JUNE 3, 2024

PROJECT NO: 2658-7080-2

SENT VIA: EMAIL
TONY@SIGMAGROUP.CA

Sigma Group
[redacted]

Attention: **Tony Gill**
Vice President, Real Estate

RE: **TRANSPORTATION IMPACT BRIEF**
6888 DRUMMOND ROAD
CITY OF NIAGRA FALLS, NIAGARA REGION

Dear Tony,

In support of the Official Plan Amendment, Zoning By-Law Amendment, and Site Plan Application related to the proposed development at 6888 Drummond Road in the City of Niagara Falls in Niagara Region. C.F. Crozier & Associates Inc. (Crozier) has prepared the following Transportation Impact Brief (TIB).

The purpose of this letter is to analyze the following aspects of the proposed development from a transportation operations perspective:

- The existing road network and record information relating to road jurisdiction, road classification, posted speed limit, lane configuration, cross-section elements.
- Forecast the trip generation characteristics of the proposed development using the Institute of Transportation Engineers Manual (11th edition).
- Analyze operations of the study intersection under Future Background and Future Total conditions during critical peak hours.
- Evaluate the proposed site access from a sight distance perspective.
- Conduct southbound left-turn lane warrants at the intersection of the proposed development.

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Sigma Group to complete a TIB for a proposed long-term care facility situated at 6888 Drummond Road in the City of Niagara Falls (City), in Niagara Region (Region).

The purpose of this letter is to explore the impact of the proposed development on the surrounding road network and review the proposed development from a transportation engineering perspective.

A Terms of Reference (ToR) encompassing the scope of the TIB was circulated to the City and Region on May 14, 2024, and comments were received from the City and Region on May 14, 2024. Correspondence from the City and Region is included in **Attachment A.**

1.1 Development Lands

The subject lands cover an area of approximately 1.38 ha and currently consist of an open greenspace with trees. The site, located in a residential neighbourhood, is bounded by a restaurant to the north, green space to the east, residential homes to the south, and Drummond Road to the west.

The location of the proposed development is attached in **Attachment B** as per the proposed development's most recent concept plan prepared by Arcavia LTC Niagara Falls, received April 23, 2024.

1.2 Development Proposal

Per the most recent concept plan prepared by Arcavia LTC Niagara Falls, elements envisioned for the full buildout of this development include approximately:

- 4 storey long-term care building with 192 beds.
- 101 vehicle parking spaces and 8 bicycle parking spaces.
- Clinic with 1007 sq. m GFA
- Site access off Drummond Road.

The most recent concept plan is attached in **Attachment B.**

1.3 Study Roadways

Drummond Road is classified as an arterial road under the jurisdiction of the City of Niagara Falls and runs north-south with a speed limit of 50 km/h. Drummond Road has a two-lane cross-section with one lane in each direction. There are designated painted bike lanes found on either side of the roadway. Sidewalks can be found on either side of roadway as well. At the intersection of the Site Access and Drummond Road, the intersection will be stop-controlled on the minor approach. Additionally, each approach has a single shared lane for all the movements.

Churchill Street is classified as local road under the jurisdiction of the City of Niagara Falls and runs east-west with a speed limit of 50 km/hr. Churchill Street has a two-lane cross-section with one lane in each direction. Sidewalks can be found on either side of the roadway. There are no on-street biking facilities.

1.4 Traffic Modelling and Assumptions

The assessment of the study intersections is based on the "Highway Capacity Manual (HCM)" methodology, which prescribes a method for estimating the Level of Service, control delay, and volume-to-capacity of an intersection along with the approaches and movements of the intersection. The Level of Service (LOS) metric provides a general performance measure of the quality of the service from a driver's perspective and ranges a letter from "A" to "F"; "A" representing best performance and "F" representing worst performance. **Attachment C** contains the Level of Service definitions. Control delay is the additional time added per vehicle as a result of the intersection and its associated control (i.e. Traffic Light / Stop Control) compared to the average speed on the adjoining roadway segments. Finally, volume-to-capacity ratio indicates the fraction of the capacity for a particular movement used by traffic volumes at an intersection.

Additionally, queuing was analyzed for the unsignalized intersections using SimTraffic, a microsimulation tool within the Synchro 11 software. The 95th percentile queue length metric, which represents the 95th percentile queue length of the peak hour traffic, were considered in this study for the auxiliary turn storage lanes. The 95th percentile queue length for each leg of the roundabout was analyzed using Arcady 8.

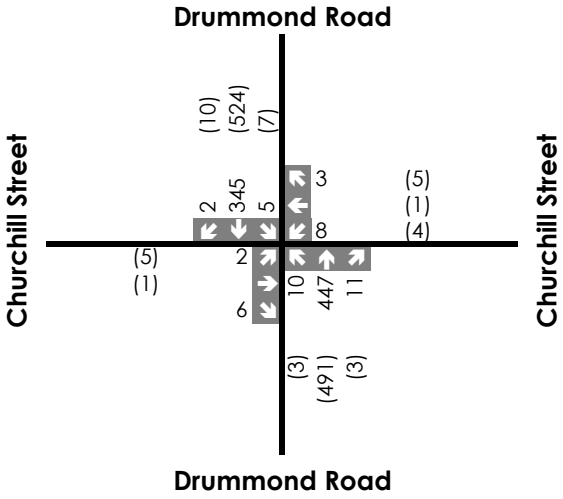
2.0 Existing Conditions

Table 1 outlines the 2024 existing conditions traffic operations at the stop-controlled study intersection. **Figure 1** illustrates the 2024 existing conditions traffic volumes used in the operational analysis. **Attachment G** contains the detailed capacity analysis worksheets.

Table 1: 2024 Existing Conditions

Intersection (Control)	Performance Metrics									
	Approach	LOS[1]		Delay (s)		v/c ratio		95th Percentile Queue Length (m)		Auxiliary Lane Storage Length (m)
		AM	PM	AM	PM	AM	PM	AM	PM	
Drummond Road and Churchill Street (TWSC)	**Overall**	**C**	**D**	**20.9**	**25.9**	**0.06**	**0.04**	**-**	**-**	n/a
	EBLTR	B	D	13.8	25.9	0.02	0.03	7.1	6.8	n/a
	WBLTR	C	C	20.9	18.7	0.06	0.04	9.1	9.4	n/a
	NBLTR	A	A	0.3	0.1	0.01	0.00	12.5	5.7	n/a
	SBLTR	A	A	0.2	0.2	0.01	0.01	7.2	7.7	n/a

All of the study intersections are operating with acceptable levels of service under 2024 existing traffic volume conditions. No queuing concerns have been noted, the study roadway has capacity for additional traffic.



Legend	6888 Drummond Road	CROZIER CONSULTING ENGINEERS	Figure 1
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2024 Existing Traffic Volumes		Project No. 2658-7080-2 Date. June 2024 Analyst. S.A

3.0 Future Background Conditions

This section summarizes the future background conditions of the study road network and provides details relating to growth rates. Established per the Terms of Reference, this study considers the 2025 and 2029 horizon year in the future background traffic analysis, the results of which are summarized herein.

3.1 Growth Rates

For this analysis, a growth rate of 2% compounded annually was applied to all movements on the road network to forecast 2025 and 2029 future background traffic volumes, as confirmed by the City and Region in the Terms of Reference.

3.2 Intersection Operations

Table 2 and **Table 3** outlines the 2025 and 2029 Future Background conditions traffic operations at the stop-controlled study intersection. **Figure 2** and **Figure 3** illustrates the 2025 and 2029 existing traffic volumes used in the operational analysis. **Attachment G** contains the detailed capacity analysis worksheets.

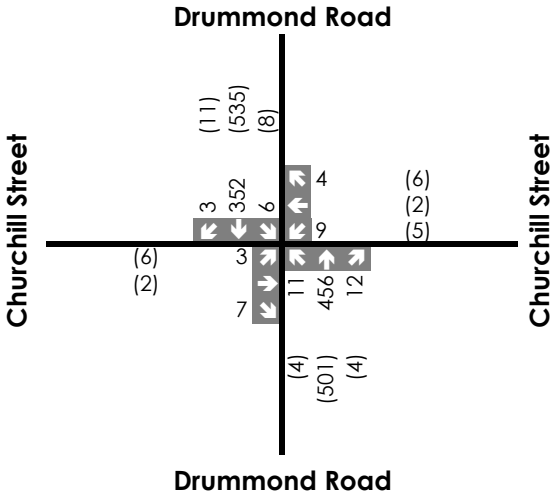
Table 2: 2025 Future Background Conditions

Intersection (Control)	Performance Metrics									
	Approach	LOS[1]		Delay (s)		v/c ratio		95th Percentile Queue Length (m)		Auxiliary Lane Storage Length (m)
		AM	PM	AM	PM	AM	PM	AM	PM	
Drummond Road and Churchill Street (TWSC)	**Overall**	**C**	**D**	**21.4**	**25.3**	**0.07**	**0.05**	**-**	**-**	**-**
	EBLTR	C	D	15.5	25.3	0.03	0.04	9.0	10.5	n/a
	WBLTR	C	C	21.4	19.0	0.07	0.05	11.0	9.5	n/a
	NBLTR	A	A	0.4	0.1	0.01	0.00	10.1	8.4	n/a
	SBLTR	A	A	0.2	0.2	0.01	0.01	9.8	12.3	n/a

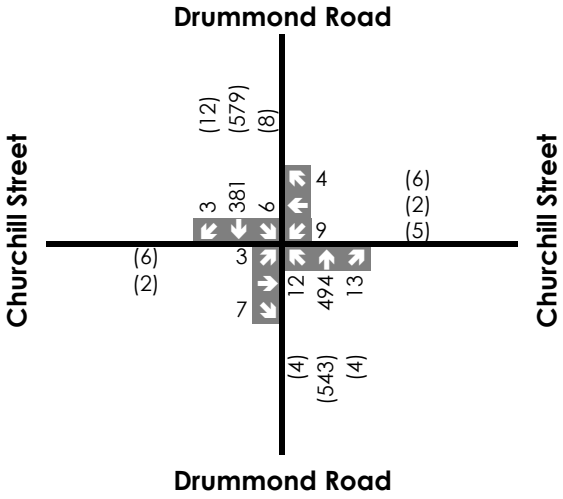
Table 3: 2029 Future Background Conditions

Intersection (Control)	Performance Metrics									
	Approach	LOS[1]		Delay (s)		v/c ratio		95th Percentile Queue Length (m)		Auxiliary Lane Storage Length (m)
		AM	PM	AM	PM	AM	PM	AM	PM	
Drummond Road and Churchill Street (TWSC)	**Overall**	**C**	**D**	**23.7**	**28.5**	**0.08**	**0.05**	**-**	**-**	n/a
	EBLTR	C	D	16.6	28.5	0.04	0.05	8.4	10.1	n/a
	WBLTR	C	C	23.7	20.8	0.08	0.05	10.6	10.3	n/a
	NBLTR	A	A	0.4	0.1	0.01	0.00	13.5	8.3	n/a
	SBLTR	A	A	0.2	0.2	0.01	0.01	8.1	9.7	n/a

The metrics summarized above indicate that the study intersection is anticipated to operate at a LOS "C" in the weekday a.m. and LOS of "D" in the weekday p.m. peak hours. The maximum volume-to-capacity ratio of 0.08 was observed for the west leg during the weekday a.m. peak hour. Queuing on the study road network is not expected to result in notable operational impacts.



Legend	6888 Drummond Road	CROZIER CONSULTING ENGINEERS	Figure 2
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2025 Future Background Traffic Volumes		Project No. 2658-7080-2 Date. June 2024 Analyst. S.A



Legend	6888 Drummond Road	CROZIER CONSULTING ENGINEERS	Figure 3
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2029 Future Background Traffic Volumes		Project No. 2658-7080-2 Date. June 2024 Analyst. S.A

4.0 Site Generated Traffic

The proposed development will result in additional vehicles on the study road network that would otherwise not exist. The development will also result in additional movements at the intersection.

4.1 ITE Edition Trip Generation

The ITE Trip Generation Manual, 11th Edition, was used to forecast the site-generated traffic for the proposed development.

Table 4: Site Generated Trips

Land Use	Units	Equation/Rate		Trip Generation			
				Weekday A.M.		Weekday P.M.	
				Inbound	Outbound	Inbound	Outbound
LUC 251 – Senior Adult Housing - Single Family	192 beds	A.M.	P.M.	21	43	45	29
		Ln(T) = 0.76 Ln(X) + 0.16	Ln(T) = 0.78 Ln(X) + 0.20				
LUC 630 Clinic	1007 sq. ft GFA	2.75	3.69	2	1	1	3
Total				**23**	**44**	**46**	**32**

As shown in **Table 4**, the proposed development is expected to generate 67 two-way (23 inbound and 44 outbound) trips during the weekday a.m. peak hour, and 78 two-way (46 inbound and 32 outbound) trips during the weekday p.m. peak hour. **Attachment E** provides excerpts from the ITE Trip Generation Manual, 11th Edition.

5.0 Future Total Conditions

This section will summarize the future total conditions of the study road network. The future total traffic volumes for the horizon years consist of the following components:

- Future background traffic volumes from the corresponding horizon year.
- Proposed development site generated traffic volumes.

The resulting total volumes in the horizon years 2025 and 2029 are presented in **Figure 4** and **Figure 5**, respectively.

5.1 Intersection Operations

Table 5 and **Table 6** outlines the 2025 and 2029 Future Background conditions traffic operations at the stop-controlled study intersection. **Figure 4** and **Figure 5** illustrates the 2025 and 2029 existing traffic volumes used in the operational analysis. **Attachment G** contains the detailed capacity analysis worksheets.

