The Willows Traffic Impact Assessment

Prepared for:
DREAM Development

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February 15, 2023

Sign-off Sheet

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City of Saskatoon
Please note the following: *Although business contact information is not personal information, this information has been redacted as a courtesy based on a request from Stantec to redirect inquires through Stantec's proper channels and not directly to the named team members in this report.*

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Number C0969
Permission to Consult held by:

Discipline	Sk. Reg. No.	Signature
Civil	39616	

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1.0 INTRODUCTION

The Willows is an existing multi-use development located in the south of Saskatoon. The development is bound by Highway 219 to the west, Clarence Avenue to the east and Canadian National Railway line to the north. Acreages and farmland are located south of the development. **Figure 1-1** shows the project location.

Initial construction at the Willows began in the early 1990's and included a 36-hole golf course, clubhouse, and residential development. The original concept plan for the Willows included additional residential land use that were to be positioned throughout the golf course.

Dream Development (Dream) acquired the development and completed a new concept plan, (2003 Concept Plan) for the area. That plan included residential and other land uses. The 2003 Concept Plan was adopted by Saskatoon City Council.

Due to changing market conditions Dream is updating the concept plan (2022 Concept Plan) for the Willows development

Dream has retained Stantec to complete a Traffic Impact Assessment (TIA) for the 2022 Concept Plan. The objective of this TIA is to estimate the impacts that traffic generated by the additional development will have on the adjacent transportation system and recommend improvements to meet those demands. This TIA is also required as part of the development approval process of the City of Saskatoon (City).

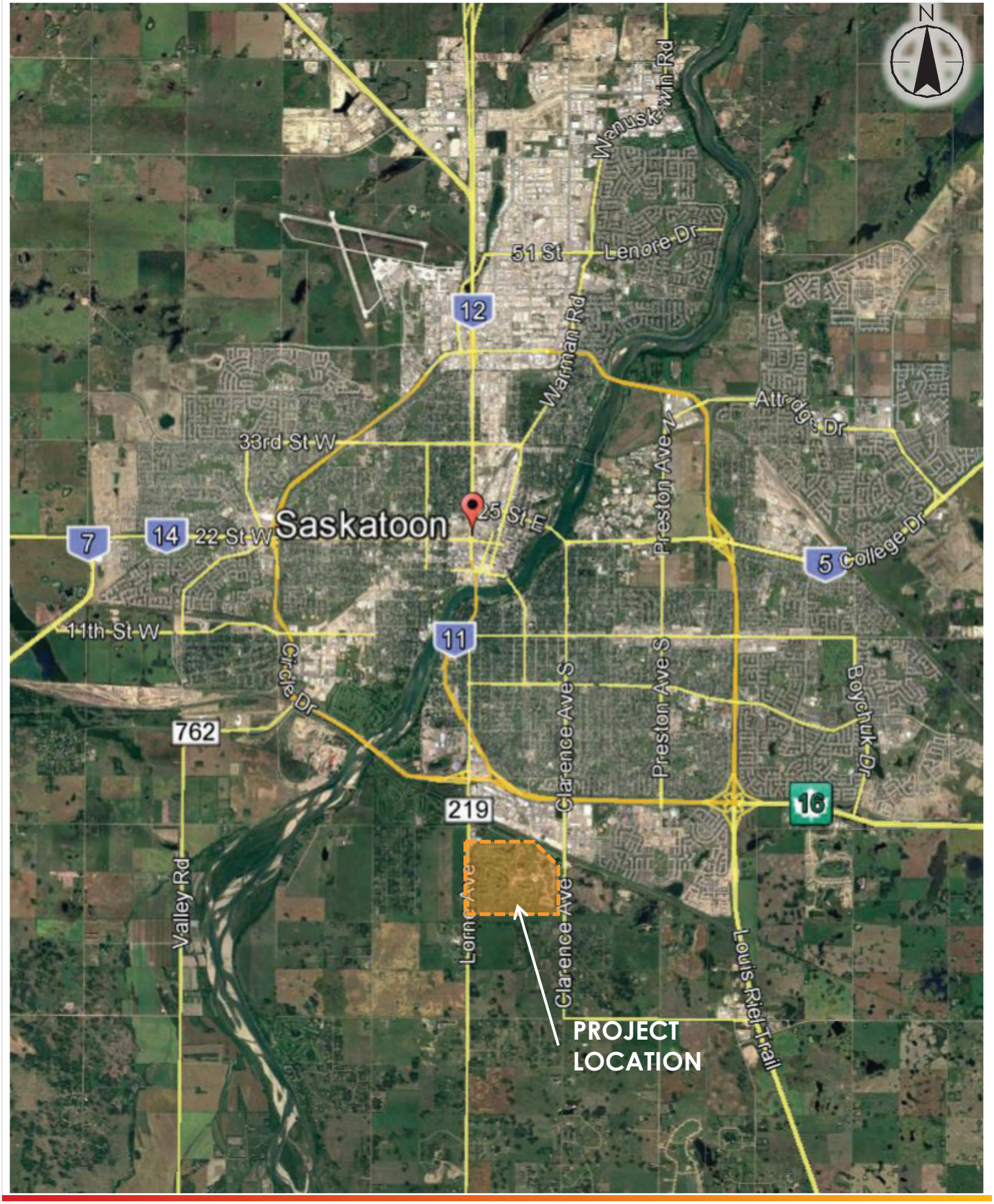
1.1 SCOPE

Stantec's transportation team understands the scope of the work to include:

- Collection of peak hour turning movement traffic counts at the intersections of Lorne Avenue with Cartwright Street, Cartwright Street with Wentworth/Waterford Access, and Cartwright Street with Clubhouse and Red Barn Access.
- Collection of a 24-hour turning movement traffic count at the intersection of Clarence Avenue with Cartwright Street.
- Calculation of current year and future year background traffic volumes (peak hour and AADT) based on collected traffic count data.
- Calculation of the total number of new trips generated by the 2003 and 2002 Concept Plans for the weekday morning and afternoon peak hour time periods. Distribute the trips to expected origins and destinations and assign them to specific routes to and from the development.
- Consultation with the Ministry of Highways (MoH) regarding access points on Highway 219 including the allowance of a westbound left turn at Access A and the allowance of a second access point onto Highway 219.
- Determine the total number of new trips generated by the proposed development for the weekday morning and afternoon peak hour time periods.

- Distribute the new trips to expected origins and destinations and assign them to specific routes to and from the proposed development.
- Review traffic calming solutions to reduce traffic diverting through the Willows when a train is crossing Lorne Avenue.
- Evaluate traffic operating conditions at the study intersections for existing conditions, the 2003 Concept Plan and the 2022 Concept Plan at full build out of the proposed development for the weekday morning and afternoon peak hour time periods; and
- Identify potential locations of unacceptable congestion or geometric constraints and determine roadway, intersection, and access requirements in terms of number of lanes, lane configuration, intersection radii, and intersection control to provide acceptable levels of service and safety.

The analysis periods selected for this study are the weekday morning and afternoon peak hours as they are expected to represent the highest traffic volumes. A 5-year analysis horizon was selected based on City of Saskatoon TIA Guidelines as well as a 15-year analysis horizon to align with study horizons of previous TIAs for this development.



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THE WILLOWS
Traffic Impact Study

FIGURE No. **1.1**

PROJECT LOCATION

2.0 DEVELOPMENT SITE CONDITIONS

2.1 TRANSPORTATION SYSTEM

The existing transportation system, including road segments, connections, and intersections form the roadway network upon which the analysis of existing (background) and future background conditions. The existing transportation system is detailed in the following sections and shown in **Figure 2-1.**

2.1.1 Road Network

Existing roadways adjacent and within the development site have the following characteristics.

- **Clarence Avenue** north of Cartwright Street, is a four-lane, divided, urban, paved major arterial roadway. South of Cartwright Street the roadway is within the RM of Corman Park and is designated as Range Road 3053. Range Road 3053 is a two-lane, undivided, rural, paved road with a posted speed of 60 km/h. Range Road 3053 connects multiple acreages and rural developments to the City.
- **Lorne Avenue** extends north of Cartwright Street. South of Cartwright Street Lorne Avenue becomes Highway 219 within the RM of Corman Park. Lorne Avenue between Cartwright Street and the CN tracks, is a two-lane, undivided, rural, asphalt-paved arterial roadway with a posted speed of 60 km/h. North of the CN tracks, the roadway widens to an urban four lane, divided, with marked bike present for both northbound and southbound directions. These bike lanes taper off at Exhibition Grounds Road. This roadway is locally known as a preferred cycling route as it travels outside of City limits.
- **Highway 219** south of Cartwright Street, is a two-lane, undivided, rural, paved Provincial highway. This road provides access to Schroh Arenas and several acreages. Concrete curbing is introduced near the Schroh Arenas. The speed limit between Cartwright Street and approximately 675 m south of Cartwright Street is 80 km/h and 100 km/h further south.
- **Cartwright Street** is a two lane, undivided, asphalt-paved collector road that runs west from Clarence Avenue to the centre of the development, swings north through a roundabout and then runs parallel to the rail before intersecting with Lorne Avenue. It provides all access for the existing development and some access for the revised development with a speed limit of 50 km/h. West of Lorne Avenue, Cartwright Street provides access to the Saskatoon Golf and Country Club, several acreages, and the Hamlet of Furdale.
- **Cartwright Terrace** is a cul-de-sac which serves two gated residential communities in the Willows. It is paved and roughly 7.5 m wide. There is a median boulevard which is roughly 10.5 m wide, including sidewalk.
- **Wentworth and Waterford Roads** are undivided private local roads which provide access to single family homes within the Willows. They are paved with a speed limit of 30 km/h.

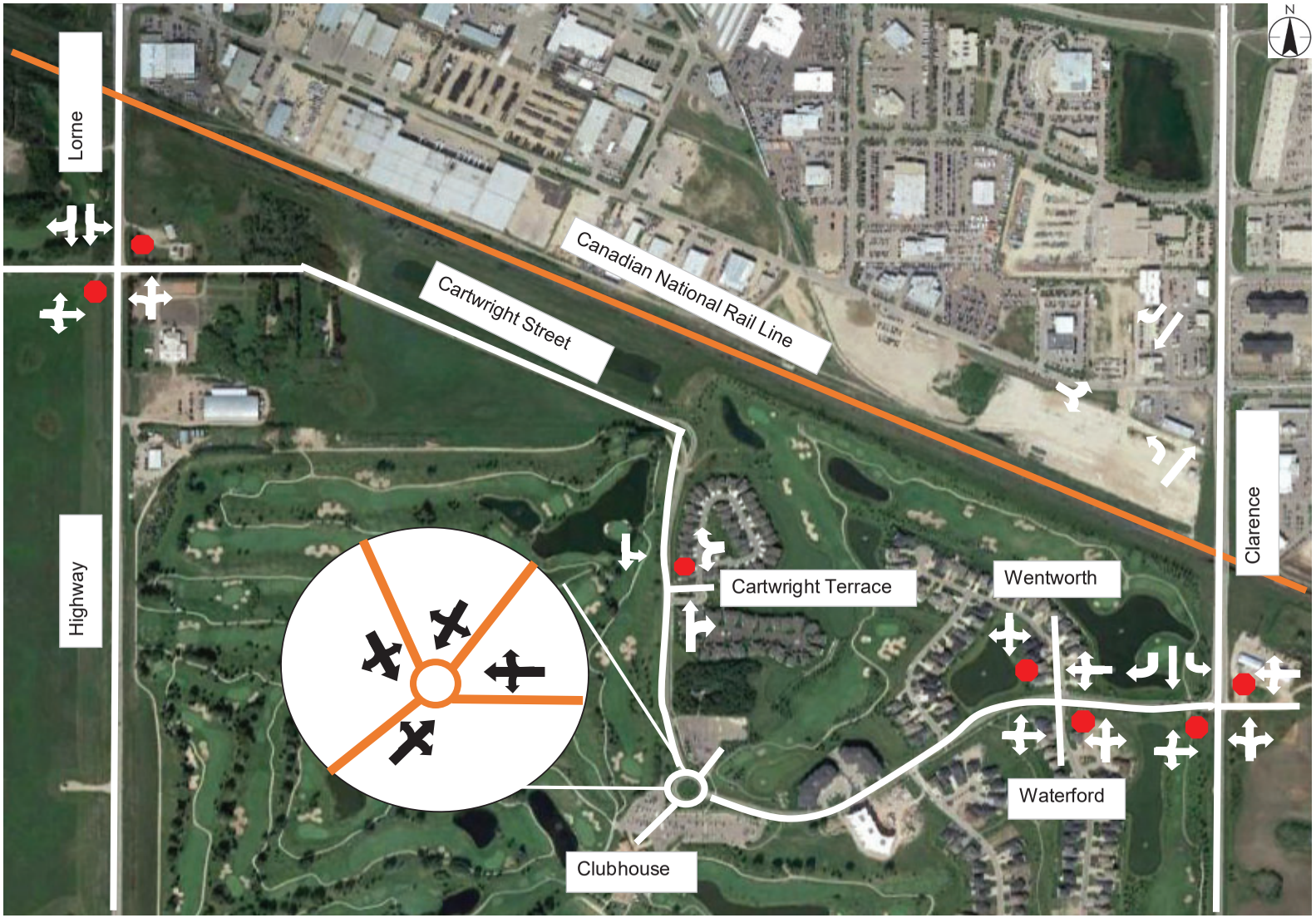

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Figure No.
2.1

Existing Transportation Network

2.1.2 Existing Study Area Intersections

Several intersections already exist in the immediate area of the development which may be affected by the additional traffic it is expected to generate. **Table 2-1** summarizes the geometry and existing traffic controls at these locations.

Table 2-1: Existing Intersection Geometry and Traffic Control

Intersection	Control	Northbound	Southbound	Eastbound	Westbound
Cartwright Street & Lorne Avenue	WB/EB Stop	Left/Thru/Right	Thru/Right, Thru/Left	Left/Thru/Right	Left/Thru/Right
Cartwright Street & Clubhouse and Red Barn Access	Roundabout (yield at entry)	Left/Thru/Right	Left/Thru/Right	Left/Thru/Right	Left/Thru/Right
Cartwright Street & Clarence Avenue	WB/EB Stop	Left/Thru/Right	Left, Thru, Right	Left/Thru, Right	Left/Thru/Right
Cartwright Street & Waterford / Wentworth Access	NB/SB Stop	Left/Thru/Right	Left/Thru/Right	Left/Thru/Right	Left/Thru/Right
Cartwright Street & Cartwright Terrace	WB Stop	Thru/Right	Left/Thru		Left/Right

2.2 BACKGROUND TRAFFIC VOLUMES

Peak hour turning movement counts at the following study intersections were conducted by Stantec from August 22nd to August 25th, 2022:

- Lorne Avenue and Cartwright Street.
- Clarence Avenue and Cartwright Street.
- Cartwright Street and Wentworth / Waterford Access.
- Cartwright Street and Clubhouse and Red Barn Access (roundabout).

The traffic count data is included in **Appendix A**. Data collection included passenger cars, trucks, buses, cyclists, and pedestrians during two-hour periods that would include the morning and afternoon peak hours (7:00AM – 9:00AM and 4:00PM – 6:00PM). A 24-hour count was also collected at the intersection of Clarence Avenue and Cartwright Street in order to obtain an idea of daily traffic volumes compared to the peak hour traffic volumes for the study area.

It is intended that golf tournaments will no longer be held at the Willows golf course after it is reduced from 27 holes to 18 holes under the 2022 Concept Plan. Therefore, to provide an estimate of golf traffic patterns that will match those expected in the future, traffic counts were collected on days when no golf

tournaments were occurring for all study intersections. For comparison purposes, the roundabout intersection was also counted on a tournament day to provide an idea of the difference in traffic that could be expected on tournament versus non-tournament days.

Turning movements for the Cartwright Street and Cartwright Terrace intersection were not collected. These volumes were interpolated by balancing the up and downstream counts for each movement and completing a trip generation for the residences on Cartwright Terrace.

The 2022 turning movement volumes for the morning and afternoon peak hours are included in **Figure 2.2**.

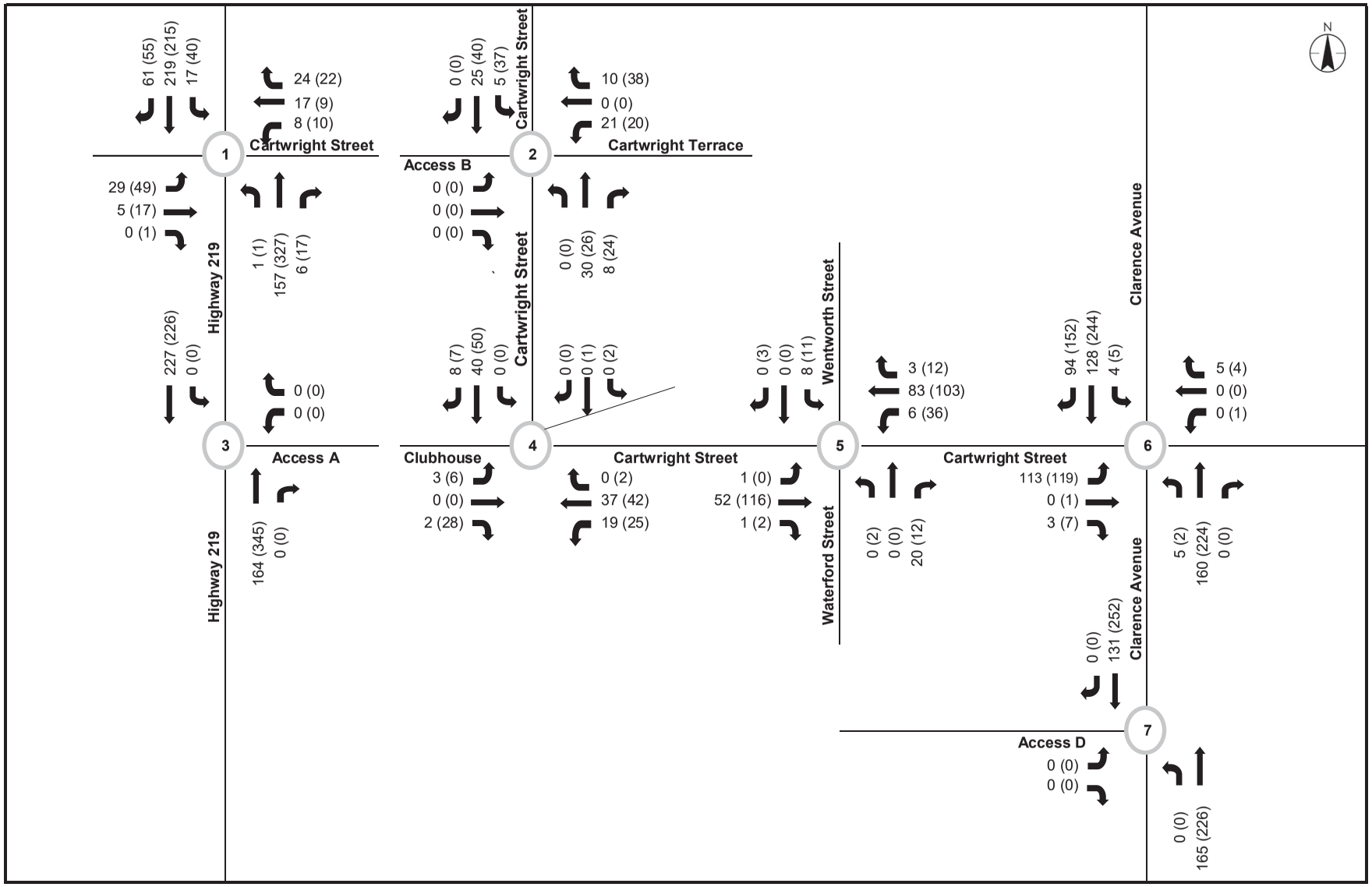

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Figure No.
2.2

Backgroudn Peak Hour Traffic Volumes 2022 - AM Peak (PM Peak)

2.2.1 Background Traffic Growth

Background traffic growth consists of known and unknown growth in the area surrounding the project location. The location of the development is on the outskirts of Saskatoon, which implies that unknown growth by traffic diverting through the development would be minimal. Therefore, it was assumed that background growth was null except on the border roadways, Lorne Avenue/Highway 219 and Clarence Avenue. According to the City of Saskatoon, their expected growth rate is 1.9%. The MoH also indicated this to be an appropriate rate to use for this location. Therefore, an annual growth rate of 1.9% was applied to traffic volumes on Lorne Avenue/Highway 219 and Clarence Avenue to calculate the future year background traffic volumes.

Projected background traffic volumes at the 2027 and 2037 horizons are shown on **Figures 2.3** and **2.4**.

2.2.2 Daily Traffic Volumes

Stantec completed a 24-hour turning movement count at the intersection of Clarence Avenue with Cartwright Street on August 22, 2022. The daily traffic volumes at the intersection are compared to the morning and afternoon peak hour traffic volumes in **Table 2-2**.

Table 2-2: Daily and Peak Hour Traffic Volumes – Clarence Avenue with Cartwright Street

	Traffic Volume												Overall Intersection
Time Period	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Daily	1516	2190	40	43	0	10	7	2154	37	47	5	1501	7550
AM Peak Hour	94	128	4	5	0	0	0	160	5	3	0	113	512
PM Peak Hour	152	244	5	4	0	1	0	224	2	7	1	119	759
AM % of Daily	6%	6%	10%	12%	-	0%	0%	7%	14%	6%	0%	8%	7%
PM % of Daily	10%	11%	13%	9%	-	10%	0%	10%	5%	15%	20%	8%	10%

Based on the traffic count data, 7% of the daily traffic volume at the intersection occurred during the morning peak hour and 10% of the daily traffic volume at the intersection occurred during the afternoon peak hour.

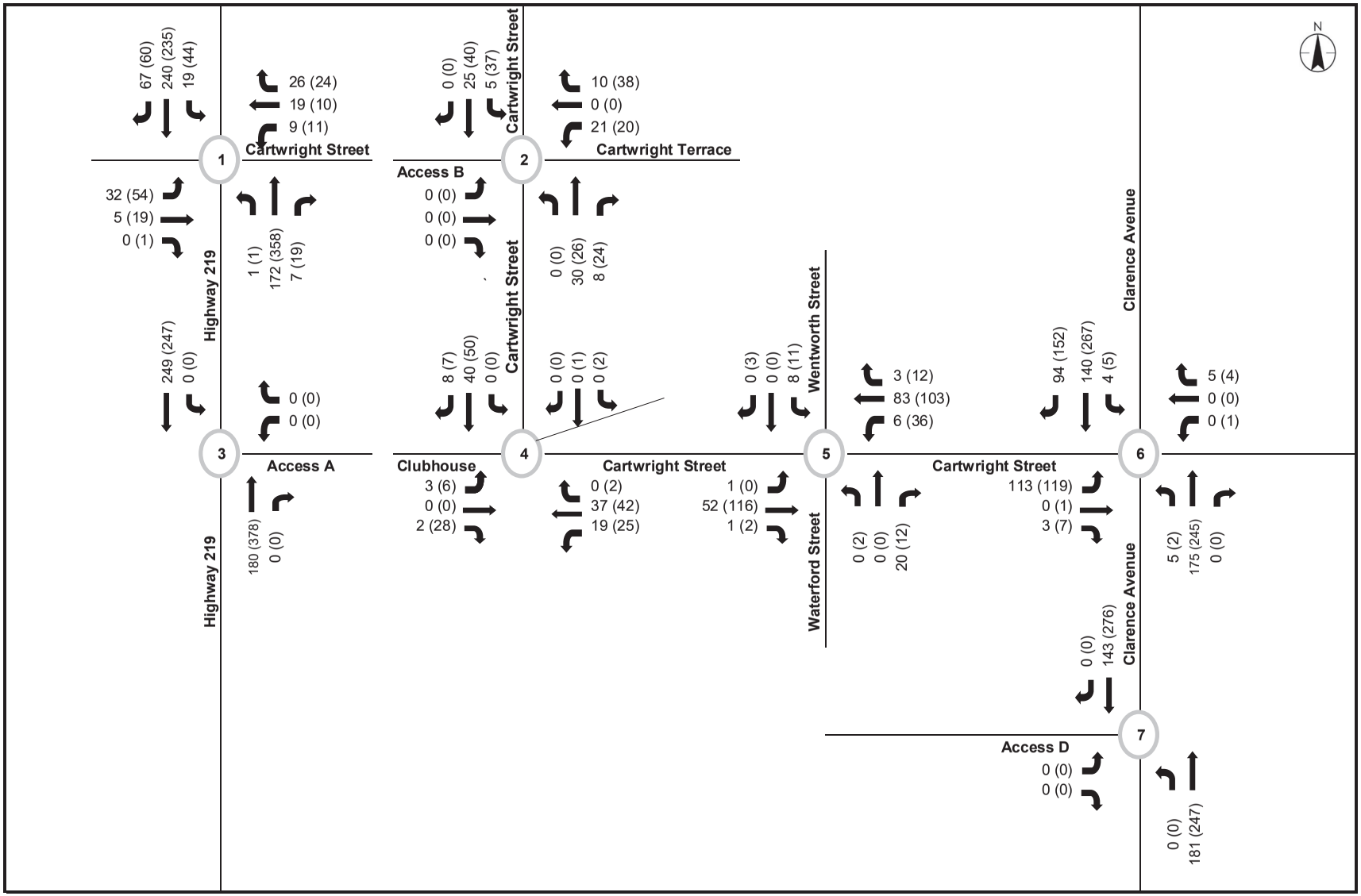

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Figure No.
2.3

Background 2027 Traffic Volumes
AM Peak (PM Peak)

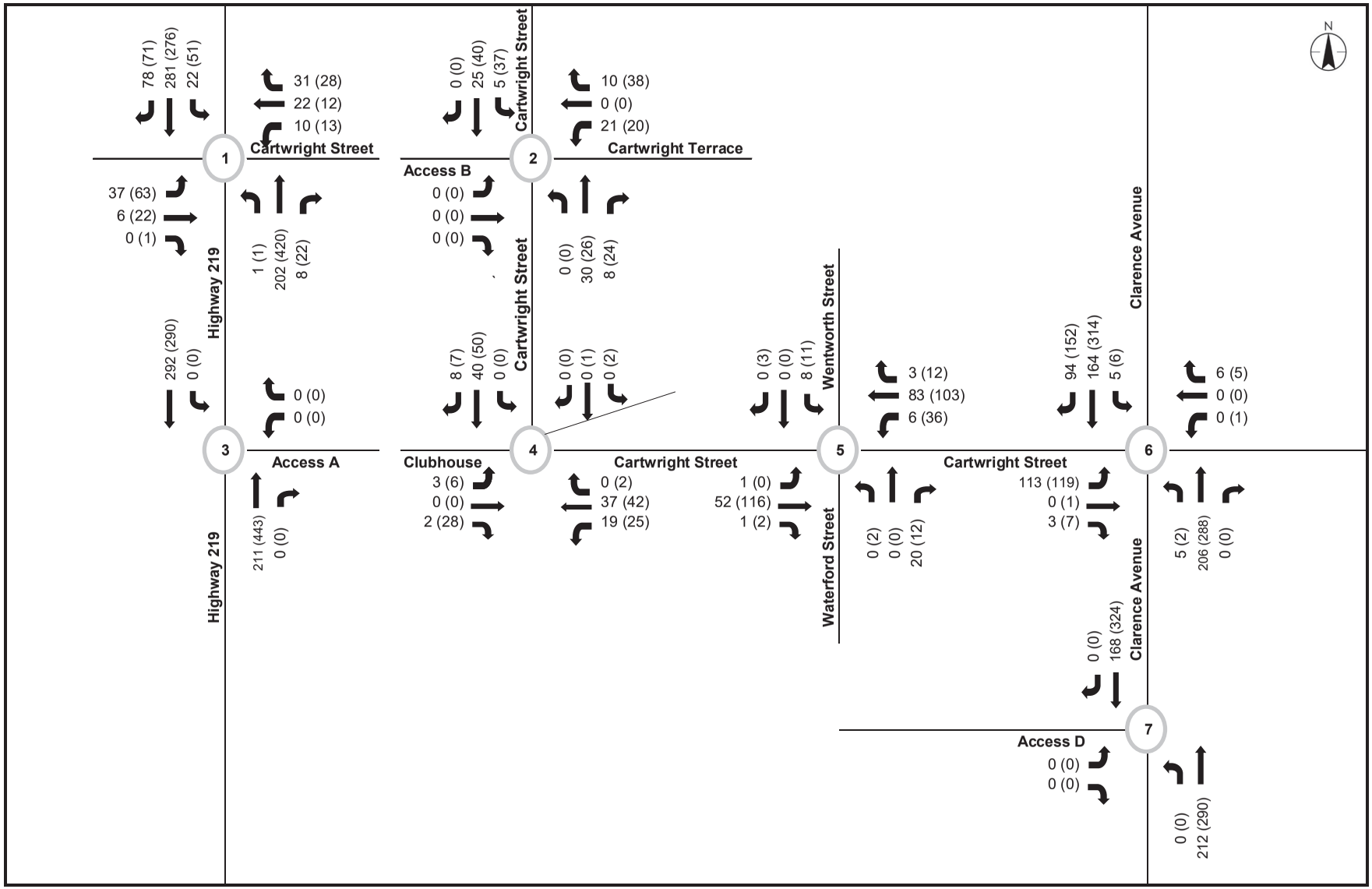

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Figure No.
2.4

Background 2037 Traffic Volumes
AM Peak (PM Peak)

3.0 PROPOSED DEVELOPMENT

Currently, the Willows contains a 27-hole golf course with single and multifamily residential housing, primarily located on the east side of the parcel. The revised proposed development includes reducing the golf course to 18 holes, relocating some of the course, building single and multifamily residential housing to complete the west and south portions of the parcel, and the construction of a resort hotel with spa facilities.

3.1 PROPOSED TRANSPORTATION NETWORK

Access A is a 2-lane roadway which will provide access to Highway 219. This access is proposed to accommodate construction traffic related to the new development as well as development traffic. The intersection of Access A with Highway 219 is proposed as an all-directional intersection.

Access B is located where Access C (Internal Roadway) intersects Cartwright Street at Cartwright Terrace.

Access C (Internal Roadway) is the internal roadway within the portion of the Willows to be developed and extends from Clarence Avenue to Cartwright Street. This road intersects with Access A.

Access D is where Access C (Internal Roadway) intersects with Clarence Avenue.

The site plan with proposed intersections is shown in **Figure 3.1**.

3.2 LAND USE

There are multiple land use types within the proposed site plan that will generate traffic as outlined below. As 9 holes of golf will be removed from the development, traffic generated by 9 holes will be subtracted from the generated trips.

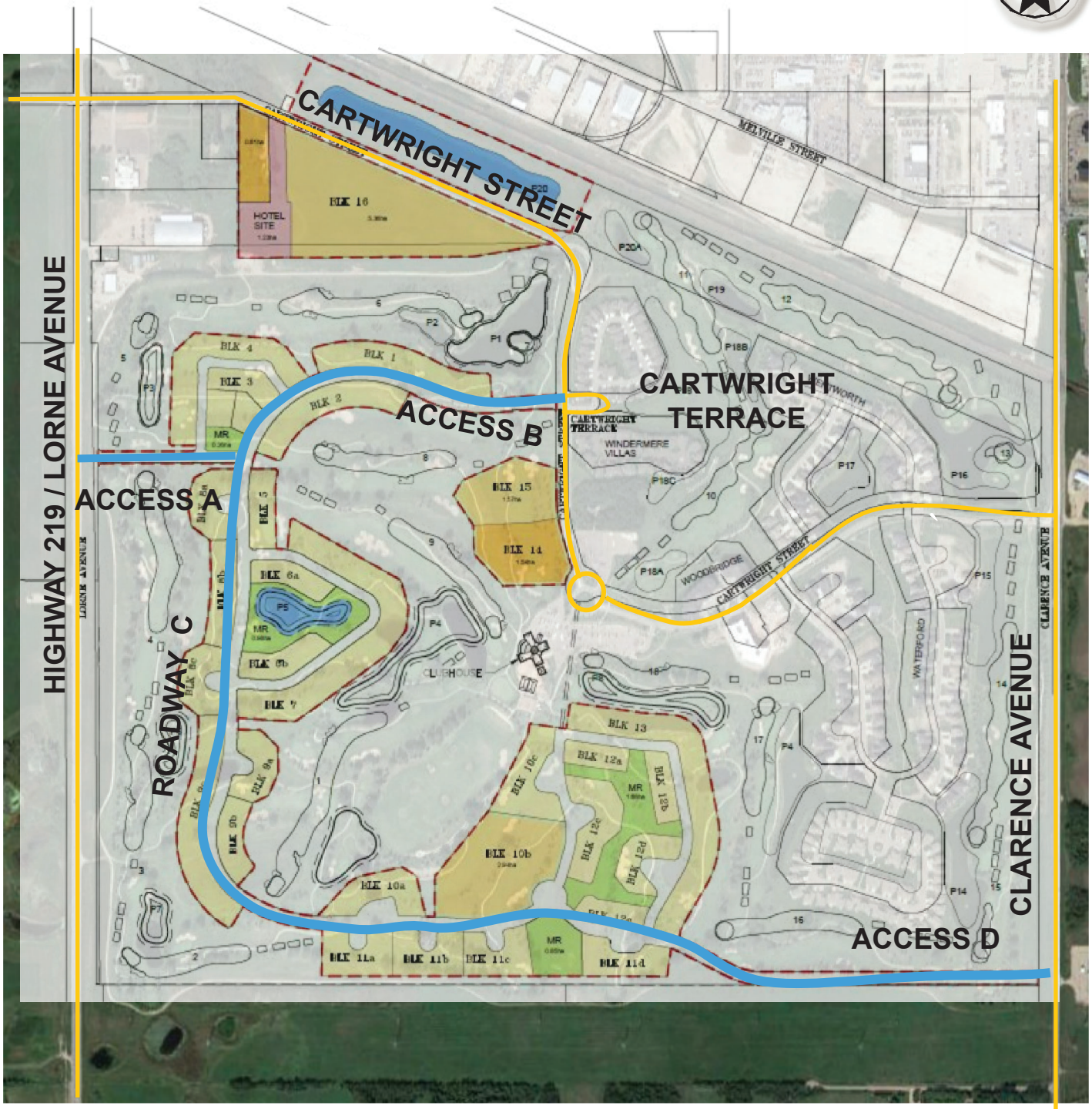
Single Family (25.95 Ha) – ITE Land Use 210 (Single Family Detached Housing) was selected to represent this use. The trip generation is based on the number of units which is 305.

Multi-Family – Low Density (9.86 Ha)– ITE Land Use 220 (Multi-family Housing (Low-Rise)) was selected to represent this use. The trip generation is based on the number of units which is 177.

Multi-Family – Medium Density (2.35 Ha) – ITE Land Use 221 (Multi-family Housing (Mid-Rise)) was selected to represent this use. The trip generation is based on the number of units which is 183.

Hotel (1.23 Ha) – ITE Land Use 330 (Resort Hotel) was selected to represent this use. The trip generation is based on the number of hotel rooms which is 120.

Golf Course (9 holes) – ITE Land Use 430 was selected to represent this use and includes facilities such as a clubhouse, pro-shops, driving range, restaurant, lounge, and banquet facilities. As 9 holes of golf will be removed from the development, traffic generated by 9 holes will be subtracted from the generated trips.



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LEGEND

STUDY ROADWAY
NEW ROADWAY

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FIGURE No. **3.1**

SITE PLAN

4.0 DEVELOPMENT TRAFFIC

Trips generated by the proposed development were estimated in accordance with the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition* wherever possible. This manual is a standard reference used by jurisdictions throughout Canada and the United States.

The trips generated by the land uses within the proposed development must be distributed and assigned to the roadway network. Trip distribution refers to the location of origins and destinations of trips generated by the proposed development. Trip assignment refers to the assignment of generated trips to the roadway network.

The assigned trips are added to existing or projected background traffic volumes and analyzed under the proposed geometric conditions. This analysis enables the identification of improvements necessary to provide an adequate level of service (LOS) and safety.

4.1 TRIP GENERATION

For this study, trip generation rates were used as described in Section 3.2 to estimate the number of new vehicle trips generated by the 2022 Concept Plan proposed land uses. Trip generation for the proposed development for weekday morning and afternoon peak hours of adjacent street traffic (i.e., one hour between 7:00 AM and 9:00 PM and one hour between 4:00 PM and 6:00 PM) were used.

The land uses and trip generation rates for this study are summarized in **Table 4-1**:

Table 4-1: Trip Generation Rates

Description	ITE Use	Unit	AM Generation			PM Generation		
			Rate	Enter	Exit	Rate	Enter	Exit
Single Family	210	Units	Ln(T)=0.91Ln(X)+0.12	26%	74%	Ln(T)=0.94Ln(X)+0.27	63%	37%
Multi Family Low Density	220	Units	T=0.31(X)+22.85	24%	76%	T=0.43(X)+20.55	63%	37%
Multi Family Medium Density	221	Units	T=0.44(X)-11.61	23%	77%	T=0.39(X)+0.34	61%	39%
Golf Course	430	Hole	1.76	79%	21%	2.91	53%	47%
Hotel	330	Room	0.32	72%	28%	0.41	43%	57%

[1] T= Average Vehicle Trip Ends, X= Number of Units of Land Use

4.1.1 Reductions in Traffic Volumes

Trips generated by new developments are often not “new” trips but rather trips that are already on the transportation network and either diverted from their original route or are passing by and decide to make a stop at the development.

No reductions were applied to the residential land uses and hotel land use. Trip generation for the 2022 Concept Plan development is summarized in **Table 4-2**.

Table 4-2: Generated Trips by Land Use

	AM Peak Hour			PM Peak Hour		
Land Use	Entering	Exiting	Total	Entering	Exiting	Total
Single Family	59	167	226	190	112	302
Multi Family Low Density	30	94	123	87	51	138
Multi Family Medium Density	13	44	57	44	28	72
Hotel	28	11	38	21	28	49
Golf Course (9 Holes)	-13	-3	-16	-14	-12	-26
Total	**117**	**313**	**429**	**328**	**207**	**535**

4.2 TRIP DISTRIBUTION

Trip distribution refers to the linkage of generated trip origins and destinations. Distribution can be understood as high-level desire lines based on employment, services, and recreation. For this development, existing travel distribution was used to inform the trip distribution, while acknowledging that the site creates a destination for trips originating outside the community. Trip distribution for the 2022 Concept Plan development is summarized in **4-3.**

Table 4-3: Trip Distribution

Origin/Destination	Percentage
North on Lorne Avenue or Clarence Avenue	98%
South	1%
East	0%
West	1%
Total	100%

4.3 TRIP ASSIGNMENT

Trip assignment refers to the allocation of expected traffic to a specific route on the transportation network. Typically, traffic is assigned to a route to and from the most convenient external access point in relation to their origin or destination, with consideration given to the minimization of travel times and conflicts.

For the 2022 Concept Plan, for the morning and afternoon peak hours, roughly 50% of traffic was assumed to use Clarence Avenue and 50% was assumed to use Lorne Avenue to travel places north. Development traffic zoning, trip generation and assignment are shown in **Figure 4.1**. The 2022 Concept Plan site generated traffic volumes are shown in **Figure 4.2**.

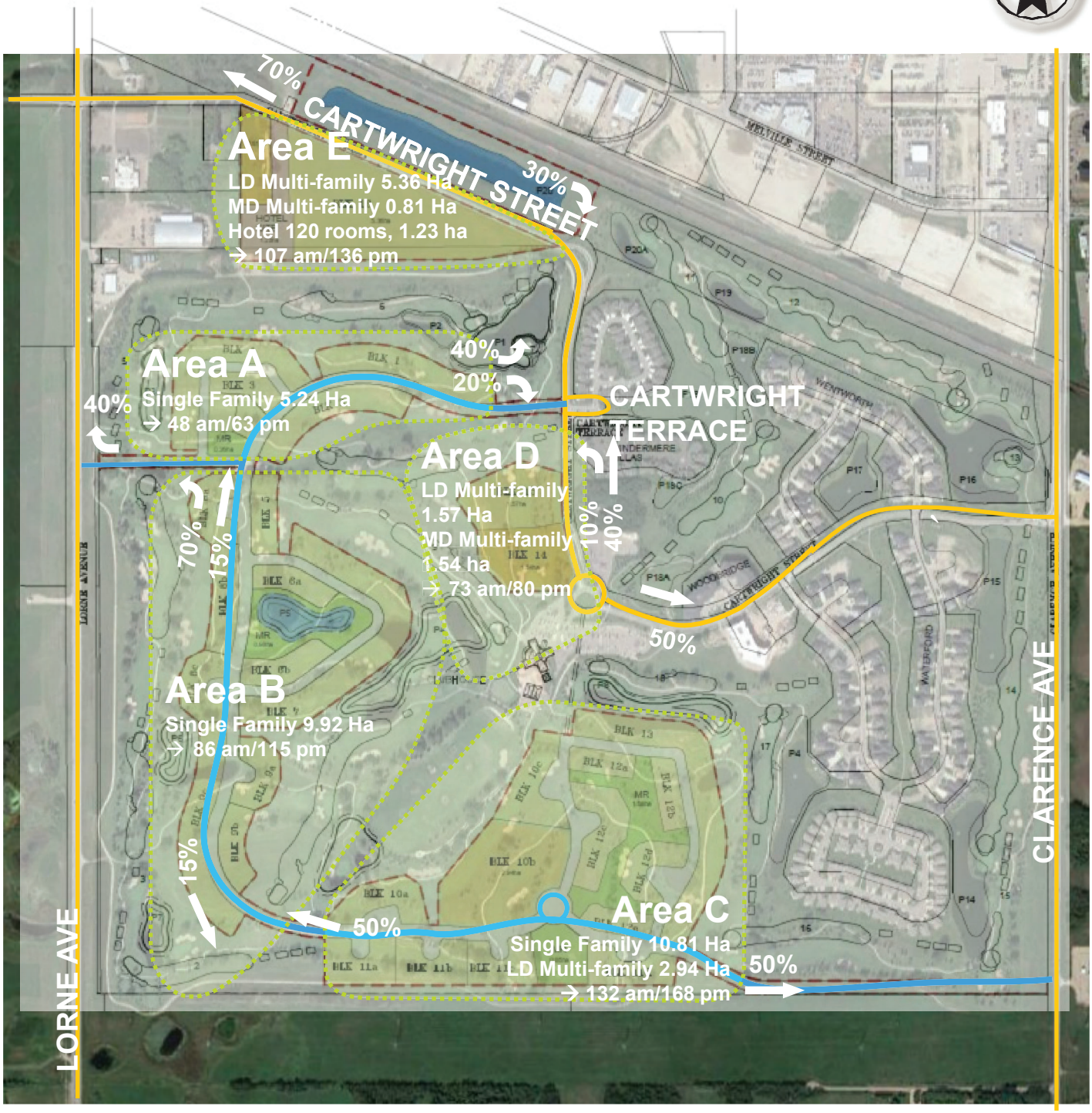

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FIGURE No. **4.1**

ZONING, TRIP GENERATION AND ASSIGNMENT

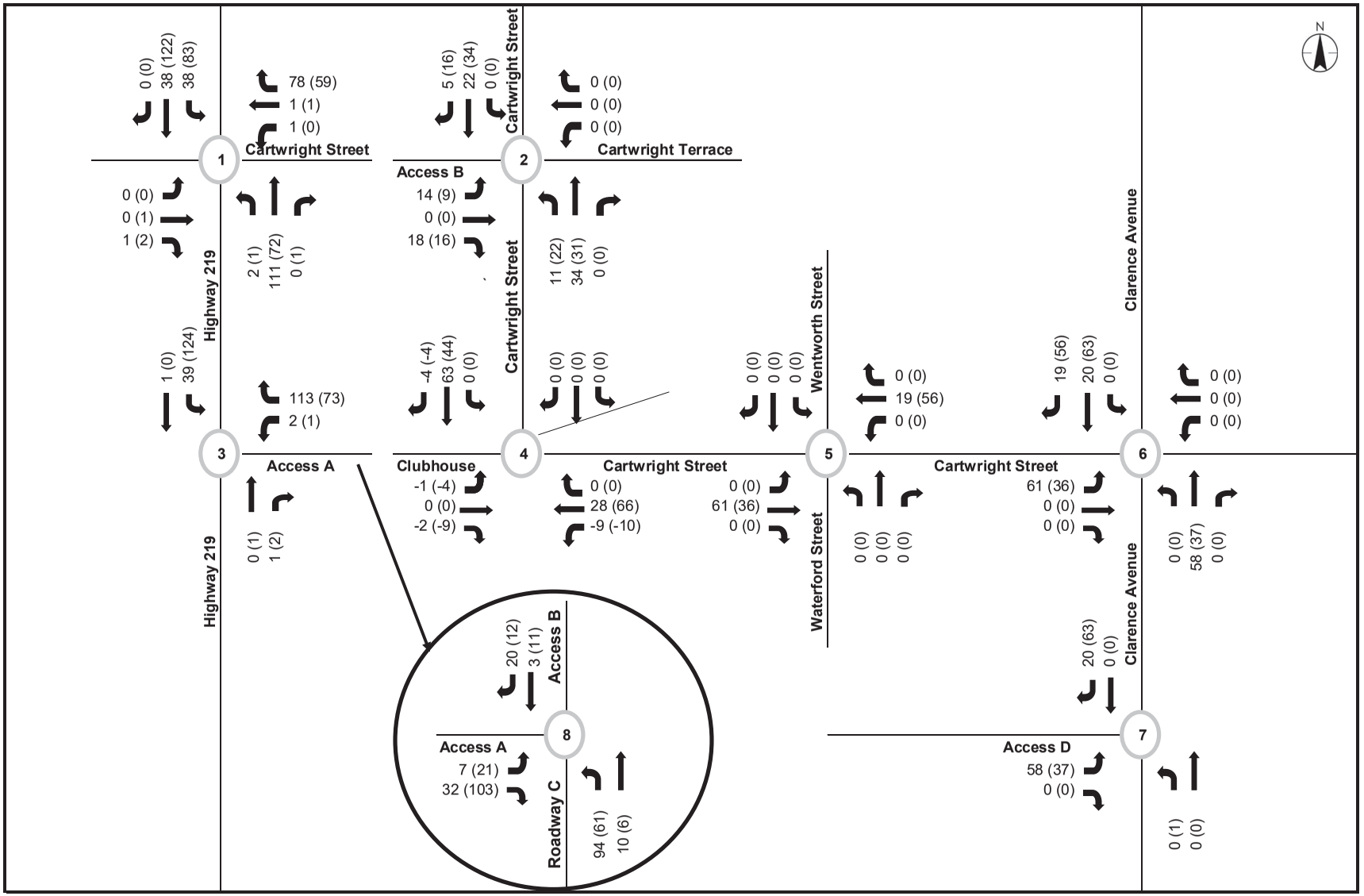

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Figure No.
4.2

2022 Concept Plan Site Generated Traffic Volumes
AM Peak (PM Peak)

4.4 2003 WILLOWS CONCEPT

In addition to comparing the traffic impacts of the 2022 Concept Plan proposed development to 2022 existing conditions, the traffic impacts of the proposed development were also compared to those of the previously approved 2003 Willows Concept Plan. Phase 2 of the 2003 Willows Concept Plan corresponds with the proposed revised development changes outlined in Section 3.0 of this report. The 2003 Willows Concept Plan is shown in **Figure 4.3**.

Trip generation was completed for the 2003 Willows Concept Plan using the ITE Trip Generation Manual and the following land uses:

Single Family (10.45 Ha) – ITE Land Use 210 (Single Family Detached Housing) was selected to represent this use. The trip generation is based on the number of units which is 125.

Multi-Family – Low Density (6.29 Ha) – ITE Land Use 220 (Multi-family Housing (Low-Rise)) was selected to represent this use. The trip generation is based on the number of units which is 157.

The resulting generated trips for the 2003 Willows concept are shown in **Table 4-4**.

Table 4-4: 2003 Willows Concept Generated Trips

	AM Peak Hour			PM Peak Hour		
Land Use	Entering	Exiting	Total	Entering	Exiting	Total
Single Family	24	68	92	77	45	122
Multi Family Low Density	23	72	95	68	40	108
Total	**47**	**139**	**186**	**145**	**85**	**230**

The 2003 Willows Concept Plan proposed access to Phase 2 of the development only from Highway 219. This means the trip assignment differs from the 2022 Concept Plan which splits generated traffic fairly evenly between Clarence Avenue and Lorne Avenue. For the 2003 Concept Plan, it was estimated that 20% of generated trips would utilize Clarence Avenue and Cartwright Street to access the development. The resulting site generated trips for the 2003 Willows concept are shown in **Figure 4.4**.

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Figure No.

4.3

Willows 2003 Concept Plan

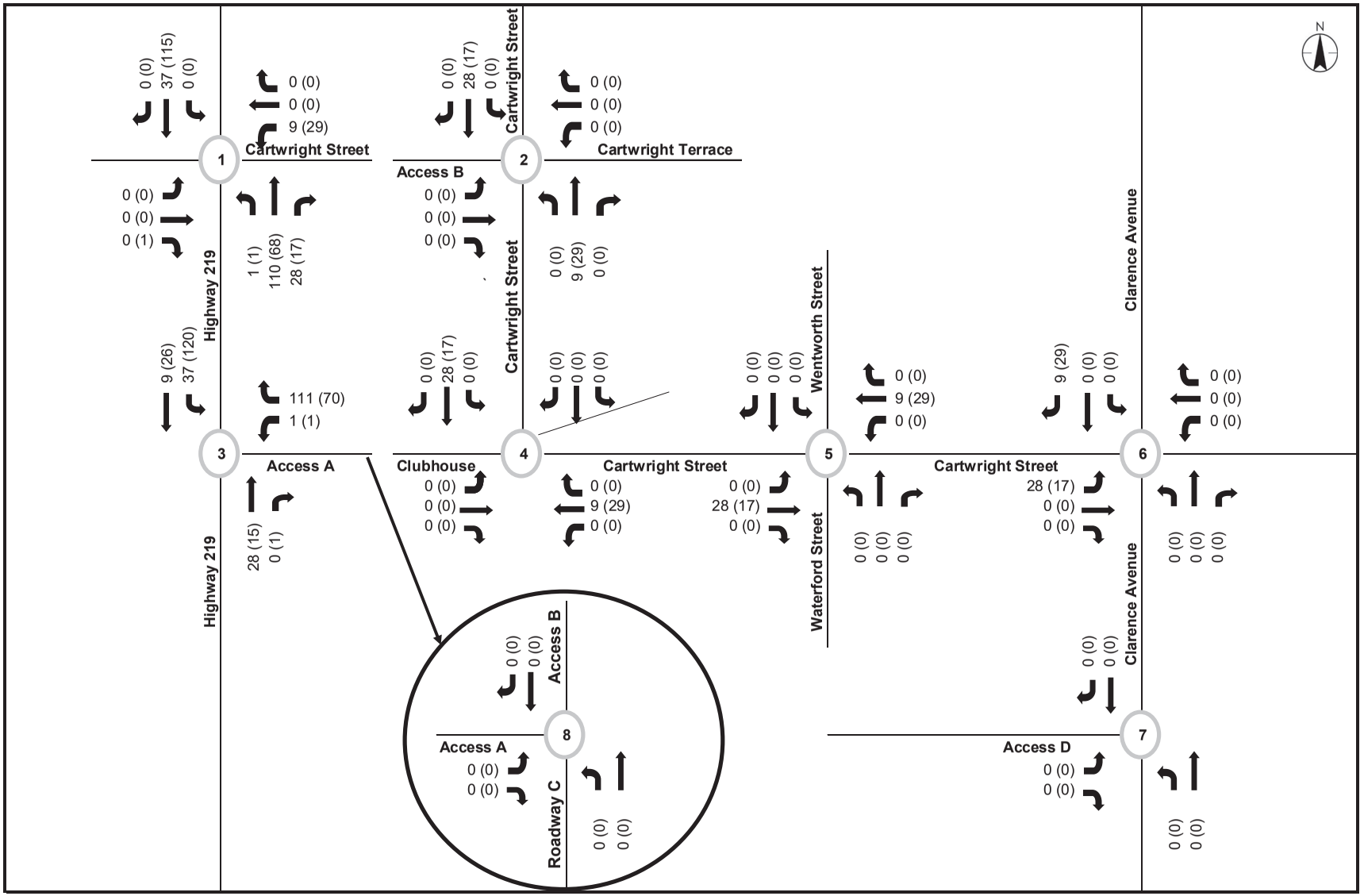

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Figure No.
4.4

Willows 2003 Concept Plan
Generated Trips
AM Peak (PM Peak)

4.5 COMBINED TRAFFIC VOLUMES

The trips generated by the 2003 and 2022 proposed Concept Plans were added to the future background traffic volumes to arrive at the combined traffic volumes for the weekday morning and afternoon peak hour time periods for both the 2027 and 2037 horizons.

The 2022 Concept Plan combined traffic volumes for the 2027 horizon at the analysis intersections are shown in **Figure 4.5**. The 2022 Concept Plan combined traffic volumes for the 2037 horizon at the analysis intersections are shown in **Figure 4.6.**

The traffic volumes generated by the 2003 Willows Concept Plan were also added to 2027 and 2037 background traffic volumes and these combined traffic volumes are shown in **Figures 4.7 and 4.8**.

