Airport Area West ASP
Transportation Review

Prepared For:

Genstar Development Company

Submitted By:

MMM Group Limited

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STANDARD LIMITATIONS

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1.0 INTRODUCTION

1.1. Background

Genstar Development Company (Genstar) retained MMM Group Limited (MMM) to conduct a transportation review for a new residential and commercial development in west Winnipeg as part of the Airport Area West (AAW) Area Structure Plan. AAW is bounded by:

- CentrePort Canada Way to the north;
- Sturgeon Road to the east;
- Saskatchewan Avenue to the south; and
- PTH 101 to the west.

This transportation review will investigate the potential traffic impacts of the development of AAW on the existing and proposed study area street network during the weekday a.m. and p.m. peak hours. A conceptual review of potential Winnipeg Transit service and active transportation routes serving the area is also included.

1.2. Study Area

The City of Winnipeg Public Works Department (Public Works) was contacted to confirm the study area for this transportation review. Based on the discussions with Public Works, the study area for the transportation review is bounded by:

- CentrePort Canada Way to the north;
- PTH 101 to the west;
- Ness Avenue to the south; and
- Moray Street to the east.

The study area includes the following signalized intersections:

- CentrePort Canada Way and Sturgeon Access;
- Sturgeon Road and Saskatchewan Avenue;
- Sturgeon Road and Ness Avenue; and
- Ness Avenue and Moray Street.

The study area includes the following stop-controlled intersections:

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- Saskatchewan Avenue and Buchanan Boulevard;
- Saskatchewan Avenue and Cavalier Drive;
- Saskatchewan Avenue and Hamilton Avenue;
- Saskatchewan Avenue and Quail Ridge Road;
- Sturgeon Road/Sturgeon Access and Summit Road;
- Buchanan Boulevard and Hamilton Avenue;
- Hamilton Avenue and Cavalier Drive;
- Hamilton Avenue and Silver Avenue; and
- Sturgeon Road and Silver Avenue/Murray Park Road.

The study area and the intersections analyzed for this study are illustrated in **Figure 1.1**.

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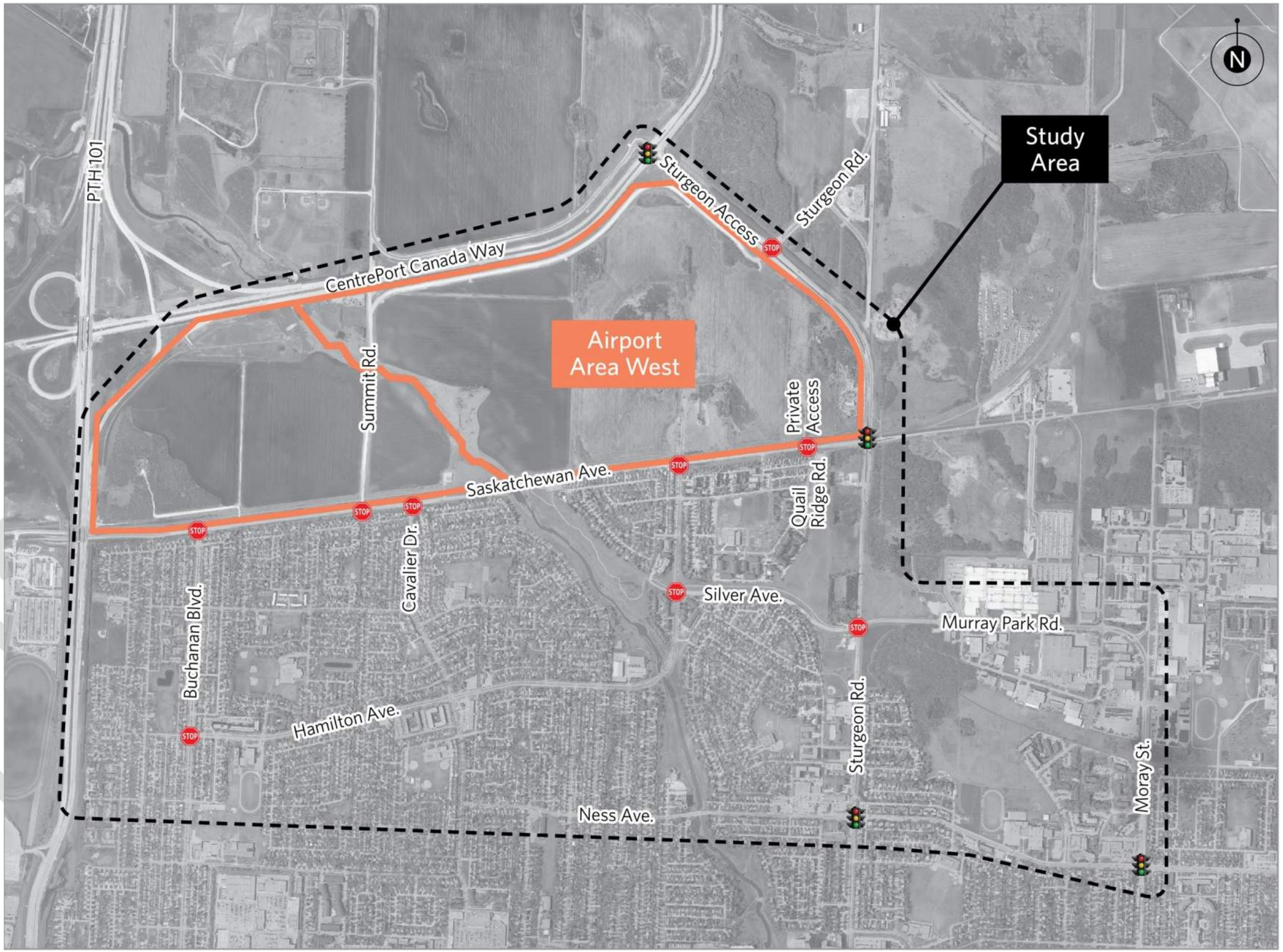

Figure 1.1: Study Area and Intersections

2.0 PROPOSED DEVELOPMENT

2.1. Development

The development site currently features agricultural land. The proposed land use is anticipated to be largely single-family and multi-family residential with a small amount of commercial development. Phase 1 of the proposed development is anticipated to be completed by 2030, while full build-out of the entire precinct is anticipated to occur by 2040.

The development of AAW was assumed to include the following land uses:

- Single family residential;
- Multi-family residential;
- Commercial; and
- Parks and green space.

The Canadian Pacific Railway (CPR Glenboro) rail line runs east-west along the south boundary of the proposed development, immediately north of Saskatchewan Avenue and is an important consideration in the planning process. There are two existing at grade crossings of this rail line in the study area: at Summit Road and at Sturgeon Road.

The north boundary of AAW is CentrePoint Canada Way, with Sturgeon Road and PTH 101 forming the east and west boundaries respectively. **Figure 2.1** illustrates the conceptual collector street network of roadways within the plan area.

For analysis purposes, the development was split into two sections; the west side (west of Sturgeon Creek), and the east side (east of Sturgeon Creek). Phase 1 of the proposed development is anticipated to be completed by year 2030, and will include 982 single family dwelling units (336 dwelling units on the west side and 646 dwelling units on the east side), 765 multi-family dwelling units (300 dwelling units on the west side and 465 dwelling units on the east side), and 170,000 square feet of commercial space (70,000 square feet on the west side, and 100,000 square feet on the east side). Phase 2 of the development will include an additional 982 single family dwelling units (336 dwelling units on the west side and 646 dwelling units on the east side). On the west side, it is expected that the south half will be constructed before the north half, and on the east side it is expected that the north half will be constructed before the south half. The conceptual plan for AAW including the phasing is illustrated in **Figure 2.1**.

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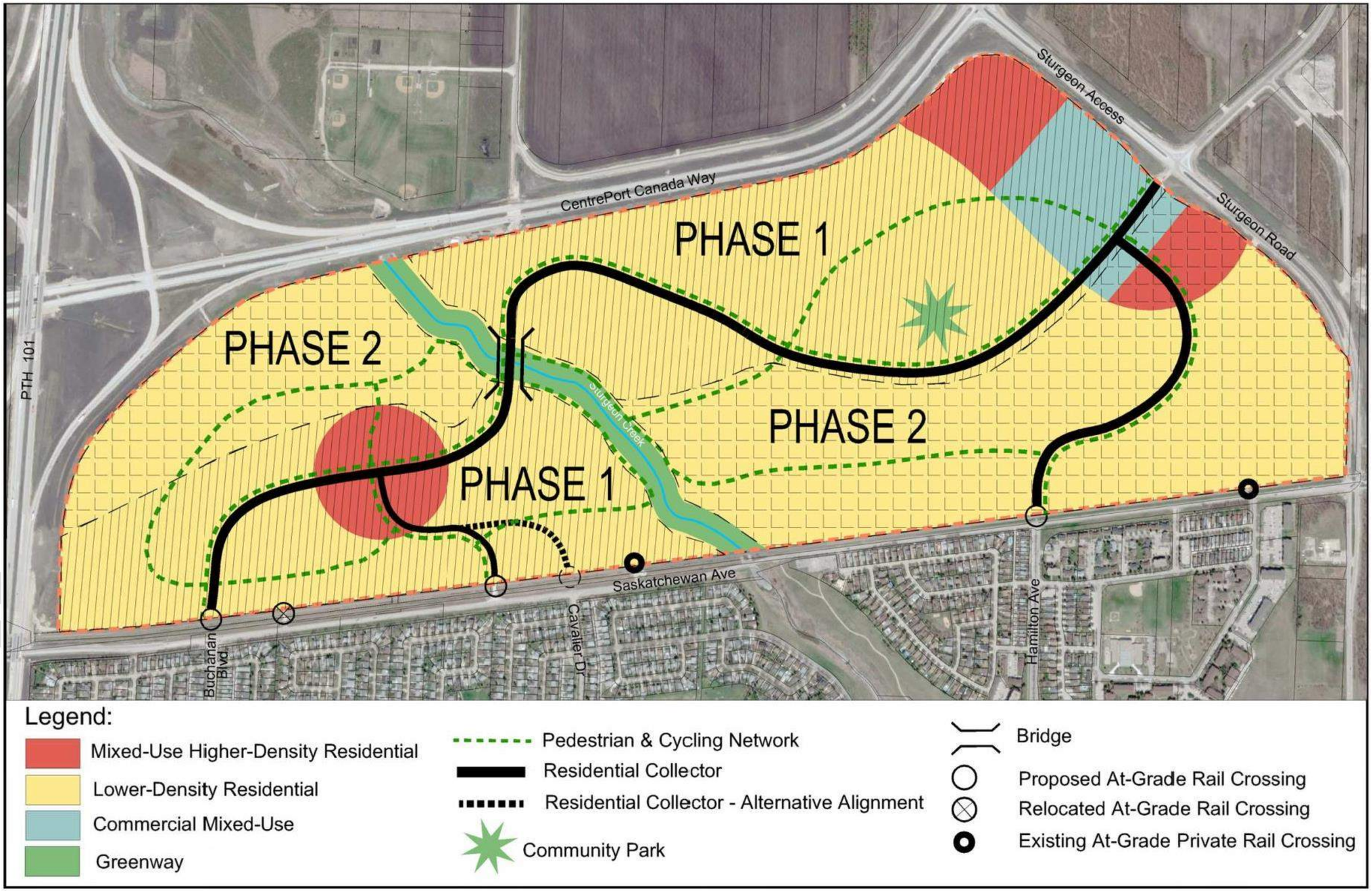

Figure 2.1: AAW Conceptual Land Use Plan

3.0 TRANSPORTATION NETWORK

3.1. Existing Road Network

The existing road network is shown in **Figure 1.1**.

3.2. Future Road Network

As development of AAW takes place, a number of additions to the existing road network will need to occur in the study area to accommodate the additional traffic. The following street system additions were assumed for the study area:

- The extension of Buchanan Boulevard north of Saskatchewan Avenue by 2030;
- The extension of Hamilton Avenue north of Saskatchewan Avenue by 2030;
- Signalization and improvement of the Sturgeon Road/Sturgeon Access and Summit Road intersection by 2030;
- The construction of a roundabout at Sturgeon Road and Silver Avenue/Murray Park Road by 2030; and
- The extension of Silver Avenue east of Sturgeon Road by 2040, replacing Murray Park Road.

The timing of the road improvements will depend on the rate of development and will be discussed in Section 4.0. The proposed layout of the AAW road network is shown in **Figure 2.1**.

3.3. CentrePoint Canada Way/PTH 101

Manitoba Infrastructure and Transportation (MIT) were contacted to discuss the operations of CentrePoint Canada Way and PTH 101 adjacent to AAW. It was indicated by MIT that no direct access would be permitted from the AAW development to CentrePoint Canada Way or PTH 101.

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4.0 TRAFFIC FORECASTS

4.1. Existing Peak Hour Traffic

Existing traffic counts for the study area were obtained from Public Works for the following intersections:

- Sturgeon Road and Saskatchewan Avenue (2014);
- Sturgeon Road and Silver Avenue/Murray Park Road (2014); and
- Sturgeon Road and Ness Avenue (2013).

The Public Works counts were supplemented with traffic counts conducted by MMM on May 27, June 3, June 4, June 5, October 28 and October 29, 2015 at the following intersections:

- CentrePort Canada Way and Sturgeon Access;
- Ness Avenue and Moray Street;
- Saskatchewan Avenue and Buchanan Boulevard;
- Saskatchewan Avenue and Cavalier Drive;
- Saskatchewan Avenue and Hamilton Avenue;
- Saskatchewan Avenue and Quail Ridge Road;
- Sturgeon Road/Sturgeon Access and Summit Road;
- Buchanan Boulevard and Hamilton Avenue;
- Hamilton Avenue and Cavalier Drive; and
- Hamilton Avenue and Silver Avenue.

The traffic counts used in this study are included in **Appendix A**.

The weekday a.m. and p.m. peak hours were selected for analysis as these are typically the most critical time periods for traffic volumes in residential areas. The weekday p.m. peak hour is also a critical time period for trips generated by commercial developments.

Compound annual growth rates were applied to the traffic volumes obtained from Public Works in order to determine the existing 2015 traffic volumes. Growth rates were determined based on a review of historical traffic volumes on similar streets and obtained from City of Winnipeg traffic flow maps for the years 2007 to 2012. A review of general traffic flow characteristics for the

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study area and potential development areas outside of the study area was also conducted. A growth rate of 0.5 percent was selected for Saskatchewan Avenue west of Cavalier Drive and east of Sturgeon Road, Hamilton Avenue, Buchanan Boulevard, Cavalier Drive, Quail Ridge Road, Silver Avenue, and Sturgeon Road east of Sturgeon Access. A growth rate of one percent was selected for Saskatchewan Avenue between Cavalier Drive and Sturgeon Road, Sturgeon Road, Murray Park Road, Ness Avenue, and Moray Street. A growth rate of two percent was selected for CentrePort Canada Way.

The existing traffic volumes are illustrated in **Figure 4.1.**

4.2. Background Peak Hour Traffic

Background traffic refers to traffic volumes that exclude the impact of a proposed development. Background traffic volumes are determined by projecting the existing traffic volumes to the desired horizon year. For this analysis, the growth rates were applied to determine the background traffic volumes for the year 2030 (Phase 1) and the year 2040 (full build-out).

The projected background traffic volumes for the 2030 peak hours are shown in **Figure 4.2.** and the projected background traffic volumes for the 2040 peak hours are shown in **Figure 4.3.**

4.2.1. Future Industrial Development

An industrial development to the north and east of the proposed AAW development is currently in the planning stages. The traffic impact of the AAW development should be considered when a Transportation Impact Study is completed for the industrial development.

4.3. Peak Hour Trip Generation

Trips generated by AAW were estimated for the weekday a.m. and p.m. peak hours of adjacent street traffic based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition.*

Due to the location of the development and the limited amount of commercial space, no pass-by trips were assumed to occur. Internal trips for the peak hour scenarios were determined based on the methodology outlined in the *ITE Trip Generation Handbook, 3nd Edition*.

The development was split into two as it was assumed that the east and west sides would each act as a stand-alone development with varying distributions.

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The forecast trip generation is outlined in **Table 4.1** for 2030 (Phase 1) and **Table 4.2** for 2040 (full build-out).

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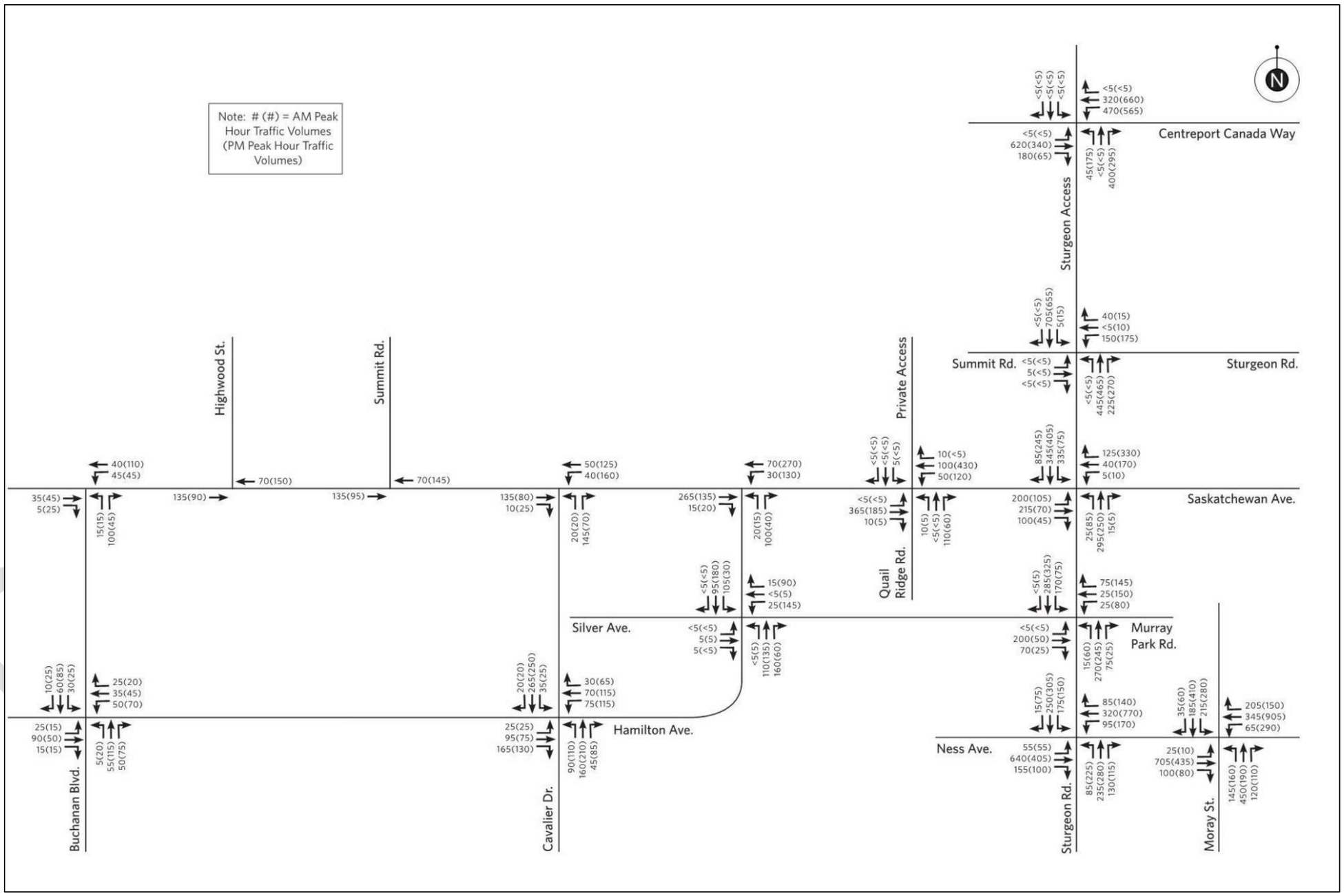

Figure 4.1: 2015 Existing Traffic Volumes

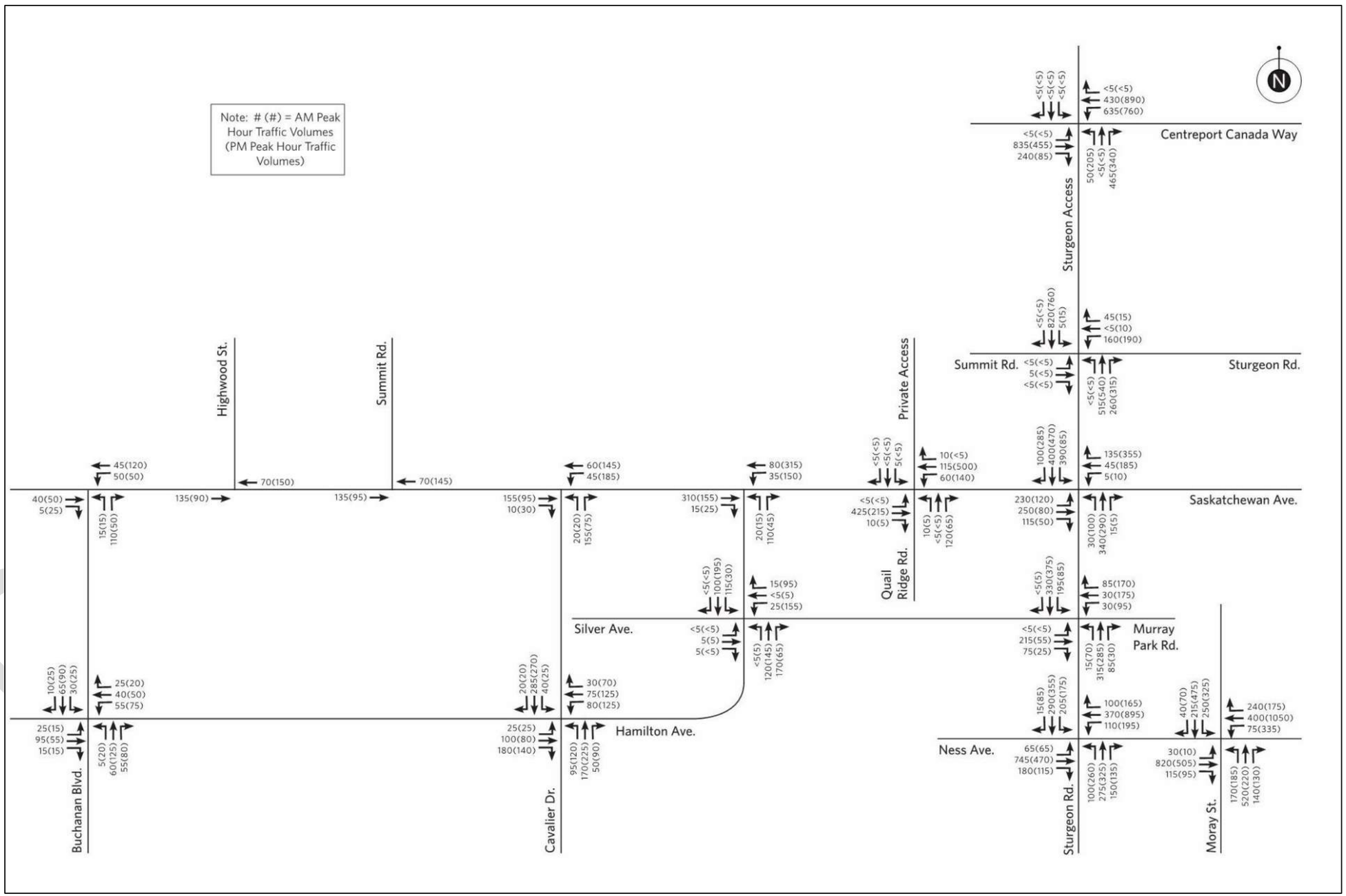

Figure 4.2.: 2030 Background Traffic Volumes

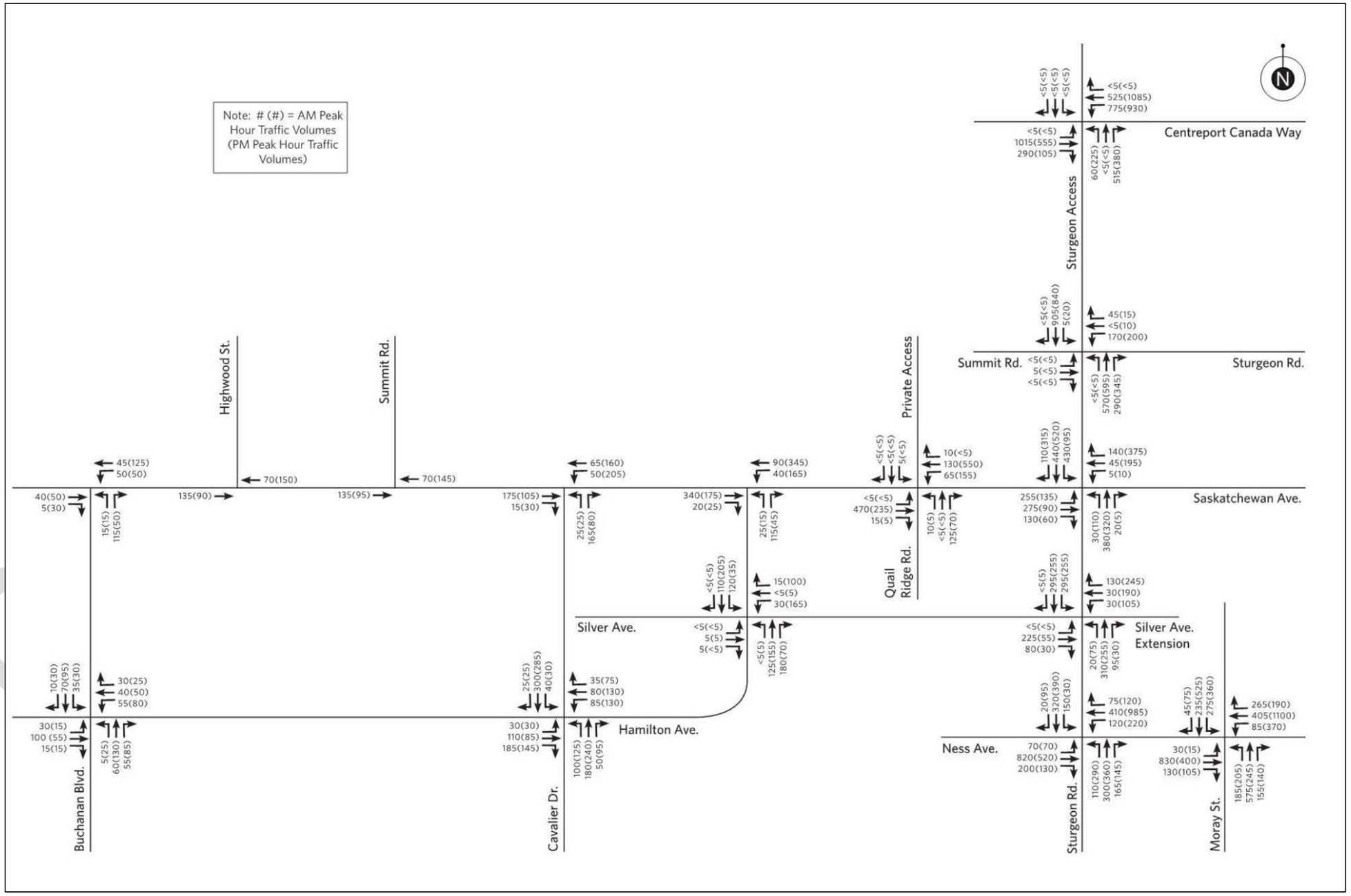

Figure 4.3: 2040 Background Traffic Volumes

Table 4.1: AAW Trip Generation (2030- Phase 1)

Location		ITE Land Use	Development Size	Trip Equation	Trip Direction		Total Trips			Internal Trips			New Trips		
					In	Out	In	Out	Total	In	Out	Total	In	Out	Total
2030 Weekday AM Peak Hour															
West Side	210 – Single Family Housing		336 units	T = 0.7(X)+9.74	25%	75%	60	185	245	2	3	5	93	257	350
	223 – Mid-Rise Apartment		300 units	T = 0.41(X)-13.06	31%	69%	35	75	110						
	820 – Shopping Centre		70,000 sq. ft.	Ln(T) = 0.61Ln(X)+2.24	62%	38%	80	50	125	3	2	5	77	48	120
					West Side Total:		**175**	**310**	**480**	**5**	**5**	**10**	**170**	**305**	**470**
East Side	210 – Single Family Housing		646 units	T = 0.7(X)+9.74	25%	75%	115	345	460	3	5	8	167	465	632
	223 – Mid-Rise Apartment		465 units	T = 0.41(X)-13.06	31%	69%	55	125	180						
	820 – Shopping Centre		100,000 sq. ft.	Ln(T) = 0.61Ln(X)+2.24	62%	38%	95	60	155	5	3	8	90	57	147
					East Side Total:		**265**	**530**	**795**	**8**	**8**	**16**	**255**	**520**	**780**
					Total		***440***	***840***	***1,275***	***13***	***13***	***26***	***425***	***825***	***1,250***
2030 Weekday PM Peak Hour															
West Side	210 – Single Family Housing		336 units	Ln(T) = 0.9Ln(X)+0.51	63%	37%	200	115	315	64	23	87	216	147	363
	223 – Mid-Rise Apartment		300 units	T = 0.48(X)-11.07	58%	42%	80	55	135						
	820 – Shopping Centre		70,000 sq. ft.	Ln(T) = 0.67Ln(X)+3.31	48%	52%	225	245	470	23	64	87	202	181	383
					West Side Total:		**505**	**415**	**920**	**87**	**87**	**174**	**420**	**330**	**745**
East Side	210 – Single Family Housing		646 units	Ln(T) = 0.9Ln(X)+0.51	63%	37%	355	210	565	81	29	110	394	271	665
	223 – Mid-Rise Apartment		465 units	T = 0.48(X)-11.07	58%	42%	120	90	210						
	820 – Shopping Centre		100,000 sq. ft.	Ln(T) = 0.67Ln(X)+3.31	48%	52%	290	310	600	29	81	110	261	229	490
					East Side Total:		**765**	**610**	**1,375**	**110**	**110**	**220**	**655**	**500**	**1,155**
					Total		***1,270***	***1,025***	***2,295***	***197***	***197***	***394***	***1,075***	***830***	***1,900***

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Table 4.2: AAW Trip Generation (2040- Phase 2)

Location		ITE Land Use	Development Size	Trip Equation	Trip Direction		Total Trips			Internal Trips			New Trips		
					In	Out	In	Out	Total	In	Out	Total	In	Out	Total
2040 Weekday AM Peak Hour															
West Side	210 – Single Family Housing		672 units	T = 0.7(X)+9.74	25%	75%	120	360	480	3	4	7	152	431	583
	223 – Mid-Rise Apartment		300 units	T = 0.41(X)-13.06	31%	69%	35	75	110						
	820 – Shopping Centre		70,000 sq. ft.	Ln(T) = 0.61Ln(X)+2.24	62%	38%	80	50	125	4	3	7	76	47	118
					West Side Total:		**235**	**485**	**715**	**7**	**7**	**14**	**230**	**480**	**700**
East Side	210 – Single Family Housing		1292 units	T = 0.7(X)+9.74	25%	75%	230	685	915	6	8	14	279	802	1,081
	223 – Mid-Rise Apartment		465 units	T = 0.41(X)-13.06	31%	69%	55	125	180						
	820 – Shopping Centre		150,000 sq. ft.	Ln(T) = 0.61Ln(X)+2.24	62%	38%	125	75	200	8	6	14	117	69	186
					East Side Total:		**410**	**885**	**1,295**	**14**	**14**	**28**	**395**	**870**	**1,265**
					Total		***645***	***1,370***	***2,010***	***21***	***21***	***42***	***625***	***1,350***	***1,965***
2040 Weekday PM Peak Hour															
West Side	210 – Single Family Housing		672 units	Ln(T) = 0.9Ln(X)+0.51	63%	37%	370	215	585	64	23	87	386	247	633
	223 – Mid-Rise Apartment		300 units	T = 0.48(X)-11.07	58%	42%	80	55	135						
	820 – Shopping Centre		70,000 sq. ft.	Ln(T) = 0.67Ln(X)+3.31	48%	52%	225	245	470	23	64	87	202	181	383
					West Side Total:		**675**	**515**	**1,190**	**87**	**87**	**174**	**590**	**430**	**1,015**
East Side	210 – Single Family Housing		1292 units	Ln(T) = 0.9Ln(X)+0.51	63%	37%	660	390	1,050	81	29	110	699	451	1,150
	223 – Mid-Rise Apartment		465 units	T = 0.48(X)-11.07	58%	42%	120	90	210						
	820 – Shopping Centre		150,000 sq. ft.	Ln(T) = 0.67Ln(X)+3.31	48%	52%	375	410	785	38	107	145	337	303	640
					East Side Total:		**1,155**	**890**	**2,045**	**145**	**145**	**290**	**1,010**	**745**	**1,755**
					Total		**1,830**	**1,405**	**3,235**	**232**	**232**	**464**	**1,600**	**1,175**	**2,770**

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4.4. Forecast Peak Hour Traffic Volumes

Trip distribution refers to the directional split of traffic entering and exiting the study area, and trip assignment refers to the assignment of distributed trips to the adjacent road network. Trip distribution for new trips generated within the study area were assumed to follow the origin-destination patterns outlined in the City of Winnipeg's 2007 *Winnipeg Area Travel Survey Results – Final Report*. The survey shows that for the Assiniboia District, 36 percent of trips during the weekday a.m. peak are internal within the District. The most common external destinations during the weekday a.m. peak are Downtown (14 percent), St. James (14 percent), St James Industrial (12 percent), West End – Wolseley (five percent), Fort Garry North and South (five percent), and Inkster and Northwest (four percent). The travel survey results indicate that the majority of trips leaving the study area are travelling in the southeast direction. The trip distribution for the East Side of AAW was determined separately from the West Side, as the two sides of the AAW development would use different access points into the development and therefore different roads. The trip distribution for year 2040 varies from that of year 2030 due to the assumption that the eastern extension of Silver Avenue will be in place at that time. The 2030 new trips for the West Side and East Side were assigned to the road network using the distributions illustrated on **Figure 4.4 and Figure 4.5**, and year 2040 new trips were assigned using the distributions illustrated on **Figure 4.6 and Figure 4.7**.