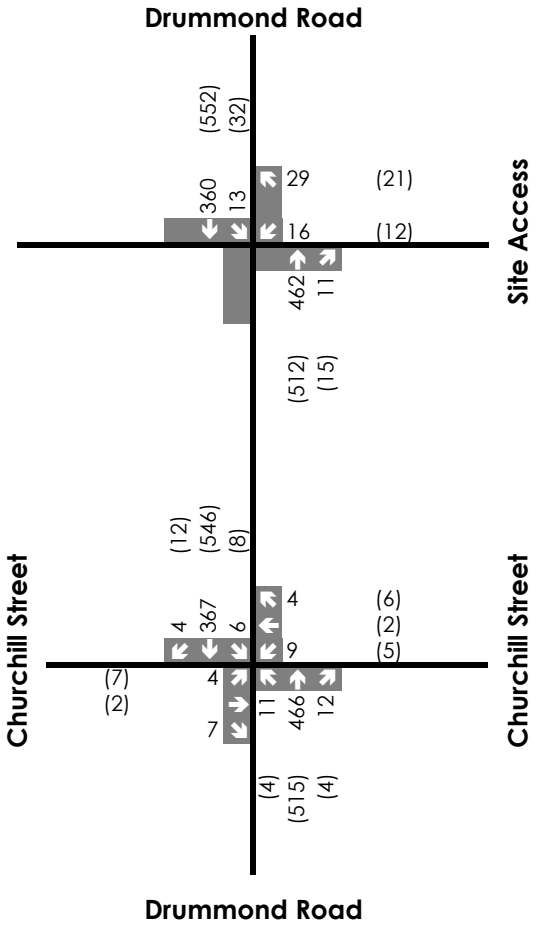
Table 5: 2025 Future Total Conditions

Intersection (Control)	Performance Metrics									
	Approach	LOS[1]		Delay (s)		v/c ratio		95th Percentile Queue Length (m)		Auxiliary Lane Storage Length (m)
		AM	PM	AM	PM	AM	PM	AM	PM	
Drummond Road and Churchill Street (TWSC)	**Overall**	**C**	**D**	**22.2**	**26.4**	**0.07**	**0.05**	**-**	**-**	n/a
	EBLTR	C	D	16.7	26.4	0.04	0.05	9.2	9.8	n/a
	WBLTR	C	C	22.2	19.5	0.07	0.05	10.1	10.6	n/a
	NBLTR	A	A	0.4	0.1	0.01	0.00	12.8	7.9	n/a
	SBLTR	A	A	0.2	0.2	0.01	0.01	7.4	7.8	n/a
Drummond Road and Site Access (Stop-Controlled)	**Overall**	**B**	**C**	**14.5**	**17.7**	**0.30**	**0.34**	-	-	-
	WBLR	B	C	14.5	17.7	0.11	0.11	15.9	14.6	n/a
	NBTR	A	A	0.0	0.0	0.30	0.34	n/a	3.1	n/a
	SBTR	A	A	0.4	0.9	0.01	0.04	11.3	15.4	n/a

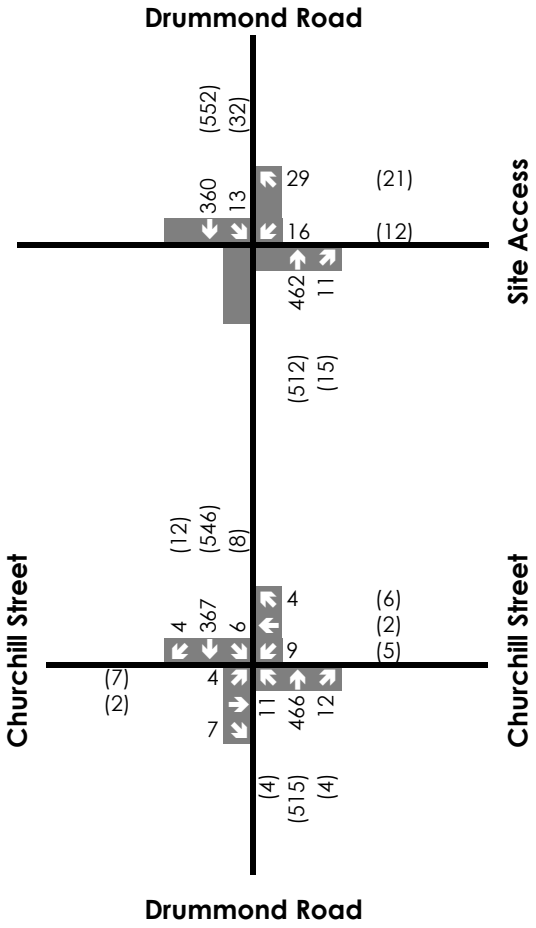
Table 6: 2029 Future Total Conditions

Intersection (Control)	Performance Metrics									
	Approach	LOS[1]		Delay (s)		v/c ratio		95th Percentile Queue Length (m)		Auxiliary Lane Storage Length (m)
		AM	PM	AM	PM	AM	PM	AM	PM	
Drummond Road and Churchill Street (TWSC)	**Overall**	**C**	**D**	**24.6**	**29.7**	**0.08**	**0.06**	**-**	**-**	n/a
	EBLTR	C	D	18.0	29.7	0.04	0.06	10.0	8.8	n/a
	WBLTR	C	C	24.6	21.4	0.08	0.06	10.3	10.3	n/a
	NBLTR	A	A	0.4	0.1	0.01	0.00	17.0	9.7	n/a
	SBLTR	A	A	0.2	0.2	0.01	0.01	9.0	11.5	n/a
Drummond Road and Site Access (Stop-Controlled)	**Overall**	C	C	15.4	19.4	0.33	0.36	-	-	-
	WBLR	C	C	15.4	19.4	0.12	0.13	15.9	15.1	n/a
	NBTR	A	A	0.0	0.0	0.33	0.36	n/a	3.0	n/a
	SBTR	A	A	0.4	1.0	0.1	0.04	11.6	24.0	n/a

All the study intersections are expected to continue operating with acceptable levels of service under 2029 future total traffic volume conditions. The additional traffic generated by the proposed development is expected to have a minimal impact on the operations of the boundary road network. Accordingly, the proposed development can be supported from an operations perspective.



Legend	6888 Drummond Road	CROZIER CONSULTING ENGINEERS	Figure 4
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2025 Future Total Traffic Volumes		Project No. 2658-7080-2 Date. June 2024 Analyst. S.A



Legend	6888 Drummond Road	CROZIER CONSULTING ENGINEERS	Figure 5
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2029 Future Total Traffic Volumes		Project No. 2658-7080-2 Date. June 2024 Analyst. S.A

6.0 Warrant

A left-turn lane warrant was conducted based on the Ministry of Transportation Ontario (MTO) left-turn lane criteria as requested by the City. Correspondence can be found in **Attachment A.**

A southbound left-turn lane with 15 metres of storage length is warranted under the 2029 Future Total scenario during the p.m. peak period. These warrants can be found in **Attachment F.**

7.0 Site Access Review

The site's proposed access was reviewed for safety concerns for corner clearance and sightlines. These were checked using the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) (June 2017).

7.1 Corner Clearence

Corner Clearance is the distance between the site accesses and nearby intersections. The required spacing per Figure 8.8.2 in TAC GDGCR are summarized in **Table 7.** All TAC excerpts can be found in **Attachment H.**

Table 7: Corner Clearence

Feature	Drummond Road Access and Churchill Street	Drummond Road Access and Atlee Street
Minimum Spacing Requirement	15 m	15 m
Available Spacing	48 m	30 m
Minimum Spacing Satisfied?	**Yes**	**Yes**

The spacing between the access and nearby intersections satisfy the requirements outlined in TAC.

7.2 Sight Distance Assessment

The sight distance at the proposed access along Drummond Road was assessed using TAC GDGCR methodology. All TAC excerpts can be found in **Attachment H.**

7.2.1 Stopping Sight Distance

Section 2.5 of the TAC GDGCR provides recommended stopping sight distances for various design speeds on level roadways. The speed limit at all the proposed access locations is posted, or assumed, as 50 km/h. A design speed of 20 km/h above the posted speed limit was used per typical industry practices.

Based on Table 2.5.2 of the TAC GDGCR, a stopping sight distance of 105 metres is recommended for a design speed of 70 km/h.

7.2.2 Intersection Sight Distance

A review of the available sight distance at the proposed site accesses was undertaken based on using TAC GDGCR. Sight distance was measured from the site access using the following assumptions:

- A standard driver eye height of 1.08 metres for a passenger car.
- A 4.4 metre setback from the approximate extension of the outer curb to represent a passenger vehicle waiting to exit the site.

Intersection sight distance is calculated using Equation 9.9.1 from the GDGCR as outlined below:

*ISD = 0.278 * V major * tg*

Where:

ISD = Intersection Sight Distance

V major = design speed of roadway (km/h)

tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Table 8 outlines the sight distance analysis for the proposed site accesses.

Table 8: Intersection Sight Distance

Feature	Site Access at Drummond Road
Access Type	Full-moves
Vehicles Expected	Passenger Car
Posted Speed Limit of Roadway	Posted 50 km/h
Assumed Design Speed	70 km/h
Base Time Gap	Left Turn: 7.5 s Right Turn: 6.5 s
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Sight Distance Required	Left Turns: 150 m Right Turns: 130 m
Stopping Sight Distance Required	105 m
Measured Sight Distance	Left Turns: 340 m Right Turns: 305 m
Measured Stopping Sight Distance	150 m +
Minimum Sight Distance Satisfied?	Yes

The measured sight distances at the proposed access exceeds the TAC requirements for a posted speed limit of 50 km/h. Therefore, the proposed access location is acceptable from a sight distance perspective.

8.0 Parking Review

The purpose of this section is to evaluate the parking requirements associated with the proposed development and determine whether the proposed parking supply can meet the parking Zoning By-Law requirements.

8.1 Zoning By-Law (ZBL) Requirements

The City of Niagara Falls Zoning By-Law *79-200, Subsection 4.19.1 "Parking Areas - Requirements"* was used to determine the adequacy of the parking supply for the proposed development.

As the number of practitioners in the clinic is unknown at this time, each potential practitioner has been allocated 130 sq. ft of space. Therefore, the maximum number of practitioners was determined to be eight (8).

Zoning By-Law excerpts can be found in **Attachment D**. **Table 9** outlines the parking requirements.

Table 9: Parking Requirements

ZBL Use	Units	Parking Rate	Total Parking Required	Total Proposed Parking	Surplus/ Deficit
Home for the Aged, Nursing Home	192 Beds	2 parking spaces for each 5 beds	77	101	**0**
Medical Clinic	8 Practitioners (1007 sq. ft)	3 parking spaces for each practitioner	24		

The proposed parking supply is in accordance with the parking requirements outlined in the By-Law.

8.2 Barrier-Free Parking Requirements

The City of Niagara Falls Zoning By-Law *79-200* was used to determine the adequacy of the accessible parking supply for the proposed development.

Zoning By-Law excerpts can be found in **Table 10** outlines the parking requirements.

Table 10: Accessible Parking Requirements

Total Proposed Parking Spaces	Parking Rate	Total Accessible Proposed Parking	Total Accessible Parking Required	Surplus/ Deficit
101	1 + 3% of the total number of parking spaces, rounding up to the nearest whole number	4	4	**0**

The development has proposed four (4) accessible parking spaces. The parking supply is in accordance with the parking requirements outlined in the By-Law.

8.3 Bicycle Parking Requirements

The City of Niagara Falls Zoning By-Law *79-200, Subsection 4.39 "Bicycle Parking"* was used to determine the adequacy of the bicycle parking supply for the proposed development.

Zoning By-Law excerpts can be found in **Attachment D**. **Table 9** outlines the parking requirements.

Table 11: Parking Requirements

	Use	Units	Parking Rate	Total Parking Required	Total Proposed Parking	Surplus/ Deficit
Short Term Bicycle Parking	Medical Clinic	1007 sq. m	1 space per 500 sq. m gross leasable area	2 spaces	8 spaces	**+4**
Bicycle Parking	Medical Clinic	1007 sq. m	1 space per 500 sq. m gross leasable area	2 spaces		

The proposed parking supply is in accordance with the parking requirements outlined in the By-Law.

9.0 Conclusion

This brief has analyzed the potential traffic impact on the boundary road network in relation to the proposed development at 6888 Drummond Road in the City of Niagara Falls. The findings from the analysis are summarized as the following:

- Under the 2024 existing conditions, the study intersection operates at an acceptable LOS with no queuing concerns.
- Under the 2029 Future Background conditions, the study intersection is anticipated to continue operating at an acceptable LOS during both the a.m. and p.m. peak periods. Queuing on the study road network is not expected to result in notable operational impacts.

- The proposed development is expected to generate 67 two-way (23 inbound and 44 outbound) trips during the weekday a.m. peak hour, and 78 two-way (46 inbound and 32 outbound) trips during the weekday p.m. peak hour.

- With the addition of site generated traffic under 2029 Future Total conditions, the study intersections are expected to operate with an acceptable LOS during the a.m. and p.m. peak periods. Queuing on the study road network is not expected to result in significant operational impacts.

- A left-turn lane warrant was conducted for southbound movement at the intersection of Drummond Road and the Site Access. It was found that a left turn lane with a storage length of 15 meters was warranted under the 2029 Future Total p.m. peak hour conditions.

- The site access review found the proposed site access exceeds TAC requirements outlined for corner clearance, stopping sight distance, and intersection sight distance.

- According to the City of Niagara Falls parking zoning by-law, the proposed development is required to have a total of 101 parking spaces for the development. The development has proposed 101 parking spaces, providing sufficient parking spaces. The by-law also requires the development to have four (4) accessible parking spaces, there are four (4) accessible parking spaces proposed. Additionally, the development is required to provide a total of four (4) bicycle parking spaces and has provided eight (8). This results in a surplus of four (4) bicycle parking spaces.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Shaira Ahmed, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Ian Lindley, MASc., P.Eng.
Project Engineer, Transportation

il/SA;dd

Enclosure
Attachment A: Agency Correspondence
Attachment B: Concept Plan
Attachment C: Level of Service Definitions
Attachment D: Detailed Capacity Analysis
Attachment E: ITE Trip Generation 11th Edition Excerpts
Attachment F: Left Turn Lane Warrant
Attachment G: Relevant Zoning By-Law Excerpts
Attachment H: Relevant TAC Excerpts
Attachment I: Traffic Data

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ATTACHMENT A

Agency Correspondence

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: May 14, 2024 1:19 PM
To: Shaira Ahmed; jgrubich@niagarafalls.ca
Cc: Aaron Wignall; Ian Lindley
Subject: RE: Terms of Reference - 6888 Drummond Road (CFCA#2658-7080-2)

Hello,

Thank you for reaching out to the Region for comments on your Terms of reference. The Region did not require a TIS for this site therefore we have no comments on the terms. If Regional traffic data is required please use the following link to request the information: https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx.

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

Thank you

Growing Better Together
Niagara Region

Susan M. Dunsmore, P.Eng.
ACTING DIRECTOR, INFRASTRUCTURE PLANNING &DEVELOPMENT ENGINEERING
Niagara Region, 1815 Sir Isaac Brock Way, Thorold, ON, L2V 4T7

P : (905) 980 - 6000 ext. 3661
W : www.niagararegion.ca
E : susan.dunsmore@niagararegion.ca

From: Shaira Ahmed <sahmed@cfcrozier.ca>
Sent: Tuesday, May 14, 2024 9:45 AM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>; jgrubich@niagarafalls.ca
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Ian Lindley <ilindley@cfcrozier.ca>
Subject: Terms of Reference - 6888 Drummond Road (CFCA#2658-7080-2)

Hello,

I hope you are doing well. We are working with our Client to complete a Transportation Impact Brief and Parking Justification Study for the proposed long term care center at 6888 Drummond Road in the City of Niagara Falls. The development concept proposes the construction of a 4-storey long term care building with 192 beds. A total of 97 standard vehicle parking spaces and four (4) barrier-free spaces are proposed. To facilitate the development, one (1) full-moves access along Drummond Road is proposed.