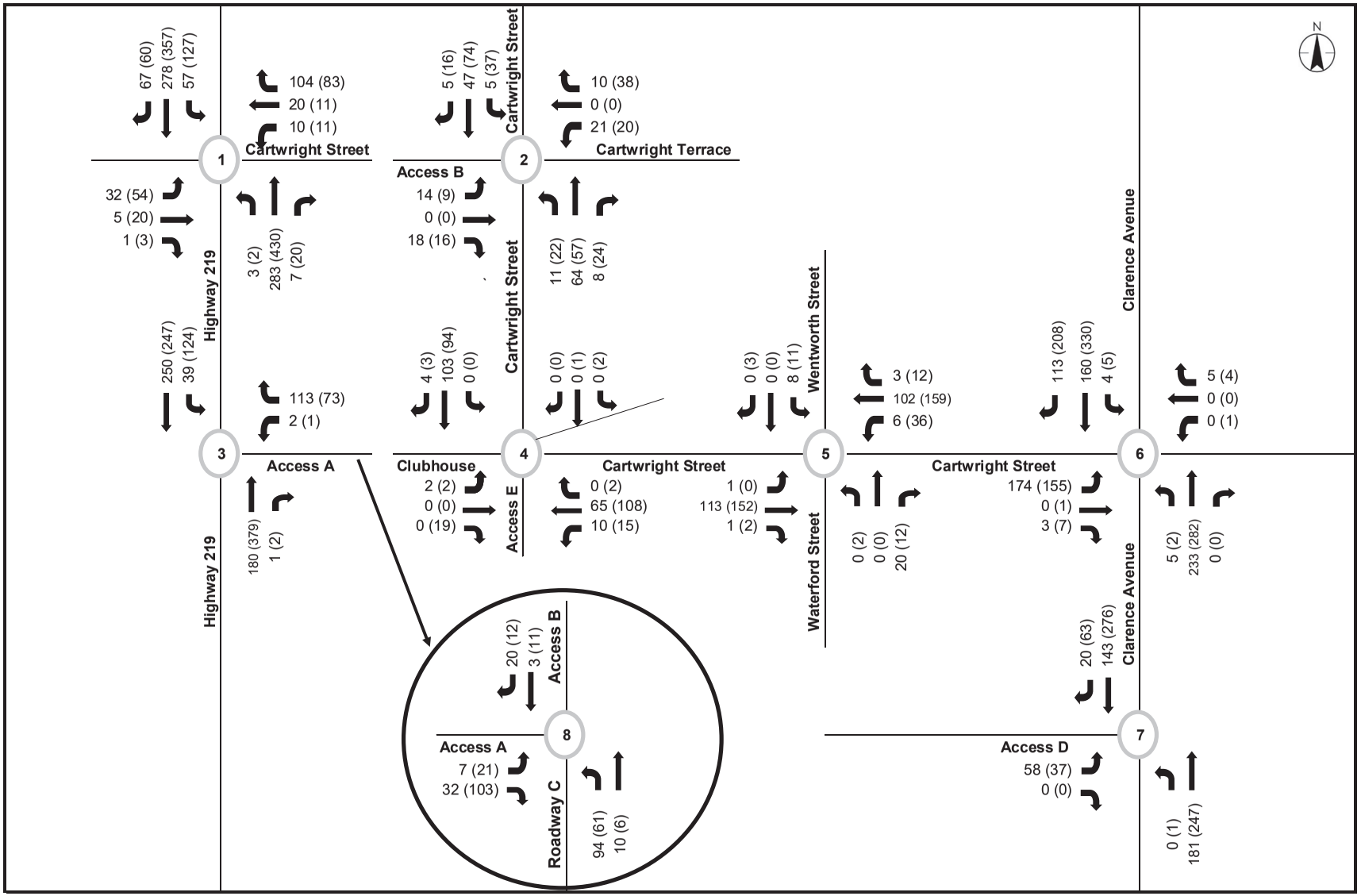

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Figure No.
4.5

Willows 2022 Concept Plan
Combined 2027 Traffic Volumes
AM Peak (PM Peak)

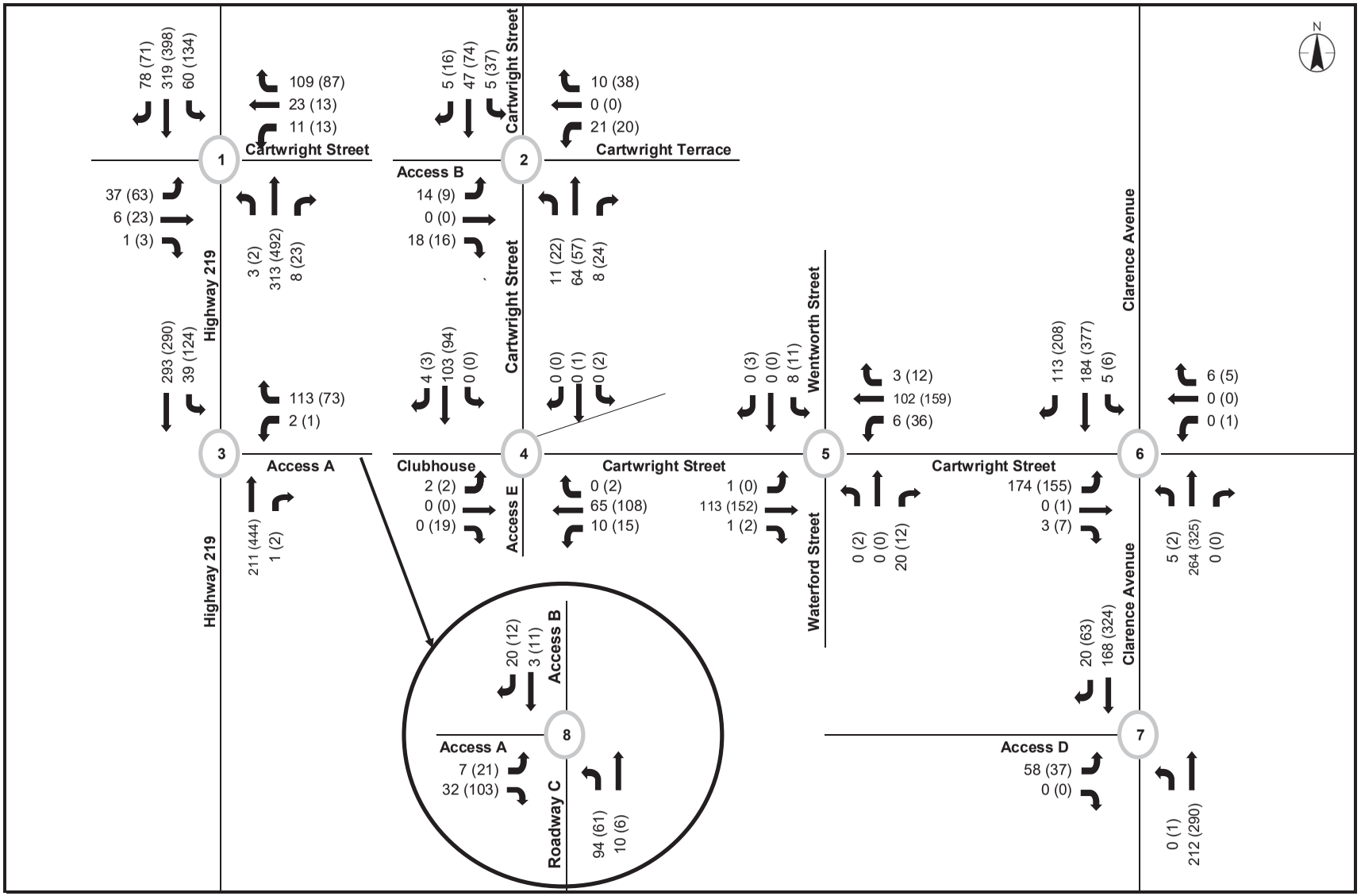

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Figure No.
4.6

Willows 2022 Concept Plan
Combined 2037 Traffic Volumes
AM Peak (PM Peak)

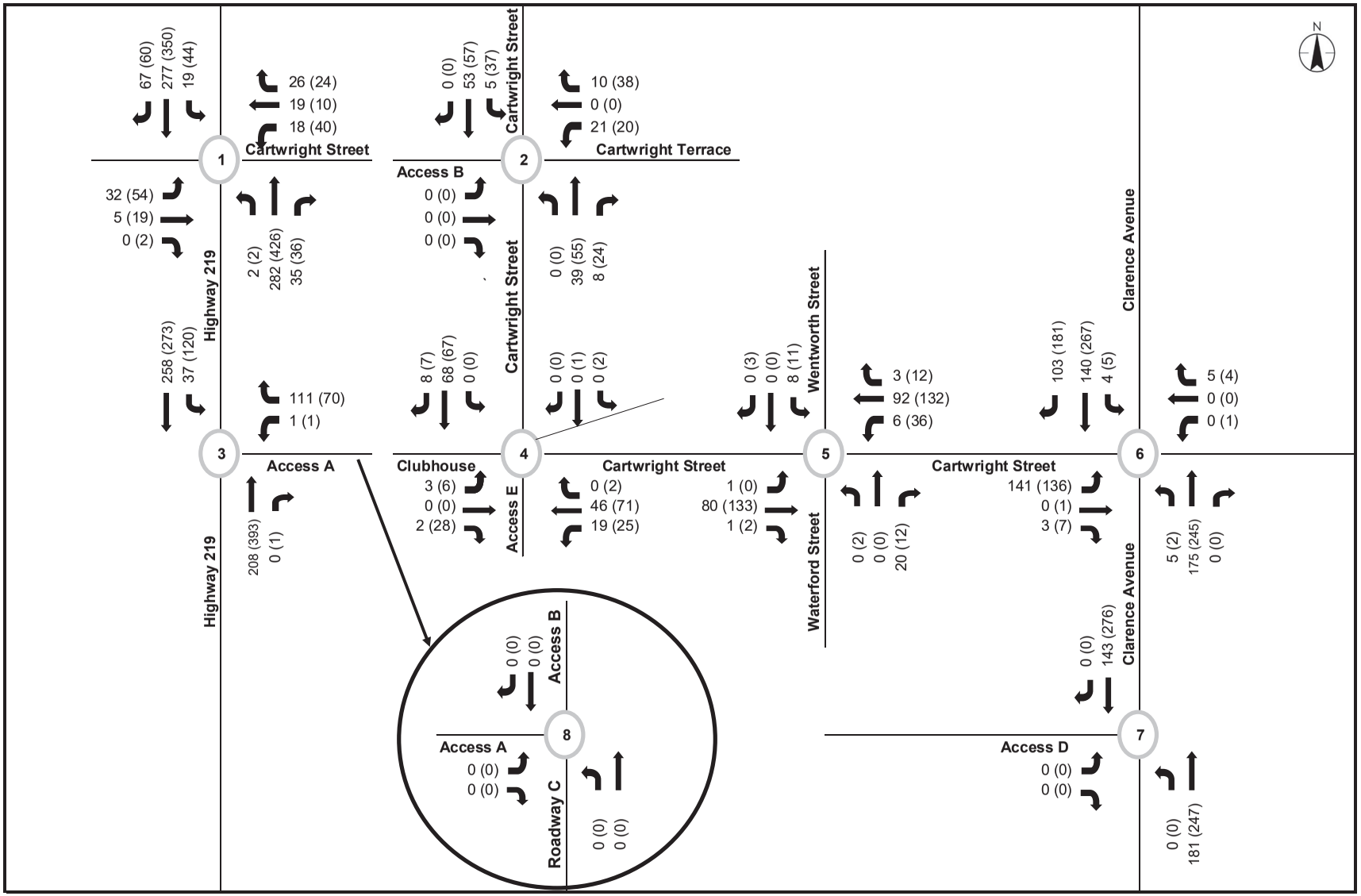

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Figure No.
4.7

Willows 2003 Concept Plan
Combined 2027 Traffic Volumes
AM Peak (PM Peak)

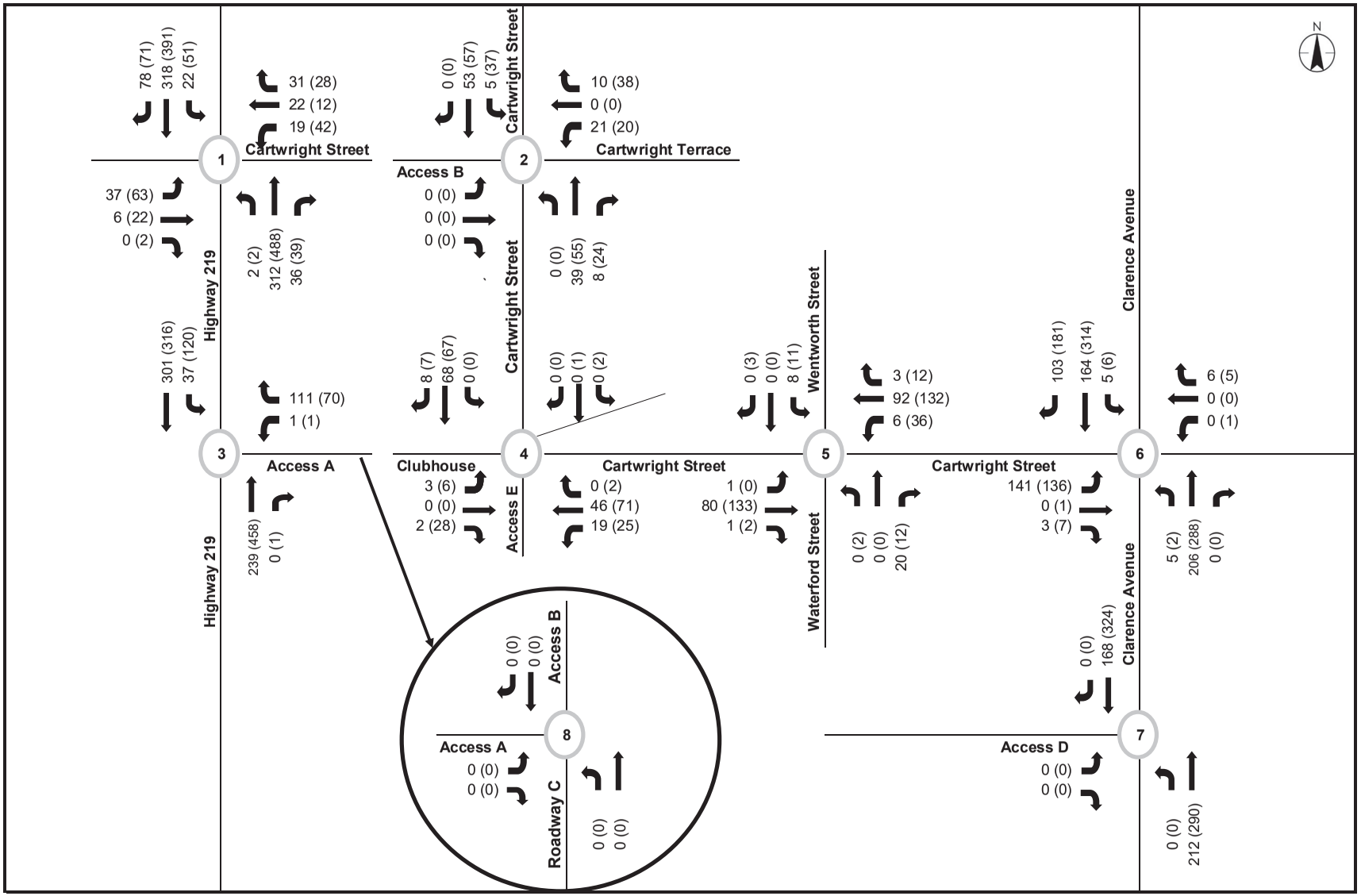

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Figure No.
4.8

Willows 2003 Concept Plan
Combined 2037 Traffic Volumes
AM Peak (PM Peak)

5.0 TRAFFIC IMPACT ANALYSIS

5.1 ANALYSIS METHODOLOGY

Capacity analysis at the study intersections was performed using Synchro Studio 11. Synchro is an industry standard software that models performance at both signalized and un-signalized intersections. Synchro's output includes two standard measures of intersection operational effectiveness: Level of Service (LOS) – a measure of delay per vehicle, and volume-to-capacity ratio (v/c) – a measure of the remaining available capacity of a movement at an intersection and thus the ability to accommodate fluctuations in traffic flow. Synchro analysis follows the methodology detailed in the 6th edition of the *Highway Capacity Manual (HCM)* and the percentile method. The roundabout intersection was analyzed using the software Sidra Intersection 7.

Queuing analysis was performed using SimTraffic, a traffic simulation software within Synchro that randomly "seeds" the road network with traffic based on given hourly volumes, heavy vehicle percentages, peak hour factors, pedestrian calls, and other driver behavioural parameters. SimTraffic then "observes" and measures the performance of each movement. It is particularly effective to determine queue lengths and locations of potential blocking.

5.1.1 Analysis Parameters

The study intersections were analyzed under the following scenarios using the traffic volumes noted to determine operating conditions under anticipated traffic volumes at the analysis horizons.

- Peak hour traffic volumes as shown in **Figure 2.2** for the 2022 existing scenario;
- Peak hour traffic volumes as shown in **Figure 4.5** were used for the 2022 Concept Plan 2027combined traffic analysis;
- Peak hour traffic volumes as shown in **Figure 4.6** were used for the 2022 Concept Plan 2037 combined traffic analysis;
- Peak hour traffic volumes as shown in **Figures 4.7 and 4.8** were used for the 2003 Concept Plan 2027 and 2037 analysis; and
- Roadway, intersection lane configurations, and controls as shown in **Table 2-1** were assumed for the initial analysis.

The following parameters were used within Synchro and Sidra:

- Traffic signal saturation flows of 1,800 vehicles per hour;
- Peak Hour Factor as measured during traffic counts, otherwise 0.90 was assumed;
- If zero vehicles were observed or assigned to a permitted movement, 1 vehicle was assigned in the model as a nominal value; and
- Heavy vehicle percentages as measured during the traffic counts. Where heavy vehicles were measured as less than 1% in the field, they were rounded up to 1% for analysis.

5.1.2 Measures of Effectiveness

Traffic analysis was conducted for the weekday morning and afternoon peak hour time periods at the analysis horizon years, assuming full build-out of the development. Level of service (LOS), average approach delay (s), volume to capacity (v/c) ratio, and 95th percentile queue length are the four performance measures used to describe the quality and efficiency of traffic flow for the purposes of this TIA.

LOS is defined by ranges of average delay per vehicle traveling through an intersection. LOS A represents the lowest range of average delay and therefore the best conditions, while LOS F represents the highest range of delay and the worst conditions. **Table 5-1** shows the ranges of delay associated with each level of service for signalized and un-signalized intersections.

Table 5-1: Ranges of Delay for Levels of Service

Level of Service	Delay per Vehicle (seconds)	
	Signalized Intersections	Un-signalized Intersections
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	>20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The v/c ratios provide a quantitative value that can indicate the intersection's ability to accommodate fluctuations in traffic flow. If this ratio is greater than 1.00, the available capacity has been completely utilized and any small fluctuation would cause traffic conditions to break down. For this analysis, a v/c threshold of 0.85 and a LOS threshold of E were used to trigger identification of critical movements for which improvements are to be considered.

The 95th percentile queue lengths for all turning movements can be used to estimate adequate storage lengths for turning lanes such that traffic does not block access to other lanes. It is also used to verify that turning lanes do not overlap and that there is sufficient distance available to provide proper tapers.

All Synchro, SimTraffic, and Sidra reports are included in **Appendix B**.

5.2 ANALYSIS RESULTS

The existing 2022 traffic volumes, the projected 2003 Concept Plan 2027 and 2037 traffic volumes, and the projected 2022 Concept Plan 2027 and 2037 traffic volumes were analyzed. This provides a comparison between existing 2022 conditions and those projected under the 2003 and 2022 Concept Plans.

The above analysis identifies the impacts of the 2003 and 2022 Concept Plans over existing conditions, and a comparison of the impacts between the 2003 and 2022 Concept Plans.

The following outlines the traffic capacity analysis results for all scenarios grouped by each intersection for easy comparison of traffic conditions under each scenario.

5.2.1 Lorne Avenue and Cartwright Street

Table 5-2 shows the expected LOS, average delays, v/c ratios, and queues for the Lorne Avenue and Cartwright Street intersection with east/west stop control and the laning outlined in Section 2.1 for the morning and afternoon peak hour periods for all study horizons.

Table 5-2: Analysis Results for Lorne Avenue and Cartwright Street

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound		Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Lt/Thru	Thru/Rt	
Lorne Avenue & Cartwright Street	Existing 2022	AM	Level of Service	C	B	A	A	A	A / 2.9
			Delay (s)	15.9	11.9	8	7.6	0.1	
			V/C Ratio	0.14	0.12	0.003	0.02	0.12	
			95th Percentile Queue (m)	17.3	15.5	0	6.4	0.9	
		PM	Level of Service	F	C	A	A	A	C / 18.1
			Delay (s)	81.2	15	7.9	8.4	0.2	
			V/C Ratio	0.92	0.15	0.001	0.05	0.12	
			95th Percentile Queue (m)	27.2	16.6	3.2	12.5	0	
	2003 Concept Combined 2027	AM	Level of Service	C	C	A	A	A	A / 3.3
			Delay (s)	24.3	16.1	8.2	8.1	0.1	
			V/C Ratio	0.23	0.22	0.007	0.02	0.15	
			95th Percentile Queue (m)	17.8	18.6	5.7	8.5	0	
		PM	Level of Service	F	D	A	A	A	F / 77.6
			Delay (s)	449.4	30.3	8.3	9	0.3	
			V/C Ratio	1.82	0.43	0.003	0.07	0.16	
			95th Percentile Queue (m)	48.4	22	3.9	19.8	5.8	
	2022 Concept Combined 2027	AM	Level of Service	E	C	A	A	A	A / 5.7
			Delay (s)	39.4	16.1	8.2	8.1	0.2	
			V/C Ratio	0.35	0.38	0.01	0.06	0.15	
			95th Percentile Queue (m)	17.4	23.9	5.4	13.4	0	
		PM	Level of Service	F	D	A	A	A	F / 242.3
			Delay (s)	1526.2	30.6	8.3	9.4	0.6	
			V/C Ratio	4.09	0.55	0.003	0.18	0.17	
			95th Percentile Queue (m)	111.2	32.8	2.9	26.1	1.4	
	2003 Concept Combined 2037	AM	Level of Service	D	C	A	A	A	A / 4.0
			Delay (s)	31.8	18.4	8.3	8.2	0.1	
			V/C Ratio	0.33	0.28	0.007	0.02	0.17	
			95th Percentile Queue (m)	20.4	19.6	2.2	9.8	1.4	
		PM	Level of Service	F	F	A	A	A	F / 170.8
			Delay (s)	975.6	50.6	8.5	9.4	0.4	
			V/C Ratio	2.96	0.62	0.003	0.08	0.19	
			95th Percentile Queue (m)	84.8	23.9	2.7	21.6	5.6	
	2022 Concept Combined 2037	AM	Level of Service	F	C	A	A	A	A / 7.8
			Delay (s)	60.6	19	8.4	8.2	0.3	
			V/C Ratio	0.52	0.46	0.01	0.07	0.17	
			95th Percentile Queue (m)	17.1	26.9	4	16.1	1	
		PM	Level of Service	F	F	A	A	A	F / 495
			Delay (s)	3029	65.8	8.5	9.8	0.8	
			V/C Ratio	7.31	0.81	0.003	0.2	0.19	
			95th Percentile Queue (m)	165.9	32.4	5	30.4	5.4	

The intersection of Lorne Avenue with Cartwright Street is projected to operate at LOS F with the eastbound and westbound movements operating at LOS F during the afternoon peak hour in the 2022 Concept Plan combined 2037 scenario. The eastbound movement is operating at LOS F during the

afternoon peak hour under 2022 existing conditions with delays, queue lengths, and v/c ratios increasing as background traffic volumes increase in 2027 and 2037. The intersection is expected to operate at LOS F during the 2027 2003 Concept Plan and 2037 2003 Concept Plan afternoon peak hours. Potential improvements to the intersection's operation are discussed in Section 5.4.

5.2.2 Cartwright Street and Access B/Cartwright Terrace

Table 5-3 shows the expected LOS, average delays, v/c ratios, and queues for the Cartwright Street and Cartwright Terrace/Access B intersection with east/west stop control and the laning outlined in Section 2.1 for the morning and afternoon peak hour periods for all study horizons.

Table 5-3: Analysis Results for Cartwright Street and Access B/Cartwright Terrace

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound	Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	
Cartwright Street & Cartwright Terrace	Existing 2022	AM	Level of Service		A	A	A	A / 3.0
			Delay (s)		9	0	7.3	
			V/C Ratio		0.04	0	0.004	
			95th Percentile Queue (m)		12.4	0	1.2	
		PM	Level of Service		A	A	A	A / 4.1
			Delay (s)		9.3	0	7.4	
			V/C Ratio		0.07	0	0.03	
			95th Percentile Queue (m)		12.6	0.9	3.6	
	2003 Concept Combined 2027	AM	Level of Service		A	A	A	A / 2.2
			Delay (s)		9.1	0	7.3	
			V/C Ratio		0.04	0	0.004	
			95th Percentile Queue (m)		13	0	1.9	
		PM	Level of Service		A	A	A	A / 3.3
			Delay (s)		9.6	0	7.5	
			V/C Ratio		0.08	0	0.04	
			95th Percentile Queue (m)		13.7	0	5.4	
	2022 Concept Combined 2027	AM	Level of Service	A	A	A	A	A / 3.4
			Delay (s)	9.3	9.7	7.3	7.4	
			V/C Ratio	0.04	0.04	0.009	0.004	
			95th Percentile Queue (m)	12.4	12.7	2.3	1.2	
		PM	Level of Service	B	B	A	A	A / 3.8
			Delay (s)	10.3	10.2	7.5	7.5	
			V/C Ratio	0.04	0.09	0.02	0.04	
			95th Percentile Queue (m)	12.4	13.3	4.1	5.9	
	2003 Concept Combined 2037	AM	Level of Service		A	A	A	A / 2.2
			Delay (s)		9.1	0	7.3	
			V/C Ratio		0.04	0	0.004	
			95th Percentile Queue (m)		12.9	0	1.9	
		PM	Level of Service		A	A	A	A / 3.3
			Delay (s)		9.6	0	7.5	
			V/C Ratio		0.08	0	0.04	
			95th Percentile Queue (m)		13.3	1	5.3	
	2022 Concept Combined 2037	AM	Level of Service	A	A	A	A	A / 3.4
			Delay (s)	9.3	9.7	7.3	7.4	
			V/C Ratio	0.04	0.04	0.009	0.004	
			95th Percentile Queue (m)	12.6	12.2	2	0.9	
		PM	Level of Service	B	B	A	A	A / 3.8
			Delay (s)	10.3	10.2	7.5	7.5	
			V/C Ratio	0.04	0.09	0.02	0.04	
			95th Percentile Queue (m)	12.1	13	4.8	4.7	

This intersection is expected to operate acceptably with all movements operating at LOS B or better. The highest v/c ratio is 0.09 for the westbound direction during the afternoon peak hour, under the 2022 Concept Plan 2037 horizon, indicating the intersection has capacity for the projected traffic volumes. The longest 95th percentile queue length is 13 m in the westbound direction during the afternoon peak hour.

5.2.3 Highway 219 and Access A

Table 5-4 shows the expected LOS, average delays, v/c ratios, and queues for the Highway 219 and Access A intersection with westbound stop control for the morning and afternoon peak hour periods for the combined scenarios as the intersection does not exist under background conditions.

Table 5-4: Analysis Results for Highway 219 and Access A

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound	Overall Intersection LOS / Delay
					Left/Right	Thru/Right	Lt/Thru	
Highway 219 & Access A	2003 Concept Combined 2027	AM	Level of Service		B	A	A	A / 2.4
			Delay (s)		10.3	0	7.8	
			V/C Ratio		0.16	0.14	0.03	
			95th Percentile Queue (m)		10.6	0	2.8	
		PM	Level of Service		B	A	A	A / 2.2
			Delay (s)		11.9	0	8.7	
			V/C Ratio		0.13	0.26	0.12	
			95th Percentile Queue (m)		15.5	0	23.6	
	2022 Concept Combined 2027	AM	Level of Service		B	A	A	A / 2.5
			Delay (s)		10.1	0	7.7	
			V/C Ratio		0.15	0.12	0.03	
			95th Percentile Queue (m)		16.4	0	8.8	
		PM	Level of Service		B	A	A	A / 2.3
			Delay (s)		11.7	0	8.6	
			V/C Ratio		0.13	0.25	0.13	
			95th Percentile Queue (m)		15.6	0	21.9	
	2003 Concept Combined 2037	AM	Level of Service		B	A	A	A / 2.2
			Delay (s)		10.6	0	7.9	
			V/C Ratio		0.16	0.16	0.03	
			95th Percentile Queue (m)		10.9	0	3	
		PM	Level of Service		B	A	A	A / 2.1
			Delay (s)		12.7	0	8.9	
			V/C Ratio		0.15	0.3	0.13	
			95th Percentile Queue (m)		9	0	12	
	2022 Concept Combined 2037	AM	Level of Service		B	A	A	A / 2.3
			Delay (s)		10.4	0	7.8	
			V/C Ratio		0.16	0.14	0.03	
			95th Percentile Queue (m)		16.8	0	10.6	
		PM	Level of Service		B	A	A	A / 2.2
			Delay (s)		12.6	0	8.9	
			V/C Ratio		0.15	0.29	0.13	
			95th Percentile Queue (m)		16	0	24.7	

This intersection is expected to operate acceptably with all movements operating at LOS B or better. The highest v/c ratio is 0.29 for the northbound direction during the afternoon peak hour under the 2022 Concept Plan 2037 horizon indicating the intersection has capacity for the projected traffic volumes. The longest 95th percentile queue length is 25 m in the southbound direction during the afternoon peak hour.

5.2.4 Cartwright Street and Clubhouse Roundabout

Table 5-5 shows the expected LOS, average delays, v/c ratios, and queues for the Cartwright Street and Clubhouse roundabout for the morning and afternoon peak hour periods for all study horizons.

Table 5-5: Analysis Results for Cartwright Street and Clubhouse Roundabout

Intersection	Horizon	Peak	Measure	Northeastbound			Westbound			Southwestbound			Southbound			Overall Intersection LOS / Delay
				Lt/Thru/Right			Lt/Thru/Right			Lt/Thru/Right			Lt/Thru/Right			
Roundabout	Existing 2022	AM	Level of Service	A			A			A			A			A / 4.6
			Delay (s)	6.6	1.3	1.2	6.4	1.9	2.3	8.8	1.4	2.5	8.6	7.6	1.1	
			V/C Ratio	0.006			0.04			0.002			0.04			
			95th Percentile Queue (m)	0.2			1.5			0.1			1.3			
		PM	Level of Service	A			A			A			A			A / 4.5
			Delay (s)	6.7	1.4	1.3	6.5	2.0	2.3	8.9	1.5	2.6	8.7	7.6	1.2	
			V/C Ratio	0.03			0.06			0.007			0.06			
			95th Percentile Queue (m)	1.1			2.1			0.2			1.8			
	2003 Concept Combined 2027	AM	Level of Service	A			A			A			A			A / 4.9
			Delay (s)	6.7	1.4	1.3	6.4	1.9	2.3	8.8	1.5	2.5	8.6	7.6	1.1	
			V/C Ratio	0.006			0.05			0.002			0.06			
			95th Percentile Queue (m)	0.2			1.7			0.1			2			
		PM	Level of Service	A			A			A			A			A / 4.4
			Delay (s)	6.8	1.5	1.4	6.5	2.0	2.3	9	1.7	2.7	8.7	7.6	1.2	
			V/C Ratio	0.03			0.08			0.007			0.07			
			95th Percentile Queue (m)	1.1			3			0.2			2.3			
	2022 Concept Combined 2027	AM	Level of Service	A			A			A			A			A / 5.1
			Delay (s)	6.8	1.6	1.4	6.4	1.9	2.3	8.8	1.5	2.6	8.6	7.5	1.1	
			V/C Ratio	0.004			0.06			0.002			0.08			
			95th Percentile Queue (m)	0.1			1.9			0.1			2.6			
		PM	Level of Service	A			A			A			A			A / 4.4
			Delay (s)	6.9	1.6	1.5	6.4	1.9	2.3	9.1	1.8	2.8	8.6	7.6	1.1	
			V/C Ratio	0.03			0.1			0.007			0.09			
			95th Percentile Queue (m)	1.1			3.7			0.2			3			
	2003 Concept Combined 2037	AM	Level of Service	A			A			A			A			A / 4.9
			Delay (s)	6.7	1.4	1.3	6.4	1.9	2.3	8.8	1.5	2.5	8.6	7.6	1.1	
			V/C Ratio	0.006			0.05			0.002			0.06			
			95th Percentile Queue (m)	0.2			1.7			0.1			2			
		PM	Level of Service	A			A			A			A			A / 4.4
			Delay (s)	6.8	1.5	1.4	6.5	2.0	2.3	9	1.7	2.7	8.7	7.6	1.2	
			V/C Ratio	0.03			0.08			0.007			0.07			
			95th Percentile Queue (m)	1.1			3			0.2			2.3			
	2022 Concept Combined 2037	AM	Level of Service	A			A			A			A			A / 5.1
			Delay (s)	6.8	1.6	1.4	6.4	1.9	2.3	8.8	1.5	2.6	8.6	7.5	1.1	
			V/C Ratio	0.004			0.06			0.002			0.08			
			95th Percentile Queue (m)	0.1			1.9			0.1			2.6			
		PM	Level of Service	A			A			A			A			A / 4.4
			Delay (s)	6.9	1.6	1.5	6.4	1.9	2.3	9.1	1.8	2.8	8.6	7.6	1.1	
			V/C Ratio	0.02			0.1			0.007			0.09			
			95th Percentile Queue (m)	0.7			3.7			0.2			3			

The roundabout is expected to operate acceptably with all movements operating at LOS A. The highest v/c ratio is 0.1 for the westbound direction during the afternoon peak hour under the 2022 Concept Plan 2037 horizon indicating the intersection has capacity for the projected traffic volumes. There is virtually no queuing expected at the intersection.

5.2.5 Cartwright Street and Wentworth/Waterford

Table 5-6 shows the expected LOS, average delays, v/c ratios, and queues for the Cartwright Street and Wentworth/Waterford intersection with north/south stop control and the laning outlined in Section 2.1 for the morning and afternoon peak hour periods for all study horizons.

Table 5-6: Analysis Results for Cartwright Street and Wentworth/Waterford

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound	Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	
Cartwright Street & Wentworth/ Waterford	Existing 2022	AM	Level of Service	A	A	A	B	A / 2.1
			Delay (s)	7.4	7.5	8.9	10.1	
			V/C Ratio	0.003	0.006	0.04	0.02	
			95th Percentile Queue (m)	0	1.2	13.1	8.9	
		PM	Level of Service	A	A	A	B	A / 2.1
			Delay (s)	7.5	7.6	9.7	11.7	
			V/C Ratio	0.001	0.03	0.03	0.04	
			95th Percentile Queue (m)	0	6	11.3	12.1	
	2003 Concept Combined 2027	AM	Level of Service	A	A	A	B	A / 1.8
			Delay (s)	7.5	7.6	9.1	10.5	
			V/C Ratio	0.003	0.006	0.04	0.02	
			95th Percentile Queue (m)	0	2	12.4	9.7	
		PM	Level of Service	A	A	A	B	A / 1.9
			Delay (s)	7.6	7.6	9.9	12.3	
			V/C Ratio	0.001	0.03	0.03	0.04	
			95th Percentile Queue (m)	0	6.6	11.5	13.3	
	2022 Concept Combined 2027	AM	Level of Service	A	A	A	B	A / 1.5
			Delay (s)	7.5	7.7	9.4	11	
			V/C Ratio	0.003	0.006	0.04	0.02	
			95th Percentile Queue (m)	0	2.3	13	9.4	
		PM	Level of Service	A	A	B	B	A / 1.7
			Delay (s)	7.7	7.7	10.2	13.1	
			V/C Ratio	0.001	0.04	0.04	0.05	
			95th Percentile Queue (m)	1.9	5.9	11	12.4	
	2003 Concept Combined 2037	AM	Level of Service	A	A	A	B	A / 1.8
			Delay (s)	7.5	7.6	9.1	10.5	
			V/C Ratio	0.003	0.006	0.04	0.02	
			95th Percentile Queue (m)	1.3	1.1	11.9	10.2	
		PM	Level of Service	A	A	A	B	A / 1.9
			Delay (s)	7.6	7.6	9.9	12.3	
			V/C Ratio	0.001	0.03	0.03	0.04	
			95th Percentile Queue (m)	0	6.1	11.2	14.6	
	2022 Concept Combined 2037	AM	Level of Service	A	A	A	B	A / 1.5
			Delay (s)	7.5	7.7	9.4	11	
			V/C Ratio	0.003	0.006	0.04	0.02	
			95th Percentile Queue (m)	1.4	2.1	12.9	10.3	
		PM	Level of Service	A	A	B	B	A / 1.7
			Delay (s)	7.7	7.7	10.2	13.1	
			V/C Ratio	0.001	0.04	0.04	0.05	
			95th Percentile Queue (m)	1.2	6.8	11.6	12.4	

This intersection is expected to operate acceptably with all movements operating at LOS B or better. The highest v/c ratio is 0.05 for the southbound direction during the afternoon peak hour under the 2022 Concept Plan 2037 horizon indicating the intersection has capacity for the projected traffic volumes.

5.2.6 Clarence Avenue and Cartwright Street

Table 5-7 shows the expected LOS, average delays, v/c ratios, and queues for the Clarence Avenue and Cartwright Street intersection with east/west stop control and the laning outlined in Section 2.1 for the morning and afternoon peak hour periods for all study horizons.

Table 5-7: Analysis Results for Clarence Avenue and Cartwright Street

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound			Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Left	Thru	Right	
Cartwright Street & Clarence Avenue	Existing 2022	AM	Level of Service	B	B	A	A	A	A	A / 3.6
			Delay (s)	14.5	10.1	7.6	7.9	0	0	
			V/C Ratio	0.29	0.01	0.008	0.006	0.11	0.06	
			95th Percentile Queue (m)	17.6	9.4	2.8	1.3	0	0	
		PM	Level of Service	D	B	A	A	A	A	A / 8.1
			Delay (s)	30.1	11.4	7.9	7.8	0	0	
			V/C Ratio	0.68	0.02	0.003	0.006	0.18	0.12	
			95th Percentile Queue (m)	22.8	7.7	2.2	3.9	0	0	
	2003 Concept Combined 2027	AM	Level of Service	C	B	A	A	A	A	A / 4.4
			Delay (s)	16.5	10.3	7.6	8	0	0	
			V/C Ratio	0.38	0.02	0.01	0.007	0.12	0.06	
			95th Percentile Queue (m)	20	7.5	2	4.6	0	0	
		PM	Level of Service	E	B	A	A	A	A	B / 13
			Delay (s)	48.3	11.8	7.9	7.8	0	0	
			V/C Ratio	0.84	0.02	0.003	0.006	0.19	0.14	
			95th Percentile Queue (m)	27	6.8	1.7	3.7	0	4	
	2022 Concept Combined 2027	AM	Level of Service	C	B	A	A	A	A	A / 6.1
			Delay (s)	23	11	7.7	8.2	0	0	
			V/C Ratio	0.54	0.02	0.009	0.007	0.13	0.07	
			95th Percentile Queue (m)	24.5	9.2	2.2	4	0	0	
		PM	Level of Service	F	B	A	A	A	A	D / 34.7
			Delay (s)	133.8	12.8	8.1	7.9	0	0	
			V/C Ratio	1.15	0.03	0.003	0.007	0.24	0.16	
			95th Percentile Queue (m)	27.4	8.2	5.3	3.7	0	2.2	
	2003 Concept Combined 2037	AM	Level of Service	C	B	A	A	A	A	A / 4.6
			Delay (s)	19	10.6	7.7	8.1	0	0	
			V/C Ratio	0.43	0.02	0.01	0.009	0.14	0.06	
			95th Percentile Queue (m)	19.6	8.8	4.6	3.6	0	2.1	
		PM	Level of Service	F	B	A	A	A	A	C / 21.7
			Delay (s)	88.5	12.4	8.1	8	0	0	
			V/C Ratio	1	0.03	0.003	0.008	0.23	0.14	
			95th Percentile Queue (m)	28.1	7.3	3.5	3.8	0	0	
	2022 Concept Combined 2037	AM	Level of Service	D	B	A	A	A	A	A / 7.0
			Delay (s)	28.7	11.3	7.8	8.3	0	0	
			V/C Ratio	0.62	0.02	0.009	0.009	0.15	0.07	
			95th Percentile Queue (m)	23.5	8.4	4.3	5	0	0	
		PM	Level of Service	F	B	A	A	A	A	F / 55.1
			Delay (s)	230	13.5	8.3	8.1	0	0	
			V/C Ratio	1.38	0.03	0.004	0.008	0.27	0.16	
			95th Percentile Queue (m)	30.4	9.4	2.6	4.5	0	0	

The intersection is projected to operate at LOS F with the eastbound movement operating at LOS F during the afternoon peak hour under the 2022 Concept Plan 2037 horizon. The eastbound movement is expected to operate at LOS E during the 2003 Concept Plan 2027 horizon afternoon peak hour with delays, queue lengths, and v/c ratios increasing as background traffic volumes increase in the 2027

combined 2022 concept and 2037 scenarios. Potential improvements to the intersection's operation are discussed in Section 5.4.

5.2.7 Clarence Avenue and Access D

Table 5-8 shows the expected LOS, average delays, v/c ratios, and queues for the Clarence Avenue and Access D intersection with eastbound stop control for the morning and afternoon peak hour periods for the combined scenarios as the intersection does not exist under background conditions.

Table 5-8: Analysis Results for Clarence Avenue and Access D

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound	Overall Intersection LOS / Delay
				Left/Right		Left/Thru	Thru/Right	
Clarence Avenue & Access D	2022 Concept Combined 2027	AM	Level of Service	B		A	A	A / 1.6
			Delay (s)	11.7		7.6	0	
			V/C Ratio	0.11		0.001	0.11	
			95th Percentile Queue (m)	17.3		0	0	
		PM	Level of Service	B		A	A	A / 0.8
			Delay (s)	13.7		8	0	
			V/C Ratio	0.1		0.001	0.21	
			95th Percentile Queue (m)	15.1		2.1	0	
	2022 Concept Combined 2037	AM	Level of Service	B		A	A	A / 1.5
			Delay (s)	12.4		7.7	0	
			V/C Ratio	0.12		0.001	0.13	
			95th Percentile Queue (m)	17.3		0	0	
		PM	Level of Service	C		A	A	A / 0.8
			Delay (s)	15.1		8.1	0	
			V/C Ratio	0.11		0.001	0.24	
			95th Percentile Queue (m)	14.4		1.2	0	

This intersection is expected to operate acceptably with all movements operating at LOS C or better. The highest v/c ratio is 0.24 for the southbound direction during the afternoon peak hour under the 2022 Concept Plan 2037 horizon, indicating the intersection has capacity for the projected traffic volumes.

5.2.8 Access A and Access B/Internal Roadway C

Table 5-9 shows the expected LOS, delays, v/c ratios, and queues for the Access A and Access C (Internal Collector) intersection with eastbound stop control for the morning and afternoon peak hour periods for the combined scenarios as the intersection does not exist under background conditions.

Table 5-9: Analysis Results for Access A and Access B/Internal Roadway C

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound	Overall Intersection LOS / Delay
				Left/Right		Left/Thru	Thru/Right	
Access A & Access B/Internal Roadway C	2022 Concept Combined 2027	AM	Level of Service	A		A	A	A / 6.3
			Delay (s)	8.8		7.4	0	
			V/C Ratio	0.04		0.07	0.01	
			95th Percentile Queue (m)	12.5		5.2	0	
		PM	Level of Service	A		A	A	A / 7.4
			Delay (s)	9.2		7.4	0	
			V/C Ratio	0.14		0.04	0.01	
			95th Percentile Queue (m)	13.2		4.2	0	
	2022 Concept Combined 2037	AM	Level of Service	A		A	A	A / 6.3
			Delay (s)	8.8		7.4	0	
			V/C Ratio	0.04		0.07	0.01	
			95th Percentile Queue (m)	12.8		6.1	0	
		PM	Level of Service	A		A	A	A / 7.4
			Delay (s)	9.2		7.4	0	
			V/C Ratio	0.14		0.04	0.01	
			95th Percentile Queue (m)	12.3		4.3	0	

This intersection is expected to operate acceptably with all movements operating at LOS A. The highest v/c ratio is 0.14 for the eastbound direction during the afternoon peak hour for the 2022 Concept Plan under the 2037 horizon indicating the intersection has capacity for the projected traffic volumes.

5.3 SIGNAL WARRANT ANALYSIS

Transportation Association of Canada (TAC) Traffic Signal and Pedestrian Signal Head Warrant Handbook describes the accepted procedure for determining whether vehicle traffic volumes are sufficient to warrant installation of a traffic signal. This analysis considers proximity to schools, presence of bus routes, heavy vehicle traffic, and both vehicular and pedestrian traffic volume over six hours to calculate risk exposure at a given intersection. The procedure assigns warrant points to the intersection based on a number of parameters. A score of 100 basis points or more suggests that a traffic signal is warranted at the intersection based on the users' exposure to risk.

Traffic signal warrant analysis was performed for the Lorne Avenue with Cartwright Street, and Clarence Avenue with Cartwright Street intersections. **Table 5-10** shows the calculated warrant points for the 2022 concept combined scenarios. The warrant calculations are provided in **Appendix C**.

Table 5-10: Signal Warrant Points for 2022 Concept Combined Scenarios

Intersection	Horizon			
	2027		2037	
	Points	Warrant	Points	Warrant
Lorne Avenue & Cartwright Street	60	Not Met	76	Not Met
Clarence Avenue & Cartwright Street	44	Not Met	51	Not Met

Signals are not warranted at either intersection in the 2027 or 2037 horizons.

5.4 SIGNALIZED INTERSECTION ANALYSIS RESULTS

The intersections of Lorne Avenue and Cartwright Street, and Clarence Avenue and Cartwright Street had movements operating at LOS F and v/c ratios over 1.0. Although the warrants for signalization were not met for these intersections, they were modelled to determine if signalization would reduce the eastbound and westbound delays and improve the intersection operation. The results of this analysis follow.

5.4.1 Lorne Avenue and Cartwright Street

Table 5-11 shows the expected LOS, average delays, v/c ratios, and queues for Lorne Avenue and Cartwright Street as a signalized intersection for the analysis scenarios which had failing movements under a stop sign controlled intersection.

Table 5-11: Analysis Results for Signalized Lorne Avenue and Cartwright Street

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound		Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Lt/Thru	Thru/Rt	
Lorne Avenue & Cartwright Street	Existing 2022	AM	Level of Service	A	A	A	A	A	A / 4.1
			Delay (s)	7.8	5.7	4.2	3.2	3.2	
			V/C Ratio	0.13	0.18	0.14	0.16	0.16	
			95th Percentile Queue (m)	17.8	14.9	13	17.6	12.2	
		PM	Level of Service	B	A	B	A	A	A / 9.9
			Delay (s)	15.3	5.9	10.7	6.4	6.4	
			V/C Ratio	0.54	0.13	0.49	0.25	0.25	
			95th Percentile Queue (m)	22.6	14.6	29.7	24.1	14.7	
	2003 Concept Combined 2027	AM	Level of Service	B	A	A	A	A	A / 5.3
			Delay (s)	11.2	8.6	5.4	3.9	3.9	
			V/C Ratio	0.19	0.25	0.33	0.22	0.22	
			95th Percentile Queue (m)	18.3	18	25.7	22.9	16.1	
		PM	Level of Service	C	B	B	A	A	B / 14.1
			Delay (s)	28.9	11.4	14.3	7.2	7.2	
			V/C Ratio	0.71	0.25	0.71	0.36	0.36	
			95th Percentile Queue (m)	30.4	20.3	54.1	32.9	23	
	2022 Concept Combined 2027	AM	Level of Service	A	A	A	A	A	A / 6.3
			Delay (s)	9.7	5.8	7.1	5.6	5.6	
			V/C Ratio	0.17	0.39	0.36	0.33	0.33	
			95th Percentile Queue (m)	16.4	21.6	26.1	28.7	19.3	
		PM	Level of Service	C	A	B	B	B	B / 13.5
			Delay (s)	21.6	5.9	14.7	11.3	11.3	
			V/C Ratio	0.64	0.29	0.7	0.61	0.61	
			95th Percentile Queue (m)	30.1	21.9	41.4	55.2	38.7	
	2003 Concept Combined 2037	AM	Level of Service	B	A	A	A	A	A / 5.6
			Delay (s)	11.9	8.8	5.7	4.1	4.1	
			V/C Ratio	0.22	0.28	0.36	0.25	0.25	
			95th Percentile Queue (m)	18	18.1	28.1	24.9	18.3	
		PM	Level of Service	C	A	B	A	A	B / 16.5
			Delay (s)	31.4	12	18.3	7.8	7.8	
			V/C Ratio	0.75	0.26	0.8	0.41	0.41	
			95th Percentile Queue (m)	36.8	20.6	72.2	53.6	40.7	
	2022 Concept Combined 2037	AM	Level of Service	B	A	A	A	A	A / 6.6
			Delay (s)	10.8	6.3	7.4	5.8	5.8	
			V/C Ratio	0.2	0.41	0.39	0.37	0.37	
			95th Percentile Queue (m)	18.5	22.1	29.5	34.5	19.6	
		PM	Level of Service	C	A	B	B	B	B / 17.4
			Delay (s)	28.6	6.1	19.3	13.7	13.7	
			V/C Ratio	0.74	0.3	0.79	0.7	0.7	
			95th Percentile Queue (m)	36.9	24.2	67.9	68.5	52.1	

The intersection of Lorne Avenue and Cartwright Street is expected to operate acceptably as a signalized intersection for all horizons with existing lane geometry. The intersection is expected to operate at LOS A during the morning peak hour and LOS B during the afternoon peak hour with all movements operating at LOS C or better. The highest v/c ratio expected is 0.79 for the northbound movement during the afternoon peak hour under the 2022 Concept Plan 2037 horizon. The longest 95th percentile queue length expected is 69 m in the southbound direction during the afternoon peak hour under the 2022 Concept Plan 2037 horizon. The intersection is located approximately 270 m south of a major CN rail crossing, meaning it is expected that the intersection queue length can be accommodated along Lorne Avenue without impacting the rail crossing.

5.4.2 Clarence Avenue and Cartwright Street

Table 5-12 shows the expected LOS, average delays, v/c ratios, and queues for Clarence Avenue and Cartwright Street as a signalized intersection for the analysis scenarios which had failing movements under a stop sign controlled intersection.

Table 5-12: Analysis Results for Signalized Clarence Avenue and Cartwright Street

Intersection	Horizon	Peak	Measure	Eastbound	Westbound	Northbound	Southbound			Overall Intersection LOS / Delay
				Lt/Thru/Right	Lt/Thru/Right	Lt/Thru/Right	Left	Thru	Right	
Cartwright Street & Clarence Avenue	2003 Concept Combined 2027	AM	Level of Service	B	A	A	A	A	A	A / 8.3
			Delay (s)	12	5	8.4	7.2	8.2	2.8	
			V/C Ratio	0.46	0.02	0.27	0.01	0.22	0.14	
			95th Percentile Queue (m)	19.9	6.6	23.2	3.9	19.5	0	
		PM	Level of Service	B	A	B	A	B	A	B / 11.7
			Delay (s)	18.4	6	11.6	8.4	12	3.1	
			V/C Ratio	0.68	0.02	0.43	0.02	0.47	0.33	
			95th Percentile Queue (m)	25.4	6.1	27.2	6	25.4	0	
	2022 Concept Combined 2027	AM	Level of Service	B	A	A	A	A	A	A / 9.5
			Delay (s)	13.9	5.6	9.7	7.8	8.9	2.8	
			V/C Ratio	0.53	0.02	0.35	0.02	0.25	0.15	
			95th Percentile Queue (m)	24.1	7.9	27.8	7	27.1	0	
		PM	Level of Service	C	A	B	A	B	A	B / 13.6
			Delay (s)	22.6	6.3	12.7	8.4	14.1	3.2	
			V/C Ratio	0.74	0.02	0.49	0.02	0.58	0.37	
			95th Percentile Queue (m)	27.7	5.8	31.1	4.8	32.6	3.9	
	2003 Concept Combined 2037	AM	Level of Service	B	A	A	A	A	A	A / 8.6
			Delay (s)	12.6	5.2	8.6	7.2	8.3	2.7	
			V/C Ratio	0.47	0.03	0.31	0.02	0.25	0.14	
			95th Percentile Queue (m)	21.2	7.2	20.2	5.5	18.2	0	
		PM	Level of Service	B	A	B	A	B	A	B / 12.3
			Delay (s)	19.4	6	12.2	8.3	12.9	3	
			V/C Ratio	0.69	0.03	0.49	0.02	0.54	0.32	
			95th Percentile Queue (m)	27.1	6.9	26.4	7.3	24.7	0	
	2022 Concept Combined 2037	AM	Level of Service	B	A	B	A	A	A	A / 9.8
			Delay (s)	14.3	5.5	10	7.8	9.1	2.8	
			V/C Ratio	0.54	0.03	0.39	0.02	0.29	0.15	
			95th Percentile Queue (m)	25	7.6	30.7	9.5	23.6	0	
		PM	Level of Service	C	A	B	A	B	A	B / 14.6
			Delay (s)	24.7	6.9	13	8.5	15.1	3	
			V/C Ratio	0.76	0.03	0.54	0.03	0.63	0.36	
			95th Percentile Queue (m)	31.8	6.4	35.7	7.4	33.8	0	

The intersection of Clarence Avenue and Cartwright Street is expected to operate acceptably as a signalized intersection for all horizons with existing lane geometry. The intersection is expected to operate at LOS A during the morning peak hour and LOS B during the afternoon peak hour with all movements operating at LOS C or better. The highest v/c ratio expected is 0.76 for the eastbound movement during the afternoon peak hour under the 2022 Concept Plan 2037 horizon. The longest 95th percentile queue length expected is 36 m in the northbound direction during the afternoon peak hour under the same concept plan and time period. These queue lengths can be accommodated within the existing roadway network and turn bay lengths.

5.5 ROADWAY CLASSIFICATIONS

Recommended classification for the study roadways was determined based on the City of Saskatoon *New Neighbourhood Design and Development Standards Manual*, Section Eight (Transportation). The recommendations are based mainly on Annual Average Daily Traffic (AADT), but also were developed considering the roadway purpose and level of access. The daily traffic volumes and design speeds that are used by the City to establish road classification are shown in **Table 5-13**.

Table 5-13: City of Saskatoon Road Classification Criteria

Street Classification	Typical Daily Service Volume (veh/day)	Posted Speed (Maximum)	Design Speed (above posted speed)
Freeway/Expressway	>10,000 / >20,000	90 kph	+20 kph
Arterial	5,000 – 25,000	70 kph	+10 kph
Collector	5,000 – 10,000	50 kph	+10 kph
Local	1,000 – 5,000	50 kph	+10 kph
Lane	500 – 1,000	20 kph	+10 kph

Table 3-1: Daily Service Volumes and Design Speeds, from City of Saskatoon New Neighbourhood Design and Development Standards Manual, Section Eight

To calculate the expected AADT volumes for the study roadways, the ratio between the daily and peak hour volumes counted at the intersection of Clarence Avenue and Cartwright Street were utilized for non-highway roadways. For Highway 219, the MoH provided K factor of 0.12 was utilized.

The resulting approximate AADT for the Access A roadway is 2,000 vpd. For Access C, the internal collector, the projected AADT ranges between 630 and 1,810 vpd depending on location. This would suggest all internal roadways could be classified as local roadways based on their projected daily traffic volumes. However, given that Access A and the Access C internal roadway serve a collector function, and both roadways may be designated as transit routes in the future, it is considered appropriate to designate these roadways as collectors with a design speed of 60 km/h and a posted speed of 50 km/h.

5.6 HIGHWAY 219 SPEED LIMITS

The current speed limits on Highway 219 are 60 km/h north of Cartwright Street (on Lorne Avenue), 80 km/h between Cartwright Street and the approximate location of proposed Access A, and 100 km/h south of Access A.

With the proposed construction of Access A and residential development along the east side of Highway 219 it is considered prudent to review posted speed limits along Highway 219 adjacent to the Willows development to improve safety along that corridor. Stantec considered the following when completing this review:

- Highway 219 falls under the jurisdiction of the Ministry of Highways (MoH). MoH's Design Manual was consulted for guidelines on speed limits and speed zones (DM 2130). It is important that speed limits are not set too low, as this can cause problems in terms of monitoring and does not ensure compliance.
- Development along the east side of Highway 219, the construction of Access A, and the signalization of the intersection of Cartwright Street with Lorne Avenue will contribute to an increasingly urban character of the area.
- The signalized intersection of Lorne Avenue and Cartwright Street will be the first signalized intersection for northbound vehicles entering Saskatoon along Highway 219. A reduction in speed in advance of the signalized intersection would be appropriate.
- Traffic characteristics will be altered as a new intersection at Access A is introduced. With the new turning movements, there is a greater risk for collisions.
- Northbound traffic entering Highway 219 from Access A may not accelerate to highway speed in anticipation of the signalized intersection at Cartwright Street.
- Pedestrian traffic along Highway 219 may increase with the proposed development. However pedestrian crossings of Highway 219 are not expected.
- The Highway 219 corridor is frequented by cyclists who use the highway for athletic training. This poses a potential safety concern that could be impacted by additional traffic generated by this development.

In order to be effective, speed limits must be safe, enforceable, accepted by the majority of road users, and consistent. Lower vehicle speeds reduce the stopping distance, reduce the severity of accidents, and communicate relevant information to the driver, such as indicating the change in the surrounding land use and the relative risk.

Considering the above, the following changes are proposed to speed limits on Highway 219 at the time Access A is constructed:

- Relocate the speed reduction to 80 km/hr south to align with the southern extent of the Willows development, indicating to drivers a change in road character and increasing urbanization.
- Relocate the speed reduction to 60 km/hr south just beyond the Access A intersection, further indicating the increasingly urban character, the increased potential for entering vehicles, and the potential for pedestrian and cyclists to be present.

Figure 5.1 shows the existing and proposed speed limits.

EXISTING

PROPOSED

N

LEGEND

- 100 KM/H
- 80 KM/H
- 60 KM/H

Stantec

Stantec Consulting Ltd.
100-75 24th Street East
Saskatoon, Saskatchewan

THE WILLOWS
Traffic Impact Assessment

FIGURE No. **5.1**

EXISTING AND PROPOSED HIGHWAY 219
SPEED LIMITS

6.0 HIGHWAY 219 AND ACCESS A INTERSECTION

Saskatchewan Ministry of Highways (MoH) intersection treatment warrants are provided as a guideline for assisting in the determination of an appropriate geometry for intersections with Saskatchewan's highway network. The intersection of Highway 219 with Access A will be located within MoH right-of-way. Intersection treatment warrants and lighting warrants were considered for the intersection of Highway 219 and Access A. All warrants are provided in **Appendix D**.

In order to calculate the peak hour traffic volumes at the intersection of Highway 219 with Access A for the completion of MoH intersection treatment warrants, the following methodology was utilized. The design hour volumes (DHV) and passenger car equivalents for the study intersection were calculated as described in the section SKS 2.3.1-C in the MoH Geometric Design Guide Supplement. According to the MoH, the K factor for Highway 219 is 0.12. The four-day correction factor (CF) for the week of the traffic counts was 0.78. The percent of AADT (%AADT) factor applied to the counted traffic volume (N) for the counted hours was taken from the hourly distribution for Regional Commuter Highways. These factors were used to calculate the DHV as shown in Equation 1. The E-factor used to convert the DHV to passenger car equivalent (PCE) was 1.7, applied to the volume of heavy vehicles.

Equation 1: $$DHV = K \times CF \times \left(\frac{N}{\sum \%AADT}\right)$$

The 2037 PCE traffic volumes for the intersection of Highway 219 and Access A are shown in **Figure 6.1**.

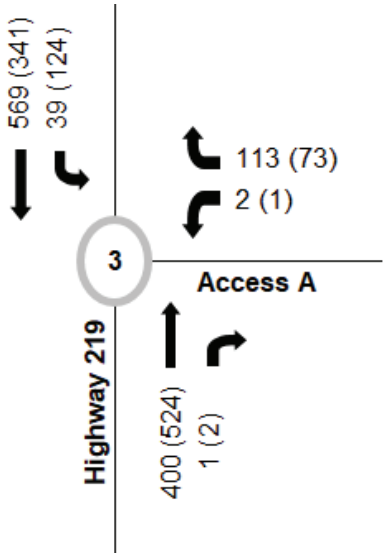

Figure 6.1: 2037 Combined PCE Traffic Volumes - AM (PM)

6.1 INTERSECTION TREATMENT WARRANTS

MoH warrants for delineation lighting, area lighting, a right turn lane, a channelization treatment, and acceleration lanes were completed. The warrants were completed using the 2037 combined scenario PCE traffic volumes shown in **Figure 6.1**.

As this intersection does not currently exist, there are no existing intersection treatments or lighting. However, there are currently two southbound lanes on Highway 219 which merge down to one southbound lane just north of the proposed Access A location.

6.1.1 Delineation Lighting

Delineation lighting is warranted at highway intersections when the intersecting roadway traffic AADT volume is greater than 150. The AADT on Access A is 2,000 vpd for the 2037 horizon. Therefore, delineation lighting will be warranted at this intersection.

6.1.2 Area Lighting

Area lighting is warranted if:

The average AADT of the primary Highway exceeds 1,500 AADT and the intersecting highway exceeds 1,000 AADT on average;

> The AADT of Highway 219 is projected to be 8,042 vpd at the 2037 horizon. Therefore, the highway AADT exceeds 1,500 for the primary highway. The AADT on Access A is 2,000 vpd for the 2037 horizon scenario. The AADT on the intersecting roadway is over 1,000 AADT and therefore this is met and area intersection lighting will be warranted.

There is a raised channelization of median curb with an 85th percentile speed greater or equal than 60 km/h;

> There is no raised channelization or median curb at either intersection. Therefore, the area lighting is not warranted on this criterion.

The accident rate is greater than or equal to 1.5 accidents / million entering vehicles and the primary highway volume is greater than or equal to 1,000 AADT.

> As this intersection does not currently exist, there are no collisions in the TAIS database for the intersection, therefore this criterion is not met.