The assignment of new trips to the study area road network are illustrated in **Figure 4.8** for year 2030 and **Figure 4.9** for year 2040 (full build-out).

Post development traffic volumes are illustrated in **Figure 4.10** for year 2030 and **Figure 4.11** for year 2040 (full build-out).

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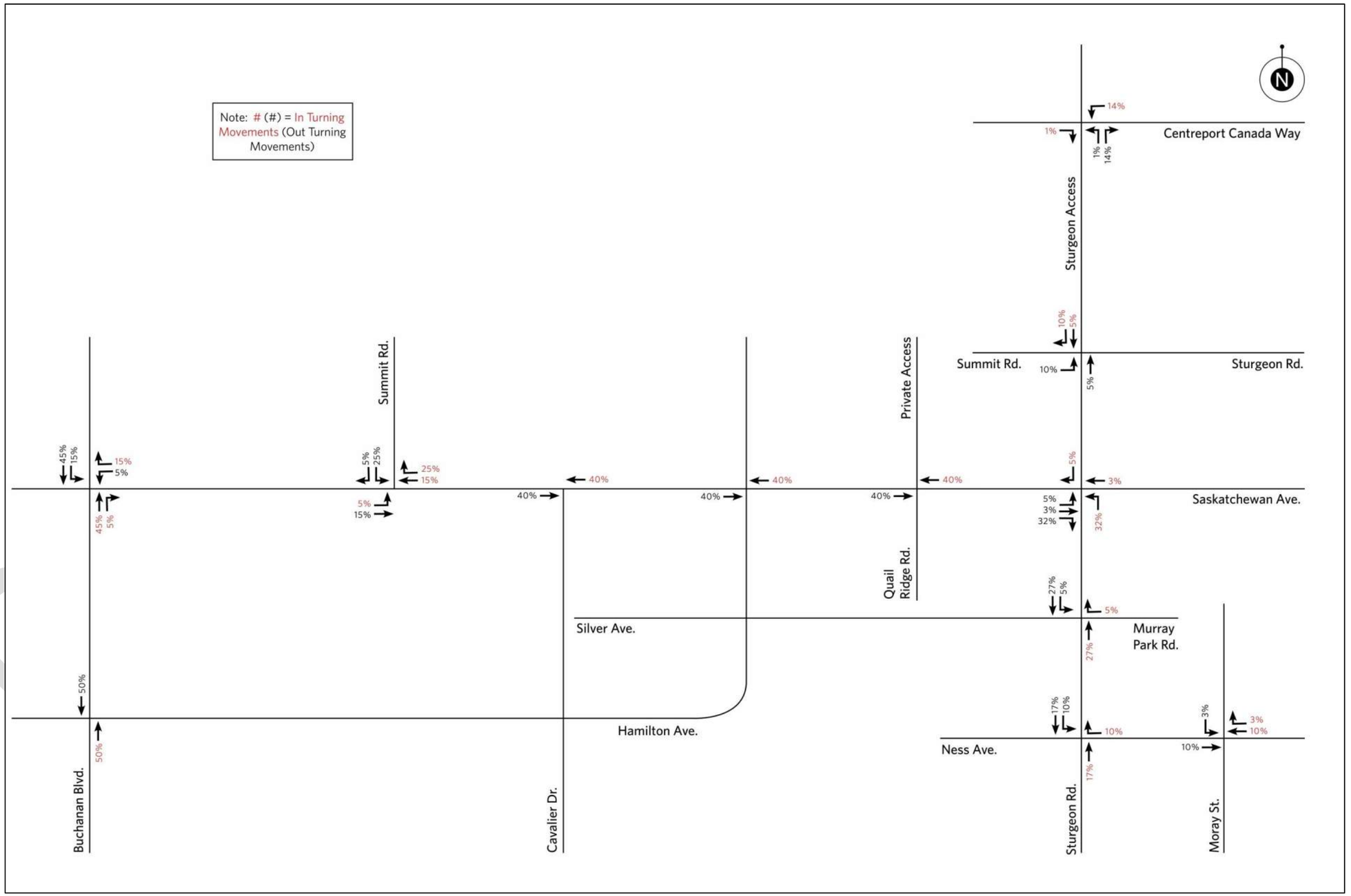

Figure 4.4: 2030 West Side Trip Distribution

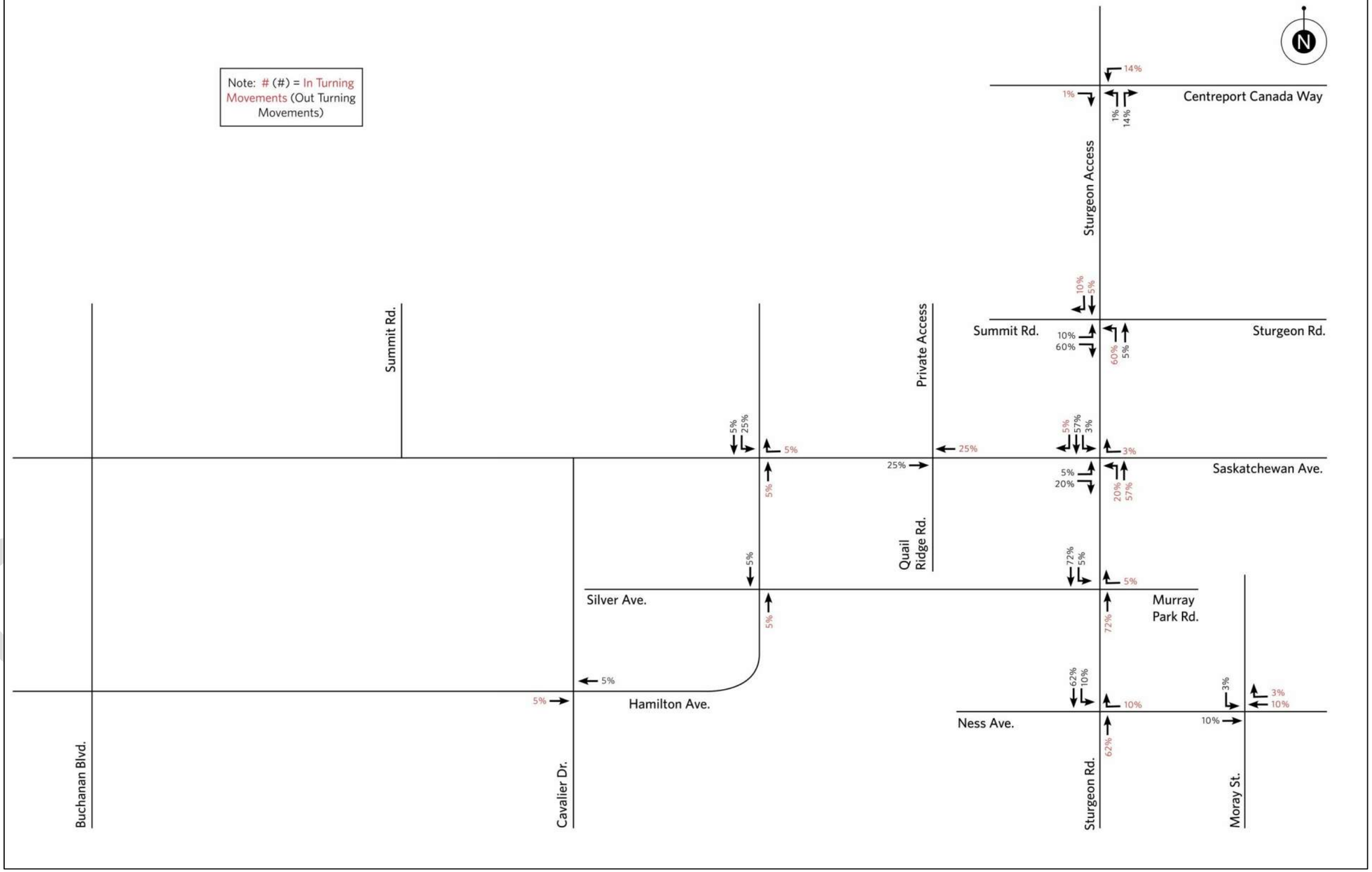

Figure 4.5: 2030 East Side Trip Distribution

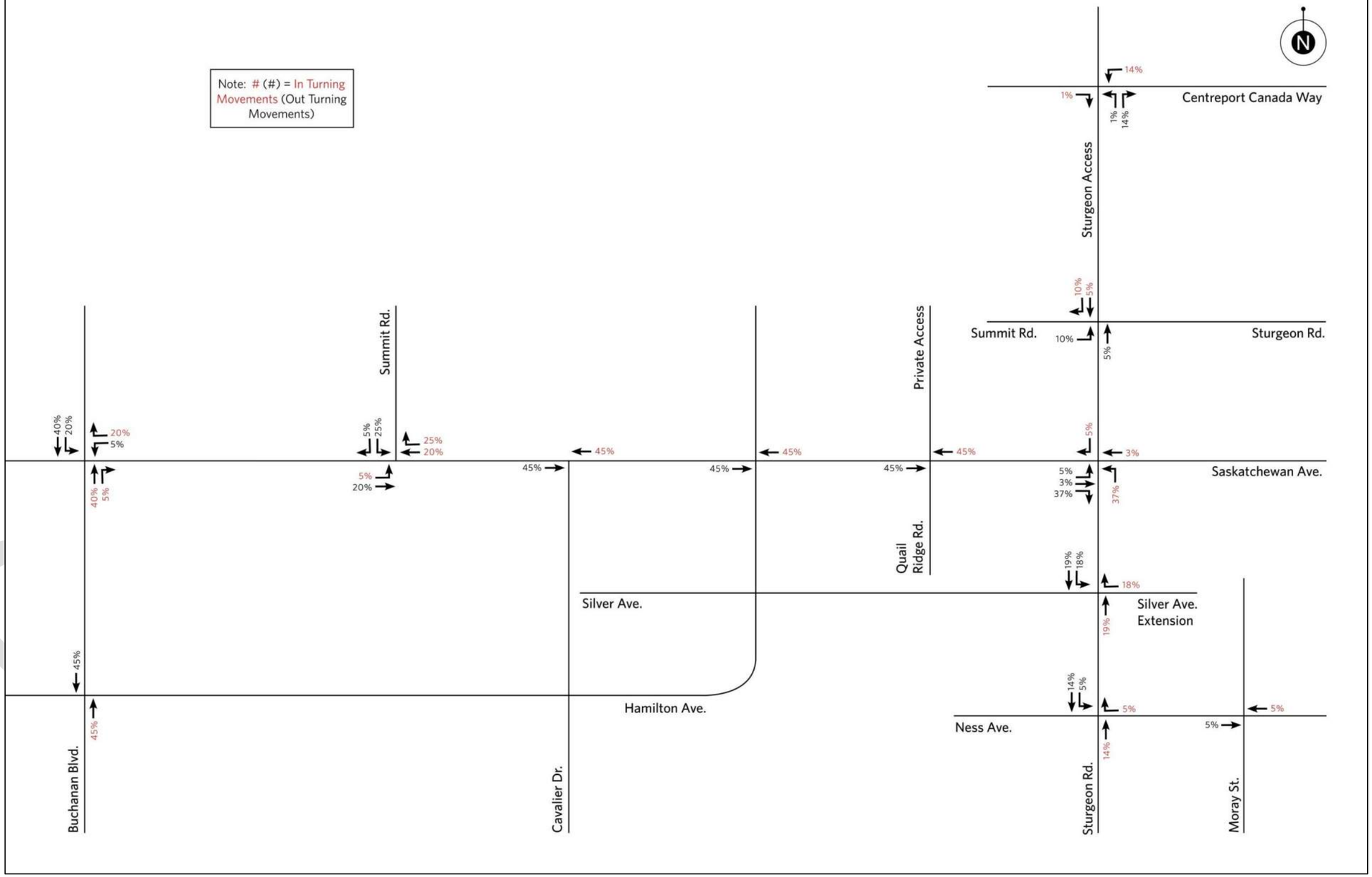

Figure 4.6: 2040 West Side Trip Distribution

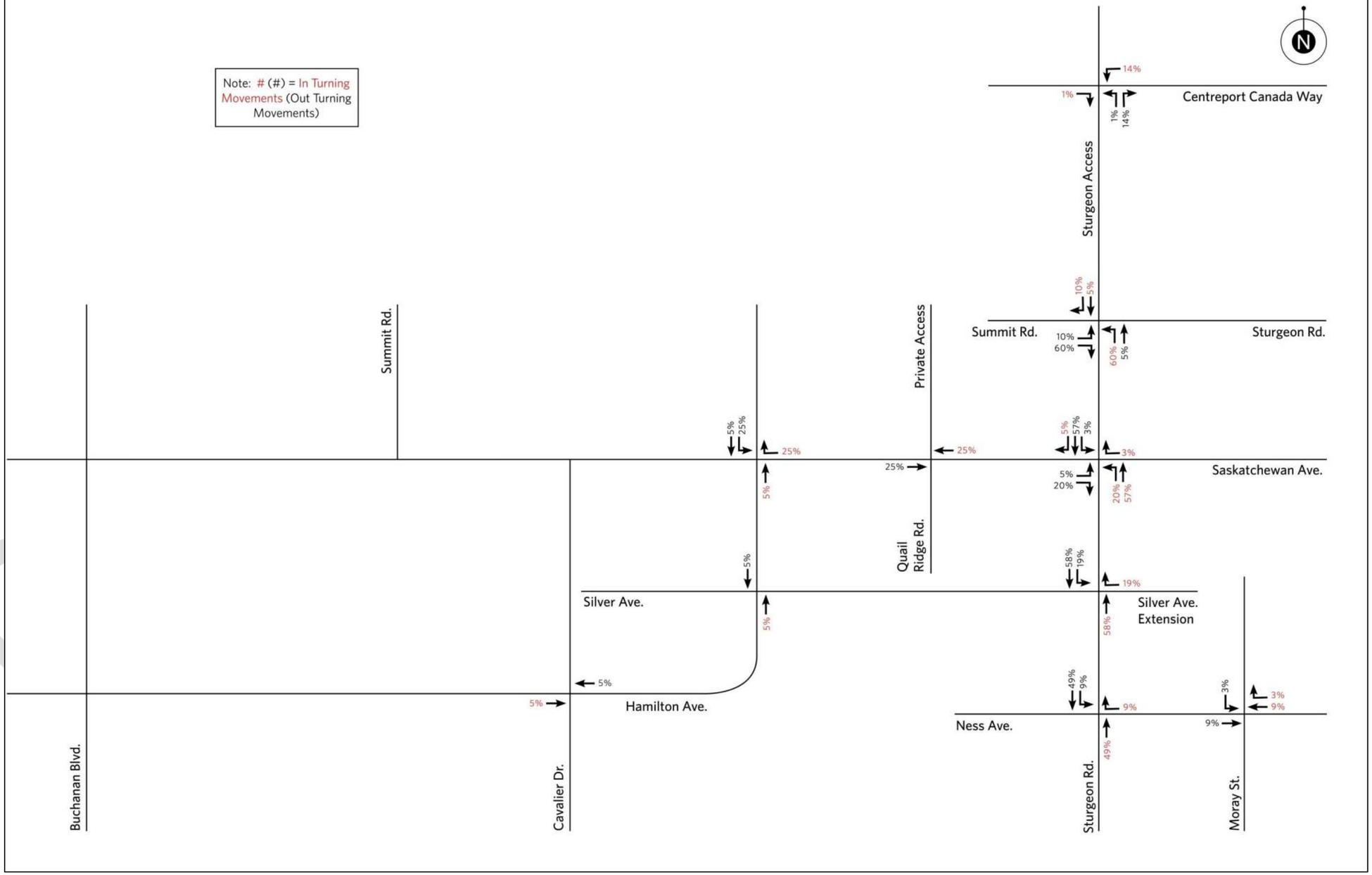

Figure 4.7: 2040 East Side Trip Distribution

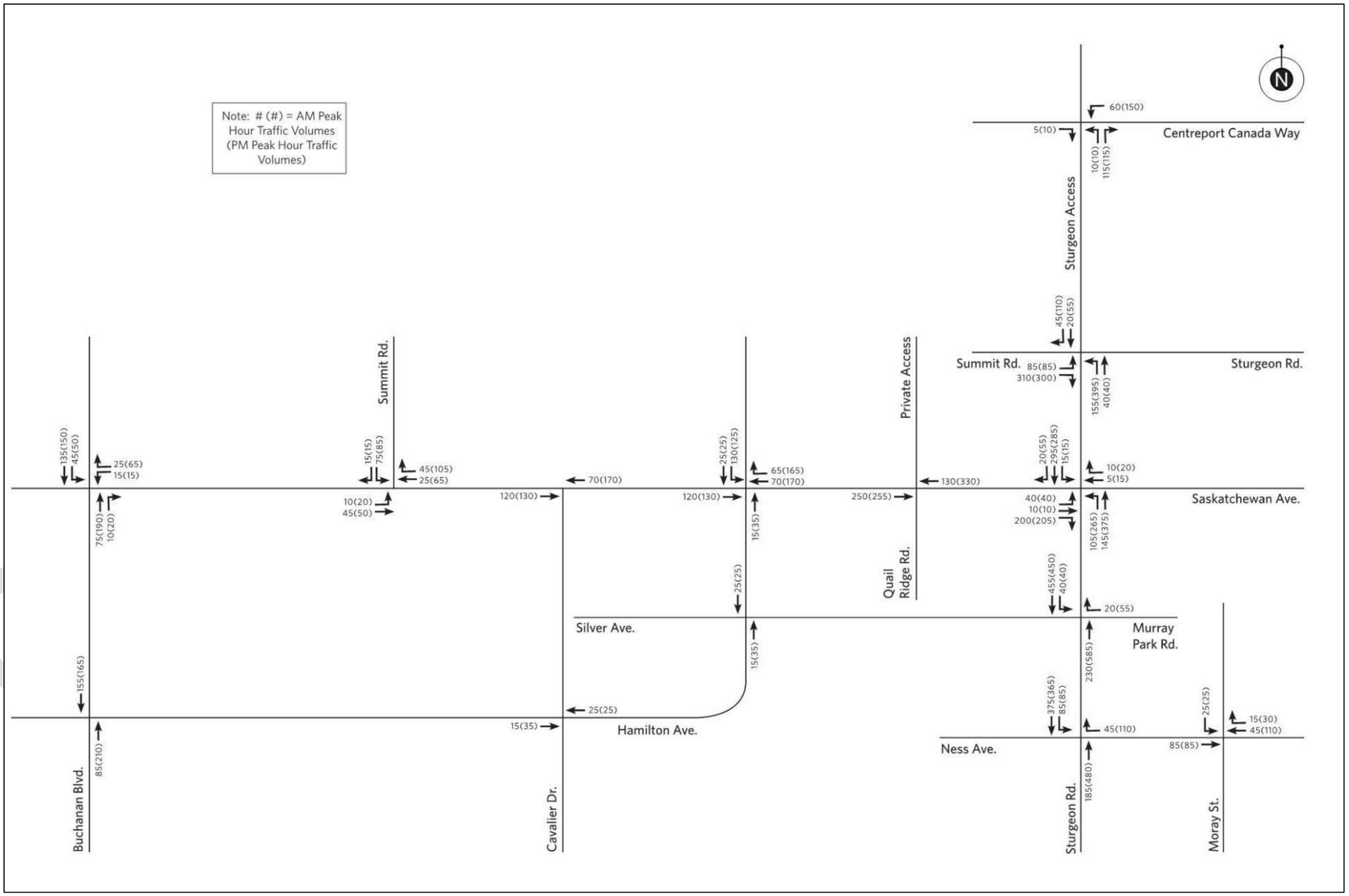

Figure 4.8: 2030 New Trips

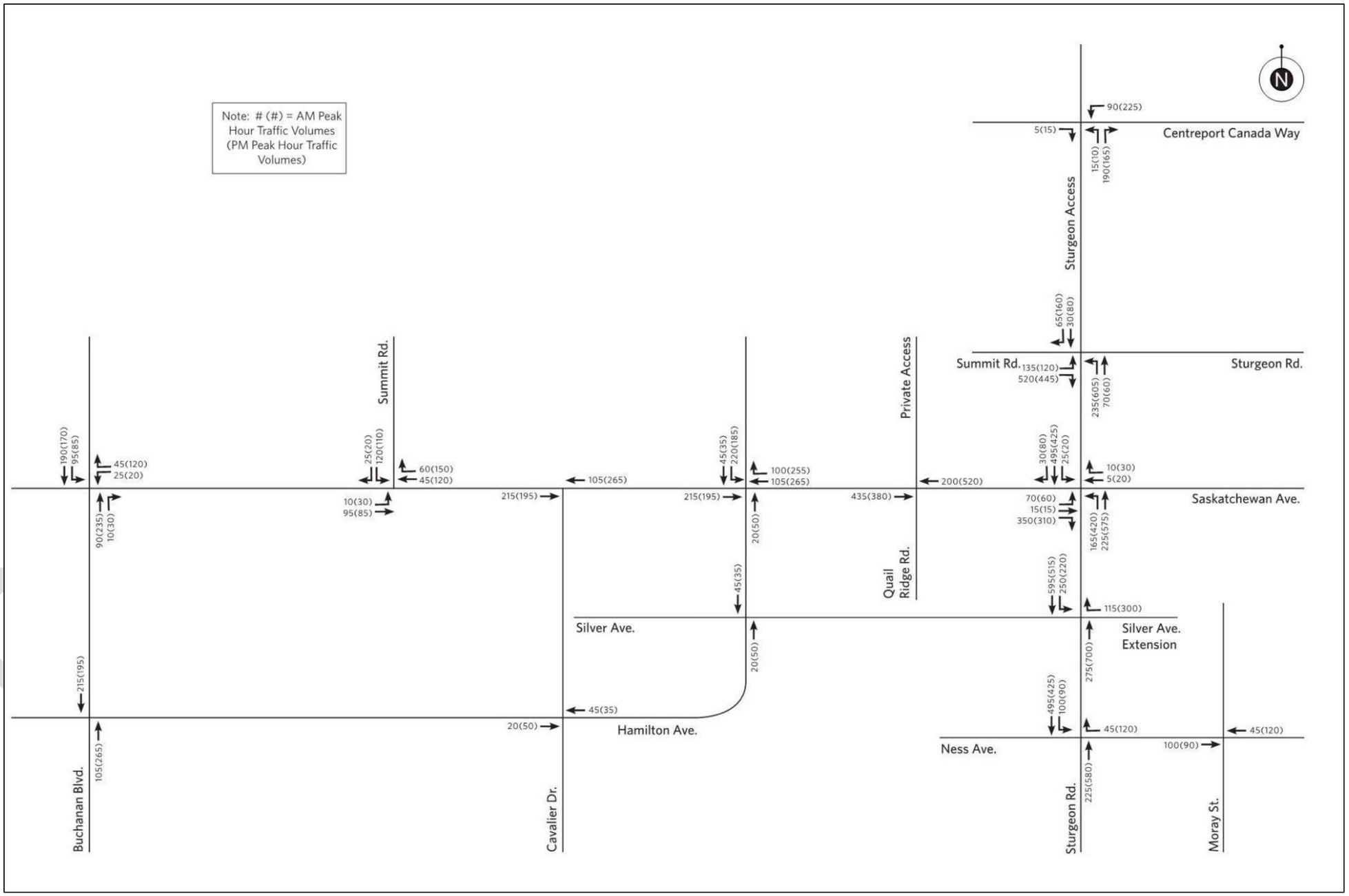

Figure 4.9: 2040 New Trips

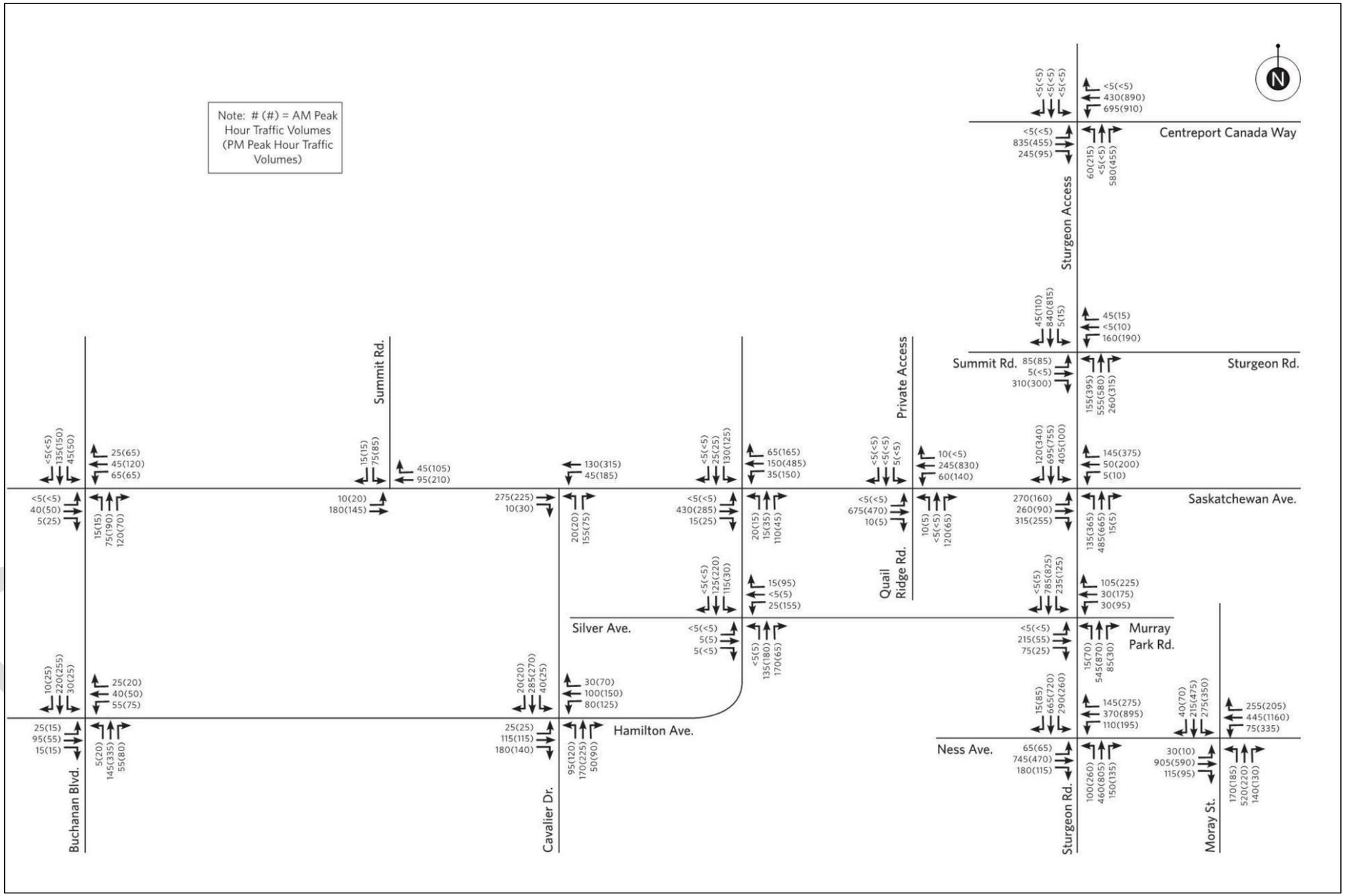

Figure 4.10: 2030 Post Development Traffic Volumes

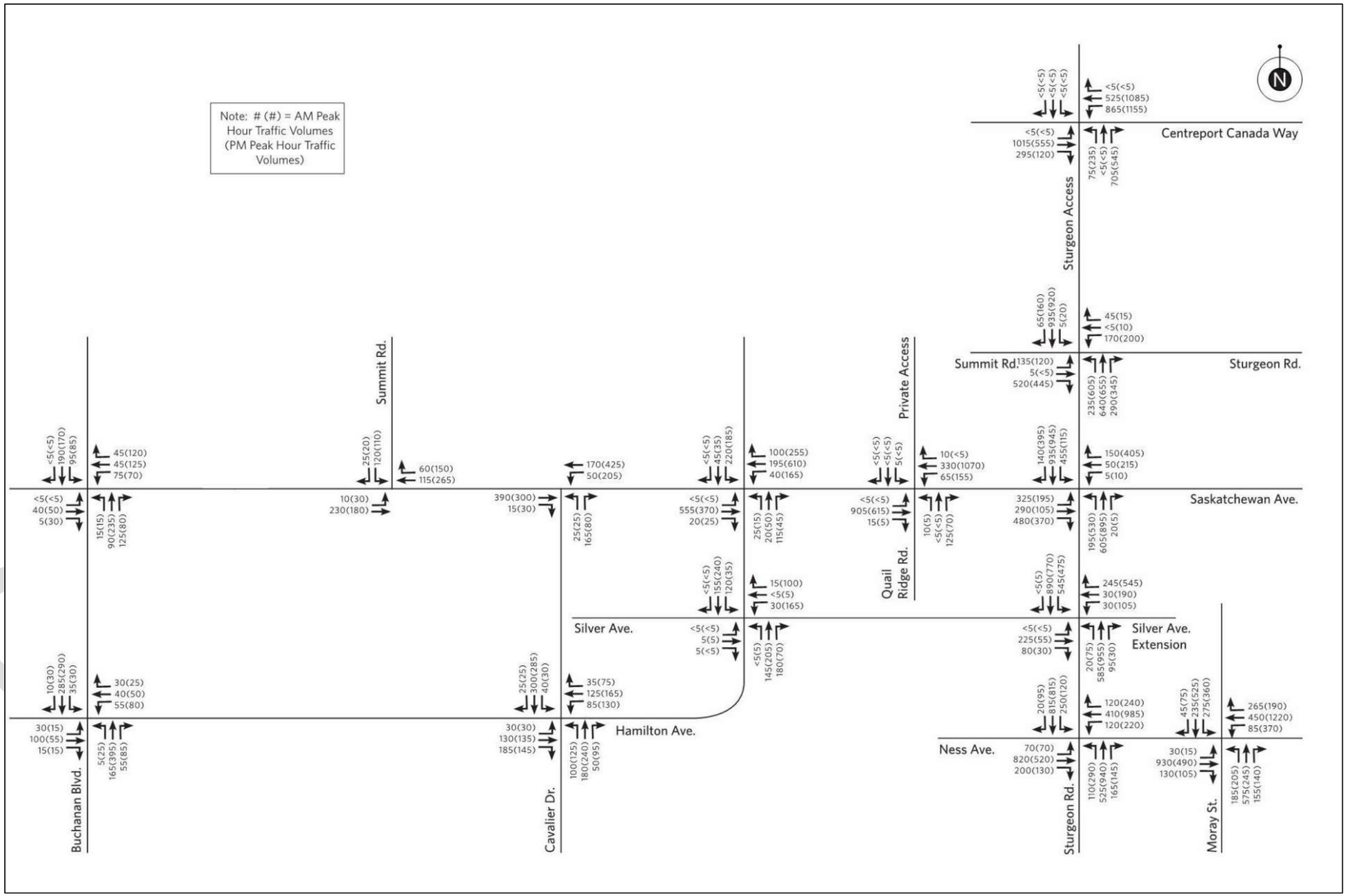

Figure 4.11: 2040 Post Development Traffic Volumes

5.0 STREET CLASSIFICATIONS

5.1. Existing Daily Traffic Volumes

Existing traffic counts in the adjacent neighbourhood of Crestview were obtained from Public Works. Year 2015 daily traffic volumes for the collector road network in these neighborhoods are illustrated in **Figure 5.1**.

Hamilton Avenue functions as an east-west residential collector in Crestview and is a four-lane divided roadway from Buchanan Boulevard to Saskatchewan Avenue. Hamilton Avenue between Silver Avenue and Cavalier Drive has daily traffic volumes of approximately 5,250 vehicles per day. Buchanan Boulevard is a north-south collector in the western portion of Crestview and is four lane divided from Portage Avenue to Saskatchewan Avenue. Buchanan Boulevard between Saskatchewan Avenue and Hamilton Avenue has daily traffic volumes of approximately 2,850 vehicles per day. Cavalier Drive is a north-south collector in central Crestview which connects Portage Avenue to Saskatchewan Avenue. It is a two lane roadway for much of its length, widening to four lane divided at its north intersection with Saskatchewan Avenue, and to four lane divided for a short distance north of its intersection with Portage Avenue. Cavalier Drive between Saskatchewan Avenue and Hamilton Avenue has daily traffic volumes of approximately 5,950 vehicles per day.

5.2. Daily Trip Generation

Daily trips generated by AAW were estimated based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition*.

The forecast daily trip generation for 2030 and 2040 (full build-out) is outlined in **Table 5.1.**

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Table 5.1: AAW Daily Trip Generation (2030 and 2040)

Location	Dwelling Units	Commercial Size	Daily Trips
2030 (Phase 1)			
Commercial	-	170,000 sq. ft.	12,180
Multi-family Residential	765	-	3,380
Lower Density Residential	982	-	11,050
TOTALS	**1,747**	**170,000 sq. ft.**	**26,610**
2040 (Phase 2)			
Commercial	-	220,000 sq. ft.	14,230
Multi-family Residential	765	-	3,380
Lower Density Residential	1,964	-	20,900
TOTALS	**2932**	**170,000 sq. ft.**	**38,510**

5.3. Forecast Daily Traffic Volumes

The daily trips generated by the development were assumed to follow the 2030 and 2040 trip distributions outlined in Section 4.4. The resulting daily traffic volumes are shown in **Figures 5.2** and **5.3**.