Study Methodology for the Transportation Impact Brief

The study will be prepared in accordance with the City of Niagara Falls: *Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review (November 2011)* and Niagara Region: *Transportation Impact assessment Guidelines (July 2023).* On this basis, we propose the following Terms of Reference for the Transportation Impact Study:

Study Intersections

- We propose the following study intersections:
    - Drummond Road and Atlee Street
    - Drummond Road and Dunn Street
    - Drummond Road and Churchill Street
    - Drummond Road and Site Access

Existing Conditions

- We will consult specialty traffic counting firms we typically work with to obtain traffic data for the intersections listed above unless the City of Niagara Falls (City) or Niagara Region (Region) has data for these intersections.
- We will request signal timing plans via the Region's online Traffic Data Request form.
- We will analyze the weekday a.m. and p.m. peak periods; 7:00 a.m. to 9:00 a.m. & 4:00 p.m. to 7:00 p.m.; reflective of the typical peak periods.
- We will analyze the existing vehicle traffic conditions based on peak hour traffic counts using Synchro Version 11.0, LOS (based on control delays), and maximum volume-to-capacity ratios. 95th percentile queues from Sim Traffic will also be outlined.

Study Horizons

- We will analyze the current year (2024), an opening year of (2025) and five (5) years from the date of full buildout (2030).
- **Please confirm if these horizon years are adequate.**

Growth Rates

We kindly request a recommended growth rate applicable to traffic volumes in the study area, to sufficiently reflect future conditions in the horizon years. If a growth rate is not available, an industry standard of 2% is suggested to forecast future traffic growth at the intersections of the study. **Please confirm if this is acceptable.**

Background Developments

Please confirm if any background development should be included in the analysis. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis.

Future Background Conditions

- We will forecast the 2025 and 2030 future background vehicle traffic volumes based on the above growth rates (and any background developments requested by the Region and City).
- Future background vehicle traffic volumes will be analyzed based on Synchro Version 11.0, LOS (based on control delays) and maximum volume-to-capacity ratios. Queue lengths will be evaluated based on Sim Traffic results.

Future Total Conditions

- Trip Distribution will be based on Transportation Tomorrow Survey (TTS) data and/or existing travel patterns.
- Trip Generation will be based on ITE Trip Generation Manual, 11th edition using Land Use Category 251 – Senior Adult Housing – Single-Family. Trip generation will be forecasted for passenger vehicles.
- Future total vehicle traffic volumes will be analyzed based on Synchro Version 11.0, LOS (based on control delays) and maximum volume-to-capacity ratios. Queue lengths will be evaluated based on Sim Traffic results.
- Future background and future total conditions will be compared to identify if capacity and queuing issues are forecasted and if site-specific mitigation measures are required.

Traffic Safety

- The available sight distance at the proposed site accesses will be compared to standards set out by the Transportation Associates of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR).
- The supportability of site access location and restrictions will be reviewed based on traffic operations and expected queue lengths, as well as applicable access spacing guidelines.
- Conflicts will be reviewed between vehicles, pedestrians, cyclists, and recommendations made to maintain multimodal safety.

Parking Justification Study

Based on the City of Niagara Falls Zoning By-Law 79-200, the proposed parking does not meet the required parking spaces. As such, a parking justification study is to be prepared to justify the parking spaces and will be include in the TIB.

- An estimate of peak parking demand for the proposed development will be evaluated based on the Institute of Transportation Engineers (ITE) Parking Generation Manual, 6th Edition, to the compare to the proposed parking supply, as well as the City's By-law requirements.
- Other parking supply rates approved elsewhere within the City in a similar transportation setting will be reviewed. These recent approval trends will be used as additional justification to support the reduced parking supply.
- Please provide criteria for sites we would be able to survey or outline any sites that you would like surveyed in the area. As well as any previously collected data on parking utilization that is relevant to the Site.

I hope the contents outlined in this email are acceptable. If you have any questions or would like to discuss further, please do not hesitate to reach out.

Regards,

Shaira Ahmed
Engineering Intern, Transportation
Office: 905.693.4706
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER

From: John Grubich <jgrubich@niagarafalls.ca>
Sent: May 14, 2024 1:27 PM
To: Shaira Ahmed; Dunsmore, Susan
Cc: Aaron Wignall; Ian Lindley
Subject: RE: [EXTERNAL]-Terms of Reference - 6888 Drummond Road (CFCA#2658-7080-2)

Shaira;

Thank you for providing an updated site plan and your work plan.

Given that the number of practitioners has been identified, it appears that enough parking will be provided on-site (101 parking spaces are required and 101 parking spaces to be provided) with this revised site concept. If that is the case, a parking study is not required.

I provided comments below on the traffic component. Be advised that the City of Niagara Falls adopted the Niagara Region's July 2023 Traffic Impact Study Guidelines.

Please feel free to contact me if you have any questions.

John Grubich, C.E.T. | Traffic Planning Supervisor | Municipal Works - Transportation Services | City of Niagara Falls
8208 Heartland Forest Road | Niagara Falls, ON L2H 0L7 | (905) 356-7521 ext 5214 | Fax 905-356-5576 | jgrubich@niagarafalls.ca

---

From: Shaira Ahmed <sahmed@cfcrozier.ca>
Sent: Tuesday, May 14, 2024 9:45 AM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>; John Grubich <jgrubich@niagarafalls.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Ian Lindley <ilindley@cfcrozier.ca>
Subject: [EXTERNAL]-Terms of Reference - 6888 Drummond Road (CFCA#2658-7080-2)

Hello,

I hope you are doing well. We are working with our Client to complete a Transportation Impact Brief and Parking Justification Study for the proposed long term care center at 6888 Drummond Road in the City of Niagara Falls. The development concept proposes the construction of a 4-storey long term care building with 192 beds. A total of 97 standard vehicle parking spaces and four (4) barrier-free spaces are proposed. To facilitate the development, one (1) full-moves access along Drummond Road is proposed.

Study Methodology for the Transportation Impact Brief

The study will be prepared in accordance with the City of Niagara Falls: *Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review (November 2011)* and Niagara Region: *Transportation Impact assessment Guidelines (July 2023).* On this basis, we propose the following Terms of Reference for the Transportation Impact Study:

Study Intersections

- We propose the following study intersections:
    - ~~Drummond Road and Atlee Street~~ **exclude**
    - ~~Drummond Road and Dunn Street~~ **exclude**
    - Drummond Road and Churchill Street
    - Drummond Road and Site Access

Existing Conditions

- We will consult specialty traffic counting firms we typically work with to obtain traffic data for the intersections listed above unless the City of Niagara Falls (City) or Niagara Region (Region) has data for these intersections. **The City has a 2017 TMC for Drummond/Churchill, but it would be considered outdated as it is beyond 5 years old**
- We will request signal timing plans via the Region's online Traffic Data Request form.
- We will analyze the weekday a.m. and p.m. peak periods; 7:00 a.m. to 9:00 a.m. & 4:00 p.m. to 7:00 p.m.; reflective of the typical peak periods.
- We will analyze the existing vehicle traffic conditions based on peak hour traffic counts using Synchro Version 11.0, LOS (based on control delays), and maximum volume-to-capacity ratios. 95th percentile queues from Sim Traffic will also be outlined.

Study Horizons

- We will analyze the current year (2024), an opening year of (2025) and five (5) years from the date of full buildout (2030).
- **Please confirm if these horizon years are adequate. Yes, these horizon years are acceptable**

Growth Rates

We kindly request a recommended growth rate applicable to traffic volumes in the study area, to sufficiently reflect future conditions in the horizon years. If a growth rate is not available, an industry standard of 2% is suggested to forecast future traffic growth at the intersections of the study. **Please confirm if this is acceptable. A 2% growth rate is acceptable**

Background Developments

Please confirm if any background development should be included in the analysis. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis. **No background developments to consider**

Future Background Conditions

- We will forecast the 2025 and 2030 future background vehicle traffic volumes based on the above growth rates (and any background developments requested by the Region and City).
- Future background vehicle traffic volumes will be analyzed based on Synchro Version 11.0, LOS (based on control delays) and maximum volume-to-capacity ratios. Queue lengths will be evaluated based on Sim Traffic results.

Future Total Conditions

- Trip Distribution will be based on Transportation Tomorrow Survey (TTS) data and/or existing travel patterns.
- Trip Generation will be based on ITE Trip Generation Manual, 11th edition using Land Use Category 251 – Senior Adult Housing – Single-Family. Trip generation will be forecasted for passenger vehicles. **Also include trips related to the clinic**

- Future total vehicle traffic volumes will be analyzed based on Synchro Version 11.0, LOS (based on control delays) and maximum volume-to-capacity ratios. Queue lengths will be evaluated based on Sim Traffic results.
- Future background and future total conditions will be compared to identify if capacity and queuing issues are forecasted and if site-specific mitigation measures are required.

Traffic Safety

- The available sight distance at the proposed site accesses will be compared to standards set out by the Transportation Associates of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR).
- The supportability of site access location and restrictions will be reviewed based on traffic operations and expected queue lengths, as well as applicable access spacing guidelines.
- Conflicts will be reviewed between vehicles, pedestrians, cyclists, and recommendations made to maintain multimodal safety.

- **Assess if turn lanes are warranted, based on MTO left turn lane criteria.**

Parking Justification Study

Based on the City of Niagara Falls Zoning By-Law 79-200, the proposed parking does not meet the required parking spaces. As such, a parking justification study is to be prepared to justify the parking spaces and will be include in the TIB.

- An estimate of peak parking demand for the proposed development will be evaluated based on the Institute of Transportation Engineers (ITE) Parking Generation Manual, 6th Edition, to the compare to the proposed parking supply, as well as the City's By-law requirements.
- Other parking supply rates approved elsewhere within the City in a similar transportation setting will be reviewed. These recent approval trends will be used as additional justification to support the reduced parking supply.
- Please provide criteria for sites we would be able to survey or outline any sites that you would like surveyed in the area. As well as any previously collected data on parking utilization that is relevant to the Site.

I hope the contents outlined in this email are acceptable. If you have any questions or would like to discuss further, please do not hesitate to reach out.

Regards,

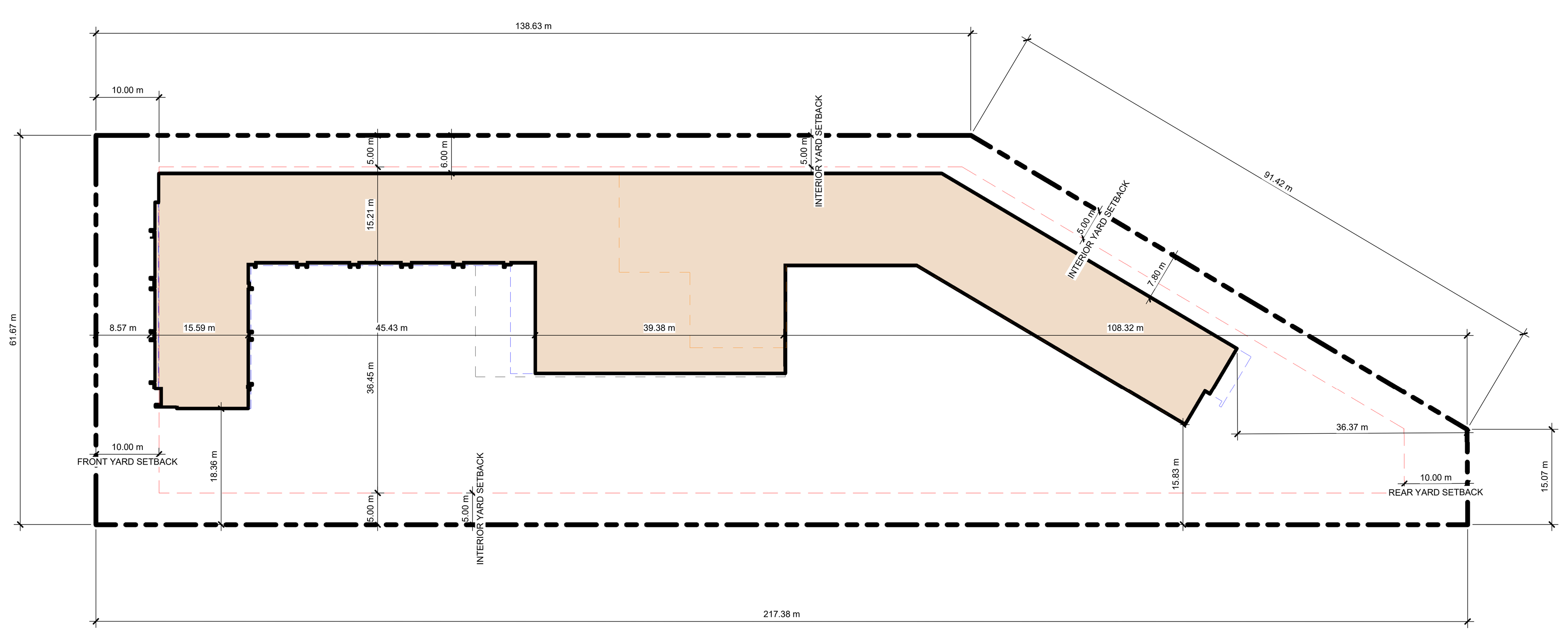
Shaira Ahmed
Engineering Intern, Transportation
Office: 905.693.4706
Collingwood | Milton | Toronto | Bradford | Guelph

ATTACHMENT B

Concept Plan

1 / SP-1 Site Plan
1 : 300

Key Plan
1 : 5000



SETBACK PLAN
1 : 500

GENERAL PROVISIONS

Zone (I zone) – Institutional zone
(d) Long Term Care
City of Niagra Falls Zoning By-law No. 79-200

ZONING DATA	REQUIRED	PROVIDED
STREET FRONT YARD	10 m	8.57 m
REAR YARD	10 m	36.37 m
MIN INTERIOR SIDE YARD	5 m	6 m
MIN EXTERIOR SIDE YARD	7.5	NA
MIN LOT AREA	1,500 sqm	11,567 sqm
MIN LOT DEPTH	30 m	154 m
MAX LOT COVERAGE	35%	22%
BUILDING HEIGHT MAX		19.6m
- U/S ROOF		25.5 m
- U/S MECH PENTHOUSE		29.5 m
LANDSCAPE OPEN SPACE	35%	36%