6.1.3 Warrant for Right-Turn Lane

A right-turn lane warrant was completed for the northbound direction at the study intersection. According to SP 20614 in the MoH Design Manual, a right-turn lane is warranted if:

The calculated point falls to the right of the line on the graph;

For the 2037 horizon, due to the volume advancing being greater than 300, the plotted points falls beyond the extents of the warrant chart. This results in the warrant being inconclusive. However, with the low right turn volume being 1 vehicle in the morning peak hour and 2 vehicles in the afternoon peak hour and the resulting small R value, it is extrapolated that a right turn lane would not be warranted. For completeness, the remaining criteria were reviewed for a right turn lane at this intersection.

The right-turn lanes are warranted at the following locations:

Intersections with other Provincial Highways;

The crossroad is not a provincial highway, therefore the warrant is not met on this criterion.

Provincial Campground and Picnic Sites.

The warrant is not met on this criterion.

Industrial Access Roads.

The warrant is not met on this criterion.

Therefore, a northbound right turn lane is not warranted at the intersection of Highway 219 and Access A.

6.1.4 Warrant for a Channelization Lane

Warrants were completed for a southbound channelization lane at the study intersection which would provide a left turn lane for southbound vehicles with a painted median. According to MoH SP 20611, a channelization lane is warranted if the plotted point falls to the right of applicable “L” line. No warrant if L is less than 0.05. MoH Standard Plan 20619 outlining the geometry for a channelized intersection treatment is included in **Appendix D**.

For the 2037 horizon, L was calculated to be 0.06 for the morning peak hour and 0.27 for the afternoon peak hour. Similar to the right turn lane warrant, the high through traffic volumes result in the plotted point falling beyond the extents of the warrant chart. However, it can be more easily extrapolated that the plotted point falls to the right of the warrant line for both the morning and afternoon peak hours, indicating a channelization treatment is warranted.

6.1.5 Acceleration Lane Considerations

There is no formal warrant for an acceleration lane, however some guidance is provided in MoH SKS 2.3.5-F. MoH begins to evaluate the need for acceleration lanes when the LOS reaches level D. However, just because LOS at an intersection reaches D, it does not mean that the acceleration lane is immediately recommended.

At the study intersection, the highest movement LOS is LOS B for the 2037 horizon, therefore acceleration lanes are not recommended.

6.1.6 Warrant Summary

Table 6-1 shows the summary of warranted and not warranted intersection treatments at Highway 219 and Access A.

Table 6-1: Intersection Warrant Summary

Intersection Treatment Warrant	Warrant Result
Delineation Lighting	Warranted
Area Lighting	Warranted
Right Turn Lane	Not Warranted
Channelization	Warranted
Acceleration Lane	Not Warranted

The warrant for Channelized Intersections (SP 20611) was found to be met. Although channelization warrant criteria is met for the intersection, a bypass lane may be more appropriate at this location due to upstream intersection spacing. A bypass intersection treatment is approximately 150 m shorter than a channelization intersection treatment and will reduce conflicts with the upstream intersections. The installation of a bypass treatment could be accomplished by extending the existing second southbound lane past Access A and installing the downstream taper as per MoH Standard Plan 20620. MoH Standard Plan 20620 is included in **Appendix D**.

Intersection area lighting is warranted at the intersection of Highway 219 and Access A.

6.2 ACCESS MANAGEMENT

Access A is proposed approximately 570 m south of Cartwright Street. The Ministry of Highways has indicated this access point will be allowed and if/when the parcel along the west side of Highway 219 develops, its access will be installed at the same location to form a four-leg intersection.

A second access onto Highway 219 from the Willows, south of Access A, will not be permitted at this time. However, long range plans for this roadway include the conversion of the roadway to a more urban character. This means there could be potential for a second access onto Highway 219 to be permitted in the future.

7.0 ALTERNATIVE MODES

7.1 TRANSIT

There are no transit lines which currently pass through the development. The closest routes are Routes 1 and 17. Route 1 connects on Lorne Avenue & Melville Street, which would require a 1.7 km walk from Cartwright Terrace. Route 17 connects at Clarence Avenue & Stonebridge Boulevard, which requires an 0.8 km walk from the Wentworth and Waterford communities.

Logical future transit routes serving the Willows may include Cartwright Street, the Access C internal roadway, and Clarence Avenue.

7.2 ACTIVE TRANSPORTATION

An active transportation plan is included in the concept plan amendment report for the development. It outlines locations of pathways and sidewalks as well as pedestrian crossings. The recreational character of the development is maintained through the provision of a pathway network linking the many open green spaces. Pedestrians within the development will be accommodated on sidewalks provided on both sides of the proposed development roadways and the existing walks along Cartwright Street as well as the significant pathway network throughout the development.

To maintain system connectivity, pedestrian crossings are proposed at the locations where the proposed pathway crosses the collector roadways within the development including the Access A and Access C internal roadways and Cartwright Street. The crossing treatment for these locations was reviewed as per the TAC Pedestrian Crossing Control Guide. The ADT on the internal roadway network is less than 4,500. With a speed limit of 50 km/h or less, and two lanes of traffic, a GM treatment is warranted for the crossings.

A GM treatment includes side mounted RA-4 signage on both sides of the roadway, twin parallel line crosswalk markings, and stopping prohibition for 15 m approaching the crossing and 10 m following the crossing. Where sight lines are limited, it may also be prudent to install an advance warning sign such as the WC-2 on both sides of the roadway. The pedestrian crossing signs are shown in **Figure 7.1**.

Figure 7.1: Crosswalk Signage

In addition to the existing pedestrian crossings along Cartwright Street, raised crosswalks are proposed at four locations along Cartwright Street as noted in Section 7.3.

Connections to the active transportation network outside of the proposed development will be provided along Clarence Avenue and Lorne Avenue. There is an existing sidewalk along the west side of Clarence Avenue which provides connectivity to the mixed use development to the north. Also included with the development is a proposed pathway along the north side of Cartwright Street and the east side of Lorne Avenue which will connect to the existing pathway network along Lorne Avenue at Melville Street.

7.3 TRAFFIC CALMING

Current residents of the Willows development have voiced concern of short cutting through the neighbourhood when a train is crossing Lorne Avenue north of Cartwright Street. To address this concern, potential traffic calming strategies which reduce traffic volumes, meaning they discourage the use of the roadway for shortcutting, were reviewed. A horizontal deflection with a median around a curve already exists on Cartwright Street north of Cartwright Terrace where the advisory speed for the curve is 30 km/h. Traffic calming installations noted in the TAC Guide to Traffic Calming as having a substantial benefit or minor benefit on reducing traffic volumes are as follows:

Substantial benefit:

- Chicane (one-lane)
- Directional closure
- Diverter
- Full closure
- Raised median through intersection
- Right-in/right-out island

Minor benefit

- Speed cushion
- Speed hump/table
- Traffic circle/mini roundabout
- Intersection channelization

It is understood that it is not desirable to reduce the access along Cartwright Street as this would impact access for residents in addition to those shortcutting through the neighbourhood. With that in mind, the only traffic calming options which do not reduce access are the one-lane chicane, speed cushion, speed hump/table, and traffic circle/mini roundabout.

A speed hump/table could be installed at a location which coincides with pedestrian desire lines so the installation also provides benefit for pedestrians as a raised crosswalk. The Concept Plan includes four raised cross walks throughout the development to provide traffic calming and enhanced pedestrian accommodation.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 SUMMARY OF ANALYSIS RESULTS

Based on the analysis conducted, the proposed roadway network, with the exception of the Cartwright Street and Lorne Avenue, and Cartwright Street and Clarence Avenue intersections, is capable of accommodating the vehicular traffic volumes generated by the proposed development at the analysis horizon years.

8.1.1 Cartwright Street and Lorne Avenue

Based on the traffic analysis performed, the following remarks regarding the impact of the proposed development on the intersection of Cartwright Street and Lorne Avenue are provided:

- Under eastbound and westbound stop sign control:
    - Existing 2022 traffic volumes show that the eastbound movement exceeds acceptable delays during the afternoon peak hour.
    - 2003 Willows Concept Plan projected volumes show that the eastbound movement and the intersection exceed acceptable delays during the afternoon peak hour during the 2027 and 2037 horizons.
    - 2022 Willows Concept Plan projected volumes show that the eastbound movement and the intersection exceed acceptable delays during the afternoon peak hour during the 2027 and 2037 horizons.
    - 2003 and 2022 Concept Plan projected volumes show that the westbound movement exceed acceptable delays during the afternoon peak hour during the 2027 and 2037 horizons.
- TAC Signal warrant points are not met at this intersection for the 2037 horizon for either the 2003 or 2022 Concept Plans.
- Once signalized, all measures of effectiveness reach satisfactory levels for both the 2003 and 2022 Concept Plans.
- There are no recommendation differences between the 2003 and 2022 Concept Plans for this intersection.

8.1.2 Cartwright Street and Clarence Avenue

Based on the traffic analysis performed, the following remarks regarding the impact of the proposed development on the intersection of Cartwright Street and Clarence Avenue are provided:

- Under eastbound and westbound stop sign control:
    - Existing 2022 traffic volumes show that all movements and the intersection operate at acceptable levels during the morning and afternoon peak hours.

- 2003 Willows Concept Plan projected volumes show that the eastbound movement exceeds acceptable delays during the afternoon peak hour during the 2027 and 2037 horizons.
- 2022 Willows Concept Plan projected volumes show that the eastbound movement exceeds acceptable delays during the afternoon peak hour during the 2027 and 2037 horizons and that the intersection exceeds acceptable delays during the afternoon peak hour during 2037 horizon.

- TAC Signal warrant points are not met at this intersection for the 2003 and 2022 Concept Plans under the 2027 and 2037 horizons.
- Once signalized, all measures of effectiveness reach satisfactory levels for both the 2003 and 2022 Concept Plans.
- There are no recommendation differences between the 2003 and 2022 Concept Plans for this intersection.

8.1.3 Highway 219 and Access A

The following remarks regarding the impact of the proposed development on **Highway 219**:

- The intersection of Access A with Highway 219 be constructed as an all-directional intersection.
- A right turn lane is not warranted for Access A and Highway 219.
- A southbound channelization treatment is warranted at Highway 219 and Access A. Given the existing geometry and access spacing north of the intersection, it is recommended to extend the second southbound lane to create a bypass treatment at this intersection.
- Access A and Highway 219 qualify for area intersection illumination.
- With the increasing urbanization, increase in turning movements, and the addition of a signalized intersection at Cartwright Street, there are safety benefits to extending the 60 km/h speed limit south of Access A and the 80 km/h speed limit to the south development edge.

8.2 RECOMMENDATIONS

It is recommended:

1) That traffic signals be installed at Clarence Avenue and Cartwright Street at or prior to the 2027 horizon.
2) That traffic signals be installed at Lorne Avenue and Cartwright Street at or prior to the 2027 horizon.
    a. That the Highway 219 and Access A intersection be constructed as an all-directional access with a southbound left turn bypass treatment and area intersection lighting. The installation of the bypass treatment could be accomplished by extending the existing second southbound lane past Access A and installing the downstream taper as per MoH Standard Plan 20620.
3) Access A and the Access C internal roadway be classified as collector roadways with a design speed of 60 km/h and a posted speed of 50 km/h.

4) That the posted speed limits on Highway 219 be reduced to:
    a. the speed limit be changed to 80 km/h where the development abuts Highway 219.
    b. the speed limit be changed to 60 km/h on Highway 219 south of Cartwright Street to just south of the Access A location.
5) GM pedestrian crossing be installed at locations where the pathway system crosses the collector roadways within the proposed development.

Appendix A TRAFFIC COUNT DATA

Stantec Consulting Ltd.
300 - 1919 Rose St

Regina, Saskatchewan, Canada S4P 3P1
[redacted]@stantec.com

Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022

Turning Movement Data

Start Time	Lorne Avenue Southbound					Cartwright Street Westbound					Highway 219 Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	7	23	2	0	32	0	3	2	0	5	1	14	1	0	16	0	0	3	0	3	56
7:15 AM	7	36	3	0	46	4	5	2	0	11	0	27	0	0	27	0	1	2	0	3	87
7:30 AM	5	34	3	0	42	5	6	7	0	18	0	26	0	0	26	0	3	2	0	5	91
7:45 AM	16	46	5	0	67	9	4	2	0	15	0	38	0	0	38	0	0	9	0	9	129
Hourly Total	35	139	13	0	187	18	18	13	0	49	1	105	1	0	107	0	4	16	0	20	363
8:00 AM	13	66	1	0	80	6	6	1	0	13	1	38	0	0	39	0	0	8	0	8	140
8:15 AM	19	62	6	0	87	3	3	3	0	9	2	38	1	0	41	0	4	7	0	11	148
8:30 AM	13	45	5	0	63	6	4	2	0	12	3	43	0	0	46	0	1	5	0	6	127
8:45 AM	7	36	5	0	48	3	4	2	0	9	5	39	1	0	45	0	5	8	0	13	115
Hourly Total	52	209	17	0	278	18	17	8	0	43	11	158	2	0	171	0	10	28	0	38	530
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	9	50	7	0	66	2	5	2	0	9	4	62	1	0	67	1	8	6	0	15	157
4:15 PM	13	57	14	0	84	7	4	3	0	14	5	60	1	0	66	0	7	11	0	18	182
4:30 PM	7	57	6	0	70	4	3	1	0	8	3	94	0	0	97	0	2	17	0	19	194
4:45 PM	14	50	14	0	78	5	0	2	0	7	6	81	0	0	87	1	8	11	0	20	192
Hourly Total	43	214	41	0	298	18	12	8	0	38	18	297	2	0	317	2	25	45	0	72	725
5:00 PM	21	51	6	1	79	6	2	4	0	12	3	92	0	0	95	0	0	10	0	10	196
5:15 PM	16	50	7	0	73	4	6	1	0	11	2	72	0	0	74	0	3	8	0	11	169
5:30 PM	15	59	5	0	79	6	7	1	0	14	5	55	0	0	60	0	1	9	0	10	163
5:45 PM	9	45	5	0	59	2	2	1	0	5	2	55	1	1	59	0	1	19	0	20	143
Hourly Total	61	205	23	1	290	18	17	7	0	42	12	274	1	1	288	0	5	46	0	51	671
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	191	767	94	1	1053	72	64	36	0	172	42	834	6	1	883	2	44	135	0	181	2289
Approach %	18.1	72.8	8.9	0.1	-	41.9	37.2	20.9	0.0	-	4.8	94.5	0.7	0.1	-	1.1	24.3	74.6	0.0	-	-
Total %	8.3	33.5	4.1	0.0	46.0	3.1	2.8	1.6	0.0	7.5	1.8	36.4	0.3	0.0	38.6	0.1	1.9	5.9	0.0	7.9	-
Lights	186	739	92	1	1018	71	64	35	0	170	42	803	6	1	852	2	44	130	0	176	2216
% Lights	97.4	96.3	97.9	100.0	96.7	98.6	100.0	97.2	-	98.8	100.0	96.3	100.0	100.0	96.5	100.0	100.0	96.3	-	97.2	96.8
Other Vehicles	5	28	2	0	35	1	0	1	0	2	0	31	0	0	31	0	0	5	0	5	73
% Other Vehicles	2.6	3.7	2.1	0.0	3.3	1.4	0.0	2.8	-	1.2	0.0	3.7	0.0	0.0	3.5	0.0	0.0	3.7	-	2.8	3.2

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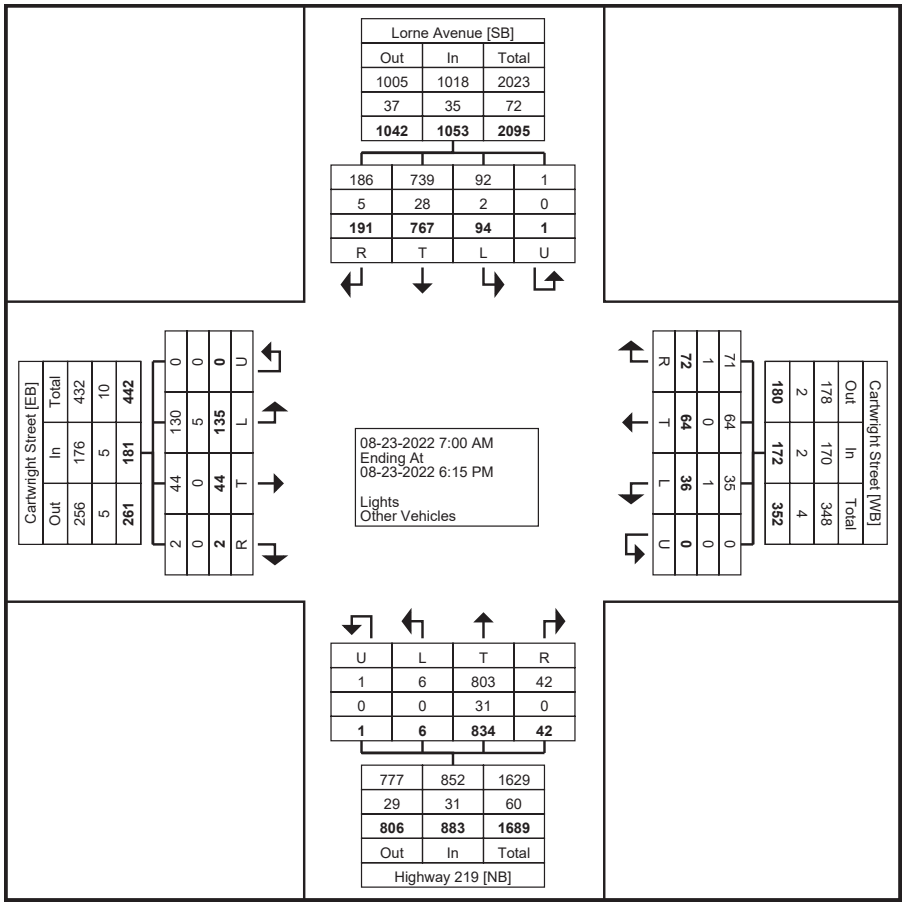
Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022



Turning Movement Data Plot

Stantec Consulting Ltd.
300 - 1919 Rose St

Regina, Saskatchewan, Canada S4P 3P1
[redacted]@stantec.com

Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Lorne Avenue Southbound					Cartwright Street Westbound					Highway 219 Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:45 AM	16	46	5	0	67	9	4	2	0	15	0	38	0	0	38	0	0	9	0	9	129
8:00 AM	13	66	1	0	80	6	6	1	0	13	1	38	0	0	39	0	0	8	0	8	140
8:15 AM	19	62	6	0	87	3	3	3	0	9	2	38	1	0	41	0	4	7	0	11	148
8:30 AM	13	45	5	0	63	6	4	2	0	12	3	43	0	0	46	0	1	5	0	6	127
Total	61	219	17	0	297	24	17	8	0	49	6	157	1	0	164	0	5	29	0	34	544
Approach %	20.5	73.7	5.7	0.0	-	49.0	34.7	16.3	0.0	-	3.7	95.7	0.6	0.0	-	0.0	14.7	85.3	0.0	-	-
Total %	11.2	40.3	3.1	0.0	54.6	4.4	3.1	1.5	0.0	9.0	1.1	28.9	0.2	0.0	30.1	0.0	0.9	5.3	0.0	6.3	-
PHF	0.803	0.830	0.708	0.000	0.853	0.667	0.708	0.667	0.000	0.817	0.500	0.913	0.250	0.000	0.891	0.000	0.313	0.806	0.000	0.773	0.919
Lights	59	206	17	0	282	24	17	7	0	48	6	152	1	0	159	0	5	25	0	30	519
% Lights	96.7	94.1	100.0	-	94.9	100.0	100.0	87.5	-	98.0	100.0	96.8	100.0	-	97.0	-	100.0	86.2	-	88.2	95.4
Other Vehicles	2	13	0	0	15	0	0	1	0	1	0	5	0	0	5	0	0	4	0	4	25
% Other Vehicles	3.3	5.9	0.0	-	5.1	0.0	0.0	12.5	-	2.0	0.0	3.2	0.0	-	3.0	-	0.0	13.8	-	11.8	4.6

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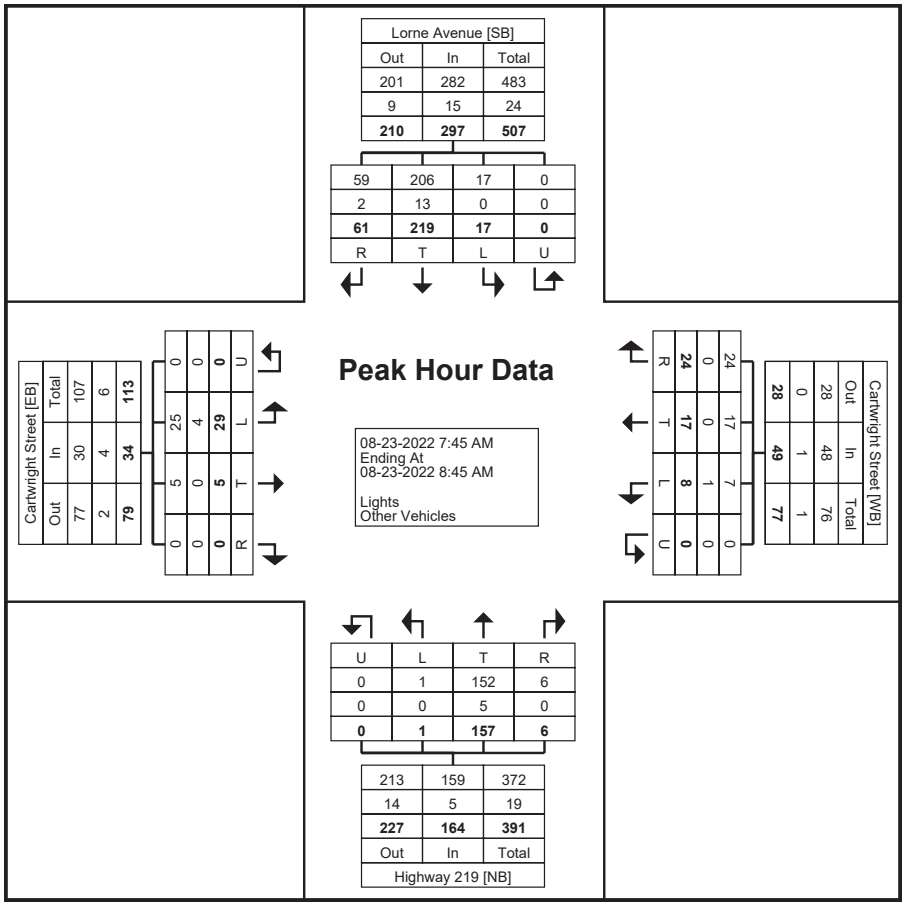
Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022



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

Stantec Consulting Ltd.
300 - 1919 Rose St

Regina, Saskatchewan, Canada S4P 3P1
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Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Lorne Avenue Southbound					Cartwright Street Westbound					Highway 219 Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:15 PM	13	57	14	0	84	7	4	3	0	14	5	60	1	0	66	0	7	11	0	18	182
4:30 PM	7	57	6	0	70	4	3	1	0	8	3	94	0	0	97	0	2	17	0	19	194
4:45 PM	14	50	14	0	78	5	0	2	0	7	6	81	0	0	87	1	8	11	0	20	192
5:00 PM	21	51	6	1	79	6	2	4	0	12	3	92	0	0	95	0	0	10	0	10	196
Total	55	215	40	1	311	22	9	10	0	41	17	327	1	0	345	1	17	49	0	67	764
Approach %	17.7	69.1	12.9	0.3	-	53.7	22.0	24.4	0.0	-	4.9	94.8	0.3	0.0	-	1.5	25.4	73.1	0.0	-	-
Total %	7.2	28.1	5.2	0.1	40.7	2.9	1.2	1.3	0.0	5.4	2.2	42.8	0.1	0.0	45.2	0.1	2.2	6.4	0.0	8.8	-
PHF	0.655	0.943	0.714	0.250	0.926	0.786	0.563	0.625	0.000	0.732	0.708	0.870	0.250	0.000	0.889	0.250	0.531	0.721	0.000	0.838	0.974
Lights	55	209	40	1	305	22	9	10	0	41	17	314	1	0	332	1	17	49	0	67	745
% Lights	100.0	97.2	100.0	100.0	98.1	100.0	100.0	100.0	-	100.0	100.0	96.0	100.0	-	96.2	100.0	100.0	100.0	-	100.0	97.5
Other Vehicles	0	6	0	0	6	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	19
% Other Vehicles	0.0	2.8	0.0	0.0	1.9	0.0	0.0	0.0	-	0.0	0.0	4.0	0.0	-	3.8	0.0	0.0	0.0	-	0.0	2.5

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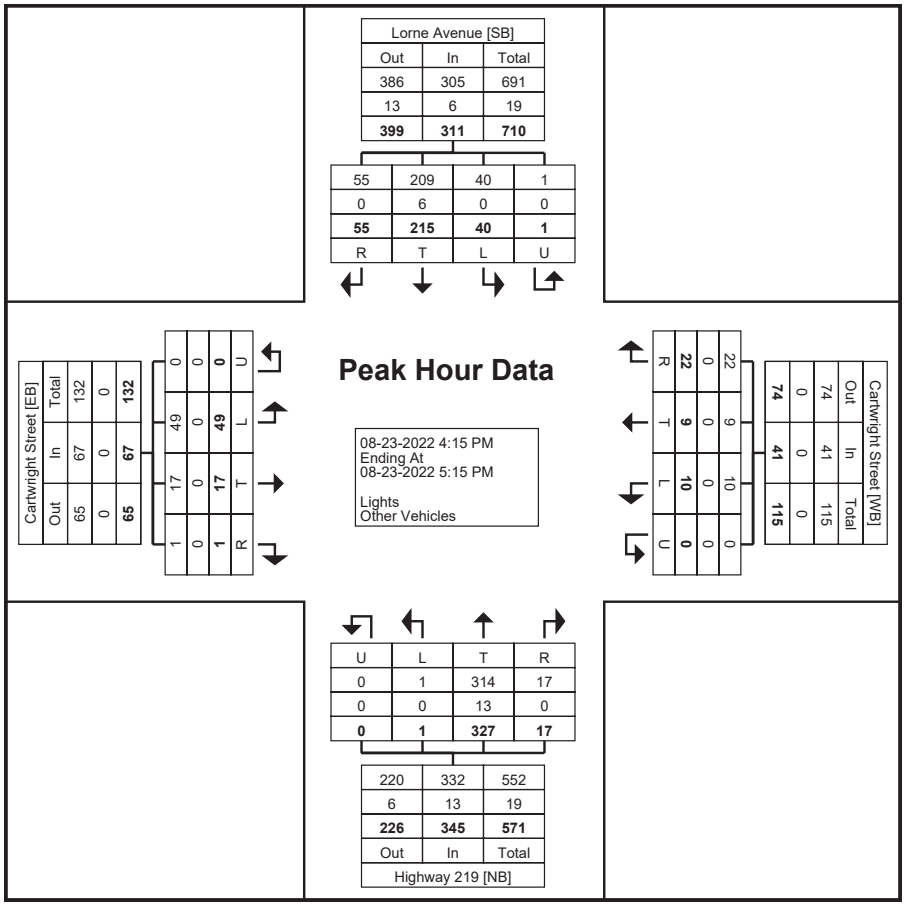
Count Name: Lorne Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-23-2022



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

Intersection: **Clubhouse** (North/South Road) **&** **Cartwright Street** (East/West Road)

Date of Count:

RAW DATA

		Clubhouse Northeastbound			Cartwright Street Southbound			Cartwright Street Westbound			Parking Lot Southwestbound			**Total Vehicles in Intersection**
Start Time		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
6:30 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
6:45 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
7:00 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
7:15 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
7:30 AM	cars	0	0	0	0	7	0	3	12	0	0	0	0	
	trucks/buses					1								
	total	0	0	0	0	8	0	3	12	0	0	0	0	23
	% trucks		#DIV/0!			12.5%			0.0%			#DIV/0!		4.3%
7:45 AM	cars	1	0	0	0	7	1	1	1	0	0	0	0	
	trucks/buses													
	total	1	0	0	0	7	1	1	1	0	0	0	0	11
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
8:00 AM	cars	0	0	0	0	5	2	2	5	1	0	0	1	
	trucks/buses													
	total	0	0	0	0	5	2	2	5	1	0	0	1	16
	% trucks		#DIV/0!			0.0%			0.0%			0.0%		0.0%
8:15 AM	cars	0	0	0	0	5	0	6	11	0	0	0	0	
	trucks/buses													
	total	0	0	0	0	5	0	6	11	0	0	0	0	22
	% trucks		#DIV/0!			0.0%			0.0%			#DIV/0!		0.0%
8:30 AM	cars	0	0	0	0	8	2	2	6	0	0	0	0	
	trucks/buses													
	total	0	0	0	0	8	2	2	6	0	0	0	0	18
	% trucks		#DIV/0!			0.0%			0.0%			#DIV/0!		0.0%
8:45 AM	cars	0	0	0	0	12	0	4	13	0	0	0	0	
	trucks/buses													
	total	0	0	0	0	12	0	4	13	0	0	0	0	29
	% trucks		#DIV/0!			0.0%			0.0%			#DIV/0!		0.0%
9:00 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
9:15 AM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!

HOURLY VOLUMES

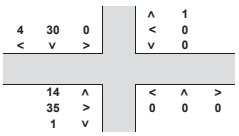
6:30-7:30 AM	cars	0	0	0	0	0	0	0	0	0	0	0	0	
6:30-7:30 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
6:30-7:30 AM	**TOTAL VEHICLE**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
6:45-7:45 AM	cars	0	0	0	0	7	0	3	12	0	0	0	0	
6:45-7:45 AM	trucks/buses	0	0	0	0	1	0	0	0	0	0	0	0	
6:45-7:45 AM	**TOTAL VEHICLE**	**0**	**0**	**0**	**0**	**8**	**0**	**3**	**12**	**0**	**0**	**0**	**0**	**23**
	% trucks		#DIV/0!			12.5%			0.0%			#DIV/0!		4.3%
7:00-8:00 AM	cars	1	0	0	0	14	1	4	13	0	0	0	0	
7:00-8:00 AM	trucks/buses	0	0	0	0	1	0	0	0	0	0	0	0	
7:00-8:00 AM	**TOTAL VEHICLE**	**1**	**0**	**0**	**0**	**15**	**1**	**4**	**13**	**0**	**0**	**0**	**0**	**34**
	% trucks		0.0%			6.3%			0.0%			#DIV/0!		2.9%
7:15-8:15 AM	cars	1	0	0	0	19	3	6	18	1	0	0	1	
7:15-8:15 AM	trucks/buses	0	0	0	0	1	0	0	0	0	0	0	0	
7:15-8:15 AM	**TOTAL VEHICLE**	**1**	**0**	**0**	**0**	**20**	**3**	**6**	**18**	**1**	**0**	**0**	**1**	**50**
	% trucks		0.0%			4.3%			0.0%			0.0%		2.0%
7:30-8:30 AM	cars	1	0	0	0	24	3	12	29	1	0	0	1	
7:30-8:30 AM	trucks/buses	0	0	0	0	1	0	0	0	0	0	0	0	
7:30-8:30 AM	**TOTAL VEHICLE**	**1**	**0**	**0**	**0**	**25**	**3**	**12**	**29**	**1**	**0**	**0**	**1**	**72**
	% trucks		0.0%			3.6%			0.0%			0.0%		1.4%
7:45-8:45 AM	cars	1	0	0	0	25	5	11	23	1	0	0	1	
7:45-8:45 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
7:45-8:45 AM	**TOTAL VEHICLE**	**1**	**0**	**0**	**0**	**25**	**5**	**11**	**23**	**1**	**0**	**0**	**1**	**67**
	% trucks		0.0%			0.0%			0.0%			0.0%		0.0%
8:00-9:00 AM	cars	0	0	0	0	30	4	14	35	1	0	0	1	
8:00-9:00 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
8:00-9:00 AM	**TOTAL VEHICLE**	**0**	**0**	**0**	**0**	**30**	**4**	**14**	**35**	**1**	**0**	**0**	**1**	**85**
	% trucks		#DIV/0!			0.0%			0.0%			0.0%		0.0%
8:15-9:15 AM	cars	0	0	0	0	25	2	12	30	0	0	0	0	
8:15-9:15 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
8:15-9:15 AM	**TOTAL VEHICLE**	**0**	**0**	**0**	**0**	**25**	**2**	**12**	**30**	**0**	**0**	**0**	**0**	**69**
	% trucks		#DIV/0!			0.0%			0.0%			#DIV/0!		0.0%
8:30-9:30 AM	cars	0	0	0	0	20	2	6	19	0	0	0	0	
8:30-9:30 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
8:30-9:30 AM	**TOTAL VEHICLE**	**0**	**0**	**0**	**0**	**20**	**2**	**6**	**19**	**0**	**0**	**0**	**0**	**47**
	% trucks		#DIV/0!			0.0%			0.0%			#DIV/0!		0.0%

PEAK HOUR: 8:00-9:00 AM

85

PEAK HOUR	cars	0	0	0	0	30	4	14	35	1	0	0	1	
8:00-9:00 AM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
	TOTAL VEHICLE	**0**	**0**	**0**	**0**	**30**	**4**	**14**	**35**	**1**	**0**	**0**	**1**	**85**
	% trucks		#DIV/0!			0.0%			0.0%			0.0%		0.0%
	% trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	PHF	1.00	1.00	1.00	1.00	0.63	0.50	0.58	0.67	0.25	1.00	1.00	0.25	
			1.00			0.71			0.74			0.25		

AM Peak Hour Intersection Volumes



Intersection: **Clubhouse** (North/South Road) **&** **Cartwright Street** (East/West Road)

Date of Count:

RAW DATA

		Clubhouse Northeastbound			Cartwright Street Southbound			Cartwright Street Westbound			Parking Lot Southwestbound			Total Vehicles in Intersection
Start Time		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
3:30 PM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
3:45 PM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
4:00 PM	cars	2	0	1	0	19	4	6	7	1	0	0	0	
	trucks/buses													
	total	2	0	1	0	19	4	6	7	1	0	0	0	40
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:15 PM	cars	1	0	4	0	10	2	8	11	0	0	0	0	
	trucks/buses													
	total	1	0	4	0	10	2	8	11	0	0	0	0	36
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:30 PM	cars	1	0	1	0	15	2	3	12	0	0	0	0	
	trucks/buses													
	total	1	0	1	0	15	2	3	12	0	0	0	0	34
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:45 PM	cars	1	0	3	0	12	1	3	12	0	0	0	0	
	trucks/buses													
	total	1	0	3	0	12	1	3	12	0	0	0	0	32
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:00 PM	cars	1	0	5	0	11	1	6	13	1	0	0	0	
	trucks/buses													
	total	1	0	5	0	11	1	6	13	1	0	0	0	38
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:15 PM	cars	3	0	4	0	13	0	5	15	0	0	0	0	
	trucks/buses													
	total	3	0	4	0	13	0	5	15	0	0	0	0	40
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:30 PM	cars	0	0	5	2	21	0	7	18	1	0	0	0	
	trucks/buses													
	total	0	0	5	2	21	0	7	18	1	0	0	0	54
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:45 PM	cars	0	0	4	0	18	1	5	6	0	0	0	0	
	trucks/buses													
	total	0	0	4	0	18	1	5	6	0	0	0	0	34
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
6:00 PM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!
6:15 PM	cars													
	trucks/buses													
	total	0	0	0	0	0	0	0	0	0	0	0	0	0
	% trucks		#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		#DIV/0!

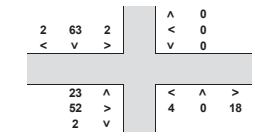
HOURLY VOLUMES

3:30-4:30 PM	cars	3	0	5	0	29	6	14	18	1	0	0	0	
3:30-4:30 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
3:30-4:30 PM	**TOTAL VEHICLE**	**3**	**0**	**5**	**0**	**29**	**6**	**14**	**18**	**1**	**0**	**0**	**0**	**76**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
3:45-4:45 PM	cars	4	0	6	0	44	8	17	30	1	0	0	0	
3:45-4:45 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
3:45-4:45 PM	**TOTAL VEHICLE**	**4**	**0**	**6**	**0**	**44**	**8**	**17**	**30**	**1**	**0**	**0**	**0**	**110**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:00-5:00 PM	cars	5	0	9	0	56	9	20	42	1	0	0	0	
4:00-5:00 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
4:00-5:00 PM	**TOTAL VEHICLE**	**5**	**0**	**9**	**0**	**56**	**9**	**20**	**42**	**1**	**0**	**0**	**0**	**142**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:15-5:15 PM	cars	4	0	13	0	48	6	20	48	1	0	0	0	
4:15-5:15 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
4:15-5:15 PM	**TOTAL VEHICLE**	**4**	**0**	**13**	**0**	**48**	**6**	**20**	**48**	**1**	**0**	**0**	**0**	**140**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:30-5:30 PM	cars	6	0	13	0	51	4	17	52	1	0	0	0	
4:30-5:30 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
4:30-5:30 PM	**TOTAL VEHICLE**	**6**	**0**	**13**	**0**	**51**	**4**	**17**	**52**	**1**	**0**	**0**	**0**	**144**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
4:45-5:45 PM	cars	5	0	17	2	57	2	21	58	2	0	0	0	
4:45-5:45 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
4:45-5:45 PM	**TOTAL VEHICLE**	**5**	**0**	**17**	**2**	**57**	**2**	**21**	**58**	**2**	**0**	**0**	**0**	**164**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:00-6:00 PM	cars	4	0	18	2	63	2	23	52	2	0	0	0	
5:00-6:00 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
5:00-6:00 PM	**TOTAL VEHICLE**	**4**	**0**	**18**	**2**	**63**	**2**	**23**	**52**	**2**	**0**	**0**	**0**	**166**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:15-6:15 PM	cars	3	0	13	2	52	1	17	39	1	0	0	0	
5:15-6:15 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
5:15-6:15 PM	**TOTAL VEHICLE**	**3**	**0**	**13**	**2**	**52**	**1**	**17**	**39**	**1**	**0**	**0**	**0**	**128**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
5:30-6:30 PM	cars	0	0	9	2	39	1	12	24	1	0	0	0	
5:30-6:30 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
5:30-6:30 PM	**TOTAL VEHICLE**	**0**	**0**	**9**	**2**	**39**	**1**	**12**	**24**	**1**	**0**	**0**	**0**	**88**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%

PEAK HOUR: 5:00-6:00 PM

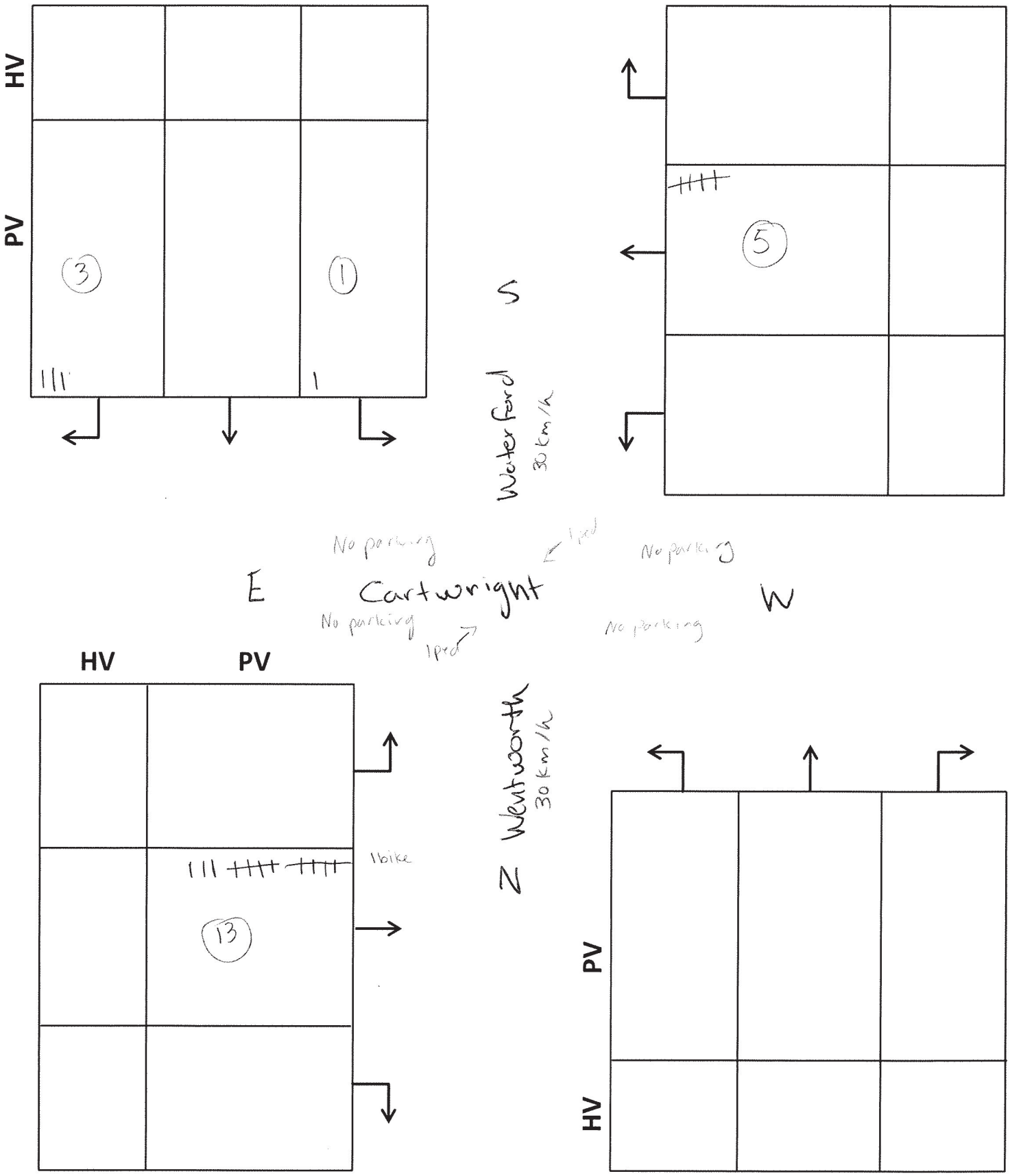
166

PEAK HOUR	cars	4	0	18	2	63	2	23	52	2	0	0	0	
5:00-6:00 PM	trucks/buses	0	0	0	0	0	0	0	0	0	0	0	0	
	TOTAL VEHICLE	**4**	**0**	**18**	**2**	**63**	**2**	**23**	**52**	**2**	**0**	**0**	**0**	**166**
	% trucks		0.0%			0.0%			0.0%			#DIV/0!		0.0%
	% trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	PHF	0.33	1.00	0.90	0.25	0.75	0.50	0.82	0.72	0.50	1.00	1.00	1.00	
			0.79			0.73			0.74			1.00		



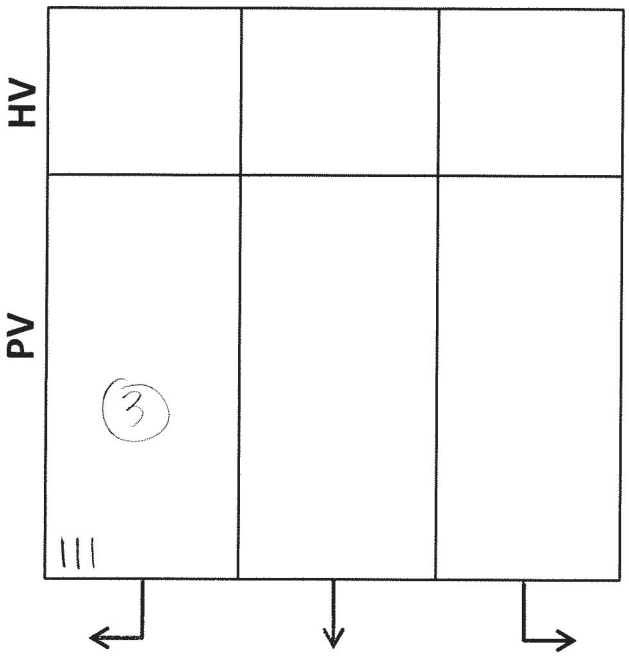
Intersection Traffic Count: Cartwright & Wentworth / Waterford

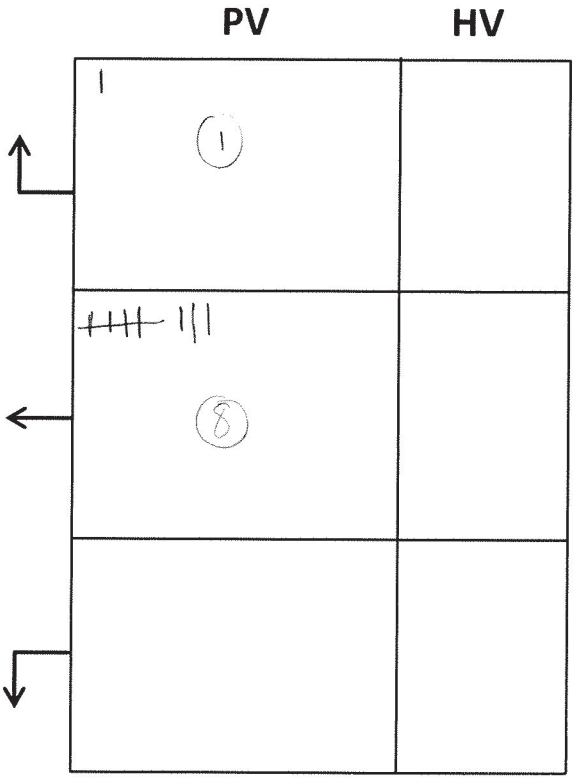
TIME: 7:00 - 7:15 AM

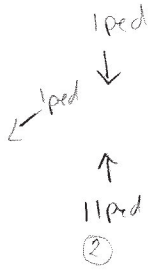


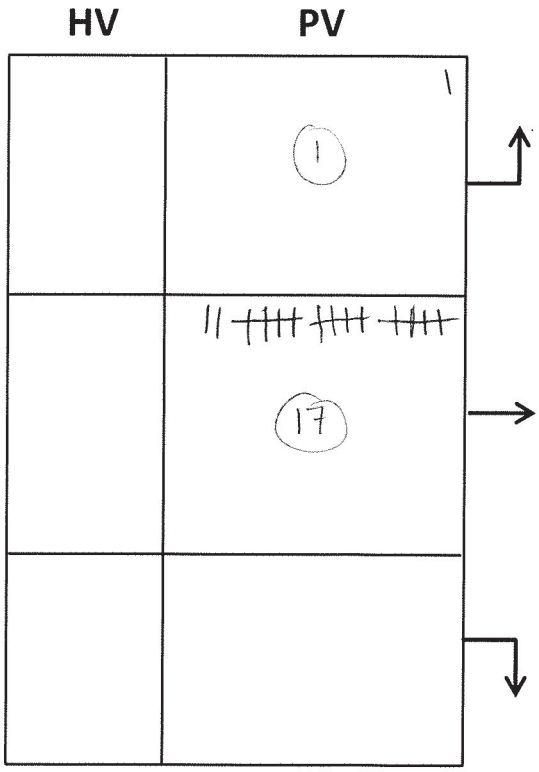
Intersection Traffic Count: _____ & _____

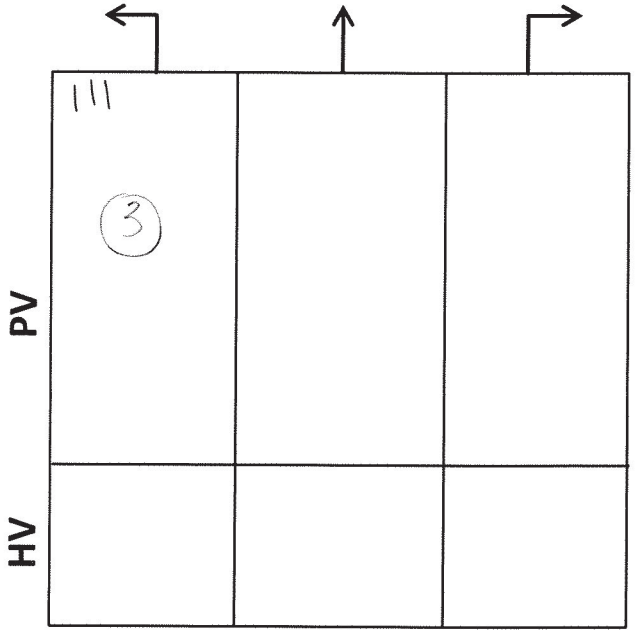
TIME: 7:15 - 7:30AM





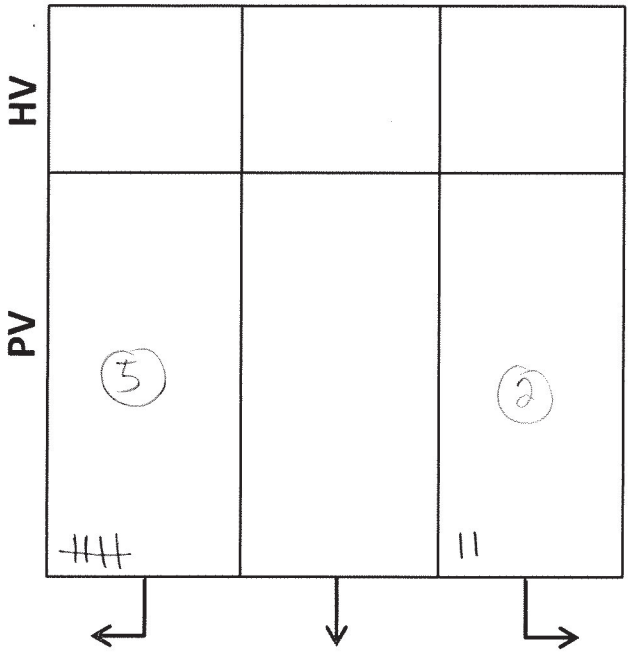


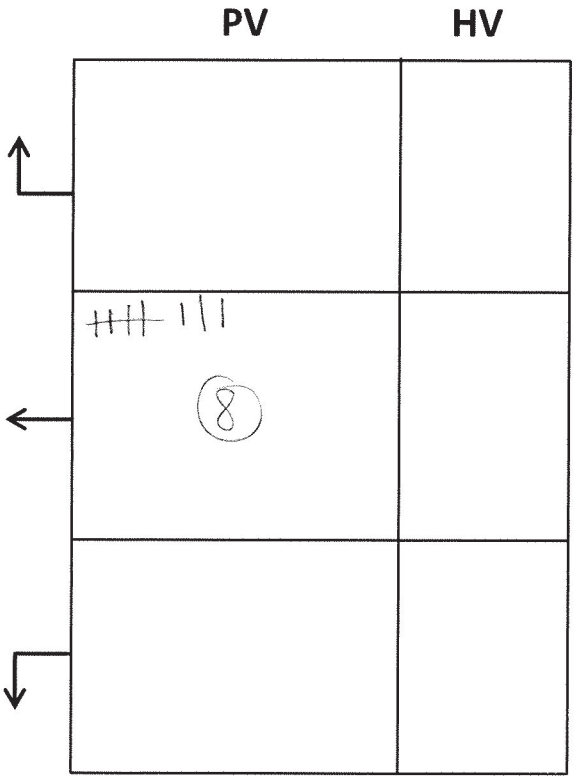




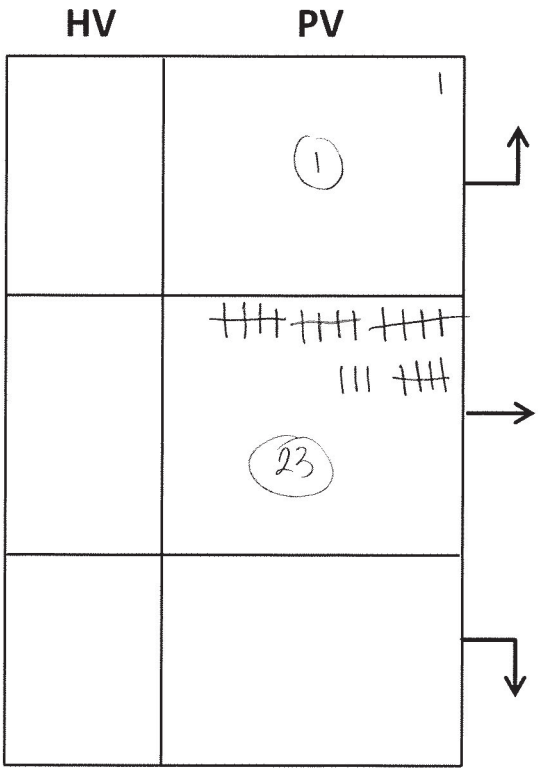
Intersection Traffic Count: _____ & _____

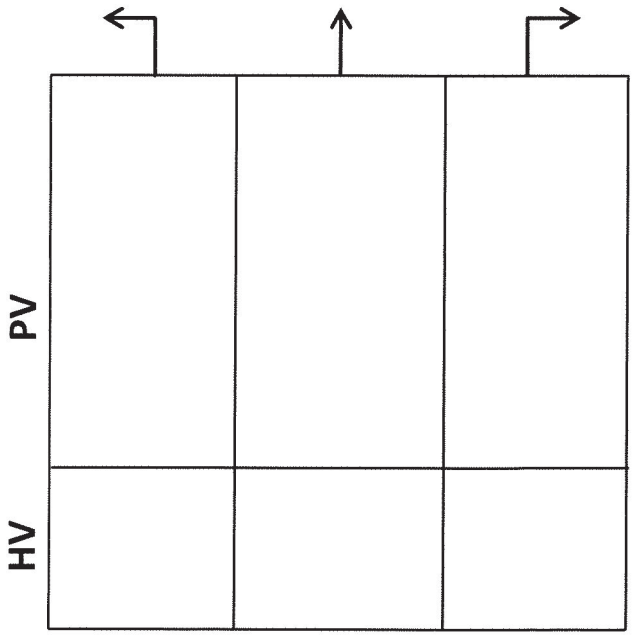
TIME: 7:30 - 7:45 AM





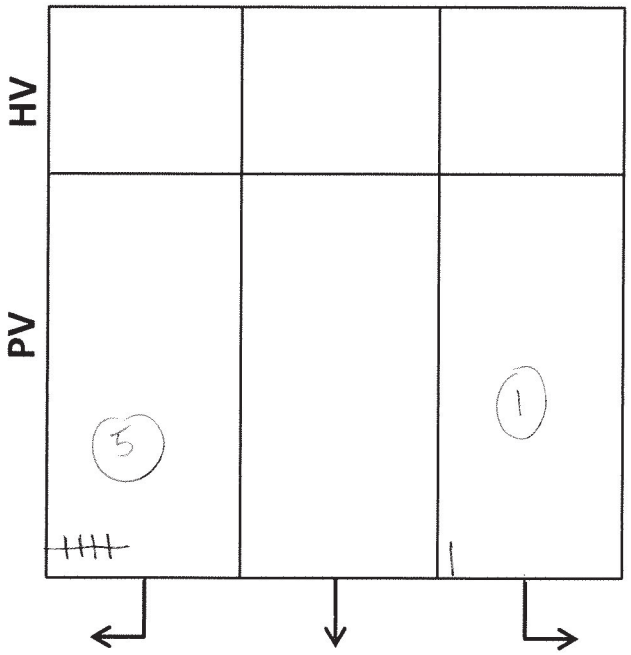
1 ped
II ped
1 ped
1 ped
1 ped
II ped

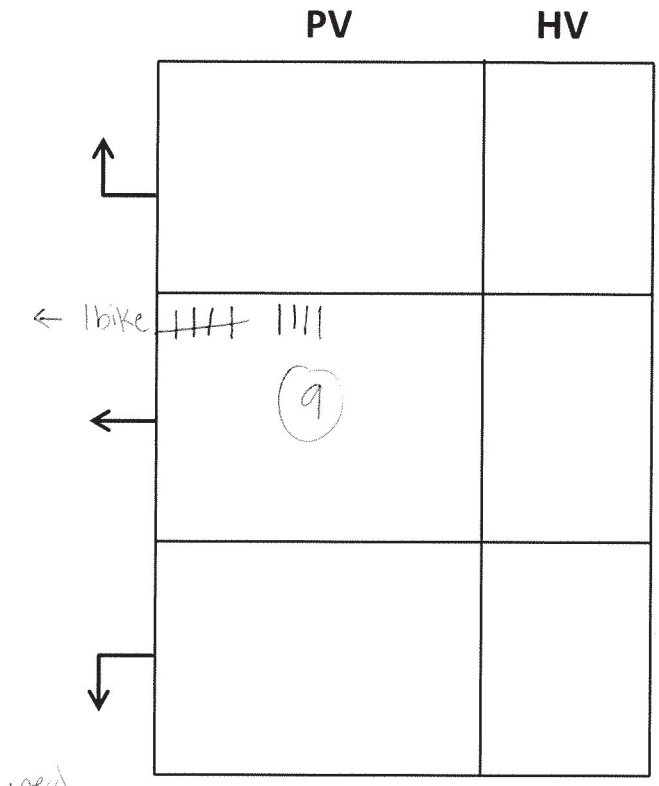


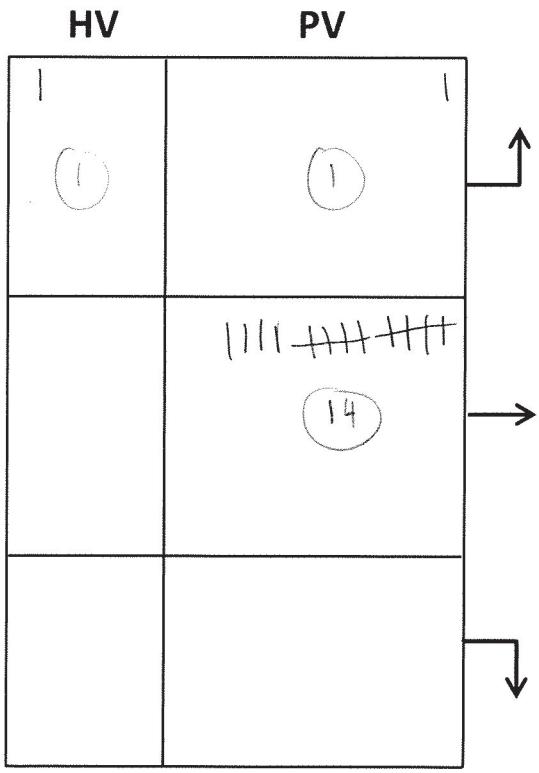


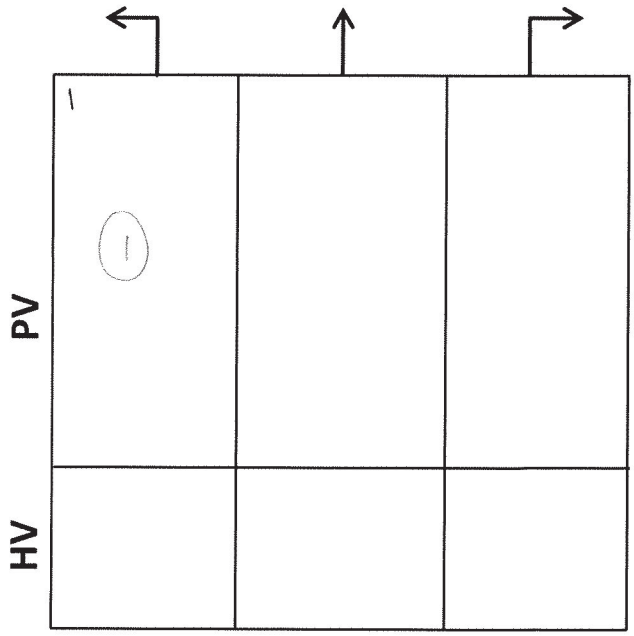
Intersection Traffic Count: _____ & _____