The *City of Winnipeg Transportation Standards Manual – Draft* volume guidelines were applied to the forecast daily traffic volumes to determine road classifications as follows:

- **Two-Lane Residential Collector:** Less than 5,000 vehicles per day.
- **Four-Lane Residential Collector:** Less than 20,000 vehicles per day.
- **Four-Lane Minor Arterial:** Less than 25,000 vehicles per day.

The following roadway classifications for AAW are based on the forecast daily traffic volumes:

- Buchanan Boulevard north of Saskatchewan Avenue: Four-Lane Residential Collector with 7,350 vehicles per day by 2040.
- Summit Road north of Saskatchewan Avenue: Two-Lane Residential Collector with 3,670 vehicles per day by 2040.
- Hamilton Avenue north of Saskatchewan Avenue: Four-Lane Residential Collector with 6,350 vehicles per day by 2040.

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- Summit Road west of Sturgeon Road/Sturgeon Access: Four-Lane Residential Collector with 16,140 vehicles per day by 2040.

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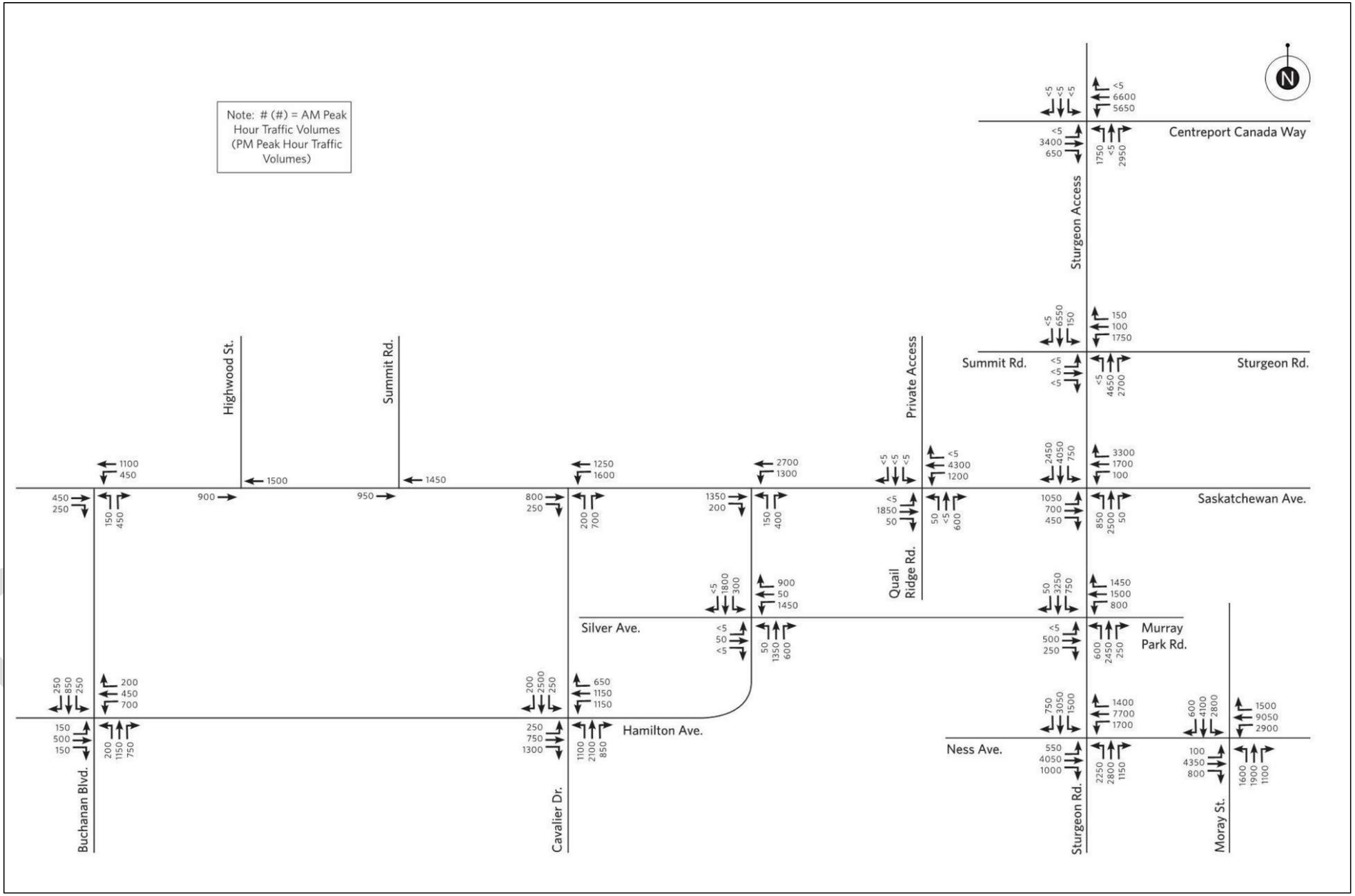

Figure 5.1: Existing Daily Traffic Volumes

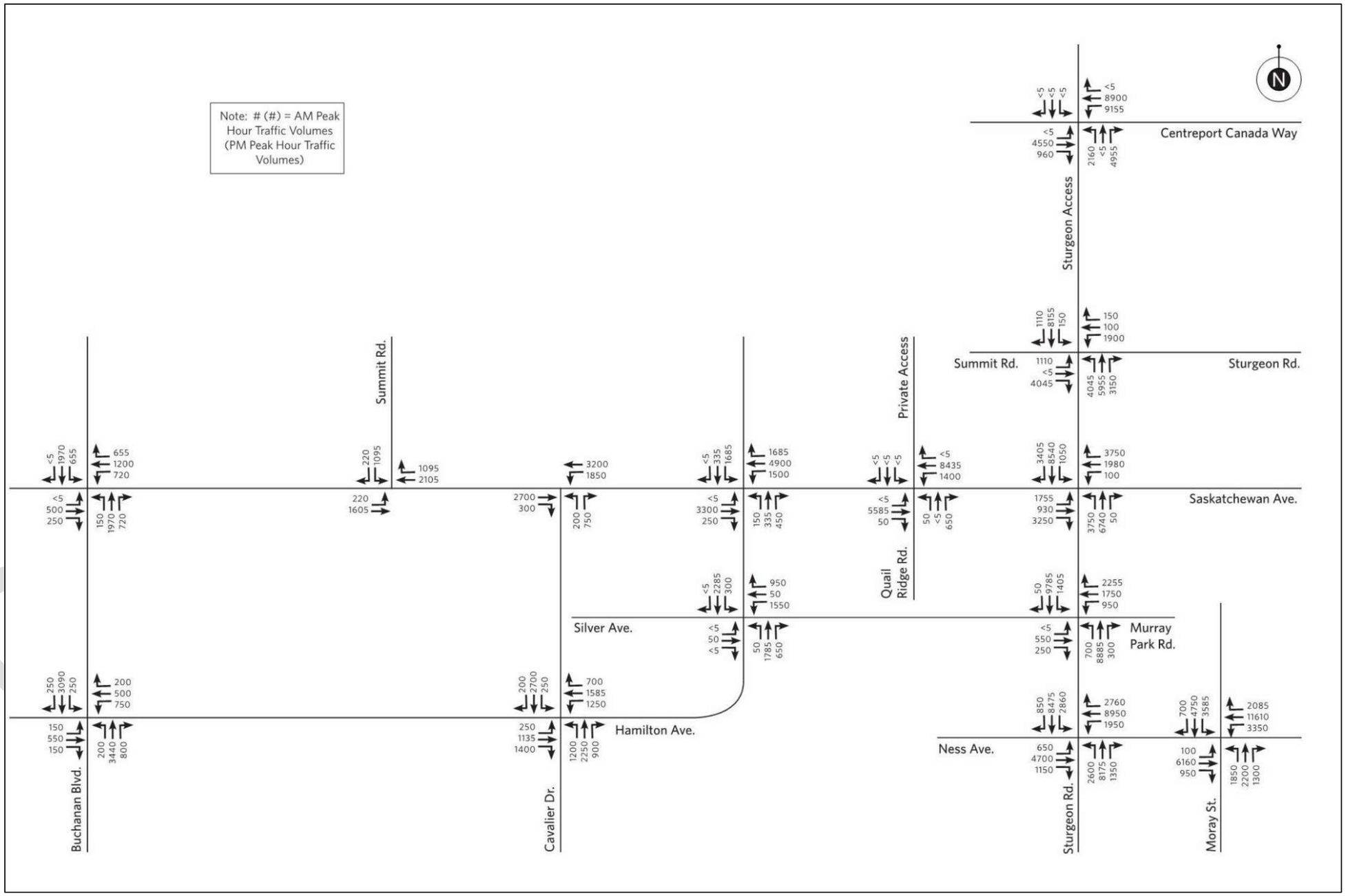

Figure 5.2: 2030 Post Development Daily Traffic Volumes

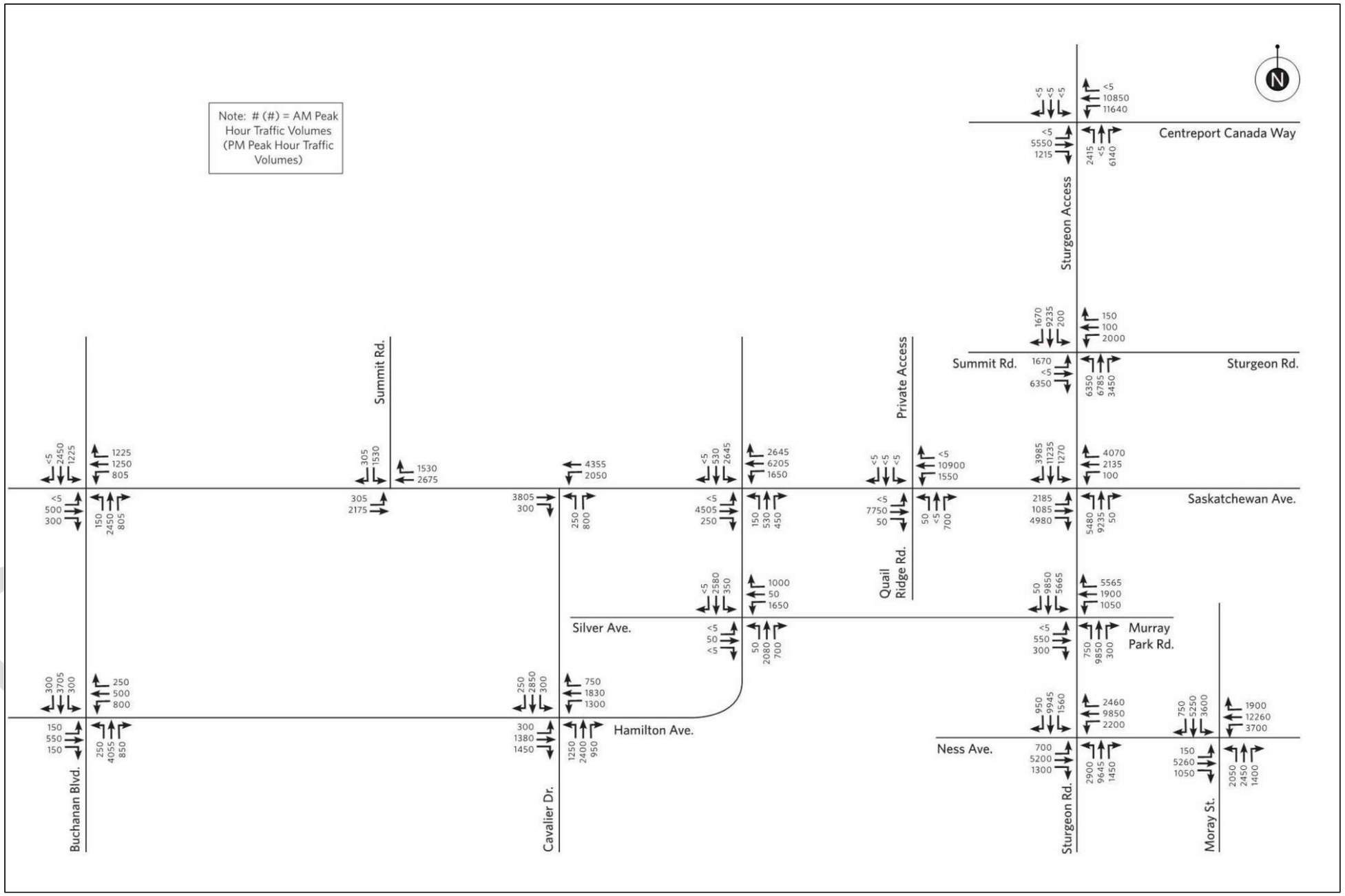

Figure 5.3: 2040 Post Development Daily Traffic Volumes

6.0 TRAFFIC REVIEW

6.1. Intersection Analysis

The traffic analysis for the proposed development was undertaken using Synchro 8.0 traffic analysis software and SimTraffic simulation software. The relative performance of an intersection is measured in terms of level of service (LOS). Levels of service range from A (excellent) to F (beyond capacity). In general, LOS E is considered to be at capacity. Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, cycle length, green ratio and ratio for the lane group in question.

LOS D or better for the overall intersection is widely considered desirable in an urban area during peak traffic periods.

Intersection capacity utilization level of service (ICU LOS) provides additional insight into how a signalized intersection is functioning and how much extra capacity is available to handle traffic fluctuations and incidents. ICU LOS ranges from A (excellent) to H (beyond capacity), with ICU LOS E generally considered to be at practical capacity.

The volume to capacity (v/c) ratio is used to determine the level of congestion for each lane group. If the v/c ratio is greater or equal to 1.00 that approach is operating above capacity. A v/c ratio of 0.85 is considered the maximum acceptable level for through and shared through/turning lanes, and a v/c ratio of 0.90 is considered the maximum acceptable level for turning lanes, as defined by the City of Winnipeg Public Works Department.

The analysis assumes that the street system modifications described in Section 3.2 are in place. Traffic signal timing information for the study area intersections was obtained from the City of Winnipeg Public Works Department and Manitoba Infrastructure and Transportation (MIT). Synchro's signal optimization feature was used for all signals in the 2030 and 2040 scenarios. The results of the analysis for each intersection are discussed in the following sections. The detailed Synchro results are included in **Appendix B**.

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6.1.1. CentrePort Canada Way and Sturgeon Access

The intersection of CentrePort Canada Way and Sturgeon Access is a four-legged signalized intersection consisting of the following geometry:

- The northbound approach on Sturgeon Access consists of a left-turn lane, a through lane and a right-turn cut-off lane;
- The southbound approach on Summit Road consists of a shared left-turn/through lane, and a shared through/right-turn lane;
- The eastbound approach on CentrePort Canada Way consists of a left-turn lane, two through lanes and a right-turn cut-off lane; and
- The westbound approach CentrePort Canada Way consists of two left-turn lanes, two through lanes and a right-turn lane.

The north and southbound approaches do not have signage or pavement markings indicating the intended lane configurations. The lane configurations listed above are assumed, and the intersection has been modelled accordingly. During the traffic counts at the intersection, it was observed that vehicles would occasionally use the northbound through lane as a second northbound left-turn lane. The lane configurations can be changed in the future using signage and pavement markings.

Table 6.1 summarizes the results of the intersection analysis for CentrePort Canada Way and Sturgeon Access.

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Table 6.1: CentrePort Canada Way and Sturgeon Access Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	B (14 sec)	A (51%)	0.57 (EBT)	NBL	C (29 sec)
2030 Background Traffic	B (17 sec)	B (62%)	0.70 (WBL)	NBL	D (39 sec)
2030 Post Development Traffic	C (29 sec)	C (67%)	**0.94 (NBR)**	WBL	D (45 sec)
2040 Background Traffic	C (22 sec)	C (71%)	0.80 (EBT)	WBL	D (43 sec)
2040 Post Development Traffic	C (34 sec)	D (80%)	**0.95 (EBT)**	**EBT**	**E (55 sec)**
PM Peak Hour					
2015 Existing Traffic	B (16 sec)	A (49%)	0.59 (WBL)	NBL	C (30 sec)
2030 Background Traffic	C (20 sec)	B (58%)	0.70 (WBL)	NBL	D (42 sec)
2030 Post Development Traffic	C (24 sec)	B (63%)	**0.97 (WBL)**	WBL	D (48 sec)
2040 Background Traffic	C (24 sec)	C (67%)	0.78 (WBL)	**NBL**	**E (56 sec)**
2040 Post Development Traffic	C (24 sec)	D (74%)	**0.93 (WBL)**	**NBL**	**E (58 sec)**

No issues were noted in the SimTraffic simulation.

6.1.2. Sturgeon Road and Saskatchewan Avenue

The intersection of Sturgeon Road and Saskatchewan Avenue is a four-legged signalized intersection consisting of the following geometry:

- The northbound approach on Sturgeon Road consists of a left-turn lane and a shared through/right-turn lane;
- The southbound approach on Sturgeon Road consists of a shared left-turn/through lane, a through lane and a right-turn lane;
- The eastbound approach on Saskatchewan Avenue consists of a left-turn lane and a shared through/right-turn lane; and
- The westbound approach Saskatchewan Avenue consists of a left-turn lane and a shared through/right-turn lane.

The intersection was analysed with this geometry for the 2015, 2030 and 2040 scenarios, and required improvements for the 2030 and 2040 post development scenarios are discussed below.

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Table 6.2 summarizes the results of the intersection analysis for Sturgeon Road and Saskatchewan Avenue.

Table 6.2: Sturgeon Road and Saskatchewan Avenue Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	B (17 sec)	D (74%)	0.65 (SBL/T)	WBL	C (28 sec)
2030 Background Traffic	C (20 sec)	E (82%)	*** 0.88 (dl SBL/T)**	EBL	D (36 sec)
2030 Post Development Traffic	**E (55 sec)**	**H (111%)**	**1.09 (EBT/R)**	**EBT/R**	**F (98 sec)**
2030 Post Development Traffic With Improvements	C (27 sec)	D (82%)	**0.90 (EBT/R)**	EBT/R	D (38 sec)
2040 Background Traffic	C (23 sec)	E (89%)	*** 0.95 (dl SBL/T)**	EBL	D (40 sec)
2040 Post Development Traffic	**F (157 sec)**	**H (138%)**	**1.64 (NBL)**	**EBT/R & NBL**	**F (>200 sec)**
2040 Post Development Traffic With Improvements	C (33 sec)	D (80%)	**0.96 (EBL)**	**EBL**	**E (68 sec)**
PM Peak Hour					
2015 Existing Traffic	B (20 sec)	B (79%)	0.79 (WBT/R)	SBL/T	C (26 sec)
2030 Background Traffic	C (22 sec)	E (86%)	0.82 (WBT/R)	SBL/T	C (33 sec)
2030 Post Development Traffic	**E (79 sec)**	**H (118%)**	**1.36 (NBL)**	**NBL**	**F (>200 sec)**
2030 Post Development Traffic With Improvements	C (24 sec)	E (82%)	**0.96 (NBL)**	NBL	D (53 sec)
2040 Background Traffic	C (26 sec)	**F (92%)**	**0.86 (WBT/R)**	SBL/T	D (38 sec)
2040 Post Development Traffic	**F (188 sec)**	**H (141%)**	**1.97 (NBL)**	**EBL, WBT/R, NBL & SBL/T**	**F (>200 sec)**
2040 Post Development Traffic With Improvements	C (32 sec)	D (80%)	**0.94 (NBL)**	**SBL**	**E (58 sec)**

*Defacto left-turn lane, meaning shared left-turn/through lane actually used as a left-turn lane due to the high left-turn volume.

The following issues were noted in the SimTraffic simulation:

- 2030 a.m. peak background: occasional queuing noted in the southbound left-turn/through lane.
- 2030 p.m. peak background: queuing noted in the southbound left-turn/through lane and westbound through/right-turn lane.

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- 2030 a.m. peak post development: severe queuing noted in the southbound left-turn/through lane and eastbound through/right-turn lane, extending past adjacent intersections and causing delays at:
    - Sturgeon Road/Sturgeon Access and Summit Road;
    - Sturgeon Access/Summit Road and CentrePort Canada Way; and
    - Saskatchewan Avenue and Quail Ridge Road.
- 2030 p.m. peak post development: severe queuing noted in the westbound through/right-turn lane.
- 2030 p.m. peak post development with improvements: occasional queuing noted in the northbound left-turn lane.
- 2040 a.m. peak background: queuing noted in the southbound left-turn lane and eastbound lanes.
- 2040 p.m. peak background: occasional queuing noted in the westbound through/right-turn lane.
- 2040 a.m. peak post development: severe queuing noted in the southbound lanes and eastbound lanes, extending past adjacent intersections and causing delays at:
    - Sturgeon Road/Sturgeon Access and Summit Road;
    - Sturgeon Access/Summit Road and CentrePort Canada Way;
    - Saskatchewan Avenue and Quail Ridge Road;
    - Saskatchewan Avenue and Hamilton Avenue; and
    - Saskatchewan Avenue and Cavalier Drive.
- 2040 p.m. peak post development: severe queuing noted in the southbound, northbound and westbound lanes, extending past adjacent intersections and causing delays at:
    - Sturgeon Road/Sturgeon Access and Summit Road; and
    - Sturgeon Access/Summit Road and CentrePort Canada Way.

The intersection of Sturgeon Road and Saskatchewan Avenue requires the following improvements to operate at an acceptable overall LOS D or better with acceptable queuing lengths observed in SimTraffic in the 2030 weekday peak post development periods:

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- The northbound approach on Sturgeon Road requires a left-turn lane, a through lane and a shared through/right-turn lane;
- The southbound approach on Sturgeon Road requires a left-turn lane, two through lanes and a right-turn lane;
- The eastbound approach on Saskatchewan Avenue requires a left-turn lane and a shared through/right-turn lane; and
- The westbound approach Saskatchewan Avenue requires a left-turn lane, a through lane and right-turn lane.

To accommodate post development traffic by 2030 Sturgeon Road requires widening to four lanes within the study area, and was modelled accordingly in the 2030 and 2040 post development with improvements scenarios.

The intersection requires additional improvements by 2040 to operate at an acceptable overall LOS D or better with acceptable queuing lengths observed in SimTraffic in the 2040 weekday peak post development periods. The following geometry is required by 2040:

- The northbound approach on Sturgeon Road requires two left-turn lanes, a through lane and a shared through/right-turn lane;
- The southbound approach on Sturgeon Road requires a left-turn lane, two through lanes and a right-turn lane;
- The eastbound approach on Saskatchewan Avenue requires a left-turn lane, a through lane and a right-turn cut-off lane; and
- The westbound approach Saskatchewan Avenue requires a left-turn lane, a through lane and right-turn cut-off lane.

The construction of a southbound left-turn lane and a westbound right-turn cut-off lane may not be feasible due to the rail line to the north of the intersection; however, eliminating either additional lane results in an overall LOS F at the intersection in the 2040 Post Development scenario and significant queuing as observed in SimTraffic simulations. Constructing two northbound left-turn lanes requires upgrading Saskatchewan west of Sturgeon Road to a four lane roadway. The additional lanes should extend from Sturgeon Road to Hamilton Avenue.

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6.1.3. Sturgeon Road and Ness Avenue

The intersection of Sturgeon Road and Ness Avenue is a four-legged signalized intersection consisting of the following geometry:

- The northbound approach on Sturgeon Road consists of a left-turn lane, a through lane and a right-turn lane;
- The southbound approach on Sturgeon Road consists of a left-turn lane, a through lane and a shared through/right-turn cut-off lane;
- The eastbound approach on Ness Avenue consists of a left-turn lane, a through lane and a shared through/right-turn cut-off lane; and
- The westbound approach Ness Avenue consists of a left-turn lane, a through lane and a shared through/right-turn cut-off lane.

Table 6.3 summarizes the results of the intersection analysis for Sturgeon Road and Ness Avenue.

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Table 6.3: Sturgeon Road and Ness Avenue Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	C (20 sec)	B (75%)	0.65 (EBT/R)	SBT/R	C (26 sec)
2030 Background Traffic	C (23 sec)	C (71%)	0.78 (EBT/R)	EBT/R	C (27 sec)
2030 Post Development Traffic	C (31 sec)	D (81%)	**0.90 (EBT/R)**	EBT/R	D (38 sec)
*** 2030 Post Development Traffic With Improvements**	C (31 sec)	D (81%)	**0.90 (EBT/R)**	EBT/R	D (38 sec)
2040 Background Traffic	C (23 sec)	C (73%)	0.81 (EBT/R)	SBT/R	C (27 sec)
2040 Post Development Traffic	C (33 sec)	E (84%)	**0.88 (NBT/R)**	SBL	D (42 sec)
PM Peak Hour					
2015 Existing Traffic	D (50 sec)	C (67%)	**1.11 (WBT/R)**	**WBT/R**	**F (103 sec)**
**** 2015 Existing Traffic Optimized**	C (22 sec)	C (67%)	0.77 (WBT/R)	SBT/R	C (25 sec)
2030 Background Traffic	C (26 sec)	D (76%)	0.81 (WBT/R)	SBT/R	C (33 sec)
2030 Post Development Traffic	D (46 sec)	**F (93%)**	**1.01 (WBT/R)**	**NBT/R**	**E (60 sec)**
*** 2030 Post Development Traffic With Improvements**	D (46 sec)	**F (93%)**	**1.01 (WBT/R)**	**NBT/R**	**E (60 sec)**
2040 Background Traffic	C (29 sec)	D (80%)	**0.92 (WBT/R)**	WBT/R	C (32 sec)
2040 Post Development Traffic	D (50 sec)	**F (95%)**	**1.04 (SBT/R)**	**SBT/R**	**E (74 sec)**

* No improvements specifically at the intersection were analyzed, but the improvements include widening Sturgeon Road to four lanes, significantly reducing queuing observed in SimTraffic in the southbound lanes at Ness Avenue.

** Optimizing the 2015 Existing Traffic signal timing results in significant operational improvements.

The following issues were noted in the SimTraffic simulation:

- 2015 p.m. peak: queuing in the westbound through lanes.
- 2030 a.m. peak post development: queuing noted in the northbound through lanes.
- 2030 p.m. peak post development: severe queuing noted in the northbound lanes and queuing noted in the westbound through lanes.
- 2030 a.m. peak post development with improvements: queuing noted in the northbound lanes.

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- 2030 p.m. peak post development with improvements: queuing noted in the northbound lanes, westbound through lanes, and the southbound left-turn lane.
- 2040 p.m. peak post development: significant queuing noted in the northbound left-turn lane.

Sturgeon Road requires widening to four lanes within the study area to accommodate post development traffic by 2030, and was modelled accordingly in the 2030 and 2040 post development with improvements scenarios.

6.1.4. Ness Avenue and Moray Street

The intersection of Ness Avenue and Moray Street is a four-legged signalized intersection consisting of the following geometry:

- The northbound approach on Moray Street consists of a left-turn lane, a through lane and a shared through/right-turn lane;
- The southbound approach on Moray Street consists of a left-turn lane, two through lanes, and a right-turn cut-off lane;
- The eastbound approach on Ness Avenue consists of a left-turn lane, a through lane and a shared through/right-turn lane; and
- The westbound approach on Ness Avenue consists of a left-turn lane, a through lane and a shared through/right-turn lane.

Table 6.4 summarizes the results of the intersection analysis for Ness Avenue and Moray Street.

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Table 6.4: Ness Avenue and Moray Street Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	C (22 sec)	F (92%)	0.97 (SBL)	SBL	E (75 sec)
2030 Background Traffic	C (23 sec)	F (96%)	0.92 (SBL)	SBL	E (57 sec)
2030 Post Development Traffic	C (25 sec)	F (97%)	1.01 (SBL)	SBL	E (79 sec)
2040 Background Traffic	C (25 sec)	F (99%)	1.01 (SBL)	SBL	E (78 sec)
2040 Post Development Traffic	C (26 sec)	F (99%)	1.01 (SBL)	SBL	E (78 sec)
PM Peak Hour					
2015 Existing Traffic	C (26 sec)	F (92%)	0.96 (SBL)	SBL	E (69 sec)
* 2015 Existing Traffic Optimized	C (23 sec)	F (92%)	0.99 (SBL)	SBL	E (76 sec)
2030 Background Traffic	C (28 sec)	G (101%)	0.96 (SBL)	SBL	E (65 sec)
2030 Post Development Traffic	D (30 sec)	G (107%)	1.02 (SBL)	SBL	F (80 sec)
2040 Background Traffic	C (32 sec)	G (106%)	1.08 (SBL)	SBL	F (95 sec)
2040 Post Development Traffic	D (36 sec)	H (109%)	1.17 (SBL)	SBL	F (130 sec)

* Optimizing the 2015 Existing Traffic signal timing results in significant operational improvements.

The following issues were noted in the SimTraffic simulation:

- 2030 a.m. peak background: queuing in the southbound left-turn lane.
- 2040 a.m. peak background: occasional queuing in the southbound left-turn lane.
- 2040 a.m. peak post development: occasional queuing in the southbound left-turn lane.
- 2040 p.m. peak post development: occasional queuing in the southbound left-turn lane.

6.1.5. Sturgeon Road/Sturgeon Access and Summit Road

The intersection of Sturgeon Road/Sturgeon Access and Summit Road is a four-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Sturgeon Road consists of a shared left-turn/through lane, a through lane and a right-turn cut-off lane;

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- The southbound approach on Sturgeon Access consists of a left-turn lane, a through lane, and a shared through/right-turn lane;
- The eastbound approach on Summit Road consists of a single lane; and
- The westbound approach on Sturgeon Road consists of a shared left-turn/through lane, and a right-turn cut-off lane.

The northbound and southbound approaches are free-flowing and eastbound and westbound are stop-controlled.

This intersection will be a four-legged signalized intersection in the 2030 and 2040 post development scenarios to provide access to the east side of the development, and will consist of the following geometry:

- The northbound approach on Sturgeon Road requires two left-turn lanes, two through lanes and a right-turn cut-off lane;
- The southbound approach on Sturgeon Access requires a left-turn lane, a through lane, and a shared through/right-turn lane;
- The eastbound approach on Summit Road requires a shared left-turn/through lane and a right-turn cut-off lane; and
- The westbound approach on Sturgeon Road requires a shared left-turn/through lane, and a right-turn cut-off lane.

Table 6.5 summarizes the results of the intersection analysis for Sturgeon Road/Sturgeon Access and Summit Road.

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Table 6.5: Sturgeon Road/Sturgeon Access and Summit Road Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (5 sec)	A (47%)	0.70 (WB)	**WB**	**E (41 sec)**
2030 Background Traffic	A (10 sec)	A (52%)	**0.94 (WB)**	**WB**	**F (84 sec)**
2030 Post Development Traffic	B (14 sec)	C (68%)	0.65 (SBT/R)	NBL	D (36 sec)
2040 Background Traffic	C (17 sec)	B (56%)	**1.21 (WB)**	**WB**	**F (159 sec)**
2040 Post Development Traffic	C (25 sec)	E (85%)	**0.94 (EBR)**	**NBL**	**E (59 sec)**
PM Peak Hour					
2015 Existing Traffic	A (9 sec)	A (41%)	**0.88 (WB)**	**WB**	**F (71 sec)**
2030 Background Traffic	C (21 sec)	A (47%)	**1.20 (WB)**	**WB**	**F (178 sec)**
2030 Post Development Traffic	C (22 sec)	C (71%)	**0.89 (NBL)**	NBL	D (50 sec)
2040 Background Traffic	**E (37 sec)**	A (51%)	**1.55 (WB)**	**WB**	**F (>200 sec)**
2040 Post Development Traffic	C (29 sec)	E (85%)	**0.94 (NBL)**	**WBL/T**	**E (68 sec)**

The following issues were noted in the SimTraffic simulation:

- 2030 a.m. peak background: occasional minor queuing noted in the westbound left-turn/through lane.
- 2030 p.m. peak background: occasional minor queuing noted in the westbound left-turn/through lane.
- 2030 a.m. peak post development: severe queuing noted in the southbound direction on Sturgeon Road at Saskatchewan Avenue occasionally continued north to Summit Road, causing queuing in the southbound direction on Sturgeon Access.
- 2040 p.m. peak background: occasional minor queuing noted in the westbound left-turn/through lane.

Sturgeon Road requires widening to four lanes within the study area to accommodate post development traffic by 2030, and was modelled accordingly in the 2030 and 2040 post development with improvements scenarios.

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6.1.6. Sturgeon Road and Silver Avenue/Murray Park Road

The intersection of Sturgeon Road and Silver Avenue/Murray Park Road is a four-legged stop-controlled intersection in the 2015 scenarios, consisting of the following geometry:

- The northbound approach on Sturgeon Road consists of a single lane;
- The southbound approach on Sturgeon Road consists of a single lane;
- The eastbound approach on Silver Avenue consists of a single lane; and
- The westbound approach on Murray Park Road consists of a single lane.

The intersection is currently undergoing construction and will be a four-legged roundabout in the 2030 scenarios. It was assumed to consist of the following geometry:

- The northbound approach on Sturgeon Road consists of a single lane;
- The southbound approach on Sturgeon Road consists of a single lane;
- The eastbound approach on Silver Avenue consists of a single lane; and
- The westbound approach on Murray Park Road consists of a single lane.

By 2040 it was assumed that the Silver Avenue Extension would be constructed east of Sturgeon Road. Murray Park Road would be realigned and remain as a collector street for the industrial park. The intersection of Sturgeon Road and Silver Avenue Extension was assumed to be a four-legged signalized intersection in the 2040 scenarios with the following geometry:

- The northbound approach on Sturgeon Road requires a shared left-turn/through lane, and a right-turn lane;
- The southbound approach on Sturgeon Road requires a left-turn lane, and a shared through/right-turn lane;
- The eastbound approach on Silver Avenue requires a shared left-turn/through lane, a and a shared through/right-turn lane; and
- The westbound approach on the Silver Avenue Extension requires a left-turn lane, a through lane and a right-turn lane.