SITE STATISTICS

DESCRIPTION	AREA (SM)	AREA (SF)	%
BUILDING			
BUILDING	2229 m²	23998 ft²	22%
	2229 m²	23998 ft²	22%
HARD LANDSCAPE			
ASPHALT	3375 m²	36333 ft²	33%
CURBS	86 m²	927 ft²	1%
SIDEWALK	1633 m²	17579 ft²	16%
	5095 m²	54839 ft²	49%
SOFT LANDSCAPE			
LANDSCAPE	3026 m²	32568 ft²	29%
	3026 m²	32568 ft²	29%
	10350 m²	111405 ft²	100%
OVERALL SITE	11567 m²	124510 ft²	100.0%

SNOW STORAGE

DESCRIPTION	AREA (SM)	AREA (SF)	%
OVERALL SITE			
OVERALL SITE	11567 m²	124510 ft²	100%
	11567 m²	124510 ft²	100%
	11567 m²	124510 ft²	100%

PARKING REQUIRMENTS

PARKING COUNT

REQUIRED
NURSING HOME - 2 PARKING SPACES FOR EACH 5 BEDS = **192 beds / 5 x 2 = 76.8 (77)**

COMMERCIAL - 3 PARKING SPACES PER PRACTITIONER = (1007/130)*3 = 24

TOTAL PARKING REQUIRED : 77+24= 101 PARKING SPACES

ACCESSIBLE PARKING

REQUIRED
101-200 = 1 + 3% OF THE TOTAL NUMBER OF PARKING SPACES, ROUNDING UP TO THE NEAREST WHOLE NUMBER

1 + (101 x 0.03 = 3.03(3)) = 1 + 3 **= 4**

DRIVE AISLE:
- 6.0 m

PARKING SIZES:
- TYPICAL PARKING
  = 3.0 X 6.0
- LOADING TYPE A
  = 3.0m X 7.0m - 4m CLEARANCE
- ACCESSIBLE PARKING
  = 3.9 X 6.0 (+ 1.5m ACCESSIBLE AISLE)

BICYCLE PARKING:
- 1 space/500 m2 of floor area

SHORT TERM **BICYCLE PARKING:**
- 1 space/500 m2 of gross leasable floor area

OVERALL PARKING SCHEUDLE

TYPE MARK	DESCRIPTION	COUNT
TYPICAL	6.0m X 3.0m	97
	TYPE A - 3.4mX5.2m	4
		101

BICYCLE PARKING

TYPE	DESCRIPTION	COUNT
BIKE PARKING		8
Grand total		8

FSI CALCULATION

GROSS FLOOR AREA = 13762 sm
AREA OF LOT = 3166 sm

13762 / 3166 = 4.35

LEGEND

CONCRETE CURB	PROPOSED BUILDING
CONCRETE SIDEWALK	LANDSCAPE
PAVERS	ASPHALT DRIVEWAY
MULCH/ WOODCHIPS	6m WIDE FIRE ROUTE WITH HEAVY DUTY ASPHALT
PAINTED ROAD LINES	SETBACK LINES
	LANDSCAPE BUFFER
	LOT OUTLINE

C:\Users\chamberlain\Documents\121067 - Drummond Rd - Niagara Falls - Revit 2024 - Site Plan SM-2024.03

4/23/2024 11:05:01 AM

Chamberlain Architects Constructors Managers

Chamberlain Architect Services Limited

4671 Palladium Way (Unit 1)
Burlington, Ontario. L7M 0W9
CANADA

Phone: 905.631.7777

www.chamberlainIPD.com

NO.	ISSUED	DATE
	PRECONSULTATION	2024.12.11

CLIENT
Owner

SEAL
ONTARIO ASSOCIATION OF ARCHITECTS
STEPHEN A. MAURO
LICENCE
6514

CONSTRUCTION NORTH TRUE NORTH

PROJECT
ARCAVIA LTC
NIAGRA FALLS

6888 DRUMMOND RD,
NIAGARA FALLS, ON

SHEET NAME
SITE PLAN

START DATE	2022 - NOVEMBER
DRAWN BY	MA,BB
CHECKED BY	SM
SCALE	As indicated
PROJECT NO.	121067

DRAWING
SP-1

ATTACHMENT C

Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

ATTACHMENT D

Detailed Capacity Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	6	8	0	3	10	447	11	5	345	2
Future Volume (vph)	2	0	6	8	0	3	10	447	11	5	345	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.895			0.961			0.997			0.999	
Flt Protected		0.989			0.966			0.999			0.999	
Satd. Flow (prot)	0	1244	0	0	1304	0	0	1381	0	0	1376	0
Flt Permitted		0.989			0.966			0.999			0.999	
Satd. Flow (perm)	0	1244	0	0	1304	0	0	1381	0	0	1376	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Confl. Peds. (#/hr)	1		22	22		1	12		8	4		12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	22%	3%	2%	0%	4%	0%
Adj. Flow (vph)	2	0	7	10	0	4	12	539	13	6	416	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	14	0	0	564	0	0	424	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	8	0	3	10	447	11	5	345	2
Future Volume (Veh/h)	2	0	6	8	0	3	10	447	11	5	345	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	2	0	7	10	0	4	12	539	13	6	416	2
Pedestrians		12			8			22			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1016	1025	451	1036	1020	554	430			560		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1016	1025	451	1036	1020	554	430			560		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	99	100	99	95	100	99	99			99		
cM capacity (veh/h)	207	227	591	197	229	528	1020			1014		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	14	564	424
Volume Left	2	10	12	6
Volume Right	7	4	13	2
cSH	419	240	1020	1014
Volume to Capacity	0.02	0.06	0.01	0.01
Queue Length 95th (m)	0.5	1.5	0.3	0.1
Control Delay (s)	13.8	20.9	0.3	0.2
Lane LOS	B	C	A	A
Approach Delay (s)	13.8	20.9	0.3	0.2
Approach LOS	B	C		

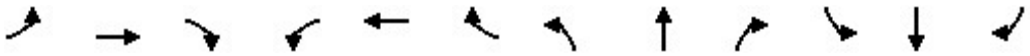
Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.2	9.1	24.7	16.6
Average Queue (m)	1.6	2.5	2.3	1.1
95th Queue (m)	7.1	9.1	12.5	7.2
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

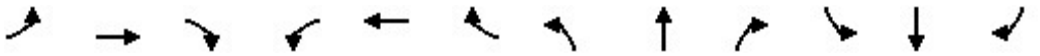
Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	0	4	1	5	3	491	3	7	524	10
Future Volume (vph)	5	1	0	4	1	5	3	491	3	7	524	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.932			0.999			0.997	
Flt Protected		0.960			0.980						0.999	
Satd. Flow (prot)	0	1349	0	0	1283	0	0	1403	0	0	1399	0
Flt Permitted		0.960			0.980						0.999	
Satd. Flow (perm)	0	1349	0	0	1283	0	0	1403	0	0	1399	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1	0	4	1	5	3	534	3	8	570	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	10	0	0	540	0	0	589	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1	0	4	1	5	3	491	3	7	524	10
Future Volume (Veh/h)	5	1	0	4	1	5	3	491	3	7	524	10
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)	5	1	0	4	1	5	3	534	3	8	570	11
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	1138	1134	576	1134	1138	536	581			537		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1138	1134	576	1134	1138	536	581			537		
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	100	100	98	99	99	100			99		
cM capacity (veh/h)	175	200	517	178	199	545	993			1031		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	6	10	540	589
Volume Left	5	4	3	8
Volume Right	0	5	3	11
cSH	178	272	993	1031
Volume to Capacity	0.03	0.04	0.00	0.01
Queue Length 95th (m)	0.8	0.9	0.1	0.2
Control Delay (s)	25.9	18.7	0.1	0.2
Lane LOS	D	C	A	A
Approach Delay (s)	25.9	18.7	0.1	0.2
Approach LOS	D	C		

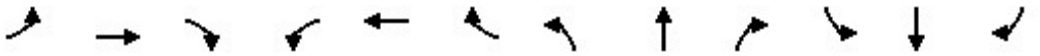
Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	53.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.2	10.4	15.7	16.4
Average Queue (m)	1.4	2.6	0.6	1.1
95th Queue (m)	6.8	9.4	5.7	7.7
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	9	0	4	11	456	12	6	352	3
Future Volume (vph)	3	0	7	9	0	4	11	456	12	6	352	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.910			0.958			0.997			0.999	
Flt Protected		0.984			0.967			0.999			0.999	
Satd. Flow (prot)	0	1258	0	0	1301	0	0	1380	0	0	1376	0
Flt Permitted		0.984			0.967			0.999			0.999	
Satd. Flow (perm)	0	1258	0	0	1301	0	0	1380	0	0	1376	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Confl. Peds. (#/hr)	1		22	22		1	12		8	4		12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	22%	3%	2%	0%	4%	0%
Adj. Flow (vph)	4	0	8	11	0	5	13	549	14	7	424	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	16	0	0	576	0	0	435	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.9%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	7	9	0	4	11	456	12	6	352	3
Future Volume (Veh/h)	3	0	7	9	0	4	11	456	12	6	352	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	4	0	8	11	0	5	13	549	14	7	424	4
Pedestrians		12			8			22			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1040	1049	460	1060	1044	565	440			571		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1040	1049	460	1060	1044	565	440			571		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	98	100	99	94	100	99	99			99		
cM capacity (veh/h)	199	219	584	189	221	520	1011			1005		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	16	576	435
Volume Left	4	11	13	7
Volume Right	8	5	14	4
cSH	355	236	1011	1005
Volume to Capacity	0.03	0.07	0.01	0.01
Queue Length 95th (m)	0.8	1.7	0.3	0.2
Control Delay (s)	15.5	21.4	0.4	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	15.5	21.4	0.4	0.2
Approach LOS	C	C		

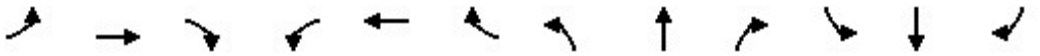
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	55.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.2	10.4	17.9	18.0
Average Queue (m)	2.5	3.7	2.0	1.6
95th Queue (m)	9.0	11.0	10.1	9.8
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	2	0	5	2	6	4	501	4	8	535	11
Future Volume (vph)	6	2	0	5	2	6	4	501	4	8	535	11
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.938			0.999			0.997	
Flt Protected		0.964			0.981						0.999	
Satd. Flow (prot)	0	1354	0	0	1293	0	0	1431	0	0	1426	0
Flt Permitted		0.964			0.981						0.999	
Satd. Flow (perm)	0	1354	0	0	1293	0	0	1431	0	0	1426	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Confl. Peds. (#/hr)	1		2	2		1	4		4	4		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	0%	2%	2%	0%	2%
Adj. Flow (vph)	6	2	0	5	2	6	4	516	4	8	552	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	13	0	0	524	0	0	571	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	2	0	5	2	6	4	501	4	8	535	11
Future Volume (Veh/h)	6	2	0	5	2	6	4	501	4	8	535	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	6	2	0	5	2	6	4	516	4	8	552	11
Pedestrians		4			4			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1112	1110	564	1106	1113	523	567			524		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1112	1110	564	1106	1113	523	567			524		
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	99	100	97	99	99	100			99		
cM capacity (veh/h)	180	206	523	183	205	552	1002			1039		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	13	524	571
Volume Left	6	5	4	8
Volume Right	0	6	4	11
cSH	185	271	1002	1039
Volume to Capacity	0.04	0.05	0.00	0.01
Queue Length 95th (m)	1.1	1.2	0.1	0.2
Control Delay (s)	25.3	19.0	0.1	0.2
Lane LOS	D	C	A	A
Approach Delay (s)	25.3	19.0	0.1	0.2
Approach LOS	D	C		

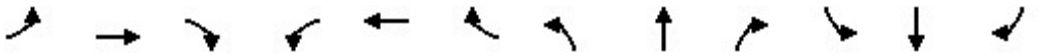
Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	55.8%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	12.0	10.4	15.4	21.8
Average Queue (m)	3.1	2.7	1.4	2.2
95th Queue (m)	10.5	9.5	8.4	12.3
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

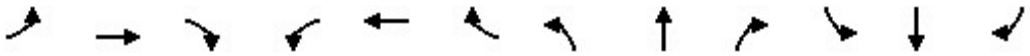
Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	9	0	4	12	494	13	6	381	3
Future Volume (vph)	3	0	7	9	0	4	12	494	13	6	381	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.910			0.958			0.997			0.999	
Flt Protected		0.984			0.967			0.999			0.999	
Satd. Flow (prot)	0	1258	0	0	1301	0	0	1380	0	0	1376	0
Flt Permitted		0.984			0.967			0.999			0.999	
Satd. Flow (perm)	0	1258	0	0	1301	0	0	1380	0	0	1376	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Confl. Peds. (#/hr)	1		22	22		1	12		8	4		12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	22%	3%	2%	0%	4%	0%
Adj. Flow (vph)	4	0	8	11	0	5	14	595	16	7	459	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	16	0	0	625	0	0	470	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.6%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	7	9	0	4	12	494	13	6	381	3
Future Volume (Veh/h)	3	0	7	9	0	4	12	494	13	6	381	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	4	0	8	11	0	5	14	595	16	7	459	4
Pedestrians		12			8			22			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1124	1134	495	1144	1128	612	475			619		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1124	1134	495	1144	1128	612	475			619		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	98	100	99	93	100	99	99			99		
cM capacity (veh/h)	174	195	558	165	197	489	980			965		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	16	625	470
Volume Left	4	11	14	7
Volume Right	8	5	16	4
cSH	321	208	980	965
Volume to Capacity	0.04	0.08	0.01	0.01
Queue Length 95th (m)	0.9	2.0	0.3	0.2
Control Delay (s)	16.6	23.7	0.4	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	16.6	23.7	0.4	0.2
Approach LOS	C	C		