TIME: 7:45 - 8:00AM



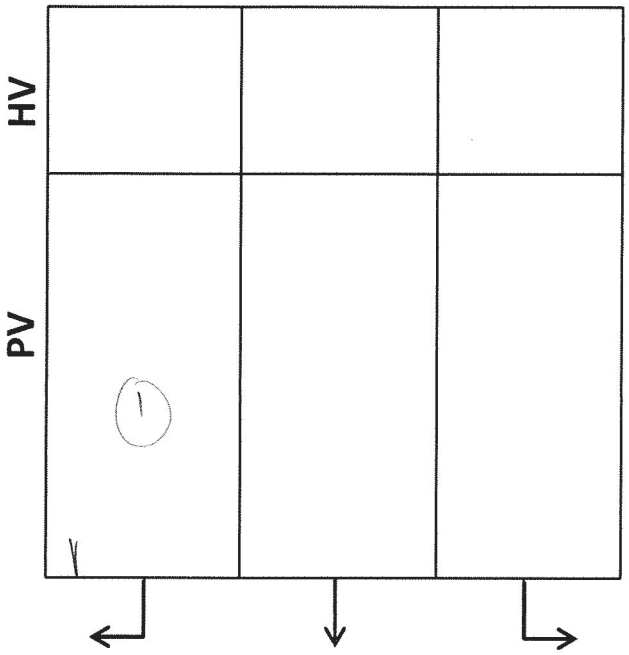


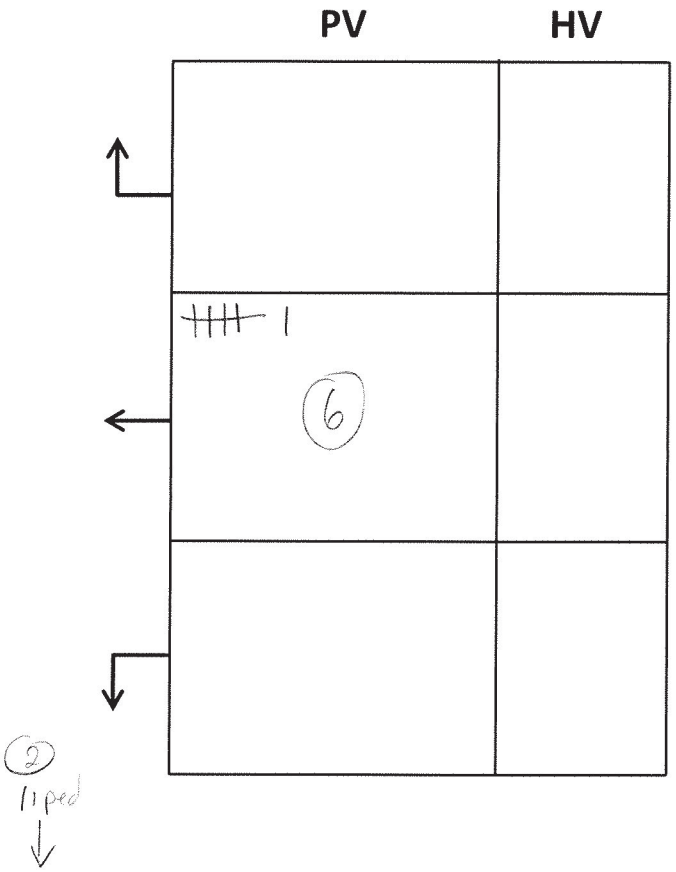


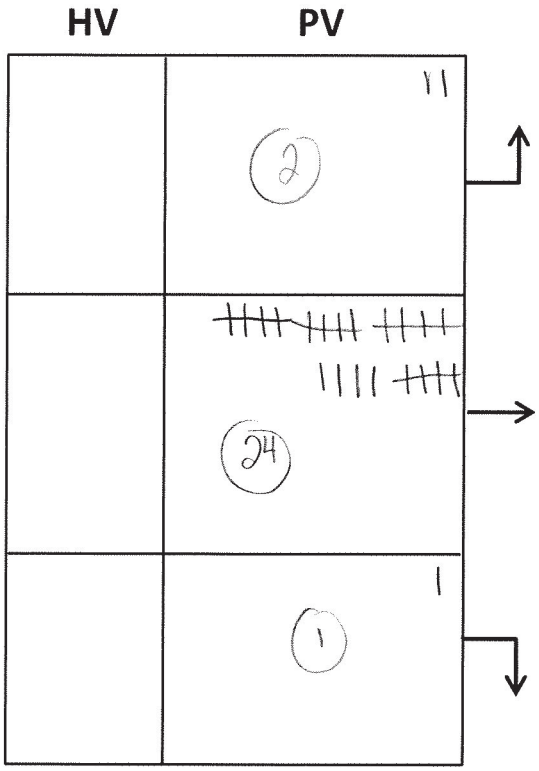


Intersection Traffic Count: _____ & _____

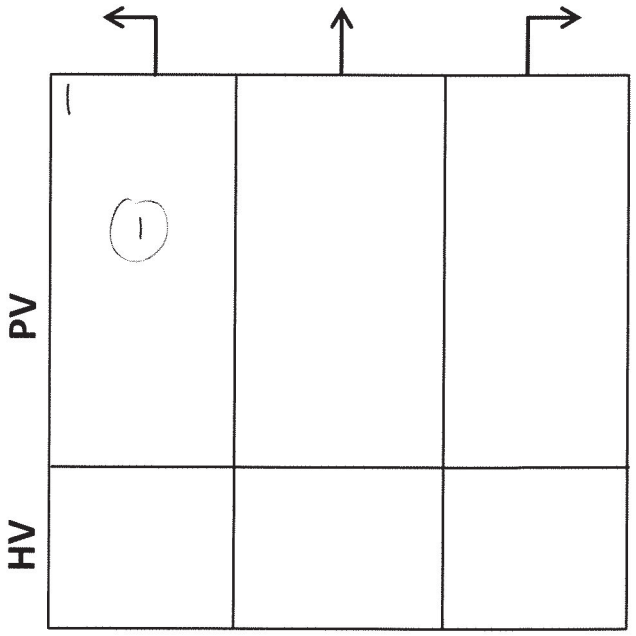
TIME: 8:00 - 8:15 AM





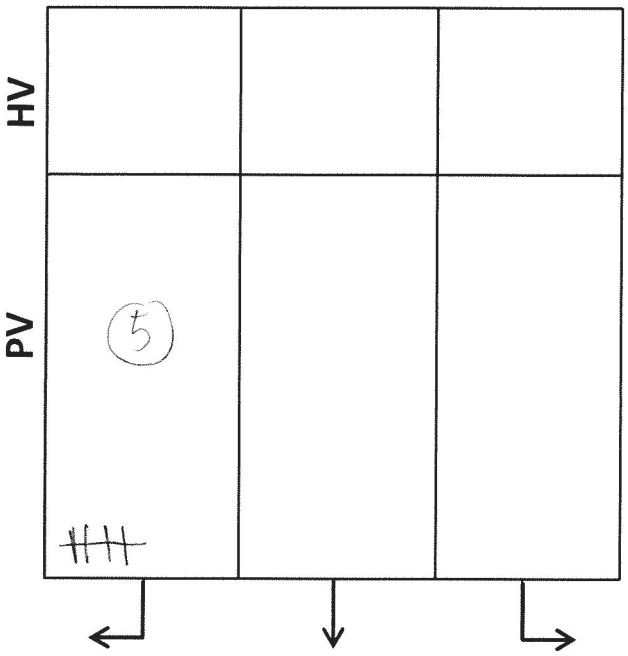


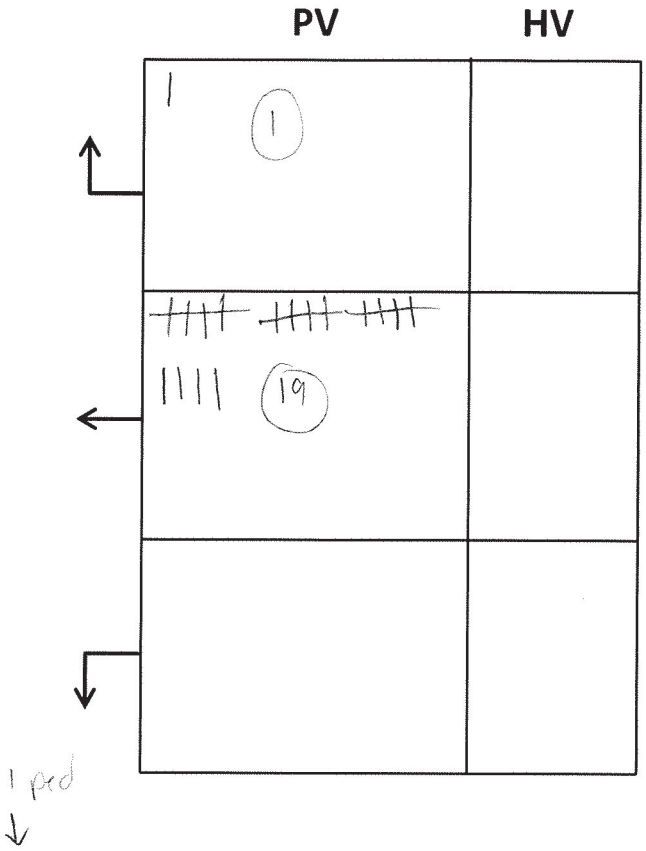
cart

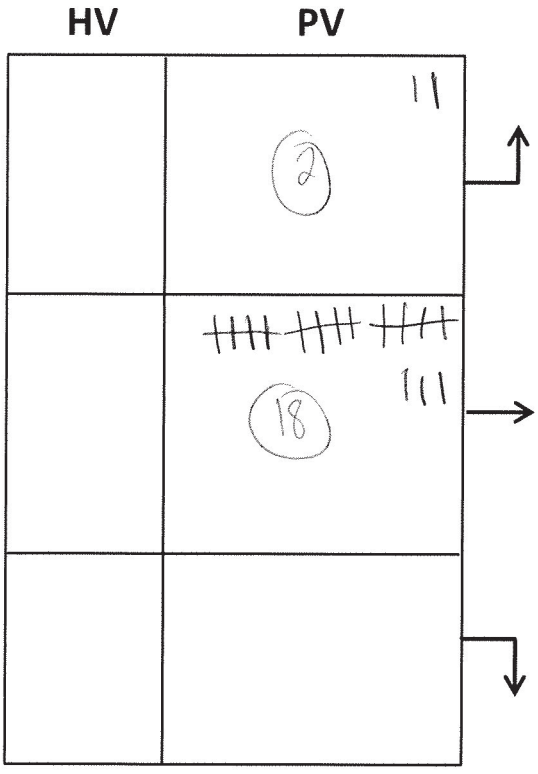


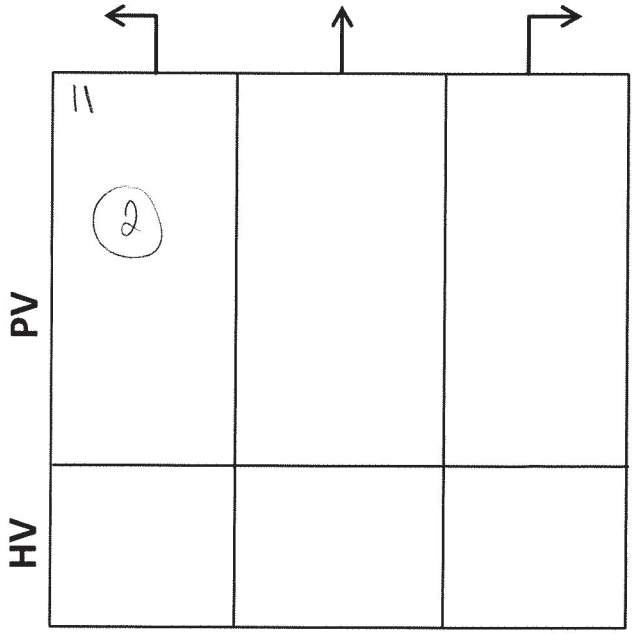
Intersection Traffic Count: _____ & _____

TIME: 8:15 - 8:30 AM



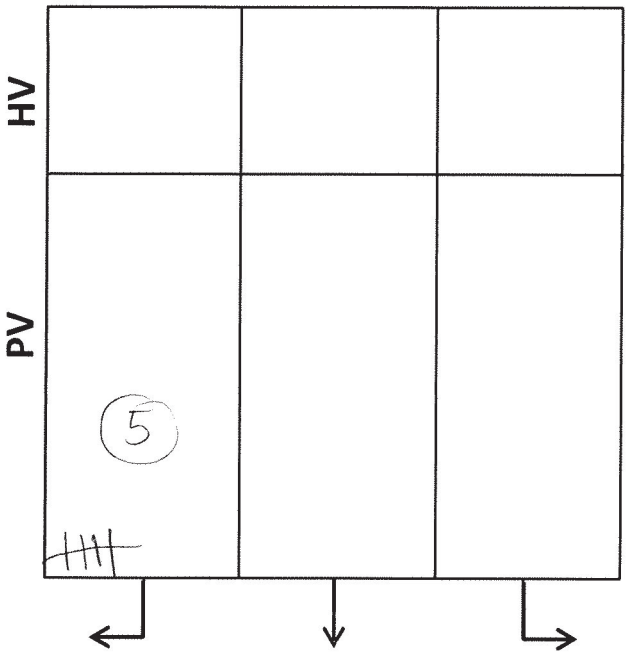


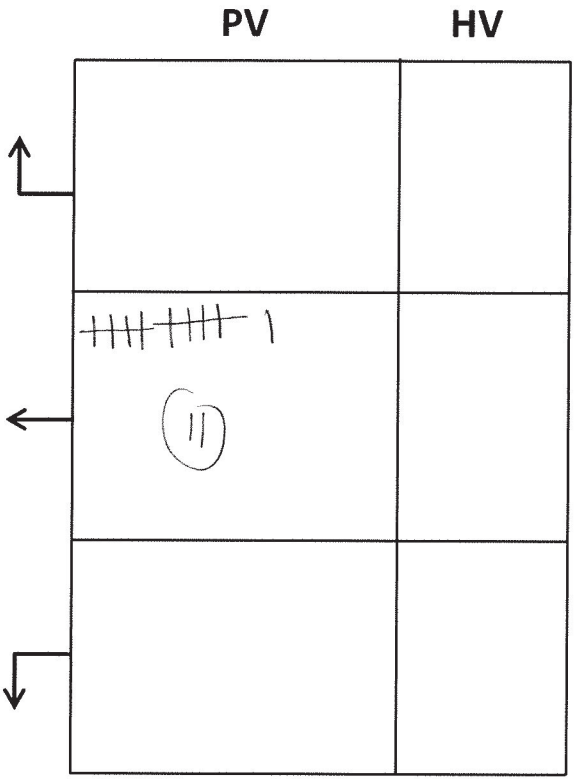




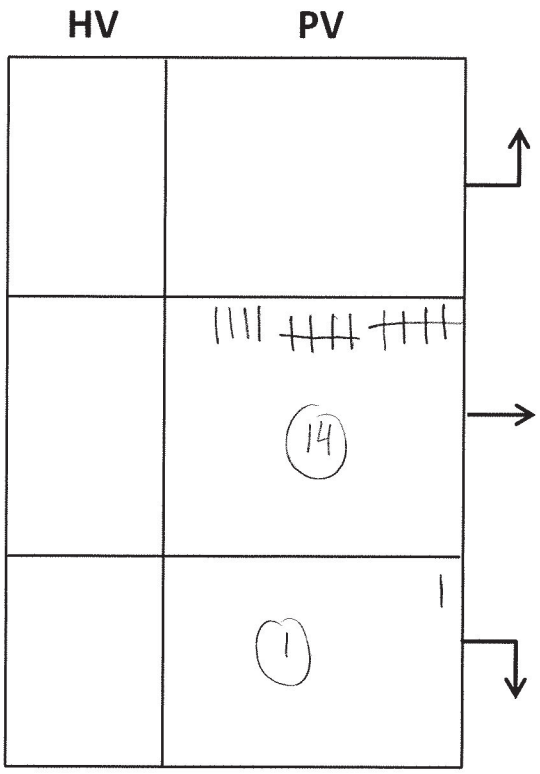
Intersection Traffic Count: _____ & _____

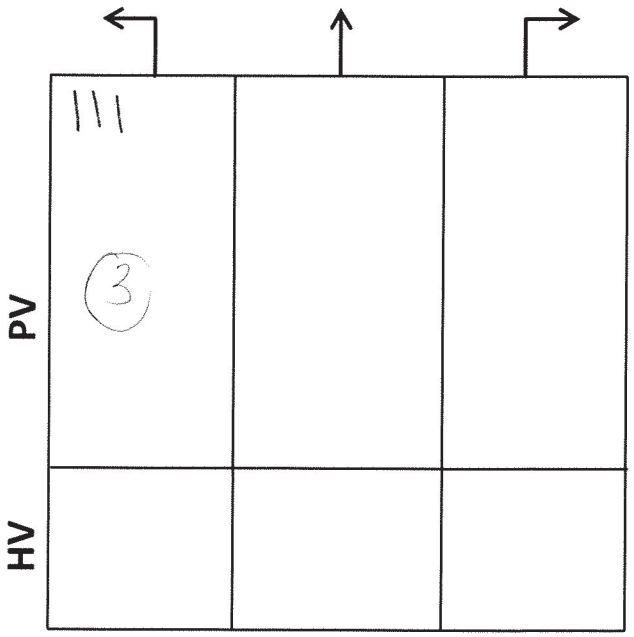
TIME: 8:30 - 8:45 AM





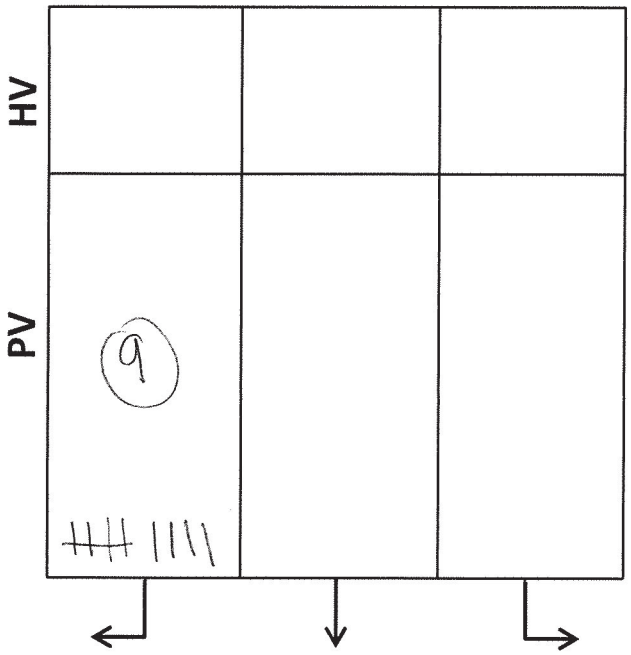
1 ped
1 ped
1 ped
1 ped

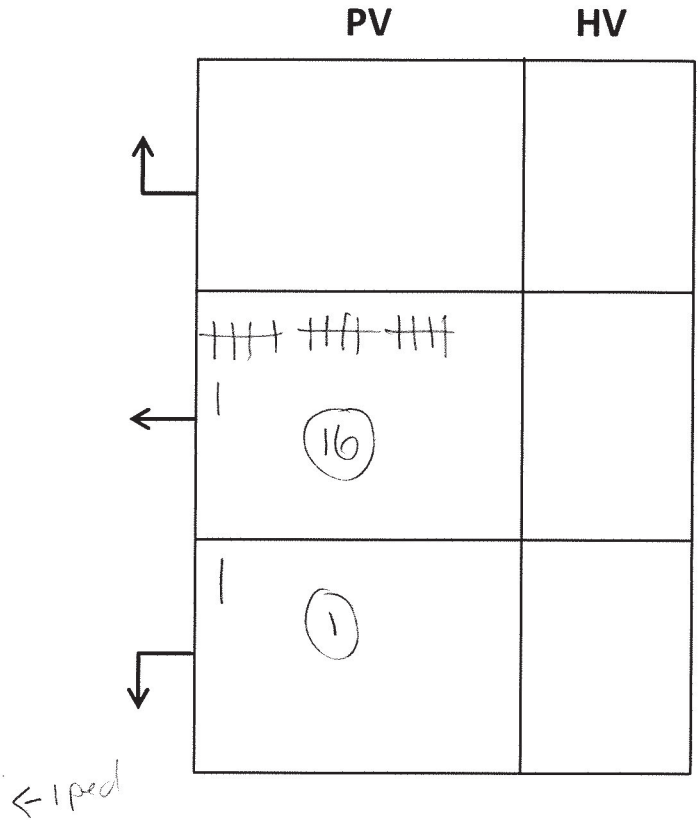


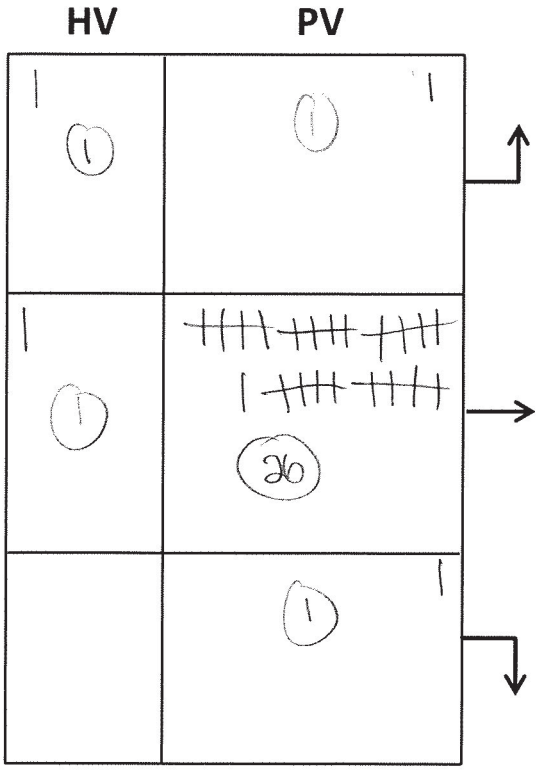


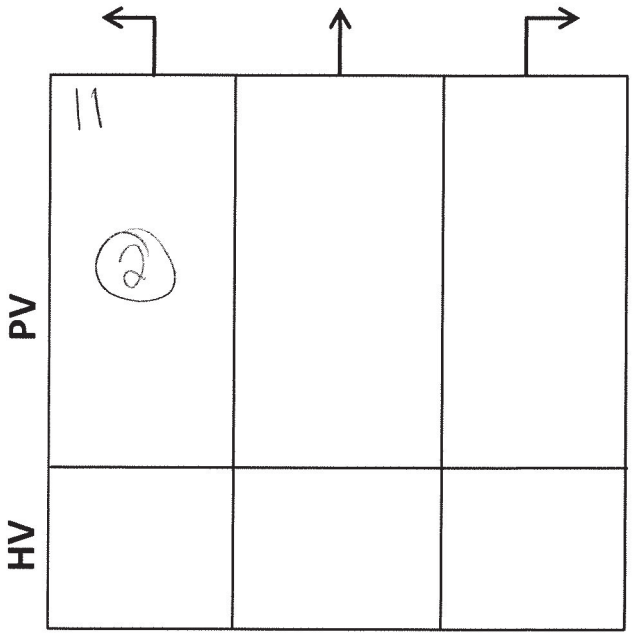
Intersection Traffic Count: _____ & _____

TIME: 8:45 -9:00AM



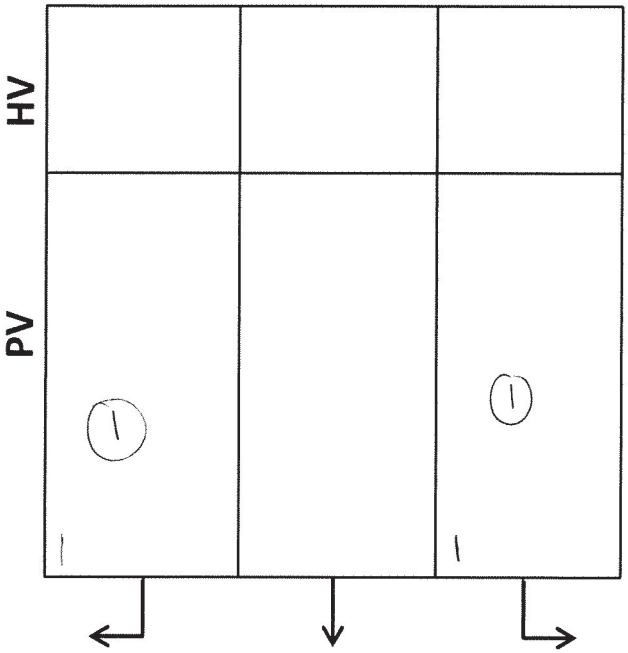


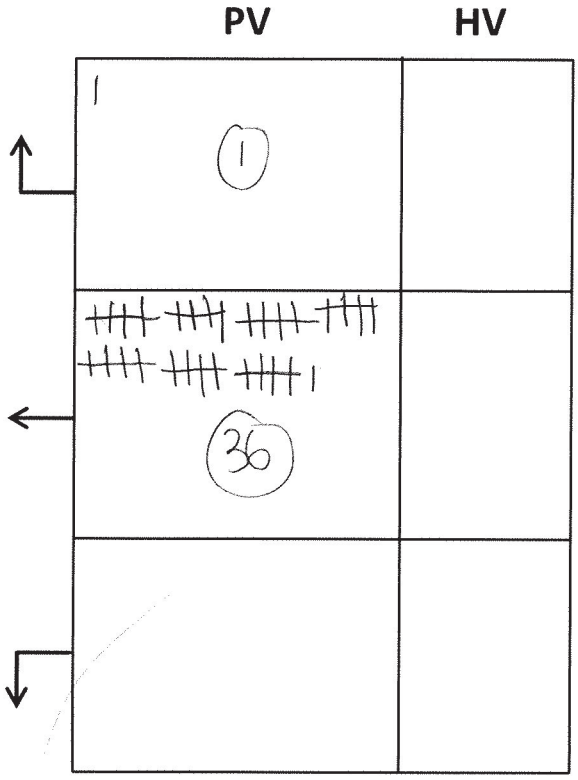




Intersection Traffic Count: _____ & _____

TIME: 4:00 - 4:15 PM

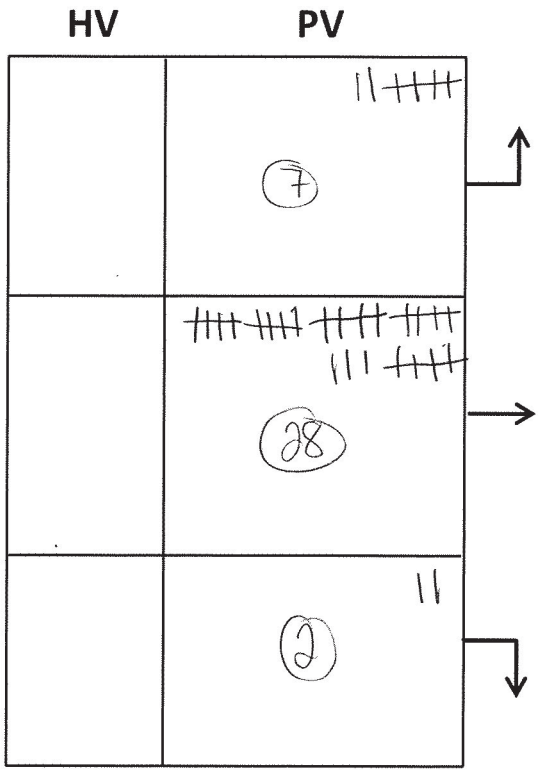


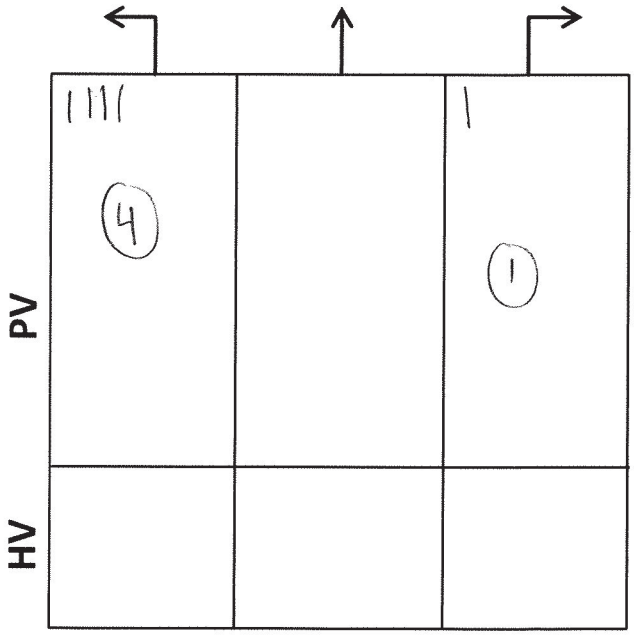


Waterford S

E Cartwright Street W

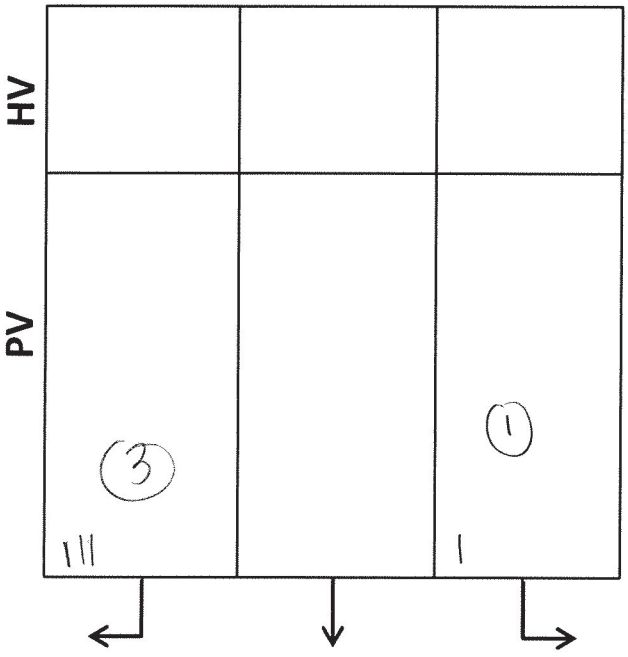
Wentworth N

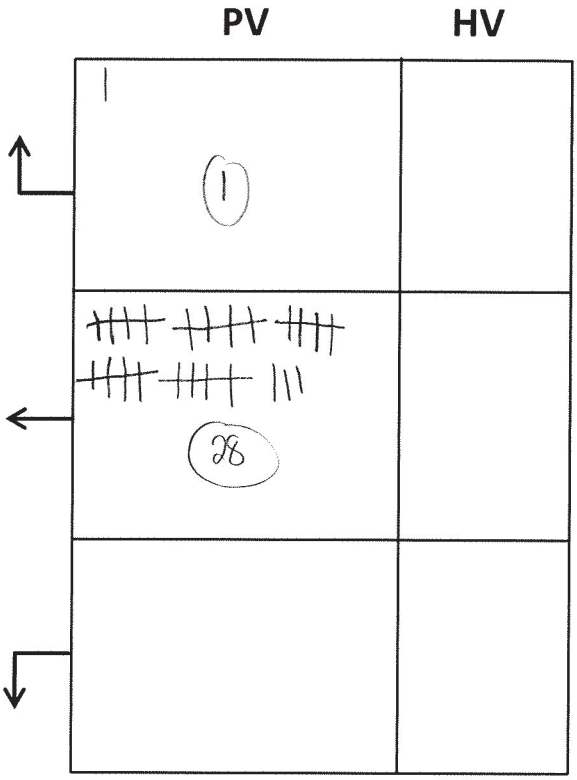


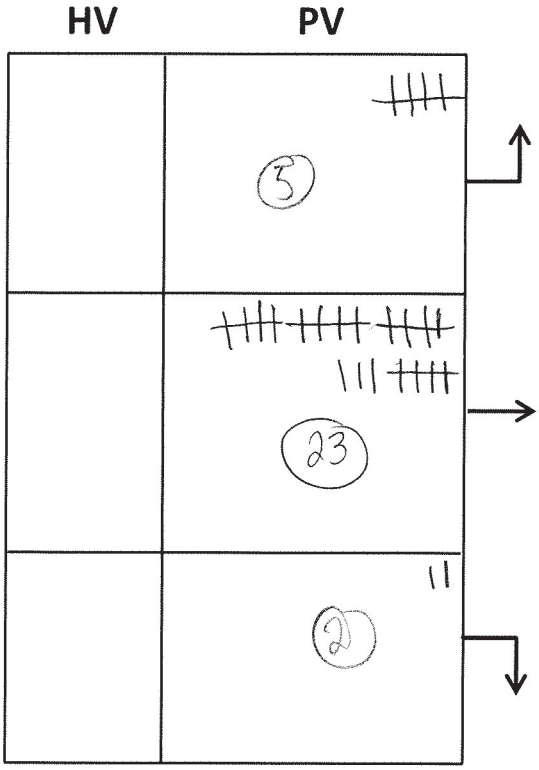


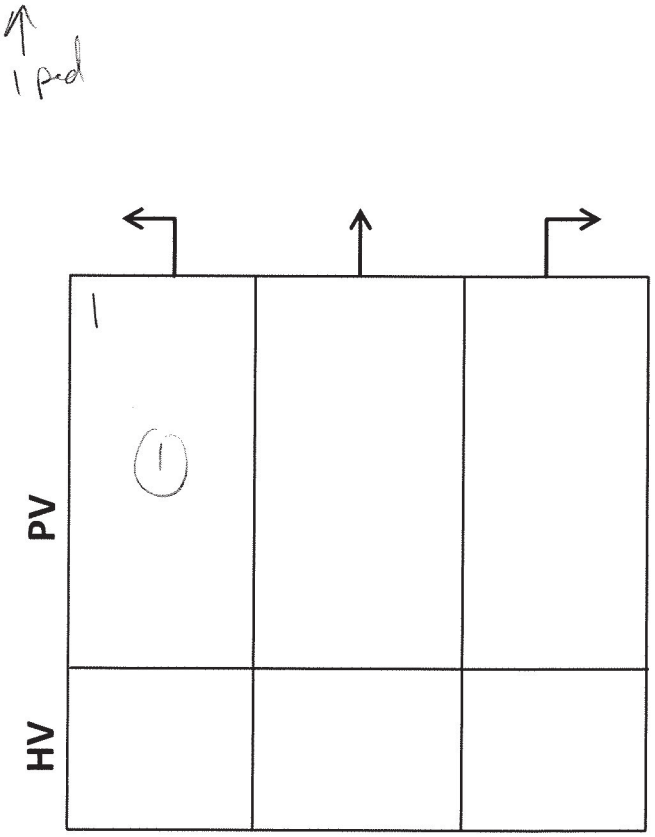
Intersection Traffic Count: _____ & _____

TIME: 4:15 - 4:30PM



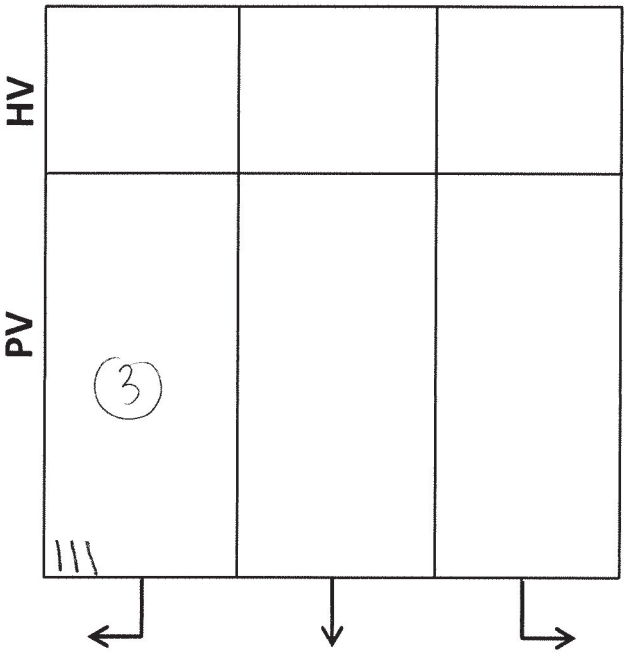


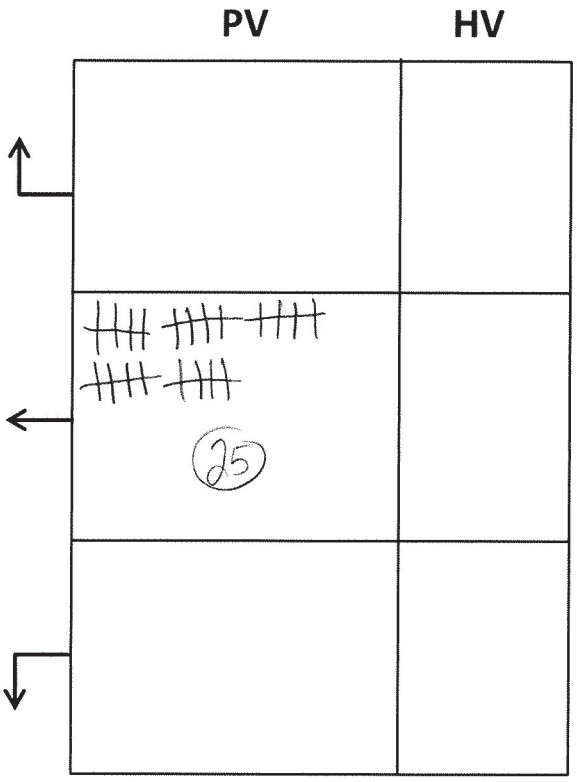


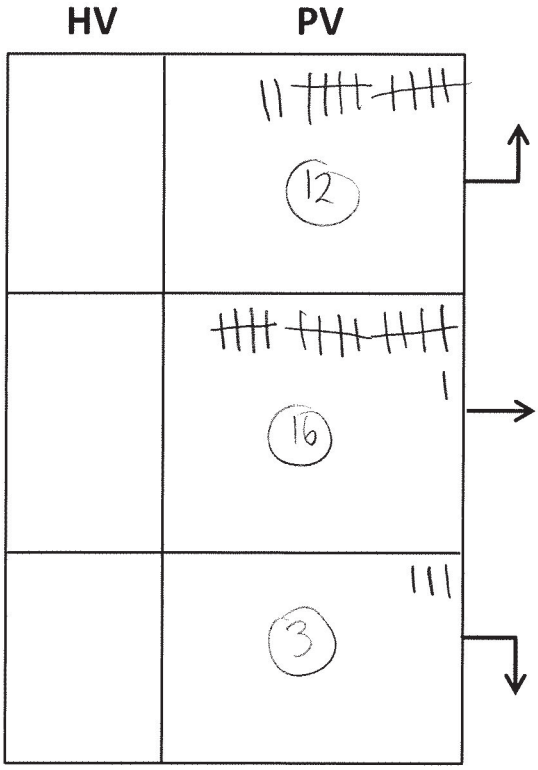


Intersection Traffic Count: _____ & _____

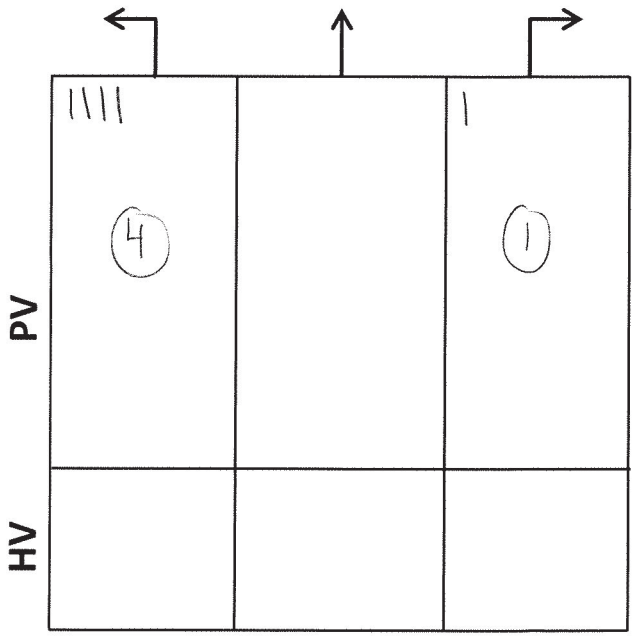
TIME: 4:30 - 4:45 PM





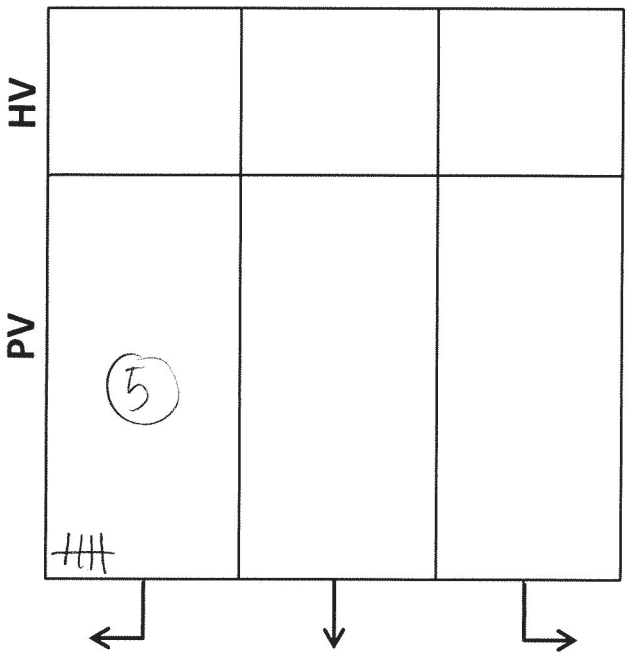


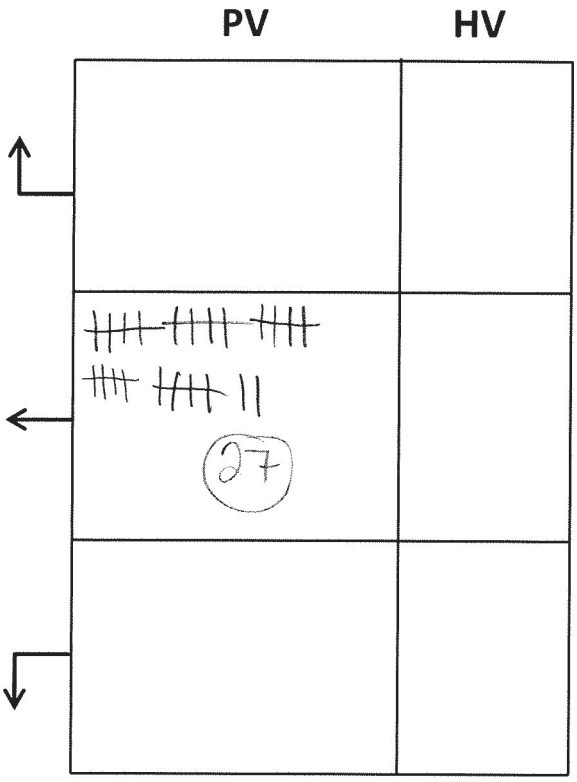
III Red



Intersection Traffic Count: _____ & _____

TIME: 4:45 - 5:00PM





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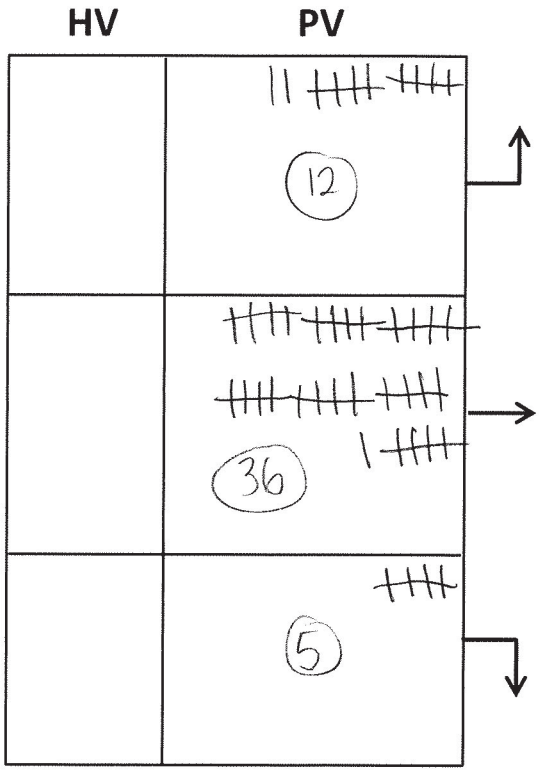
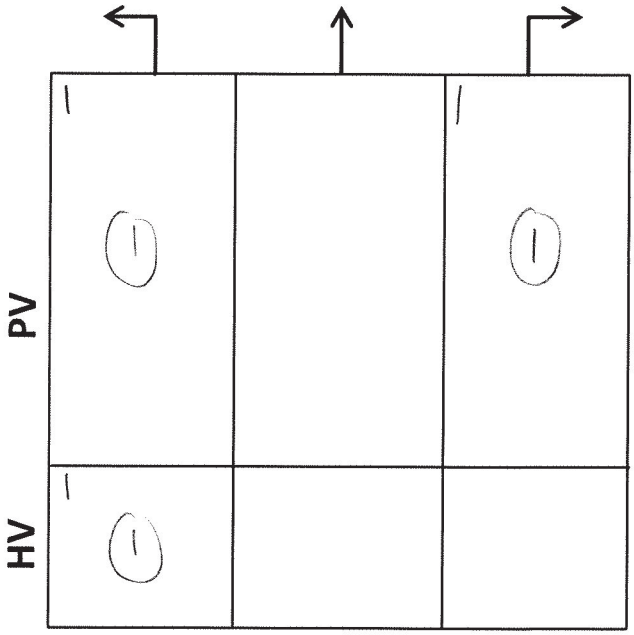
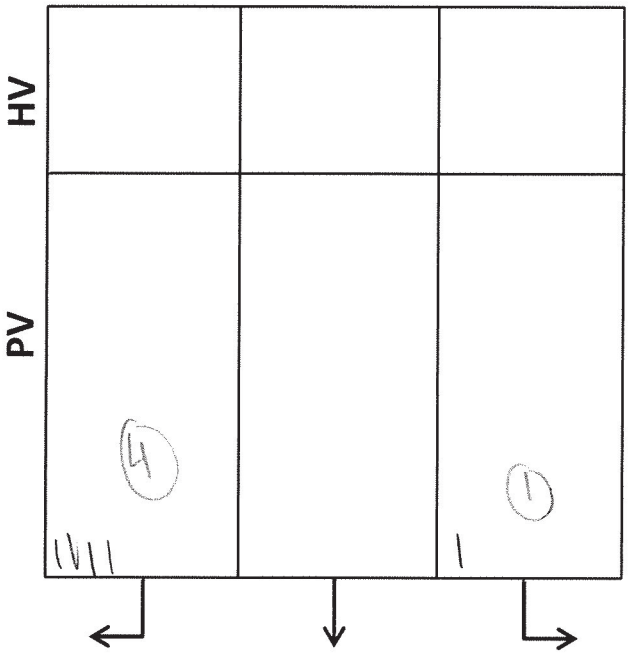
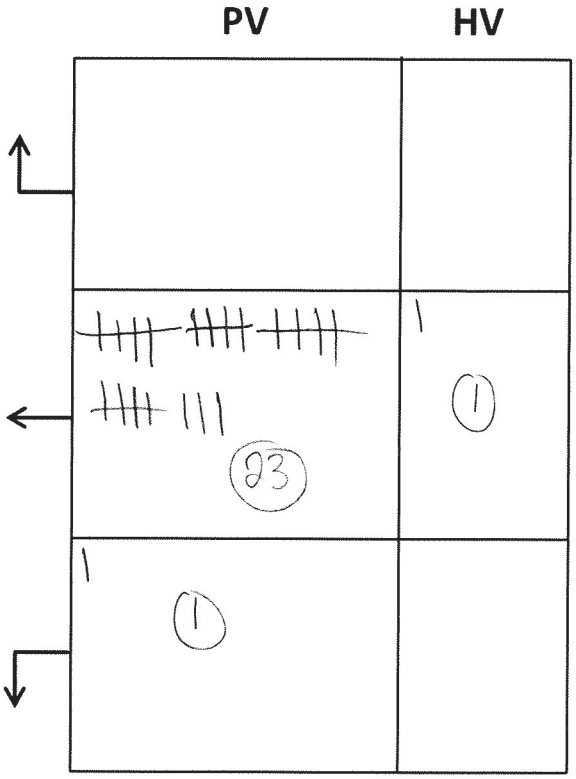


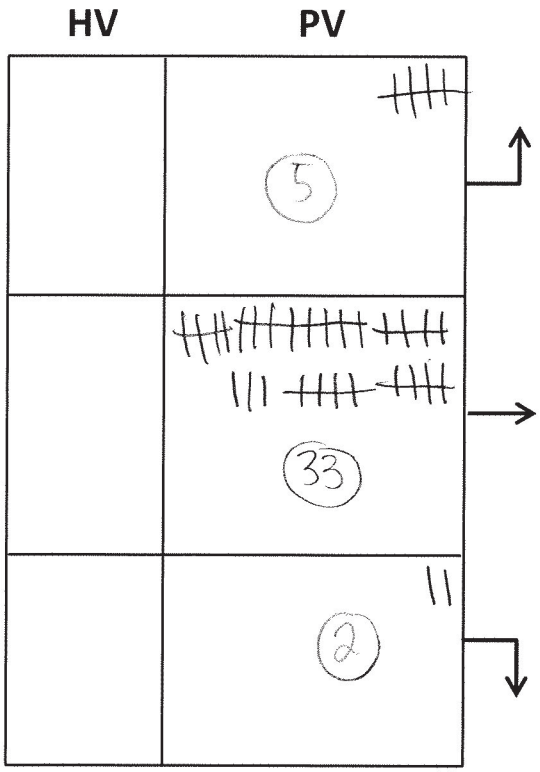


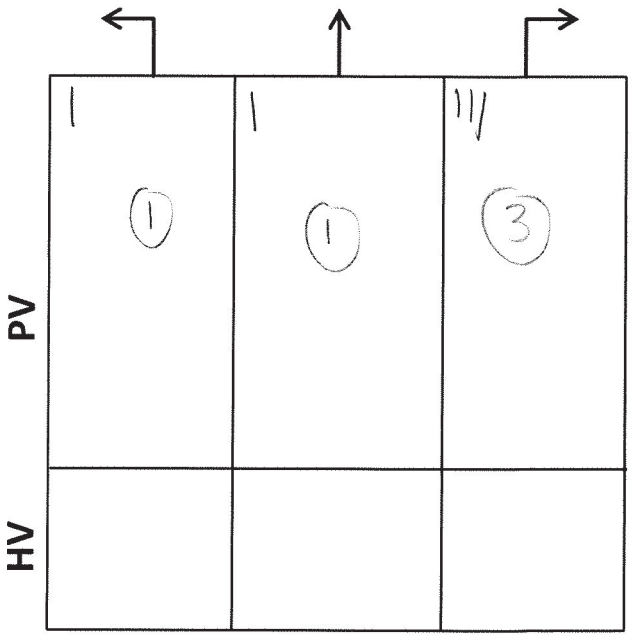
Intersection Traffic Count: _____ & _____

TIME: 5:00 - 5:15PM



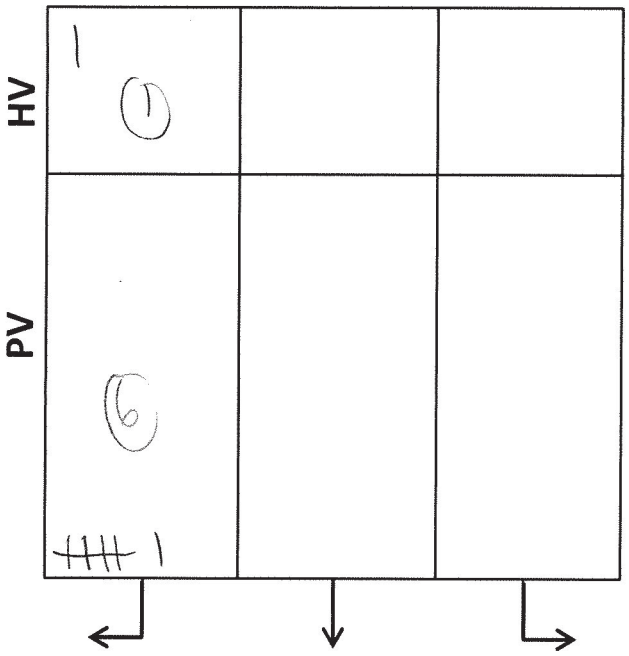


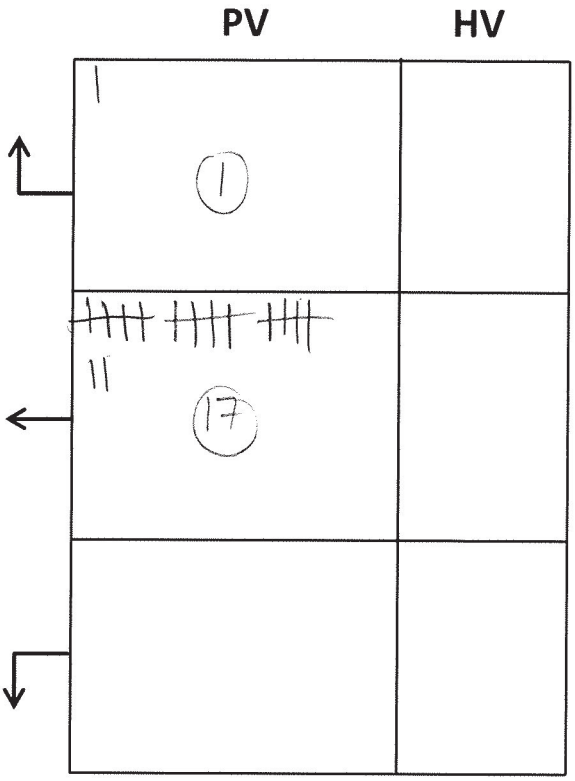


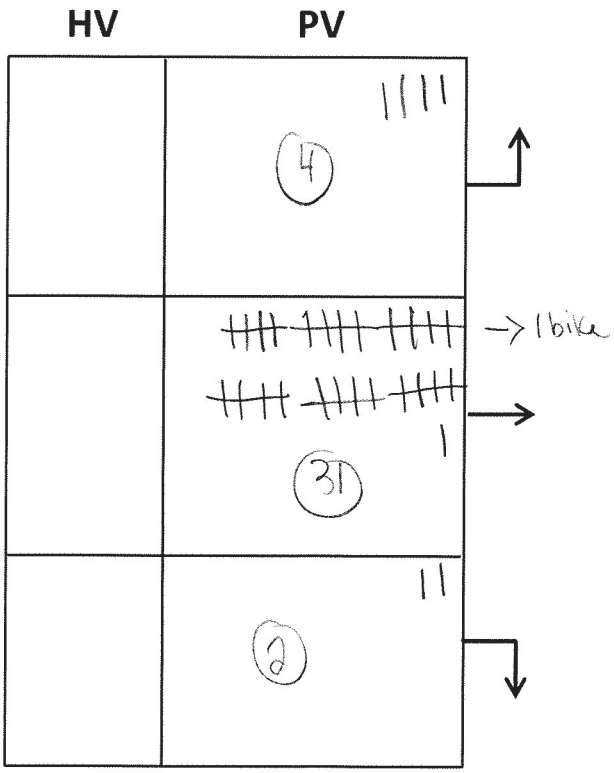


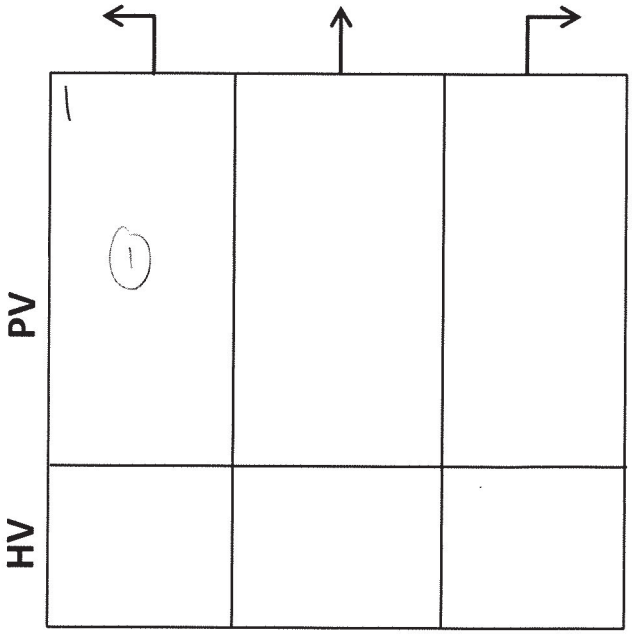
Intersection Traffic Count: _____ & _____