Table 6.6 summarizes the results of the intersection analysis for Sturgeon Road and Silver Avenue/Murray Park Road/Silver Avenue Extension.

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Table 6.6: Sturgeon Road and Silver Avenue/Murray Park Road Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	D (30 sec)	D (76%)	**0.91 (SB)**	**SB**	**E (46 sec)**
2030 Background Traffic	B (13 sec)	E (88%)	0.64 (NB)	NB	C (17 sec)
2030 Post Development Traffic	**F (67 sec)**	**H (128%)**	**1.09 (SB)**	**SB**	**F (74 sec)**
2030 Post Development Traffic With Improvements	B (14 sec)	E (89%)	0.79 (SB)	EB	C (28 sec)
2040 Background Traffic	A (10 sec)	C (66%)	0.55 (SBL)	WBL	B (18 sec)
2040 Post Development Traffic	C (34 sec)	**H (111%)**	**1.08 (SBL)**	**SBL**	**F (83 sec)**
2040 Post Development Traffic With Improvements	B (17 sec)	D (73%)	0.83 (SBL)	SBL	C (34 sec)
PM Peak Hour					
2015 Existing Traffic	D (26 sec)	B (64%)	0.80 (SB)	SB	D (31 sec)
2030 Background Traffic	B (14 sec)	C (71%)	0.66 (SB)	SB	C (17 sec)
2030 Post Development Traffic	**F (156 sec)**	**H (122%)**	**1.38 (WB)**	**WB**	**F (>200 sec)**
2030 Post Development Traffic With Improvements	C (26 sec)	**G (101%)**	**0.96 (WB)**	WB	D (50 sec)
2040 Background Traffic	B (11 sec)	B (59%)	0.54 (SBL)	WBT	B (18 sec)
2040 Post Development Traffic	**F (104 sec)**	**H (123%)**	**1.34 (SBL)**	**SBL**	**F (>200 sec)**
2040 Post Development Traffic With Improvements	D (37 sec)	D (78%)	**0.99 (SBL)**	**SBL**	**E (74 sec)**

The following issues were noted in the SimTraffic simulations:

- 2030 a.m. peak post development: queuing noted in the southbound lane on Sturgeon Road.
- 2030 p.m. peak post development: severe queuing noted in the southbound lane on Sturgeon Road extending to Saskatchewan Avenue.
- 2040 p.m. peak post development: severe queuing noted in the westbound right-turn lane.

The intersection of Sturgeon Road and Silver Avenue/Murray Park Road requires the following upgrades along with signalization to operate at an overall LOS D with acceptable queuing lengths in the 2030 weekday peak post development periods:

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- The northbound approach on Sturgeon Road requires a shared left-turn/through lane and a shared through/right-turn lane;
- The southbound approach on Sturgeon Road requires a shared left-turn/through lane and a shared through/right-turn lane;
- The eastbound approach on Silver Avenue requires a single lane; and
- The westbound approach Murray Park Road requires a single lane with a right-turn cut-off.

Sturgeon Road requires widening to four lanes within the study area to accommodate post development traffic by 2030, and was modelled accordingly in the 2030 and 2040 post development with improvements scenarios.

The intersection of Sturgeon Road and Silver AvenueExtension requires the following upgrades along with signalization to operate at an overall LOS D with acceptable queuing lengths in the 2040 weekday peak post development periods:

- The northbound approach on Sturgeon Road requires a shared left-turn/through lane, a through lane and a right-turn lane;
- The southbound approach on Sturgeon Road requires two left-turn lanes, a through lane and a shared through/right-turn lane;
- The eastbound approach on Silver Avenue requires a left-turn lane, a through lane and a shared through/right-turn lane; and
- The westbound approach on the Silver Avenue Extension requires a left-turn lane, a through lane and a right-turn cut-off lane.

6.1.7. Saskatchewan Avenue and Buchanan Boulevard

The intersection of Saskatchewan Avenue and Buchanan Boulevard is currently a three-legged stop-controlled intersection and was assumed to remain a three-legged stop-controlled intersection in all background scenarios, consisting of the following geometry:

- The northbound approach on Buchanan Boulevard consists of a left-turn lane and a right-turn cut-off lane, and is stop-controlled;
- The eastbound approach on Saskatchewan Avenue consists of a through lane and a right-turn cut-off lane, and is free-flowing; and

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- The westbound approach Saskatchewan Avenue consists of a shared left-turn/through lane, and is free-flowing.

The eastbound and westbound approaches are free-flowing and the northbound approach is stop-controlled.

This intersection will be a four-legged stop-controlled intersection in the 2030 and 2040 post development scenarios to provide access to the west side of the AAW development, and will consist of the following geometry:

- The northbound approach on Buchanan Boulevard requires a shared left-turn/through lane and a right-turn cut-off lane;
- The southbound approach on Buchanan Boulevard requires a single lane.
- The eastbound approach on Saskatchewan Avenue requires a shared left-turn/through lane and a right-turn cut-off lane; and
- The westbound approach on Saskatchewan Avenue requires a single lane.

All approaches are stop-controlled in the post development scenarios.

Table 6.7 summarizes the results of the intersection analysis for Saskatchewan Avenue and Buchanan Boulevard.

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Table 6.7: Saskatchewan Avenue and Buchanan Boulevard Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (6 sec)	A (21%)	0.11 (NB)	NB	A (9 sec)
2030 Background Traffic	A (6 sec)	A (22%)	0.12 (NB)	NB	A (9 sec)
2030 Post Development Traffic	A (8 sec)	A (37%)	0.25 (SB)	SB	A (9 sec))
2040 Background Traffic	A (6 sec)	A (22%)	0.12 (NB)	NB	A (9 sec)
2040 Post Development Traffic	A (9 sec)	A (45%)	0.41 (SB)	SB	B (11 sec)
PM Peak Hour					
2015 Existing Traffic	A (3 sec)	A (25%)	0.05 (NB)	NB	A (9 sec)
2030 Background Traffic	A (3 sec)	A (26%)	0.05 (NB)	NB	A (9 sec)
2030 Post Development Traffic	B (10 sec)	A (52%)	0.38 (WB)	WB	B (11 sec)
2040 Background Traffic	A (3 sec)	A (26%)	0.05 (NB)	NB	A (9 sec)
2040 Post Development Traffic	B (12 sec)	B (61%)	0.51 (WB)	WB	B (14 sec)

No issues were noted in the SimTraffic simulation.

6.1.8. Saskatchewan Avenue and Cavalier Drive

The intersection of Saskatchewan Avenue and Cavalier Drive is a three-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Cavalier Drive consists of a left-turn lane and a right-turn cut-off lane;
- The eastbound approach on Saskatchewan Avenue consists of a through lane and a right-turn cut-off lane; and
- The westbound approach Saskatchewan Avenue consists of a shared left-turn/through lane.

The eastbound and westbound approaches are free-flowing and the northbound approach is stop-controlled.

Table 6.8 summarizes the results of the intersection analysis of Saskatchewan Avenue and Cavalier Drive.

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Table 6.8: Saskatchewan Avenue and Cavalier Drive Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (5 sec)	A (25%)	0.18 (NB)	NB	A (10 sec)
2030 Background Traffic	A (5 sec)	A (27%)	0.19 (NB)	NB	B (10 sec)
2030 Post Development Traffic	A (4 sec)	A (37%)	0.23 (NB)	NB	B (12 sec)
2040 Background Traffic	A (5 sec)	A (29%)	0.21 (NB)	NB	B (11 sec)
2040 Post Development Traffic	A (4 sec)	A (46%)	0.28 (NB)	NB	B (13 sec)
PM Peak Hour					
2015 Existing Traffic	A (5 sec)	A (32%)	0.12 (WB)	NB	B (10 sec)
2030 Background Traffic	A (5 sec)	A (35%)	0.14 (WB)	NB	B (11 sec)
2030 Post Development Traffic	*A (4 sec)	A (52%)	0.15 (WB)	NB	B (13 sec)
2040 Background Traffic	A (5 sec)	A (36%)	0.5 4 (WB)	NB	B (11 sec)
2040 Post Development Traffic	*A (4 sec)	B (63%)	0.19 (EB)	NB	C (16 sec)

*The overall LOS and delay improved because an increased volume operates under free-flowing conditions at the intersection

No issues were noted in the SimTraffic simulation.

6.1.9. Saskatchewan Avenue and Hamilton Avenue

The intersection of Saskatchewan Avenue and Hamilton Avenue is a three-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Hamilton Avenue consists of a left-turn lane and a right-turn lane;
- The eastbound approach on Saskatchewan Avenue consists of a shared through/right-turn lane; and
- The westbound approach Saskatchewan Avenue consists of a shared left-turn/through lane.

The eastbound and westbound approaches are free-flowing and the northbound approach is stop-controlled.

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This intersection will be a four-legged signalized intersection in the 2030 and 2040 post development scenarios to provide access to the east side of the development, and will consist of the following geometry:

- The northbound approach on Hamilton Avenue requires a shared left-turn/through lane and a right-turn lane;
- The southbound approach on Hamilton Avenue requires a left-turn lane and a shared through/right-turn lane;
- The eastbound approach on Saskatchewan Avenue requires a single lane; and
- The westbound approach on Saskatchewan Avenue requires a shared left-turn/through lane and a right-turn lane.

Table 6.9 summarizes the results of the intersection analysis for Saskatchewan Avenue and Hamilton Avenue.

Table 6.9: Saskatchewan Avenue and Hamilton Avenue Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (3 sec)	A (34%)	0.18 (EB)	NB	B (11 sec)
2030 Background Traffic	A (3 sec)	A (37%)	0.21 (EB)	NB	B (11 sec)
2030 Post Development Traffic	A (10 sec)	B (62%)	0.47 (SBL)	SBL	B (20 sec)
2040 Background Traffic	A (3 sec)	A (39%)	0.23 (EB)	NB	B (12 sec)
2040 Post Development Traffic	B (14 sec)	D (73%)	0.72 (SB)	SBL	C (31 sec)
PM Peak Hour					
2015 Existing Traffic	A (3 sec)	A (43%)	0.10 (EB & WB)	NB	B (11 sec)
2030 Background Traffic	A (3 sec)	A (48%)	0.12 (EB & WB)	NB	B (12 sec)
2030 Post Development Traffic	B (12 sec)	D (79%)	0.66 (WBL/T)	SBL	C (29 sec)
2040 Background Traffic	A (3 sec)	A (51%)	0.13 (EB & WB)	NB	B (12 sec)
2040 Post Development Traffic	C (20 sec)	**F (94%)**	**0.88 (WBL/T)**	SBL	D (51 sec)

The following issues were noted in the SimTraffic simulations:

- 2040 a.m. peak post development: When Saskatchewan Avenue at Sturgeon Road is analysed without improvements, queuing extends west past Hamilton Avenue causing delays at the Saskatchewan Avenue at Hamilton Avenue intersection.

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- No issues observed when Saskatchewan Avenue at Sturgeon Road is analysed with improvements.

6.1.10. Saskatchewan Avenue and Quail Ridge Road/Private Access

The intersection of Saskatchewan Avenue and Quail Ridge Road/Private Access is a four-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Quail Ridge Road consists of a single lane;
- The southbound approach on the private access consists of a single lane;
- The eastbound approach on Saskatchewan Avenue consists of a single lane; and
- The westbound approach Saskatchewan Avenue consists of a single lane.

The eastbound and westbound approaches are free-flowing and the northbound and southbound approaches are stop-controlled.

Table 6.10 summarizes the results of the intersection analysis for Saskatchewan Avenue and Quail Ridge Road. No changes to the geometry of the intersection are required by 2030 or 2040.

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Table 6.10: Saskatchewan Avenue and Quail Ridge Road Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (3 sec)	A (46%)	0.21 (NB)	SB	C (19 sec)
2030 Background Traffic	A (3 sec)	A (51%)	0.25 (NB)	SB	C (23 sec)
2030 Post Development Traffic	A (3 sec)	C (71%)	0.38 (NB)	**SB**	**E (46 sec)**
2040 Background Traffic	A (3 sec)	A (55%)	0.28 (NB)	SB	D (26 sec)
2040 Post Development Traffic	A (5 sec)	E (88%)	0.57 (NB)	**SB**	**F (108 sec)**
PM Peak Hour					
2015 Existing Traffic	A (3 sec)	A (53%)	0.10 (WB & NB)	NB	B (11 sec)
2030 Background Traffic	A (3 sec)	B (60%)	0.12 (NB)	NB	B (11 sec)
2030 Post Development Traffic	A (3 sec)	E (91%)	0.23 (NB)	NB	C (19 sec)
2040 Background Traffic	A (3 sec)	C (65%)	0.13 (NB)	NB	B (12 sec)
2040 Post Development Traffic	A (6 sec)	**H (112%)**	0.48 (NB)	**NB**	**F (52 sec)**

The following issues were noted in the SimTraffic simulation:

- 2030 a.m. peak post development: When Saskatchewan Avenue at Sturgeon Road is analysed without improvements, queuing extends west past Quail Ridge Road causing delays at the Saskatchewan Avenue at Hamilton Avenue intersection.
    - No issues observed when Saskatchewan Avenue at Sturgeon Road is analysed with improvements.
- 2040 a.m. peak post development: When Saskatchewan Avenue at Sturgeon Road is analysed without improvements, queuing extends west past Quail Ridge Road causing delays at the Saskatchewan Avenue at Hamilton Avenue intersection.
    - No issues observed when Saskatchewan Avenue at Sturgeon Road is analysed with improvements.

6.1.11. Buchanan Boulevard and Hamilton Avenue

Buchanan Boulevard and Hamilton Avenue east of Buchanan Boulevard are both four lane divided roadways, but parking is permitted in the right lane in all directions. The intersection was modelled accordingly, with the right lane in each direction being used as a right-turn only lane. If additional capacity was required at some future date, parking could be restricted during

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peak hours, allowing the right lanes to be used as shared through/right-turn lanes. The intersection of Buchanan Boulevard and Hamilton Avenue is a four-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Buchanan Boulevard consists of a shared left-turn/through lane and a right-turn lane;
- The southbound approach on Buchanan Boulevard consists of a shared left-turn/through lane and a right-turn lane;
- The eastbound approach on Hamilton Avenue consists of a single lane; and
- The westbound approach on Hamilton Avenue consists of a shared left-turn/through lane, and a right-turn lane.

All approaches at the intersection are stop-controlled.

Table 6.11 summarizes the results of the intersection analysis for Buchanan Boulevard and Hamilton Avenue. No changes to the geometry of the intersection are required by 2030 or 2040.

Table 6.11: Buchanan Boulevard and Hamilton Avenue Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (8 sec)	A (32%)	0.21 (EB)	EB	A (10 sec)
2030 Background Traffic	A (8 sec)	A (32%)	0.22 (EB)	EB	A (10 sec)
2030 Post Development Traffic	B (10 sec)	A (45%)	0.43 (SBL/T)	SBL/T	B (12 sec)
2040 Background Traffic	A (8 sec)	A (33%)	0.23 (EB)	EB	A (10 sec)
2040 Post Development Traffic	B (12 sec)	A (50%)	0.57 (SBL/T)	SBL/T	C (15 sec)
PM Peak Hour					
2015 Existing Traffic	A (9 sec)	A (33%)	0.22 (NBL/T)	EB	A (10 sec)
2030 Background Traffic	A (9 sec)	A (37%)	0.24 (NBL/T)	EB	A (10 sec)
2030 Post Development Traffic	B (14 sec)	A (54%)	0.63 (NBL/T)	NBL/T	C (17 sec)
2040 Background Traffic	A (9 sec)	A (39%)	0.26 (NBL/T)	EB	A (10 sec)
2040 Post Development Traffic	C (18 sec)	B (62%)	0.77 (NBL/T)	NBL/T	D (25 sec)

No issues were noted in the SimTraffic simulation.

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6.1.12. Hamilton Avenue and Cavalier Drive

Hamilton Avenue is a four lane divided roadway, but parking is permitted in the right lane in both directions. The intersection was modelled with the right lane in each direction on Hamilton Avenue being used as a right-turn only lane. If additional capacity was required at some future date, parking could be restricted during peak hours, allowing the right lanes to be used as shared through/right-turn lanes. The intersection of Hamilton Avenue and Cavalier Drive is a four-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Cavalier Drive consists of a single lane;
- The southbound approach on Cavalier Drive consists of a single lane;
- The eastbound approach on Hamilton Avenue consists of a shared left-turn/through lane and a right-turn lane; and
- The westbound approach on Hamilton Avenue consists of a shared left-turn/through lane and a right-turn lane.

All approaches at the intersection are stop-controlled.

Table 6.12 summarizes the results of the intersection analysis for Hamilton Avenue and Cavalier Drive. No changes to the geometry of the intersection are required by 2030 or 2040.

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Table 6.12: Hamilton Avenue and Cavalier Drive Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	B (15 sec)	B (55%)	0.59 (SB)	SB	C (18 sec)
2030 Background Traffic	C (17 sec)	B (57%)	0.67 (SB)	SB	C (21 sec)
2030 Post Development Traffic	C (18 sec)	B (58%)	0.69 (SB)	SB	C (23 sec)
2040 Background Traffic	C (20 sec)	B (60%)	0.73 (SB)	SB	D (26 sec)
2040 Post Development Traffic	C (23 sec)	C (68%)	0.79 (SB)	SB	D (32 sec)
PM Peak Hour					
2015 Existing Traffic	C (22 sec)	C (67%)	0.81 (NB)	NB	D (32 sec)
2030 Background Traffic	D (31 sec)	D (73%)	**0.93 (NB)**	**NB**	**F (50 sec)**
2030 Post Development Traffic	**E (38 sec)**	D (76%)	**0.99 (NB)**	**NB**	**F (65 sec)**
2040 Background Traffic	**E (41 sec)**	D (77%)	**1.02 (NB)**	**NB**	**F (74 sec)**
2040 Post Development Traffic	**F (50 sec)**	D (81%)	**1.09 (NB)**	**NB**	**F (97 sec)**

No issues were noted in the SimTraffic simulation.

6.1.13. Hamilton Avenue and Silver Avenue

Hamilton Avenue is a four lane divided roadway, but parking is permitted in the right lane in both directions. The intersection was modelled accordingly, with the right lane in each direction on Hamilton Avenue being used as a right-turn only lane. If additional capacity was required at some future date, parking could be restricted, allowing the right lanes to be used as shared through/right-turn lanes. The intersection of Hamilton Avenue and Silver Avenue is a four-legged stop-controlled intersection consisting of the following geometry:

- The northbound approach on Hamilton Avenue consists of a shared left-turn/through lane and a right-turn lane;
- The southbound approach on Hamilton Avenue consists of a shared left-turn/through lane and a right-turn lane;
- The eastbound approach on Silver Avenue consists of a single lane; and
- The westbound approach on Silver Avenue consists of a single lane.

All approaches at the intersection are stop-controlled.

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Table 6.13 summarizes the results of the intersection analysis for Hamilton Avenue and Silver Avenue. No changes to the geometry of the intersection are required by 2030 or 2040.

Table 6.13: Hamilton Avenue and Silver Avenue Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	A (8 sec)	A (34%)	0.31 (SBL/T)	SBL/T	A (9 sec)
2030 Background Traffic	A (8 sec)	A (35%)	0.34 (SBL/T)	SBL/T	A (10 sec)
2030 Post Development Traffic	A (9 sec)	A (39%)	0.38 (SBL/T)	SBL/T	B (10 sec)
2040 Background Traffic	A (9 sec)	A (38%)	0.36 (SBL/T)	SBL/T	A (10 sec)
2040 Post Development Traffic	A (9 sec)	A (42%)	0.43 (SBL/T)	SBL/T	B (11 sec)
PM Peak Hour					
2015 Existing Traffic	A (10 sec)	A (49%)	0.36 (WB)	WB	B (11 sec)
2030 Background Traffic	B (10 sec)	A (51%)	0.39 (WB)	WB	B (11 sec)
2030 Post Development Traffic	B (11 sec)	A (54%)	0.43 (SBL/T)	WB & SBL/T	B (12 sec)
2040 Background Traffic	B (11 sec)	A (53%)	0.42 (WB & SBL/T)	WB	B (12 sec)
2040 Post Development Traffic	B (12 sec)	B (58%)	0.49 (SBL/T)	SBL/T	B (13 sec)

No issues were noted in the SimTraffic simulation.

6.1.14. Saskatchewan Avenue and Summit Road

The intersection of Saskatchewan Avenue and Summit Road is a three-legged stop-controlled intersection in the 2030 and 2040 post development scenarios, providing access to the future development, consisting of the following geometry:

- The southbound approach on Summit Road requires a single lane;
- The eastbound approach on Saskatchewan Avenue requires a single lane; and
- The westbound approach on Saskatchewan Avenue requires a single lane.

The eastbound and westbound approaches are free-flowing and the southbound approach is stop-controlled.

Table 6.14 summarizes the results of the intersection analysis for Saskatchewan Avenue and Summit Road.

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Table 6.14: Saskatchewan Avenue and Summit Road Intersection Analysis

Scenario	Overall Intersection			Critical Movement	
	LOS (Delay)	ICU LOS	Max v/c	Movement	LOS (Delay)
AM Peak Hour					
2015 Existing Traffic	-	-	-	-	-
2030 Background Traffic	-	-	-	-	-
2030 Post Development Traffic	A (3 sec)	A (29%)	0.14 (SB)	SB	B (11 sec)
2040 Background Traffic	-	-	-	-	-
2040 Post Development Traffic	A (4 sec)	A (35%)	0.26 (SB)	SB	B (13 sec)
PM Peak Hour					
2015 Existing Traffic	-	-	-	-	-
2030 Background Traffic	-	-	-	-	-
2030 Post Development Traffic	A (2 sec)	A (37%)	0.20 (WBT/R)	SB	B (11 sec)
2040 Background Traffic	-	-	-	-	-
2040 Post Development Traffic	A (3 sec)	A (49%)	0.31 (SB)	SB	C (16 sec)

No issues were noted in the SimTraffic simulation.

6.2. Signal Warrant Analysis

A traffic signal warrant analysis was carried out for the following intersections utilizing the Canadian Matrix Traffic Signal Warrant Analysis:

- Saskatchewan Avenue at Buchanan Boulevard;
- Saskatchewan Avenue at Summit Road;
- Saskatchewan Avenue at Hamilton Avenue; and
- Sturgeon Road/Sturgeon Access at Summit Road.

The warrant is based on a review of the average six-hour peak turning movements, the distance to upstream traffic signals, median width and local demographics.

The Canadian Matrix Traffic Signal Warrant (developed by the Transportation Association of Canada (TAC)) is based on a 100 priority point warrant, and a traffic signal is warranted for consideration when the 100 priority point threshold is exceeded, and there are greater than 75 vehicles per hour approaching on the minor street (Vs). The signal warrant results for 2040 post development traffic volumes are shown in **Table 6.15**.

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Table 6.15: 2040 Signal Warrant Analysis

Intersection	Priority Points	Vs>75	Signal Warranted
Saskatchewan Avenue and Buchanan Boulevard	54	Yes	No
Saskatchewan Avenue and Hamilton Avenue	135	Yes	Yes
Saskatchewan Avenue and Summit Road	22	Yes	No
Sturgeon Road/Sturgeon Access and Summit Road	462	Yes	Yes

The side street volume exceeds 75 and the 100 priority point threshold is exceeded at Saskatchewan Avenue and Hamilton Avenue, and Sturgeon Road/Sturgeon Access and Summit Road. Signalization of the two intersections is therefore warranted. The completed Canadian Matrix Traffic Signal Warrant for the four intersections is included in **Appendix C**.

6.3. Collision Analysis

A collision analysis involves a review of the collision history of a facility through an assessment of multiple years of collision statistics. The purpose of this review is to establish collision rates and to identify possible relationships between the collisions that have occurred and the geometric features and operational conditions of the facility.

Collision data for the study area was requested from the City of Winnipeg. The collision data provided included collisions that occurred from 2011 to 2013. The traffic volume information was based on data provided by Public Works and traffic counts conducted by MMM. Summaries of the intersection collision data and link collision data are provided in **Tables 6.16** and **6.17**, respectively.

Collision rate is a measure of the risk faced by the road user and is based on the number of incidents that occurred and the volume of traffic during a specified period. Collision rates exceeding 1.5 incidents per million vehicle-kilometres travelled (MVKT) for a link or 1.5 incidents per million entering vehicles (MEV) for an intersection are often considered as warranting further investigation (e.g., this is the rate used by the Province of Manitoba for identifying locations that should be reviewed). The intersections of Sturgeon Road and Saskatchewan Avenue, Sturgeon Road and Ness Avenue, and Ness Avenue and Moray Street warrant further investigation as the collision rates exceed 1.5 incidents per MEV.

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Table 6.16: 2011-2013 Intersection Collision Analysis

Intersection	Collisions from 2011 to 2013 (3 year period)	Average Daily Entering Vehicles	Collision Rate
Sturgeon Road and Saskatchewan Avenue	36	17,700	**1.86**
Sturgeon Road and Ness Avenue	60	27,100	**2.02**
Ness Avenue and Moray Street	74	29,850	**2.26**
Saskatchewan Avenue and Buchanan Boulevard	2	2,850	0.64
Saskatchewan Avenue and Cavalier Drive	1	4,700	0.19
Saskatchewan Avenue and Quail Ridge Road	1	7,800	0.12
Buchanan Boulevard and Hamilton Avenue	4	5,550	0.66
Hamilton Avenue and Cavalier Drive	13	12,000	0.99
Hamilton Avenue and Silver Avenue	2	6,500	0.28

Table 6.17: 2011-2013 Link Collision Analysis

Roadway	Road Segment	Segment Length (km)	Collisions from 2011 to 2013 (3 year period)	Average Daily Vehicles	Collision Rate
Saskatchewan Avenue	Buchanan Boulevard to Sturgeon Road	2.75	2	5,400	0.12
Hamilton Avenue	Saskatchewan Avenue to Buchanan Boulevard	2.83	1	3,700	0.09
Cavalier Drive	Saskatchewan Avenue to Hamilton Avenue	0.81	1	4,300	0.26
Ness Avenue	Sturgeon Road to Moray Street	1.20	6	16,500	0.28

6.4. Rail Crossings

The Canadian Pacific Railway (CPR Glenboro) is an east-west rail line that runs along the southern boundary of AAW. There are two existing crossings of this rail line within the precinct at Summit Road (a cross-buck sign with a stop sign) and at Sturgeon Road (lights, bells and gates).

There are two additional proposed future at-grade crossings of the rail line. The first crossing is proposed as an extension of Hamilton Avenue and the second crossing is proposed at a future north-south collector in the western half of AAW (the extension of Buchanan Boulevard).

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In order to confirm the future warning requirements for the proposed at-grade crossings, the cross-product (AADT multiplied by the average daily train volumes) was determined for each location. The cross-product warrant is based on Transport Canada's *Grade Crossing Standards, February 2014*, which includes the following requirements:

- **Cross Product less than 2,000:** Grade crossing warning system is not warranted.
- **Cross Product between 2,000 and 50,000:** Grade crossing warning system consisting of a railway crossing sign, flashing lights and bells is warranted.
- **Cross Product greater than 50,000:** Gates are also warranted.

According to CPR, the Glenboro line currently carries two trains per day. The railway design speed is 48 kilometres per hour (30 miles per hour). The results of the cross-product analysis for the two proposed crossing locations (Buchanan Boulevard Extension and Hamilton Avenue Extension) and the two existing crossing locations (Summit Road and Sturgeon Road) for year 2040 are summarized in **Table 6.18**. Based on the forecast future traffic volumes, a grade crossing warning system without gates is warranted at both proposed locations and the Summit Road location, and a warning system with gates is warranted at the Sturgeon Road location.

Table 6.18: Cross-Product Analysis

Scenario	Road Segment	AADT	Trains per Day	Cross Product	Warrented Protection
2030 Post Development	Buchanan Blvd Extension	5,250	2	10,500	Warning system without gates
	Hamilton Ave Extension	4,040	2	8,080	Warning system without gates
	Summit Road	2,630	2	5,260	Warning system without gates
	Sturgeon Road	25,240	2	50,480	Warning system **with** gates
2040 Post Development	Buchanan Blvd Extension	7,350	2	14,700	Warning system without gates
	Hamilton Ave Extension	6,350	2	12,700	Warning system without gates
	Summit Road	3,670	2	7,340	Warning system without gates
	Sturgeon Road	31,980	2	63,960	Warning system **with** gates

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7.0 ALTERNATIVE TRANSPORTATION

7.1. Pedestrian and Cyclist Facilities

The *City of Winnipeg Pedestrian and Cycling Strategies*, which provides a long-range policy framework for active modes of transportation for the next 20 years was approved by City Council on July 15, 2015. That document proposes that a shared use pathway be implemented within the Saskatchewan Avenue right-of-way to connect to the existing Sturgeon Creek and Yellow Ribbon Pathways. It also proposes a shared use pathway within the Sturgeon Road right-of-way from the Yellow Ribbon Greenway to CentrePort Canada Way.

Additional pedestrian and cycling routes within the AAW development are anticipated to provide direct routes for pedestrians and cyclists throughout the development. Future routes are expected to include a combination of multi-use pathways, sidewalks, and bike lanes that will provide access to the school, community centre, commercial developments, and the various parks. The exact locations of the active transportation facilities and routes will be determined as the planning process moves forward.

The conceptual layout of the active transportation network is included in the conceptual land use plan illustrated in **Figure 2.1**.

7.2. Transit Service

There are Winnipeg Transit routes that currently operate near AAW and could potentially provide Transit service to the proposed development in the future:

- Route 24: Ness (Unicity to Polo Park);
- Route 83: Murray Park – Strauss – Grace Hospital - Unicity

Future transit service to AAW is expected to utilize the future collector roadway system to travel through the neighbourhood. Additional discussion with Winnipeg Transit will be required to determine the future transit service for AAW.

Route maps for routes 24 and 83 are included in **Appendix D.**

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8.0 CONCLUSIONS

The following conclusions are made base on the results of the transportation study:

- AAW is forecast to generate:
  - 1,250 new trips (425 entering, 825 exiting) in the 2030 weekday a.m. peak hour scenario and 1,900 new trips (1,075 entering, 830 exiting) in the 2030 weekday p.m. peak hour scenario.
  - 1,965 new trips (625 entering, 1,350 exiting) in the 2040 weekday a.m. peak hour scenario and 2,770 new trips (1,600 entering, 1,175 exiting) in the 2040 weekday p.m. peak hour scenario.
- Street system modifications that were assumed in the study analysis include:
  - The extension of Buchanan Boulevard north of Saskatchewan Avenue by 2030;
  - The extension of Hamilton Avenue north of Saskatchewan Avenue by 2030;
  - Signalization and improvement of the Sturgeon Road/Sturgeon Access and Summit Road intersection by 2030;
  - The construction of a roundabout at Sturgeon Road and Silver Avenue/Murray Park Road by 2030; and
  - The extension of Silver Avenue east of Sturgeon Road by 2040, replacing Murray Park Road.
- The following study area intersections for which information was available had a collision rate that warranted further review:
  - Sturgeon Road and Saskatchewan Avenue;
  - Sturgeon Road and Ness Avenue; and
  - Ness Avenue and Moray Street.

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9.0 RECOMMENDATIONS

The following recommendations are made based on the results of the transportation study:

- Additional active transportation routes within AAW should provide direct routes for pedestrians and cyclists throughout the precinct.
- Further street system modifications required as shown by the study analysis include:
    - Widening Sturgeon Road to four lanes by 2030;
    - Improvements at the Sturgeon Road and Saskatchewan Avenue intersection in 2030 and additional improvements in 2040; and
    - Signalization and improvement of the Sturgeon Road and Silver Avenue/Murray Park Road intersection by 2030, with additional improvements by 2040.
- Winnipeg Transit should service AAW and use the arterial and collector roadway network. Additional discussion with Winnipeg Transit will be required to determine future transit requirements for AAW.
- The two proposed at-grade rail crossings on the Buchanan Boulevard and Hamilton Avenue extensions and the Summit Road grade rail crossing should include a grade crossing warning system (railway crossing sign, flashing lights and bells). The Sturgeon Road grade rail crossing should include a grade crossing warning system (railway crossing sign, flashing lights and bells) with gates.