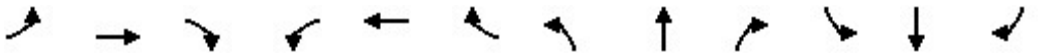
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	59.6%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.2	13.1	24.6	16.3
Average Queue (m)	2.2	3.2	2.8	1.2
95th Queue (m)	8.4	10.6	13.5	8.1
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	2	0	5	2	6	4	543	4	8	579	12
Future Volume (vph)	6	2	0	5	2	6	4	543	4	8	579	12
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.938			0.999			0.997	
Flt Protected		0.964			0.981						0.999	
Satd. Flow (prot)	0	1354	0	0	1293	0	0	1431	0	0	1426	0
Flt Permitted		0.964			0.981						0.999	
Satd. Flow (perm)	0	1354	0	0	1293	0	0	1431	0	0	1426	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			185.6	
Travel Time (s)		13.4			12.4			8.4			13.4	
Confl. Peds. (#/hr)	1		2	2		1	4		4	4		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	0%	2%	2%	0%	2%
Adj. Flow (vph)	6	2	0	5	2	6	4	560	4	8	597	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	13	0	0	568	0	0	617	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.0%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	2	0	5	2	6	4	543	4	8	579	12
Future Volume (Veh/h)	6	2	0	5	2	6	4	543	4	8	579	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	6	2	0	5	2	6	4	560	4	8	597	12
Pedestrians		4			4			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1201	1199	609	1196	1203	567	613			568		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1201	1199	609	1196	1203	567	613			568		
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 %	96	99	100	97	99	99	100			99		
cM capacity (veh/h)	156	182	493	158	181	521	963			1001		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	13	568	617
Volume Left	6	5	4	8
Volume Right	0	6	4	12
cSH	161	240	963	1001
Volume to Capacity	0.05	0.05	0.00	0.01
Queue Length 95th (m)	1.2	1.4	0.1	0.2
Control Delay (s)	28.5	20.8	0.1	0.2
Lane LOS	D	C	A	A
Approach Delay (s)	28.5	20.8	0.1	0.2
Approach LOS	D	C		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	59.0%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	11.8	11.9	18.3	18.0
Average Queue (m)	2.9	3.1	1.2	1.6
95th Queue (m)	10.1	10.3	8.3	9.7
Link Distance (m)	177.8	164.4	108.0	177.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	7	9	0	4	11	466	12	6	367	4
Future Volume (vph)	4	0	7	9	0	4	11	466	12	6	367	4
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.917			0.958			0.997			0.999	
Flt Protected		0.981			0.967			0.999			0.999	
Satd. Flow (prot)	0	1264	0	0	1301	0	0	1380	0	0	1377	0
Flt Permitted		0.981			0.967			0.999			0.999	
Satd. Flow (perm)	0	1264	0	0	1301	0	0	1380	0	0	1377	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			63.9	
Travel Time (s)		13.4			12.4			8.4			4.6	
Confl. Peds. (#/hr)	1		22	22		1	12		8	4		12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	22%	3%	2%	0%	4%	0%
Adj. Flow (vph)	5	0	8	11	0	5	13	561	14	7	442	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	16	0	0	588	0	0	454	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	7	9	0	4	11	466	12	6	367	4
Future Volume (Veh/h)	4	0	7	9	0	4	11	466	12	6	367	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	5	0	8	11	0	5	13	561	14	7	442	5
Pedestrians		12			8			22			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1070	1080	478	1090	1075	577	459			583		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1070	1080	478	1090	1075	577	459			583		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	97	100	99	94	100	99	99			99		
cM capacity (veh/h)	189	210	570	180	212	512	994			995		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	16	588	454
Volume Left	5	11	13	7
Volume Right	8	5	14	5
cSH	321	226	994	995
Volume to Capacity	0.04	0.07	0.01	0.01
Queue Length 95th (m)	1.0	1.8	0.3	0.2
Control Delay (s)	16.7	22.2	0.4	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	16.7	22.2	0.4	0.2
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	29	462	11	13	360
Future Volume (vph)	16	29	462	11	13	360
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.912		0.997			
Flt Protected	0.983					0.998
Satd. Flow (prot)	1259	0	1401	0	0	1402
Flt Permitted	0.983					0.998
Satd. Flow (perm)	1259	0	1401	0	0	1402
Link Speed (k/h)	50		50			50
Link Distance (m)	51.0		63.9			116.4
Travel Time (s)	3.7		4.6			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	32	502	12	14	391
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	514	0	0	405
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	29	462	11	13	360
Future Volume (Veh/h)	16	29	462	11	13	360
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	32	502	12	14	391
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	927	508			514	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	927	508			514	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	94			99	
cM capacity (veh/h)	294	565			1052	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	49	514	405
Volume Left	17	0	14
Volume Right	32	12	0
cSH	428	1700	1052
Volume to Capacity	0.11	0.30	0.01
Queue Length 95th (m)	3.1	0.0	0.3
Control Delay (s)	14.5	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	14.5	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.1	10.4	21.6	15.4
Average Queue (m)	2.6	3.0	2.9	1.2
95th Queue (m)	9.2	10.1	12.8	7.4
Link Distance (m)	177.8	164.4	108.0	45.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Site Access & Drummond Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	20.4	20.6
Average Queue (m)	7.6	2.7
95th Queue (m)	15.9	11.3
Link Distance (m)	42.5	109.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	2	0	5	2	6	4	515	4	8	546	12
Future Volume (vph)	7	2	0	5	2	6	4	515	4	8	546	12
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.938			0.999			0.997	
Flt Protected		0.963			0.981						0.999	
Satd. Flow (prot)	0	1353	0	0	1293	0	0	1431	0	0	1426	0
Flt Permitted		0.963			0.981						0.999	
Satd. Flow (perm)	0	1353	0	0	1293	0	0	1431	0	0	1426	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			63.9	
Travel Time (s)		13.4			12.4			8.4			4.6	
Confl. Peds. (#/hr)	1		2	2		1	4		4	4		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	0%	2%	2%	0%	2%
Adj. Flow (vph)	7	2	0	5	2	6	4	531	4	8	563	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	539	0	0	583	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	0	5	2	6	4	515	4	8	546	12
Future Volume (Veh/h)	7	2	0	5	2	6	4	515	4	8	546	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	2	0	5	2	6	4	531	4	8	563	12
Pedestrians		4			4			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1138	1136	575	1133	1140	538	579			539		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1138	1136	575	1133	1140	538	579			539		
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 %	96	99	100	97	99	99	100			99		
cM capacity (veh/h)	172	198	515	175	197	541	991			1026		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	13	539	583
Volume Left	7	5	4	8
Volume Right	0	6	4	12
cSH	177	261	991	1026
Volume to Capacity	0.05	0.05	0.00	0.01
Queue Length 95th (m)	1.3	1.3	0.1	0.2
Control Delay (s)	26.4	19.5	0.1	0.2
Lane LOS	D	C	A	A
Approach Delay (s)	26.4	19.5	0.1	0.2
Approach LOS	D	C		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	21	512	15	32	552
Future Volume (vph)	12	21	512	15	32	552
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.914		0.996			
Flt Protected	0.982					0.997
Satd. Flow (prot)	1261	0	1399	0	0	1401
Flt Permitted	0.982					0.997
Satd. Flow (perm)	1261	0	1399	0	0	1401
Link Speed (k/h)	50		50			50
Link Distance (m)	51.0		63.9			116.4
Travel Time (s)	3.7		4.6			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	23	557	16	35	600
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	573	0	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	21	512	15	32	552
Future Volume (Veh/h)	12	21	512	15	32	552
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)	13	23	557	16	35	600
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	1235	565			573	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1235	565			573	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	96			96	
cM capacity (veh/h)	188	524			1000	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	573	635
Volume Left	13	0	35
Volume Right	23	16	0
cSH	319	1700	1000
Volume to Capacity	0.11	0.34	0.04
Queue Length 95th (m)	3.0	0.0	0.9
Control Delay (s)	17.7	0.0	0.9
Lane LOS	C		A
Approach Delay (s)	17.7	0.0	0.9
Approach LOS	C		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.4	9.1	13.6	16.9
Average Queue (m)	2.9	3.6	1.1	1.2
95th Queue (m)	9.8	10.6	7.9	7.8
Link Distance (m)	177.8	164.4	108.0	45.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Site Access & Drummond Road

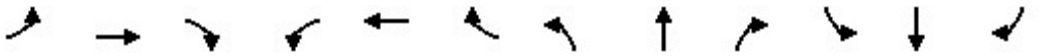
Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	17.0	6.2	25.3
Average Queue (m)	6.6	0.2	4.3
95th Queue (m)	14.6	3.1	15.4
Link Distance (m)	42.5	45.1	109.7
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	7	9	0	4	12	504	13	6	396	4
Future Volume (vph)	4	0	7	9	0	4	12	504	13	6	396	4
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.917			0.958			0.997			0.999	
Flt Protected		0.981			0.967			0.999			0.999	
Satd. Flow (prot)	0	1264	0	0	1301	0	0	1380	0	0	1376	0
Flt Permitted		0.981			0.967			0.999			0.999	
Satd. Flow (perm)	0	1264	0	0	1301	0	0	1380	0	0	1376	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			63.9	
Travel Time (s)		13.4			12.4			8.4			4.6	
Confl. Peds. (#/hr)	1		22	22		1	12		8	4		12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	22%	3%	2%	0%	4%	0%
Adj. Flow (vph)	5	0	8	11	0	5	14	607	16	7	477	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	16	0	0	637	0	0	489	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	7	9	0	4	12	504	13	6	396	4
Future Volume (Veh/h)	4	0	7	9	0	4	12	504	13	6	396	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	5	0	8	11	0	5	14	607	16	7	477	5
Pedestrians		12			8			22			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1154	1164	514	1174	1159	624	494			631		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1154	1164	514	1174	1159	624	494			631		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	97	100	99	93	100	99	99			99		
cM capacity (veh/h)	165	187	545	157	188	482	964			955		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	16	637	489
Volume Left	5	11	14	7
Volume Right	8	5	16	5
cSH	289	199	964	955
Volume to Capacity	0.04	0.08	0.01	0.01
Queue Length 95th (m)	1.1	2.1	0.4	0.2
Control Delay (s)	18.0	24.6	0.4	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	18.0	24.6	0.4	0.2
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	60.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	29	500	11	13	389
Future Volume (vph)	16	29	500	11	13	389
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.912		0.997			
Flt Protected	0.983					0.998
Satd. Flow (prot)	1259	0	1401	0	0	1402
Flt Permitted	0.983					0.998
Satd. Flow (perm)	1259	0	1401	0	0	1402
Link Speed (k/h)	50		50			50
Link Distance (m)	51.0		63.9			116.4
Travel Time (s)	3.7		4.6			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	32	543	12	14	423
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	555	0	0	437
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	29	500	11	13	389
Future Volume (Veh/h)	16	29	500	11	13	389
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	32	543	12	14	423
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	1000	549			555	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1000	549			555	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	94			99	
cM capacity (veh/h)	266	535			1015	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	49	555	437
Volume Left	17	0	14
Volume Right	32	12	0
cSH	396	1700	1015
Volume to Capacity	0.12	0.33	0.01
Queue Length 95th (m)	3.4	0.0	0.3
Control Delay (s)	15.4	0.0	0.4
Lane LOS	C		A
Approach Delay (s)	15.4	0.0	0.4
Approach LOS	C		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Drummond Road & Churchill Street

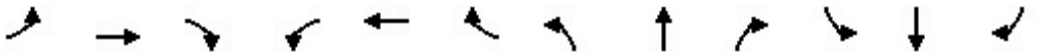
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.4	11.8	26.5	15.2
Average Queue (m)	3.0	3.1	4.2	1.7
95th Queue (m)	10.0	10.3	17.0	9.0
Link Distance (m)	177.8	164.4	108.0	45.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Site Access & Drummond Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	20.6	22.6
Average Queue (m)	8.1	2.2
95th Queue (m)	15.9	11.6
Link Distance (m)	42.5	109.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

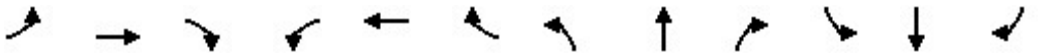
Network Summary

Network wide Queuing Penalty: 0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	2	0	5	2	6	4	557	4	8	590	13
Future Volume (vph)	7	2	0	5	2	6	4	557	4	8	590	13
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.938			0.999			0.997	
Flt Protected		0.963			0.981						0.999	
Satd. Flow (prot)	0	1353	0	0	1293	0	0	1431	0	0	1426	0
Flt Permitted		0.963			0.981						0.999	
Satd. Flow (perm)	0	1353	0	0	1293	0	0	1431	0	0	1426	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		186.3			172.9			116.5			63.9	
Travel Time (s)		13.4			12.4			8.4			4.6	
Confl. Peds. (#/hr)	1		2	2		1	4		4	4		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	0%	2%	2%	0%	2%
Adj. Flow (vph)	7	2	0	5	2	6	4	574	4	8	608	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	582	0	0	629	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	0	5	2	6	4	557	4	8	590	13
Future Volume (Veh/h)	7	2	0	5	2	6	4	557	4	8	590	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	2	0	5	2	6	4	574	4	8	608	13
Pedestrians		4			4			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1226	1224	620	1222	1229	581	625			582		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1226	1224	620	1222	1229	581	625			582		
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 %	95	99	100	97	99	99	100			99		
cM capacity (veh/h)	149	176	485	152	174	511	953			989		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	13	582	629
Volume Left	7	5	4	8
Volume Right	0	6	4	13
cSH	154	232	953	989
Volume to Capacity	0.06	0.06	0.00	0.01
Queue Length 95th (m)	1.5	1.4	0.1	0.2
Control Delay (s)	29.7	21.4	0.1	0.2
Lane LOS	D	C	A	A
Approach Delay (s)	29.7	21.4	0.1	0.2
Approach LOS	D	C		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	59.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	21	554	15	32	598
Future Volume (vph)	12	21	554	15	32	598
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.914		0.997			
Flt Protected	0.982					0.997
Satd. Flow (prot)	1261	0	1401	0	0	1401
Flt Permitted	0.982					0.997
Satd. Flow (perm)	1261	0	1401	0	0	1401
Link Speed (k/h)	50		50			50
Link Distance (m)	51.0		63.9			116.4
Travel Time (s)	3.7		4.6			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	23	602	16	35	650
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	618	0	0	685
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 86.3%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	21	554	15	32	598
Future Volume (Veh/h)	12	21	554	15	32	598
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)	13	23	602	16	35	650
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	1330	610			618	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1330	610			618	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	95			96	
cM capacity (veh/h)	164	494			962	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	618	685
Volume Left	13	0	35
Volume Right	23	16	0
cSH	287	1700	962
Volume to Capacity	0.13	0.36	0.04
Queue Length 95th (m)	3.4	0.0	0.9
Control Delay (s)	19.4	0.0	1.0
Lane LOS	C		A
Approach Delay (s)	19.4	0.0	1.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection: 1: Drummond Road & Churchill Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.4	9.1	19.2	23.4
Average Queue (m)	2.3	3.3	1.1	1.8
95th Queue (m)	8.8	10.3	9.7	11.5
Link Distance (m)	177.8	164.4	108.0	45.1
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Site Access & Drummond Road

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	17.2	6.0	44.6
Average Queue (m)	6.8	0.2	6.5
95th Queue (m)	15.1	3.0	24.0
Link Distance (m)	42.5	45.1	109.7
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