TIME: 5:15 - 5:30PM



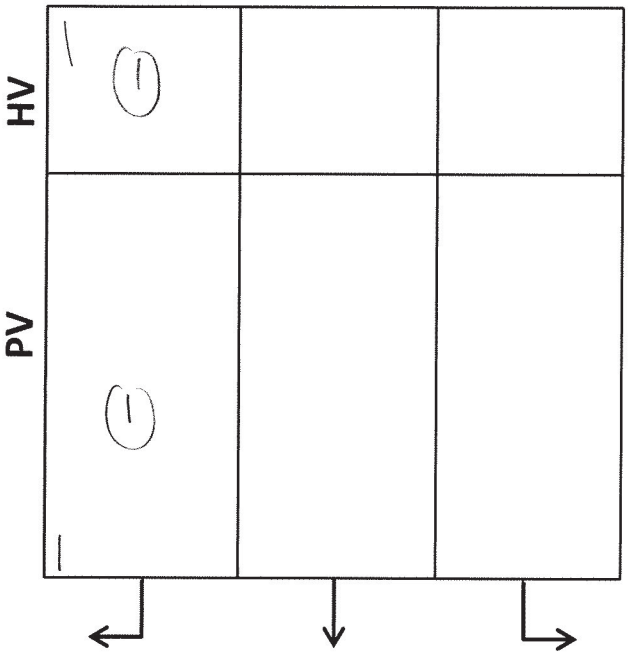


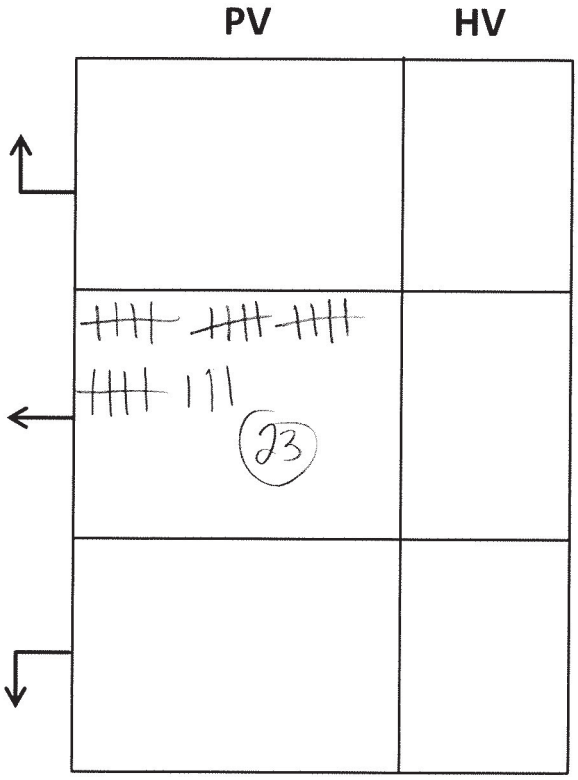


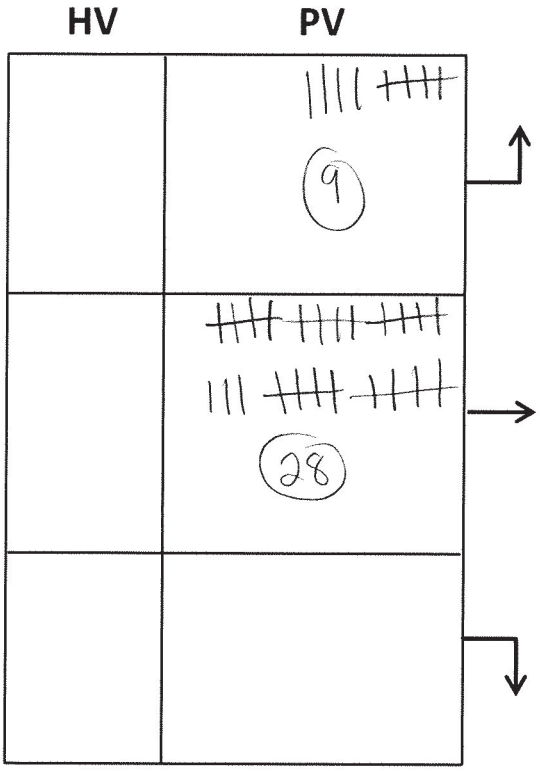


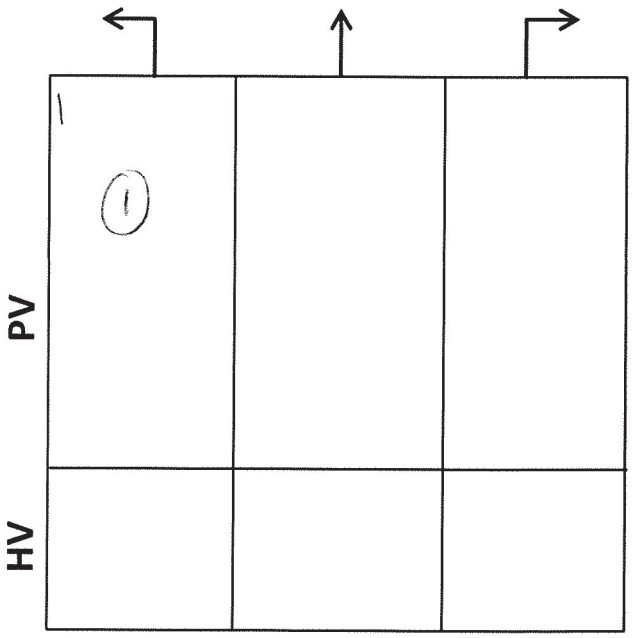
Intersection Traffic Count: _____ & _____

TIME: 5:30 - 5:45 PM



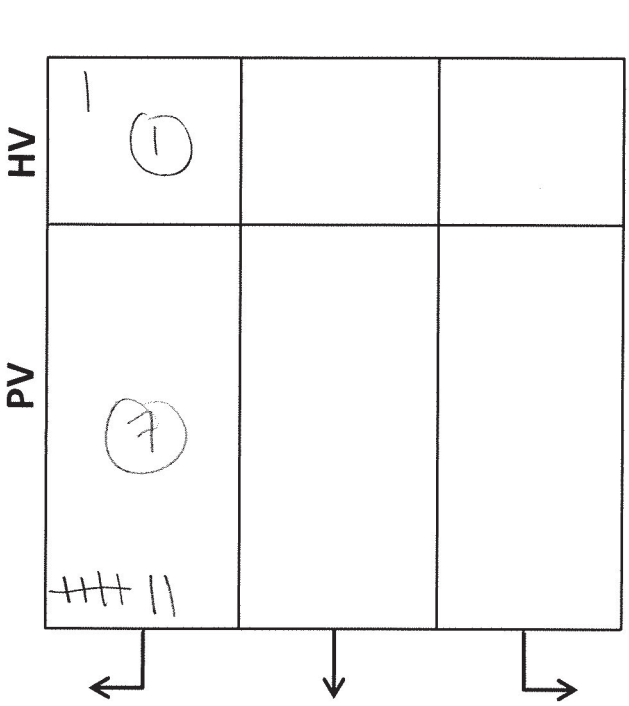


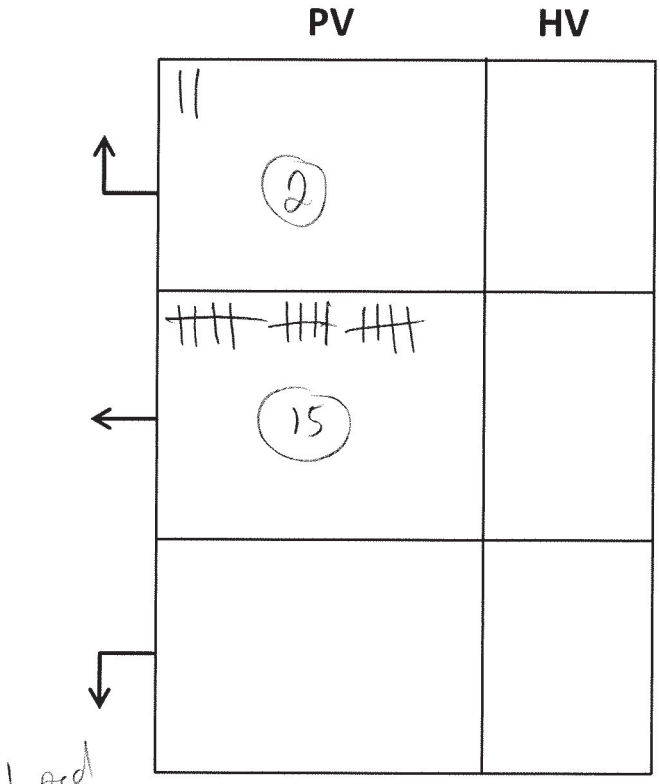


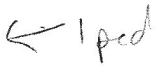


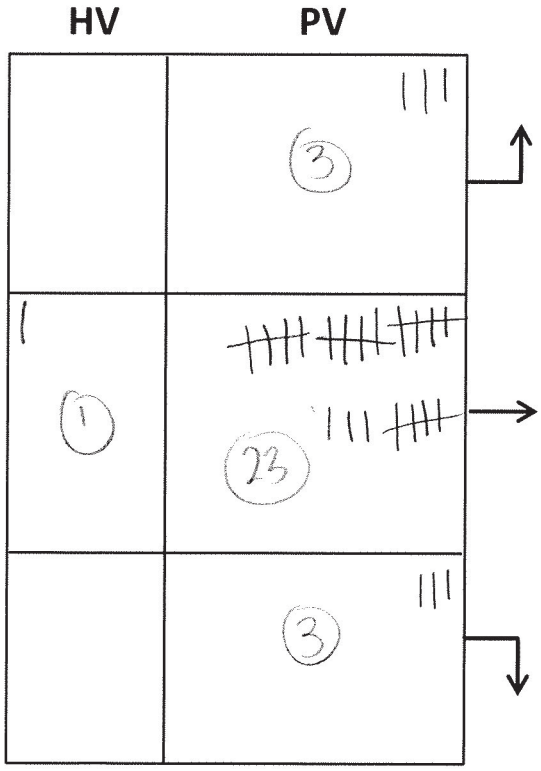
Intersection Traffic Count: _____ & _____

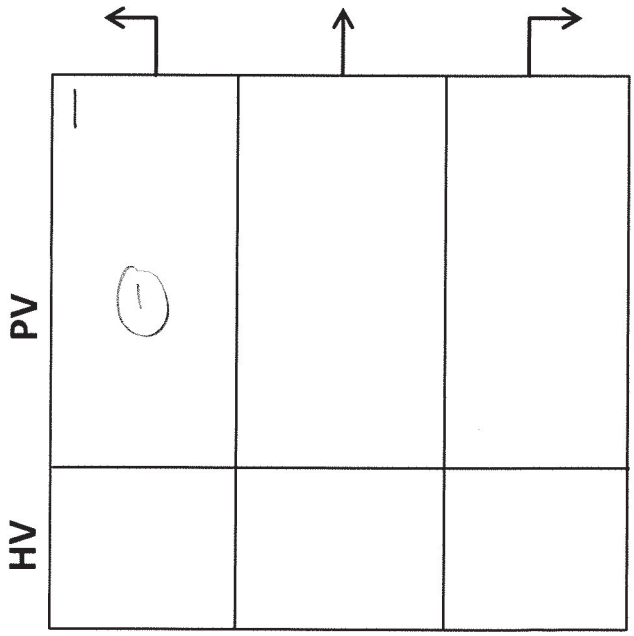
TIME: 5:45 - 6:00PM











Stantec Consulting Ltd.
300 - 1919 Rose St

Regina, Saskatchewan, Canada S4P 3P1
[redacted]@stantec.com

Count Name: Clarence Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-22-2022

Turning Movement Data

Start Time	Clarence Avenue Southbound					Access Westbound					Clarence Avenue Northbound					Cartwright Street Eastbound					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
6:00 PM	20	42	1	0	63	1	0	0	0	1	0	30	2	0	32	1	0	15	0	16	112
6:15 PM	21	64	0	0	85	0	0	0	0	0	0	30	0	0	30	0	0	22	0	22	137
6:30 PM	18	30	1	0	49	0	0	0	0	0	0	35	0	0	35	0	0	17	0	17	101
6:45 PM	11	20	0	0	31	1	0	0	0	1	0	21	0	0	21	0	0	19	0	19	72
Hourly Total	70	156	2	0	228	2	0	0	0	2	0	116	2	0	118	1	0	73	0	74	422
7:00 PM	21	42	0	0	63	0	0	0	0	0	0	21	3	0	24	1	0	21	0	22	109
7:15 PM	16	37	1	0	54	0	0	0	0	0	0	30	0	0	30	0	0	29	0	29	113
7:30 PM	16	28	1	0	45	1	0	0	0	1	0	52	1	0	53	0	0	26	0	26	125
7:45 PM	11	40	0	0	51	0	0	0	0	0	1	25	0	0	26	0	0	18	0	18	95
Hourly Total	64	147	2	0	213	1	0	0	0	1	1	128	4	0	133	1	0	94	0	95	442
8:00 PM	10	26	0	1	37	1	0	0	0	1	0	27	0	0	27	0	0	26	0	26	91
8:15 PM	15	29	0	0	44	0	0	0	0	0	0	19	0	0	19	1	0	11	0	12	75
8:30 PM	11	21	1	0	33	1	0	0	0	1	0	30	0	0	30	1	0	14	0	15	79
8:45 PM	11	10	0	0	21	0	0	0	0	0	0	50	0	0	50	1	0	29	0	30	101
Hourly Total	47	86	1	1	135	2	0	0	0	2	0	126	0	0	126	3	0	80	0	83	346
9:00 PM	7	16	0	0	23	0	0	0	0	0	0	17	0	0	17	0	0	12	0	12	52
9:15 PM	12	11	0	0	23	0	0	0	0	0	0	5	0	0	5	1	0	12	0	13	41
9:30 PM	3	13	0	1	17	0	0	0	0	0	0	15	0	0	15	0	0	10	0	10	42
9:45 PM	6	9	0	0	15	3	0	0	0	3	0	9	0	0	9	0	0	9	0	9	36
Hourly Total	28	49	0	1	78	3	0	0	0	3	0	46	0	0	46	1	0	43	0	44	171
10:00 PM	5	8	0	0	13	0	0	0	0	0	0	7	0	0	7	0	0	8	0	8	28
10:15 PM	0	6	0	0	6	0	0	0	0	0	0	12	0	0	12	0	0	4	0	4	22
10:30 PM	2	13	0	0	15	0	0	0	0	0	0	9	0	0	9	0	0	2	0	2	26
10:45 PM	3	5	0	0	8	0	0	0	0	0	0	4	0	0	4	0	0	2	0	2	14
Hourly Total	10	32	0	0	42	0	0	0	0	0	0	32	0	0	32	0	0	16	0	16	90
11:00 PM	1	3	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	9
11:15 PM	1	4	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	7
11:30 PM	2	2	0	0	4	0	0	0	0	0	0	6	0	0	6	1	0	1	0	2	12
11:45 PM	1	1	0	0	2	0	0	0	0	0	0	3	0	0	3	1	0	1	0	2	7
Hourly Total	5	10	0	0	15	0	0	0	0	0	0	15	0	0	15	2	0	3	0	5	35
12:00 AM	4	2	0	0	6	0	0	0	0	0	0	4	0	0	4	0	0	3	0	3	13
12:15 AM	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4
12:30 AM	2	2	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	6
12:45 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Hourly Total	8	8	0	0	16	0	0	0	0	0	0	5	0	0	5	1	0	4	0	5	26
1:00 AM	1	0	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4

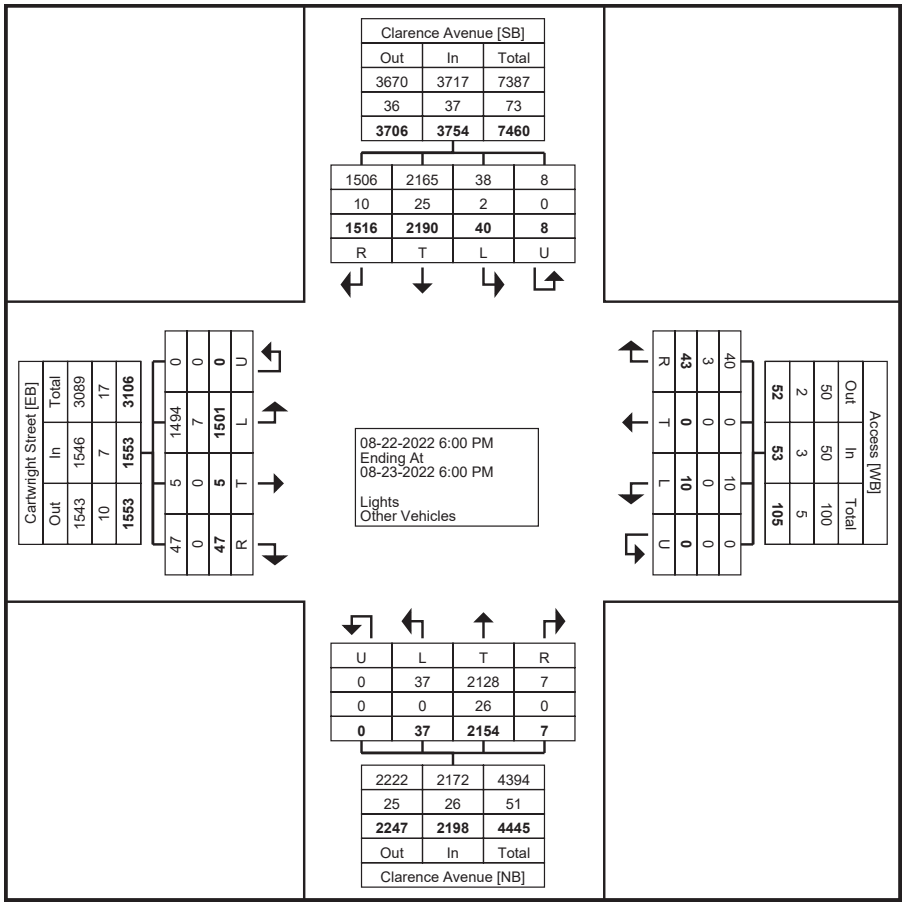
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	3
1:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
1:45 AM	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	6
Hourly Total	2	1	0	0	3	0	0	0	0	0	0	9	0	0	9	0	0	3	0	3	15
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
2:15 AM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Hourly Total	2	0	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	6
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Hourly Total	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	3
4:00 AM	1	0	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	4
4:15 AM	1	1	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
4:30 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
4:45 AM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	4
Hourly Total	2	4	0	0	6	0	0	0	0	0	0	8	0	0	8	0	0	2	0	2	16
5:00 AM	3	4	0	0	7	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	9
5:15 AM	3	3	0	0	6	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	9
5:30 AM	5	2	0	0	7	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	11
5:45 AM	4	4	0	0	8	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	10
Hourly Total	15	13	0	0	28	0	0	0	0	0	0	9	0	0	9	1	0	1	0	2	39
6:00 AM	4	4	1	0	9	0	0	0	0	0	0	5	0	0	5	0	0	2	0	2	16
6:15 AM	7	3	1	0	11	2	0	1	0	3	0	7	0	0	7	0	1	5	0	6	27
6:30 AM	10	9	0	0	19	0	0	0	0	0	0	11	0	0	11	0	0	4	0	4	34
6:45 AM	6	18	1	0	25	0	0	0	0	0	0	13	1	0	14	0	0	11	0	11	50
Hourly Total	27	34	3	0	64	2	0	1	0	3	0	36	1	0	37	0	1	22	0	23	127
7:00 AM	13	15	0	0	28	0	0	0	0	0	0	16	0	0	16	0	0	8	0	8	52
7:15 AM	18	12	0	0	30	0	0	0	0	0	0	25	0	0	25	0	0	14	0	14	69
7:30 AM	24	14	0	0	38	0	0	0	0	0	0	22	0	0	22	0	0	13	0	13	73
7:45 AM	16	31	3	0	50	0	0	0	0	0	0	26	0	0	26	0	0	14	0	14	90
Hourly Total	71	72	3	0	146	0	0	0	0	0	0	89	0	0	89	0	0	49	0	49	284
8:00 AM	25	27	0	0	52	0	0	0	0	0	0	28	2	0	30	0	0	9	0	9	91
8:15 AM	21	45	1	0	67	0	0	0	0	0	0	33	0	0	33	0	0	25	0	25	125
8:30 AM	13	32	0	0	45	0	0	0	0	0	0	35	1	0	36	0	0	20	0	20	101
8:45 AM	29	27	0	0	56	1	0	0	0	1	0	47	1	0	48	1	0	26	0	27	132
Hourly Total	88	131	1	0	220	1	0	0	0	1	0	143	4	0	147	1	0	80	0	81	449
9:00 AM	26	27	0	0	53	2	0	0	0	2	0	42	1	0	43	1	0	24	0	25	123
9:15 AM	18	31	1	0	50	1	0	1	0	2	1	31	1	0	33	2	1	18	0	21	106
9:30 AM	21	29	0	0	50	0	0	1	0	1	0	26	1	0	27	0	0	19	0	19	97
9:45 AM	18	20	1	0	39	0	0	0	0	0	0	42	1	0	43	0	0	36	0	36	118
Hourly Total	83	107	2	0	192	3	0	2	0	5	1	141	4	0	146	3	1	97	0	101	444
10:00 AM	22	30	0	0	52	2	0	0	0	2	0	52	1	0	53	0	0	26	0	26	133
10:15 AM	27	45	2	0	74	2	0	0	0	2	0	34	0	0	34	1	0	28	0	29	139
10:30 AM	27	33	1	0	61	1	0	0	0	1	0	32	3	0	35	2	0	23	0	25	122
10:45 AM	24	27	0	0	51	0	0	0	0	0	0	28	0	0	28	0	0	28	0	28	107
Hourly Total	100	135	3	0	238	5	0	0	0	5	0	146	4	0	150	3	0	105	0	108	501
11:00 AM	16	40	1	1	58	1	0	1	0	2	0	29	0	0	29	1	1	22	0	24	113
11:15 AM	33	32	2	1	68	2	0	0	0	2	1	30	1	0	32	2	0	28	0	30	132
11:30 AM	26	30	0	0	56	0	0	1	0	1	0	44	1	0	45	1	0	25	0	26	128

11:45 AM	26	41	2	0	69	1	0	0	0	1	0	25	1	0	26	1	0	33	0	34	130
Hourly Total	101	143	5	2	251	4	0	2	0	6	1	128	3	0	132	5	1	108	0	114	503
12:00 PM	52	35	2	0	89	1	0	1	0	2	1	39	2	0	42	1	0	23	0	24	157
12:15 PM	34	35	2	0	71	5	0	0	0	5	0	29	0	0	29	1	0	32	0	33	138
12:30 PM	28	44	0	0	72	0	0	0	0	0	0	34	0	0	34	0	0	22	0	22	128
12:45 PM	15	40	0	0	55	1	0	0	0	1	0	30	0	0	30	1	1	28	0	30	116
Hourly Total	129	154	4	0	287	7	0	1	0	8	1	132	2	0	135	3	1	105	0	109	539
1:00 PM	18	32	1	0	51	0	0	0	0	0	0	38	1	0	39	2	0	39	0	41	131
1:15 PM	24	32	0	0	56	0	0	0	0	0	0	33	0	0	33	1	0	36	0	37	126
1:30 PM	19	33	1	0	53	0	0	0	0	0	0	43	0	0	43	0	0	24	0	24	120
1:45 PM	29	32	0	0	61	1	0	0	0	1	0	39	0	0	39	0	0	27	0	27	128
Hourly Total	90	129	2	0	221	1	0	0	0	1	0	153	1	0	154	3	0	126	0	129	505
2:00 PM	32	33	0	0	65	0	0	1	0	1	1	41	1	0	43	1	0	27	0	28	137
2:15 PM	33	39	0	0	72	0	0	1	0	1	0	45	0	0	45	2	0	36	0	38	156
2:30 PM	27	24	2	0	53	0	0	0	0	0	0	37	1	0	38	0	0	30	0	30	121
2:45 PM	34	38	0	0	72	0	0	0	0	0	0	34	0	0	34	0	0	20	0	20	126
Hourly Total	126	134	2	0	262	0	0	2	0	2	1	157	2	0	160	3	0	113	0	116	540
3:00 PM	45	29	0	0	74	1	0	0	0	1	1	31	3	0	35	1	0	31	0	32	142
3:15 PM	38	56	0	0	94	1	0	0	0	1	0	35	0	0	35	2	0	32	0	34	164
3:30 PM	39	58	0	0	97	1	0	0	0	1	0	35	2	0	37	1	0	31	0	32	167
3:45 PM	34	43	0	0	77	0	0	0	0	0	0	35	0	0	35	0	0	45	0	45	157
Hourly Total	156	186	0	0	342	3	0	0	0	3	1	136	5	0	142	4	0	139	0	143	630
4:00 PM	36	55	1	0	92	0	0	0	0	0	0	43	1	0	44	1	0	45	0	46	182
4:15 PM	30	75	2	0	107	1	0	0	0	1	0	52	0	0	52	0	0	33	0	33	193
4:30 PM	30	53	2	0	85	0	0	0	0	0	0	66	1	0	67	4	1	26	0	31	183
4:45 PM	52	50	0	0	102	2	0	0	0	2	0	54	1	0	55	0	0	35	0	35	194
Hourly Total	148	233	5	0	386	3	0	0	0	3	0	215	3	0	218	5	1	139	0	145	752
5:00 PM	40	66	1	1	108	1	0	1	0	2	0	52	0	0	52	3	0	25	0	28	190
5:15 PM	37	44	2	1	84	2	0	1	0	3	1	50	2	0	53	1	0	26	0	27	167
5:30 PM	37	59	1	1	98	2	0	0	0	2	0	41	0	0	41	1	0	25	0	26	167
5:45 PM	30	56	1	1	88	1	0	0	0	1	0	37	0	0	37	2	0	21	0	23	149
Hourly Total	144	225	5	4	378	6	0	2	0	8	1	180	2	0	183	7	0	97	0	104	673
Grand Total	1516	2190	40	8	3754	43	0	10	0	53	7	2154	37	0	2198	47	5	1501	0	1553	7558
Approach %	40.4	58.3	1.1	0.2	-	81.1	0.0	18.9	0.0	-	0.3	98.0	1.7	0.0	-	3.0	0.3	96.7	0.0	-	-
Total %	20.1	29.0	0.5	0.1	49.7	0.6	0.0	0.1	0.0	0.7	0.1	28.5	0.5	0.0	29.1	0.6	0.1	19.9	0.0	20.5	-
Lights	1506	2165	38	8	3717	40	0	10	0	50	7	2128	37	0	2172	47	5	1494	0	1546	7485
% Lights	99.3	98.9	95.0	100.0	99.0	93.0	-	100.0	-	94.3	100.0	98.8	100.0	-	98.8	100.0	100.0	99.5	-	99.5	99.0
Other Vehicles	10	25	2	0	37	3	0	0	0	3	0	26	0	0	26	0	0	7	0	7	73
% Other Vehicles	0.7	1.1	5.0	0.0	1.0	7.0	-	0.0	-	5.7	0.0	1.2	0.0	-	1.2	0.0	0.0	0.5	-	0.5	1.0

Stantec Consulting Ltd.
300 - 1919 Rose St

Regina, Saskatchewan, Canada S4P 3P1
[redacted]@stantec.com

Count Name: Clarence Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-22-2022



Turning Movement Data Plot

Stantec Consulting Ltd.
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Regina, Saskatchewan, Canada S4P 3P1
[redacted]@stantec.com

Count Name: Clarence Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-22-2022

Turning Movement Peak Hour Data (7:00 PM)

Start Time	Clarence Avenue Southbound					Access Westbound					Clarence Avenue Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 PM	21	42	0	0	63	0	0	0	0	0	0	21	3	0	24	1	0	21	0	22	109
7:15 PM	16	37	1	0	54	0	0	0	0	0	0	30	0	0	30	0	0	29	0	29	113
7:30 PM	16	28	1	0	45	1	0	0	0	1	0	52	1	0	53	0	0	26	0	26	125
7:45 PM	11	40	0	0	51	0	0	0	0	0	1	25	0	0	26	0	0	18	0	18	95
Total	64	147	2	0	213	1	0	0	0	1	1	128	4	0	133	1	0	94	0	95	442
Approach %	30.0	69.0	0.9	0.0	-	100.0	0.0	0.0	0.0	-	0.8	96.2	3.0	0.0	-	1.1	0.0	98.9	0.0	-	-
Total %	14.5	33.3	0.5	0.0	48.2	0.2	0.0	0.0	0.0	0.2	0.2	29.0	0.9	0.0	30.1	0.2	0.0	21.3	0.0	21.5	-
PHF	0.762	0.875	0.500	0.000	0.845	0.250	0.000	0.000	0.000	0.250	0.250	0.615	0.333	0.000	0.627	0.250	0.000	0.810	0.000	0.819	0.884
Lights	64	146	2	0	212	1	0	0	0	1	1	126	4	0	131	1	0	94	0	95	439
% Lights	100.0	99.3	100.0	-	99.5	100.0	-	-	-	100.0	100.0	98.4	100.0	-	98.5	100.0	-	100.0	-	100.0	99.3
Other Vehicles	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
% Other Vehicles	0.0	0.7	0.0	-	0.5	0.0	-	-	-	0.0	0.0	1.6	0.0	-	1.5	0.0	-	0.0	-	0.0	0.7

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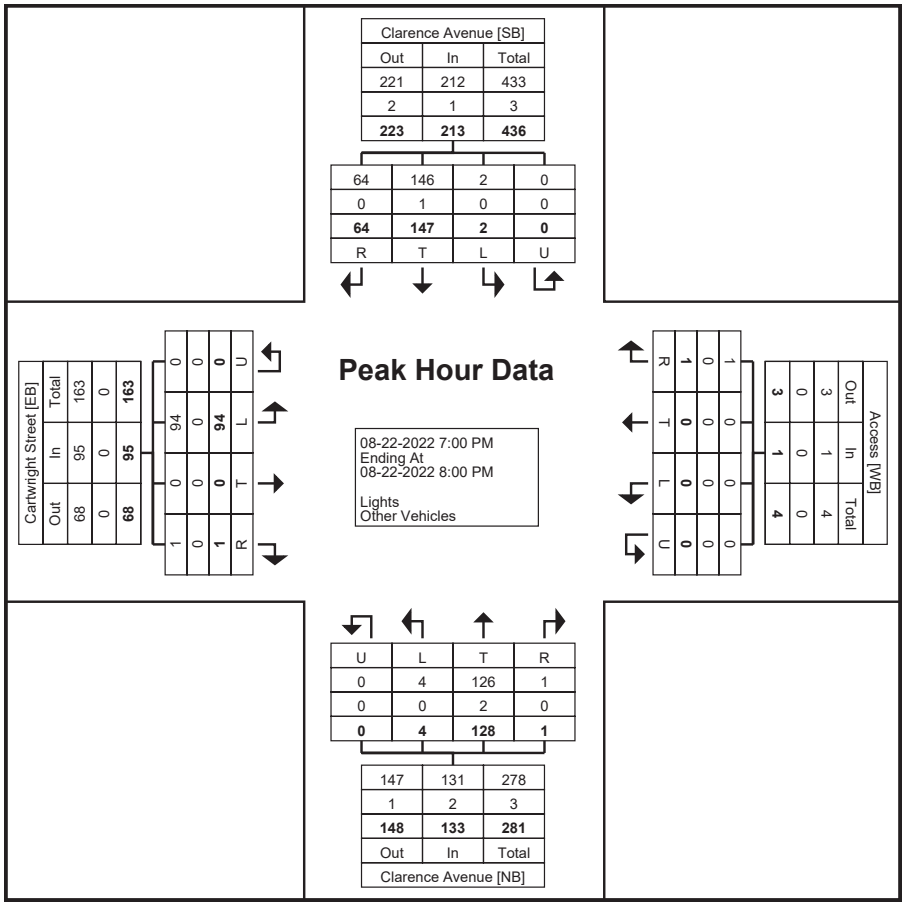

Turning Movement Peak Hour Data Plot (7:00 PM)

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Count Name: Clarence Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-22-2022

Turning Movement Peak Hour Data (9:45 AM)

Start Time	Clarence Avenue Southbound					Access Westbound					Clarence Avenue Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
9:45 AM	18	20	1	0	39	0	0	0	0	0	0	42	1	0	43	0	0	36	0	36	118
10:00 AM	22	30	0	0	52	2	0	0	0	2	0	52	1	0	53	0	0	26	0	26	133
10:15 AM	27	45	2	0	74	2	0	0	0	2	0	34	0	0	34	1	0	28	0	29	139
10:30 AM	27	33	1	0	61	1	0	0	0	1	0	32	3	0	35	2	0	23	0	25	122
Total	94	128	4	0	226	5	0	0	0	5	0	160	5	0	165	3	0	113	0	116	512
Approach %	41.6	56.6	1.8	0.0	-	100.0	0.0	0.0	0.0	-	0.0	97.0	3.0	0.0	-	2.6	0.0	97.4	0.0	-	-
Total %	18.4	25.0	0.8	0.0	44.1	1.0	0.0	0.0	0.0	1.0	0.0	31.3	1.0	0.0	32.2	0.6	0.0	22.1	0.0	22.7	-
PHF	0.870	0.711	0.500	0.000	0.764	0.625	0.000	0.000	0.000	0.625	0.000	0.769	0.417	0.000	0.778	0.375	0.000	0.785	0.000	0.806	0.921
Lights	93	123	3	0	219	4	0	0	0	4	0	157	5	0	162	3	0	113	0	116	501
% Lights	98.9	96.1	75.0	-	96.9	80.0	-	-	-	80.0	-	98.1	100.0	-	98.2	100.0	-	100.0	-	100.0	97.9
Other Vehicles	1	5	1	0	7	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	11
% Other Vehicles	1.1	3.9	25.0	-	3.1	20.0	-	-	-	20.0	-	1.9	0.0	-	1.8	0.0	-	0.0	-	0.0	2.1

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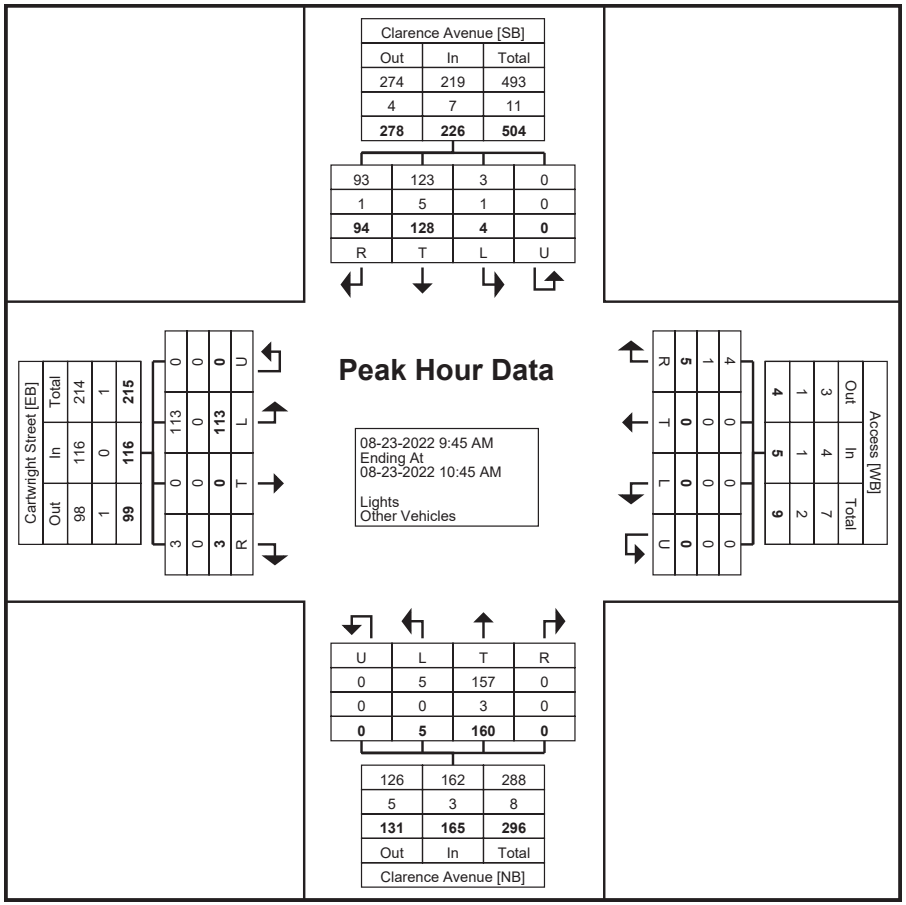

Turning Movement Peak Hour Data Plot (9:45 AM)

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Count Name: Clarence Avenue & Cartwright Street
Site Code: 111000399
Start Date: 08-22-2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Clarence Avenue Southbound					Access Westbound					Clarence Avenue Northbound					Cartwright Street Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:15 PM	30	75	2	0	107	1	0	0	0	1	0	52	0	0	52	0	0	33	0	33	193
4:30 PM	30	53	2	0	85	0	0	0	0	0	0	66	1	0	67	4	1	26	0	31	183
4:45 PM	52	50	0	0	102	2	0	0	0	2	0	54	1	0	55	0	0	35	0	35	194
5:00 PM	40	66	1	1	108	1	0	1	0	2	0	52	0	0	52	3	0	25	0	28	190
Total	152	244	5	1	402	4	0	1	0	5	0	224	2	0	226	7	1	119	0	127	760
Approach %	37.8	60.7	1.2	0.2	-	80.0	0.0	20.0	0.0	-	0.0	99.1	0.9	0.0	-	5.5	0.8	93.7	0.0	-	-
Total %	20.0	32.1	0.7	0.1	52.9	0.5	0.0	0.1	0.0	0.7	0.0	29.5	0.3	0.0	29.7	0.9	0.1	15.7	0.0	16.7	-
PHF	0.731	0.813	0.625	0.250	0.931	0.500	0.000	0.250	0.000	0.625	0.000	0.848	0.500	0.000	0.843	0.438	0.250	0.850	0.000	0.907	0.979
Lights	152	243	5	1	401	4	0	1	0	5	0	218	2	0	220	7	1	119	0	127	753
% Lights	100.0	99.6	100.0	100.0	99.8	100.0	-	100.0	-	100.0	-	97.3	100.0	-	97.3	100.0	100.0	100.0	-	100.0	99.1
Other Vehicles	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	7
% Other Vehicles	0.0	0.4	0.0	0.0	0.2	0.0	-	0.0	-	0.0	-	2.7	0.0	-	2.7	0.0	0.0	0.0	-	0.0	0.9

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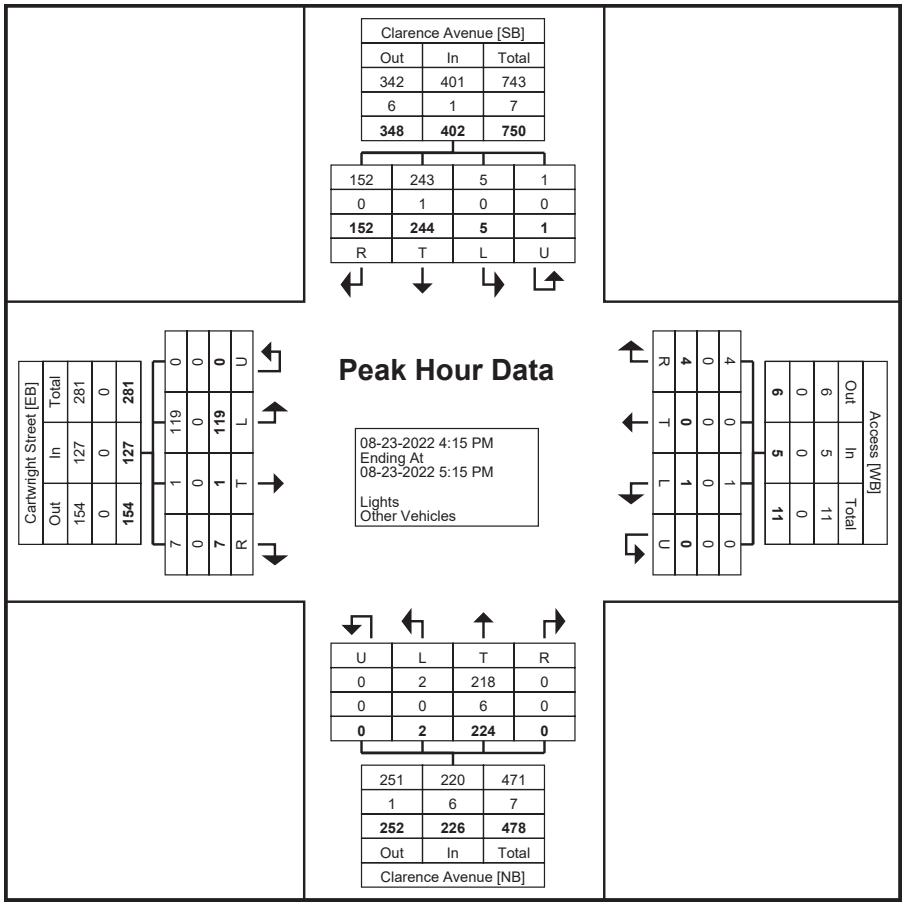


Turning Movement Peak Hour Data Plot (4:15 PM)

Appendix B SYNCHRO, SIMTRAFFIC & SIDRA REPORTS

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	5	1	8	17	24	1	157	6	17	219	61
Future Vol, veh/h	29	5	1	8	17	24	1	157	6	17	219	61
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	31	95	67	71	67	25	91	50	71	83	80
Heavy Vehicles, %	14	1	1	13	1	1	1	3	1	1	6	3
Mvmt Flow	36	16	1	12	24	36	4	173	12	24	264	76

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	567	543	170	375	575	179	340	0	0	185	0	0
Stage 1	350	350	-	187	187	-	-	-	-	-	-	-
Stage 2	217	193	-	188	388	-	-	-	-	-	-	-
Critical Hdwy	7.51	6.515	6.915	7.495	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.71	5.515	-	6.295	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.515	-	6.695	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.633	4.0095	3.3095	3.6235	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	399	448	848	546	429	866	1224	-	-	1395	-	-
Stage 1	613	634	-	786	747	-	-	-	-	-	-	-
Stage 2	754	742	-	769	610	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	359	437	848	520	418	866	1224	-	-	1395	-	-
Mov Cap-2 Maneuver	359	437	-	520	418	-	-	-	-	-	-	-
Stage 1	611	621	-	783	744	-	-	-	-	-	-	-
Stage 2	697	739	-	732	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	11.9	0.2	0.6
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1224	-	-	384	590	1395	-	-
HCM Lane V/C Ratio	0.003	-	-	0.138	0.122	0.017	-	-
HCM Control Delay (s)	8	0	-	15.9	11.9	7.6	0.1	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	21	0	10	0	30	8	5	25	0
Future Vol, veh/h	0	0	0	21	0	10	0	30	8	5	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	82	82	82	86	86	86
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	0	0	23	0	11	0	37	10	6	29	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	89	88	29	83	83	42	29	0	0	47	0	0
Stage 1	41	41	-	42	42	-	-	-	-	-	-	-
Stage 2	48	47	-	41	41	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	898	804	1049	907	809	1032	1591	-	-	1567	-	-
Stage 1	976	863	-	975	862	-	-	-	-	-	-	-
Stage 2	968	858	-	976	863	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	885	801	1049	904	806	1032	1591	-	-	1567	-	-
Mov Cap-2 Maneuver	885	801	-	904	806	-	-	-	-	-	-	-
Stage 1	976	860	-	975	862	-	-	-	-	-	-	-
Stage 2	958	858	-	972	860	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9	0	1.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1591	-	-	-	942	1567	-	-
HCM Lane V/C Ratio	-	-	-	-	0.037	0.004	-	-
HCM Control Delay (s)	0	-	-	0	9	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	52	1	6	83	3	1	1	20	8	1	1
Future Vol, veh/h	1	52	1	6	83	3	1	1	20	8	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	68	25	75	77	75	95	95	56	95	95	67
Heavy Vehicles, %	1	1	1	17	1	1	1	1	1	1	1	1
Mvmt Flow	4	76	4	8	108	4	1	1	36	8	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	112	0	0	80	0	0	213	214	78	231	214	110
Stage 1	-	-	-	-	-	-	86	86	-	126	126	-
Stage 2	-	-	-	-	-	-	127	128	-	105	88	-
Critical Hdwy	4.11	-	-	4.27	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.353	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1484	-	-	1428	-	-	746	685	985	726	685	946
Stage 1	-	-	-	-	-	-	924	826	-	880	794	-
Stage 2	-	-	-	-	-	-	879	792	-	903	824	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1484	-	-	1428	-	-	739	679	985	694	679	946
Mov Cap-2 Maneuver	-	-	-	-	-	-	739	679	-	694	679	-
Stage 1	-	-	-	-	-	-	921	824	-	877	789	-
Stage 2	-	-	-	-	-	-	871	787	-	867	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	8.9	10.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	964	1484	-	-	1428	-	-	719
HCM Lane V/C Ratio	0.039	0.003	-	-	0.006	-	-	0.015
HCM Control Delay (s)	8.9	7.4	0	-	7.5	0	-	10.1
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↰	↑	↱
Traffic Vol, veh/h	113	1	3	1	1	5	5	160	1	4	128	94
Future Vol, veh/h	113	1	3	1	1	5	5	160	1	4	128	94
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	95	38	95	95	62	42	77	95	50	71	87
Heavy Vehicles, %	1	1	1	1	1	20	1	2	1	25	4	1
Mvmt Flow	145	1	8	1	1	8	12	208	1	8	180	108

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	433	429	180	434	429	209	180	0	0	209	0	0
Stage 1	196	196	-	233	233	-	-	-	-	-	-	-
Stage 2	237	233	-	201	196	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.4	4.11	-	-	4.35	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.48	2.209	-	-	2.425	-	-
Pot Cap-1 Maneuver	535	520	865	534	520	788	1402	-	-	1236	-	-
Stage 1	808	740	-	772	714	-	-	-	-	-	-	-
Stage 2	768	714	-	803	740	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	522	512	865	522	512	788	1402	-	-	1236	-	-
Mov Cap-2 Maneuver	522	512	-	522	512	-	-	-	-	-	-	-
Stage 1	800	736	-	764	707	-	-	-	-	-	-	-
Stage 2	751	707	-	789	736	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	10.1	0.4	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1402	-	-	533	711	1236	-	-
HCM Lane V/C Ratio	0.008	-	-	0.289	0.014	0.006	-	-
HCM Control Delay (s)	7.6	0	-	14.5	10.1	7.9	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.2	0	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout AM (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	19	1.0	27	1.0	0.044	6.4	LOS A	0.2	1.5	0.04	0.40	0.04	50.0
6	R2	37	1.0	44	1.0	0.044	1.9	LOS A	0.2	1.5	0.04	0.40	0.04	48.2
6b	R3	1	1.0	1	1.0	0.044	2.3	LOS A	0.2	1.5	0.04	0.40	0.04	47.6
Approach		57	1.0	72	1.0	0.044	3.6	LOS A	0.2	1.5	0.04	0.40	0.04	48.8
NorthEast: Parking Access														
24b	L3	1	1.0	1	1.0	0.002	8.8	LOS A	0.0	0.1	0.18	0.39	0.18	50.9
25	T1	1	1.0	1	1.0	0.002	1.4	LOS A	0.0	0.1	0.18	0.39	0.18	49.1
26b	R3	1	1.0	1	1.0	0.002	2.5	LOS A	0.0	0.1	0.18	0.39	0.18	47.0
Approach		3	1.0	3	1.0	0.002	4.2	LOS A	0.0	0.1	0.18	0.39	0.18	49.0
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.041	8.6	LOS A	0.2	1.3	0.11	0.49	0.11	49.9
7	L2	40	2.0	44	2.0	0.041	7.6	LOS A	0.2	1.3	0.11	0.49	0.11	49.2
9a	R1	8	1.0	16	1.0	0.041	1.1	LOS A	0.2	1.3	0.11	0.49	0.11	47.7
Approach		49	1.8	61	1.7	0.041	5.9	LOS A	0.2	1.3	0.11	0.49	0.11	48.8
SouthWest: Clubhouse														
30a	L1	3	1.0	4	1.0	0.006	6.6	LOS A	0.0	0.2	0.14	0.35	0.14	49.7
31	T1	1	1.0	1	1.0	0.006	1.3	LOS A	0.0	0.2	0.14	0.35	0.14	49.5
32a	R1	2	1.0	4	1.0	0.006	1.2	LOS A	0.0	0.2	0.14	0.35	0.14	49.0
Approach		6	1.0	9	1.0	0.006	3.6	LOS A	0.0	0.2	0.14	0.35	0.14	49.4
All Vehicles		115	1.3	145	1.3	0.044	4.6	LOS A	0.2	1.5	0.08	0.44	0.08	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	SB	SB
Directions Served	LTR	LTR	LT	TR
Maximum Queue (m)	22.6	17.5	12.8	1.2
Average Queue (m)	7.3	7.4	1.1	0.0
95th Queue (m)	17.3	15.5	6.4	0.9
Link Distance (m)	146.4	259.1	244.9	244.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (m)	10.1	2.3
Average Queue (m)	5.6	0.1
95th Queue (m)	12.4	1.2
Link Distance (m)	85.2	242.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.8	1.6	12.1	10.7
Average Queue (m)	0.0	0.1	5.4	2.3
95th Queue (m)	0.0	1.2	13.1	8.9
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	22.2	15.8	5.1	1.8
Average Queue (m)	11.1	2.2	0.3	0.1
95th Queue (m)	17.6	9.4	2.8	1.3
Link Distance (m)	221.1	88.9	765.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	18.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	17	1	10	9	22	1	327	17	40	215	55
Future Vol, veh/h	49	17	1	10	9	22	1	327	17	40	215	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	53	72	79	56	62	71	87	25	71	94	65
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	3	1
Mvmt Flow	196	32	1	13	16	35	1	376	68	56	229	85

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	822	830	157	655	838	410	314	0	0	444	0	0
Stage 1	384	384	-	412	412	-	-	-	-	-	-	-
Stage 2	438	446	-	243	426	-	-	-	-	-	-	-
Critical Hdwy	7.315	6.515	6.915	7.315	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.515	5.515	-	6.115	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.115	5.515	-	6.515	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	4.0095	3.3095	3.5095	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	281	306	864	367	303	643	1251	-	-	1121	-	-
Stage 1	614	613	-	619	596	-	-	-	-	-	-	-
Stage 2	599	575	-	742	587	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	242	287	864	320	284	643	1251	-	-	1121	-	-
Mov Cap-2 Maneuver	242	287	-	320	284	-	-	-	-	-	-	-
Stage 1	613	576	-	618	595	-	-	-	-	-	-	-
Stage 2	550	574	-	657	551	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	81.2	15	0	1.4
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1251	-	-	249	424	1121	-	-
HCM Lane V/C Ratio	0.001	-	-	0.922	0.151	0.05	-	-
HCM Control Delay (s)	7.9	0	-	81.2	15	8.4	0.2	-
HCM Lane LOS	A	A	-	F	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	8.1	0.5	0.2	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	20	0	38	0	26	24	37	40	0
Future Vol, veh/h	0	0	0	20	0	38	0	26	24	37	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	73	73	73	71	71	71
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	0	0	22	0	42	0	36	33	52	56	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	234	229	56	213	213	53	56	0	0	69	0	0
Stage 1	160	160	-	53	53	-	-	-	-	-	-	-
Stage 2	74	69	-	160	160	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	723	672	1013	746	686	1017	1555	-	-	1538	-	-
Stage 1	845	767	-	962	853	-	-	-	-	-	-	-
Stage 2	938	839	-	845	767	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	675	648	1013	726	662	1017	1555	-	-	1538	-	-
Mov Cap-2 Maneuver	675	648	-	726	662	-	-	-	-	-	-	-
Stage 1	845	740	-	962	853	-	-	-	-	-	-	-
Stage 2	899	839	-	815	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9.3	0	3.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1555	-	-	-	894	1538	-	-
HCM Lane V/C Ratio	-	-	-	-	0.072	0.034	-	-
HCM Control Delay (s)	0	-	-	0	9.3	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	116	2	36	103	12	2	1	12	11	1	3
Future Vol, veh/h	1	116	2	36	103	12	2	1	12	11	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	81	50	75	72	60	50	95	60	69	95	75
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	9	1	1
Mvmt Flow	1	143	4	48	143	20	4	1	20	16	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	163	0	0	147	0	0	399	406	145	407	398	153
Stage 1	-	-	-	-	-	-	147	147	-	249	249	-
Stage 2	-	-	-	-	-	-	252	259	-	158	149	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.19	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.581	4.009	3.309
Pot Cap-1 Maneuver	1422	-	-	1441	-	-	563	536	905	542	541	896
Stage 1	-	-	-	-	-	-	858	777	-	740	702	-
Stage 2	-	-	-	-	-	-	754	695	-	828	776	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1422	-	-	1441	-	-	543	516	905	514	520	896
Mov Cap-2 Maneuver	-	-	-	-	-	-	543	516	-	514	520	-
Stage 1	-	-	-	-	-	-	857	776	-	739	676	-
Stage 2	-	-	-	-	-	-	722	669	-	808	775	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.7	9.7	11.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	795	1422	-	-	1441	-	-	560
HCM Lane V/C Ratio	0.032	0.001	-	-	0.033	-	-	0.037
HCM Control Delay (s)	9.7	7.5	0	-	7.6	0	-	11.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↰	↑	↱
Traffic Vol, veh/h	119	1	7	1	1	4	2	224	1	5	244	152
Future Vol, veh/h	119	1	7	1	1	4	2	224	1	5	244	152
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	25	85	25	95	50	50	85	95	62	81	73
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	1	1
Mvmt Flow	270	4	8	4	1	8	4	264	1	8	301	208

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	594	590	301	596	590	265	301	0	0	265	0	0
Stage 1	317	317	-	273	273	-	-	-	-	-	-	-
Stage 2	277	273	-	323	317	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	418	422	741	417	422	776	1266	-	-	1305	-	-
Stage 1	696	656	-	735	686	-	-	-	-	-	-	-
Stage 2	732	686	-	691	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	410	418	741	406	418	776	1266	-	-	1305	-	-
Mov Cap-2 Maneuver	410	418	-	406	418	-	-	-	-	-	-	-
Stage 1	693	652	-	732	683	-	-	-	-	-	-	-
Stage 2	720	683	-	675	652	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.1	11.4	0.1	0.1
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1266	-	-	416	576	1305	-	-
HCM Lane V/C Ratio	0.003	-	-	0.68	0.023	0.006	-	-
HCM Control Delay (s)	7.9	0	-	30.1	11.4	7.8	-	-
HCM Lane LOS	A	A	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	4.9	0.1	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout PM (Site Folder: General)]

PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	25	1.0	40	1.0	0.061	6.5	LOS A	0.3	2.1	0.06	0.41	0.06	49.8
6	R2	42	1.0	56	1.0	0.061	2.0	LOS A	0.3	2.1	0.06	0.41	0.06	48.1
6b	R3	2	1.0	4	1.0	0.061	2.3	LOS A	0.3	2.1	0.06	0.41	0.06	47.4
Approach		69	1.0	100	1.0	0.061	3.8	LOS A	0.3	2.1	0.06	0.41	0.06	48.7
NorthEast: Parking Access														
24b	L3	2	1.0	4	1.0	0.007	8.9	LOS A	0.0	0.2	0.22	0.42	0.22	50.4
25	T1	1	1.0	4	1.0	0.007	1.5	LOS A	0.0	0.2	0.22	0.42	0.22	48.7
26b	R3	1	1.0	1	1.0	0.007	2.6	LOS A	0.0	0.2	0.22	0.42	0.22	46.6
Approach		4	1.0	9	1.0	0.007	4.9	LOS A	0.0	0.2	0.22	0.42	0.22	49.2
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.055	8.7	LOS A	0.3	1.8	0.15	0.52	0.15	49.3
7	L2	50	1.0	68	1.0	0.055	7.6	LOS A	0.3	1.8	0.15	0.52	0.15	48.6
9a	R1	7	1.0	12	1.0	0.055	1.2	LOS A	0.3	1.8	0.15	0.52	0.15	47.2
Approach		58	1.0	81	1.0	0.055	6.7	LOS A	0.3	1.8	0.15	0.52	0.15	48.4
SouthWest: Clubhouse														
30a	L1	6	1.0	8	1.0	0.032	6.7	LOS A	0.2	1.1	0.19	0.26	0.19	50.5
31	T1	1	1.0	1	1.0	0.032	1.4	LOS A	0.2	1.1	0.19	0.26	0.19	50.3
32a	R1	28	1.0	36	1.0	0.032	1.3	LOS A	0.2	1.1	0.19	0.26	0.19	49.7
Approach		35	1.0	45	1.0	0.032	2.3	LOS A	0.2	1.1	0.19	0.26	0.19	49.8
All Vehicles		166	1.0	234	1.0	0.061	4.5	LOS A	0.3	2.1	0.12	0.42	0.12	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LT
Maximum Queue (m)	34.2	19.1	8.0	15.4
Average Queue (m)	11.8	8.4	0.3	4.4
95th Queue (m)	27.2	16.6	3.2	12.5
Link Distance (m)	146.4	259.1		244.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	11.7	1.2	5.8
Average Queue (m)	7.5	0.0	0.6
95th Queue (m)	12.6	0.9	3.6
Link Distance (m)	85.2	280.3	242.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	8.0	10.6	14.7
Average Queue (m)	1.3	4.0	3.6
95th Queue (m)	6.0	11.3	12.1
Link Distance (m)	221.1	170.0	154.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	28.8	8.4	3.1	8.8
Average Queue (m)	13.5	2.0	0.2	0.5
95th Queue (m)	22.8	7.7	2.2	3.9
Link Distance (m)	221.1	88.9	765.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	5	1	18	19	26	2	282	35	19	277	67
Future Vol, veh/h	32	5	1	18	19	26	2	282	35	19	277	67
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	31	95	67	71	67	25	91	50	71	83	80
Heavy Vehicles, %	14	1	1	13	1	1	1	3	1	1	6	3
Mvmt Flow	40	16	1	27	27	39	8	310	70	27	334	84