DRAFT

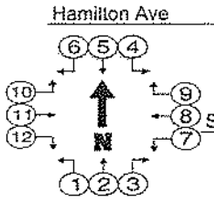
APPENDIX A – Traffic Counts

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Silver Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: WENDY LEE **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15	3	29	18	31	8		15	4	5	1	3	5	118
	Start: 7:15 End: 7:30		19	20	15	12		3		1				70
	Start: 7:30 End: 7:45		29	35	23	16		1	1	4		2	1	114
	Start: 7:45 End: 8:00		30	44	32	23		4		3		2	1	139

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

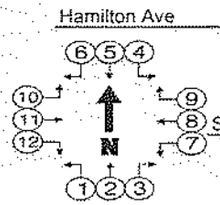
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Silver Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: WENDY LEE **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15		29	50	22	20		5		2			3	132
	Start: 8:15 End: 8:30	1	24	30	29	34		13		4		1		136
	Start: 8:30 End: 8:45		15	24	14	26		10		7		3	1	100
	Start: 8:45 End: 9:00	2	20	19	6	16		6		7		1	2	79

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

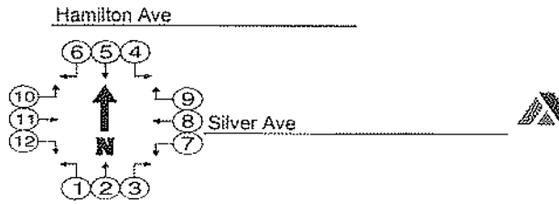
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Silver Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: WENDY LEE **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
1 / 1 / 11 /	TIME Start: 3:30 End: 3:45		22	21	5	23		30	1	15			1	119
/ 111 / 111 /	Start: 3:45 End: 4:00		39	11	6	27		26		18		1	4	123
11 / 1 / 1111 /	Start: 4:00 End: 4:15	3	26	6	9	42		29	2	20	1	2		140
/ 1 / 111 /	Start: 4:15 End: 4:30		39	12	8	36		27	1	21			1	145

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

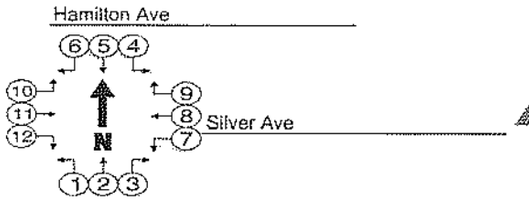
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Silver Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: WENDY LEE **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
4 / 1 / 4 /	TIME Start: 4:30 End: 4:45	2	25	12	10	43		39	2	19		2	1	155
1 / 1 / 3 /	Start: 4:45 End: 5:00		40	18	5	45		39	3	22		1		173
/ / 1 /	Start: 5:00 End: 5:15	3	43	12	11	52	2	36	1	26		2		188
/ / 1 /	Start: 5:15 End: 5:30	1	26	18	3	39		32		23	1	1	1	149

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

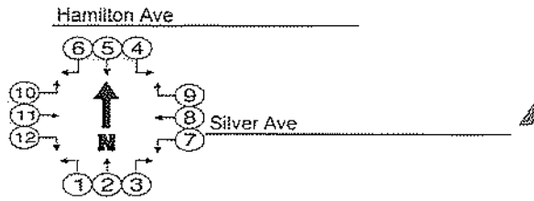
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Silver Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: WENDY LEE **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30 End: 5:45	1	31	14	9	24		32	1	12			3	127
	Start: 5:45 End: 6:00	1	31	24	14	32		16		17				137

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

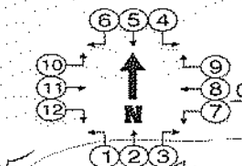
INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 PM AM

Observer: **Comments:**

Sturgeon Access



MMM GROUP

7:15-7:30 10 102 105 10 133 39 456

347

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7 3:30 End: 8 6:45	14		112				128	72	1		174	54	563
	Start: 7 3:45 End: 4:00	9		92		4		121	105			163	55	549
	Start: 8 4:00 End: 8 4:15	11		94				107	75		51	145	32	465
	Start: 8 4:15 End: 8 4:30	10		75				106	68			121	26	421

Light: (circle) daylight, dusk, dark, street lights on 8:30 8:45 8

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other 59 88

Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery 66 50 N

333

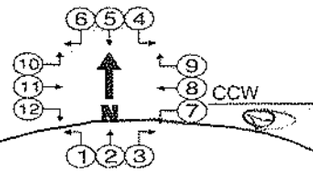
INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Ken Wimble **Comments:**

Sturgeon Access



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT
	TIME Start: 7:00 End: 7:15	6		9			1	17	6			18	29
	Start: 7:15 End: 7:30	11						4-3-6-3-5					11
	Start: 7:30 End: 7:45	14		12				13	7	1			
	Start: 7:45 End: 8:00	9		9				9	10	2			

348

Not counted

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

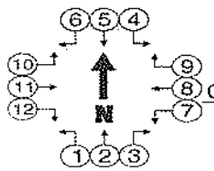
INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: _____ **Comments:** _____

Sturgeon Access



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT
	TIME Start: 8:00 End: 8:15	11		46				101	91				
	Start: 8:15 End: 8:30	10		75				901	89				
	Start: 8:30 End: 8:45	9		69				88	75				
	Start: 8:45 End: 9:00	9		57				85	99				

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other _____

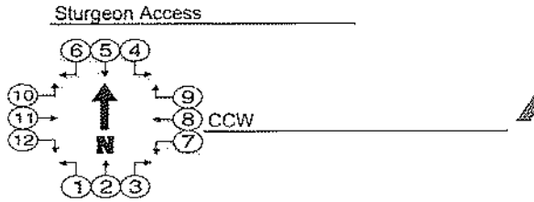
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 3:30 End: 3:45	33		97				116	91	1		73	10	328 42
	Start: 3:45 End: 4:00	33	1	92				83	109			50	17	101 42
	Start: 4:00 End: 4:15	55		89	—	—		109	136			98	13	115 50
	Start: 4:15 End: 4:30	40		82				145	145		—	82	24	117 5

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

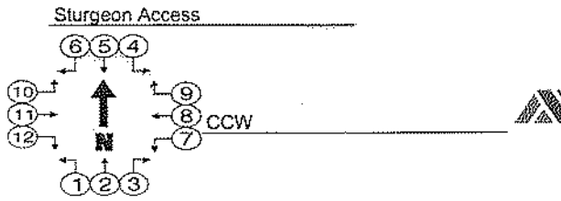
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45	67		77				134	196			69	5	276 (56)
	Start: 4:45 End: 5:00	32		63			—	141	147			44	11	236 (47)
	Start: 5:00 End: 5:15	35		74			—	146	173			26	12	266 (53)
	Start: 5:15 End: 5:30	18		72			—	139	170			48	14	261 (52)

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

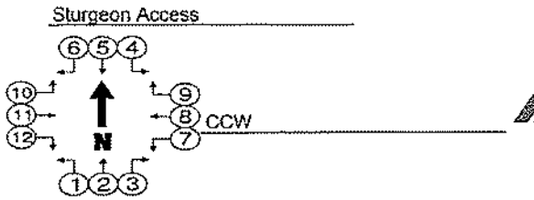
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS				Movement	1	2	3	4	5	6	7	8	9	10	11	12
WEST LEG	EAST LEG	NORTH LEG	SOUTH LEG		NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	WB LT	WB TH	WB RT	EB LT	EB TH	EB RT
				TIME Start: 5:30 End: 5:45	12	13	50		—		98	94		11	76	91
				Start: 5:45 End: 6:00												

353

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

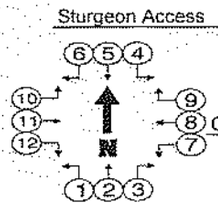
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT
	TIME Start: 3:30 End: 3:45	33		46				116	91	1			
	Start: 3:45 End: 4:00	33	1	72				88	101				
	Start: 4:00 End: 4:15	55		48				109	136				
	Start: 4:15 End: 4:30	60		82				145	145				

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

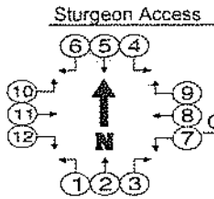
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT
	TIME Start: 4:30 End: 4:45	29		77				194	196				
	Start: 4:45 End: 5:00	32		69				191	147				
	Start: 5:00 End: 5:15	35	1	74				196	173	1			
	Start: 5:15 End: 5:30	18	1	72				139	170				

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

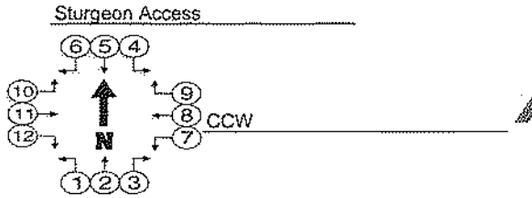
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Access & CCW

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT
	TIME Start: 5:30 End: 5:45	11	11	5				8	4				
	Start: 5:45 End: 6:00												

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

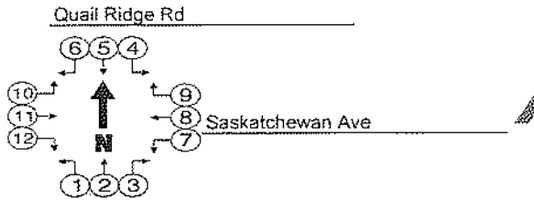
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Quail Ridge Rd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: MEL SPENCER **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15			25				6	19			75	1	126
	Start: 7:15 End: 7:30			40				3	13			102	1	159
	Start: 7:30 End: 7:45	3		26				8	19	1		109	1	167
	Start: 7:45 End: 8:00	4	1	26	1	1		10	30	6		108		185

1 TURN PROHIBITED

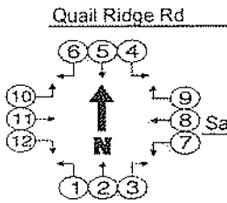
Light: (circle) daylight, dusk, dark, street lights on **Weather:** (circle) clear, cloudy, rain, snow, mist, fog, other _____ **Road Surface:** (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Quail Ridge Rd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: MEL SPENCER **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15	3		24				11	21	2		70	4	135
	Start: 8:15 End: 8:30	2		32	13		1	20	32	1		79	4	174
	Start: 8:30 End: 8:45	4		22				15	24			51	6	121
	Start: 8:45 End: 9:00	3		24	1			19	27		1	54	3	132

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

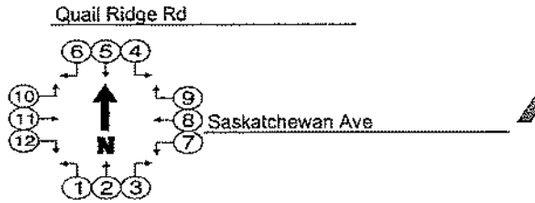
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Quail Ridge Rd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: MEL SPENCER **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start:	(7)		(29)	(1)			(24)	(67)			(28)	(1)	
	3:30													157
	End:													
	3:45	IIII			1			IIII					1	
	Start:	(1)		(4)				(15)	(79)	(1)		(21)	(1)	
	3:45													152
	End:									1				
	4:00	1											1	
	Start:			(16)	(1)			(9)	(92)			(50)	(5)	
	4:00													183
	End:			1										
	4:15				1								IIII	
	Start:			(12)				22	(112)			(3)		
	4:15													159
	End:													
	4:30													

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

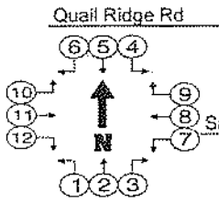
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Quail Ridge Rd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: MEL SPENCER **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45	(2) ||		(21)				(25)	(113)	(1)		(51)		213
	Start: 4:45 End: 5:00	(1) |		(11) |	(1) |			(29)	(105)			(49)	(1) |	196
	Start: 5:00 End: 5:15	(3) ||		(1) |		(1) |		(34)	(103)			(43)		195
	Start: 5:15 End: 5:30			(17)				(33)	(107)			(42)	(3) ||		203

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

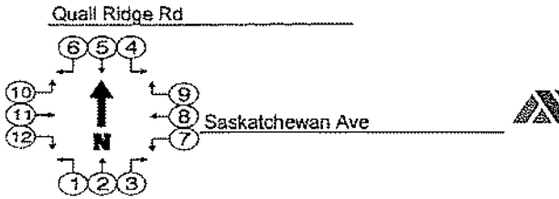
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Quail Ridge Rd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: MEL SPENCER **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30 End: 5:45			15				34	79			50	1	179
	Start: 5:45 End: 6:00	3		25				28	65			49	1	171

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

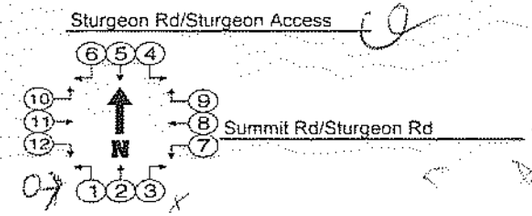
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Rd/Sturgeon Access & Summit Rd/Sturgeo

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15	1	230	61	101	182		35		12				530
	Start: 7:15 End: 7:30		142	65	1	161		32		10		1		412
	Start: 7:30 End: 7:45		200	65		182		26		11		1		486
	Start: 7:45 End: 8:00		210	51		150		49		9		2		517

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

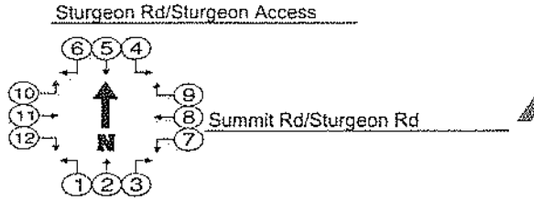
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Rd/Sturgeon Access & Summit Rd/Sturgeo

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15		145	49	1	18C		46	1	3				438
	Start: 8:15 End: 8:30		125	51	1	176		36	2	7				397
	Start: 8:30 End: 8:45		94	39		128		39		4				302
	Start: 8:45 End: 9:00	1	103	36		137		31		3				311

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

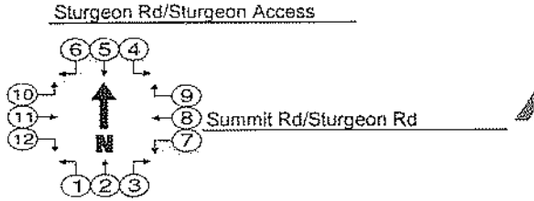
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Rd/Sturgeon Access & Summit Rd/Sturgeo

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 3:30 End: 3:45		134	90	10	148		43		3				419
	Start: 3:45 End: 4:00		106	60	9	136		46	1	2				359
	Start: 4:00 End: 4:15		135	84	2	139		43	2	5				410
	Start: 4:15 End: 4:30		109	77	3	177		33	2					401

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other _____

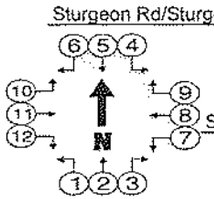
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Rd/Sturgeon Access & Summit Rd/Sturgeo

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45		119	52	9	179		47	2	4	1		1	409
	Start: 4:45 End: 5:00		83	56	5	141		52	3	4				416
	Start: 5:00 End: 5:15		90	53	4	176		40		4		1		308
	Start: 5:15 End: 5:30		89	59	5	179		48		5				385

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

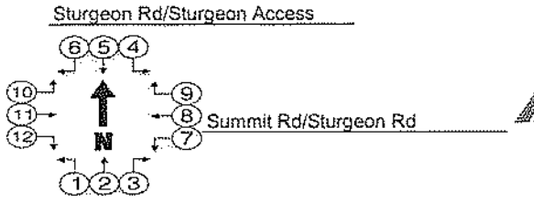
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Sturgeon Rd/Sturgeon Access & Summit Rd/Sturgeo

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: _____ **Comments:** _____



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30 End: 5:45		79	57	6	132		47	1	6		1		329
	Start: 5:45 End: 6:00		81	41	4	143	1	38 37	1			1	1	311

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

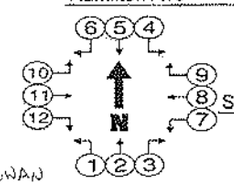
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Darren Sali **Comments:** Low Truck volume. Line of sight is impaired for NB left vehicles are approaching/stopping near the centreline of Saskatchewan



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15	1		30 1 motorcycle				7	9			55	6	108
	Start: 7:15 End: 7:30	3		25 1 motorcycle				6	8			65	6	113
	Start: 7:30 End: 7:45	6		26				7	15			86 1 motorcycle	3	143
	Start: 7:45 End: 8:00	4		28				8	26			59	5	130

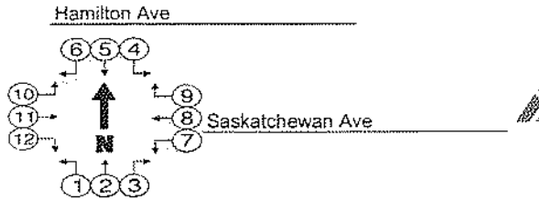
Light: (circle) daylight, dusk, dark, street lights on **Weather:** (circle) clear, cloudy, rain, snow, mist, fog, other 20C – 7pm **Road Surface:** (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: [illegible] **Comments:** School Sos back, low Truck volume



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15	5		22				7	19			54	3	110
	Start: 8:15 End: 8:30	3		18				5	20			50	5	101
	Start: 8:30 End: 8:45	3		9				11	19			26	1	79
	Start: 8:45 End: 9:00	2		14				10	22			34		78

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other q-c

Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

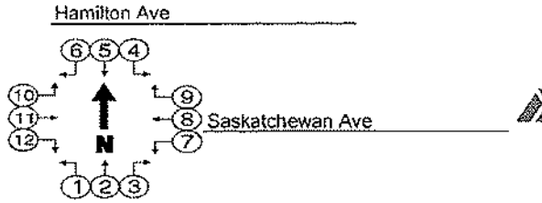
1

Sheet 1 of 3

Project No: 5515037.161 **Location:** Hamilton Ave & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Daniel Sun **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 3:30 End: 3:45													
	Start: 3:45 End: 4:00	4		18				26	53			16	3	120
	Start: 4:00 End: 4:15	4		15				29	67			38	4	155
	Start: 4:15 End: 4:30	3		11				30	75			21	1	140

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other 13°C

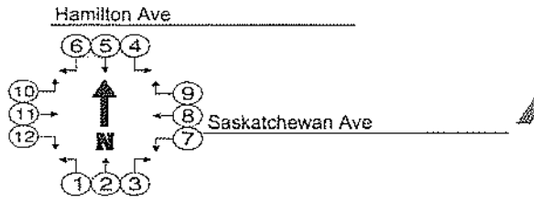
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Daniel Su **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45	1		III				26	65			32	7	134
	Start: 4:45 End: 5:00	6		10				34	70			39	4	163
	Start: 5:00 End: 5:15	1		12				42 (1 motorcycle)	61			31	3	150
	Start: 5:15 End: 5:30	8		14				30	73 (1 motorcycle)			33 (1 motorcycle)	4	162

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other 18°C

Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

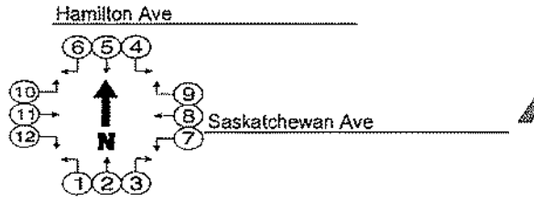
609

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Hamilton Ave & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: DANIEL SM **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30	11		15				19	55			36	3	130
	End: 5:45	2												
	Start: 5:45	1		15				17	50			34	2	124
	End: 6:00	6												

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other 15°C

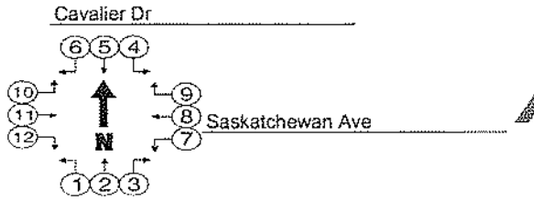
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Cavalier Dr & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Dayne Calverley **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15	4		27				6	6			23	2	68
	Start: 7:15 End: 7:30	3		38				5	6			34	2	88
	Start: 7:30 End: 7:45	6		50				11	11			39	3	126
	Start: 7:45 End: 8:00	5		31				16	20			33	1	106

Light: (circle) (daylight) dusk, dark, street lights on

Weather: (circle) (clear) cloudy, rain, snow, mist, fog, other

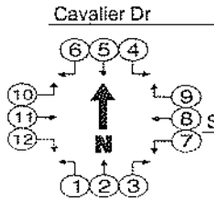
Road Surface: (circle) (dry) damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Cavalier Dr & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Dayna Calverley **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15	5		27				9	13 (Cyclist)			31	4	89
	Start: 8:15 End: 8:30	3		30				6	18			25	5	87
	Start: 8:30 End: 8:45	4		12				13	15			17	4	65
	Start: 8:45 End: 9:00	3		14				13	11			18	2	61

Light: (circle) (daylight), dusk, dark, street lights on

Weather: (circle) (clear), cloudy, rain, snow, mist, fog, other_____

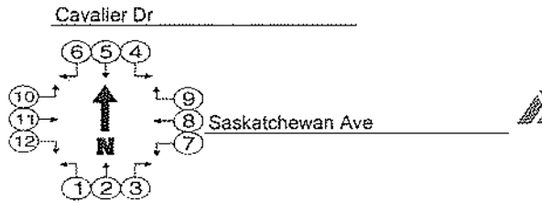
Road Surface: (circle) (dry), damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Cavalier Dr & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Dayna Calverley **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 3:30 End: 3:45	4		11				32	27			12	4	90
	Start: 3:45 End: 4:00	6 (1 cyclist)		12				34	35			8	4	99
	Start: 4:00 End: 4:15	5		17				31	26			22	4	105
	Start: 4:15 End: 4:30	2		11				44	46			14	1	118

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

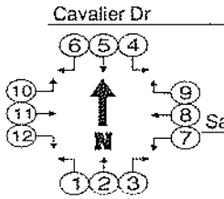
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Cavalier Dr & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Dayna Cloverley **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45	6		11				31	32			21	6	107
	Start: 4:45 End: 5:00	6		20				48	44			21	5	144
	Start: 5:00 End: 5:15	5		19				31	29			19	6	108
	Start: 5:15 End: 5:30	4		18				44	25			19	9	119

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other

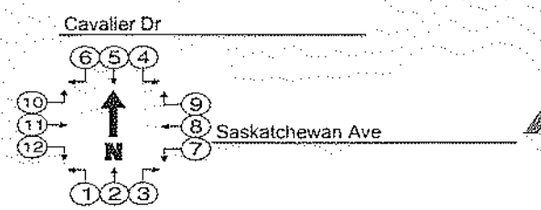
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Cavalier Dr & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Dyna Calvert-Ley **Comments:**



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30 End: 5:45	4		10				39	30			22	4	110
	Start: 5:45 End: 6:00	3		11				39	24			27	6	110

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other_____

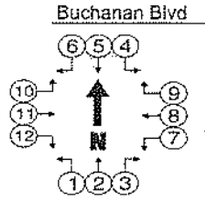
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Buchanan Blvd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Daniel Koniecznuy **Comments:** No Heavy Vehicles



MMM GROUP

PEDESTRIANS (WEST LEG / TO SOUTH / WEST LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 7:00 End: 7:15	4		28				7	3			5	2	49
	Start: 7:15 End: 7:30	4		20				2	8			14	1	49
	Start: 7:30 End: 7:45	3		35				13	7			8	0	67
	Start: 7:45 End: 8:00	3		27				13	12			7	1	63

Light: (circle) (daylight) dusk, dark, street lights on

Weather: (circle) (clear) cloudy, rain, snow, mist, fog, other _____

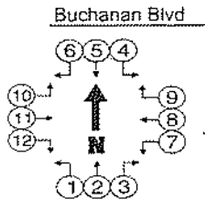
Road Surface: (circle) (dry) damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Buchanan Blvd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 7:00 to 9:00 A.M.

Observer: Daniel Konieczny **Comments:** [redacted] No Heavy Vehicles



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 8:00 End: 8:15	5		22				6	13			10	2	58
	Start: 8:15 End: 8:30	3		18				13	10			9	3	56
	Start: 8:30 End: 8:45	3		9				10	5			8	0	35
	Start: 8:45 End: 9:00	2		11				10	4			7	3	37

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other _____

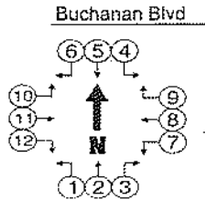
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Buchanan Blvd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Daniel Konieczny **Comments:** [redacted] Hv Heavy Vehicles



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 3:30 End: 3:45													
	Start: 3:45 End: 4:00	2		9				26	13			9	2	61
	Start: 4:00 End: 4:15	2		17				17	13			9	3	61
	Start: 4:15 End: 4:30	2		7				30	16			6	7	63

Light: (circle) daylight, dusk, dark, street lights on

Weather: (circle) clear, cloudy, rain, snow, mist, fog, other _____

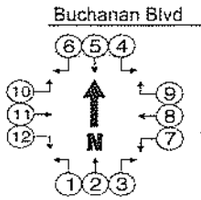
Road Surface: (circle) dry, damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Buchanan Blvd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Daniel Konieczny **Comments:** No Heavy Vehicles



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 4:30 End: 4:45	4		12				26	12			14	2	70
	Start: 4:45 End: 5:00	6		15				30	11			15	9	86
	Start: 5:00 End: 5:15	4		13				26	7			9	6	65
	Start: 5:15 End: 5:30	5		15				27	4			7	4	62

Light: (circle) (daylight) dusk, dark, street lights on

Weather: (circle) (clear) cloudy, rain, snow, mist, fog, other _____

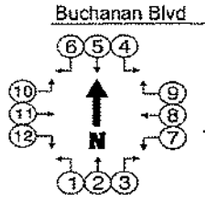
Road Surface: (circle) (dry) damp, wet, snowy, icy, smooth, rough, slippery

INTERSECTION TRAFFIC COUNT FIELD SHEET

Project No: 5515037.161 **Location:** Buchanan Blvd & Saskatchewan Ave

Day and Date: Wednesday, May 27, 2015 **Time:** 3:30 to 6:00 P.M.

Observer: Daniel Konieczny **Comments:** No Heavy Vehicles



MMM GROUP

PEDESTRIANS (WEST LEG / EAST LEG / NORTH LEG / SOUTH LEG)	Movement	1 NB LT	2 NB TH	3 NB RT	4 SB LT	5 SB TH	6 SB RT	7 WB LT	8 WB TH	9 WB RT	10 EB LT	11 EB TH	12 EB RT	
	TIME Start: 5:30 End: 5:45	4		18				24	7			10	0	63
	Start: 5:45 End: 6:00	8		14				21	7			8	10	68

Light: (circle) (daylight) dusk, dark, street lights on

Weather: (circle) (clear) cloudy, rain, snow, mist, fog, other_____

Road Surface: (circle) (dry) damp, wet, snowy, icy, smooth, rough, slippery

THE CITY OF WINNIPEG — **12 Hour Manual Vehicle Count** — **Traffic Studies**

PUBLIC WORKS DEPARTMENT — **Intersection Turning Movement** — **Phone: 986-5034**

Time	NORTHBOUND ON				SOUTHBOUND ON				EASTBOUND ON				WESTBOUND ON				Previous Count
Start 00:00	STURGEON RD				STURGEON RD				SASKATCHEWAN AVE				SASKATCHEWAN AVE				2007 TOTAL
Time Ending	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
00:15																	
00:30																	
00:45																	
01:00																	
01:15																	
01:30																	
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06:30																	
06:45																	
07:00																	
07:15		3	53	1		65	58	6		43	37	20		1	9	39	335
07:30		6	64	4		61	66	6		40	55	23		1	11	56	393
07:45			74	2		69	74	14		66	52	34			4	27	416
08:00		7	74	4		89	93	17		51	65	22		1	2	21	446
08:15		4	58	4		81	75	13		41	43	21		1	8	21	370
08:30		10	53	1		50	62	15		35	34	27		1	7	21	316
08:45		5	45	1		36	72	17		27	27	24		1	20	12	287
09:00		7	40		1	31	67	13		21	18	18			7	14	237
09:15		11	31	3		28	57	5		21	13	22		1	10	15	217
09:30		4	23	1		12	38	15		20	14	14			3	23	167
09:45		5	29	3		6	54	7		17	8	12		1	5	11	158
10:00		4	27		1	11	40	8		11	6	13		2	4	10	137
10:15		5	27	3		7	35	6		13	7	13			6	7	129
10:30		7	29	2		13	28	7		12	4	15			12	5	134
10:45		4	22	3		10	40	5		9	4	11		2	6	2	118
11:00	1	5	32	5		12	35	13		19	1	13		2	4	11	153
11:15		3	24			8	31	6		13	6	10		1	3	9	114
11:30		8	26	1		8	34	5		12	5	20		3	6	10	138
11:45		7	32			13	30	14		13	10	19		3	9	16	166
12:00	1	14	22	1		10	28	9		13	10	11		1	10	11	141
12:15		10	23	1		8	36	10		11	6	13		2	21	16	157
12:30		8	35	1		17	22	15		10	10	11		1	12	16	158
12:45		8	29	2		9	33	12		6	19	10		3	5	6	142
13:00		12	19			16	41	11		7	19	18		2	5	10	160
13:15		10	32	1		5	31	8		16	6	10		3	4	15	141
13:30		13	23			6	27	7		8	8	10		1	4	10	117
13:45		8	28	2		13	28	7		7	12	10		1	5	14	135
14:00		9	32	4	1	13	45	10		10	11	8		2	7	18	170
14:15		8	29	2		16	55	13		14	8	7		1	9	7	169
14:30		8	37	3		20	62	13		15	10	10		2	7	22	209
14:45		2	58	3		44	63	13		7	9	16			10	28	253
15:00	1	7	36			36	48	14		19	14	18		3	12	34	242
15:15		19	51			28	46	22		18	7	12		4	31	76	314
15:30		12	81			18	47	27		20	12	14		6	37	94	368
15:45		10	82	1	1	11	52	19		14	7	26		1	38	80	342
16:00		16	74	4		18	79	30		12	12	19		4	42	76	386
16:15		18	79	4		18	65	36		16	9	6		3	53	77	384
16:30		21	75			12	87	54		18	14	13		4	51	77	426
16:45		22	71	2		12	74	45		19	15	13		1	38	92	404
17:00		24	78			23	96	71		23	13	11		1	27	85	452
17:15		21	65	1		24	78	60		18	11	12			42	49	381
17:30		26	66			15	91	58		20	6	13		2	26	40	363
17:45		27	68			12	61	26		11	5	16		1	19	31	277
18:00		20	51			9	65	39		13	9	14		3	20	16	259
18:15		22	43			8	38	24		15	6	13		1	13	11	194
18:30		15	23			3	40	24		9	5	16		1	7	13	156
18:45		14	36	1		3	39	26		11	10	11		1	10	10	172
19:00		16	26			9	23	16		13	4	18		1	7	4	137
19:15																	
19:30																	
19:45																	
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23:45																	
24:00																	
12 hr	3	525	2,135	71	4	1,046	2,489	911		877	696	730		77	708	1,368	11,640
TOTAL		2,734				4,450				2,303				2,153			
AM Peak	**AM Peak Hour (between 7:00 and 9:00), based on total volume, is from:**													**7:15 - 8:15**			
Hour		17	270	14		300	308	50		198	215	100		3	25	125	1,625
AM Peak	**AM Peak Period is from:**													**7:00 - 9:00**			
Period		42	461	17	1	482	567	101		324	331	189		6	68	211	2,800
Off-Peak	**Highest Off-Peak Hour is from:**													**14:30 - 15:30**			
Hour	1	40	226	3		126	204	76		64	42	60		13	90	232	1,177
PM Peak	**PM Peak Hour (between 15:30 and 17:30), based on total volume, is from:**													**16:00 - 17:00**			
Hour		85	303	6		65	322	206		76	51	43		9	169	331	1,666
PM Peak	**PM Peak Period is from:**													**15:30 - 17:30**			
Period		158	590	12	1	133	622	373		140	87	113		16	317	576	3,138
	7:45 - 8:00				**7:45 - 8:00**				**7:30 - 7:45**				**7:15 - 7:30**				**A.M. Peak**
		0.65	0.91	0.88		0.84	0.83	0.91		0.76	0.83	0.76		1.00	0.53	0.64	**PHF**
Peak 15 Minute Time & PHF	**17:30 - 17:45**				**14:30 - 14:45**				**9:00 - 9:15**				**15:15 - 15:30**				**Off-Peak**
		0.78	0.70	0.65		0.73	0.88	0.72		0.82	0.71	0.72		0.54	0.61	0.62	**PHF**
	16:45 - 17:00				**16:45 - 17:00**				**15:30 - 15:45**				**16:00 - 16:15**				**P.M. Peak**
		0.89	0.95	0.63		0.77	0.88	0.82		0.87	0.88	0.62		0.75	0.87	0.90	**PHF**

Ratio: E/W to N/S = 0.62
E/W = 38.3%
N/S = 61.7%

	AM	PM
Shift		
Weather:		
Temperature:		
Counted/Compiled By:	CC/JJ	
Count Date:	2014-03-04	2014-03-03
Counting Period:	0700-1900	
Requested By:	MC	

Location:
STURGEON RD & SASKATCHEWAN AVE

Notes:

THE CITY OF WINNIPEG — **5 Hour Manual Vehicle Count** — **Traffic Studies**

PUBLIC WORKS DEPARTMENT — **Intersection Turning Movement** — **Phone: 986-5034**

Time	NORTHBOUND ON				SOUTHBOUND ON				EASTBOUND ON				WESTBOUND ON				Previous Count
Start 00:00	STURGEON RD				STURGEON RD				SILVER AVE				SILVER AVE				2009
Time Ending	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	TOTAL
00:15																	
00:30																	
00:45																	
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06:00																	
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06:30																	
06:45																	
07:00																	
07:15		2	43	20		20	44			1	29	19		5	8	18	209
07:30		2	59	17		29	55				38	13		10	6	21	250
07:45		1	73	20		38	69				37	18		7	5	23	291
08:00		4	78	24		47	63			1	60	11		9	6	20	323
08:15		6	53	20		47	82	1			46	20		3	7	15	300
08:30		5	59	11		37	68				59	23		7	9	19	297
08:45		3	57	10		24	60				25	11		11	13	16	230
09:00		4	36	13		34	72				16	14		5	8	5	207
09:15																	
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14:45																	
15:00																	
15:15		9	52	9		12	47	1		1	6	11		34	20	21	223
15:30		8	68	4		11	70				10	7		28	24	40	270
15:45		9	55	6		12	74			3	11	7		30	30	46	283
16:00		13	59	11		16	66	1		1	10	6		20	27	38	268
16:15		15	72	7		13	61	2			10	5		16	25	32	258
16:30		21	61	4		12	79	1			8	9		14	36	25	270
16:45		12	61	9		18	74	1			12	8		25	41	42	303
17:00		12	49	6		25	84	3		2	22	5		26	46	43	323
17:15		12	46	1		11	73				9	3		16	30	30	231
17:30		10	51	7		18	89			1	9	7		16	29	22	259
17:45		11	47	6		8	86				12	5		13	28	21	237
18:00		8	46	3		4	63			2	14	6		5	25	23	199
18:15																	
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23:45																	
24:00																	
5 hr		167	1,125	208		436	1,379	10		12	443	208		300	423	520	5,231
TOTAL		1,500				1,825				663				1,243			
AM Peak	**AM Peak Hour (between 7:00 and 9:00), based on total volume, is from:**													**7:30 - 8:30**			
Hour		16	263	75		169	282	1		1	202	72		26	27	77	1,211
AM Peak	**AM Peak Period is from:**													**7:00 - 9:00**			
Period		27	458	135		276	513	1		2	310	129		57	62	137	2,107
Off-Peak	**Highest Off-Peak Hour is from:**													**14:30 - 15:30**			
Hour		17	120	13		23	117	1		1	16	18		62	44	61	493
PM Peak	**PM Peak Hour (between 15:30 and 17:30), based on total volume, is from:**													**16:00 - 17:00**			
Hour		60	243	26		68	298	7		2	52	27		81	148	142	1,154
PM Peak	**PM Peak Period is from:**													**15:30 - 17:30**			
Period		104	454	51		125	600	8		7	91	50		163	264	278	2,195
	7:45 - 8:00				**8:00 - 8:15**				**8:15 - 8:30**				**8:30 - 8:45**				**A.M. Peak**
		0.75	0.84	0.84		0.90	0.86	0.25		0.50	0.84	0.78		0.70	0.71	0.89	**PHF**
Peak 15 Minute Time & PHF	**15:15 - 15:30**				**17:30 - 17:45**				**17:45 - 18:00**				**15:15 - 15:30**				**Off-Peak**
		0.43	0.44	0.36		0.48	0.43	0.25		0.25	0.46	0.41		0.46	0.47	0.38	**PHF**
	16:00 - 16:15				**16:45 - 17:00**				**16:45 - 17:00**				**16:45 - 17:00**				**P.M. Peak**
		0.73	0.88	0.70		0.72	0.90	0.58		0.33	0.59	0.78		0.69	0.83	0.77	**PHF**