ATTACHMENT E

ITE Trip Generation 11th Edition Excerpts

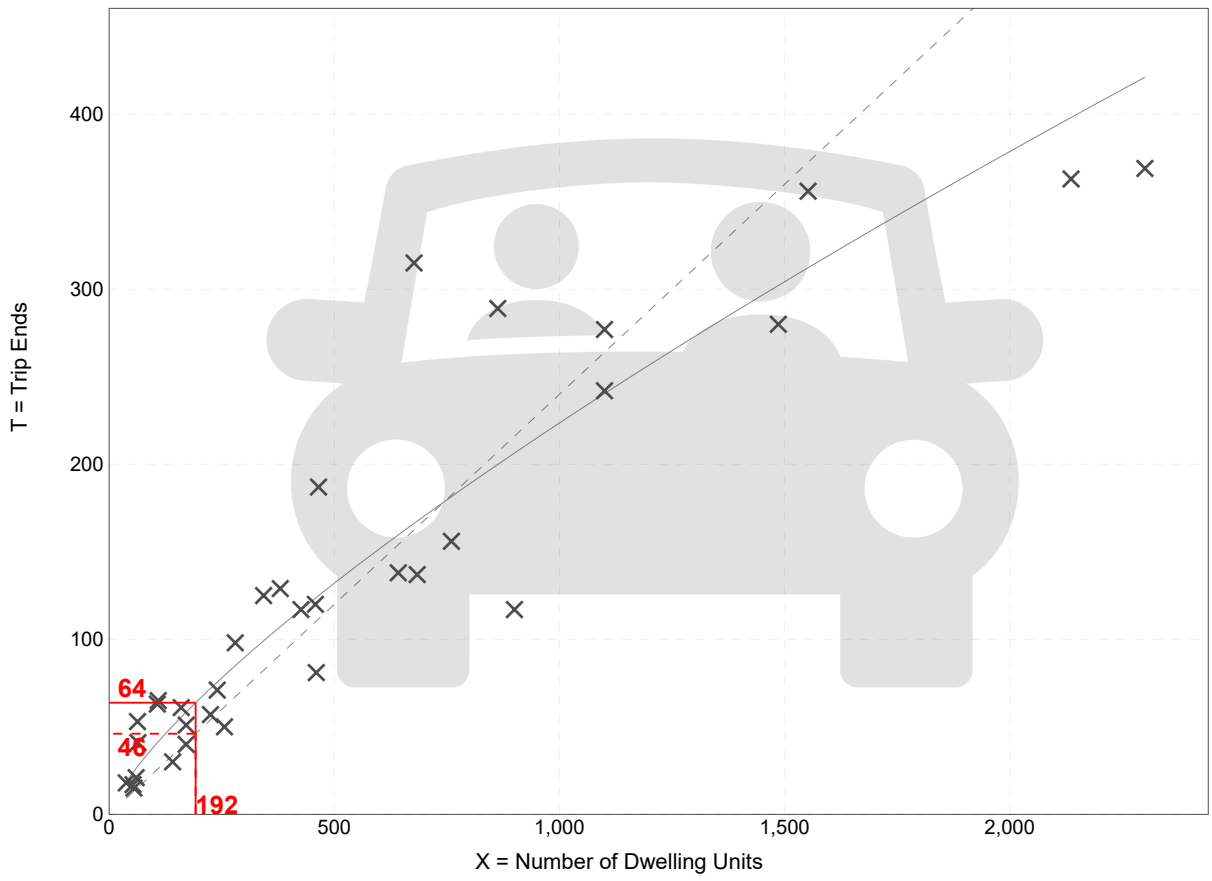
Senior Adult Housing - Single-Family
(251)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 34
Avg. Num. of Dwelling Units: 557
Directional Distribution: 33% entering, 67% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.84	0.10

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.76 Ln(X) + 0.16 **R^2= 0.88**

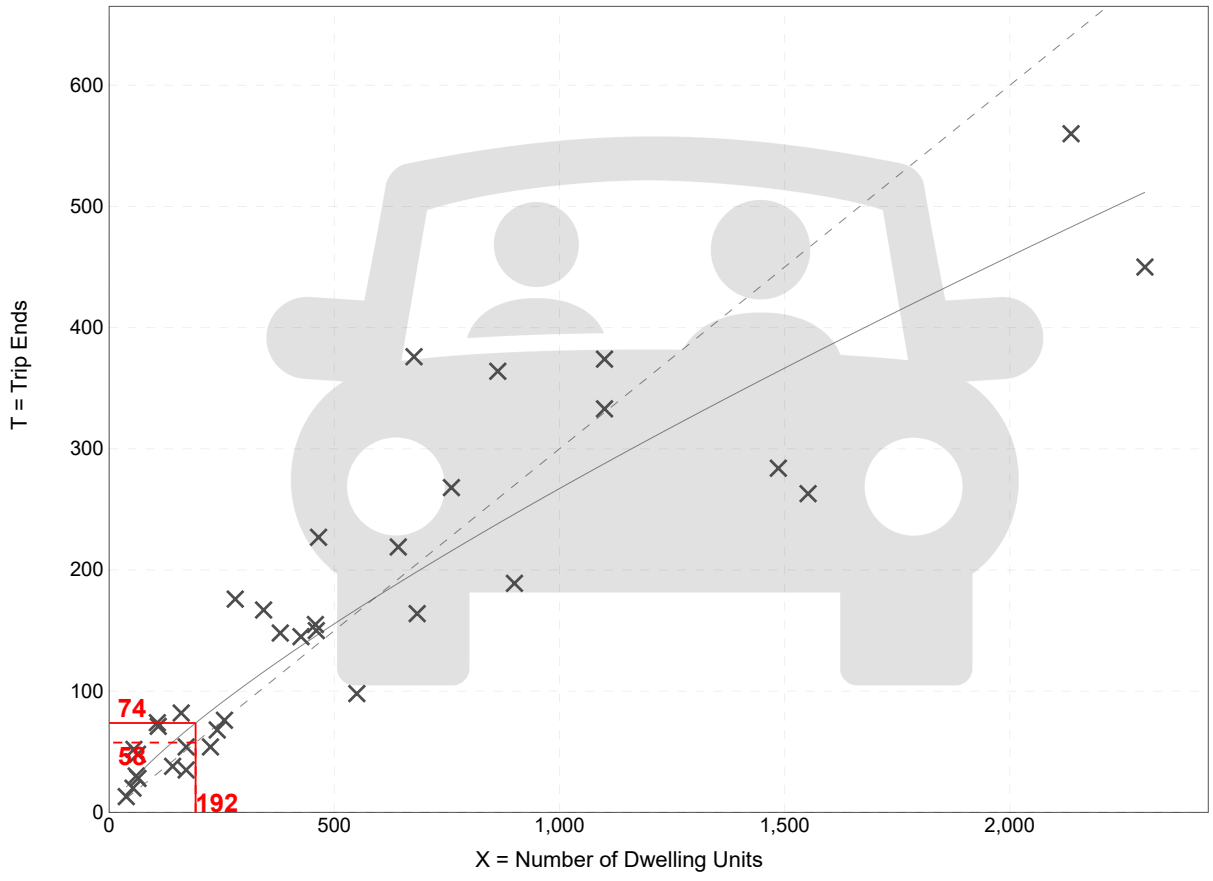
Senior Adult Housing - Single-Family
(251)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 35
Avg. Num. of Dwelling Units: 556
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.95	0.12

Data Plot and Equation

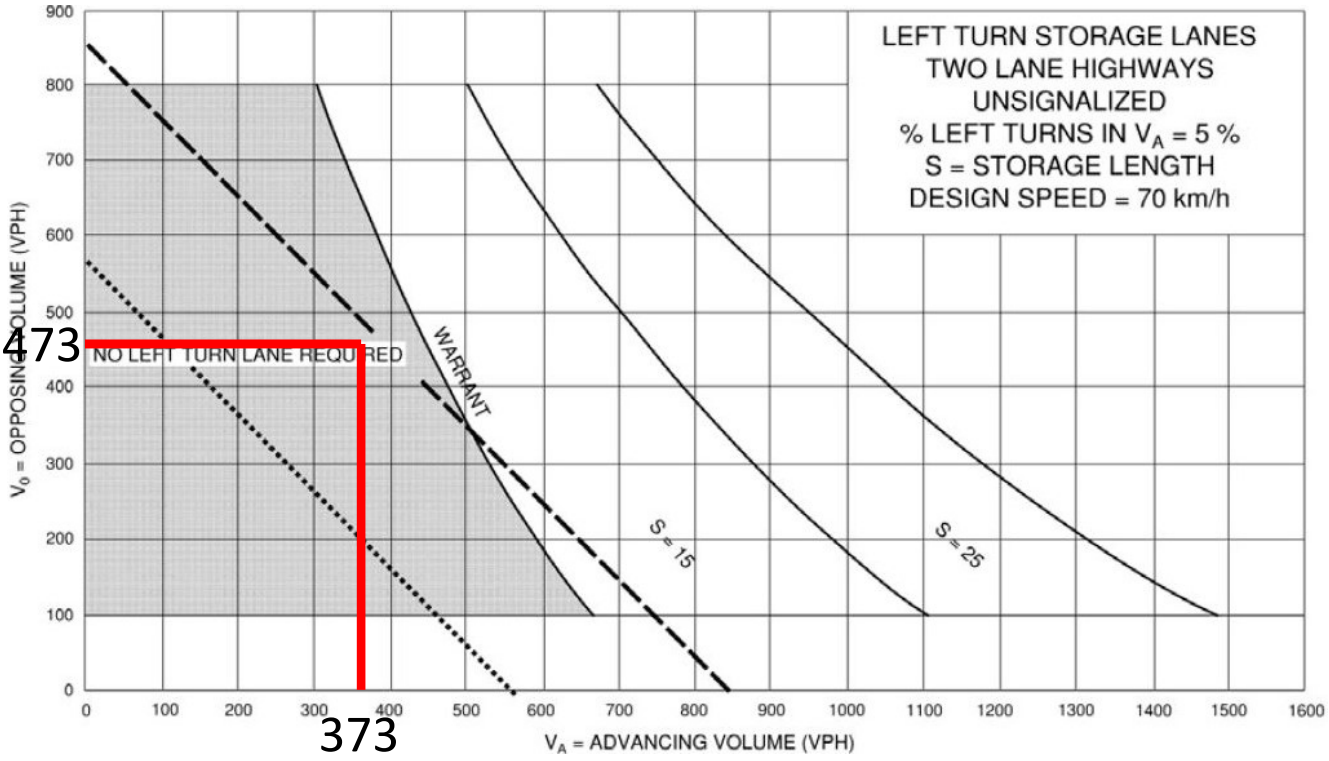


Fitted Curve Equation: Ln(T) = 0.78 Ln(X) + 0.20 **R^2= 0.86**

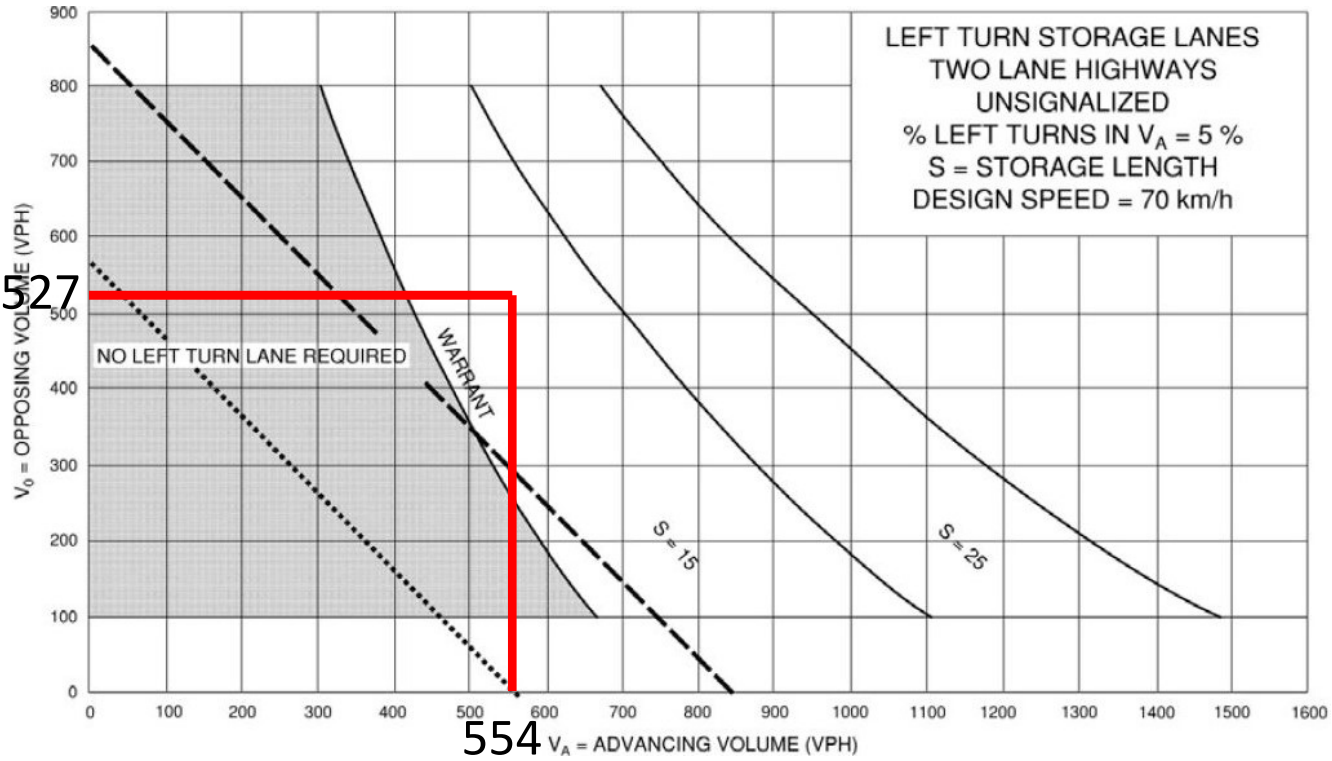
ATTACHMENT F

Left Turn Lane Warrant

AM Peak Hour



PM Peak Hour



2029 Future Total - Left Turn Lane Warrant

ATTACHMENT G

Relevant Zoning By-Law Excerpts

be made a condition to the approval of plans and drawings in a site plan control area established under section 35a of The Planning Act. Where a building, structure or lot accommodates more than one use or purpose, the required parking spaces shall be the sum of the required parking spaces for each such use or purpose.