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	824	826	209	590	833	345	418	0	0	380	0	0
Stage 1	430	430	-	361	361	-	-	-	-	-	-	-
Stage 2	394	396	-	229	472	-	-	-	-	-	-	-
Critical Hdwy	7.51	6.515	6.915	7.495	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.71	5.515	-	6.295	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.515	-	6.695	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.633	4.0095	3.3095	3.6235	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	262	308	800	386	305	700	1146	-	-	1183	-	-
Stage 1	548	585	-	630	627	-	-	-	-	-	-	-
Stage 2	602	605	-	727	560	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	296	800	359	293	700	1146	-	-	1183	-	-
Mov Cap-2 Maneuver	223	296	-	359	293	-	-	-	-	-	-	-
Stage 1	543	567	-	624	621	-	-	-	-	-	-	-
Stage 2	539	600	-	684	543	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.3	16.1	0.2	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	243	417	1183	-	-
HCM Lane V/C Ratio	0.007	-	-	0.233	0.222	0.023	-	-
HCM Control Delay (s)	8.2	0	-	24.3	16.1	8.1	0.1	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	10	39	8	5	53
Future Vol, veh/h	21	10	39	8	5	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	82	82	86	86
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	23	11	48	10	6	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	127	53	0	0	58	0
Stage 1	53	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	870	1017	-	-	1553	-
Stage 1	972	-	-	-	-	-
Stage 2	951	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	867	1017	-	-	1553	-
Mov Cap-2 Maneuver	867	-	-	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	947	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	910	1553	-
HCM Lane V/C Ratio	-	-	0.038	0.004	-
HCM Control Delay (s)	-	-	9.1	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	111	208	1	37	258
Future Vol, veh/h	1	111	208	1	37	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	94	94
Heavy Vehicles, %	1	1	3	1	1	6
Mvmt Flow	1	123	234	1	39	274

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	587	235	0	0	235	0
Stage 1	235	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	474	807	-	-	1338	-
Stage 1	806	-	-	-	-	-
Stage 2	714	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	458	807	-	-	1338	-
Mov Cap-2 Maneuver	458	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	802	1338	-
HCM Lane V/C Ratio	-	-	0.155	0.029	-
HCM Control Delay (s)	-	-	10.3	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	80	1	6	92	3	1	1	20	8	1	1
Future Vol, veh/h	1	80	1	6	92	3	1	1	20	8	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	68	25	75	77	75	95	95	56	95	95	67
Heavy Vehicles, %	1	1	1	17	1	1	1	1	1	1	1	1
Mvmt Flow	4	118	4	8	119	4	1	1	36	8	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	123	0	0	122	0	0	266	267	120	284	267	121
Stage 1	-	-	-	-	-	-	128	128	-	137	137	-
Stage 2	-	-	-	-	-	-	138	139	-	147	130	-
Critical Hdwy	4.11	-	-	4.27	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.353	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1470	-	-	1377	-	-	689	641	934	670	641	933
Stage 1	-	-	-	-	-	-	878	792	-	869	785	-
Stage 2	-	-	-	-	-	-	868	784	-	858	791	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1470	-	-	1377	-	-	682	635	934	639	635	933
Mov Cap-2 Maneuver	-	-	-	-	-	-	682	635	-	639	635	-
Stage 1	-	-	-	-	-	-	875	790	-	866	780	-
Stage 2	-	-	-	-	-	-	860	779	-	822	789	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	9.1	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	913	1470	-	-	1377	-	-	667
HCM Lane V/C Ratio	0.041	0.003	-	-	0.006	-	-	0.016
HCM Control Delay (s)	9.1	7.5	0	-	7.6	0	-	10.5
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↑	↱
Traffic Vol, veh/h	141	1	3	1	1	5	5	175	1	4	140	103
Future Vol, veh/h	141	1	3	1	1	5	5	175	1	4	140	103
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	95	38	95	95	62	42	77	95	50	71	87
Heavy Vehicles, %	1	1	1	1	1	20	1	2	1	25	4	1
Mvmt Flow	181	1	8	1	1	8	12	227	1	8	197	118

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	469	465	197	470	465	228	197	0	0	228	0	0
Stage 1	213	213	-	252	252	-	-	-	-	-	-	-
Stage 2	256	252	-	218	213	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.4	4.11	-	-	4.35	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.48	2.209	-	-	2.425	-	-
Pot Cap-1 Maneuver	506	496	847	505	496	769	1382	-	-	1216	-	-
Stage 1	791	728	-	754	700	-	-	-	-	-	-	-
Stage 2	751	700	-	787	728	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	493	488	847	493	488	769	1382	-	-	1216	-	-
Mov Cap-2 Maneuver	493	488	-	493	488	-	-	-	-	-	-	-
Stage 1	783	723	-	746	693	-	-	-	-	-	-	-
Stage 2	735	693	-	773	723	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.5	10.3	0.4	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1382	-	-	502	688	1216	-	-
HCM Lane V/C Ratio	0.009	-	-	0.378	0.015	0.007	-	-
HCM Control Delay (s)	7.6	0	-	16.5	10.3	8	-	-
HCM Lane LOS	A	A	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.7	0	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout AM (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	19	1.0	27	1.0	0.050	6.4	LOS A	0.2	1.7	0.04	0.39	0.04	50.1
6	R2	46	1.0	55	1.0	0.050	1.9	LOS A	0.2	1.7	0.04	0.39	0.04	48.3
6b	R3	1	1.0	1	1.0	0.050	2.3	LOS A	0.2	1.7	0.04	0.39	0.04	47.7
Approach		66	1.0	83	1.0	0.050	3.4	LOS A	0.2	1.7	0.04	0.39	0.04	48.9
NorthEast: Parking Access														
24b	L3	1	1.0	1	1.0	0.002	8.8	LOS A	0.0	0.1	0.20	0.39	0.20	50.9
25	T1	1	1.0	1	1.0	0.002	1.5	LOS A	0.0	0.1	0.20	0.39	0.20	49.1
26b	R3	1	1.0	1	1.0	0.002	2.5	LOS A	0.0	0.1	0.20	0.39	0.20	47.0
Approach		3	1.0	3	1.0	0.002	4.3	LOS A	0.0	0.1	0.20	0.39	0.20	48.9
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.060	8.6	LOS A	0.3	2.0	0.11	0.52	0.11	49.6
7	L2	68	2.0	75	2.0	0.060	7.6	LOS A	0.3	2.0	0.11	0.52	0.11	48.8
9a	R1	8	1.0	16	1.0	0.060	1.1	LOS A	0.3	2.0	0.11	0.52	0.11	47.4
Approach		77	1.9	92	1.8	0.060	6.5	LOS A	0.3	2.0	0.11	0.52	0.11	48.6
SouthWest: Clubhouse														
30a	L1	3	1.0	4	1.0	0.006	6.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.6
31	T1	1	1.0	1	1.0	0.006	1.4	LOS A	0.0	0.2	0.19	0.36	0.19	49.4
32a	R1	2	1.0	4	1.0	0.006	1.3	LOS A	0.0	0.2	0.19	0.36	0.19	48.8
Approach		6	1.0	9	1.0	0.006	3.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.2
All Vehicles		152	1.4	187	1.4	0.060	4.9	LOS A	0.3	2.0	0.09	0.45	0.09	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LT
Maximum Queue (m)	22.4	20.6	11.9	12.8
Average Queue (m)	8.8	10.5	0.8	1.7
95th Queue (m)	17.8	18.6	5.7	8.5
Link Distance (m)	146.4	259.1		244.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Cartwright Street & Cartwright Terrace

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	11.7	3.6
Average Queue (m)	6.1	0.1
95th Queue (m)	13.0	1.9
Link Distance (m)	85.2	246.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	20.2	19.4
Average Queue (m)	10.6	2.8
95th Queue (m)	16.7	11.1
Link Distance (m)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.8	1.6	10.5	9.2
Average Queue (m)	0.0	0.2	5.0	2.9
95th Queue (m)	0.0	2.0	12.4	9.7
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	23.1	9.4	3.2	11.3
Average Queue (m)	12.3	1.8	0.2	0.4
95th Queue (m)	20.0	7.5	2.0	4.6
Link Distance (m)	221.1	88.9		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	77.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	54	19	2	40	10	24	2	426	36	44	350	60
Future Vol, veh/h	54	19	2	40	10	24	2	426	36	44	350	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	53	72	79	56	62	71	87	25	71	94	65
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	3	1
Mvmt Flow	216	36	3	51	18	39	3	490	144	62	372	92

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1139	1182	232	896	1156	562	464	0	0	634	0	0
Stage 1	542	542	-	568	568	-	-	-	-	-	-	-
Stage 2	597	640	-	328	588	-	-	-	-	-	-	-
Critical Hdwy	7.315	6.515	6.915	7.315	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.515	5.515	-	6.115	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.115	5.515	-	6.515	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	4.0095	3.3095	3.5095	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	~ 168	190	774	249	197	528	1102	-	-	953	-	-
Stage 1	495	521	-	509	508	-	-	-	-	-	-	-
Stage 2	491	471	-	662	497	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 134	172	774	194	179	528	1102	-	-	953	-	-
Mov Cap-2 Maneuver	~ 134	172	-	194	179	-	-	-	-	-	-	-
Stage 1	493	475	-	507	506	-	-	-	-	-	-	-
Stage 2	437	469	-	556	453	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 449.4	30.3	0	1.3
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1102	-	-	140	247	953	-	-
HCM Lane V/C Ratio	0.003	-	-	1.819	0.434	0.065	-	-
HCM Control Delay (s)	8.3	0	-	$ 449.4	30.3	9	0.3	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	19.3	2.1	0.2	-	-

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

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	38	55	24	37	57
Future Vol, veh/h	20	38	55	24	37	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	73	73	71	71
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	22	42	75	33	52	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	276	92	0	0	108	0
Stage 1	92	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	716	968	-	-	1489	-
Stage 1	934	-	-	-	-	-
Stage 2	850	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	690	968	-	-	1489	-
Mov Cap-2 Maneuver	690	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	819	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	850	1489	-
HCM Lane V/C Ratio	-	-	0.076	0.035	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	70	393	1	120	273
Future Vol, veh/h	1	70	393	1	120	273
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	87	87
Heavy Vehicles, %	1	1	4	1	1	3
Mvmt Flow	1	78	442	1	138	314

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1033	443	0	0	443	0
Stage 1	443	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	259	617	-	-	1122	-
Stage 1	649	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	220	617	-	-	1122	-
Mov Cap-2 Maneuver	220	-	-	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	473	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	602	1122	-
HCM Lane V/C Ratio	-	-	0.131	0.123	-
HCM Control Delay (s)	-	-	11.9	8.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.4	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	133	2	36	132	12	2	1	12	11	1	3
Future Vol, veh/h	1	133	2	36	132	12	2	1	12	11	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	81	50	75	72	60	50	95	60	69	95	75
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	9	1	1
Mvmt Flow	1	164	4	48	183	20	4	1	20	16	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	203	0	0	168	0	0	460	467	166	468	459	193
Stage 1	-	-	-	-	-	-	168	168	-	289	289	-
Stage 2	-	-	-	-	-	-	292	299	-	179	170	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.19	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.581	4.009	3.309
Pot Cap-1 Maneuver	1375	-	-	1416	-	-	513	495	881	494	500	851
Stage 1	-	-	-	-	-	-	836	761	-	704	675	-
Stage 2	-	-	-	-	-	-	718	668	-	807	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1375	-	-	1416	-	-	495	476	881	468	481	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	476	-	468	481	-
Stage 1	-	-	-	-	-	-	835	760	-	703	649	-
Stage 2	-	-	-	-	-	-	686	643	-	787	759	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	9.9	12.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	759	1375	-	-	1416	-	-	513
HCM Lane V/C Ratio	0.033	0.001	-	-	0.034	-	-	0.041
HCM Control Delay (s)	9.9	7.6	0	-	7.6	0	-	12.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	136	1	7	1	1	4	2	245	1	5	267	181
Future Vol, veh/h	136	1	7	1	1	4	2	245	1	5	267	181
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	25	85	25	95	50	50	85	95	62	81	73
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	1	1
Mvmt Flow	309	4	8	4	1	8	4	288	1	8	330	248

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	647	643	330	649	643	289	330	0	0	289	0	0
Stage 1	346	346	-	297	297	-	-	-	-	-	-	-
Stage 2	301	297	-	352	346	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	385	393	714	384	393	752	1235	-	-	1279	-	-
Stage 1	672	637	-	714	669	-	-	-	-	-	-	-
Stage 2	710	669	-	667	637	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	377	389	714	374	389	752	1235	-	-	1279	-	-
Mov Cap-2 Maneuver	377	389	-	374	389	-	-	-	-	-	-	-
Stage 1	669	633	-	711	666	-	-	-	-	-	-	-
Stage 2	699	666	-	651	633	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	48.3	11.8	0.1	0.1
HCM LOS	E	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1235	-	-	382	543	1279	-	-
HCM Lane V/C Ratio	0.003	-	-	0.841	0.024	0.006	-	-
HCM Control Delay (s)	7.9	0	-	48.3	11.8	7.8	-	-
HCM Lane LOS	A	A	-	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	7.8	0.1	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout PM (Site Folder: General)]

PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	25	1.0	40	1.0	0.084	6.5	LOS A	0.4	3.0	0.06	0.37	0.06	50.2
6	R2	71	1.0	95	1.0	0.084	2.0	LOS A	0.4	3.0	0.06	0.37	0.06	48.4
6b	R3	2	1.0	4	1.0	0.084	2.3	LOS A	0.4	3.0	0.06	0.37	0.06	47.7
Approach		98	1.0	138	1.0	0.084	3.3	LOS A	0.4	3.0	0.06	0.37	0.06	48.8
NorthEast: Parking Access														
24b	L3	2	1.0	4	1.0	0.007	9.0	LOS A	0.0	0.2	0.27	0.43	0.27	50.3
25	T1	1	1.0	4	1.0	0.007	1.7	LOS A	0.0	0.2	0.27	0.43	0.27	48.5
26b	R3	1	1.0	1	1.0	0.007	2.7	LOS A	0.0	0.2	0.27	0.43	0.27	46.5
Approach		4	1.0	9	1.0	0.007	5.0	LOS A	0.0	0.2	0.27	0.43	0.27	49.0
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.070	8.7	LOS A	0.3	2.3	0.15	0.53	0.15	49.2
7	L2	67	1.0	91	1.0	0.070	7.6	LOS A	0.3	2.3	0.15	0.53	0.15	48.5
9a	R1	7	1.0	12	1.0	0.070	1.2	LOS A	0.3	2.3	0.15	0.53	0.15	47.0
Approach		75	1.0	104	1.0	0.070	6.9	LOS A	0.3	2.3	0.15	0.53	0.15	48.3
SouthWest: Clubhouse														
30a	L1	6	1.0	8	1.0	0.032	6.8	LOS A	0.2	1.1	0.22	0.27	0.22	50.4
31	T1	1	1.0	1	1.0	0.032	1.5	LOS A	0.2	1.1	0.22	0.27	0.22	50.2
32a	R1	28	1.0	36	1.0	0.032	1.4	LOS A	0.2	1.1	0.22	0.27	0.22	49.6
Approach		35	1.0	45	1.0	0.032	2.3	LOS A	0.2	1.1	0.22	0.27	0.22	49.7
All Vehicles		212	1.0	296	1.0	0.084	4.4	LOS A	0.4	3.0	0.12	0.41	0.12	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	63.8	26.2	6.4	29.8	9.2
Average Queue (m)	18.6	12.2	0.5	6.6	0.3
95th Queue (m)	48.4	22.0	3.9	19.8	5.8
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Cartwright Terrace

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.9	9.0
Average Queue (m)	7.9	0.9
95th Queue (m)	13.7	5.4
Link Distance (m)	85.2	246.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	19.2	27.5
Average Queue (m)	9.3	10.2
95th Queue (m)	15.5	23.6
Link Distance (m)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	10.8	14.4	17.2
Average Queue (m)	1.4	4.0	4.7
95th Queue (m)	6.6	11.5	13.3
Link Distance (m)	221.1	170.0	154.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	R
Maximum Queue (m)	40.6	8.3	3.2	6.8	9.3
Average Queue (m)	14.6	1.6	0.1	0.5	0.3
95th Queue (m)	27.0	6.8	1.7	3.7	4.0
Link Distance (m)	221.1	88.9			506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	5	1	10	20	104	3	283	7	57	278	67
Future Vol, veh/h	32	5	1	10	20	104	3	283	7	57	278	67
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	31	95	67	71	67	25	91	50	71	83	80
Heavy Vehicles, %	14	1	1	13	1	1	1	3	1	1	6	3
Mvmt Flow	40	16	1	15	28	155	12	311	14	80	335	84

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	971	886	210	678	921	318	419	0	0	325	0	0
Stage 1	537	537	-	342	342	-	-	-	-	-	-	-
Stage 2	434	349	-	336	579	-	-	-	-	-	-	-
Critical Hdwy	7.51	6.515	6.915	7.495	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.71	5.515	-	6.295	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.515	-	6.695	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.633	4.0095	3.3095	3.6235	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	205	284	799	334	271	725	1145	-	-	1240	-	-
Stage 1	472	524	-	646	639	-	-	-	-	-	-	-
Stage 2	572	635	-	627	502	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	136	256	799	294	245	725	1145	-	-	1240	-	-
Mov Cap-2 Maneuver	136	256	-	294	245	-	-	-	-	-	-	-
Stage 1	466	479	-	638	631	-	-	-	-	-	-	-
Stage 2	424	627	-	554	459	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	39.4	16.1	0.3	1.4
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1145	-	-	160	522	1240	-	-
HCM Lane V/C Ratio	0.01	-	-	0.354	0.38	0.065	-	-
HCM Control Delay (s)	8.2	0	-	39.4	16.1	8.1	0.2	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.5	1.8	0.2	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	1	18	21	1	10	11	64	8	5	47	5
Future Vol, veh/h	14	1	18	21	1	10	11	64	8	5	47	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	82	82	82	86	86	86
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	16	1	20	23	1	11	13	78	10	6	55	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	185	184	58	190	182	83	61	0	0	88	0	0
Stage 1	70	70	-	109	109	-	-	-	-	-	-	-
Stage 2	115	114	-	81	73	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	778	712	1011	772	714	979	1549	-	-	1514	-	-
Stage 1	942	839	-	899	807	-	-	-	-	-	-	-
Stage 2	892	803	-	930	836	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	761	703	1011	748	705	979	1549	-	-	1514	-	-
Mov Cap-2 Maneuver	761	703	-	748	705	-	-	-	-	-	-	-
Stage 1	934	836	-	891	800	-	-	-	-	-	-	-
Stage 2	873	796	-	907	833	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.7	1	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	877	806	1514	-	-
HCM Lane V/C Ratio	0.009	-	-	0.042	0.044	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.7	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	113	180	1	39	250
Future Vol, veh/h	2	113	180	1	39	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	94	94
Heavy Vehicles, %	1	1	3	1	1	6
Mvmt Flow	2	126	202	1	41	266

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	551	203	0	0	203	0
Stage 1	203	-	-	-	-	-
Stage 2	348	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	497	840	-	-	1375	-
Stage 1	833	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	480	840	-	-	1375	-
Mov Cap-2 Maneuver	480	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	692	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	829	1375	-
HCM Lane V/C Ratio	-	-	0.154	0.03	-
HCM Control Delay (s)	-	-	10.1	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	113	1	6	102	3	1	1	20	8	1	1
Future Vol, veh/h	1	113	1	6	102	3	1	1	20	8	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	68	25	75	77	75	95	95	56	95	95	67
Heavy Vehicles, %	1	1	1	17	1	1	1	1	1	1	1	1
Mvmt Flow	4	166	4	8	132	4	1	1	36	8	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	136	0	0	170	0	0	327	328	168	345	328	134
Stage 1	-	-	-	-	-	-	176	176	-	150	150	-
Stage 2	-	-	-	-	-	-	151	152	-	195	178	-
Critical Hdwy	4.11	-	-	4.27	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.353	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1454	-	-	1321	-	-	628	592	879	611	592	918
Stage 1	-	-	-	-	-	-	828	755	-	855	775	-
Stage 2	-	-	-	-	-	-	854	774	-	809	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1454	-	-	1321	-	-	621	586	879	581	586	918
Mov Cap-2 Maneuver	-	-	-	-	-	-	621	586	-	581	586	-
Stage 1	-	-	-	-	-	-	826	753	-	852	770	-
Stage 2	-	-	-	-	-	-	845	769	-	773	752	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	9.4	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	857	1454	-	-	1321	-	-	612
HCM Lane V/C Ratio	0.044	0.003	-	-	0.006	-	-	0.018
HCM Control Delay (s)	9.4	7.5	0	-	7.7	0	-	11
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↰	↑	↱
Traffic Vol, veh/h	174	1	3	1	1	5	5	233	1	4	160	113
Future Vol, veh/h	174	1	3	1	1	5	5	233	1	4	160	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	95	38	95	95	62	42	77	95	50	71	87
Heavy Vehicles, %	1	1	1	1	1	20	1	2	1	25	4	1
Mvmt Flow	223	1	8	1	1	8	12	303	1	8	225	130

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	573	569	225	574	569	304	225	0	0	304	0	0
Stage 1	241	241	-	328	328	-	-	-	-	-	-	-
Stage 2	332	328	-	246	241	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.4	4.11	-	-	4.35	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.48	2.209	-	-	2.425	-	-
Pot Cap-1 Maneuver	432	433	817	431	433	695	1350	-	-	1137	-	-
Stage 1	765	708	-	687	649	-	-	-	-	-	-	-
Stage 2	684	649	-	760	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	420	425	817	420	425	695	1350	-	-	1137	-	-
Mov Cap-2 Maneuver	420	425	-	420	425	-	-	-	-	-	-	-
Stage 1	757	703	-	679	642	-	-	-	-	-	-	-
Stage 2	668	642	-	746	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23	11	0.3	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1350	-	-	427	613	1137	-	-
HCM Lane V/C Ratio	0.009	-	-	0.543	0.017	0.007	-	-
HCM Control Delay (s)	7.7	0	-	23	11	8.2	-	-
HCM Lane LOS	A	A	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	3.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	58	1	1	181	143	20
Future Vol, veh/h	58	1	1	181	143	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	78	78	87	87
Heavy Vehicles, %	1	1	1	2	4	1
Mvmt Flow	64	1	1	232	164	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	410	176	187	0	-	0
Stage 1	176	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	600	870	1393	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	599	870	1393	-	-	-
Mov Cap-2 Maneuver	599	-	-	-	-	-
Stage 1	856	-	-	-	-	-
Stage 2	807	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1393	-	602	-	-
HCM Lane V/C Ratio	0.001	-	0.109	-	-
HCM Control Delay (s)	7.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	32	94	10	3	20
Future Vol, veh/h	7	32	94	10	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	8	36	104	11	3	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	14	25	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	757	1069	1596	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	707	1069	1596	-	-	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	6.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	979	-	-
HCM Lane V/C Ratio	0.065	-	0.044	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout AM (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	10	1.0	14	1.0	0.055	6.4	LOS A	0.3	1.9	0.04	0.33	0.04	50.6
6	R2	65	1.0	77	1.0	0.055	1.9	LOS A	0.3	1.9	0.04	0.33	0.04	48.8
6b	R3	1	1.0	1	1.0	0.055	2.3	LOS A	0.3	1.9	0.04	0.33	0.04	48.2
Approach		76	1.0	93	1.0	0.055	2.6	LOS A	0.3	1.9	0.04	0.33	0.04	49.1
NorthEast: Parking Access														
24b	L3	1	1.0	1	1.0	0.002	8.8	LOS A	0.0	0.1	0.21	0.40	0.21	50.9
25	T1	1	1.0	1	1.0	0.002	1.5	LOS A	0.0	0.1	0.21	0.40	0.21	49.1
26b	R3	1	1.0	1	1.0	0.002	2.6	LOS A	0.0	0.1	0.21	0.40	0.21	46.9
Approach		3	1.0	3	1.0	0.002	4.3	LOS A	0.0	0.1	0.21	0.40	0.21	48.9
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.076	8.6	LOS A	0.4	2.6	0.08	0.55	0.08	49.2
7	L2	103	2.0	113	2.0	0.076	7.5	LOS A	0.4	2.6	0.08	0.55	0.08	48.5
9a	R1	4	1.0	8	1.0	0.076	1.1	LOS A	0.4	2.6	0.08	0.55	0.08	47.1
Approach		108	2.0	122	1.9	0.076	7.1	LOS A	0.4	2.6	0.08	0.55	0.08	48.4
SouthWest: Clubhouse														
30a	L1	2	1.0	3	1.0	0.004	6.8	LOS A	0.0	0.1	0.24	0.37	0.24	49.3
31	T1	1	1.0	1	1.0	0.004	1.6	LOS A	0.0	0.1	0.24	0.37	0.24	49.1
32a	R1	1	1.0	2	1.0	0.004	1.4	LOS A	0.0	0.1	0.24	0.37	0.24	48.6
Approach		4	1.0	6	1.0	0.004	4.0	LOS A	0.0	0.1	0.24	0.37	0.24	49.0
All Vehicles		191	1.5	224	1.5	0.076	5.1	LOS A	0.4	2.6	0.07	0.45	0.07	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LT
Maximum Queue (m)	24.2	29.4	11.9	18.3
Average Queue (m)	7.2	14.1	0.7	4.3
95th Queue (m)	17.4	23.9	5.4	13.4
Link Distance (m)	146.4	259.1		244.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.3	12.6	4.6	2.2
Average Queue (m)	5.5	6.4	0.2	0.1
95th Queue (m)	12.4	12.7	2.3	1.2
Link Distance (m)	537.9	85.2	280.3	242.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	18.9	18.3
Average Queue (m)	10.4	2.0
95th Queue (m)	16.4	8.8
Link Distance (m)	255.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	3.2	11.8	9.2
Average Queue (m)	0.2	5.7	2.6
95th Queue (m)	2.3	13.0	9.4
Link Distance (m)	221.1	170.0	154.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	32.0	13.4	3.0	7.9
Average Queue (m)	14.4	2.4	0.1	0.4
95th Queue (m)	24.5	9.2	2.2	4.0
Link Distance (m)	221.1	88.9	765.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Clarence Avenue & Access D

Movement	EB
Directions Served	LR
Maximum Queue (m)	18.9
Average Queue (m)	9.4
95th Queue (m)	17.3
Link Distance (m)	1587.7
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Access C/Access B & Access A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	9.2	8.8
Average Queue (m)	5.7	0.7
95th Queue (m)	12.5	5.2
Link Distance (m)	255.2	764.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	242.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	54	20	3	11	11	83	2	430	20	127	357	60
Future Vol, veh/h	54	20	3	11	11	83	2	430	20	127	357	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	53	72	79	56	62	71	87	25	71	94	65
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	3	1
Mvmt Flow	216	38	4	14	20	134	3	494	80	179	380	92

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1401	1364	236	1107	1370	534	472	0	0	574	0	0
Stage 1	784	784	-	540	540	-	-	-	-	-	-	-
Stage 2	617	580	-	567	830	-	-	-	-	-	-	-
Critical Hdwy	7.315	6.515	6.915	7.315	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.515	5.515	-	6.115	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.115	5.515	-	6.515	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	4.0095	3.3095	3.5095	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	~ 109	148	769	177	147	548	1094	-	-	1003	-	-
Stage 1	355	405	-	527	522	-	-	-	-	-	-	-
Stage 2	479	501	-	479	386	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 58	111	769	106	111	548	1094	-	-	1003	-	-
Mov Cap-2 Maneuver	~ 58	111	-	106	111	-	-	-	-	-	-	-
Stage 1	354	306	-	525	520	-	-	-	-	-	-	-
Stage 2	347	499	-	315	291	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	1526.2	30.6	0	2.9
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	63	303	1003	-	-
HCM Lane V/C Ratio	0.003	-	-	4.094	0.553	0.178	-	-
HCM Control Delay (s)	8.3	0	-	$ 1526.2	30.6	9.4	0.6	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	27.8	3.1	0.6	-	-

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	1	16	20	1	38	22	57	24	37	74	16
Future Vol, veh/h	9	1	16	20	1	38	22	57	24	37	74	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	73	73	73	71	71	71
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	10	1	18	22	1	42	30	78	33	52	104	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	396	391	116	384	386	95	127	0	0	111	0	0
Stage 1	220	220	-	155	155	-	-	-	-	-	-	-
Stage 2	176	171	-	229	231	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	566	546	939	576	550	964	1465	-	-	1485	-	-
Stage 1	785	723	-	850	771	-	-	-	-	-	-	-
Stage 2	828	759	-	776	715	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	514	939	539	518	964	1465	-	-	1485	-	-
Mov Cap-2 Maneuver	516	514	-	539	518	-	-	-	-	-	-	-
Stage 1	768	696	-	831	754	-	-	-	-	-	-	-
Stage 2	773	742	-	731	688	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.2	1.6	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1465	-	-	714	752	1485	-	-
HCM Lane V/C Ratio	0.021	-	-	0.04	0.087	0.035	-	-
HCM Control Delay (s)	7.5	0	-	10.3	10.2	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	73	379	2	124	247
Future Vol, veh/h	1	73	379	2	124	247
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	87	87
Heavy Vehicles, %	1	1	4	1	1	3
Mvmt Flow	1	81	426	2	143	284

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	997	427	0	0	428	0
Stage 1	427	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	272	630	-	-	1137	-
Stage 1	660	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	231	630	-	-	1137	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	660	-	-	-	-	-
Stage 2	483	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	2.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	616	1137	-
HCM Lane V/C Ratio	-	-	0.133	0.125	-
HCM Control Delay (s)	-	-	11.7	8.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.4	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	152	2	36	159	12	2	1	12	11	1	3
Future Vol, veh/h	1	152	2	36	159	12	2	1	12	11	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	81	50	75	72	60	50	95	60	69	95	75
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	9	1	1
Mvmt Flow	1	188	4	48	221	20	4	1	20	16	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	241	0	0	192	0	0	522	529	190	530	521	231
Stage 1	-	-	-	-	-	-	192	192	-	327	327	-
Stage 2	-	-	-	-	-	-	330	337	-	203	194	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.19	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.581	4.009	3.309
Pot Cap-1 Maneuver	1331	-	-	1388	-	-	467	457	854	449	461	811
Stage 1	-	-	-	-	-	-	812	743	-	671	650	-
Stage 2	-	-	-	-	-	-	685	643	-	783	742	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1331	-	-	1388	-	-	449	438	854	424	442	811
Mov Cap-2 Maneuver	-	-	-	-	-	-	449	438	-	424	442	-
Stage 1	-	-	-	-	-	-	811	742	-	670	624	-
Stage 2	-	-	-	-	-	-	653	617	-	763	741	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	10.2	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	721	1331	-	-	1388	-	-	467
HCM Lane V/C Ratio	0.035	0.001	-	-	0.035	-	-	0.045
HCM Control Delay (s)	10.2	7.7	0	-	7.7	0	-	13.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	34.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↑	↱
Traffic Vol, veh/h	155	1	7	1	1	4	2	282	1	5	330	208
Future Vol, veh/h	155	1	7	1	1	4	2	282	1	5	330	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	25	85	25	95	50	50	85	95	62	81	73
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	1	1
Mvmt Flow	352	4	8	4	1	8	4	332	1	8	407	285

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	768	764	407	770	764	333	407	0	0	333	0	0
Stage 1	423	423	-	341	341	-	-	-	-	-	-	-
Stage 2	345	341	-	429	423	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	~ 320	335	646	319	335	711	1157	-	-	1232	-	-
Stage 1	611	589	-	676	640	-	-	-	-	-	-	-
Stage 2	673	640	-	606	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 313	332	646	309	332	711	1157	-	-	1232	-	-
Mov Cap-2 Maneuver	~ 313	332	-	309	332	-	-	-	-	-	-	-
Stage 1	609	585	-	673	637	-	-	-	-	-	-	-
Stage 2	662	637	-	590	585	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	133.8	12.8	0.1	0.1
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1157	-	-	317	477	1232	-	-
HCM Lane V/C Ratio	0.003	-	-	1.15	0.027	0.007	-	-
HCM Control Delay (s)	8.1	0	-	133.8	12.8	7.9	-	-
HCM Lane LOS	A	A	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	15	0.1	0	-	-

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

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	37	1	1	247	276	63
Future Vol, veh/h	37	1	1	247	276	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	84	84	95	95
Heavy Vehicles, %	1	1	1	3	1	1
Mvmt Flow	41	1	1	294	291	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	620	324	357	0	-	0
Stage 1	324	-	-	-	-	-
Stage 2	296	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	453	719	1207	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	453	719	1207	-	-	-
Mov Cap-2 Maneuver	453	-	-	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	757	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1207	-	457	-	-
HCM Lane V/C Ratio	0.001	-	0.092	-	-
HCM Control Delay (s)	8	0	13.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	103	61	6	11	12
Future Vol, veh/h	21	103	61	6	11	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	23	114	68	7	12	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	162	19	25	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	143	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	831	1062	1596	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	795	1062	1596	-	-	-
Mov Cap-2 Maneuver	795	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1005	-	-
HCM Lane V/C Ratio	0.042	-	0.137	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout PM (Site Folder: General)]

PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	15	1.0	24	1.0	0.100	6.4	LOS A	0.5	3.7	0.04	0.33	0.04	50.7
6	R2	108	1.0	144	1.0	0.100	1.9	LOS A	0.5	3.7	0.04	0.33	0.04	48.8
6b	R3	2	1.0	4	1.0	0.100	2.3	LOS A	0.5	3.7	0.04	0.33	0.04	48.2
Approach		125	1.0	172	1.0	0.100	2.6	LOS A	0.5	3.7	0.04	0.33	0.04	49.1
NorthEast: Parking Access														
24b	L3	2	1.0	4	1.0	0.007	9.1	LOS A	0.0	0.2	0.29	0.43	0.29	50.2
25	T1	1	1.0	4	1.0	0.007	1.8	LOS A	0.0	0.2	0.29	0.43	0.29	48.5
26b	R3	1	1.0	1	1.0	0.007	2.8	LOS A	0.0	0.2	0.29	0.43	0.29	46.4
Approach		4	1.0	9	1.0	0.007	5.1	LOS A	0.0	0.2	0.29	0.43	0.29	49.0
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.086	8.6	LOS A	0.4	3.0	0.12	0.55	0.12	49.0
7	L2	94	1.0	127	1.0	0.086	7.6	LOS A	0.4	3.0	0.12	0.55	0.12	48.2
9a	R1	3	1.0	5	1.0	0.086	1.1	LOS A	0.4	3.0	0.12	0.55	0.12	46.8
Approach		98	1.0	133	1.0	0.086	7.3	LOS A	0.4	3.0	0.12	0.55	0.12	48.2
SouthWest: Clubhouse														
30a	L1	2	1.0	3	1.0	0.021	6.9	LOS A	0.1	0.7	0.26	0.26	0.26	50.5
31	T1	1	1.0	1	1.0	0.021	1.6	LOS A	0.1	0.7	0.26	0.26	0.26	50.3
32a	R1	19	1.0	24	1.0	0.021	1.5	LOS A	0.1	0.7	0.26	0.26	0.26	49.7
Approach		22	1.0	28	1.0	0.021	2.0	LOS A	0.1	0.7	0.26	0.26	0.26	49.8
All Vehicles		249	1.0	342	1.0	0.100	4.4	LOS A	0.5	3.7	0.10	0.41	0.10	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	134.9	42.9	6.3	34.6	2.7
Average Queue (m)	38.4	16.6	0.3	12.3	0.1
95th Queue (m)	111.2	32.8	2.9	26.1	1.4
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)	4				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.2	15.7	9.2	11.2
Average Queue (m)	5.6	7.8	0.6	1.1
95th Queue (m)	12.4	13.3	4.1	5.9
Link Distance (m)	537.9	85.2	280.3	242.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	19.3	27.5
Average Queue (m)	9.3	10.7
95th Queue (m)	15.6	21.9
Link Distance (m)	255.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	3.7	9.4	9.0	14.0
Average Queue (m)	0.1	1.1	3.8	4.1
95th Queue (m)	1.9	5.9	11.0	12.4
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	R
Maximum Queue (m)	34.4	9.6	8.6	6.9	3.1
Average Queue (m)	15.9	2.3	0.3	0.5	0.1
95th Queue (m)	27.4	8.2	5.3	3.7	2.2
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Clarence Avenue & Access D

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	17.7	3.2
Average Queue (m)	7.3	0.2
95th Queue (m)	15.1	2.1
Link Distance (m)	1587.7	373.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Access C/Access B & Access A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	16.4	9.1
Average Queue (m)	9.7	0.6
95th Queue (m)	13.2	4.2
Link Distance (m)	255.2	764.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	6	1	19	22	31	2	312	36	22	318	78
Future Vol, veh/h	37	6	1	19	22	31	2	312	36	22	318	78
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	31	95	67	71	67	25	91	50	71	83	80
Heavy Vehicles, %	14	1	1	13	1	1	1	3	1	1	6	3
Mvmt Flow	46	19	1	28	31	46	8	343	72	31	383	98

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	928	925	241	658	938	379	481	0	0	415	0	0
Stage 1	494	494	-	395	395	-	-	-	-	-	-	-
Stage 2	434	431	-	263	543	-	-	-	-	-	-	-
Critical Hdwy	7.51	6.515	6.915	7.495	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.71	5.515	-	6.295	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.515	-	6.695	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.633	4.0095	3.3095	3.6235	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	220	270	763	345	265	670	1086	-	-	1148	-	-
Stage 1	501	548	-	604	606	-	-	-	-	-	-	-
Stage 2	572	584	-	693	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	179	257	763	313	253	670	1086	-	-	1148	-	-
Mov Cap-2 Maneuver	179	257	-	313	253	-	-	-	-	-	-	-
Stage 1	496	528	-	598	600	-	-	-	-	-	-	-
Stage 2	500	578	-	642	502	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.8	18.4	0.2	0.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1086	-	-	199	374	1148	-	-
HCM Lane V/C Ratio	0.007	-	-	0.332	0.282	0.027	-	-
HCM Control Delay (s)	8.3	0	-	31.8	18.4	8.2	0.1	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.4	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	10	39	8	5	53
Future Vol, veh/h	21	10	39	8	5	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	82	82	86	86
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	23	11	48	10	6	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	127	53	0	0	58	0
Stage 1	53	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	870	1017	-	-	1553	-
Stage 1	972	-	-	-	-	-
Stage 2	951	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	867	1017	-	-	1553	-
Mov Cap-2 Maneuver	867	-	-	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	947	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	910	1553	-
HCM Lane V/C Ratio	-	-	0.038	0.004	-
HCM Control Delay (s)	-	-	9.1	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	111	239	1	37	301
Future Vol, veh/h	1	111	239	1	37	301
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	94	94
Heavy Vehicles, %	1	1	3	1	1	6
Mvmt Flow	1	123	269	1	39	320

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	668	270	0	0	270	0
Stage 1	270	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	425	771	-	-	1299	-
Stage 1	778	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	409	771	-	-	1299	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	656	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	765	1299	-
HCM Lane V/C Ratio	-	-	0.163	0.03	-
HCM Control Delay (s)	-	-	10.6	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	80	1	6	92	3	1	1	20	8	1	1
Future Vol, veh/h	1	80	1	6	92	3	1	1	20	8	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	68	25	75	77	75	95	95	56	95	95	67
Heavy Vehicles, %	1	1	1	17	1	1	1	1	1	1	1	1
Mvmt Flow	4	118	4	8	119	4	1	1	36	8	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	123	0	0	122	0	0	266	267	120	284	267	121
Stage 1	-	-	-	-	-	-	128	128	-	137	137	-
Stage 2	-	-	-	-	-	-	138	139	-	147	130	-
Critical Hdwy	4.11	-	-	4.27	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.353	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1470	-	-	1377	-	-	689	641	934	670	641	933
Stage 1	-	-	-	-	-	-	878	792	-	869	785	-
Stage 2	-	-	-	-	-	-	868	784	-	858	791	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1470	-	-	1377	-	-	682	635	934	639	635	933
Mov Cap-2 Maneuver	-	-	-	-	-	-	682	635	-	639	635	-
Stage 1	-	-	-	-	-	-	875	790	-	866	780	-
Stage 2	-	-	-	-	-	-	860	779	-	822	789	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	9.1	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	913	1470	-	-	1377	-	-	667
HCM Lane V/C Ratio	0.041	0.003	-	-	0.006	-	-	0.016
HCM Control Delay (s)	9.1	7.5	0	-	7.6	0	-	10.5
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↑	↱
Traffic Vol, veh/h	141	1	3	1	1	6	5	206	1	5	164	103
Future Vol, veh/h	141	1	3	1	1	6	5	206	1	5	164	103
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	95	38	95	95	62	42	77	95	50	71	87
Heavy Vehicles, %	1	1	1	1	1	20	1	2	1	25	4	1
Mvmt Flow	181	1	8	1	1	10	12	268	1	10	231	118

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	549	544	231	549	544	269	231	0	0	269	0	0
Stage 1	251	251	-	293	293	-	-	-	-	-	-	-
Stage 2	298	293	-	256	251	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.4	4.11	-	-	4.35	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.48	2.209	-	-	2.425	-	-
Pot Cap-1 Maneuver	448	448	811	448	448	728	1343	-	-	1173	-	-
Stage 1	755	701	-	717	672	-	-	-	-	-	-	-
Stage 2	713	672	-	751	701	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	435	439	811	436	439	728	1343	-	-	1173	-	-
Mov Cap-2 Maneuver	435	439	-	436	439	-	-	-	-	-	-	-
Stage 1	747	695	-	709	665	-	-	-	-	-	-	-
Stage 2	695	665	-	736	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19	10.6	0.3	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	444	651	1173	-	-
HCM Lane V/C Ratio	0.009	-	-	0.427	0.018	0.009	-	-
HCM Control Delay (s)	7.7	0	-	19	10.6	8.1	-	-
HCM Lane LOS	A	A	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	0.1	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout AM (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	19	1.0	27	1.0	0.050	6.4	LOS A	0.2	1.7	0.04	0.39	0.04	50.1
6	R2	46	1.0	55	1.0	0.050	1.9	LOS A	0.2	1.7	0.04	0.39	0.04	48.3
6b	R3	1	1.0	1	1.0	0.050	2.3	LOS A	0.2	1.7	0.04	0.39	0.04	47.7
Approach		66	1.0	83	1.0	0.050	3.4	LOS A	0.2	1.7	0.04	0.39	0.04	48.9
NorthEast: Parking Access														
24b	L3	1	1.0	1	1.0	0.002	8.8	LOS A	0.0	0.1	0.20	0.39	0.20	50.9
25	T1	1	1.0	1	1.0	0.002	1.5	LOS A	0.0	0.1	0.20	0.39	0.20	49.1
26b	R3	1	1.0	1	1.0	0.002	2.5	LOS A	0.0	0.1	0.20	0.39	0.20	47.0
Approach		3	1.0	3	1.0	0.002	4.3	LOS A	0.0	0.1	0.20	0.39	0.20	48.9
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.060	8.6	LOS A	0.3	2.0	0.11	0.52	0.11	49.6
7	L2	68	2.0	75	2.0	0.060	7.6	LOS A	0.3	2.0	0.11	0.52	0.11	48.8
9a	R1	8	1.0	16	1.0	0.060	1.1	LOS A	0.3	2.0	0.11	0.52	0.11	47.4
Approach		77	1.9	92	1.8	0.060	6.5	LOS A	0.3	2.0	0.11	0.52	0.11	48.6
SouthWest: Clubhouse														
30a	L1	3	1.0	4	1.0	0.006	6.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.6
31	T1	1	1.0	1	1.0	0.006	1.4	LOS A	0.0	0.2	0.19	0.36	0.19	49.4
32a	R1	2	1.0	4	1.0	0.006	1.3	LOS A	0.0	0.2	0.19	0.36	0.19	48.8
Approach		6	1.0	9	1.0	0.006	3.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.2
All Vehicles		152	1.4	187	1.4	0.060	4.9	LOS A	0.3	2.0	0.09	0.45	0.09	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	23.2	24.7	2.8	13.8	2.6
Average Queue (m)	10.3	11.0	0.2	2.4	0.1
95th Queue (m)	20.4	19.6	2.2	9.8	1.4
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Cartwright Terrace

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	10.5	1.8
Average Queue (m)	6.3	0.1
95th Queue (m)	12.9	1.9
Link Distance (m)	85.2	246.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	22.1	17.9
Average Queue (m)	10.9	3.0
95th Queue (m)	17.2	11.6
Link Distance (m)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.8	1.5	12.2	10.5
Average Queue (m)	0.1	0.1	4.3	3.0
95th Queue (m)	1.3	1.1	11.9	10.2
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	R
Maximum Queue (m)	22.8	12.2	6.4	4.7	2.9
Average Queue (m)	12.4	2.2	0.7	0.3	0.1
95th Queue (m)	19.6	8.8	4.6	3.6	2.1
Link Distance (m)	221.1	88.9			506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	170.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	22	2	42	12	28	2	488	39	51	391	71
Future Vol, veh/h	63	22	2	42	12	28	2	488	39	51	391	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	53	72	79	56	62	71	87	25	71	94	65
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	3	1
Mvmt Flow	252	42	3	53	21	45	3	561	156	72	416	109

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1293	1338	263	1018	1314	639	525	0	0	717	0	0
Stage 1	615	615	-	645	645	-	-	-	-	-	-	-
Stage 2	678	723	-	373	669	-	-	-	-	-	-	-
Critical Hdwy	7.315	6.515	6.915	7.315	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.515	5.515	-	6.115	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.115	5.515	-	6.515	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	4.0095	3.3095	3.5095	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	~ 130	153	739	204	159	477	1046	-	-	887	-	-
Stage 1	448	483	-	462	469	-	-	-	-	-	-	-
Stage 2	443	432	-	623	457	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 95	134	739	141	140	477	1046	-	-	887	-	-
Mov Cap-2 Maneuver	~ 95	134	-	141	140	-	-	-	-	-	-	-
Stage 1	446	426	-	460	467	-	-	-	-	-	-	-
Stage 2	381	430	-	495	404	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 975.6	50.6	0	1.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1046	-	-	100	192	887	-	-
HCM Lane V/C Ratio	0.003	-	-	2.963	0.624	0.081	-	-
HCM Control Delay (s)	8.5	0	-	$ 975.6	50.6	9.4	0.4	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	28.4	3.6	0.3	-	-

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

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	38	55	24	37	57
Future Vol, veh/h	20	38	55	24	37	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	73	73	71	71
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	22	42	75	33	52	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	276	92	0	0	108	0
Stage 1	92	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	716	968	-	-	1489	-
Stage 1	934	-	-	-	-	-
Stage 2	850	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	690	968	-	-	1489	-
Mov Cap-2 Maneuver	690	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	819	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	850	1489	-
HCM Lane V/C Ratio	-	-	0.076	0.035	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	70	458	1	120	316
Future Vol, veh/h	1	70	458	1	120	316
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	87	87
Heavy Vehicles, %	1	1	4	1	1	3
Mvmt Flow	1	78	515	1	138	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1155	516	0	0	516	0
Stage 1	516	-	-	-	-	-
Stage 2	639	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	219	561	-	-	1055	-
Stage 1	601	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	183	561	-	-	1055	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	545	1055	-
HCM Lane V/C Ratio	-	-	0.145	0.131	-
HCM Control Delay (s)	-	-	12.7	8.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.4	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	133	2	36	132	12	2	1	12	11	1	3
Future Vol, veh/h	1	133	2	36	132	12	2	1	12	11	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	81	50	75	72	60	50	95	60	69	95	75
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	9	1	1
Mvmt Flow	1	164	4	48	183	20	4	1	20	16	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	203	0	0	168	0	0	460	467	166	468	459	193
Stage 1	-	-	-	-	-	-	168	168	-	289	289	-
Stage 2	-	-	-	-	-	-	292	299	-	179	170	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.19	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.581	4.009	3.309
Pot Cap-1 Maneuver	1375	-	-	1416	-	-	513	495	881	494	500	851
Stage 1	-	-	-	-	-	-	836	761	-	704	675	-
Stage 2	-	-	-	-	-	-	718	668	-	807	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1375	-	-	1416	-	-	495	476	881	468	481	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	476	-	468	481	-
Stage 1	-	-	-	-	-	-	835	760	-	703	649	-
Stage 2	-	-	-	-	-	-	686	643	-	787	759	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	9.9	12.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	759	1375	-	-	1416	-	-	513
HCM Lane V/C Ratio	0.033	0.001	-	-	0.034	-	-	0.041
HCM Control Delay (s)	9.9	7.6	0	-	7.6	0	-	12.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	21.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	136	1	7	1	1	5	2	288	1	6	314	181
Future Vol, veh/h	136	1	7	1	1	5	2	288	1	6	314	181
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	25	85	25	95	50	50	85	95	62	81	73
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	1	1
Mvmt Flow	309	4	8	4	1	10	4	339	1	10	388	248

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	761	756	388	762	756	340	388	0	0	340	0	0
Stage 1	408	408	-	348	348	-	-	-	-	-	-	-
Stage 2	353	348	-	414	408	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	323	339	662	323	339	705	1176	-	-	1225	-	-
Stage 1	622	598	-	670	636	-	-	-	-	-	-	-
Stage 2	666	636	-	618	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	315	335	662	313	335	705	1176	-	-	1225	-	-
Mov Cap-2 Maneuver	315	335	-	313	335	-	-	-	-	-	-	-
Stage 1	620	593	-	667	633	-	-	-	-	-	-	-
Stage 2	653	633	-	601	593	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	88.5	12.4	0.1	0.1
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	320	500	1225	-	-
HCM Lane V/C Ratio	0.003	-	-	1.004	0.03	0.008	-	-
HCM Control Delay (s)	8.1	0	-	88.5	12.4	8	-	-
HCM Lane LOS	A	A	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	11.1	0.1	0	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout PM (Site Folder: General)]

PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	25	1.0	40	1.0	0.084	6.5	LOS A	0.4	3.0	0.06	0.37	0.06	50.2
6	R2	71	1.0	95	1.0	0.084	2.0	LOS A	0.4	3.0	0.06	0.37	0.06	48.4
6b	R3	2	1.0	4	1.0	0.084	2.3	LOS A	0.4	3.0	0.06	0.37	0.06	47.7
Approach		98	1.0	138	1.0	0.084	3.3	LOS A	0.4	3.0	0.06	0.37	0.06	48.8
NorthEast: Parking Access														
24b	L3	2	1.0	4	1.0	0.007	9.0	LOS A	0.0	0.2	0.27	0.43	0.27	50.3
25	T1	1	1.0	4	1.0	0.007	1.7	LOS A	0.0	0.2	0.27	0.43	0.27	48.5
26b	R3	1	1.0	1	1.0	0.007	2.7	LOS A	0.0	0.2	0.27	0.43	0.27	46.5
Approach		4	1.0	9	1.0	0.007	5.0	LOS A	0.0	0.2	0.27	0.43	0.27	49.0
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.070	8.7	LOS A	0.3	2.3	0.15	0.53	0.15	49.2
7	L2	67	1.0	91	1.0	0.070	7.6	LOS A	0.3	2.3	0.15	0.53	0.15	48.5
9a	R1	7	1.0	12	1.0	0.070	1.2	LOS A	0.3	2.3	0.15	0.53	0.15	47.0
Approach		75	1.0	104	1.0	0.070	6.9	LOS A	0.3	2.3	0.15	0.53	0.15	48.3
SouthWest: Clubhouse														
30a	L1	6	1.0	8	1.0	0.032	6.8	LOS A	0.2	1.1	0.22	0.27	0.22	50.4
31	T1	1	1.0	1	1.0	0.032	1.5	LOS A	0.2	1.1	0.22	0.27	0.22	50.2
32a	R1	28	1.0	36	1.0	0.032	1.4	LOS A	0.2	1.1	0.22	0.27	0.22	49.6
Approach		35	1.0	45	1.0	0.032	2.3	LOS A	0.2	1.1	0.22	0.27	0.22	49.7
All Vehicles		212	1.0	296	1.0	0.084	4.4	LOS A	0.4	3.0	0.12	0.41	0.12	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	103.3	30.0	5.9	25.6	10.1
Average Queue (m)	29.7	13.0	0.3	7.3	0.4
95th Queue (m)	84.8	23.9	2.7	21.6	5.6
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Cartwright Terrace

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	14.4	1.3	8.7
Average Queue (m)	7.9	0.0	0.8
95th Queue (m)	13.3	1.0	5.3
Link Distance (m)	85.2	280.7	246.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	17.3	44.9
Average Queue (m)	9.0	12.0
95th Queue (m)	15.6	29.9
Link Distance (m)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	12.2	10.6	17.9
Average Queue (m)	1.0	3.8	5.0
95th Queue (m)	6.1	11.2	14.6
Link Distance (m)	221.1	170.0	154.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	37.1	8.4	7.2	6.9
Average Queue (m)	15.1	1.8	0.3	0.5
95th Queue (m)	28.1	7.3	3.5	3.8
Link Distance (m)	221.1	88.9		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	6	1	11	23	109	3	313	8	60	319	78
Future Vol, veh/h	37	6	1	11	23	109	3	313	8	60	319	78
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	31	95	67	71	67	25	91	50	71	83	80
Heavy Vehicles, %	14	1	1	13	1	1	1	3	1	1	6	3
Mvmt Flow	46	19	1	16	32	163	12	344	16	85	384	98

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1077	987	241	748	1028	352	482	0	0	360	0	0
Stage 1	603	603	-	376	376	-	-	-	-	-	-	-
Stage 2	474	384	-	372	652	-	-	-	-	-	-	-
Critical Hdwy	7.51	6.515	6.915	7.495	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.71	5.515	-	6.295	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.31	5.515	-	6.695	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.633	4.0095	3.3095	3.6235	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	172	248	763	298	235	693	1085	-	-	1203	-	-
Stage 1	430	489	-	618	618	-	-	-	-	-	-	-
Stage 2	543	613	-	596	465	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	106	220	763	254	209	693	1085	-	-	1203	-	-
Mov Cap-2 Maneuver	106	220	-	254	209	-	-	-	-	-	-	-
Stage 1	424	441	-	609	609	-	-	-	-	-	-	-
Stage 2	388	604	-	513	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.6	19	0.3	1.4
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1085	-	-	127	465	1203	-	-
HCM Lane V/C Ratio	0.011	-	-	0.52	0.455	0.07	-	-
HCM Control Delay (s)	8.4	0	-	60.6	19	8.2	0.3	-
HCM Lane LOS	A	A	-	F	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.5	2.3	0.2	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	1	18	21	1	10	11	64	8	5	47	5
Future Vol, veh/h	14	1	18	21	1	10	11	64	8	5	47	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	82	82	82	86	86	86
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	16	1	20	23	1	11	13	78	10	6	55	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	185	184	58	190	182	83	61	0	0	88	0	0
Stage 1	70	70	-	109	109	-	-	-	-	-	-	-
Stage 2	115	114	-	81	73	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	778	712	1011	772	714	979	1549	-	-	1514	-	-
Stage 1	942	839	-	899	807	-	-	-	-	-	-	-
Stage 2	892	803	-	930	836	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	761	703	1011	748	705	979	1549	-	-	1514	-	-
Mov Cap-2 Maneuver	761	703	-	748	705	-	-	-	-	-	-	-
Stage 1	934	836	-	891	800	-	-	-	-	-	-	-
Stage 2	873	796	-	907	833	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.7	1	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	877	806	1514	-	-
HCM Lane V/C Ratio	0.009	-	-	0.042	0.044	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.7	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	113	211	1	39	293
Future Vol, veh/h	2	113	211	1	39	293
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	94	94
Heavy Vehicles, %	1	1	3	1	1	6
Mvmt Flow	2	126	237	1	41	312

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	632	238	0	0	238	0
Stage 1	238	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	446	803	-	-	1335	-
Stage 1	804	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	429	803	-	-	1335	-
Mov Cap-2 Maneuver	429	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	658	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	791	1335	-
HCM Lane V/C Ratio	-	-	0.162	0.031	-
HCM Control Delay (s)	-	-	10.4	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	113	1	6	102	3	1	1	20	8	1	1
Future Vol, veh/h	1	113	1	6	102	3	1	1	20	8	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	68	25	75	77	75	95	95	56	95	95	67
Heavy Vehicles, %	1	1	1	17	1	1	1	1	1	1	1	1
Mvmt Flow	4	166	4	8	132	4	1	1	36	8	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	136	0	0	170	0	0	327	328	168	345	328	134
Stage 1	-	-	-	-	-	-	176	176	-	150	150	-
Stage 2	-	-	-	-	-	-	151	152	-	195	178	-
Critical Hdwy	4.11	-	-	4.27	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.353	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1454	-	-	1321	-	-	628	592	879	611	592	918
Stage 1	-	-	-	-	-	-	828	755	-	855	775	-
Stage 2	-	-	-	-	-	-	854	774	-	809	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1454	-	-	1321	-	-	621	586	879	581	586	918
Mov Cap-2 Maneuver	-	-	-	-	-	-	621	586	-	581	586	-
Stage 1	-	-	-	-	-	-	826	753	-	852	770	-
Stage 2	-	-	-	-	-	-	845	769	-	773	752	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	9.4	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	857	1454	-	-	1321	-	-	612
HCM Lane V/C Ratio	0.044	0.003	-	-	0.006	-	-	0.018
HCM Control Delay (s)	9.4	7.5	0	-	7.7	0	-	11
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↑	↱
Traffic Vol, veh/h	174	1	3	1	1	6	5	264	1	5	184	113
Future Vol, veh/h	174	1	3	1	1	6	5	264	1	5	184	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	95	38	95	95	62	42	77	95	50	71	87
Heavy Vehicles, %	1	1	1	1	1	20	1	2	1	25	4	1
Mvmt Flow	223	1	8	1	1	10	12	343	1	10	259	130