Ratio: E/W to N/S = 0.57
E/W = 36.4%
N/S = 63.6%

	AM	PM
Shift		
Weather:		
Temperature:		
Counted/Compiled By:	CC/JJ	
Count Date:	2014-02-26	2014-02-25
Counting Period:	0700-0900 and 1500-1800	
Requested By:	MC	

Location:
STURGEON RD & SILVER AVE

Notes:

THE CITY OF WINNIPEG — **8 Hour Manual Vehicle Count** — **Traffic Studies**

PUBLIC WORKS DEPARTMENT — **Intersection Turning Movement** — **Phone: 986-5034**

Time	NORTHBOUND ON				SOUTHBOUND ON				EASTBOUND ON				WESTBOUND ON				Previous Count
Start 00:00	STURGEON RD				STURGEON RD				NESS AVE				NESS AVE				2002
Time Ending	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	TOTAL
00:15																	
00:30																	
00:45																	
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01:15																	
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07:15		3	36	18		34	39	3		12	123	33		8	24	12	345
07:30		13	41	19		43	49	3		20	130	20		12	36	15	401
07:45		20	48	34		32	56			15	153	33		8	45	11	455
08:00		11	63	22		40	56	1		16	153	32		15	61	22	492
08:15		24	63	21		36	58	2		16	161	36		20	72	10	519
08:30		26	51	50		41	71	5		7	154	49		26	83	17	580
08:45		25	54	34		54	60	6		15	156	32		33	97	34	600
09:00		14	46	9		39	53	6		11	160	31		20	77	15	481
09:15																	
09:30																	
09:45																	
10:00																	
10:15																	
10:30																	
10:45																	
11:00																	
11:15																	
11:30																	
11:45																	
12:00																	
12:15		23	43	16		20	48	12		16	72	14		32	95	27	418
12:30		20	29	20		30	45	8		15	84	21		24	82	16	394
12:45		22	37	15		31	39	11		15	82	21		25	91	21	410
13:00		20	42	19		29	41	8		14	86	20		21	91	22	413
13:15		28	28	22		22	36	10		12	96	23		27	78	10	392
13:30		22	37	25		24	30	10		14	121	33		18	100	13	447
13:45		20	37	15		24	49	6		19	94	20		28	80	16	408
14:00		26	39	14		24	42	7		13	94	24		18	91	12	404
14:15		26	49	23		22	35	8		20	74	18		26	100	17	418
14:30		27	50	23		18	48	11		13	73	19		31	94	22	429
14:45		28	30	15		29	50	17		20	91	21		24	84	24	433
15:00		19	35	21		26	60	8		10	87	23		26	97	13	425
15:15		27	58	18		25	64	15		19	77	23		19	106	11	462
15:30		47	53	31		25	50	29		16	88	27		30	147	29	572
15:45		47	56	37		40	58	16		9	98	28		49	183	32	653
16:00		68	69	28		44	67	20		7	103	30		52	182	31	701
16:15		51	78	29		28	85	18		18	106	19		24	190	33	679
16:30		54	71	21		35	91	19		20	89	19		43	202	39	703
16:45		54	72	22		46	71	19		10	88	30		25	165	21	623
17:00		51	57	22		31	73	18		9	105	24		27	195	24	636
17:15		41	58	26		36	79	16		22	82	29		32	181	34	636
17:30		34	55	9		42	76	10		12	106	29		28	168	28	597
17:45		59	63	30		36	55	19		33	109	17		39	145	37	642
18:00		33	53	15		29	55	15		11	101	26		37	125	32	532
18:15																	
18:30																	
18:45																	
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23:15																	
23:30																	
23:45																	
24:00																	
8 hr		983	1,601	723		1,035	1,789	356		479	3,396	824		847	3,567	700	16,300
TOTAL		3,307				3,180				4,699				5,114			
AM Peak	**AM Peak Hour (between 7:00 and 9:00), based on total volume, is from:**													**7:45 - 8:45**			
Hour		86	231	127		171	245	14		54	624	149		94	313	83	2,191
AM Peak	**AM Peak Period is from:**													**7:00 - 9:00**			
Period		136	402	207		319	442	26		112	1,190	266		142	495	136	3,873
Off-Peak	**Highest Off-Peak Hour is from:**													**14:30 - 15:30**			
Hour		121	176	85		105	224	69		65	343	94		99	434	77	1,892
PM Peak	**PM Peak Hour (between 15:30 and 17:30), based on total volume, is from:**													**15:30 - 16:30**			
Hour		220	274	115		147	301	73		54	396	96		168	757	135	2,736
PM Peak	**PM Peak Period is from:**													**15:30 - 17:30**			
Period		400	516	194		302	600	136		107	777	208		280	1,466	242	5,228
	8:15 - 8:30				**8:30 - 8:45**				**8:00 - 8:15**				**8:30 - 8:45**				**A.M. Peak**
		0.86	0.92	0.64		0.79	0.86	0.79		0.84	0.98	0.77		0.75	0.85	0.61	**PHF**
Peak 15 Minute Time & PHF	**17:30 - 17:45**				**17:30 - 17:45**				**13:15 - 13:30**				**17:30 - 17:45**				**Off-Peak**
		0.51	0.70	0.69		0.78	0.88	0.59		0.50	0.84	0.76		0.69	0.74	0.58	**PHF**
	15:45 - 16:00				**16:15 - 16:30**				**17:15 - 17:30**				**16:15 - 16:30**				**P.M. Peak**
		0.83	0.93	0.78		0.84	0.88	0.95		0.69	0.93	0.93		0.81	0.94	0.87	**PHF**

Ratio: E/W to N/S = 1.51
E/W = 60.2%
N/S = 39.8%

	Shift	AM	PM
Weather:			
Temperature:			
Counted/Compiled By:		CountCam/SW	
Count Date:		2013-05-08	2013-05-08
Counting Period:		(0700-0900 and1200-1800)	
Requested By:		DT	

Location:
STURGEON RD & NESS AVE

Notes:

Study Name	Buchanan at Hamilton
Start Date	Wednesday, October 28, 2015 2:30 PM
End Date	Thursday, October 29, 2015 9:00 AM
Site Code	

Road Volumes

TMV	Movement																				
	Southbound				Southbound To	Westbound				Westbound To	Northbound				Northbound To	Eastbound				Eastbound To	Grand Total
Interval	R	T	L	U		R	T	L	U		R	T	L	U		R	T	L	U		
10/28/2015 14:30	3	14	5	0	22	7	7	3	0	17	11	13	0	0	24	1	5	5	0	11	74
Lights	3	13	5	0	21	7	7	1	0	15	9	13	0	0	22	1	5	5	0	11	69
Other Vehicles	0	1	0	0	1	0	0	2	0	2	2	0	0	0	2	0	0	0	0	0	5
10/28/2015 14:45	1	8	4	0	13	5	2	8	0	15	18	10	3	0	31	1	8	4	0	13	72
Lights	1	8	4	0	13	5	2	7	0	14	17	9	3	0	29	1	8	4	0	13	69
Other Vehicles	0	0	0	0	0	0	0	1	0	1	1	1	0	0	2	0	0	0	0	0	3
10/28/2015 15:00	1	19	6	0	26	7	11	11	0	29	21	15	4	0	40	6	10	2	0	18	113
Lights	1	18	5	0	24	7	11	10	0	28	17	15	4	0	36	6	10	2	0	18	106
Other Vehicles	0	1	1	0	2	0	0	1	0	1	4	0	0	0	4	0	0	0	0	0	7
10/28/2015 15:15	0	17	7	0	24	6	13	19	1	39	18	17	0	0	35	3	15	5	0	23	121
Lights	0	17	7	0	24	6	11	17	1	35	16	15	0	0	31	3	14	5	0	22	112
Other Vehicles	0	0	0	0	0	0	2	2	0	4	2	2	0	0	4	0	1	0	0	1	9
10/28/2015 15:30	7	20	9	0	36	17	16	20	0	53	15	19	4	0	38	4	16	4	0	24	151
Lights	7	19	9	0	35	17	16	18	0	51	14	18	4	0	36	3	16	4	0	23	145
Other Vehicles	0	1	0	0	1	0	0	2	0	2	1	1	0	0	2	1	0	0	0	1	6
10/28/2015 15:45	4	16	3	0	23	5	14	18	0	37	21	26	2	0	49	3	16	3	0	22	131
Lights	4	16	3	0	23	5	14	15	0	34	19	24	2	0	45	3	15	3	0	21	123
Other Vehicles	0	0	0	0	0	0	0	3	0	3	2	2	0	0	4	0	1	0	0	1	8
10/28/2015 16:00	5	19	2	0	26	5	22	19	0	46	13	23	1	0	37	5	12	3	0	20	129
Lights	5	18	2	0	25	5	22	16	0	43	11	21	1	0	33	5	12	3	0	20	121
Other Vehicles	0	1	0	0	1	0	0	3	0	3	2	2	0	0	4	0	0	0	0	0	8
10/28/2015 16:15	4	25	4	0	33	3	19	13	0	35	14	29	5	1	49	5	10	5	0	20	137
Lights	4	25	4	0	33	3	19	10	0	32	13	28	5	1	47	5	10	5	0	20	132
Other Vehicles	0	0	0	0	0	0	0	3	0	3	1	1	0	0	2	0	0	0	0	0	5
10/28/2015 16:30	6	18	10	0	34	8	19	14	0	41	16	23	3	0	42	3	8	7	0	18	135
Lights	6	17	10	0	33	8	19	12	0	39	15	23	2	0	40	3	7	6	0	16	128
Other Vehicles	0	1	0	0	1	0	0	2	0	2	1	0	1	0	2	0	1	1	0	2	7
10/28/2015 16:45	6	24	5	0	35	5	13	16	1	35	15	27	7	0	49	3	12	8	0	23	142
Lights	6	24	5	0	35	5	13	15	1	34	14	25	7	0	46	3	12	8	0	23	138
Other Vehicles	0	0	0	0	0	0	0	1	0	1	1	2	0	0	3	0	0	0	0	0	4
10/28/2015 17:00	4	17	4	0	25	7	15	16	1	39	17	28	4	1	50	7	12	4	0	23	137
Lights	4	17	4	0	25	7	15	14	1	37	15	28	4	1	48	7	12	4	0	23	133
Other Vehicles	0	0	0	0	0	0	0	2	0	2	2	0	0	0	2	0	0	0	0	0	4
10/28/2015 17:15	11	20	7	0	38	3	10	18	0	31	25	34	3	0	62	3	12	1	0	16	147
Lights	11	19	7	0	37	3	10	16	0	29	25	34	3	0	62	3	12	1	0	16	144
Other Vehicles	0	1	0	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	3
10/28/2015 17:30	4	26	11	0	41	6	9	20	0	35	18	27	5	1	51	4	12	3	0	19	146
Lights	4	25	11	0	40	6	9	17	0	32	16	26	5	1	48	4	11	3	0	18	138
Other Vehicles	0	1	0	0	1	0	0	3	0	3	2	1	0	0	3	0	1	0	0	1	8
10/28/2015 17:45	2	23	4	0	29	10	11	15	0	36	14	27	3	0	44	2	20	3	0	25	134
Lights	2	23	4	0	29	10	11	15	0	36	13	25	3	0	41	2	20	3	0	25	131
Other Vehicles	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	3
10/28/2015 18:00	4	18	5	0	27	4	7	11	0	22	22	24	6	0	52	4	11	5	0	20	121
Lights	4	17	5	0	26	4	7	7	0	18	22	24	6	0	52	4	11	5	0	20	116
Other Vehicles	0	1	0	0	1	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	5

10/28/2015 18:15	2	23	7	0	32	3	8	14	0	25	23	25	6	0	54	4	6	1	0	11	122
Lights	2	23	7	0	32	3	8	11	0	22	22	24	6	0	52	4	6	1	0	11	117
Other Vehicles	0	0	0	0	0	0	0	3	0	3	1	1	0	0	2	0	0	0	0	0	5
10/29/2015 7:00	0	15	4	0	19	1	7	5	0	13	2	7	2	0	11	2	16	11	0	29	72
Lights	0	15	3	0	18	1	7	4	0	12	1	6	2	0	9	2	16	11	0	29	68
Other Vehicles	0	0	1	0	1	0	0	1	0	1	1	1	0	0	2	0	0	0	0	0	4
10/29/2015 7:15	1	19	7	0	27	1	4	10	0	15	8	9	0	0	17	5	18	2	0	25	84
Lights	1	18	7	0	26	1	4	8	0	13	6	9	0	0	15	5	18	2	0	25	79
Other Vehicles	0	1	0	0	1	0	0	2	0	2	2	0	0	0	2	0	0	0	0	0	5
10/29/2015 7:30	4	15	3	0	22	7	8	16	0	31	10	17	0	0	27	3	20	11	0	34	114
Lights	4	15	3	0	22	7	8	15	0	30	7	16	0	0	23	3	18	11	0	32	107
Other Vehicles	0	0	0	0	0	0	0	1	0	1	3	1	0	0	4	0	2	0	0	2	7
10/29/2015 7:45	2	14	5	0	21	4	6	8	0	18	7	19	0	0	26	4	20	7	0	31	96
Lights	2	13	5	0	20	4	5	6	0	15	5	18	0	0	23	3	20	6	0	29	87
Other Vehicles	0	1	0	0	1	0	1	2	0	3	2	1	0	0	3	1	0	1	0	2	9
10/29/2015 8:00	3	14	13	0	30	2	6	7	0	15	17	12	2	0	31	7	25	6	0	38	114
Lights	2	13	12	0	27	1	6	6	0	13	13	10	2	0	25	7	23	6	0	36	101
Other Vehicles	1	1	1	0	3	1	0	1	0	2	4	2	0	0	6	0	2	0	0	2	13
10/29/2015 8:15	2	18	8	0	28	11	15	17	0	43	16	5	2	0	23	2	27	2	0	31	125
Lights	2	17	8	0	27	11	15	14	0	40	14	5	1	0	20	2	27	2	0	31	118
Other Vehicles	0	1	0	0	1	0	0	3	0	3	2	0	1	0	3	0	0	0	0	0	7
10/29/2015 8:30	0	17	4	0	21	3	6	10	0	19	16	11	2	0	29	4	13	2	0	19	88
Lights	0	17	4	0	21	3	5	9	0	17	15	11	2	0	28	4	13	2	0	19	85
Other Vehicles	0	0	0	0	0	0	1	1	0	2	1	0	0	0	1	0	0	0	0	0	3
10/29/2015 8:45	1	13	5	0	19	1	6	9	0	16	16	11	0	0	27	3	14	1	0	18	80
Lights	1	12	5	0	18	1	6	7	0	14	13	10	0	0	23	3	14	1	0	18	73
Other Vehicles	0	1	0	0	1	0	0	2	0	2	3	1	0	0	4	0	0	0	0	0	7
Grand Total	77	432	142	0	651	131	254	317	3	705	373	458	64	3	898	88	338	105	0	531	2785

Study Name	Hamilton and Cavalier - AM Peak Hour
Start Date	Friday, June 05, 2015 7:00 AM
End Date	Friday, June 05, 2015 9:00 AM
Site Code	

Road Volumes

TMV	Movement																				
	Southbound				Southbound To	Westbound				Westbound To	Northbound				Northbound To	Eastbound				Eastbound To	Grand Total
Interval	R	T	L	U		R	T	L	U		R	T	L	U		R	T	L	U		
6/5/2015 7:00	0	45	12	0	57	4	9	14	0	27	9	13	9	0	31	28	14	2	0	44	159
6/5/2015 7:15	1	43	7	0	51	6	13	8	0	27	13	26	8	0	47	38	14	5	0	57	182
6/5/2015 7:30	6	52	9	0	67	4	5	18	0	27	11	38	10	0	59	30	22	5	0	57	210
6/5/2015 7:45	1	55	12	0	68	6	12	14	0	32	17	37	19	0	73	34	31	3	0	68	241
6/5/2015 8:00	8	73	7	0	88	5	11	20	0	36	9	42	18	0	69	39	22	11	0	72	265
6/5/2015 8:15	7	70	6	0	83	8	33	17	0	58	13	50	39	0	102	56	21	5	0	82	325
6/5/2015 8:30	5	69	9	0	83	13	12	22	1	48	8	33	13	0	54	38	19	6	0	63	248
6/5/2015 8:45	3	68	8	0	79	7	9	13	0	29	12	43	7	0	62	23	19	5	0	47	217
Grand Total	31	475	70	0	576	53	104	126	1	284	92	282	123	0	497	286	162	42	0	490	1847

Crosswalk Volumes

	Movement												
	Southbound		Southbound To	Westbound		Westbound To	Northbound		Northbound To	Eastbound		Eastbound To	Grand Total
Interval	PCCW	PCW		PCCW	PCW		PCCW	PCW		PCCW	PCW		
7:00 AM	2	1	3	0	1	1	1	1	2	1	1	2	8
Pedestrians	2	1	3	0	1	1	1	1	2	1	1	2	8
7:15 AM	0	1	1	1	0	1	0	0	0	4	0	4	6
Pedestrians	0	1	1	1	0	1	0	0	0	4	0	4	6
7:30 AM	0	0	0	1	1	2	0	1	1	1	1	2	5
Pedestrians	0	0	0	1	1	2	0	1	1	1	1	2	5
7:45 AM	0	0	0	1	1	2	0	0	0	2	0	2	4
Pedestrians	0	0	0	1	1	2	0	0	0	2	0	2	4
8:00 AM	4	0	4	1	0	1	0	2	2	6	2	8	15
Pedestrians	4	0	4	1	0	1	0	2	2	6	2	8	15
8:15 AM	7	2	9	1	1	2	2	2	4	4	0	4	19
Pedestrians	7	2	9	1	1	2	2	2	4	4	0	4	19
8:30 AM	0	0	0	1	0	1	2	1	3	2	0	2	6
Pedestrians	0	0	0	1	0	1	2	1	3	2	0	2	6
8:45 AM	1	1	2	0	2	2	0	0	0	4	2	6	10
Pedestrians	1	1	2	0	2	2	0	0	0	4	2	6	10
Grand Total	14	5	19	6	6	12	5	7	12	24	6	30	73

Study Name	Hamilton and Cavalier - PM Peak Hour
Start Date	Thursday, June 04, 2015 3:30 PM
End Date	Thursday, June 04, 2015 6:00 PM
Site Code	

Road Volumes

TMV	Movement																				
	Southbound				Southbound To	Westbound				Westbound To	Northbound				Northbound To	Eastbound				Eastbound To	Grand Total
Interval	R	T	L	U		R	T	L	U		R	T	L	U		R	T	L	U		
6/4/2015 15:30	10	54	11	0	75	16	28	23	0	67	13	55	17	0	85	39	26	18	0	83	310
6/4/2015 15:45	7	63	6	0	76	19	11	23	0	53	20	43	32	0	95	39	30	6	0	75	299
6/4/2015 16:00	17	52	7	0	76	19	27	26	0	72	16	51	25	0	92	25	25	6	0	56	296
6/4/2015 16:15	6	56	3	0	65	17	19	20	0	56	27	55	31	0	113	29	10	3	0	42	276
6/4/2015 16:30	8	60	5	0	73	18	24	33	0	75	26	58	26	0	110	40	25	5	0	70	328
6/4/2015 16:45	5	54	4	0	63	18	32	32	0	82	23	50	24	0	97	30	18	8	0	56	298
6/4/2015 17:00	6	66	8	0	80	14	28	27	0	69	17	48	32	0	97	34	13	5	0	52	298
6/4/2015 17:15	3	72	8	0	83	14	31	22	0	67	17	53	29	0	99	25	17	6	0	48	297
6/4/2015 17:30	3	64	6	0	73	11	15	15	0	41	15	56	30	0	101	29	19	4	0	52	267
6/4/2015 17:45	5	48	5	0	58	9	15	15	0	39	17	61	35	0	113	37	22	7	0	66	276
Grand Total	70	589	63	0	722	155	230	236	0	621	191	530	281	0	1002	327	205	68	0	600	2945

Crosswalk Volumes

	Movement												
	Southbound		Southbound To	Westbound		Westbound To	Northbound		Northbound To	Eastbound		Eastbound To	Grand Total
Interval	PCCW	PCW		PCCW	PCW		PCCW	PCW		PCCW	PCW		
3:30 PM	1	6	7	3	1	4	5	4	9	4	2	6	26
Pedestrians	1	6	7	3	1	4	5	4	9	4	2	6	26
3:45 PM	4	0	4	1	0	1	17	1	18	1	2	3	26
Pedestrians	4	0	4	1	0	1	17	1	18	1	2	3	26
4:00 PM	2	6	8	2	2	4	1	1	2	0	2	2	16
Pedestrians	2	6	8	2	2	4	1	1	2	0	2	2	16
4:15 PM	3	1	4	4	3	7	3	0	3	3	3	6	20
Pedestrians	3	1	4	4	3	7	3	0	3	3	3	6	20
4:30 PM	0	0	0	3	0	3	2	0	2	0	3	3	8
Pedestrians	0	0	0	3	0	3	2	0	2	0	3	3	8
4:45 PM	6	0	6	5	0	5	4	0	4	7	2	9	24
Pedestrians	6	0	6	5	0	5	4	0	4	7	2	9	24
5:00 PM	0	0	0	3	0	3	0	4	4	2	0	2	9
Pedestrians	0	0	0	3	0	3	0	4	4	2	0	2	9
5:15 PM	1	2	3	1	0	1	2	4	6	4	0	4	14
Pedestrians	1	2	3	1	0	1	2	4	6	4	0	4	14
5:30 PM	0	0	0	0	2	2	0	0	0	1	0	1	3
Pedestrians	0	0	0	0	2	2	0	0	0	1	0	1	3
5:45 PM	1	2	3	3	0	3	2	0	2	2	2	4	12
Pedestrians	1	2	3	3	0	3	2	0	2	2	2	4	12
Grand Total	18	17	35	25	8	33	36	14	50	24	16	40	158

Study Name	Ness and Moray - AM Peak Hour
Start Date	Thursday, June 04, 2015 7:00 AM
End Date	Thursday, June 04, 2015 9:15 AM
Site Code	

Road Volumes

TMV	Movement																								
	Southbound					Southbound To	Westbound					Westbound To	Northbound					Northbound To	Eastbound					Eastbound To	Grand Total
Interval	R	RoR	T	L	U		R	RoR	T	L	U		R	RoR	T	L	U		R	RoR	T	L	U		
6/4/2015 7:00	4	4	62	77	0	147	24	2	47	10	1	84	18	10	81	13	0	122	7	2	139	5	0	153	506
6/4/2015 7:15	3	5	39	53	0	100	51	8	48	13	0	120	18	7	94	15	0	134	8	1	163	9	0	181	535
6/4/2015 7:30	0	3	42	52	0	97	53	0	71	17	0	141	25	2	101	22	0	150	23	0	211	6	0	240	628
6/4/2015 7:45	0	2	44	44	0	90	63	2	67	14	0	146	26	3	170	33	0	232	15	1	191	6	0	213	681
6/4/2015 8:00	8	4	54	60	0	126	38	2	83	21	0	144	22	7	103	51	0	183	20	2	162	6	0	190	643
6/4/2015 8:15	1	15	43	58	0	117	45	1	122	15	0	183	25	12	77	40	0	154	35	5	143	8	0	191	645
6/4/2015 8:30	3	6	54	54	1	118	31	3	113	18	0	165	33	13	53	33	0	132	20	6	141	3	0	170	585
6/4/2015 8:45	1	3	45	38	0	87	30	2	95	28	0	155	23	6	45	26	1	101	15	2	113	1	0	131	474
6/4/2015 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	20	42	383	436	1	882	335	20	646	136	1	1138	190	60	724	233	1	1208	143	19	1263	44	0	1469	4697

Crosswalk Volumes

	Movement												
	Southbound		Southbound To	Westbound		Westbound To	Northbound		Northbound To	Eastbound		Eastbound To	Grand Total
Interval	PCCW	PCW		PCCW	PCW		PCCW	PCW		PCCW	PCW		
7:00 AM	0	0	0	0	0	0	0	0	0	5	1	6	6
Pedestrians	0	0	0	0	0	0	0	0	0	5	1	6	6
7:15 AM	0	1	1	1	0	1	1	0	1	2	0	2	5
Pedestrians	0	1	1	1	0	1	1	0	1	2	0	2	5
7:30 AM	0	0	0	0	0	0	0	0	0	1	1	2	2
Pedestrians	0	0	0	0	0	0	0	0	0	1	1	2	2
7:45 AM	1	1	2	0	0	0	0	0	0	5	1	6	8
Pedestrians	1	1	2	0	0	0	0	0	0	5	1	6	8
8:00 AM	7	0	7	2	0	2	0	0	0	1	4	5	14
Pedestrians	7	0	7	2	0	2	0	0	0	1	4	5	14
8:15 AM	13	1	14	1	0	1	0	0	0	4	6	10	25
Pedestrians	13	1	14	1	0	1	0	0	0	4	6	10	25
8:30 AM	2	0	2	0	0	0	0	0	0	6	0	6	8
Pedestrians	2	0	2	0	0	0	0	0	0	6	0	6	8
8:45 AM	2	1	3	0	0	0	2	0	2	5	1	6	11
Pedestrians	2	1	3	0	0	0	2	0	2	5	1	6	11
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	25	4	29	4	0	4	3	0	3	29	14	43	79

Study Name	Ness and Moray - PM Peak Hour
Start Date	Wednesday, June 03, 2015 3:30 PM
End Date	Wednesday, June 03, 2015 6:00 PM
Site Code	

Road Volumes

TMV	Movement																								
	Southbound					Southbound To	**Westbound**					Westbound To	**Northbound**					Northbound To	**Eastbound**					Eastbound To	**Grand Total**
Interval	**R**	**RoR**	**T**	**L**	**U**		**R**	**RoR**	**T**	**L**	**U**		**R**	**RoR**	**T**	**L**	**U**		**R**	**RoR**	**T**	**L**	**U**		
6/3/2015 15:30	21	26	150	94	0	291	26	2	184	52	0	264	8	12	35	33	0	88	28	5	151	4	0	188	831
Lights	21	25	149	89	0	284	24	1	182	52	0	259	8	10	35	33	0	86	28	5	142	3	0	178	807
Mediums	0	1	1	4	0	6	2	1	1	0	0	4	0	2	0	0	0	2	0	0	8	1	0	9	21
Articulated Trucks	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	3
6/3/2015 15:45	2	5	87	58	0	152	34	6	202	65	0	307	11	20	57	49	0	137	28	11	100	4	0	143	739
Lights	2	5	87	54	0	148	32	5	195	65	0	297	11	20	56	48	0	135	28	11	94	4	0	137	717
Mediums	0	0	0	3	0	3	1	1	7	0	0	9	0	0	1	1	0	2	0	0	6	0	0	6	20
Articulated Trucks	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
6/3/2015 16:00	7	8	93	70	0	178	40	3	212	72	0	327	6	27	60	48	0	141	15	2	109	1	0	127	773
Lights	7	5	92	65	0	169	38	3	205	72	0	318	6	27	58	47	0	138	15	2	106	1	0	124	749
Mediums	0	3	1	4	0	8	2	0	7	0	0	9	0	0	1	1	0	2	0	0	3	0	0	3	22
Articulated Trucks	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
6/3/2015 16:15	3	6	78	57	0	144	33	4	199	76	0	312	13	20	49	44	0	126	8	11	86	2	0	107	689
Lights	3	5	77	53	0	138	31	2	196	75	0	304	13	20	49	44	0	126	8	11	84	1	0	104	672
Mediums	0	1	1	3	0	5	1	2	3	1	0	7	0	0	0	0	0	0	0	0	2	1	0	3	15
Articulated Trucks	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
6/3/2015 16:30	9	16	149	96	1	271	30	11	245	67	0	353	9	13	36	35	0	93	12	8	129	2	0	151	868
Lights	9	16	149	95	1	270	27	10	240	67	0	344	9	13	34	34	0	90	12	7	126	2	0	147	851
Mediums	0	0	0	0	0	0	3	1	4	0	0	8	0	0	2	1	0	3	0	1	2	0	0	3	14
Articulated Trucks	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	3
6/3/2015 16:45	3	7	90	57	0	157	29	2	247	73	0	351	9	11	47	32	1	100	17	5	113	4	0	139	747
Lights	2	7	90	52	0	151	29	2	241	73	0	345	9	11	47	32	1	100	17	5	109	4	0	135	731
Mediums	1	0	0	5	0	6	0	0	4	0	0	4	0	0	0	0	0	0	0	0	3	0	0	3	13
Articulated Trucks	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	3
6/3/2015 17:00	3	3	95	67	1	169	27	5	187	60	0	279	7	14	36	34	0	91	13	6	105	0	0	124	663
Lights	3	2	94	66	0	165	25	4	185	60	0	274	7	14	36	34	0	91	13	6	103	0	0	122	652
Mediums	0	1	1	1	1	4	2	1	2	0	0	5	0	0	0	0	0	0	0	0	2	0	0	2	11
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2015 17:15	6	2	41	48	0	97	40	2	237	66	0	345	8	16	48	37	0	109	16	2	113	3	0	134	685
Lights	6	1	41	44	0	92	39	2	233	66	0	340	8	16	47	37	0	108	16	2	108	3	0	129	669
Mediums	0	1	0	2	0	3	1	0	3	0	0	4	0	0	1	0	0	1	0	0	4	0	0	4	12
Articulated Trucks	0	0	0	2	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	4
6/3/2015 17:30	0	3	43	44	0	90	45	2	220	46	0	313	4	23	53	36	1	117	16	1	95	2	0	114	634
Lights	0	2	43	42	0	87	45	2	214	46	0	307	4	23	53	36	1	117	16	1	91	2	0	110	621
Mediums	0	1	0	2	0	3	0	0	6	0	0	6	0	0	0	0	0	0	0	0	4	0	0	4	13
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2015 17:45	9	0	43	41	0	93	23	2	181	40	1	247	9	15	38	39	0	101	15	0	96	1	0	112	553
Lights	9	0	42	38	0	89	23	2	174	40	1	240	9	15	37	39	0	100	15	0	94	1	0	110	539
Mediums	0	0	1	3	0	4	0	0	7	0	0	7	0	0	1	0	0	1	0	0	2	0	0	2	14
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	63	76	869	632	2	1642	327	39	2114	617	1	3098	84	171	459	387	2	1103	168	51	1097	23	0	1339	7182

Crosswalk Volumes

	Movement												
	Southbound		Southbound To	**Westbound**		Westbound To	**Northbound**		Northbound To	**Eastbound**		Eastbound To	**Grand Total**
Interval	**PCCW**	**PCW**		**PCCW**	**PCW**		**PCCW**	**PCW**		**PCCW**	**PCW**		
3:30 PM	3	25	28	0	2	2	6	1	7	19	2	21	58
Pedestrians	3	25	28	0	2	2	6	1	7	19	2	21	58
3:45 PM	7	11	18	3	2	5	1	2	3	3	10	13	39
Pedestrians	7	11	18	3	2	5	1	2	3	3	10	13	39
4:00 PM	2	5	7	0	2	2	0	0	0	7	4	11	20

Pedestrians	2	5	7	0	2	2	0	0	0	7	4	11	20
4:15 PM	5	3	8	0	0	0	0	0	0	0	0	0	8
Pedestrians	5	3	8	0	0	0	0	0	0	0	0	0	8
4:30 PM	2	2	4	1	2	3	0	0	0	7	0	7	14
Pedestrians	2	2	4	1	2	3	0	0	0	7	0	7	14
4:45 PM	5	0	5	1	0	1	0	0	0	8	0	8	14
Pedestrians	5	0	5	1	0	1	0	0	0	8	0	8	14
5:00 PM	0	1	1	1	0	1	0	0	0	8	0	8	10
Pedestrians	0	1	1	1	0	1	0	0	0	8	0	8	10
5:15 PM	3	1	4	1	0	1	0	0	0	2	2	4	9
Pedestrians	3	1	4	1	0	1	0	0	0	2	2	4	9
5:30 PM	3	3	6	1	0	1	1	0	1	1	1	2	10
Pedestrians	3	3	6	1	0	1	1	0	1	1	1	2	10
5:45 PM	0	3	3	0	2	2	0	0	0	1	0	1	6
Pedestrians	0	3	3	0	2	2	0	0	0	1	0	1	6
Grand Total	30	54	84	8	10	18	8	3	11	56	19	75	188