Table 1

CLASS OF USE, BUILDING OR STRUCTURE	**MINIMUM PARKING SPACE REQUIREMENTS**
Arena	1 parking space for each 5 seats
Bank, trust company, credit union, Currency exchange, sightseeing tourist information centre, timeshare sales office, office other than a dental or medical office or clinic medical office or clinic (2002-061)	1 parking space for each 25 square metres (269.1 sq. ft.) of gross leasable floor area
Barbershop or hairdressing establishment	3 parking spaces plus 1 additional parking space for each chair above 3
Bed and Breakfast	1 parking space for each guest room in addition to the parking space required for a detached dwelling or dwelling unit
Car Wash (81-62, #40)	4 parking spaces in line per bay
Dental or Medical Clinic or office	3 parking spaces for each practitioner
Drive-in-Restaurant	25 parking spaces plus 1 parking space for each 5 seats within the building or structure
Drive-through Facility accessory to a restaurant or retail store	12 parking spaces in a queuing lane measured from where products are dispensed, each with a minimum length of 6 metres (19.69 ft.) and a minimum width of 2.75 metres (9.02 ft.).
Drive-through Facility accessory to a financial institution	3 spaces in a queuing lane, measured from where products are dispensed, each with a minimum length of 6 metres (19.69 ft.) and a minimum width of 2.75 metres (9.02 ft.).
Detached dwelling, Duplex dwelling or Semi-detached dwelling and an on street townhouse dwelling	1 parking space for each dwelling unit
Dwelling containing 3 or more dwelling units save and except an on street townhouse dwelling	1.4 parking space for each dwelling unit
Funeral Home	15 parking spaces
Home for the Aged, Nursing Home	2 parking spaces for each 5 beds
Hospital	1 parking space for each 2 beds
Hotel	1 parking space for each two bedrooms. plus 1 parking space for each 5.5 square metres (59.2 sq. ft.) of floor area used as a place of assembly
Mobile Home Park	1.1 parking spaces for each mobile home
Motel	1 parking space for each 1.3 motel units

(f) Subject to clause (g) of section 4.37, every reference to a zone in clauses (b) and (c) of section 4.37 shall be deemed to include any zone described in section 19 of the by-law that is derived from the zones listed in clauses (b) and (c) of section 4.37;

(g) Existing tourist homes and any other permitted uses that fall within the ambit of the definition of a bed and breakfast as set out in this by-law shall henceforth be referred to as a bed and breakfast, but in all other respects shall continue to be governed by the site specific regulations that govern their permitted use on the effective date of this amendment to the by-law;

(h) Parking and access requirements shall be in accordance with section 4.19.1.

4.38 VACATION RENTAL UNIT: a vacation rental unit shall comply with the following regulations: (2018-92)

(a) The maximum number of bedrooms permitted in a vacation rental unit in an existing detached dwelling or dwelling unit in a TC, GC, and CB zone shall be 3;

(b) A vacation rental unit shall be licenced by the City of Niagara Falls and the municipal licence of a vacation rental unit must be kept current and maintained in good standing;

(c) The maximum number of travelers permitted to stay in an existing detached dwelling or dwelling unit used as a vacation rental unit shall be in accordance with the requirements of the Building Code Act, 1992, S. O. 1992, c.23, as amended, and the regulations promulgated thereunder;

(d) Subject to clause (e) of section 4.38, any and every reference to a zone in clause (a) of section 4.38 shall be deemed to include any zone described in section 19 of the by- law that is derived from the zones listed in clause (a) of section 4.38;

(e) Existing cottage rental dwellings and any other permitted uses that fall within the ambit of the definition of a vacation rental unit as set out in this by-law shall henceforth be referred to as a vacation rental unit, but in all other respects shall continue to be governed by the site specific regulations that govern their permitted use on the effective date of this amendment to the by-law;

(f) Parking and access requirements shall be in accordance with section 4.19.1.

4.39 BICYCLE PARKING: bicycle parking enclosures shall only be required for buildings or portions of buildings that were not existing on the effective date of the By-law and shall be provided in accordance with the following: (2021-40)

(i) Bicycle parking shall be provided at a rate of 0.5 spaces/dwelling unit for apartment dwellings and 1 space/500m² of floor area for non-residential uses.

(ii) Short-term bicycle parking shall be provided at a rate of 2 spaces per apartment dwellings with 20 units or less, and at a rate of 6 spaces per apartment dwelling having more than 20 dwelling units. Non-residential uses shall provide 1 space/500m² of gross leasable floor area.

(iii) A bicycle parking space shall be located within a building, structure, enclosure and/or bicycle locker.

(iv) A bicycle parking space shall be a minimum of 1.8 metres in length, a minimum of 0.6 metres in width, and overhead clearance in covered spaces shall be a minimum of 2.1 metres.

(v) Notwithstanding subsection (iii) above, where a bicycle parking space provides for vertical storage of a bicycle, the minimum length may be reduced to 1.2 metres.

(vi) Notwithstanding subsections (i) and (iii), where a bicycle parking space is located within a bicycle locker, overhead clearance shall not be required.

(vii) A bicycle parking space shall abut an access aisle which shall be a minimum of 1.5 metres in width.

4.40 NIGHTCLUBS: nightclubs, where permitted in a zone shall be subject to the following regulations: (2021-40)

(i) A nightclub shall be separated from another nightclub or licensed establishment by a minimum distance of 100 metres measured from premises to premises.

(ii) A nightclub shall be separated from the boundary of a Residential Zone by a minimum distance of 45 metres.

(iii) Parking for a nightclub shall be provided at a rate of 1 parking space for each 5 persons that can be lawfully accommodated therein at any one time.

4.41 COMMUNITY GARDEN: Nothing in this by-law shall prevent the use of any land for a community garden, save and except for land within an EPA or HL zone. (2022-094)

4.42 TECHNICAL REVISIONS TO BY-LAW NO. 79-200: Revisions may be made to By-law No. 79-200 without the need for a Zoning By-law Amendment in the following cases: (2022-095)

(a) Correction of grammar or typographical errors or revisions to format in a manner that does not change the intent of the regulation;

(b) Changes to references to a street name, where Council of the Corporation of the City of Niagara Falls or the Regional Municipality of Niagara has passed a by-law to change the street name;

(c) Adding or revising technical information on maps or schedules which does not change the zoning of the lands or amend a zoning boundary including, but not limited to, addition of or modifications to streets, modifications to street names, legends, scales or title blocks;

(d) Changes to table of contents, headings, marginal notes, page numbering, footers and headers, which do not form part of this By-law and are inserted or modified for convenience of reference only.

4.43 MEASUREMENTS: All measurements of length, area or height used in this By-law shall be subject to the normal rules of rounding numbers, within the degree of precision specified by the number of units following the decimal point (if any) so that: (2022-095)

ATTACHMENT H

Relevant TAC Excerpts

Stopping sight distance is the sum of the distance travelled during the perception and reaction time and the braking distance.

$$SSD = 0.278Vt + 0.039 \frac{V^2}{a} \quad (2.5.2)$$

Where:

SSD = Stopping sight distance (m)
t = Brake reaction time, 2.5 s
V = Design speed (km/h)
a = Deceleration rate (m/s^2)

Table 2.5.2 gives the minimum stopping sight distances on level grade, on wet pavement, for a range of design speeds. These values are used for vertical curve design, intersection geometry and the placement of traffic control devices. The stopping sight distances quoted in **Table 2.5.2** may need to be increased for a variety of reasons related to grade and vehicle type as noted below.

Table 2.5.2: Stopping Sight Distance on level roadways for Automobiles[54]

Design speed (km/h)	Brake reaction distance (m)	Braking distance on level (m)	Stopping sight distance	
			Calculated (m)	Design (m)
20	13.9	4.6	18.5	20
30	20.9	10.3	31.2	35
40	27.8	18.4	46.2	50
50	34.8	28.7	63.5	65
60	41.7	41.3	83.0	85
70	48.7	56.2	104.9	105
80	55.6	73.4	129.0	130
90	62.6	92.9	155.5	160
100	69.5	114.7	184.2	185
110	76.5	138.8	215.3	220
120	83.4	165.2	248.6	250
130	90.4	193.8	284.2	285

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s^2 used to determine calculated sight distance.

Table 9.9.3: Time Gap for Case B1, Left Turn from Stop

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Notes: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.2 s for each percent grade for left turns.
- Some road authorities use higher values for certain specialized vehicles (e.g., Alberta uses 22 s for very long log trucks).

The intersection sight distance along the major road (distance b in **Figure 9.9.2**) is determined by:

$$ISD = 0.278\ V_{major}\ t_g \qquad (9.9.1)$$

Where:

ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)
V_{major} = design speed of the major road (km/h)
t_g = time gap for minor road vehicle to enter the major road (s)

For example, a passenger car turning left onto a two-lane major road should be provided sight distance equivalent to a time gap of 7.5 s in major-road traffic. If the design speed of the major road is 100 km/h, this corresponds to a sight distance of 0.278(100)(7.5) = 208.5 or 210 m, rounded for design.

A passenger car turning left onto a four-lane undivided roadway will need to cross two near lanes, rather than one. This increases the recommended gap in major-road traffic from 7.5 to 8.0 s. The corresponding value of sight distance for this example would be 223 m. If the minor-road approach to such an intersection is located on a 4% upgrade, then the time gap selected for intersection sight distance design for left turns should be increased from 8.0 to 8.8 s, equivalent to an increase of 0.2 s for each percent grade.

The design values for intersection sight distance for passenger cars are shown in **Table 9.9.4**. **Figure 9.9.4** includes design values, based on the time gaps for the design vehicles included in **Table 9.9.3**.

No adjustment of the recommended sight distance values for the major-road grade is generally needed because both the major- and minor-road vehicle will be on the same grade when departing from the intersection. However, if the minor-road design vehicle is a heavy truck and the intersection is located near a sag vertical curve with grades over 3%, then an adjustment to extend the recommended sight distance based on the major-road grade should be considered.

Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of case B3.

The time gaps in **Table 9.9.3** can be decreased by 1.0 s for right-turn maneuvers without undue interference with major-road traffic. These adjusted time gaps for the right turn from the minor road are shown in **Table 9.9.5**. Design values based on these adjusted time gaps are shown in **Table 9.9.6** for passenger cars. **Figure 9.9.5** includes the design values for the design vehicles for each of the time gaps in **Table 9.9.5**.

Table 9.9.5: Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	6.5
Single-unit truck	8.5
Combination truck (WB 19 and WB 20)	10.5

Note: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.1 s for each percent grade for left turns.

Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	36.1	40
30	35	54.2	55
40	50	72.3	75
50	65	90.4	95
60	85	108.4	110
70	105	126.5	130
80	130	144.6	145
90	160	162.6	165
100	185	180.7	185
110	220	198.8	200
120	250	216.8	220
130	285	234.9	235

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or to cross a two-lane highway with no median and with grades of 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

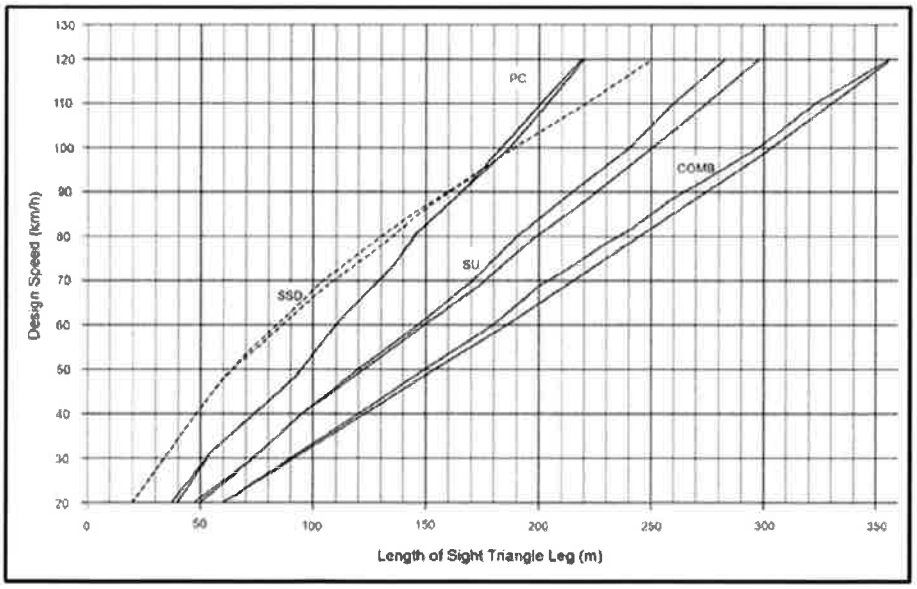


Figure 9.9.5: Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver (Calculated and Design Values Plotted)

Case F – Left Turns from the Major Road

All locations along a major highway from which vehicles are permitted to turn left across opposing traffic, including intersections and driveways, should have sufficient sight distance to accommodate the left-turn maneuver. Left-turning drivers need sufficient sight distance to decide when to turn left across the lane(s) used by opposing traffic. Sight distance design should be based on a left turn by a stopped vehicle, since a vehicle that turns left without stopping would need less sight distance. The sight distance along the major road to accommodate left turns is the distance traversed at the design speed of the major road in the travel time for the design vehicle given in **Table 9.9.11**.

Table 9.9.11: Time Gap for Case F, Left Turns from the Major Road

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	5.5
Single-unit truck	6.5
Combination truck (WB 19 and WB 20)	7.5

Note: Adjustment for multi-lane highways: For turning vehicles that cross more than one opposing lane, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane to be crossed.

The table also contains appropriate adjustment factors for the number of major-road lanes to be crossed by the turning vehicle. The unadjusted time gap in **Table 9.9.11** for passenger cars was used to develop the sight distances in **Table 9.9.12** and is illustrated in **Figure 9.9.8.**

Table 9.9.12: Intersection Sight Distance – Case F, Left Turn from the Major Road

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance	
		Passenger Cars	
		Calculated (m)	Design (m)
20	20	30.6	35
30	35	45.9	50
40	50	61.2	65
50	65	76.5	80
60	85	91.7	95
70	105	107.0	110
80	130	122.3	125
90	160	137.6	140
100	185	152.9	155
110	220	168.2	170
120	250	183.5	185
130	285	198.8	200

Note: Intersection sight distance shown is for a passenger car making a left turn from an undivided highway. For other conditions and design vehicles, the time gap should be adjusted and the sight distance recalculated.