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	652	647	259	652	647	344	259	0	0	344	0	0
Stage 1	279	279	-	368	368	-	-	-	-	-	-	-
Stage 2	373	368	-	284	279	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.4	4.11	-	-	4.35	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.48	2.209	-	-	2.425	-	-
Pot Cap-1 Maneuver	382	391	782	382	391	660	1311	-	-	1098	-	-
Stage 1	730	682	-	654	623	-	-	-	-	-	-	-
Stage 2	650	623	-	725	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	370	383	782	372	383	660	1311	-	-	1098	-	-
Mov Cap-2 Maneuver	370	383	-	372	383	-	-	-	-	-	-	-
Stage 1	722	676	-	647	616	-	-	-	-	-	-	-
Stage 2	632	616	-	710	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.7	11.3	0.3	0.2
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1311	-	-	377	582	1098	-	-
HCM Lane V/C Ratio	0.009	-	-	0.615	0.02	0.009	-	-
HCM Control Delay (s)	7.8	0	-	28.7	11.3	8.3	-	-
HCM Lane LOS	A	A	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	3.9	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	58	1	1	212	168	20
Future Vol, veh/h	58	1	1	212	168	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	78	78	87	87
Heavy Vehicles, %	1	1	1	2	4	1
Mvmt Flow	64	1	1	272	193	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	479	205	216	0	-	0
Stage 1	205	-	-	-	-	-
Stage 2	274	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	547	838	1360	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	546	838	1360	-	-	-
Mov Cap-2 Maneuver	546	-	-	-	-	-
Stage 1	831	-	-	-	-	-
Stage 2	774	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1360	-	549	-	-
HCM Lane V/C Ratio	0.001	-	0.119	-	-
HCM Control Delay (s)	7.7	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	32	94	10	3	20
Future Vol, veh/h	7	32	94	10	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	8	36	104	11	3	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	14	25	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	757	1069	1596	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	707	1069	1596	-	-	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	6.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	979	-	-
HCM Lane V/C Ratio	0.065	-	0.044	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout AM (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	19	1.0	27	1.0	0.050	6.4	LOS A	0.2	1.7	0.04	0.39	0.04	50.1
6	R2	46	1.0	55	1.0	0.050	1.9	LOS A	0.2	1.7	0.04	0.39	0.04	48.3
6b	R3	1	1.0	1	1.0	0.050	2.3	LOS A	0.2	1.7	0.04	0.39	0.04	47.7
Approach		66	1.0	83	1.0	0.050	3.4	LOS A	0.2	1.7	0.04	0.39	0.04	48.9
NorthEast: Parking Access														
24b	L3	1	1.0	1	1.0	0.002	8.8	LOS A	0.0	0.1	0.20	0.39	0.20	50.9
25	T1	1	1.0	1	1.0	0.002	1.5	LOS A	0.0	0.1	0.20	0.39	0.20	49.1
26b	R3	1	1.0	1	1.0	0.002	2.5	LOS A	0.0	0.1	0.20	0.39	0.20	47.0
Approach		3	1.0	3	1.0	0.002	4.3	LOS A	0.0	0.1	0.20	0.39	0.20	48.9
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.060	8.6	LOS A	0.3	2.0	0.11	0.52	0.11	49.6
7	L2	68	2.0	75	2.0	0.060	7.6	LOS A	0.3	2.0	0.11	0.52	0.11	48.8
9a	R1	8	1.0	16	1.0	0.060	1.1	LOS A	0.3	2.0	0.11	0.52	0.11	47.4
Approach		77	1.9	92	1.8	0.060	6.5	LOS A	0.3	2.0	0.11	0.52	0.11	48.6
SouthWest: Clubhouse														
30a	L1	3	1.0	4	1.0	0.006	6.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.6
31	T1	1	1.0	1	1.0	0.006	1.4	LOS A	0.0	0.2	0.19	0.36	0.19	49.4
32a	R1	2	1.0	4	1.0	0.006	1.3	LOS A	0.0	0.2	0.19	0.36	0.19	48.8
Approach		6	1.0	9	1.0	0.006	3.7	LOS A	0.0	0.2	0.19	0.36	0.19	49.2
All Vehicles		152	1.4	187	1.4	0.060	4.9	LOS A	0.3	2.0	0.09	0.45	0.09	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	18.7	37.0	9.7	23.4	1.4
Average Queue (m)	7.8	15.3	0.5	5.5	0.1
95th Queue (m)	17.1	26.9	4.0	16.1	1.0
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	11.7	9.9	1.6	1.2
Average Queue (m)	5.9	5.8	0.2	0.0
95th Queue (m)	12.6	12.2	2.0	0.9
Link Distance (m)	537.9	85.2	280.3	242.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	20.8	17.0
Average Queue (m)	10.6	2.8
95th Queue (m)	16.8	10.6
Link Distance (m)	255.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.9	3.2	11.9	9.2
Average Queue (m)	0.1	0.2	5.5	3.2
95th Queue (m)	1.4	2.1	12.9	10.3
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	27.4	12.0	10.9	10.2
Average Queue (m)	14.8	2.1	0.4	0.6
95th Queue (m)	23.5	8.4	4.3	5.0
Link Distance (m)	221.1	88.9	765.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Clarence Avenue & Access D

Movement	EB
Directions Served	LR
Maximum Queue (m)	17.8
Average Queue (m)	9.3
95th Queue (m)	17.3
Link Distance (m)	1587.7
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Access C/Access B & Access A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	11.6	13.2
Average Queue (m)	6.3	0.9
95th Queue (m)	12.8	6.1
Link Distance (m)	255.2	764.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	495

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	63	23	3	13	13	87	2	492	23	134	398	71
Future Vol, veh/h	63	23	3	13	13	87	2	492	23	134	398	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	53	72	79	56	62	71	87	25	71	94	65
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	3	1
Mvmt Flow	252	43	4	16	23	140	3	566	92	189	423	109

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1556	1520	266	1229	1528	612	532	0	0	658	0	0
Stage 1	856	856	-	618	618	-	-	-	-	-	-	-
Stage 2	700	664	-	611	910	-	-	-	-	-	-	-
Critical Hdwy	7.315	6.515	6.915	7.315	6.515	6.215	4.115	-	-	4.115	-	-
Critical Hdwy Stg 1	6.515	5.515	-	6.115	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.115	5.515	-	6.515	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	4.0095	3.3095	3.5095	4.0095	3.3095	2.2095	-	-	2.2095	-	-
Pot Cap-1 Maneuver	~ 84	119	736	145	118	494	1040	-	-	933	-	-
Stage 1	321	375	-	478	482	-	-	-	-	-	-	-
Stage 2	431	459	-	451	354	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 37	84	736	68	83	494	1040	-	-	933	-	-
Mov Cap-2 Maneuver	~ 37	84	-	68	83	-	-	-	-	-	-	-
Stage 1	319	265	-	476	480	-	-	-	-	-	-	-
Stage 2	292	457	-	265	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 3029	65.8	0	3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1040	-	-	41	223	933	-	-
HCM Lane V/C Ratio	0.003	-	-	7.306	0.807	0.202	-	-
HCM Control Delay (s)	8.5	0	-	$ 3029	65.8	9.8	0.8	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	35.5	6	0.8	-	-

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	1	16	20	1	38	22	57	24	37	74	16
Future Vol, veh/h	9	1	16	20	1	38	22	57	24	37	74	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	73	73	73	71	71	71
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	10	1	18	22	1	42	30	78	33	52	104	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	396	391	116	384	386	95	127	0	0	111	0	0
Stage 1	220	220	-	155	155	-	-	-	-	-	-	-
Stage 2	176	171	-	229	231	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	566	546	939	576	550	964	1465	-	-	1485	-	-
Stage 1	785	723	-	850	771	-	-	-	-	-	-	-
Stage 2	828	759	-	776	715	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	514	939	539	518	964	1465	-	-	1485	-	-
Mov Cap-2 Maneuver	516	514	-	539	518	-	-	-	-	-	-	-
Stage 1	768	696	-	831	754	-	-	-	-	-	-	-
Stage 2	773	742	-	731	688	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.2	1.6	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1465	-	-	714	752	1485	-	-
HCM Lane V/C Ratio	0.021	-	-	0.04	0.087	0.035	-	-
HCM Control Delay (s)	7.5	0	-	10.3	10.2	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	73	444	2	124	290
Future Vol, veh/h	1	73	444	2	124	290
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	89	89	87	87
Heavy Vehicles, %	1	1	4	1	1	3
Mvmt Flow	1	81	499	2	143	333

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1119	500	0	0	501	0
Stage 1	500	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	230	573	-	-	1068	-
Stage 1	611	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	192	573	-	-	1068	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	2.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	558	1068	-
HCM Lane V/C Ratio	-	-	0.147	0.133	-
HCM Control Delay (s)	-	-	12.6	8.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.5	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	152	2	36	159	12	2	1	12	11	1	3
Future Vol, veh/h	1	152	2	36	159	12	2	1	12	11	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	81	50	75	72	60	50	95	60	69	95	75
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	9	1	1
Mvmt Flow	1	188	4	48	221	20	4	1	20	16	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	241	0	0	192	0	0	522	529	190	530	521	231
Stage 1	-	-	-	-	-	-	192	192	-	327	327	-
Stage 2	-	-	-	-	-	-	330	337	-	203	194	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.19	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.19	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.581	4.009	3.309
Pot Cap-1 Maneuver	1331	-	-	1388	-	-	467	457	854	449	461	811
Stage 1	-	-	-	-	-	-	812	743	-	671	650	-
Stage 2	-	-	-	-	-	-	685	643	-	783	742	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1331	-	-	1388	-	-	449	438	854	424	442	811
Mov Cap-2 Maneuver	-	-	-	-	-	-	449	438	-	424	442	-
Stage 1	-	-	-	-	-	-	811	742	-	670	624	-
Stage 2	-	-	-	-	-	-	653	617	-	763	741	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	10.2	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	721	1331	-	-	1388	-	-	467
HCM Lane V/C Ratio	0.035	0.001	-	-	0.035	-	-	0.045
HCM Control Delay (s)	10.2	7.7	0	-	7.7	0	-	13.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	55.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↑	↱
Traffic Vol, veh/h	155	1	7	1	1	5	2	325	1	6	377	208
Future Vol, veh/h	155	1	7	1	1	5	2	325	1	6	377	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	-	-	-	30	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	25	85	25	95	50	50	85	95	62	81	73
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	1	1
Mvmt Flow	352	4	8	4	1	10	4	382	1	10	465	285

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	881	876	465	882	876	383	465	0	0	383	0	0
Stage 1	485	485	-	391	391	-	-	-	-	-	-	-
Stage 2	396	391	-	491	485	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	~ 268	288	599	268	288	667	1102	-	-	1181	-	-
Stage 1	565	553	-	635	609	-	-	-	-	-	-	-
Stage 2	631	609	-	561	553	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 260	284	599	259	284	667	1102	-	-	1181	-	-
Mov Cap-2 Maneuver	~ 260	284	-	259	284	-	-	-	-	-	-	-
Stage 1	562	549	-	632	606	-	-	-	-	-	-	-
Stage 2	617	606	-	545	549	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	230	13.5	0.1	0.1
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1102	-	-	264	441	1181	-	-
HCM Lane V/C Ratio	0.004	-	-	1.381	0.034	0.008	-	-
HCM Control Delay (s)	8.3	0	-	230	13.5	8.1	-	-
HCM Lane LOS	A	A	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	19.6	0.1	0	-	-

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

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	37	1	1	290	324	63
Future Vol, veh/h	37	1	1	290	324	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	84	84	95	95
Heavy Vehicles, %	1	1	1	3	1	1
Mvmt Flow	41	1	1	345	341	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	721	374	407	0	-	0
Stage 1	374	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	396	674	1157	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	718	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	396	674	1157	-	-	-
Mov Cap-2 Maneuver	396	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	718	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1157	-	400	-	-
HCM Lane V/C Ratio	0.001	-	0.106	-	-
HCM Control Delay (s)	8.1	0	15.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	103	61	6	11	12
Future Vol, veh/h	21	103	61	6	11	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	23	114	68	7	12	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	162	19	25	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	143	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	831	1062	1596	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	795	1062	1596	-	-	-
Mov Cap-2 Maneuver	795	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1005	-	-
HCM Lane V/C Ratio	0.042	-	0.137	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

MOVEMENT SUMMARY

Site: 4 [Cartwright Street Roundabout PM (Site Folder: General)]

PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cartwright Street														
4a	L1	25	1.0	40	1.0	0.084	6.5	LOS A	0.4	3.0	0.06	0.37	0.06	50.2
6	R2	71	1.0	95	1.0	0.084	2.0	LOS A	0.4	3.0	0.06	0.37	0.06	48.4
6b	R3	2	1.0	4	1.0	0.084	2.3	LOS A	0.4	3.0	0.06	0.37	0.06	47.7
Approach		98	1.0	138	1.0	0.084	3.3	LOS A	0.4	3.0	0.06	0.37	0.06	48.8
NorthEast: Parking Access														
24b	L3	2	1.0	4	1.0	0.007	9.0	LOS A	0.0	0.2	0.27	0.43	0.27	50.3
25	T1	1	1.0	4	1.0	0.007	1.7	LOS A	0.0	0.2	0.27	0.43	0.27	48.5
26b	R3	1	1.0	1	1.0	0.007	2.7	LOS A	0.0	0.2	0.27	0.43	0.27	46.5
Approach		4	1.0	9	1.0	0.007	5.0	LOS A	0.0	0.2	0.27	0.43	0.27	49.0
North: Cartwright Street														
7b	L3	1	1.0	1	1.0	0.070	8.7	LOS A	0.3	2.3	0.15	0.53	0.15	49.2
7	L2	67	1.0	91	1.0	0.070	7.6	LOS A	0.3	2.3	0.15	0.53	0.15	48.5
9a	R1	7	1.0	12	1.0	0.070	1.2	LOS A	0.3	2.3	0.15	0.53	0.15	47.0
Approach		75	1.0	104	1.0	0.070	6.9	LOS A	0.3	2.3	0.15	0.53	0.15	48.3
SouthWest: Clubhouse														
30a	L1	6	1.0	8	1.0	0.032	6.8	LOS A	0.2	1.1	0.22	0.27	0.22	50.4
31	T1	1	1.0	1	1.0	0.032	1.5	LOS A	0.2	1.1	0.22	0.27	0.22	50.2
32a	R1	28	1.0	36	1.0	0.032	1.4	LOS A	0.2	1.1	0.22	0.27	0.22	49.6
Approach		35	1.0	45	1.0	0.032	2.3	LOS A	0.2	1.1	0.22	0.27	0.22	49.7
All Vehicles		212	1.0	296	1.0	0.084	4.4	LOS A	0.4	3.0	0.12	0.41	0.12	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	148.1	44.8	10.4	41.4	9.5
Average Queue (m)	65.7	17.2	0.6	15.5	0.3
95th Queue (m)	165.9	32.4	5.0	30.4	5.4
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)	24				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Cartwright Street & Access B/Cartwright Terrace

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	8.9	14.7	7.8	9.9
Average Queue (m)	5.3	7.6	0.8	0.8
95th Queue (m)	12.1	13.0	4.8	4.7
Link Distance (m)	537.9	85.2	280.3	242.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Lorne Avenue & Access A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	18.5	31.0
Average Queue (m)	9.5	12.3
95th Queue (m)	16.0	24.7
Link Distance (m)	255.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Waterford/Wentworth & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.6	12.0	10.3	12.6
Average Queue (m)	0.1	1.2	4.2	4.4
95th Queue (m)	1.2	6.8	11.6	12.4
Link Distance (m)	576.1	221.1	170.0	154.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	L
Maximum Queue (m)	38.9	13.5	4.6	8.7
Average Queue (m)	17.1	2.4	0.2	0.7
95th Queue (m)	30.4	9.4	2.6	4.5
Link Distance (m)	221.1	88.9	765.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				30.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Clarence Avenue & Access D

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	14.9	1.6
Average Queue (m)	6.9	0.1
95th Queue (m)	14.4	1.2
Link Distance (m)	1587.7	373.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Access C/Access B & Access A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	15.8	7.4
Average Queue (m)	9.3	0.6
95th Queue (m)	12.3	4.3
Link Distance (m)	255.2	764.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

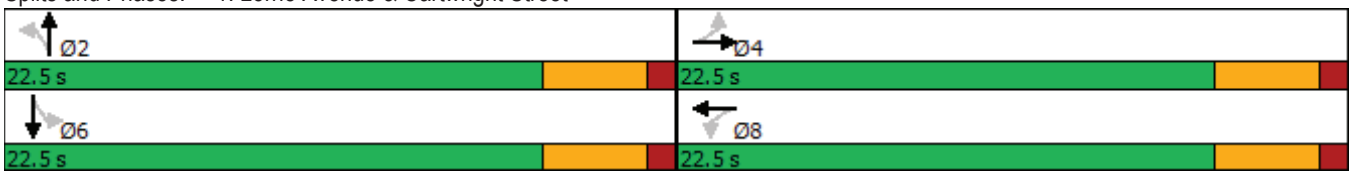
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	5	1	8	17	24	1	157	6	17	219	61
Future Volume (vph)	29	5	1	8	17	24	1	157	6	17	219	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.997			0.932			0.991			0.969	
Flt Protected		0.967			0.992			0.999			0.997	
Satd. Flow (prot)	0	1598	0	0	1634	0	0	1752	0	0	3180	0
Flt Permitted					0.929			0.992			0.935	
Satd. Flow (perm)	0	1652	0	0	1530	0	0	1740	0	0	2983	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			36			9			76	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.81	0.31	0.95	0.67	0.71	0.67	0.25	0.91	0.50	0.71	0.83	0.80
Heavy Vehicles (%)	14%	1%	1%	13%	1%	1%	1%	3%	1%	1%	6%	3%
Adj. Flow (vph)	36	16	1	12	24	36	4	173	12	24	264	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	0	0	72	0	0	189	0	0	364	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		6.5			6.4			19.2			19.2	
Actuated g/C Ratio		0.25			0.25			0.75			0.75	
v/c Ratio		0.13			0.18			0.14			0.16	
Control Delay		7.8			5.7			4.2			3.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.8			5.7			4.2			3.2	
LOS		A			A			A			A	
Approach Delay		7.8			5.7			4.2			3.2	
Approach LOS		A			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 25.5			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.18			
Intersection Signal Delay: 4.1		Intersection LOS: A	
Intersection Capacity Utilization 35.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	24.4	18.4	19.0	23.1	16.7
Average Queue (m)	7.1	6.9	4.5	6.9	3.8
95th Queue (m)	17.8	14.9	13.0	17.6	12.2
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

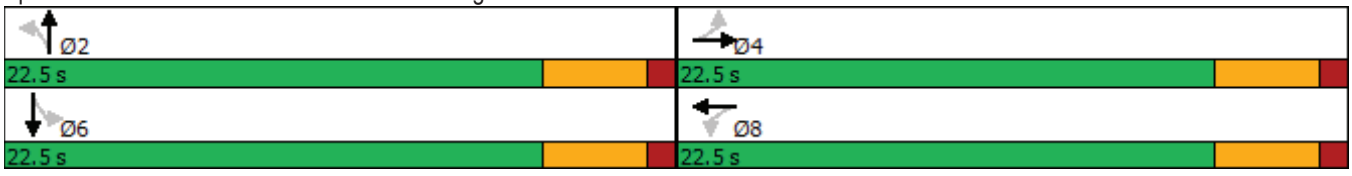
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	17	1	10	9	22	1	327	17	40	215	55
Future Volume (vph)	49	17	1	10	9	22	1	327	17	40	215	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.999			0.926			0.979			0.966	
Flt Protected		0.959			0.990						0.992	
Satd. Flow (prot)	0	1726	0	0	1652	0	0	1721	0	0	3241	0
Flt Permitted		0.712			0.911			0.999			0.858	
Satd. Flow (perm)	0	1282	0	0	1520	0	0	1719	0	0	2803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			35			24			85	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.25	0.53	0.72	0.79	0.56	0.62	0.71	0.87	0.25	0.71	0.94	0.65
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	4%	1%	1%	3%	1%
Adj. Flow (vph)	196	32	1	13	16	35	1	376	68	56	229	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	64	0	0	445	0	0	370	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.5			11.2			18.3			18.3	
Actuated g/C Ratio		0.33			0.32			0.52			0.52	
v/c Ratio		0.54			0.13			0.49			0.25	
Control Delay		15.3			5.9			10.7			6.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.3			5.9			10.7			6.4	
LOS		B			A			B			A	
Approach Delay		15.3			5.9			10.7			6.4	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 35			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 49.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	33.2	15.0	38.2	32.3	18.1
Average Queue (m)	10.4	6.8	13.8	11.5	5.9
95th Queue (m)	22.6	14.6	29.7	24.1	14.7
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

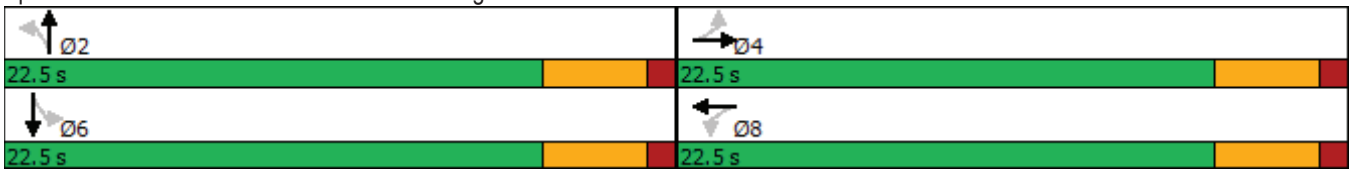
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	5	1	18	19	26	2	282	35	19	277	67
Future Volume (vph)	32	5	1	18	19	26	2	282	35	19	277	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.943			0.976			0.972	
Flt Protected		0.966			0.986			0.999			0.997	
Satd. Flow (prot)	0	1593	0	0	1620	0	0	1730	0	0	3188	0
Flt Permitted		0.792			0.882			0.990			0.925	
Satd. Flow (perm)	0	1306	0	0	1449	0	0	1714	0	0	2957	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			39			29			75	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.81	0.31	0.95	0.67	0.71	0.67	0.25	0.91	0.50	0.71	0.83	0.80
Heavy Vehicles (%)	14%	1%	1%	13%	1%	1%	1%	3%	1%	1%	6%	3%
Adj. Flow (vph)	40	16	1	27	27	39	8	310	70	27	334	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	93	0	0	388	0	0	445	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		6.9			6.8			20.1			20.1	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
v/c Ratio		0.19			0.25			0.33			0.22	
Control Delay		11.2			8.6			5.4			3.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.2			8.6			5.4			3.9	
LOS		B			A			A			A	
Approach Delay		11.2			8.6			5.4			3.9	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 29.5			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 36.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

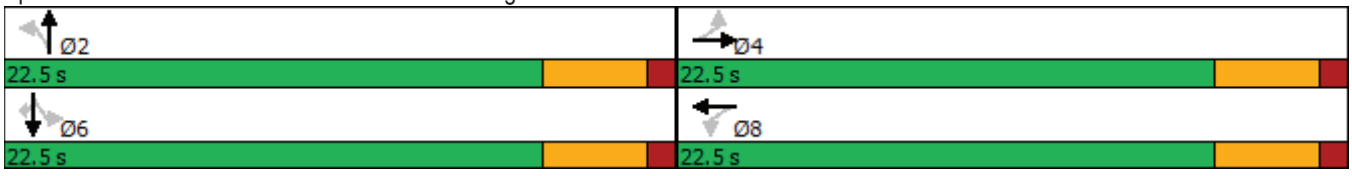


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1	3	1	1	5	5	175	1	4	140	103
Future Volume (vph)	141	1	3	1	1	5	5	175	1	4	140	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.994			0.892			0.999				0.850
Flt Protected		0.955			0.995			0.998		0.950		
Satd. Flow (prot)	0	1711	0	0	1390	0	0	1780	0	1383	1750	1532
Flt Permitted		0.729			0.962			0.983		0.741		
Satd. Flow (perm)	0	1306	0	0	1344	0	0	1753	0	1079	1750	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			8			1				118
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.78	0.95	0.38	0.95	0.95	0.62	0.42	0.77	0.95	0.50	0.71	0.87
Heavy Vehicles (%)	1%	1%	1%	1%	1%	20%	1%	2%	1%	25%	4%	1%
Adj. Flow (vph)	181	1	8	1	1	8	12	227	1	8	197	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	190	0	0	10	0	0	240	0	8	197	118
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		9.6			9.5			15.6		15.6	15.6	15.6
Actuated g/C Ratio		0.31			0.31			0.51		0.51	0.51	0.51
v/c Ratio		0.46			0.02			0.27		0.01	0.22	0.14
Control Delay		12.0			5.0			8.4		7.2	8.2	2.8
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		12.0			5.0			8.4		7.2	8.2	2.8
LOS		B			A			A		A	A	A
Approach Delay		12.0			5.0			8.4			6.2	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 30.8			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 36.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	23.8	23.0	35.5	30.8	21.7
Average Queue (m)	7.6	9.8	11.4	10.2	5.8
95th Queue (m)	18.3	18.0	25.7	22.9	16.1
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	24.1	12.0	29.7	8.4	27.8
Average Queue (m)	12.2	1.4	9.6	0.4	7.5
95th Queue (m)	19.9	6.6	23.2	3.9	19.5
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Zone Summary

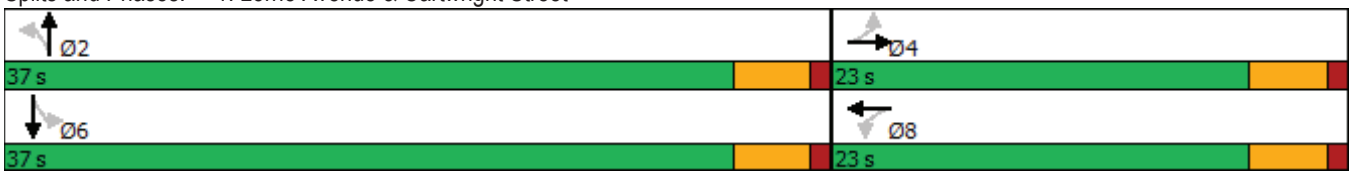
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	19	2	40	10	24	2	426	36	44	350	60
Future Volume (vph)	54	19	2	40	10	24	2	426	36	44	350	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.951			0.969			0.974	
Flt Protected		0.959			0.977						0.994	
Satd. Flow (prot)	0	1725	0	0	1674	0	0	1707	0	0	3269	0
Flt Permitted		0.685			0.813			0.998			0.844	
Satd. Flow (perm)	0	1232	0	0	1393	0	0	1704	0	0	2776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			39			38			65	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.25	0.53	0.72	0.79	0.56	0.62	0.71	0.87	0.25	0.71	0.94	0.65
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	4%	1%	1%	3%	1%
Adj. Flow (vph)	216	36	3	51	18	39	3	490	144	62	372	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	255	0	0	108	0	0	637	0	0	526	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		37.0	37.0		37.0	37.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		61.7%	61.7%		61.7%	61.7%	
Maximum Green (s)	18.5	18.5		18.5	18.5		32.5	32.5		32.5	32.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		13.8			13.8			24.4			24.4	
Actuated g/C Ratio		0.29			0.29			0.51			0.51	
v/c Ratio		0.71			0.25			0.71			0.36	
Control Delay		28.9			11.4			14.3			7.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		28.9			11.4			14.3			7.2	
LOS		C			B			B			A	
Approach Delay		28.9			11.4			14.3			7.2	
Approach LOS		C			B			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 47.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 14.1		Intersection LOS: B	
Intersection Capacity Utilization 56.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

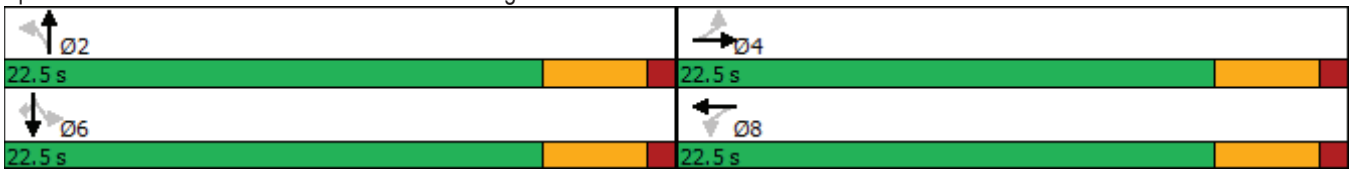


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	1	7	1	1	4	2	245	1	5	267	181
Future Volume (vph)	136	1	7	1	1	4	2	245	1	5	267	181
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.997			0.917							0.850
Flt Protected		0.954			0.985			0.999		0.950		
Satd. Flow (prot)	0	1714	0	0	1628	0	0	1766	0	1712	1802	1532
Flt Permitted		0.725			0.902			0.995		0.630		
Satd. Flow (perm)	0	1303	0	0	1490	0	0	1759	0	1135	1802	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8							248
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.44	0.25	0.85	0.25	0.95	0.50	0.50	0.85	0.95	0.62	0.81	0.73
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	3%	1%	1%	1%	1%
Adj. Flow (vph)	309	4	8	4	1	8	4	288	1	8	330	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	13	0	0	293	0	8	330	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		13.4			13.4			14.4		14.4	14.4	14.4
Actuated g/C Ratio		0.36			0.36			0.39		0.39	0.39	0.39
v/c Ratio		0.68			0.02			0.43		0.02	0.47	0.33
Control Delay		18.4			6.0			11.6		8.4	12.0	3.1
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		18.4			6.0			11.6		8.4	12.0	3.1
LOS		B			A			B		A	B	A
Approach Delay		18.4			6.0			11.6			8.2	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 37			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 41.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	45.9	24.7	71.9	49.3	37.8
Average Queue (m)	13.0	10.3	21.2	17.2	8.6
95th Queue (m)	30.4	20.3	54.1	32.9	23.0
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	LTR	L	T	R
Maximum Queue (m)	34.2	8.2	36.2	10.1	29.9	2.7
Average Queue (m)	14.0	1.3	12.1	1.1	13.3	0.0
95th Queue (m)	25.4	6.1	27.2	6.0	25.4	0.0
Link Distance (m)	221.1	88.9	765.5		506.0	506.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				30.0		
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Zone Summary

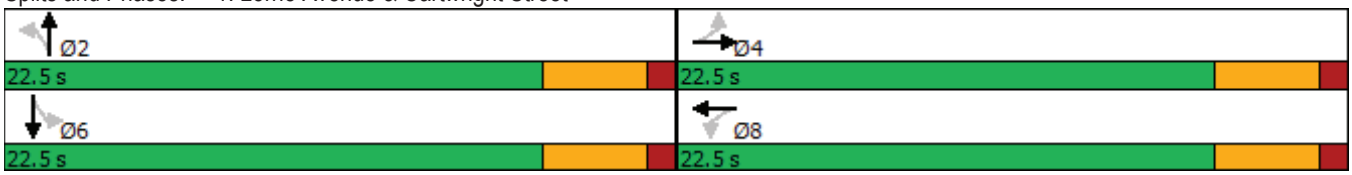
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	5	1	10	20	104	3	283	7	57	278	67
Future Volume (vph)	32	5	1	10	20	104	3	283	7	57	278	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.894			0.994			0.975	
Flt Protected		0.966			0.996			0.998			0.992	
Satd. Flow (prot)	0	1593	0	0	1590	0	0	1756	0	0	3195	0
Flt Permitted		0.817			0.967			0.977			0.859	
Satd. Flow (perm)	0	1348	0	0	1544	0	0	1719	0	0	2766	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			155			6			63	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.81	0.31	0.95	0.67	0.71	0.67	0.25	0.91	0.50	0.71	0.83	0.80
Heavy Vehicles (%)	14%	1%	1%	13%	1%	1%	1%	3%	1%	1%	6%	3%
Adj. Flow (vph)	40	16	1	15	28	155	12	311	14	80	335	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	198	0	0	337	0	0	499	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		7.1			7.1			15.4			15.4	
Actuated g/C Ratio		0.25			0.25			0.54			0.54	
v/c Ratio		0.17			0.39			0.36			0.33	
Control Delay		9.7			5.8			7.1			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.7			5.8			7.1			5.6	
LOS		A			A			A			A	
Approach Delay		9.7			5.8			7.1			5.6	
Approach LOS		A			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 28.4			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 6.3		Intersection LOS: A	
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

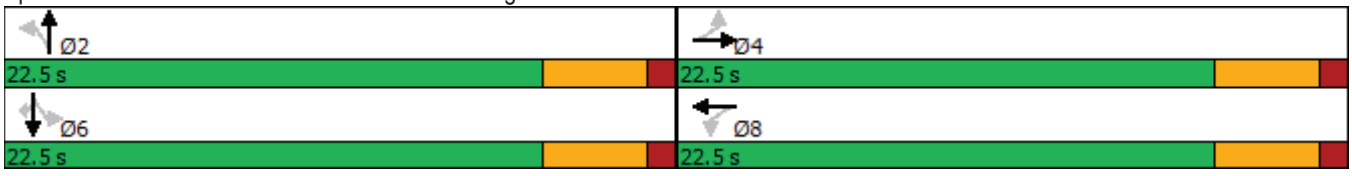


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	1	3	1	1	5	5	233	1	4	160	113
Future Volume (vph)	174	1	3	1	1	5	5	233	1	4	160	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.995			0.892							0.850
Flt Protected		0.954			0.995			0.998		0.950		
Satd. Flow (prot)	0	1710	0	0	1390	0	0	1781	0	1383	1750	1532
Flt Permitted		0.727			0.963			0.987		0.644		
Satd. Flow (perm)	0	1303	0	0	1345	0	0	1762	0	938	1750	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			8							130
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.78	0.95	0.38	0.95	0.95	0.62	0.42	0.77	0.95	0.50	0.71	0.87
Heavy Vehicles (%)	1%	1%	1%	1%	1%	20%	1%	2%	1%	25%	4%	1%
Adj. Flow (vph)	223	1	8	1	1	8	12	303	1	8	225	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	10	0	0	316	0	8	225	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		11.1			10.8			16.8		16.8	16.8	16.8
Actuated g/C Ratio		0.33			0.33			0.51		0.51	0.51	0.51
v/c Ratio		0.53			0.02			0.35		0.02	0.25	0.15
Control Delay		13.9			5.6			9.7		7.8	8.9	2.8
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		13.9			5.6			9.7		7.8	8.9	2.8
LOS		B			A			A		A	A	A
Approach Delay		13.9			5.6			9.7			6.7	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 33.2			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 41.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	21.7	28.0	32.8	33.9	23.6
Average Queue (m)	6.5	12.5	12.8	15.8	8.2
95th Queue (m)	16.4	21.6	26.1	28.7	19.3
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	33.8	14.1	39.0	13.9	39.5
Average Queue (m)	13.6	1.8	12.3	1.1	10.3
95th Queue (m)	24.1	7.9	27.8	7.0	27.1
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	20	3	11	11	83	2	430	20	127	357	60
Future Volume (vph)	54	20	3	11	11	83	2	430	20	127	357	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.892			0.981			0.979	
Flt Protected		0.960			0.996						0.986	
Satd. Flow (prot)	0	1726	0	0	1601	0	0	1724	0	0	3267	0
Flt Permitted		0.723			0.964			0.997			0.663	
Satd. Flow (perm)	0	1300	0	0	1550	0	0	1719	0	0	2197	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			134			21			48	
Link Speed (k/h)		60			50			80			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			15.8			15.0	
Peak Hour Factor	0.25	0.53	0.72	0.79	0.56	0.62	0.71	0.87	0.25	0.71	0.94	0.65
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	4%	1%	1%	3%	1%
Adj. Flow (vph)	216	38	4	14	20	134	3	494	80	179	380	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	258	0	0	168	0	0	577	0	0	651	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		13.7			13.7			20.9			20.9	
Actuated g/C Ratio		0.31			0.31			0.48			0.48	
v/c Ratio		0.64			0.29			0.70			0.61	
Control Delay		21.6			5.9			14.7			11.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.6			5.9			14.7			11.3	
LOS		C			A			B			B	
Approach Delay		21.6			5.9			14.7			11.3	
Approach LOS		C			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 44			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 64.0%		ICU Level of Service B	
Analysis Period (min) 15			

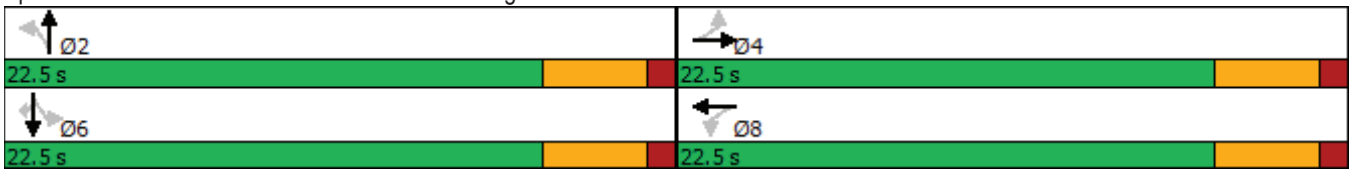
Splits and Phases: 1: Lorne Avenue & Cartwright Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1	7	1	1	4	2	282	1	5	330	208
Future Volume (vph)	155	1	7	1	1	4	2	282	1	5	330	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.997			0.917							0.850
Flt Protected		0.954			0.985			0.999		0.950		
Satd. Flow (prot)	0	1714	0	0	1628	0	0	1766	0	1712	1802	1532
Flt Permitted		0.724			0.901			0.995		0.569		
Satd. Flow (perm)	0	1301	0	0	1489	0	0	1759	0	1025	1802	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8							285
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.44	0.25	0.85	0.25	0.95	0.50	0.50	0.85	0.95	0.62	0.81	0.73
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	3%	1%	1%	1%	1%
Adj. Flow (vph)	352	4	8	4	1	8	4	332	1	8	407	285
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	13	0	0	337	0	8	407	285
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		14.6			14.6			15.2		15.2	15.2	15.2
Actuated g/C Ratio		0.37			0.37			0.39		0.39	0.39	0.39
v/c Ratio		0.74			0.02			0.49		0.02	0.58	0.37
Control Delay		22.6			6.3			12.7		8.4	14.1	3.2
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		22.6			6.3			12.7		8.4	14.1	3.2
LOS		C			A			B		A	B	A
Approach Delay		22.6			6.3			12.7			9.6	
Approach LOS		C			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 39			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 44.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	38.3	26.8	55.6	69.5	54.5
Average Queue (m)	13.8	11.6	19.5	27.3	13.3
95th Queue (m)	30.1	21.9	41.4	55.2	38.7
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	LTR	L	T	R
Maximum Queue (m)	34.6	8.3	40.1	8.9	43.4	4.3
Average Queue (m)	15.7	1.2	15.5	0.8	16.4	0.3
95th Queue (m)	27.7	5.8	31.1	4.8	32.6	3.9
Link Distance (m)	221.1	88.9	765.5		506.0	506.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				30.0		
Storage Blk Time (%)					1	
Queuing Penalty (veh)					0	

Zone Summary

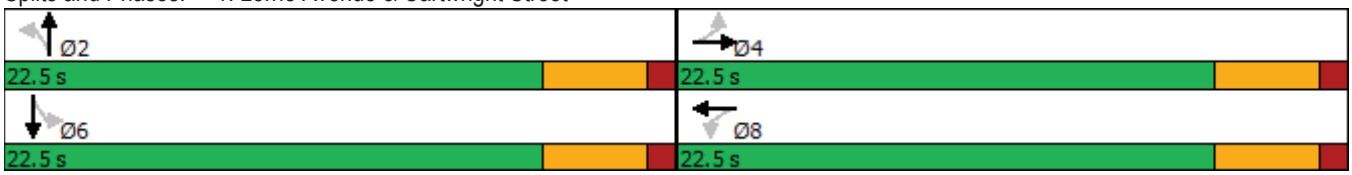
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	6	1	19	22	31	2	312	36	22	318	78
Future Volume (vph)	37	6	1	19	22	31	2	312	36	22	318	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.941			0.977			0.971	
Flt Protected		0.966			0.987			0.999			0.997	
Satd. Flow (prot)	0	1594	0	0	1622	0	0	1731	0	0	3185	0
Flt Permitted		0.771			0.887			0.990			0.922	
Satd. Flow (perm)	0	1272	0	0	1458	0	0	1715	0	0	2945	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			46			27			76	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			21.1			15.0	
Peak Hour Factor	0.81	0.31	0.95	0.67	0.71	0.67	0.25	0.91	0.50	0.71	0.83	0.80
Heavy Vehicles (%)	14%	1%	1%	13%	1%	1%	1%	3%	1%	1%	6%	3%
Adj. Flow (vph)	46	19	1	28	31	46	8	343	72	31	383	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	105	0	0	423	0	0	512	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		7.1			7.0			20.5			20.5	
Actuated g/C Ratio		0.24			0.23			0.68			0.68	
v/c Ratio		0.22			0.28			0.36			0.25	
Control Delay		11.9			8.8			5.7			4.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.9			8.8			5.7			4.1	
LOS		B			A			A			A	
Approach Delay		11.9			8.8			5.7			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 30			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 5.6		Intersection LOS: A	
Intersection Capacity Utilization 41.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

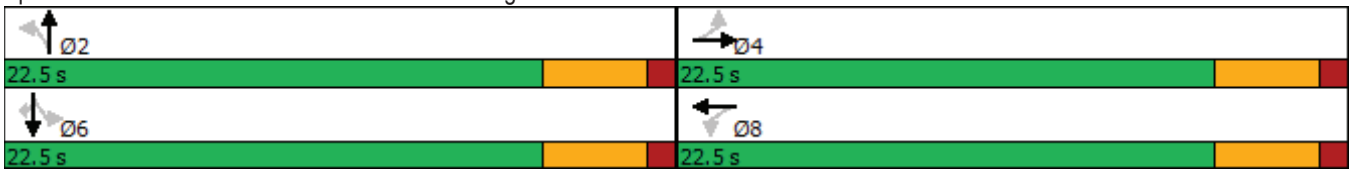


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1	3	1	1	6	5	206	1	5	164	103
Future Volume (vph)	141	1	3	1	1	6	5	206	1	5	164	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.994			0.887							0.850
Flt Protected		0.955			0.996			0.998		0.950		
Satd. Flow (prot)	0	1711	0	0	1376	0	0	1782	0	1383	1750	1532
Flt Permitted		0.728			0.969			0.985		0.690		
Satd. Flow (perm)	0	1304	0	0	1339	0	0	1758	0	1005	1750	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			10							118
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.78	0.95	0.38	0.95	0.95	0.62	0.42	0.77	0.95	0.50	0.71	0.87
Heavy Vehicles (%)	1%	1%	1%	1%	1%	20%	1%	2%	1%	25%	4%	1%
Adj. Flow (vph)	181	1	8	1	1	10	12	268	1	10	231	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	190	0	0	12	0	0	281	0	10	231	118
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		9.9			9.8			16.5		16.5	16.5	16.5
Actuated g/C Ratio		0.31			0.31			0.52		0.52	0.52	0.52
v/c Ratio		0.47			0.03			0.31		0.02	0.25	0.14
Control Delay		12.6			5.2			8.6		7.2	8.3	2.7
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		12.6			5.2			8.6		7.2	8.3	2.7
LOS		B			A			A		A	A	A
Approach Delay		12.6			5.3			8.6			6.4	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 31.8			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 38.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	20.9	22.8	34.0	34.4	27.0
Average Queue (m)	8.7	9.5	14.2	12.5	7.5
95th Queue (m)	18.0	18.1	28.1	24.9	18.3
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	27.3	8.9	23.0	8.4	20.8
Average Queue (m)	12.5	1.7	9.0	0.9	8.3
95th Queue (m)	21.2	7.2	20.2	5.5	18.2
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Zone Summary

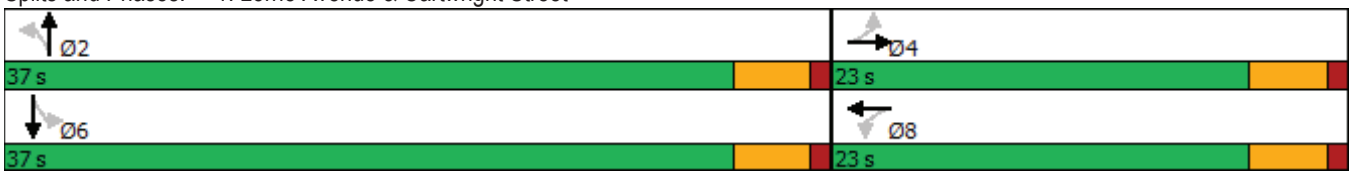
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	22	2	42	12	28	2	488	39	51	391	71
Future Volume (vph)	63	22	2	42	12	28	2	488	39	51	391	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.999			0.949			0.971			0.973	
Flt Protected		0.959			0.978						0.994	
Satd. Flow (prot)	0	1726	0	0	1672	0	0	1710	0	0	3266	0
Flt Permitted		0.735			0.816			0.998			0.829	
Satd. Flow (perm)	0	1323	0	0	1395	0	0	1707	0	0	2724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			45			36			70	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			21.1			15.0	
Peak Hour Factor	0.25	0.53	0.72	0.79	0.56	0.62	0.71	0.87	0.25	0.71	0.94	0.65
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	4%	1%	1%	3%	1%
Adj. Flow (vph)	252	42	3	53	21	45	3	561	156	72	416	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	297	0	0	119	0	0	720	0	0	597	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		37.0	37.0		37.0	37.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		61.7%	61.7%		61.7%	61.7%	
Maximum Green (s)	18.5	18.5		18.5	18.5		32.5	32.5		32.5	32.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.6			15.6			26.9			26.9	
Actuated g/C Ratio		0.30			0.30			0.52			0.52	
v/c Ratio		0.75			0.26			0.80			0.41	
Control Delay		31.4			12.0			18.3			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		31.4			12.0			18.3			7.8	
LOS		C			B			B			A	
Approach Delay		31.4			12.0			18.3			7.8	
Approach LOS		C			B			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 51.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 63.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

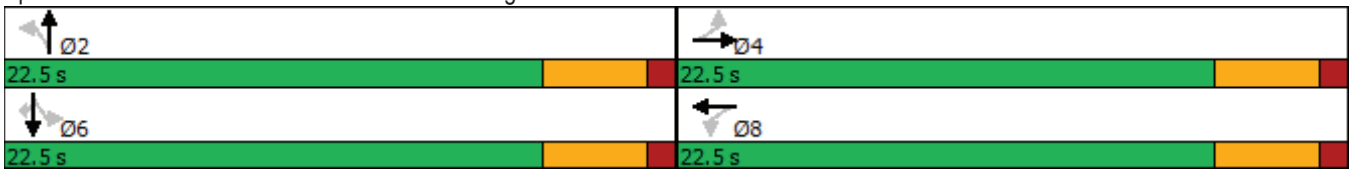


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	1	7	1	1	5	2	288	1	6	314	181
Future Volume (vph)	136	1	7	1	1	5	2	288	1	6	314	181
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.997			0.910							0.850
Flt Protected		0.954			0.987			0.999		0.950		
Satd. Flow (prot)	0	1714	0	0	1618	0	0	1766	0	1712	1802	1532
Flt Permitted		0.723			0.913			0.995		0.573		
Satd. Flow (perm)	0	1299	0	0	1497	0	0	1759	0	1033	1802	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			10							248
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.44	0.25	0.85	0.25	0.95	0.50	0.50	0.85	0.95	0.62	0.81	0.73
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	3%	1%	1%	1%	1%
Adj. Flow (vph)	309	4	8	4	1	10	4	339	1	10	388	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	15	0	0	344	0	10	388	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		13.5			13.5			15.3		15.3	15.3	15.3
Actuated g/C Ratio		0.35			0.35			0.40		0.40	0.40	0.40
v/c Ratio		0.69			0.03			0.49		0.02	0.54	0.32
Control Delay		19.4			6.0			12.2		8.3	12.9	3.0
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		19.4			6.0			12.2		8.3	12.9	3.0
LOS		B			A			B		A	B	A
Approach Delay		19.4			6.0			12.2			9.0	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 38.1			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 43.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	52.5	24.9	97.5	76.2	63.4
Average Queue (m)	16.4	10.5	29.3	23.2	13.8
95th Queue (m)	36.8	20.6	72.2	53.6	40.7
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	35.6	9.5	30.6	9.2	30.0
Average Queue (m)	14.5	1.6	13.1	1.7	12.2
95th Queue (m)	27.1	6.9	26.4	7.3	24.7
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Zone Summary

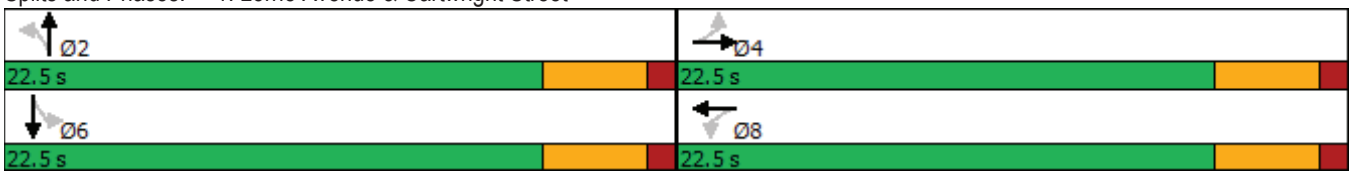
Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	6	1	11	23	109	3	313	8	60	319	78
Future Volume (vph)	37	6	1	11	23	109	3	313	8	60	319	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.896			0.994			0.974	
Flt Protected		0.966			0.996			0.998			0.993	
Satd. Flow (prot)	0	1594	0	0	1594	0	0	1755	0	0	3193	0
Flt Permitted		0.799			0.967			0.977			0.856	
Satd. Flow (perm)	0	1319	0	0	1547	0	0	1719	0	0	2753	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			163			6			65	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			21.1			15.0	
Peak Hour Factor	0.81	0.31	0.95	0.67	0.71	0.67	0.25	0.91	0.50	0.71	0.83	0.80
Heavy Vehicles (%)	14%	1%	1%	13%	1%	1%	1%	3%	1%	1%	6%	3%
Adj. Flow (vph)	46	19	1	16	32	163	12	344	16	85	384	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	211	0	0	372	0	0	567	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		7.3			7.3			16.0			16.0	
Actuated g/C Ratio		0.25			0.25			0.55			0.55	
v/c Ratio		0.20			0.41			0.39			0.37	
Control Delay		10.8			6.3			7.4			5.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		10.8			6.3			7.4			5.8	
LOS		B			A			A			A	
Approach Delay		10.8			6.3			7.4			5.8	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 29.2			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 58.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Lorne Avenue & Cartwright Street

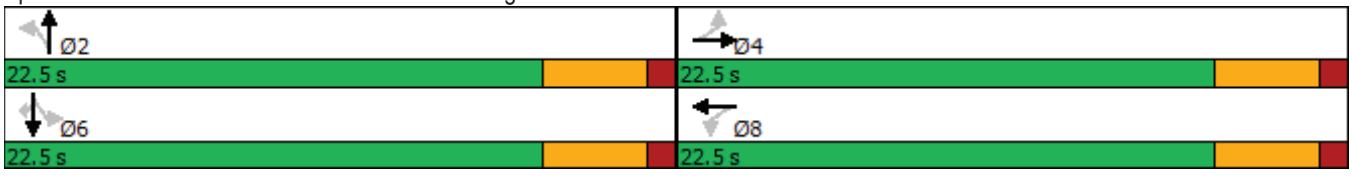


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	1	3	1	1	6	5	264	1	5	184	113
Future Volume (vph)	174	1	3	1	1	6	5	264	1	5	184	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.995			0.887							0.850
Flt Protected		0.954			0.996			0.998		0.950		
Satd. Flow (prot)	0	1710	0	0	1376	0	0	1781	0	1383	1750	1532
Flt Permitted		0.726			0.969			0.987		0.604		
Satd. Flow (perm)	0	1302	0	0	1339	0	0	1762	0	879	1750	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			10							130
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.78	0.95	0.38	0.95	0.95	0.62	0.42	0.77	0.95	0.50	0.71	0.87
Heavy Vehicles (%)	1%	1%	1%	1%	1%	20%	1%	2%	1%	25%	4%	1%
Adj. Flow (vph)	223	1	8	1	1	10	12	343	1	10	259	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	12	0	0	356	0	10	259	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		11.2			10.9			17.4		17.4	17.4	17.4
Actuated g/C Ratio		0.33			0.32			0.51		0.51	0.51	0.51
v/c Ratio		0.54			0.03			0.39		0.02	0.29	0.15
Control Delay		14.3			5.5			10.0		7.8	9.1	2.8
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		14.3			5.5			10.0		7.8	9.1	2.8
LOS		B			A			A		A	A	A
Approach Delay		14.3			5.5			10.0			7.0	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 33.8			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 43.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	22.6	28.0	36.8	41.9	30.9
Average Queue (m)	8.0	13.2	15.6	18.1	8.5
95th Queue (m)	18.5	22.1	29.5	34.5	19.6
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	37.6	10.8	41.8	15.0	29.4
Average Queue (m)	14.2	1.8	14.3	1.9	10.4
95th Queue (m)	25.0	7.6	30.7	9.5	23.6
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	23	3	13	13	87	2	492	23	134	398	71
Future Volume (vph)	63	23	3	13	13	87	2	492	23	134	398	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		10.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.998			0.894			0.981			0.977	
Flt Protected		0.960			0.996						0.987	
Satd. Flow (prot)	0	1726	0	0	1605	0	0	1724	0	0	3264	0
Flt Permitted		0.694			0.959			0.997			0.631	
Satd. Flow (perm)	0	1248	0	0	1545	0	0	1719	0	0	2086	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			140			21			53	
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		155.4			269.8			351.7			250.3	
Travel Time (s)		9.3			19.4			21.1			15.0	
Peak Hour Factor	0.25	0.53	0.72	0.79	0.56	0.62	0.71	0.87	0.25	0.71	0.94	0.65
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	4%	1%	1%	3%	1%
Adj. Flow (vph)	252	43	4	16	23	140	3	566	92	189	423	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	299	0	0	179	0	0	661	0	0	721	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.6			15.6			23.1			23.1	
Actuated g/C Ratio		0.32			0.32			0.48			0.48	
v/c Ratio		0.74			0.30			0.79			0.70	
Control Delay		28.6			6.1			19.3			13.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		28.6			6.1			19.3			13.7	
LOS		C			A			B			B	
Approach Delay		28.6			6.1			19.3			13.7	
Approach LOS		C			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 48			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 70.1%		ICU Level of Service C	
Analysis Period (min) 15			

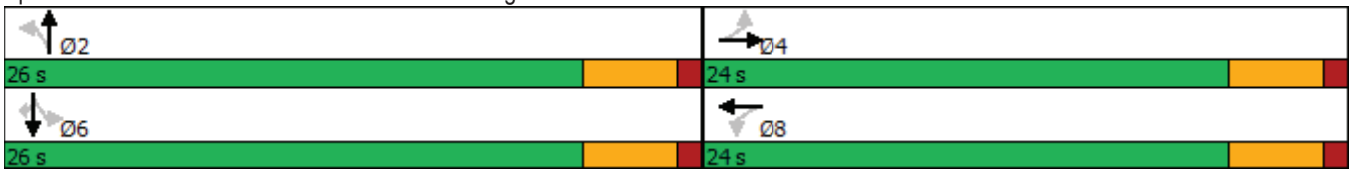
Splits and Phases: 1: Lorne Avenue & Cartwright Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1	7	1	1	5	2	325	1	6	377	208
Future Volume (vph)	155	1	7	1	1	5	2	325	1	6	377	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		25.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			15.0		
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		0.997			0.910							0.850
Flt Protected		0.954			0.987			0.999		0.950		
Satd. Flow (prot)	0	1714	0	0	1618	0	0	1766	0	1712	1802	1532
Flt Permitted		0.722			0.914			0.995		0.515		
Satd. Flow (perm)	0	1297	0	0	1499	0	0	1759	0	928	1802	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			10							285
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		235.2			99.9			778.5			511.1	
Travel Time (s)		16.9			7.2			46.7			30.7	
Peak Hour Factor	0.44	0.25	0.85	0.25	0.95	0.50	0.50	0.85	0.95	0.62	0.81	0.73
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	3%	1%	1%	1%	1%
Adj. Flow (vph)	352	4	8	4	1	10	4	382	1	10	465	285
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	15	0	0	387	0	10	465	285
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	24.0	24.0		24.0	24.0		26.0	26.0		26.0	26.0	26.0
Total Split (%)	48.0%	48.0%		48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	52.0%
Maximum Green (s)	19.5	19.5		19.5	19.5		21.5	21.5		21.5	21.5	21.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		15.7			15.7			17.4		17.4	17.4	17.4
Actuated g/C Ratio		0.37			0.37			0.41		0.41	0.41	0.41
v/c Ratio		0.76			0.03			0.54		0.03	0.63	0.36
Control Delay		24.7			6.9			13.4		8.5	15.1	3.0
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		24.7			6.9			13.4		8.5	15.1	3.0
LOS		C			A			B		A	B	A
Approach Delay		24.7			6.9			13.4			10.5	
Approach LOS		C			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 42.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Clarence Avenue & Cartwright Street



Intersection: 1: Lorne Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (m)	51.4	31.4	90.9	84.2	70.4
Average Queue (m)	16.8	13.2	32.2	35.2	18.5
95th Queue (m)	36.9	24.2	67.9	68.5	52.1
Link Distance (m)	146.4	259.1		244.9	244.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Clarence Avenue & Cartwright Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	T
Maximum Queue (m)	46.6	8.1	43.4	10.6	38.3
Average Queue (m)	16.4	1.4	17.4	1.7	17.6
95th Queue (m)	31.8	6.4	35.7	7.4	33.8
Link Distance (m)	221.1	88.9	765.5		506.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				30.0	
Storage Blk Time (%)					1
Queuing Penalty (veh)					0