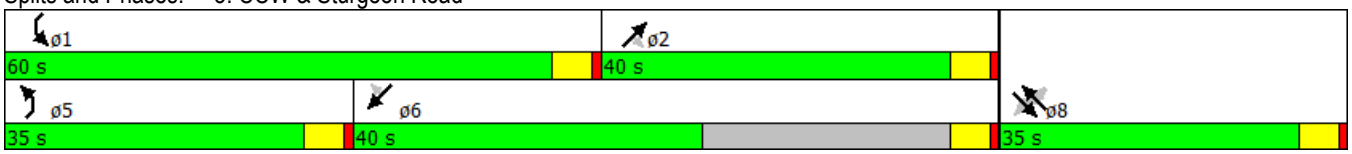
APPENDIX B – Synchro Reports

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	45	0	400	0	620	180	470	320	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						655			196			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	49	0	435	0	674	196	511	348	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				10.8		10.8		21.3	21.3	17.2	43.6	
Actuated g/C Ratio				0.17		0.17		0.33	0.33	0.27	0.67	
v/c Ratio				0.21		0.54		0.57	0.30	0.55	0.14	
Control Delay				29.3		2.5		20.3	4.2	23.7	3.8	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				29.3		2.5		20.3	4.2	23.7	3.8	
LOS				C		A		C	A	C	A	
Approach Delay								16.6			15.6	
Approach LOS								B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 64.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.57	

Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 51.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Road

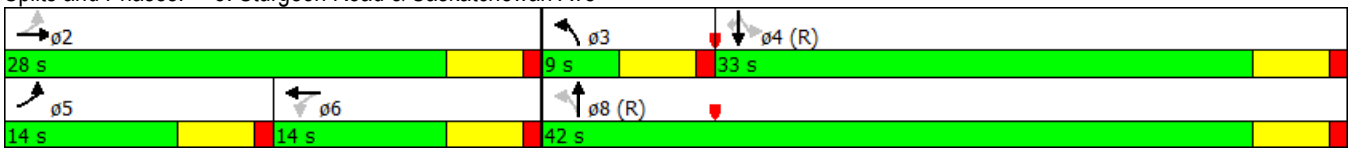


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	215	100	5	40	125	25	295	15	335	345	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1793	0	1789	1669	0	1789	1870	0	0	3493	1601
Flt Permitted	0.337			0.555			0.250				0.684	
Satd. Flow (perm)	635	1793	0	1045	1669	0	471	1870	0	0	2448	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			136			5				187
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	343	0	5	179	0	27	337	0	0	739	92
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	14.0	28.0		14.0	14.0		9.0	42.0		33.0	33.0	33.0
Total Split (%)	20.0%	40.0%		20.0%	20.0%		12.9%	60.0%		47.1%	47.1%	47.1%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	C-Min
Act Effct Green (s)	24.0	24.0		9.1	9.1		36.0	36.0			32.4	32.4
Actuated g/C Ratio	0.34	0.34		0.13	0.13		0.51	0.51			0.46	0.46
v/c Ratio	0.57	0.54		0.04	0.53		0.08	0.35			0.65	0.11
Control Delay	24.1	20.3		27.6	15.8		8.8	11.2			19.0	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	24.1	20.3		27.6	15.8		8.8	11.2			19.0	0.3
LOS	C	C		C	B		A	B			B	A
Approach Delay		21.8			16.1			11.0			16.9	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

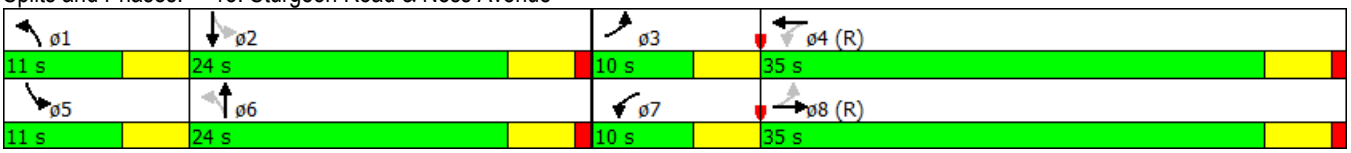
Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	640	155	95	320	85	85	235	130	175	250	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3468	0	1789	3389	0	1789	3550	0
Flt Permitted	0.457			0.198			0.557			0.437		
Satd. Flow (perm)	861	3475	0	373	3468	0	1049	3389	0	823	3550	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			47			124			7	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	864	0	103	440	0	92	396	0	190	288	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	10.0	35.0		10.0	35.0		11.0	24.0		11.0	24.0	
Total Split (%)	12.5%	43.8%		12.5%	43.8%		13.8%	30.0%		13.8%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	37.0	30.0		37.0	30.0		27.0	19.0		27.0	19.0	
Actuated g/C Ratio	0.46	0.38		0.46	0.38		0.34	0.24		0.34	0.24	
v/c Ratio	0.13	0.65		0.37	0.33		0.22	0.44		0.52	0.34	
Control Delay	10.7	22.4		13.3	15.5		17.5	19.3		23.4	26.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.7	22.4		13.3	15.5		17.5	19.3		23.4	26.0	
LOS	B	C		B	B		B	B		C	C	
Approach Delay		21.6			15.1			19.0			24.9	
Approach LOS		C			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 75 (94%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

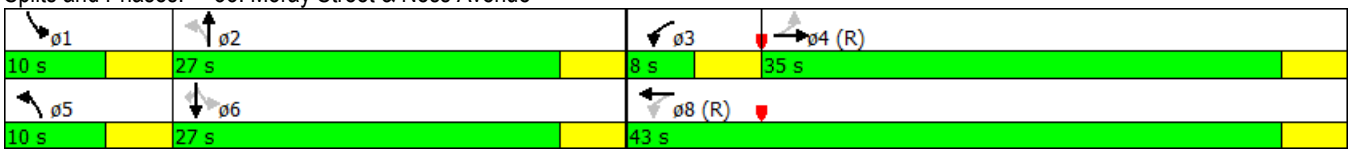


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	705	100	65	345	205	145	450	120	215	185	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3511	0	1789	3378	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.426			0.190			0.626			0.214		
Satd. Flow (perm)	802	3511	*0	358	3378	*0	1179	3464	*0	403	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			213			42				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	875	0	71	598	0	158	619	0	234	201	38
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	35.0	35.0		8.0	43.0		10.0	27.0		10.0	27.0	27.0
Total Split (%)	43.8%	43.8%		10.0%	53.8%		12.5%	33.8%		12.5%	33.8%	33.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	34.9	34.9		42.7	42.7		25.3	18.7		25.3	18.7	18.7
Actuated g/C Ratio	0.44	0.44		0.53	0.53		0.32	0.23		0.32	0.23	0.23
v/c Ratio	0.08	0.57		0.24	0.31		0.37	0.74		0.97	0.24	0.08
Control Delay	11.1	12.9		12.2	7.4		20.0	31.7		74.9	24.8	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	11.1	12.9		12.2	7.4		20.0	31.7		74.9	24.8	0.3
LOS	B	B		B	A		C	C		E	C	A
Approach Delay		12.8			7.9			29.3			47.6	
Approach LOS		B			A			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 68 (85%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	5	705	0	0	445	225	0	5	0	150	0	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	766	0	0	484	245	0	5	0	163	0	43
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	484			766			1019	1261	383	880	1261	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			766			1019	1261	383	880	1261	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	97	100	30	100	94
cM capacity (veh/h)	1075			843			180	168	615	234	168	759

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	5	511	255	161	322	245	5	207
Volume Left	5	0	0	0	0	0	0	163
Volume Right	0	0	0	0	0	245	0	43
cSH	1075	1700	1700	843	1700	1700	168	297
Volume to Capacity	0.01	0.30	0.15	0.00	0.19	0.14	0.03	0.70
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.0	0.8	36.5
Control Delay (s)	8.4	0.0	0.0	0.0	0.0	0.0	27.1	41.0
Lane LOS	A						D	E
Approach Delay (s)	0.1			0.0			27.1	41.0
Approach LOS							D	E

Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	200	70	25	25	75	15	270	75	170	285	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	217	76	27	27	82	16	293	82	185	310	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	299	136	391	500
Volume Left (vph)	5	27	16	185
Volume Right (vph)	76	82	82	5
Hadj (s)	-0.12	-0.29	-0.08	0.10
Departure Headway (s)	7.1	7.6	6.6	6.6
Degree Utilization, x	0.59	0.29	0.72	0.91
Capacity (veh/h)	471	410	504	500
Control Delay (s)	19.9	13.6	25.1	45.5
Approach Delay (s)	19.9	13.6	25.1	45.5
Approach LOS	C	B	D	E

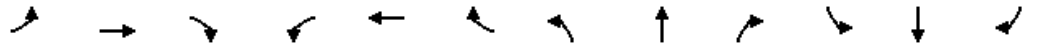
Intersection Summary				
Delay	30.4			
Level of Service	D			
Intersection Capacity Utilization	76.4%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	35	5	45	40	15	100
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	5	49	43	16	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		179	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		179	38
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	89
cM capacity (veh/h)			1572		785	1034

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	38	5	92	125
Volume Left	0	0	49	16
Volume Right	0	5	0	109
cSH	1700	1700	1572	1189
Volume to Capacity	0.02	0.00	0.03	0.11
Queue Length 95th (m)	0.0	0.0	0.7	2.7
Control Delay (s)	0.0	0.0	4.0	9.0
Lane LOS			A	A
Approach Delay (s)	0.0		4.0	9.0
Approach LOS				A

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	90	15	50	35	25	5	55	50	30	60	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	98	16	54	38	27	5	60	54	33	65	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	141	92	27	65	54	98	11
Volume Left (vph)	27	54	0	5	0	33	0
Volume Right (vph)	16	0	27	0	54	0	11
Hadj (s)	0.00	0.33	-0.67	0.08	-0.67	0.20	-0.67
Departure Headway (s)	5.2	5.6	4.6	5.4	4.7	5.5	4.7
Degree Utilization, x	0.21	0.14	0.03	0.10	0.07	0.15	0.01
Capacity (veh/h)	652	615	743	632	727	616	726
Control Delay (s)	9.6	8.3	6.5	7.8	6.8	8.3	6.5
Approach Delay (s)	9.6	7.9		7.3		8.1	
Approach LOS	A	A		A		A	

Intersection Summary				
Delay	8.3			
Level of Service	A			
Intersection Capacity Utilization	31.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	135	10	40	50	20	145
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	11	43	54	22	158
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			147		288	147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			147		288	147
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		97	82
cM capacity (veh/h)			1435		681	900

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	147	11	98	179
Volume Left	0	0	43	22
Volume Right	0	11	0	158
cSH	1700	1700	1435	1024
Volume to Capacity	0.09	0.01	0.03	0.18
Queue Length 95th (m)	0.0	0.0	0.7	4.8
Control Delay (s)	0.0	0.0	3.5	9.9
Lane LOS			A	A
Approach Delay (s)	0.0		3.5	9.9
Approach LOS				A

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	95	165	75	70	30	90	160	45	35	265	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	103	179	82	76	33	98	174	49	38	288	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	130	179	158	33	321	348
Volume Left (vph)	27	0	82	0	98	38
Volume Right (vph)	0	179	0	33	49	22
Hadj (s)	0.14	-0.67	0.29	-0.67	0.00	0.02
Departure Headway (s)	7.2	6.4	7.6	6.6	6.2	6.1
Degree Utilization, x	0.26	0.32	0.33	0.06	0.55	0.59
Capacity (veh/h)	460	517	420	485	545	547
Control Delay (s)	11.5	11.1	13.0	8.8	16.4	17.6
Approach Delay (s)	11.3		12.3		16.4	17.6
Approach LOS	B		B		C	C

Intersection Summary				
Delay	14.8			
Level of Service	B			
Intersection Capacity Utilization	55.4%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	265	15	30	70	20	100
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	288	16	33	76	22	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			304		438	296
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			304		438	296
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		96	85
cM capacity (veh/h)			1256		561	743

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	304	109	130
Volume Left	0	33	22
Volume Right	16	0	109
cSH	1700	1256	892
Volume to Capacity	0.18	0.03	0.15
Queue Length 95th (m)	0.0	0.6	3.9
Control Delay (s)	0.0	2.5	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	2.5	10.8
Approach LOS			B

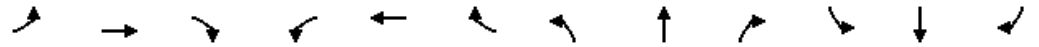
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	25	0	15	0	110	160	105	95	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	27	0	16	0	120	174	114	103	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	43	120	174	217	0
Volume Left (vph)	0	27	0	0	114	0
Volume Right (vph)	5	16	0	174	0	0
Hadj (s)	-0.27	-0.07	0.03	-0.67	0.30	0.00
Departure Headway (s)	4.8	5.0	4.9	4.2	5.2	4.9
Degree Utilization, x	0.01	0.06	0.16	0.20	0.31	0.00
Capacity (veh/h)	664	652	724	845	680	739
Control Delay (s)	7.9	8.3	7.6	7.0	9.3	6.7
Approach Delay (s)	7.9	8.3	7.2		9.3	
Approach LOS	A	A	A		A	

Intersection Summary				
Delay	8.1			
Level of Service	A			
Intersection Capacity Utilization	34.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	365	10	50	100	10	10	0	110	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	397	11	54	109	11	11	0	120	5	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	120			408			625	630	402	745	630	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	120			408			625	630	402	745	630	114
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			97	100	82	98	100	100
cM capacity (veh/h)	1468			1151			383	380	648	260	380	938

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	408	174	130	5
Volume Left	0	54	11	5
Volume Right	11	11	120	0
cSH	1468	1151	613	260
Volume to Capacity	0.00	0.05	0.21	0.02
Queue Length 95th (m)	0.0	1.1	6.1	0.5
Control Delay (s)	0.0	2.9	12.5	19.2
Lane LOS		A	B	C
Approach Delay (s)	0.0	2.9	12.5	19.2
Approach LOS			B	C

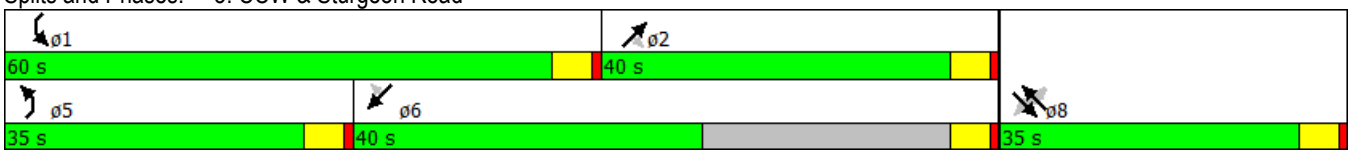
Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	175	0	295	0	340	65	565	660	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						710			97			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	190	0	321	0	370	71	614	717	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				16.5		16.5		14.6	14.6	20.1	40.0	
Actuated g/C Ratio				0.25		0.25		0.22	0.22	0.30	0.60	
v/c Ratio				0.54		0.35		0.47	0.17	0.59	0.34	
Control Delay				29.9		1.0		26.7	4.5	23.5	7.6	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				29.9		1.0		26.7	4.5	23.5	7.6	
LOS				C		A		C	A	C	A	
Approach Delay								23.1			14.9	
Approach LOS								C			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 67	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	

Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Road

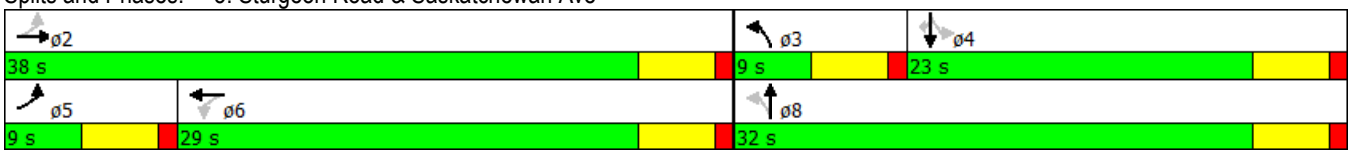


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	70	45	10	170	330	85	250	5	75	405	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1772	0	1789	1697	0	1789	1878	0	0	3550	1601
Flt Permitted	0.149			0.677			0.281				0.843	
Satd. Flow (perm)	281	1772	0	1275	1697	0	529	1878	0	0	3017	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			152			2				266
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	125	0	11	544	0	92	277	0	0	522	266
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	9.0	38.0		29.0	29.0		9.0	32.0		23.0	23.0	23.0
Total Split (%)	12.9%	54.3%		41.4%	41.4%		12.9%	45.7%		32.9%	32.9%	32.9%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	28.3	28.3		21.8	21.8		23.6	23.6			17.1	17.1
Actuated g/C Ratio	0.45	0.45		0.35	0.35		0.38	0.38			0.27	0.27
v/c Ratio	0.50	0.15		0.02	0.79		0.32	0.39			0.63	0.42
Control Delay	18.6	7.5		15.6	24.7		17.2	17.0			26.2	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	18.6	7.5		15.6	24.7		17.2	17.0			26.2	5.6
LOS	B	A		B	C		B	B			C	A
Approach Delay		12.8			24.5			17.1			19.2	
Approach LOS		B			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 62.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	

Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 78.5%	ICU Level of Service D
Analysis Period (min) 15	

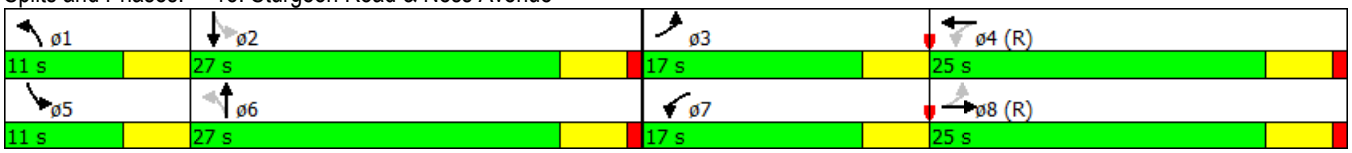
Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	405	100	170	770	140	225	280	115	150	305	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3471	0	1789	3496	0	1789	3421	0	1789	3471	0
Flt Permitted	0.200			0.302			0.440			0.426		
Satd. Flow (perm)	377	3471	0	569	3496	0	829	3421	0	802	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			25			77			37	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	549	0	185	989	0	245	429	0	163	414	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	17.0	25.0		17.0	25.0		11.0	27.0		11.0	27.0	
Total Split (%)	21.3%	31.3%		21.3%	31.3%		13.8%	33.8%		13.8%	33.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	34.0	20.0		34.0	20.0		30.0	22.0		30.0	22.0	
Actuated g/C Ratio	0.42	0.25		0.42	0.25		0.38	0.28		0.38	0.28	
v/c Ratio	0.15	0.61		0.42	1.11		0.62	0.43		0.42	0.42	
Control Delay	12.6	28.2		24.5	102.2		24.4	20.9		18.6	23.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	28.2		24.5	102.2		24.4	20.9		18.6	23.1	
LOS	B	C		C	F		C	C		B	C	
Approach Delay		26.7			90.0			22.2			21.8	
Approach LOS		C			F			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 30 (38%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 49.2		Intersection LOS: D	
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

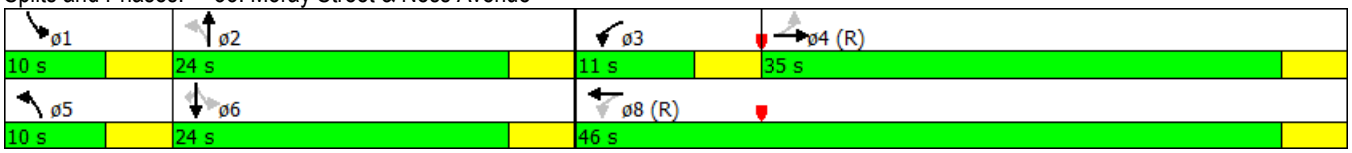


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	435	80	290	905	150	160	190	110	280	410	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3496	0	1789	3503	0	1789	3382	0	1789	3579	1601
Flt Permitted	0.248			0.326			0.311			0.452		
Satd. Flow (perm)	467	3496	*0	614	3503	*0	586	3382	*0	851	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			35			120				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	560	0	315	1147	0	174	327	0	304	446	65
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	35.0	35.0		11.0	46.0		10.0	24.0		10.0	24.0	24.0
Total Split (%)	43.8%	43.8%		13.8%	57.5%		12.5%	30.0%		12.5%	30.0%	30.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	31.8	31.8		45.8	45.8		22.2	15.4		22.2	15.4	15.4
Actuated g/C Ratio	0.40	0.40		0.57	0.57		0.28	0.19		0.28	0.19	0.19
v/c Ratio	0.06	0.40		0.63	0.57		0.66	0.44		0.96	0.65	0.16
Control Delay	32.5	34.5		17.6	12.3		33.3	19.0		68.9	34.0	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	32.5	34.5		17.6	12.3		33.3	19.0		68.9	34.0	1.6
LOS	C	C		B	B		C	B		E	C	A
Approach Delay		34.5			13.4			24.0			44.4	
Approach LOS		C			B			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 73 (91%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 92.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	15	655	0	0	465	270	0	0	0	175	10	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	712	0	0	505	293	0	0	0	190	11	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	505			712			1003	1250	356	894	1250	253
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	505			712			1003	1250	356	894	1250	253
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	18	94	98
cM capacity (veh/h)	1055			884			181	169	640	233	169	747

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	16	475	237	168	337	293	0	217
Volume Left	16	0	0	0	0	0	0	190
Volume Right	0	0	0	0	0	293	0	16
cSH	1055	1700	1700	884	1700	1700	1700	248
Volume to Capacity	0.02	0.28	0.14	0.00	0.20	0.17	0.00	0.88
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	0.0	0.0	55.5
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	0.0	71.2
Lane LOS	A						A	F
Approach Delay (s)	0.2			0.0			0.0	71.2
Approach LOS							A	F

Intersection Summary				
Average Delay	9.0			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	50	25	80	150	145	60	245	25	75	325	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	27	87	163	158	65	266	27	82	353	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	82	408	359	440
Volume Left (vph)	0	87	65	82
Volume Right (vph)	27	158	27	5
Hadj (s)	-0.17	-0.16	0.02	0.06
Departure Headway (s)	7.7	6.6	6.7	6.6
Degree Utilization, x	0.17	0.74	0.67	0.80
Capacity (veh/h)	380	512	507	527
Control Delay (s)	12.3	26.2	22.1	30.9
Approach Delay (s)	12.3	26.2	22.1	30.9
Approach LOS	B	D	C	D

Intersection Summary				
Delay	25.8			
Level of Service	D			
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	45	25	45	110	15	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	27	49	120	16	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			49		266	49
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			49		266	49
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	95
cM capacity (veh/h)			1558		700	1020

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	49	27	168	65
Volume Left	0	0	49	16
Volume Right	0	27	0	49
cSH	1700	1700	1558	1360
Volume to Capacity	0.03	0.02	0.03	0.05
Queue Length 95th (m)	0.0	0.0	0.7	1.1
Control Delay (s)	0.0	0.0	2.3	9.1
Lane LOS			A	A
Approach Delay (s)	0.0		2.3	9.1
Approach LOS				A

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	80	25	160	125	20	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	27	174	136	22	76
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			87		571	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			87		571	87
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		95	92
cM capacity (veh/h)			1509		427	972

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	87	27	310	98
Volume Left	0	0	174	22
Volume Right	0	27	0	76
cSH	1700	1700	1509	1249
Volume to Capacity	0.05	0.02	0.12	0.08
Queue Length 95th (m)	0.0	0.0	3.0	1.9
Control Delay (s)	0.0	0.0	4.7	10.1
Lane LOS			A	B
Approach Delay (s)	0.0		4.7	10.1
Approach LOS				B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	75	130	115	115	65	110	210	85	25	250	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	82	141	125	125	71	120	228	92	27	272	22

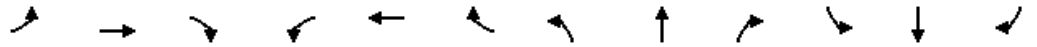
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	109	141	250	71	440	321
Volume Left (vph)	27	0	125	0	120	27
Volume Right (vph)	0	141	0	71	92	22
Hadj (s)	0.16	-0.67	0.28	-0.67	-0.04	0.01
Departure Headway (s)	8.2	7.3	8.1	7.1	6.6	7.0
Degree Utilization, x	0.25	0.29	0.56	0.14	0.81	0.62
Capacity (veh/h)	404	447	410	468	527	482
Control Delay (s)	12.7	12.1	19.6	10.0	32.1	20.7
Approach Delay (s)	12.3		17.5		32.1	20.7
Approach LOS	B		C		D	C

Intersection Summary				
Delay	22.1			
Level of Service	C			
Intersection Capacity Utilization	67.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	135	20	130	270	15	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	22	141	293	16	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			168		734	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			168		734	158
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		95	95
cM capacity (veh/h)			1409		349	888

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	168	435	60
Volume Left	0	141	16
Volume Right	22	0	43
cSH	1700	1409	1221
Volume to Capacity	0.10	0.10	0.05
Queue Length 95th (m)	0.0	2.5	1.2
Control Delay (s)	0.0	3.2	11.1
Lane LOS		A	B
Approach Delay (s)	0.0	3.2	11.1
Approach LOS			B

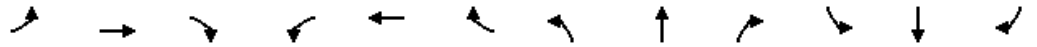
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	145	5	90	5	135	60	30	180	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	158	5	98	5	147	65	33	196	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	261	152	65	228	0
Volume Left (vph)	0	158	5	0	33	0
Volume Right (vph)	0	98	0	65	0	0
Hadj (s)	0.03	-0.07	0.05	-0.67	0.11	0.00
Departure Headway (s)	5.5	5.0	5.6	4.8	5.6	5.5
Degree Utilization, x	0.01	0.36	0.23	0.09	0.35	0.00
Capacity (veh/h)	572	673	617	702	614	635
Control Delay (s)	8.6	10.8	9.1	7.1	10.4	7.3
Approach Delay (s)	8.6	10.8	8.5		10.4	
Approach LOS	A	B	A		B	

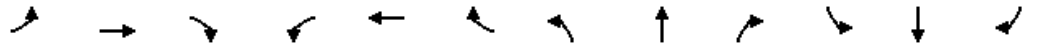
Intersection Summary				
Delay	10.0			
Level of Service	A			
Intersection Capacity Utilization	49.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	185	5	120	430	0	5	0	60	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	201	5	130	467	0	5	0	65	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	467			207			932	932	204	997	935	467
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			207			932	932	204	997	935	467
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			98	100	92	100	100	100
cM capacity (veh/h)	1094			1365			229	241	837	190	240	596

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	207	598	71	0
Volume Left	0	130	5	0
Volume Right	5	0	65	0
cSH	1094	1365	695	1700
Volume to Capacity	0.00	0.10	0.10	0.00
Queue Length 95th (m)	0.0	2.4	2.6	0.0
Control Delay (s)	0.0	2.5	10.8	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	2.5	10.8	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	50	15	70	45	20	20	115	75	25	85	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	54	16	76	49	22	22	125	82	27	92	27

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	87	125	22	147	82	120	27
Volume Left (vph)	16	76	0	22	0	27	0
Volume Right (vph)	16	0	22	0	82	0	27
Hadj (s)	-0.04	0.34	-0.67	0.11	-0.67	0.15	-0.67
Departure Headway (s)	5.6	5.9	4.9	5.4	4.7	5.6	4.7
Degree Utilization, x	0.13	0.20	0.03	0.22	0.11	0.18	0.04
Capacity (veh/h)	600	576	687	633	731	613	713
Control Delay (s)	9.5	9.2	6.8	8.8	7.0	8.6	6.7
Approach Delay (s)	9.5	8.8		8.2		8.3	
Approach LOS	A	A		A		A	

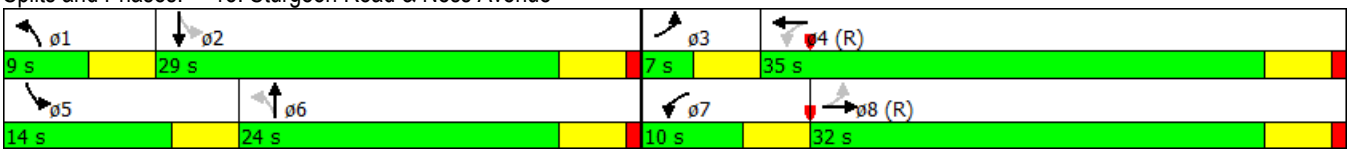
Intersection Summary				
Delay	8.5			
Level of Service	A			
Intersection Capacity Utilization	33.4%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	640	155	95	320	85	85	235	130	175	250	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3468	0	1789	3389	0	1789	3550	0
Flt Permitted	0.497			0.154			0.575			0.361		
Satd. Flow (perm)	936	3475	0	290	3468	0	1083	3389	0	680	3550	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			47			124			8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	864	0	103	440	0	92	396	0	190	288	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	7.0	32.0		10.0	35.0		9.0	24.0		14.0	29.0	
Total Split (%)	8.8%	40.0%		12.5%	43.8%		11.3%	30.0%		17.5%	36.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	31.0	27.0		37.0	30.0		25.0	19.0		34.0	24.0	
Actuated g/C Ratio	0.39	0.34		0.46	0.38		0.31	0.24		0.42	0.30	
v/c Ratio	0.15	0.72		0.42	0.33		0.24	0.44		0.44	0.27	
Control Delay	12.9	26.2		18.4	20.5		16.3	19.3		18.5	21.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.9	26.2		18.4	20.5		16.3	19.3		18.5	21.5	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		25.3			20.1			18.7			20.3	
Approach LOS		C			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 21.8		Intersection LOS: C	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

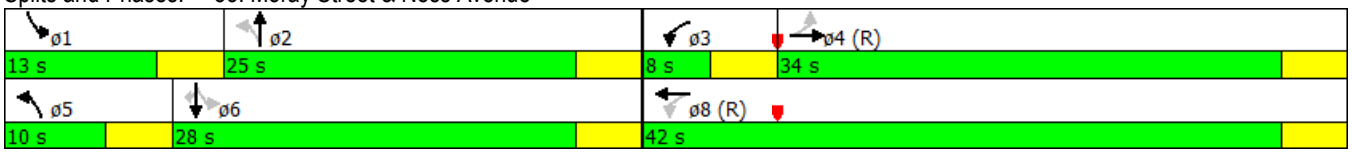


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	705	100	65	345	205	145	450	120	215	185	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3511	0	1789	3378	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.426			0.181			0.626			0.189		
Satd. Flow (perm)	802	3511	*0	341	3378	*0	1179	3464	*0	356	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			208			40				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	875	0	71	598	0	158	619	0	234	201	38
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	34.0	34.0		8.0	42.0		10.0	25.0		13.0	28.0	28.0
Total Split (%)	42.5%	42.5%		10.0%	52.5%		12.5%	31.3%		16.3%	35.0%	35.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	33.5	33.5		40.8	40.8		24.2	18.2		30.2	21.2	21.2
Actuated g/C Ratio	0.42	0.42		0.51	0.51		0.30	0.23		0.38	0.26	0.26
v/c Ratio	0.08	0.59		0.26	0.33		0.39	0.76		0.79	0.21	0.07
Control Delay	10.4	13.4		13.6	8.2		19.6	33.1		38.2	22.8	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.4	13.4		13.6	8.2		19.6	33.1		38.2	22.8	0.3
LOS	B	B		B	A		B	C		D	C	A
Approach Delay		13.3			8.8			30.3			28.6	
Approach LOS		B			A			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

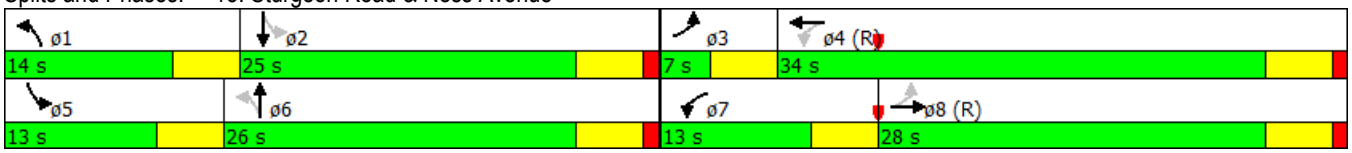
Splits and Phases: 33: Moray Street & Ness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	405	100	170	770	140	225	280	115	150	305	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3471	0	1789	3496	0	1789	3421	0	1789	3471	0
Flt Permitted	0.174			0.283			0.406			0.440		
Satd. Flow (perm)	328	3471	0	533	3496	0	765	3421	0	829	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			29			76			36	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	549	0	185	989	0	245	429	0	163	414	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	7.0	28.0		13.0	34.0		14.0	26.0		13.0	25.0	
Total Split (%)	8.8%	35.0%		16.3%	42.5%		17.5%	32.5%		16.3%	31.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	27.0	23.0		37.0	29.0		32.0	21.0		30.0	20.0	
Actuated g/C Ratio	0.34	0.29		0.46	0.36		0.40	0.26		0.38	0.25	
v/c Ratio	0.36	0.54		0.48	0.77		0.56	0.45		0.39	0.46	
Control Delay	19.5	24.5		11.6	21.3		20.6	21.8		17.2	25.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.5	24.5		11.6	21.3		20.6	21.8		17.2	25.1	
LOS	B	C		B	C		C	C		B	C	
Approach Delay		24.0			19.8			21.4			22.9	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

