitted	0.97		1.00			0.62
Satd. Flow (perm)	1701		3463			2201
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	299	738	124	217	1142
RTOR Reduction (vph)	43	0	19	0	0	0
Lane Group Flow (vph)	606	0	843	0	0	1359
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	24.0		38.2			38.2
Effective Green, g (s)	24.0		38.2			38.2
Actuated g/C Ratio	0.34		0.54			0.54
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	573		1857			1180
v/s Ratio Prot	c0.36		0.24			
v/s Ratio Perm						c0.62
v/c Ratio	1.06		0.45			1.15
Uniform Delay, d1	23.6		10.1			16.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	53.7		0.8			78.4
Delay (s)	77.3		10.9			94.9
Level of Service	E		B			F
Approach Delay (s)	77.3		10.9			94.9
Approach LOS	E		B			F

Intersection Summary			
HCM 2000 Control Delay	65.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: Albert Street & site access

10-16-2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	17	18	136	14	33	98
Future Volume (Veh/h)	17	18	136	14	33	98
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	20	148	15	36	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			166			
pX, platoon unblocked						
vC, conflicting volume	334	156			163	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334	156			163	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			97	
cM capacity (veh/h)	644	890			1416	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	163	143			
Volume Left	18	0	36			
Volume Right	20	15	0			
cSH	754	1700	1416			
Volume to Capacity	0.05	0.10	0.03			
Queue Length 95th (m)	1.3	0.0	0.6			
Control Delay (s)	10.0	0.0	2.1			
Lane LOS	B		A			
Approach Delay (s)	10.0	0.0	2.1			
Approach LOS	B					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			28.3%	ICU Level of Service		A
Analysis Period (min)	15					

Appendix G - Signal Warrant

Signal Warrant Calculation

Major Street: SIMCOE STREET

Minor Street: ALBANY STREET

Comment FT (2029) Traffic Condition

Number of Approaches: 1 2

Tee Intersection Configuration: Yes No

Flow Condition: Free Fv (Rural)
Restricted Flow (Urban)

VOLUME	AM	PM	FACTOR *	
1A - All	1,934	2,445	n/a	1,095
1B - Minor	162	118	25%	70
2A - Major	1,772	2,327	25%	1,025
2B - Cross	34	25	25%	15

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied: Yes No Warrant for new intersection with forecast traffic
 120% Satisfied: Yes No Warrant for existing intersection with forecast traffic
 100% Satisfied: Yes No Warrant for existing intersection with existing traffic *
 COMBO 80% Satisfied: Yes No Warrant for existing intersection with existing traffic
 80% Satisfied: Yes No

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	1095
	% FULFILLED				122%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	180	255	180	255	70
	% FULFILLED				27%

150% Satisfied: Yes No
 120% Satisfied: Yes No
 100% Satisfied: Yes No
 80% Satisfied: Yes No

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	1025
	% FULFILLED				114%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	50	75	15
	% FULFILLED				20%

150% Satisfied: Yes No
 120% Satisfied: Yes No
 100% Satisfied: Yes No
 80% Satisfied: Yes No

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Signal Warrant Calculation

Major Street: SIMCOE STREET

Minor Street: ALBANY STREET

Comment FT (2034) Traffic Condition

Number of Approaches: 1 2

Tee Intersection Configuration: Yes No

Flow Condition: Free Fv (Rural)
Restricted Flow (Urban)

VOLUME	AM	PM	FACTOR *	
1A - All	2,191	2,629	n/a	1,206
1B - Minor	153	201	25%	89
2A - Major	2,038	2,428	25%	1,117
2B - Cross	173	26	25%	50

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied: Yes No Warrant for new intersection with forecast traffic
 120% Satisfied: Yes No Warrant for existing intersection with forecast traffic
 100% Satisfied: Yes No Warrant for existing intersection with existing traffic *
 COMBO 80% Satisfied: Yes No Warrant for existing intersection with existing traffic
 80% Satisfied: Yes No

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
FLOW CONDITION					
		X			
ALL APPROACHES	480	720	600	900	1206
	% FULFILLED				134%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
		X			
MINOR STREET APPROACHES	180	255	180	255	89
	% FULFILLED				35%

150% Satisfied: Yes No
 120% Satisfied: Yes No
 100% Satisfied: Yes No
 80% Satisfied: Yes No

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
FLOW CONDITION					
		X			
MAJOR STREET APPROACHES	480	720	600	900	1117
	% FULFILLED				124%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
		X			
TRAFFIC CROSSING MAJOR STREET	50	75	50	75	50
	% FULFILLED				67%

150% Satisfied: Yes No
 120% Satisfied: Yes No
 100% Satisfied: Yes No
 80% Satisfied: Yes No

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.