Zone Summary

Zone wide Queuing Penalty: 0

Appendix C SIGNAL WARRANT ANALYSIS

City of Saskatoon - Traffic Signal Warrant Analysis

Main Street (name)	Lorne Avenue	Direction (EW or NS)	NS
Side Street (name)	Cartwright Street	Direction (EW or NS)	EW
Quadrant / Int #	1	Comments	2027 Combined
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Saskatoon
City:	Saskatoon, SK
Analysis Date:	2022 Nov 15, Tue
Count Date:	2022 Aug 23, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Lorne Avenue	NB				1				1
Lorne Avenue	SB		1			1		750	2
Cartwright Street	WB				1				
Cartwright Street	EB				1				
Are the Cartwright Street WB right turns significantly impeded by through movements? (y/n)							n		
Are the Cartwright Street EB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	325,000
Central Business District	(y/n)	n

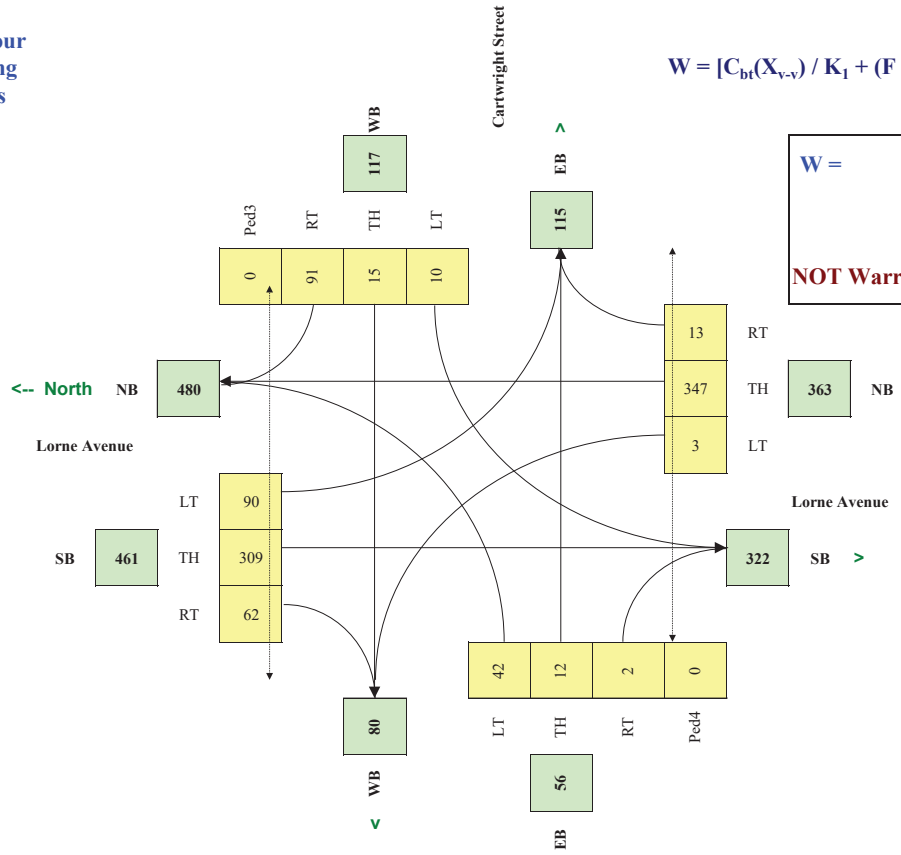
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Lorne Avenue	NS	60	4.0%	n	0.0
Cartwright Street	EW	50	1.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	3	260	6	52	256	62	9	18	96	29	5	1	0	0	0	0
	3	283	7	57	278	67	10	20	104	32	5	1	0	0	0	0
	3	357	14	92	318	64	11	16	94	43	13	2	0	0	0	0
	3	357	14	92	318	64	11	16	94	43	13	2	0	0	0	0
	2	430	20	127	357	60	11	11	83	54	20	3	0	0	0	0
	2	396	18	117	328	55	10	10	76	50	18	3	0	0	0	0
Total (6-hour peak)	16	2,083	79	537	1,855	372	62	91	547	251	74	12	0	0	0	0
Average (6-hour peak)	3	347	13	90	309	62	10	15	91	42	12	2	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W = 60 Veh, 60 Ped, 0

NOT Warranted

RESET SHEET

City of Saskatoon - Traffic Signal Warrant Analysis

Main Street (name)	Clarence Avenue	Direction (EW or NS)	NS
Side Street (name)	Cartwright Street	Direction (EW or NS)	EW
Quadrant / Int #	6	Comments	2027 Combined
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Saskatoon
City:	Saskatoon, SK
Analysis Date:	2022 Nov 15, Tue
Count Date:	2022 Aug 22, Mon
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Clarence Avenue	NB				1				1
Clarence Avenue	SB	1		1			1	500	1
Cartwright Street	WB				1				
Cartwright Street	EB				1				

Are the Cartwright Street WB right turns significantly impeded by through movements?	(y/n)	n
Are the Cartwright Street EB right turns significantly impeded by through movements?	(y/n)	n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	325,000
Central Business District	(y/n)	n

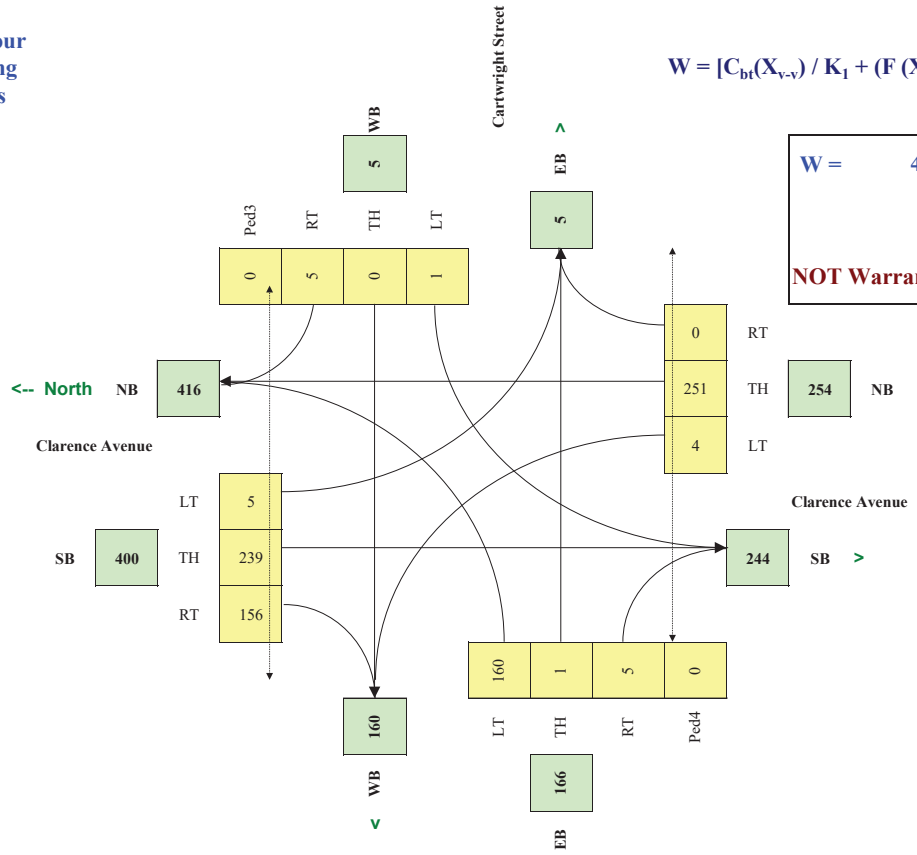
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Clarence Avenue	NS	60	2.0%	n	0.0
Cartwright Street	EW	50	1.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	5	214	0	4	147	104	0	0	5	160	0	3	0	0	0	0
	5	233	0	4	160	113	0	0	5	174	0	3	0	0	0	0
	4	258	0	5	245	161	1	0	5	165	1	5	0	0	0	0
	4	258	0	5	245	161	1	0	5	165	1	5	0	0	0	0
	2	282	0	5	330	208	1	0	4	155	1	7	0	0	0	0
	2	259	0	5	304	191	1	0	4	143	1	6	0	0	0	0
Total (6-hour peak)	22	1,504	0	28	1,431	938	4	0	28	962	4	29	0	0	0	0
Average (6-hour peak)	4	251	0	5	239	156	1	0	5	160	1	5	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	44	44	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

City of Saskatoon - Traffic Signal Warrant Analysis

Main Street (name)	Lorne Avenue	Direction (EW or NS)	NS
Side Street (name)	Cartwright Street	Direction (EW or NS)	EW
Quadrant / Int #	1	Comments	2037 Combined
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Saskatoon
City:	Saskatoon, SK
Analysis Date:	2022 Nov 15, Tue
Count Date:	2022 Aug 23, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Lorne Avenue	NB				1				1
Lorne Avenue	SB		1			1		750	2
Cartwright Street	WB				1				
Cartwright Street	EB				1				
Are the Cartwright Street WB right turns significantly impeded by through movements? (y/n)							n		
Are the Cartwright Street EB right turns significantly impeded by through movements? (y/n)							n		

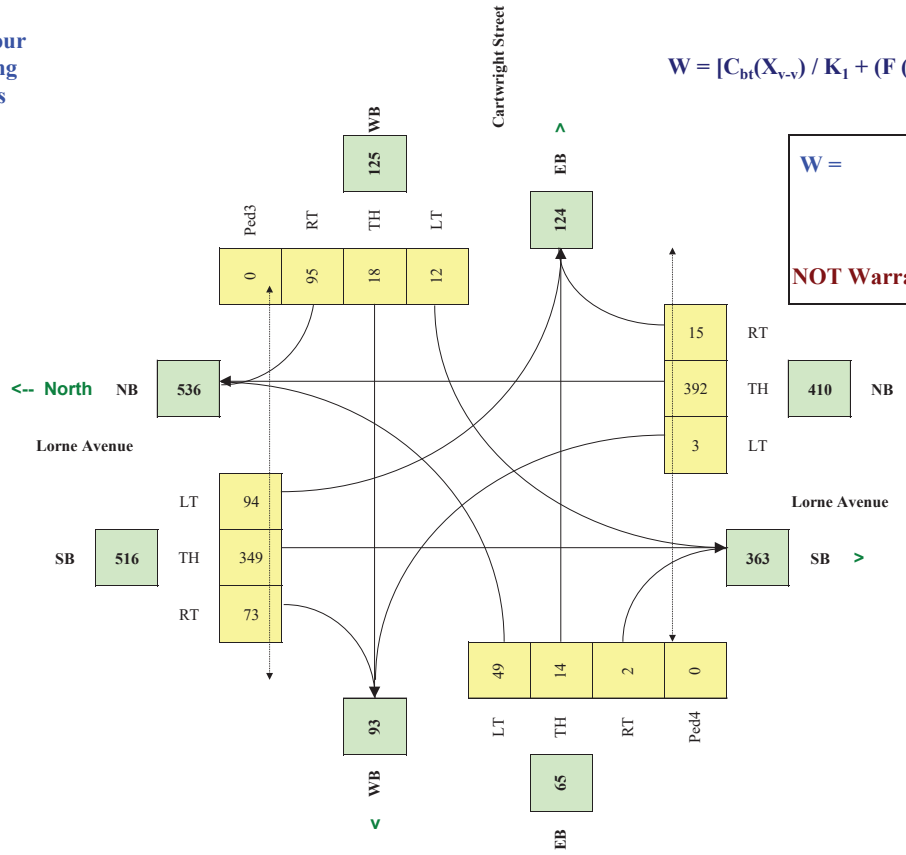
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	325,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Lorne Avenue	NS	60	4.0%	n	0.0
Cartwright Street	EW	50	1.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	3	288	7	55	293	72	10	21	100	34	6	1	0	0	0	0
	3	313	8	60	319	78	11	23	109	37	6	1	0	0	0	0
	3	403	16	97	359	75	12	18	98	50	15	2	0	0	0	0
	3	403	16	97	359	75	12	18	98	50	15	2	0	0	0	0
	2	492	23	134	398	71	13	13	87	63	23	3	0	0	0	0
	2	453	21	123	366	65	12	12	80	58	21	3	0	0	0	0
Total (6-hour peak)	16	2,352	91	566	2,094	436	70	105	572	292	86	12	0	0	0	0
Average (6-hour peak)	3	392	15	94	349	73	12	18	95	49	14	2	0	0	0	0

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	76	76	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

City of Saskatoon - Traffic Signal Warrant Analysis

Main Street (name)	Clarence Avenue	Direction (EW or NS)	NS
Side Street (name)	Cartwright Street	Direction (EW or NS)	EW
Quadrant / Int #	6	Comments	2037 Combined
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Saskatoon
City:	Saskatoon, SK
Analysis Date:	2022 Nov 15, Tue
Count Date:	2022 Aug 22, Mon
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Clarence Avenue	NB				1				1
Clarence Avenue	SB	1		1			1	500	1
Cartwright Street	WB				1				
Cartwright Street	EB				1				

Are the Cartwright Street WB right turns significantly impeded by through movements?	(y/n)	n
Are the Cartwright Street EB right turns significantly impeded by through movements?	(y/n)	n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	325,000
Central Business District	(y/n)	n

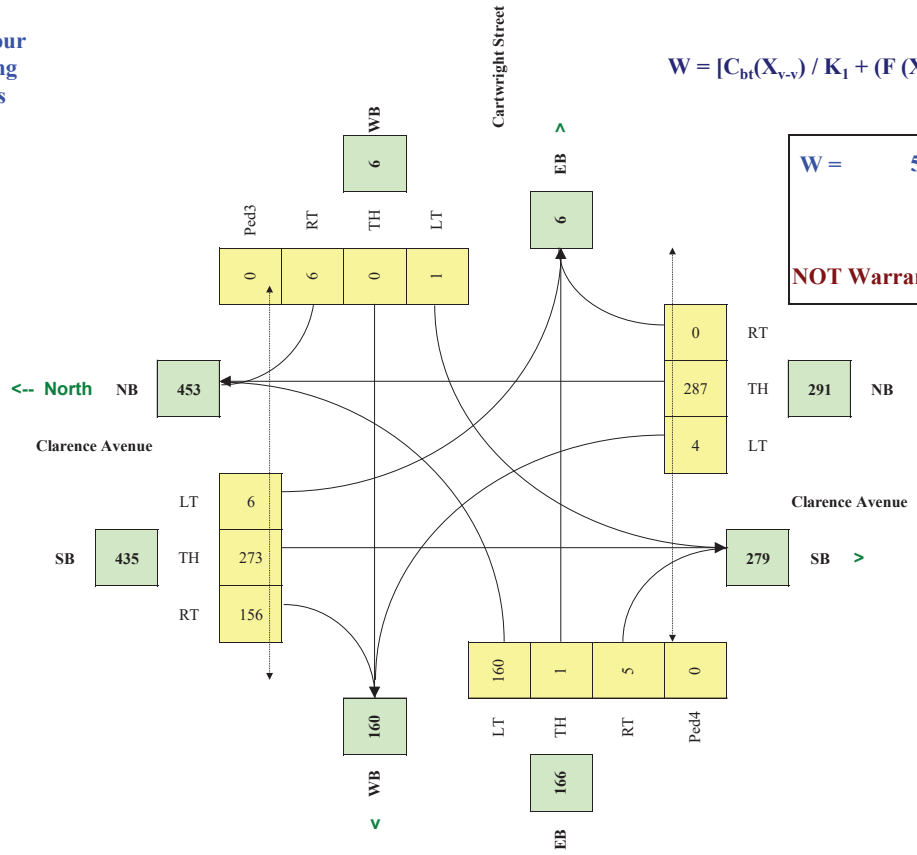
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Clarence Avenue	NS	60	2.0%	n	0.0
Cartwright Street	EW	50	1.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	5	243	0	5	169	104	0	0	6	160	0	3	0	0	0	0
	5	264	0	5	184	113	0	0	6	174	0	3	0	0	0	0
	4	295	0	6	281	161	1	0	6	165	1	5	0	0	0	0
	4	295	0	6	281	161	1	0	6	165	1	5	0	0	0	0
	2	325	0	6	377	208	1	0	5	155	1	7	0	0	0	0
	2	299	0	6	347	191	1	0	5	143	1	6	0	0	0	0
Total (6-hour peak)	22	1,721	0	34	1,639	938	4	0	34	962	4	29	0	0	0	0
Average (6-hour peak)	4	287	0	6	273	156	1	0	6	160	1	5	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	51	51	0
		Veh	Ped

NOT Warranted

RESET SHEET

Appendix D MOH INTERSECTION WARRANTS

DEFINITIONS

Partial lighting is the illumination of key decision areas that demand full driver care and alertness by the placement of a limited number of luminaires.

Intersection delineation lighting consists of the installation of high pressure sodium (HPS) luminaire(s) over the intersecting roadway or median connector of divided highways for the purpose of illuminating vehicles entering or crossing the through highway route.

The luminaires provide the secondary benefit of visibly marking the location of the intersecting roadway on the provincial highway system.

POLICY

Partial roadway lighting, in the form of intersection delineation lighting, shall be provided at provincial highway intersections in accordance with the candidate and design criteria as noted herein and within Standard Plans 2621-1-1, 2621-1-2 and 2621-1-3.

CANDIDATE CRITERIA

All provincial highway to highway intersections qualify for intersection delineation lighting.

All intersections of the designated community access road with the provincial highway system qualify for intersection delineation lighting.

All rural and urban public highway intersections with a provincial highway with an intersecting roadway traffic volume greater than 150 AADT or 250 SADT for seasonal recreational roads qualify for intersection delineation lighting.

COMMUNITY ACCESS ROADS

All intersections of the designated community access road with the provincial highway system qualify for intersection delineation lighting. Community access roads are assigned the 40 highway subsection identifier.

Intersection delineation lights for alternate access routes are subject to satisfying the minimum traffic volume criteria and priority ranking with all other provincial candidates.

PRIORITY RANKING

First priority should be given to any outstanding or new provincial highway to highway intersections where the availability of power permits an economical installation.

Next priority should be given to outstanding designated community access road intersections with a provincial highway where the availability of power permits an economical installation.

Other intersecting roadways that satisfy the 150 AADT or greater traffic criteria should be ranked on the basis of priority points. The candidate priority points are determined by use of Figure 2621-1-1 Intersection Delineation Lighting Priority Points.

A guideline for an acceptable price premium to bring power to the site is $1,000 to $2,000 per 100 AADT on the intersecting roadway.

FIGURE 2621-1-1

DELINEATION LIGHTING PRIORITY RANKING POINTS

The purpose of this rating is to priority rank intersections for intersection delineation lighting. Points are assigned as follows:

		Points	Maximum Points
1.	Highway Classification		
	Arterial (major or minor)	5	
	Collector	3	
	Local	1	
2.	AADT on Through Highway		
	Points = 0.01 * AADT (Through highway intersection leg with highest AADT)		25
3.	AADT on Intersecting Roadway		
	Points = 0.05 * AADT (AADT on intersecting leg to be lit)		
4.	Average Annual Number of Accidents		
	Average annual number of night accidents last 3 years * 10		30

FIGURE 2621-1-1
Continued

		Points	Maximum Points
5.	Geometric Features		
5.1	Through Highway		
5.1.1	Channelized intersection treatment	5	
5.1.2	Divided Highway	5	
5.1.3	Intersection on horizontal curve	2	
5.1.4	Intersection off curve but within 100 m of curve (ST or TS)	1	
5.1.5	Intersection road surface visible:		
	i) less than 180 m	2	
	ii) less than 370 m	1	
5.1.6	Obstructed Sight Triangle in advance of intersection:		
	i) one sight triangle obstructed	2	
	ii) both sight triangles obstructed	3	
5.1.7	Intersection angle less than 70 or more than 110 degrees	2	
5.2	Intersecting Roadway		
5.2.1	Intersection road surface visible from less than 180 m	2	
5.2.2	Horizontal curve ending less than 60 m from the intersection	1	
5.2.3	Channelized intersection or divided roadway	5	
5.2.4	Signed Hospital access route	5	

FIGURE 2621-1-1
Continued

	Points	Maximum Points
6. Environmental Factors		
Either		
6.1 Rural development with lighting : (within 150 m of intersecting leg)		
i) in four quadrants		8
ii) in three quadrants		6
iii) in two quadrants		4
iv) in one quadrant		1
or		
6.2 Urban built up area:		
i) highway commercial		8
ii) residential		4
iii) industrial with lighting		3

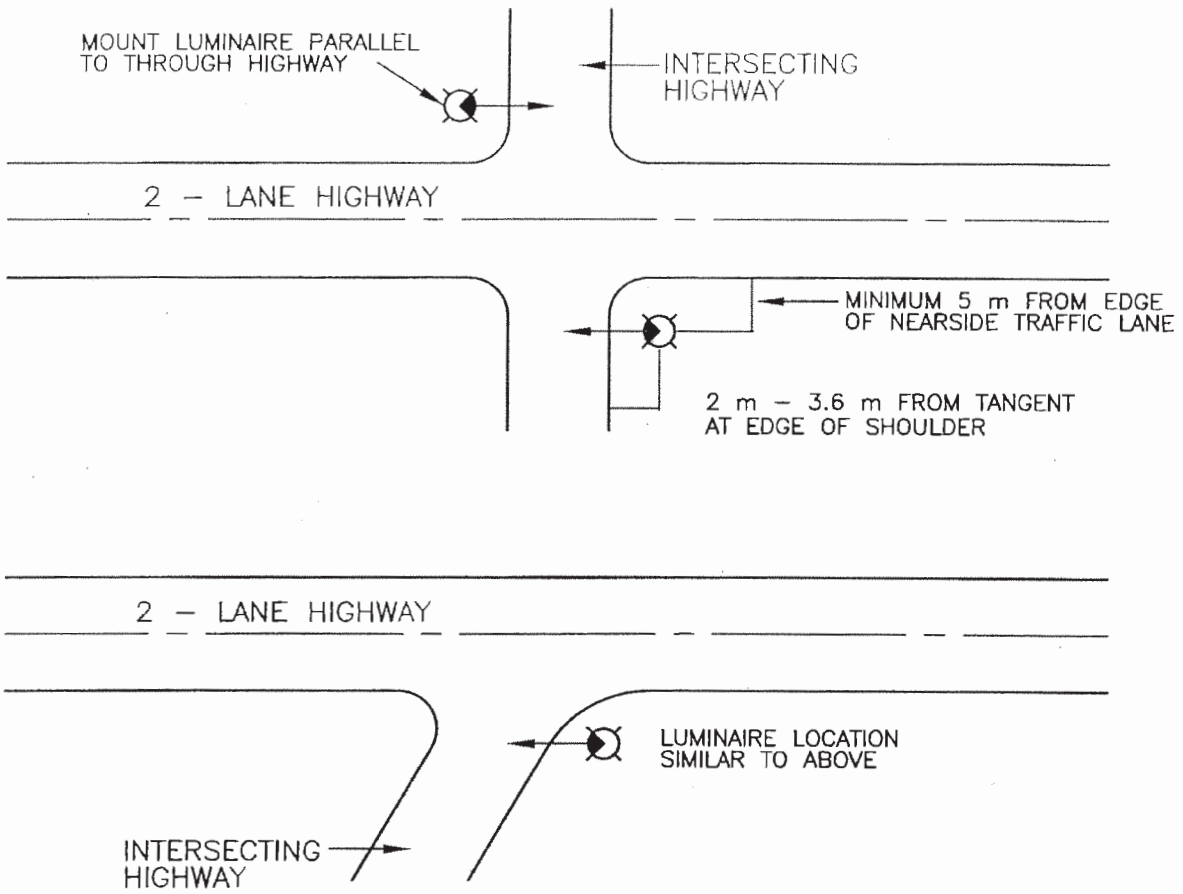
NOTES:

1. Delineation lighting is not provided if there is already an equivalent urban street light within 25 m of the intersection.

2. High speed exit/entrance roadways partial lighting should be given higher priority than at grade intersections with 60 points or less.

3. To qualify for intersection delineation lighting candidates, other than provincial highways or designated community access roads, shall incur an intersecting roadway traffic volume >= 150 AADT or 250 SADT for seasonal recreational roads.

4. Height of eye for road surface visibility should be 1.15 m.



Notes:

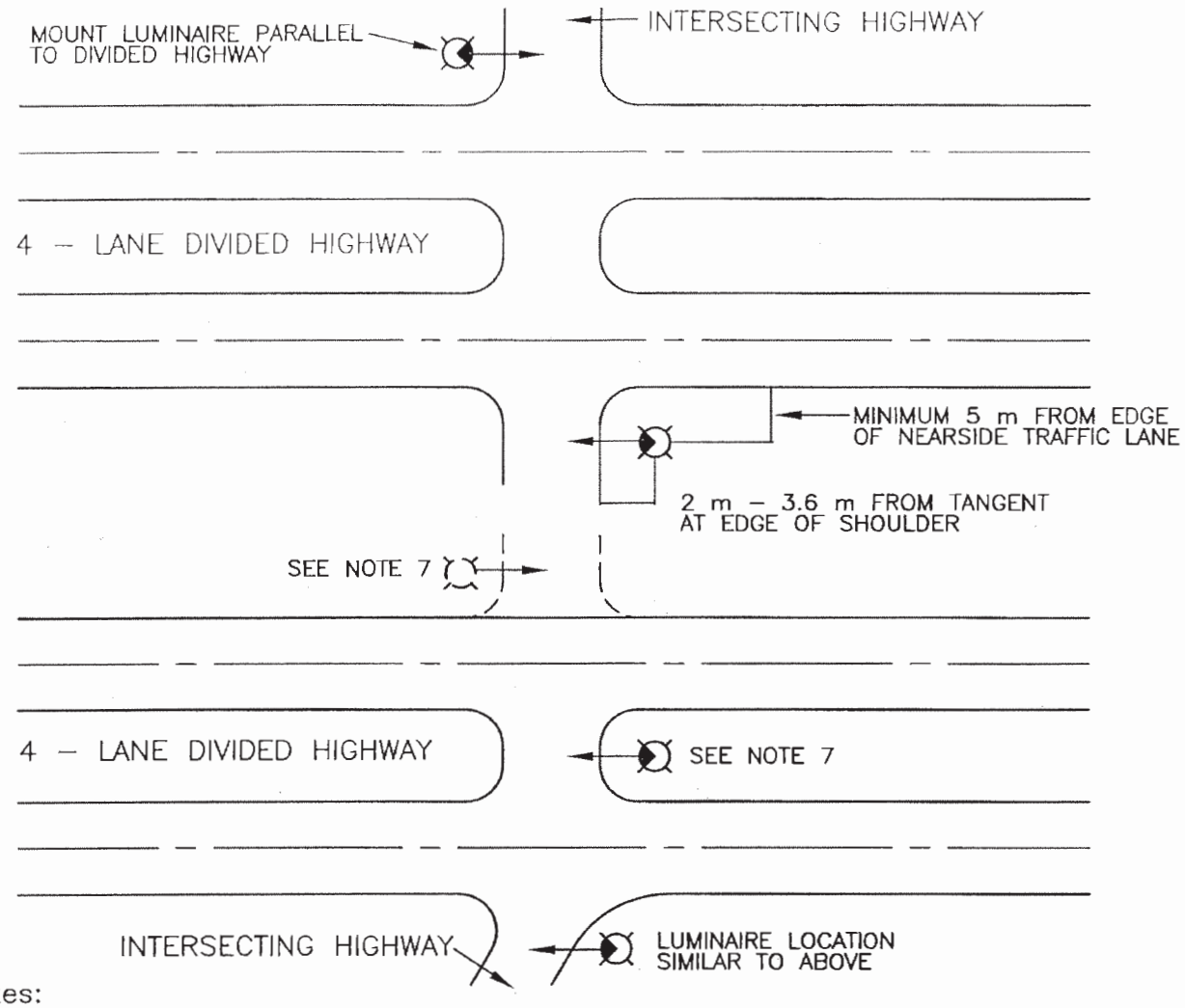
1. High Pressure Sodium Vapour Luminaire, photocell switch (150 HPS or equivalent).
2. 10.7 m high, 2.4 m davit steel pole, M.H. (road surface to luminaire) not less than 9.0 m.
3. Use approved type slip–joint or frangible base.
4. Underground wiring from nearest line pole to base of light pole.
5. Flange of slip–joint must not protrude more than 10 cm above ground.
6. Check traffic sign(s) and relocate if necessary to suit lighting.
7. At 4–leg intersections where one leg of the intersection is not a highway, a light should be installed where the road AADT is 150 or higher.

Saskatchewan Highways and Transportation

DELINEATION LIGHTING
AT RURAL HIGHWAY INTERSECTIONS
2 LANE HIGHWAY

RECOMMENDED BY:		SENIOR DESIGN ENGINEER ENGINEERING SERVICES BR.	DATE	02-05-21	STANDARD PLAN NO	2621–1–1
APPROVED BY:	R Widger	EXECUTIVE DIRECTOR ENGINEERING SERVICES BR.	DATE	02-06-05	SHEET	1 of 1

ACAD DWG: 2621-1-1.DWG LAST REV DATE: 01/11/20



Notes:

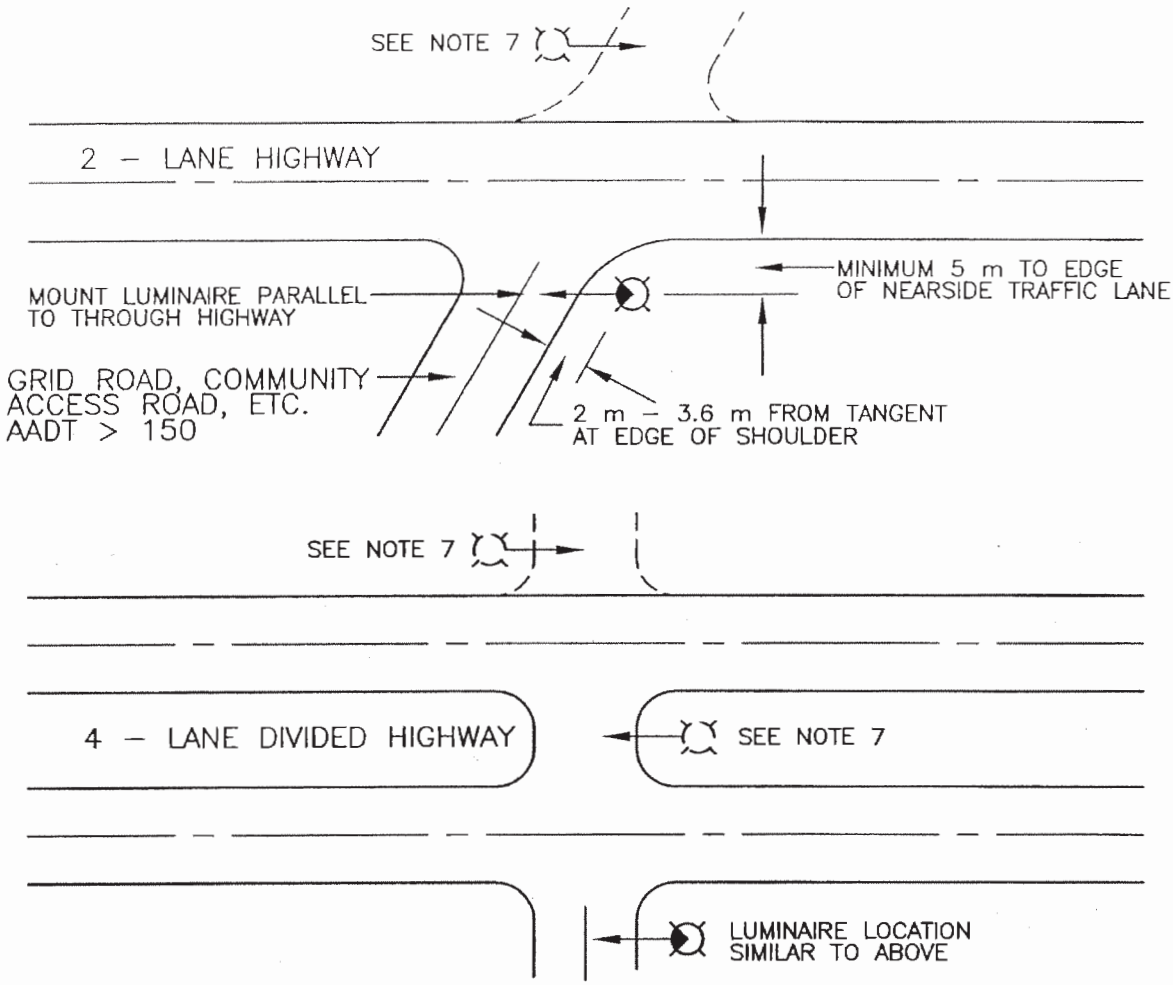
1. High Pressure Sodium Vapour Luminaire, photocell switch (150W HPS or equivalent).
2. 10.7 m high, 2.4 m davit steel pole, M.H. (road surface to luminaire) not less than 9.0 m.
3. Use approved type slip–joint or frangible base.
4. Underground wiring from nearest line pole to base of light pole.
5. Flange of slip–joint must not protrude more than 10 cm above ground.
6. Check traffic sign(s) and relocate if necessary to suit lighting.
7. a) At 4–leg intersections where one leg of the intersection is not a highway, a light shall be installed where the road AADT is 150 or higher.
   b) When the light is not required on the intersection leg, it shall be installed in the median.

Saskatchewan Highways and Transportation

DELINEATION LIGHTING
AT RURAL HIGHWAY INTERSECTIONS
DIVIDED HIGHWAY

RECOMMENDED BY:		SENIOR DESIGN ENGINEER ENGINEERING SERVICES BR.	DATE	02-05-21	STANDARD PLAN NO	2621–1–2
APPROVED BY:	R Widger	EXECUTIVE DIRECTOR ENGINEERING SERVICES BR.	DATE	02-06-05	SHEET	1 of 1

ACAD DWG: 2621–1–2.DWG LAST REV DATE: 01/11/20



Notes:

1. High Pressure Sodium Vapour Luminaire, photocell switch (150W HPS or equivalent).
2. 10.7 m high, 2.4 m davit steel pole, M.H. (road surface to luminaire) not less than 9.0 m.
3. Use approved type slip–joint or frangible base.
4. Underground wiring from nearest line pole to base of light pole.
5. Flange of slip–joint must not protrude more than 10 cm above ground.
6. Check traffic sign(s) and relocate if necessary to suit lighting.
7. a) At 4–leg intersections a light should be installed on the fourth leg where the road AADT is 150 or higher.
   b) When the light is not required on the intersection leg the second light may be installed in the median.

Saskatchewan Highways and Transportation

DELINEATION LIGHTING
AT OTHER RURAL INTERSECTIONS

RECOMMENDED BY:		SENIOR DESIGN ENGINEER ENGINEERING SERVICES BR.	DATE	02-05-21	STANDARD PLAN NO	2621–1–3
APPROVED BY:	R Dodger	EXECUTIVE DIRECTOR ENGINEERING SERVICES BR.	DATE	02-06-05	SHEET	1 of 1

ACAD DWG: 2621-1-3.DWG LAST REV DATE: 01/11/20

DEFINITION

Intersection area lighting is the illumination of the intersection area and the adjacent through and auxiliary lanes of the through highway to a specified lighting criteria.

Glare, or veiling luminance (L_v) is the vertical illuminance at the observer's eye due to each luminaire. Visual performance reduced as a result of glare can be compared to the effect of shining a light directly at a viewing screen onto which an image is being projected. The screen acts as the retina, the light as a luminaire, and the image on the screen represents the observer's field of view. In both cases the retinal image is veiled by the light from the lamp thereby giving rise to the term 'veiling luminance' for glare.

POLICY

Partial roadway lighting, such as intersection area lighting, shall be provided at provincial highway intersections in accordance with the following warrant and lighting design criteria.

WARRANTS

The warrants for intersection area lighting are outlined in Figure 2621-2-1. To qualify, one of the three warrant criteria shall be met.

Intersection area lighting should not be considered as a solution to traffic operational problems caused by poor geometric layout. Geometric deficiencies that are contributing to operational problems should be considered for corrective action first.

DESIGN CRITERIA

Intersection area lighting is to be designed to the following criteria:

Average Illuminance	7 - 9 lux
Uniformity Ratios	
Average/Minimum	3.5 : 1
Maximum/Minimum	8 : 1
Glare - Average L_v Maximum	0.18 cd/m2

The criteria should be applied to the intersection area defined by the through highway lanes, vehicle turning paths and auxiliary turning lanes within the length of influence. For other than raised curbing, the length of influence shall be limited to the provision of three lights upstream of the intersection for each travel direction plus conversion of intersection delineation light(s).

For the case of divided highways, the length of influence downstream shall be two poles. A single luminaire shall be provided over each intersecting roadway leg. In the case of a divided highway, an additional pole shall be provided for the median crossover where required to satisfy the lighting criteria.

The luminaire type shall be standard SaskPower 150 or 250 type II or III high pressure sodium vapour (HPS). The luminaire is to be mounted on pole heights of 12.1 or 13.7 m.

PRIORITY RANKING

Approved projects under categories 2 Raised Channelization/Median Curbing or 3 Traffic Accident Rate are to be given priority over 1 Traffic Volume candidates. Ranking of these candidates is based on engineering judgment with consideration of traffic volumes, roadway functional classification, accident rate, cost and any other applicable factors.

Candidates under category 1 Traffic volume warrants are ranked with highest priority assigned to the highest ranking index.

$$\text{Ranking Index} = \frac{X1 * X2}{10{,}000} * FCC$$

where,

X1 = as determined in Section 1.1
X2 = as determined in Section 1.2
FCC = functional classification factor, 1.25 for arterial, 1.10 for collector, 1.00 for local.

FIGURE 2621-2-1

WARRANTS FOR INTERSECTION AREA LIGHTING

1. Traffic Volume Warrant

   1.1 Through Highway

   $$\frac{\text{Leg 1 AADT + Leg 2 AADT}}{2} = X1 >= 1500 \text{ AADT},$$, and

   1.2 Intersecting Roadway

   Leg 1 AADT + Leg 2 AADT = X2 >= 1000 AADT

   Note: For T intersections leg 1 or leg 2 = 0 AADT

2. Raised Channelization/Median Curbing Warrant

   2.1 Traffic Speed

   Posted speed limit or actual 85th percentile speed >= 60 km/h, and

   2.2 Traffic Engineering Assessment

   Traffic engineering assessment supports retention of the raised islands/median and the provision of area lighting.

   Note: The limits of the area lighting for raised islands should extend to the limits of the raised islands/media.

3. Traffic Accident Rate Warrant

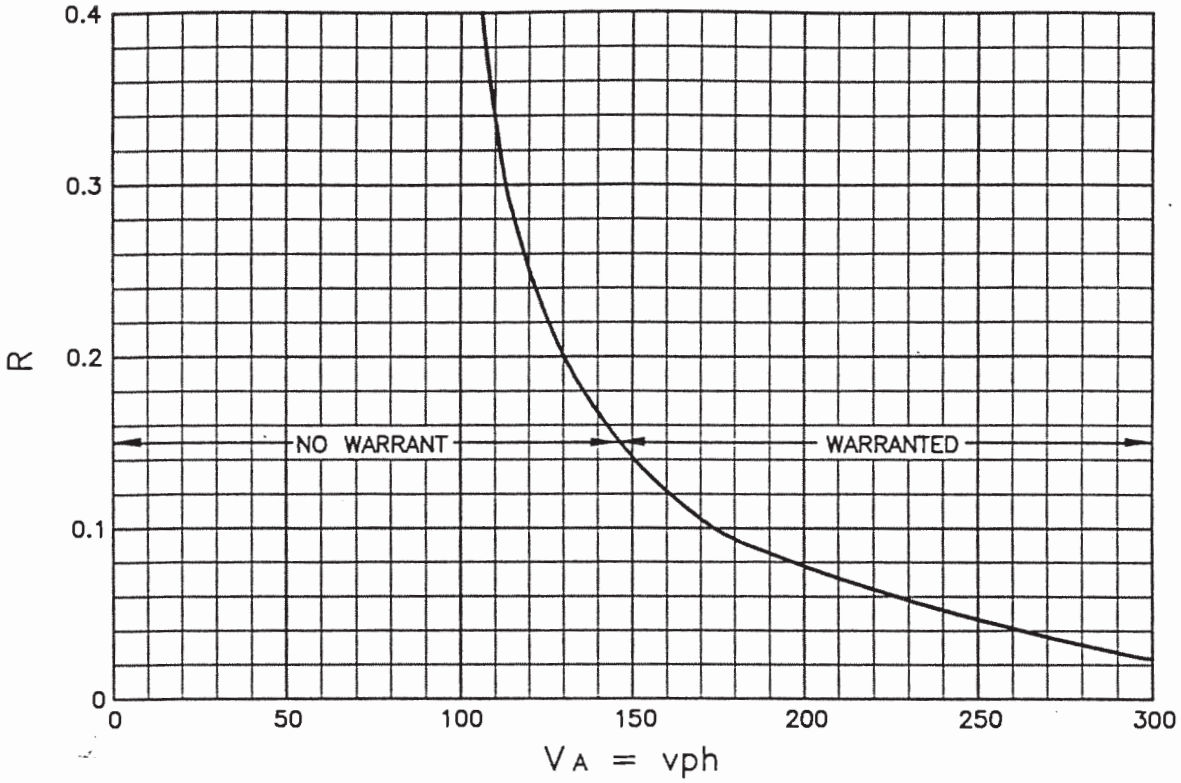
   3.1 Traffic Volume

   Through highway traffic volume >= 1000 AADT, and

   3.2 Accident Rate

   The intersection accident rate is >= 1.5 accidents/million entering vehicles/year. The ratio of the last three year average night to day accident rate is > 1.5. A traffic engineering study supports area lighting as an acceptable expenditure.

Highway 219 & Access A: 2037 Horizon



Warrants are based on Design Hourly Volumes

V_A = Advancing Volume, includes Volume Right and Volume Left unless exclusive left turn lane.

V_R = Right Turn Volume, vph.

$R = V^R/V^A$

Warrants: NON FLARED INTERSECTION – Provide 3.7 m turning lane.
FLARED INTERSECTION – Lengthen deceleration lane to meet the right turn lane standard.

AM Peak
VR = 1
VA = 401
R= 0.003

PM Peak
VR = 2
VA = 527
R= 0.004

Saskatchewan Highways and Transportation

WARRANTS FOR RIGHT TURN LANES
RURAL HIGHWAYS

RECOMMENDED BY:		DIRECTOR TECH. STDS. & POLICIES	DATE	95.02.24	STANDARD PLAN NO	20614
APPROVED BY:		ASSIST. DEPUTY MINISTER OPERATIONS DIVISION	DATE	95-02-28	SHEET	1 of 2

LAST REV DATE: FEB.14,1995
ACAD DWG: 20614-1

NOTES:

1. Right turn lanes are warranted at the following locations:
   - intersections with other Provincial Highways.
   - Industrial Access Roads.
   - Provincial Campgrounds and Picnic Sites.

2. Use corrected peak hourly volumes (vph) projected to the 10th year after the proposed construction date. Refer to correction factors under DM 502–3 for further information.

3. Normally 0.6 m shoulder will be provided on turning lane.

4. 1.5 m shoulder may be provided on divided highways and at intersections where truck volumes are higher than normal, for example, at scale sites and access to industrial sites generating heavy truck volumes.

5. Length of the turning lane will be related to highway design speed and turning speed. See Standard Plan No. 20618.

6. For 4 lane highways, the advancing volume should be based on 50% of the total directional volume (vph) or 25% of the total volume (where directional split is not a factor), with no further reduction for left turn vehicles.

Saskatchewan Highways and Transportation

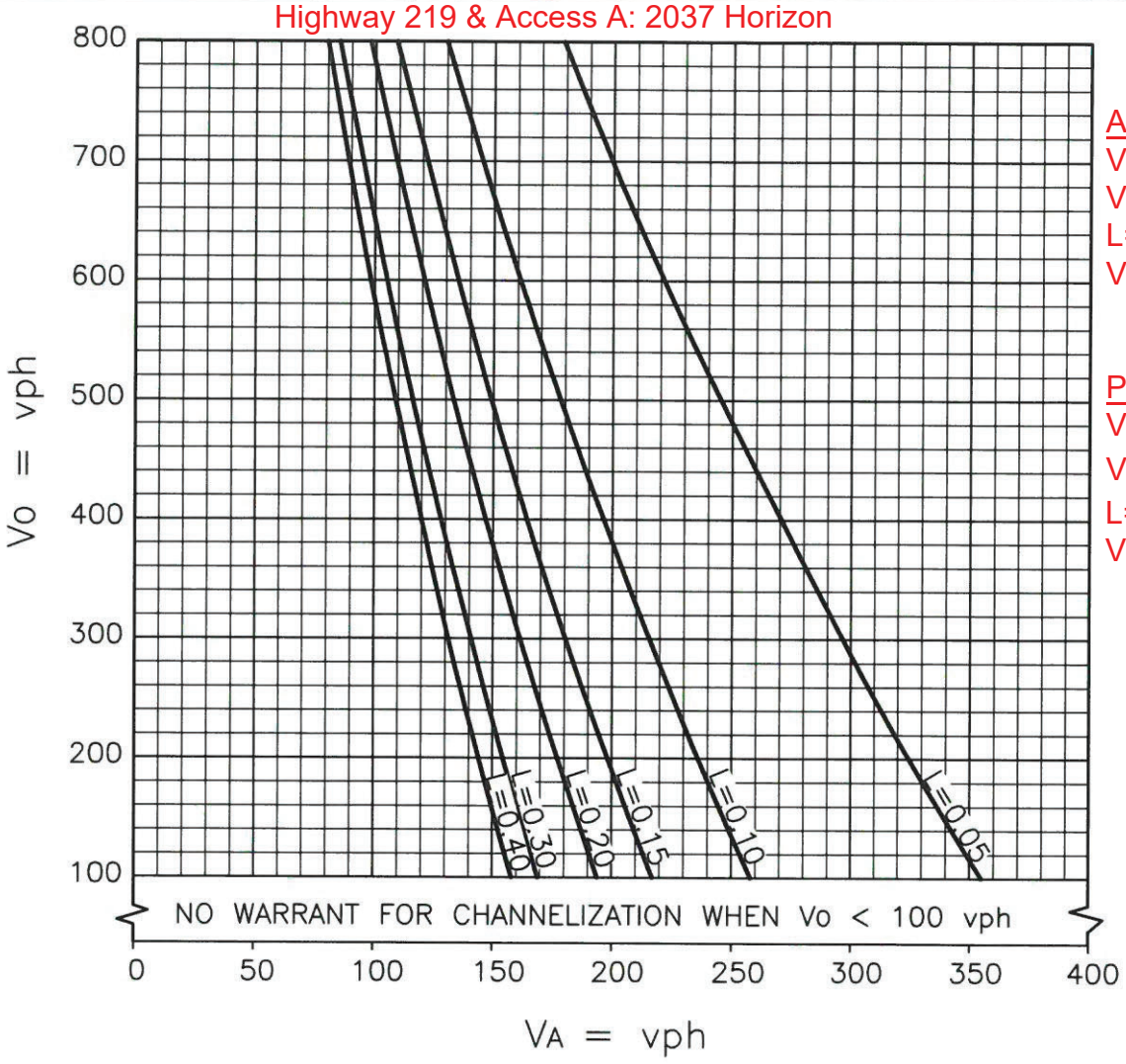
WARRANTS FOR RIGHT TURN LANES
RURAL HIGHWAYS

RECOMMENDED BY:		DIRECTOR TECH. STDS. & POLICIES	DATE	95.02.24	STANDARD PLAN NO	20614
APPROVED BY:		ASSIST. DEPUTY MINISTER OPERATIONS DIVISION	DATE	95-02-28	SHEET	2 of 2

LAST REV DATE: FEB.14,1995

ACAD DW

Highway 219 & Access A: 2037 Horizon



AM Peak
VA= 608
VL= 39
L= 0.06
VO = 401

PM Peak
VA= 465
VL= 124
L= 0.27
VO = 527

V_A = Advancing volume, includes volume left and volume right unless exclusive right turn lane.

V_0 = Opposing volume, includes volume left, and volume right unless separated right turning roadway (ramp).

V_L = Left turn volume.

$L = V_L/V_A$

NOTES:

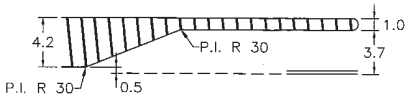
1. Use corrected peak hourly volumes (vph) projected to the 10th year after the proposed construction date. Refer to correction factors under SKS 2.3.1–C for further information.
2. No warrant for channelization if plotted point falls to left of applicable "L" line, or if L < 0.05.
3. If channelization is not warranted, check bypass lane treatment, Standard Plan 20612.
4. Check right turn lane warrants, Standard Plan 20614.
5. For additional information please refer to SKS 2.2.2–B, SKS 2.3.1–F, SKS 2.3.5–C & SKS 2.3.8–C.

Government of Saskatchewan
Ministry of Highways & Infrastructure

WARRANTS FOR CHANNELIZED INTERSECTIONS 2 LANE RURAL HIGHWAYS

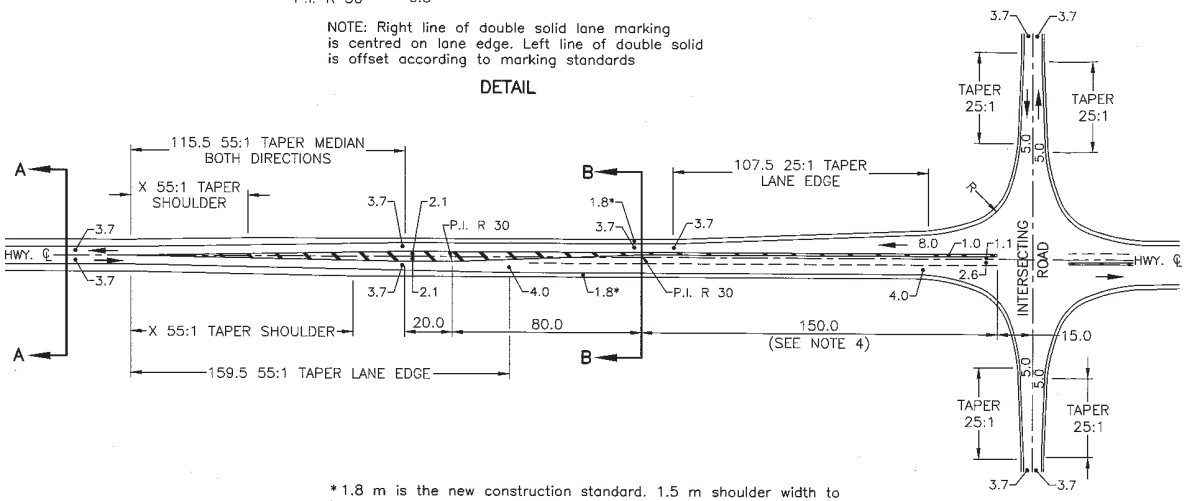
RECOMMENDED BY		DIRECTOR DESIGN & TRAFFIC ENG	DATE	2016-03-31	STANDARD PLAN NO	20611
APPROVED BY		EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH	DATE	May 5/16	SHEET	1 OF 1

ACAD DWG: SKS20611
LAST REV DATE: 16/01/27

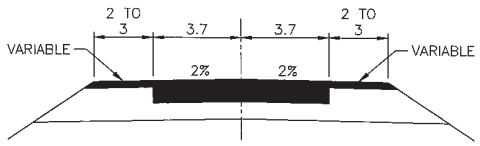


NOTE: Right line of double solid lane marking is centred on lane edge. Left line of double solid is offset according to marking standards

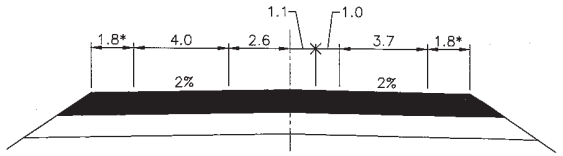
DETAIL



*1.8 m is the new construction standard. 1.5 m shoulder width to be used where future pavement rehabilitation is not likely to reduce shoulder width. Minimum shoulder width is 1.0 m for rehabilitation projects.



SECTION A–A



SECTION B–B

NOTES:
1. For R see Standard Plan No. 20600.
2. X varies dependant on highway shoulder width.
3. All dimensions are in metres.
4. The storage length for the turning lane should be assessed, see SP20618, Note 1.
5. For additional information please refer to SKS 4.2–B & SKS 9.17–C.

Saskatchewan

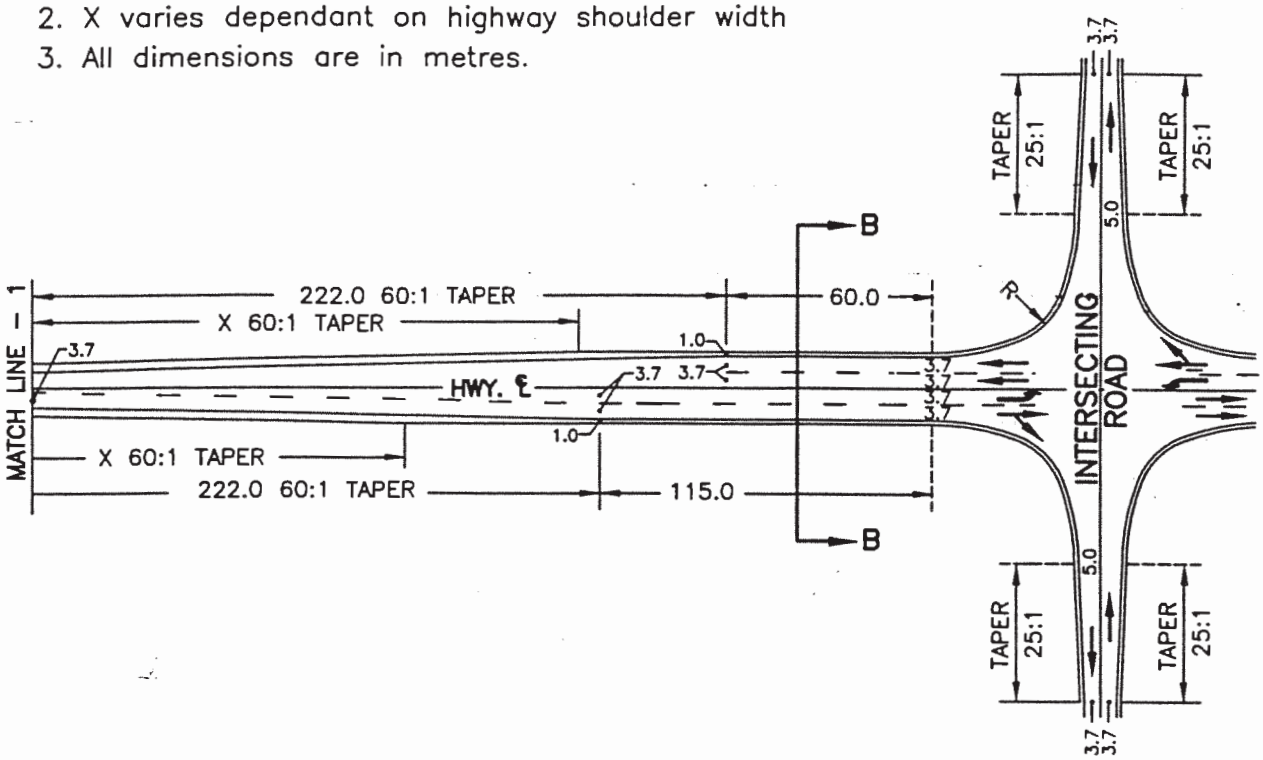
CHANNELIZED INTERSECTION
INTRODUCED LEFT TURN BAY
BOTH DIRECTIONS

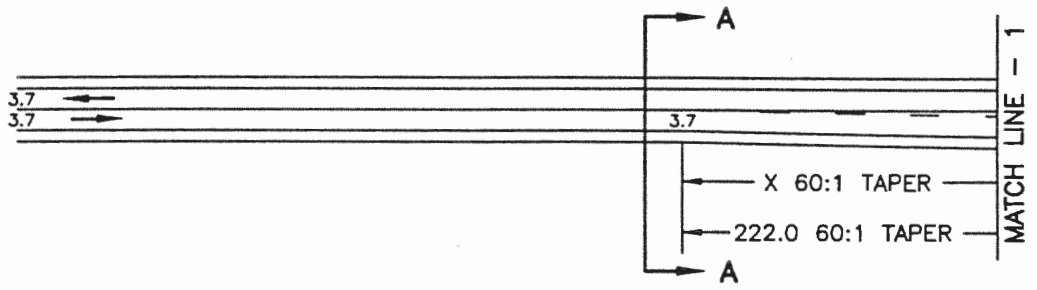
RECOMMENDED BY		DIRECTOR DESIGN STANDARDS	DATE	Oct. 21/21	STANDARD PLAN NO	20619
APPROVED BY	Larendt	EXECUTIVE DIRECTOR DESIGN BRANCH	DATE	Oct 25/21	SHEET	1 OF 2

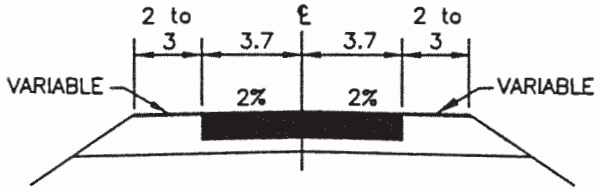
ACAD DWG: SKS20619-1
LAST REV DATE: 2021 10 15

NOTES:

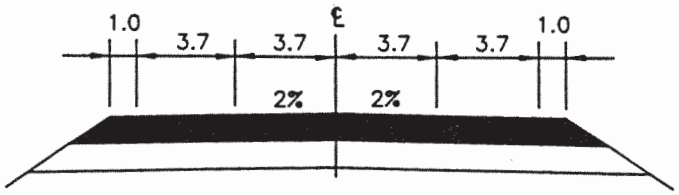
1. For R see Standard Plan No. 20600
2. X varies dependant on highway shoulder width
3. All dimensions are in metres.







SECTION A–A



SECTION B–B

Saskatchewan Highways and Transportation

INTERSECTION TREATMENT
BYPASS LANE

RECOMMENDED BY:		DIRECTOR TECH. STDS. & POLICIES	DATE	94.08.17	STANDARD PLAN NO	20620
APPROVED BY:		ASSIST. DEPUTY MINISTER OPERATIONS DIVISION	DATE	95-02-28	SHEET	1 of 1

LAST REV DATE: MAY24/94

ACAD DWG: 20620