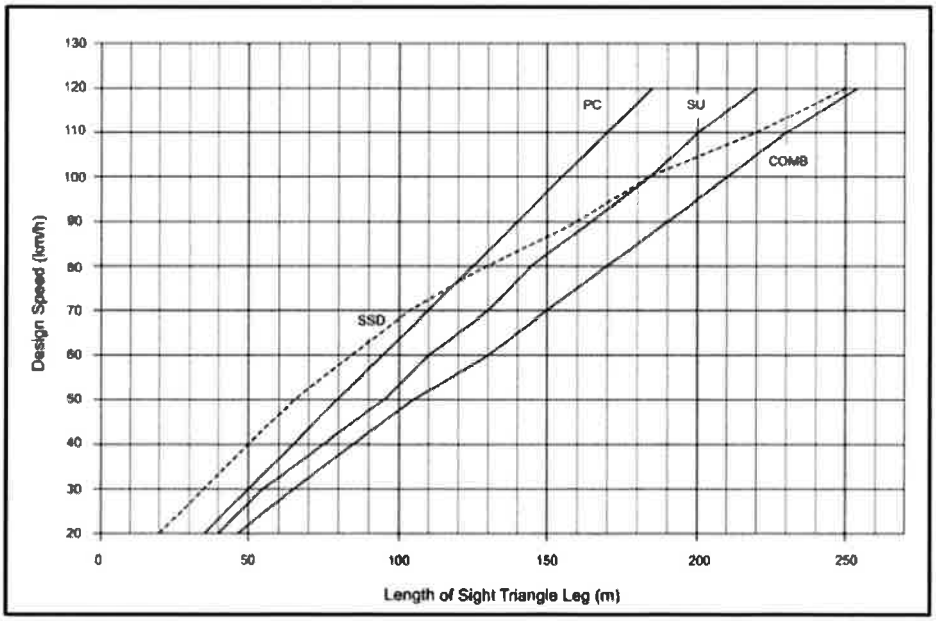


Figure 9.9.8: Intersection Sight Distance – Case F, Left Turn from the Major Road

ATTACHMENT I

Traffic Data

Spectrum

Turning Movement Count
Location Name: DRUMMOND RD & CHURCHILL ST
Date: Tue, May 28, 2024 Deployment Lead: David Chu

Crozier & Associates
ACCOUNTS PAYABLE
TORONTO - SELECT PROVINCE -, M1W1Y6
- SELECT COUNTRY -

Turning Movement Count (1 . DRUMMOND RD & CHURCHILL ST)

Start Time	N Approach DRUMMOND RD						E Approach CHURCHILL ST						S Approach DRUMMOND RD						W Approach CHURCHILL 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		
07:00:00	0	32	2	0	1	34	0	0	1	0	2	1	1	41	0	0	0	42	0	0	0	0	0	0	77	
07:15:00	0	46	4	0	1	50	1	0	1	0	0	2	3	46	1	0	0	50	1	0	1	0	0	2	104	
07:30:00	1	59	4	0	0	64	2	1	1	0	3	4	1	48	1	0	1	50	0	1	1	0	1	2	120	
07:45:00	0	47	4	0	0	51	2	0	1	0	0	3	1	69	1	0	2	71	0	1	4	0	0	5	130	431
08:00:00	0	75	3	0	0	78	0	0	3	0	0	3	5	82	0	1	1	88	0	0	0	0	1	0	169	523
08:15:00	0	103	0	0	1	103	0	0	1	0	5	1	1	136	7	0	9	144	6	0	0	0	5	6	254	673
08:30:00	2	81	2	0	0	85	2	0	2	0	1	4	3	115	1	0	3	119	0	0	2	0	2	2	210	763
08:45:00	0	86	0	0	0	86	1	0	2	0	2	3	2	114	1	0	9	117	0	0	0	0	4	0	206	839
BREAK																										
16:00:00	1	127	2	0	0	130	4	0	0	0	3	4	1	114	0	0	0	115	1	0	1	0	0	2	251	
16:15:00	5	105	1	0	0	111	0	1	0	0	2	1	1	103	0	0	1	104	2	0	2	0	4	4	220	
16:30:00	3	114	0	0	1	117	3	1	0	0	2	4	0	123	1	0	0	124	0	1	3	0	0	4	249	
16:45:00	2	130	1	0	0	133	0	0	1	0	1	1	0	136	1	0	1	137	0	0	0	0	0	0	271	991
17:00:00	3	142	3	0	0	148	1	0	2	0	0	3	0	120	1	0	0	121	0	0	0	0	0	0	272	1012
17:15:00	2	138	3	0	0	143	1	0	1	0	1	2	3	112	0	0	1	115	0	0	2	0	4	2	262	1054
17:30:00	2	101	2	0	0	105	4	0	2	0	0	6	4	110	2	0	0	116	1	0	0	0	0	1	228	1033
17:45:00	4	114	0	0	0	118	3	0	1	0	0	4	0	107	0	0	0	107	0	1	1	0	1	2	231	993
18:00:00	2	91	4	0	0	97	1	0	3	0	1	4	2	97	1	0	1	100	3	0	0	0	0	3	204	925
18:15:00	0	77	1	0	0	78	3	0	2	0	0	5	1	84	0	0	0	85	1	0	0	0	0	1	169	832
18:30:00	1	98	0	0	0	99	2	0	0	0	0	2	0	98	0	0	0	98	0	0	2	0	0	2	201	805
18:45:00	2	81	1	0	0	84	0	0	0	0	1	0	0	73	0	0	0	73	0	1	0	0	2	1	158	732
Grand Total	30	1847	37	0	4	1914	30	3	24	0	24	57	29	1928	18	1	29	1976	15	5	19	0	24	39	**3986**	-
Approach%	1.6%	96.5%	1.9%	0%		-	52.6%	5.3%	42.1%	0%		-	1.5%	97.6%	0.9%	0.1%		-	38.5%	12.8%	48.7%	0%		-	-	-
Totals %	0.8%	46.3%	0.9%	0%		48%	0.8%	0.1%	0.6%	0%		1.4%	0.7%	48.4%	0.5%	0%		49.6%	0.4%	0.1%	0.5%	0%		1%	-	-
Heavy	1	31	3	0		-	0	0	0	0		-	0	36	2	0		-	0	0	0	0		-	-	-
Heavy %	3.3%	1.7%	8.1%	0%		-	0%	0%	0%	0%		-	0%	1.9%	11.1%	0%		-	0%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

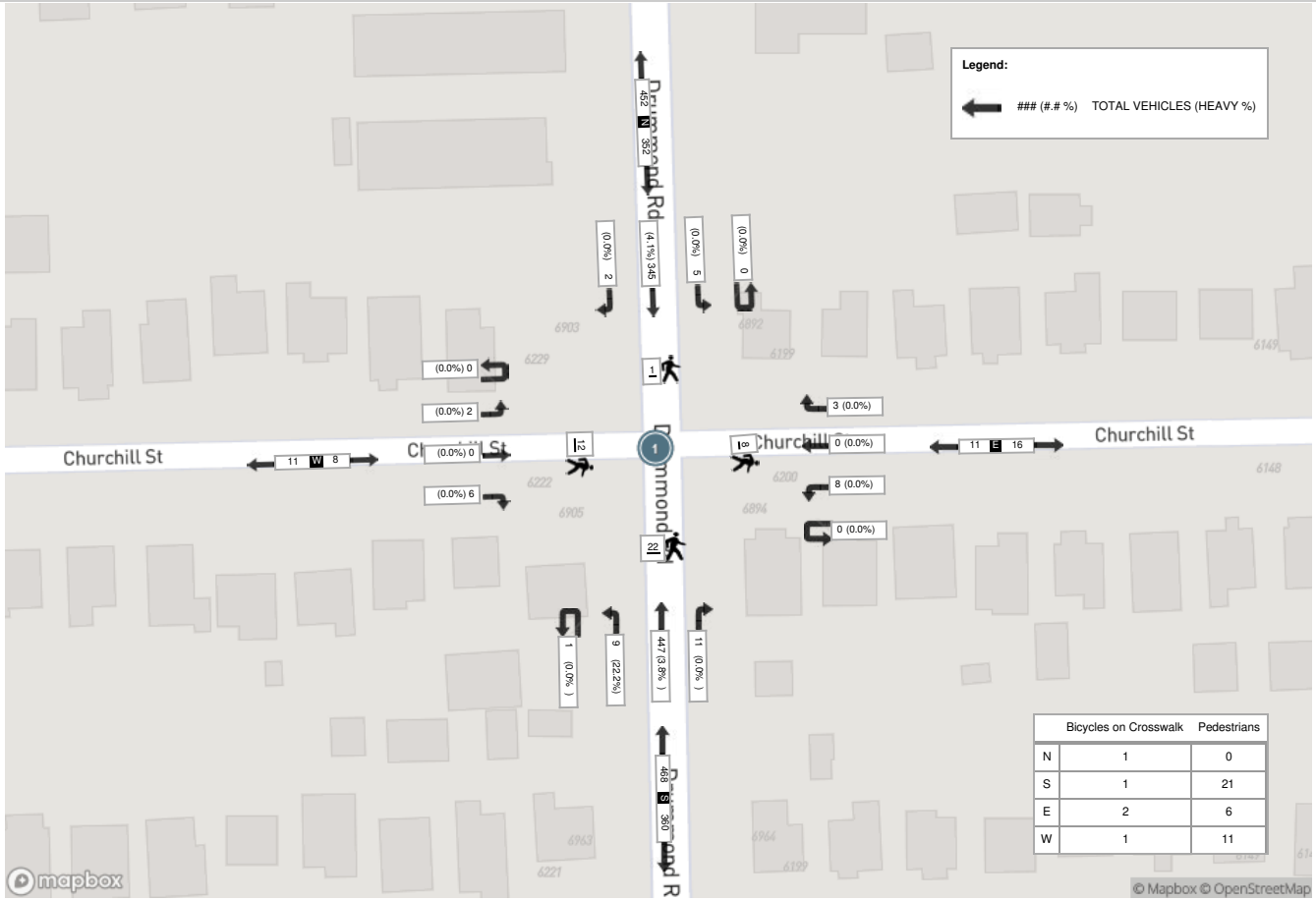
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (15.05 °C)

Start Time	N Approach DRUMMOND RD						E Approach CHURCHILL ST						S Approach DRUMMOND RD						W Approach CHURCHILL 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	
08:00:00	0	75	3	0	0	78	0	0	3	0	0	3	5	82	0	1	1	88	0	0	0	0	1	0	169
08:15:00	0	103	0	0	1	103	0	0	1	0	5	1	1	136	7	0	9	144	6	0	0	0	5	6	254
08:30:00	2	81	2	0	0	85	2	0	2	0	1	4	3	115	1	0	3	119	0	0	2	0	2	2	210
08:45:00	0	86	0	0	0	86	1	0	2	0	2	3	2	114	1	0	9	117	0	0	0	0	4	0	206
Grand Total	2	345	5	0	1	352	3	0	8	0	8	11	11	447	9	1	22	468	6	0	2	0	12	8	**839**
Approach%	0.6%	98%	1.4%	0%		-	27.3%	0%	72.7%	0%		-	2.4%	95.5%	1.9%	0.2%		-	75%	0%	25%	0%		-	**-**
Totals %	0.2%	41.1%	0.6%	0%		42%	0.4%	0%	1%	0%		1.3%	1.3%	53.3%	1.1%	0.1%		55.8%	0.7%	0%	0.2%	0%		1%	**-**
PHF	0.25	0.84	0.42	0		0.85	0.38	0	0.67	0		0.69	0.55	0.82	0.32	0.25		0.81	0.25	0	0.25	0		0.33	**-**
Heavy	0	14	0	0		14	0	0	0	0		0	0	17	2	0		19	0	0	0	0		0	**-**
Heavy %	0%	4.1%	0%	0%		4%	0%	0%	0%	0%		0%	0%	3.8%	22.2%	0%		4.1%	0%	0%	0%	0%		0%	**-**
Lights	2	330	5	0		337	3	0	8	0		11	11	429	7	1		448	6	0	2	0		8	**-**
Lights %	100%	95.7%	100%	0%		95.7%	100%	0%	100%	0%		100%	100%	96%	77.8%	100%		95.7%	100%	0%	100%	0%		100%	**-**
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.6%	0%	0%	0%	0%		0%	**-**
Buses	0	12	0	0		12	0	0	0	0		0	0	13	2	0		15	0	0	0	0		0	**-**
Buses %	0%	3.5%	0%	0%		3.4%	0%	0%	0%	0%		0%	0%	2.9%	22.2%	0%		3.2%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	2	0	0		2	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Bicycles on Road %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	21	-	-	-	-	-	11	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	14%		-	-	-	-	48.8%		-	-	-	-	25.6%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	2.3%		-	-	-	-	4.7%		-	-	-	-	2.3%		-	-	-	-	2.3%		**-**

Peak Hour: 04:30 PM - 05:30 PM **Weather: Light Intensity Shower Rain (17.71 °C)**

Start Time	N Approach DRUMMOND RD						E Approach CHURCHILL ST						S Approach DRUMMOND RD						W Approach CHURCHILL 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	
16:30:00	3	114	0	0	1	117	3	1	0	0	2	4	0	123	1	0	0	124	0	1	3	0	0	4	249
16:45:00	2	130	1	0	0	133	0	0	1	0	1	1	0	136	1	0	1	137	0	0	0	0	0	0	271
17:00:00	3	142	3	0	0	148	1	0	2	0	0	3	0	120	1	0	0	121	0	0	0	0	0	0	272
17:15:00	2	138	3	0	0	143	1	0	1	0	1	2	3	112	0	0	1	115	0	0	2	0	4	2	262
Grand Total	10	524	7	0	1	541	5	1	4	0	4	10	3	491	3	0	2	497	0	1	5	0	4	6	**1054**
Approach%	1.8%	96.9%	1.3%	0%		-	50%	10%	40%	0%		-	0.6%	98.8%	0.6%	0%		-	0%	16.7%	83.3%	0%		-	**-**
Totals %	0.9%	49.7%	0.7%	0%		51.3%	0.5%	0.1%	0.4%	0%		0.9%	0.3%	46.6%	0.3%	0%		47.2%	0%	0.1%	0.5%	0%		0.6%	**-**
PHF	0.83	0.92	0.58	0		0.91	0.42	0.25	0.5	0		0.63	0.25	0.9	0.75	0		0.91	0	0.25	0.42	0		0.38	**-**
Heavy	0	3	0	0		3	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	**-**
Heavy %	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	**-**
Lights	10	521	7	0		538	5	1	4	0		10	3	488	3	0		494	0	1	5	0		6	**-**
Lights %	100%	99.4%	100%	0%		99.4%	100%	100%	100%	0%		100%	100%	99.4%	100%	0%		99.4%	0%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	2	0	0		2	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	**-**
Buses %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	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	**-**
Articulated Trucks %	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	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	4	-	**-**
Pedestrians%	-	-	-	-	9.1%		-	-	-	-	27.3%		-	-	-	-	18.2%		-	-	-	-	36.4%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	9.1%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Overcast Clouds (15.05 °C)**



	Bicycles on Crosswalk	Pedestrians
N	1	0
S	1	21
E	2	6
W	1	11

Peak Hour: 04:30 PM - 05:30 PM **Weather: Light Intensity Shower Rain (17.71 °C)**