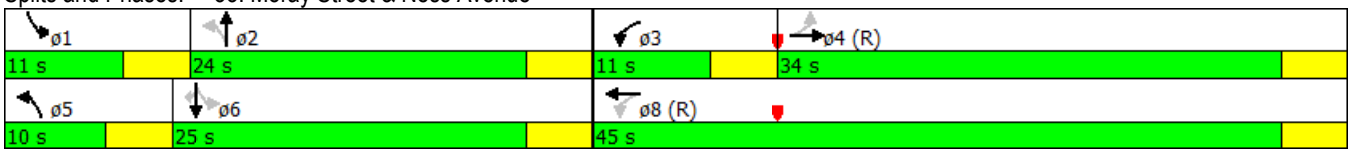


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	435	80	290	905	150	160	190	110	280	410	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3496	0	1789	3503	0	1789	3382	0	1789	3579	1601
Flt Permitted	0.248			0.327			0.335			0.414		
Satd. Flow (perm)	467	3496	*0	616	3503	*0	631	3382	*0	780	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			34			120				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	560	0	315	1147	0	174	327	0	304	446	65
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	34.0	34.0		11.0	45.0		10.0	24.0		11.0	25.0	25.0
Total Split (%)	42.5%	42.5%		13.8%	56.3%		12.5%	30.0%		13.8%	31.3%	31.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	32.0	32.0		46.5	46.5		20.5	14.5		22.5	15.5	15.5
Actuated g/C Ratio	0.40	0.40		0.58	0.58		0.26	0.18		0.28	0.19	0.19
v/c Ratio	0.06	0.40		0.62	0.56		0.70	0.46		0.99	0.64	0.16
Control Delay	11.8	12.7		16.2	11.9		37.2	19.8		76.2	33.9	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	11.8	12.7		16.2	11.9		37.2	19.8		76.2	33.9	1.6
LOS	B	B		B	B		D	B		E	C	A
Approach Delay		12.6			12.8			25.9			47.1	
Approach LOS		B			B			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 92.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue

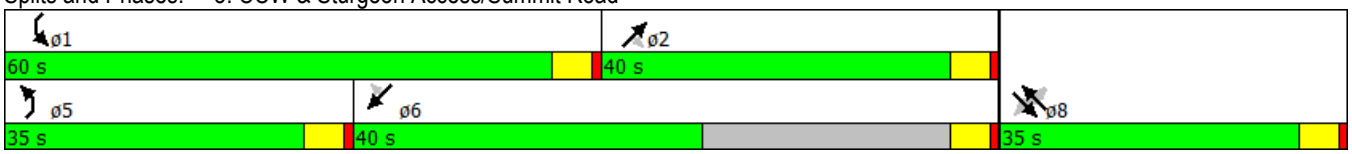


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	50	0	465	0	835	240	635	430	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						645			261			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	54	0	505	0	908	261	690	467	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				11.2		11.2		33.1	33.1	23.5	61.6	
Actuated g/C Ratio				0.13		0.13		0.40	0.40	0.28	0.74	
v/c Ratio				0.28		0.65		0.64	0.33	0.70	0.18	
Control Delay				38.7		4.8		23.4	3.9	31.2	3.3	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				38.7		4.8		23.4	3.9	31.2	3.3	
LOS				D		A		C	A	C	A	
Approach Delay								19.0			20.0	
Approach LOS								B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 83	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	

Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road



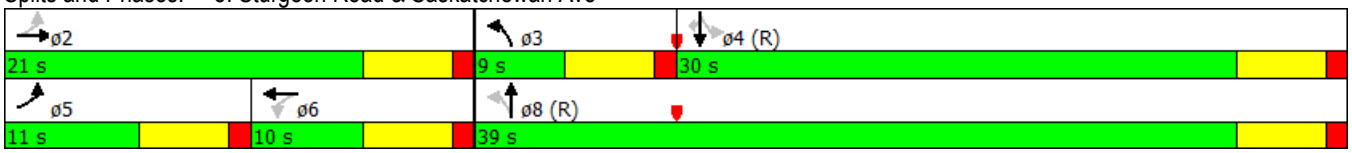
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	250	115	5	45	135	30	340	15	390	400	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1795	0	1789	1671	0	1789	1872	0	0	3493	1601
Flt Permitted	0.381			0.727			0.207				0.671	
Satd. Flow (perm)	718	1795	0	1369	1671	0	390	1872	0	0	2401	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			147			6				218
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	250	397	0	5	196	0	33	386	0	0	859	109
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	11.0	21.0		10.0	10.0		9.0	39.0		30.0	30.0	30.0
Total Split (%)	18.3%	35.0%		16.7%	16.7%		15.0%	65.0%		50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	C-Min
Act Effct Green (s)	17.6	17.6		5.5	5.5		32.4	32.4			28.8	28.8
Actuated g/C Ratio	0.29	0.29		0.09	0.09		0.54	0.54			0.48	0.48
v/c Ratio	0.74	0.72		0.04	0.68		0.11	0.38			0.88dl	0.12
Control Delay	36.3	27.5		26.2	24.0		6.6	8.8			19.4	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	36.3	27.5		26.2	24.0		6.6	8.8			19.4	0.3
LOS	D	C		C	C		A	A			B	A
Approach Delay		30.9			24.1			8.6			17.2	
Approach LOS		C			C			A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

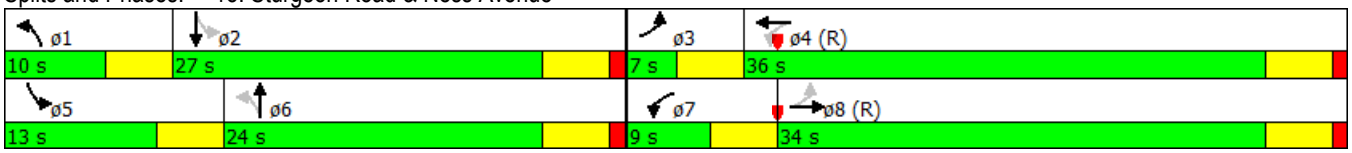
Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	745	180	110	370	100	100	275	150	205	290	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3464	0	1789	3389	0	1789	3553	0
Flt Permitted	0.438			0.129			0.552			0.320		
Satd. Flow (perm)	825	3475	0	243	3464	0	1040	3389	0	603	3553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			50			120			6	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	1006	0	120	511	0	109	462	0	223	331	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	7.0	34.0		9.0	36.0		10.0	24.0		13.0	27.0	
Total Split (%)	8.8%	42.5%		11.3%	45.0%		12.5%	30.0%		16.3%	33.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	33.0	29.0		37.0	31.0		26.0	19.0		32.0	22.0	
Actuated g/C Ratio	0.41	0.36		0.46	0.39		0.32	0.24		0.40	0.28	
v/c Ratio	0.19	0.78		0.57	0.37		0.28	0.52		0.60	0.34	
Control Delay	12.8	26.9		23.9	17.2		17.1	21.7		23.3	23.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.8	26.9		23.9	17.2		17.1	21.7		23.3	23.9	
LOS	B	C		C	B		B	C		C	C	
Approach Delay		26.0			18.5			20.8			23.7	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 22.8		Intersection LOS: C	
Intersection Capacity Utilization 71.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

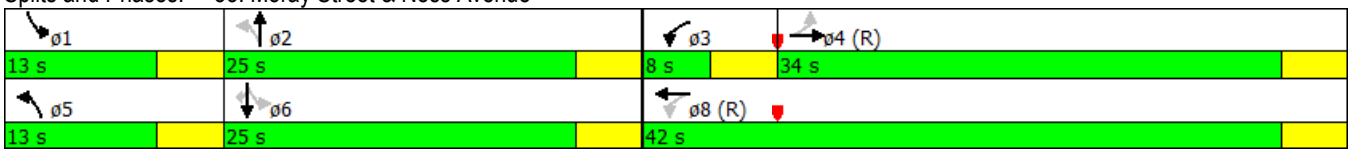


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	820	115	75	400	240	170	520	140	250	215	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3514	0	1789	3378	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.387			0.122			0.602			0.202		
Satd. Flow (perm)	729	3514	*0	230	3378	*0	1134	3464	*0	380	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			213			41				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1016	0	82	696	0	185	717	0	272	234	43
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	34.0	34.0		8.0	42.0		13.0	25.0		13.0	25.0	25.0
Total Split (%)	42.5%	42.5%		10.0%	52.5%		16.3%	31.3%		16.3%	31.3%	31.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	32.7	32.7		39.5	39.5		28.2	19.5		28.8	19.8	19.8
Actuated g/C Ratio	0.41	0.41		0.49	0.49		0.35	0.24		0.36	0.25	0.25
v/c Ratio	0.11	0.70		0.40	0.39		0.39	0.82		0.92	0.26	0.09
Control Delay	12.3	17.0		17.3	9.5		18.2	35.4		57.0	24.8	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.3	17.0		17.3	9.5		18.2	35.4		57.0	24.8	0.3
LOS	B	B		B	A		B	D		E	C	A
Approach Delay		16.9			10.3			31.9			38.8	
Approach LOS		B			B			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 96.0%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	316	158	450	571
Demand Flow Rate, veh/h	323	162	459	582
Vehicles Circulating, veh/h	616	365	455	84
Vehicles Exiting, veh/h	50	549	484	443
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	15.2	6.9	11.6	10.7
Approach LOS	C	A	B	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.795	0.205	1.000	0.000
Critical Headway, s	5.193	5.193	5.193	5.193	5.193	5.193
Entry Flow, veh/h	323	162	365	94	582	0
Cap Entry Lane, veh/h	610	784	717	717	1039	1039
Entry HV Adj Factor	0.979	0.977	0.981	0.979	0.981	1.000
Flow Entry, veh/h	316	158	358	92	571	0
Cap Entry, veh/h	598	767	703	702	1019	1039
V/C Ratio	0.529	0.207	0.509	0.131	0.560	0.000
Control Delay, s/veh	15.2	6.9	12.8	6.6	10.7	3.5
LOS	C	A	B	A	B	A
95th %tile Queue, veh	3	1	3	0	4	0

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	5	820	0	0	515	260	0	5	0	160	0	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	891	0	0	560	283	0	5	0	174	0	49
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	560			891			1182	1462	446	1019	1462	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	560			891			1182	1462	446	1019	1462	280
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	96	100	6	100	93
cM capacity (veh/h)	1007			756			135	127	560	184	127	717

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	5	594	297	187	373	283	5	223
Volume Left	5	0	0	0	0	0	0	174
Volume Right	0	0	0	0	0	283	0	49
cSH	1007	1700	1700	756	1700	1700	127	236
Volume to Capacity	0.01	0.35	0.17	0.00	0.22	0.17	0.04	0.94
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.0	1.0	63.5
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	0.0	34.6	83.5
Lane LOS	A						D	F
Approach Delay (s)	0.1			0.0			34.6	83.5
Approach LOS							D	F

Intersection Summary				
Average Delay	9.6			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	40	5	50	45	15	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	54	49	16	120
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			43		201	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			43		201	43
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	88
cM capacity (veh/h)			1565		760	1027

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	43	5	103	136
Volume Left	0	0	54	16
Volume Right	0	5	0	120
cSH	1700	1700	1565	1167
Volume to Capacity	0.03	0.00	0.03	0.12
Queue Length 95th (m)	0.0	0.0	0.8	3.0
Control Delay (s)	0.0	0.0	4.0	9.1
Lane LOS			A	A
Approach Delay (s)	0.0		4.0	9.1
Approach LOS				A

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	10	45	60	20	155
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	11	49	65	22	168
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			168		332	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			168		332	168
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		97	81
cM capacity (veh/h)			1409		640	876

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	168	11	114	190
Volume Left	0	0	49	22
Volume Right	0	11	0	168
cSH	1700	1700	1409	989
Volume to Capacity	0.10	0.01	0.03	0.19
Queue Length 95th (m)	0.0	0.0	0.8	5.4
Control Delay (s)	0.0	0.0	3.4	10.2
Lane LOS			A	B
Approach Delay (s)	0.0		3.4	10.2
Approach LOS				B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	100	180	80	75	30	95	170	50	40	285	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	109	196	87	82	33	103	185	54	43	310	22

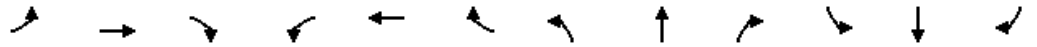
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	136	196	168	33	342	375
Volume Left (vph)	27	0	87	0	103	43
Volume Right (vph)	0	196	0	33	54	22
Hadj (s)	0.13	-0.67	0.29	-0.67	0.00	0.02
Departure Headway (s)	7.5	6.7	7.9	6.9	6.4	6.4
Degree Utilization, x	0.28	0.36	0.37	0.06	0.61	0.67
Capacity (veh/h)	441	484	403	458	525	528
Control Delay (s)	12.2	12.2	14.2	9.2	19.1	21.2
Approach Delay (s)	12.2		13.4		19.1	21.2
Approach LOS	B		B		C	C

Intersection Summary				
Delay	17.0			
Level of Service	C			
Intersection Capacity Utilization	57.1%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	310	15	35	80	20	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	337	16	38	87	22	120
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			353		508	345
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			353		508	345
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		96	83
cM capacity (veh/h)			1205		508	698

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	353	125	141
Volume Left	0	38	22
Volume Right	16	0	120
cSH	1700	1205	825
Volume to Capacity	0.21	0.03	0.17
Queue Length 95th (m)	0.0	0.7	4.7
Control Delay (s)	0.0	2.6	11.4
Lane LOS		A	B
Approach Delay (s)	0.0	2.6	11.4
Approach LOS			B

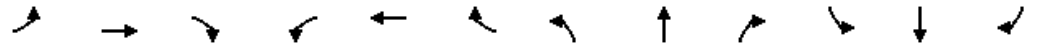
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	25	0	15	0	120	170	115	100	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	27	0	16	0	130	185	125	109	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	43	130	185	234	0
Volume Left (vph)	0	27	0	0	125	0
Volume Right (vph)	5	16	0	185	0	0
Hadj (s)	-0.27	-0.07	0.03	-0.67	0.30	0.00
Departure Headway (s)	4.9	5.1	4.9	4.2	5.2	4.9
Degree Utilization, x	0.01	0.06	0.18	0.21	0.34	0.00
Capacity (veh/h)	650	639	721	841	677	736
Control Delay (s)	8.0	8.4	7.7	7.1	9.6	6.7
Approach Delay (s)	8.0	8.4	7.4		9.6	
Approach LOS	A	A	A		A	

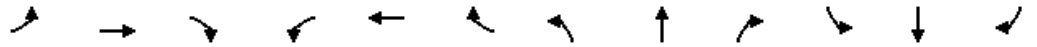
Intersection Summary				
Delay	8.3			
Level of Service	A			
Intersection Capacity Utilization	35.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	425	10	60	115	10	10	0	120	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	462	11	65	125	11	11	0	130	5	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	136			473			728	734	467	859	734	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136			473			728	734	467	859	734	130
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			97	100	78	97	100	100
cM capacity (veh/h)	1448			1089			323	327	596	206	327	919

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	473	201	141	5
Volume Left	0	65	11	5
Volume Right	11	11	130	0
cSH	1448	1089	559	206
Volume to Capacity	0.00	0.06	0.25	0.03
Queue Length 95th (m)	0.0	1.5	7.6	0.6
Control Delay (s)	0.0	3.1	13.6	22.9
Lane LOS		A	B	C
Approach Delay (s)	0.0	3.1	13.6	22.9
Approach LOS			B	C

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	50.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	95	15	55	40	25	5	60	55	30	65	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	103	16	60	43	27	5	65	60	33	71	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	147	103	27	71	60	103	11
Volume Left (vph)	27	60	0	5	0	33	0
Volume Right (vph)	16	0	27	0	60	0	11
Hadj (s)	0.00	0.32	-0.67	0.07	-0.67	0.19	-0.67
Departure Headway (s)	5.3	5.6	4.6	5.5	4.7	5.6	4.7
Degree Utilization, x	0.22	0.16	0.03	0.11	0.08	0.16	0.01
Capacity (veh/h)	644	608	733	625	717	608	714
Control Delay (s)	9.7	8.5	6.6	7.9	6.9	8.4	6.6
Approach Delay (s)	9.7	8.1		7.5		8.3	
Approach LOS	A	A		A		A	

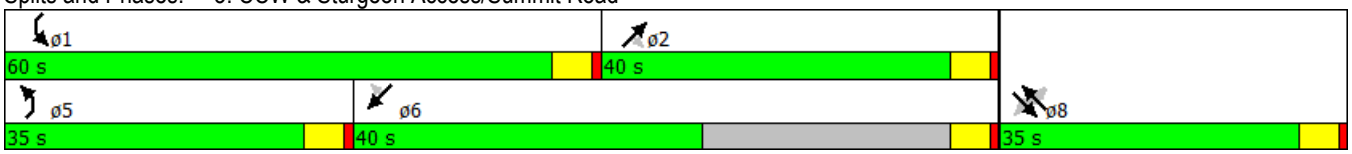
Intersection Summary				
Delay	8.4			
Level of Service	A			
Intersection Capacity Utilization	32.4%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	205	0	340	0	455	85	760	890	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						677			97			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			641.6			424.4			1266.9	
Travel Time (s)		4.3			33.0			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	223	0	370	0	495	92	826	967	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				21.0		21.0		20.5	20.5	29.8	55.6	
Actuated g/C Ratio				0.24		0.24		0.24	0.24	0.34	0.64	
v/c Ratio				0.65		0.41		0.59	0.20	0.70	0.42	
Control Delay				42.0		1.4		34.5	7.7	29.4	8.7	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				42.0		1.4		34.5	7.7	29.4	8.7	
LOS				D		A		C	A	C	A	
Approach Delay								30.3			18.3	
Approach LOS								C			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 87.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	

Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 58.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road

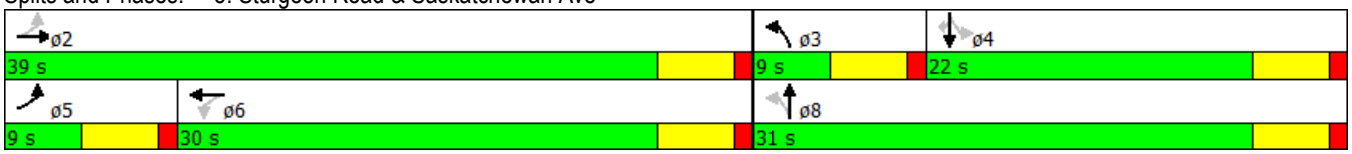


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	80	50	10	185	355	100	290	5	85	470	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1776	0	1789	1697	0	1789	1880	0	0	3550	1601
Flt Permitted	0.142			0.667			0.218				0.833	
Satd. Flow (perm)	267	1776	0	1256	1697	0	411	1880	0	0	2981	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			154			1				310
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	141	0	11	587	0	109	320	0	0	603	310
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	9.0	39.0		30.0	30.0		9.0	31.0		22.0	22.0	22.0
Total Split (%)	12.9%	55.7%		42.9%	42.9%		12.9%	44.3%		31.4%	31.4%	31.4%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	29.6	29.6		23.1	23.1		23.1	23.1			16.6	16.6
Actuated g/C Ratio	0.47	0.47		0.36	0.36		0.36	0.36			0.26	0.26
v/c Ratio	0.58	0.16		0.02	0.82		0.45	0.47			0.77	0.48
Control Delay	22.4	7.3		14.9	26.3		21.4	19.0			32.5	5.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	22.4	7.3		14.9	26.3		21.4	19.0			32.5	5.9
LOS	C	A		B	C		C	B			C	A
Approach Delay		14.5			26.1			19.6			23.5	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 63.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	

Intersection Signal Delay: 22.3	Intersection LOS: C
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

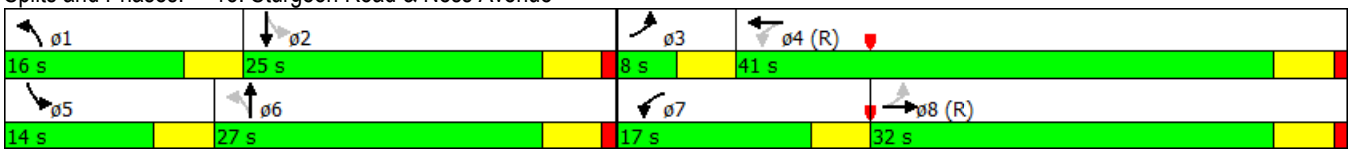
Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	470	115	195	895	165	260	325	135	175	355	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3496	0	1789	3421	0	1789	3475	0
Flt Permitted	0.148			0.233			0.297			0.360		
Satd. Flow (perm)	279	3475	0	439	3496	0	559	3421	0	678	3475	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			28			67			30	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	636	0	212	1152	0	283	500	0	190	478	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	8.0	32.0		17.0	41.0		16.0	27.0		14.0	25.0	
Total Split (%)	8.9%	35.6%		18.9%	45.6%		17.8%	30.0%		15.6%	27.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	32.0	27.0		45.0	36.0		35.0	22.0		31.0	20.0	
Actuated g/C Ratio	0.36	0.30		0.50	0.40		0.39	0.24		0.34	0.22	
v/c Ratio	0.43	0.60		0.51	0.81		0.74	0.56		0.53	0.60	
Control Delay	21.3	28.1		11.0	23.7		32.7	28.5		23.9	33.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.3	28.1		11.0	23.7		32.7	28.5		23.9	33.0	
LOS	C	C		B	C		C	C		C	C	
Approach Delay		27.4			21.7			30.0			30.4	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

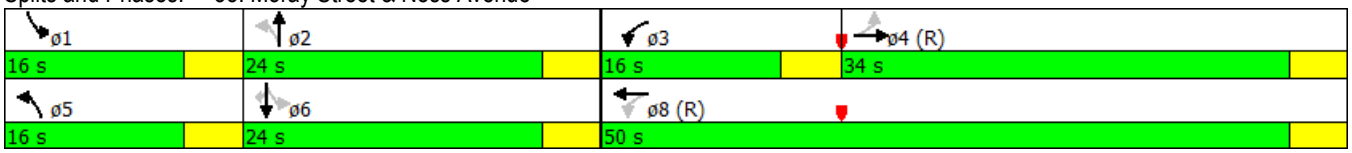


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	505	95	335	1050	175	185	220	130	325	475	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3493	0	1789	3503	0	1789	3378	0	1789	3579	1601
Flt Permitted	0.176			0.249			0.240			0.348		
Satd. Flow (perm)	331	3493	*0	469	3503	*0	452	3378	*0	655	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			30			123				109
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	652	0	364	1331	0	201	380	0	353	516	76
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	34.0	34.0		16.0	50.0		16.0	24.0		16.0	24.0	24.0
Total Split (%)	37.8%	37.8%		17.8%	55.6%		17.8%	26.7%		17.8%	26.7%	26.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	31.8	31.8		49.2	49.2		28.0	16.8		29.6	17.6	17.6
Actuated g/C Ratio	0.35	0.35		0.55	0.55		0.31	0.19		0.33	0.20	0.20
v/c Ratio	0.09	0.52		0.81	0.69		0.65	0.52		0.96	0.74	0.19
Control Delay	20.7	21.7		29.8	17.5		30.6	24.0		64.9	40.7	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	20.7	21.7		29.8	17.5		30.6	24.0		64.9	40.7	3.8
LOS	C	C		C	B		C	C		E	D	A
Approach Delay		21.7			20.2			26.3			46.8	
Approach LOS		C			C			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 101.2%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	87	478	419	505
Demand Flow Rate, veh/h	89	488	428	515
Vehicles Circulating, veh/h	615	394	155	377
Vehicles Exiting, veh/h	277	189	549	505
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.8	16.2	9.0	16.9
Approach LOS	A	C	A	C

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	89	488	428	515
Cap Entry Lane, veh/h	611	762	968	775
Entry HV Adj Factor	0.975	0.980	0.979	0.980
Flow Entry, veh/h	87	478	419	505
Cap Entry, veh/h	596	747	947	760
V/C Ratio	0.146	0.640	0.442	0.664
Control Delay, s/veh	7.8	16.2	9.0	16.9
LOS	A	C	A	C
95th %tile Queue, veh	1	5	2	5

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	15	760	0	0	540	315	0	0	0	190	10	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	826	0	0	587	342	0	0	0	207	11	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	587			826			1158	1446	413	1033	1446	293
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	587			826			1158	1446	413	1033	1446	293
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	0	92	98
cM capacity (veh/h)	984			800			136	128	588	184	128	703

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	16	551	275	196	391	342	0	234
Volume Left	16	0	0	0	0	0	0	207
Volume Right	0	0	0	0	0	342	0	16
cSH	984	1700	1700	800	1700	1700	1700	195
Volume to Capacity	0.02	0.32	0.16	0.00	0.23	0.20	0.00	1.20
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	0.0	0.0	91.9
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	0.0	177.7
Lane LOS	A						A	F
Approach Delay (s)	0.2			0.0			0.0	177.7
Approach LOS							A	F

Intersection Summary				
Average Delay	20.8			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	50	25	50	120	15	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	27	54	130	16	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		293	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		293	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	95
cM capacity (veh/h)			1551		673	1013

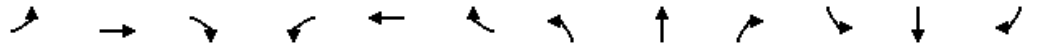
Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	54	27	185	71
Volume Left	0	0	54	16
Volume Right	0	27	0	54
cSH	1700	1700	1551	1316
Volume to Capacity	0.03	0.02	0.04	0.05
Queue Length 95th (m)	0.0	0.0	0.8	1.3
Control Delay (s)	0.0	0.0	2.4	9.2
Lane LOS			A	A
Approach Delay (s)	0.0		2.4	9.2
Approach LOS				A

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	95	30	185	145	20	75
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	33	201	158	22	82
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			103		663	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			103		663	103
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		94	91
cM capacity (veh/h)			1489		369	952

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	103	33	359	103
Volume Left	0	0	201	22
Volume Right	0	33	0	82
cSH	1700	1700	1489	1205
Volume to Capacity	0.06	0.02	0.14	0.09
Queue Length 95th (m)	0.0	0.0	3.6	2.1
Control Delay (s)	0.0	0.0	4.9	10.5
Lane LOS			A	B
Approach Delay (s)	0.0		4.9	10.5
Approach LOS				B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	80	140	125	125	70	120	225	90	25	270	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	87	152	136	136	76	130	245	98	27	293	22

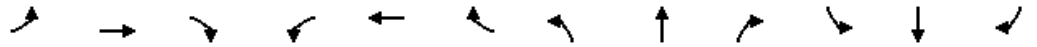
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	114	152	272	76	473	342
Volume Left (vph)	27	0	136	0	130	27
Volume Right (vph)	0	152	0	76	98	22
Hadj (s)	0.15	-0.67	0.28	-0.67	-0.03	0.01
Departure Headway (s)	8.7	7.9	8.5	7.5	7.1	7.5
Degree Utilization, x	0.28	0.33	0.64	0.16	0.93	0.71
Capacity (veh/h)	397	437	412	464	501	465
Control Delay (s)	13.8	13.5	24.4	10.7	50.1	26.7
Approach Delay (s)	13.7		21.4		50.1	26.7
Approach LOS	B		C		F	D

Intersection Summary				
Delay	30.7			
Level of Service	D			
Intersection Capacity Utilization	73.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	25	150	315	15	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	27	163	342	16	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			196		851	182
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			196		851	182
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		94	94
cM capacity (veh/h)			1377		291	860

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	196	505	65
Volume Left	0	163	16
Volume Right	27	0	49
cSH	1700	1377	1147
Volume to Capacity	0.12	0.12	0.06
Queue Length 95th (m)	0.0	3.1	1.4
Control Delay (s)	0.0	3.4	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	3.4	11.6
Approach LOS			B

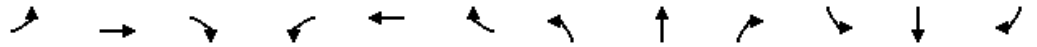
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	155	5	95	5	145	65	30	195	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	168	5	103	5	158	71	33	212	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	277	163	71	245	0
Volume Left (vph)	0	168	5	0	33	0
Volume Right (vph)	0	103	0	71	0	0
Hadj (s)	0.03	-0.07	0.05	-0.67	0.10	0.00
Departure Headway (s)	5.7	5.1	5.6	4.9	5.7	5.6
Degree Utilization, x	0.01	0.39	0.26	0.10	0.39	0.00
Capacity (veh/h)	550	660	606	688	605	625
Control Delay (s)	8.7	11.4	9.4	7.2	11.0	7.4
Approach Delay (s)	8.7	11.4	8.7		11.0	
Approach LOS	A	B	A		B	

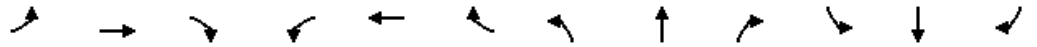
Intersection Summary				
Delay	10.4			
Level of Service	B			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	215	5	140	500	0	5	0	65	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	234	5	152	543	0	5	0	71	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	543			239			1084	1084	236	1155	1087	543
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	543			239			1084	1084	236	1155	1087	543
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			89			97	100	91	100	100	100
cM capacity (veh/h)	1025			1328			177	192	803	145	191	539

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	239	696	76	0
Volume Left	0	152	5	0
Volume Right	5	0	71	0
cSH	1025	1328	641	1700
Volume to Capacity	0.00	0.11	0.12	0.00
Queue Length 95th (m)	0.0	2.9	3.1	0.0
Control Delay (s)	0.0	2.8	11.4	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	2.8	11.4	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	55	15	75	50	20	20	125	80	25	90	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	60	16	82	54	22	22	136	87	27	98	27

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	92	136	22	158	87	125	27
Volume Left (vph)	16	82	0	22	0	27	0
Volume Right (vph)	16	0	22	0	87	0	27
Hadj (s)	-0.04	0.33	-0.67	0.10	-0.67	0.14	-0.67
Departure Headway (s)	5.7	5.9	4.9	5.5	4.7	5.6	4.8
Degree Utilization, x	0.15	0.22	0.03	0.24	0.11	0.20	0.04
Capacity (veh/h)	588	569	676	626	720	604	699
Control Delay (s)	9.6	9.4	6.9	9.0	7.1	8.8	6.8
Approach Delay (s)	9.6	9.1		8.4		8.5	
Approach LOS	A	A		A		A	

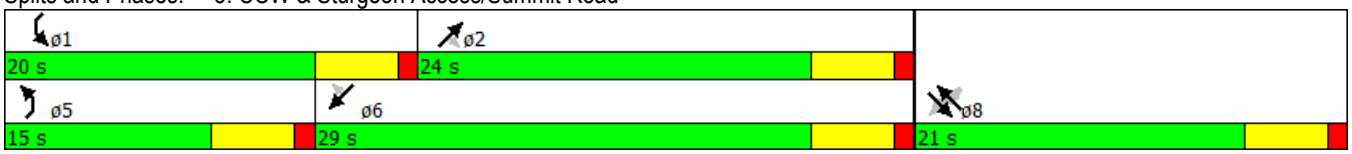
Intersection Summary				
Delay	8.7			
Level of Service	A			
Intersection Capacity Utilization	37.3%	ICU Level of Service	A	
Analysis Period (min)	15			

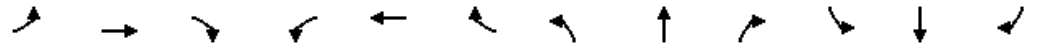
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	60	0	580	0	835	245	695	430	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						386			266			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	65	0	630	0	908	266	755	467	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	24.0	24.0	20.0	29.0	29.0
Total Split (%)	32.3%	32.3%		32.3%	32.3%	32.3%	23.1%	36.9%	36.9%	30.8%	44.6%	44.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				15.0		15.0		18.9	18.9	15.0	39.0	
Actuated g/C Ratio				0.23		0.23		0.30	0.30	0.23	0.61	
v/c Ratio				0.19		0.94		0.86	0.40	0.93	0.21	
Control Delay				21.2		34.4		31.7	4.8	44.6	6.1	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				21.2		34.4		31.7	4.8	44.6	6.1	
LOS				C		C		C	A	D	A	
Approach Delay								25.6			29.9	
Approach LOS								C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 64	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road





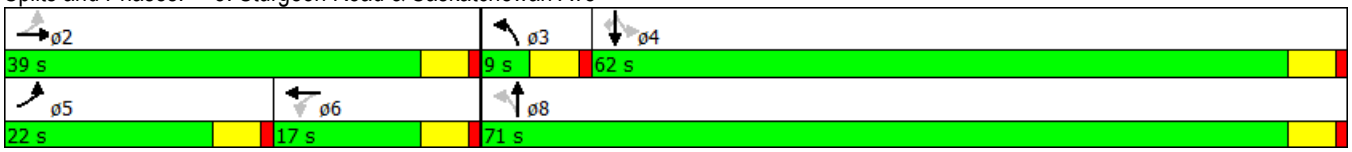
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	260	315	5	50	145	135	485	15	405	695	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1729	0	1789	1672	0	1789	1876	0	0	3514	1601
Flt Permitted	0.230			0.323			0.128				0.627	
Satd. Flow (perm)	433	1729	0	608	1672	0	241	1876	0	0	2244	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			107			2				130
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	625	0	5	212	0	147	543	0	0	1195	130
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	22.0	39.0		17.0	17.0		9.0	71.0		62.0	62.0	62.0
Total Split (%)	20.0%	35.5%		15.5%	15.5%		8.2%	64.5%		56.4%	56.4%	56.4%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	34.0	34.0		12.4	12.4		66.0	66.0			57.0	57.0
Actuated g/C Ratio	0.31	0.31		0.11	0.11		0.60	0.60			0.52	0.52
v/c Ratio	0.87	1.09		0.07	0.75		0.73	0.48			1.07dl	0.15
Control Delay	57.7	98.4		46.8	40.9		34.5	14.1			61.2	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	57.7	98.4		46.8	40.9		34.5	14.1			61.2	2.8
LOS	E	F		D	D		C	B			E	A
Approach Delay		85.4			41.0			18.5			55.4	
Approach LOS		F			D			B			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	

Intersection Signal Delay: 55.1	Intersection LOS: E
Intersection Capacity Utilization 111.2%	ICU Level of Service H
Analysis Period (min) 15	

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

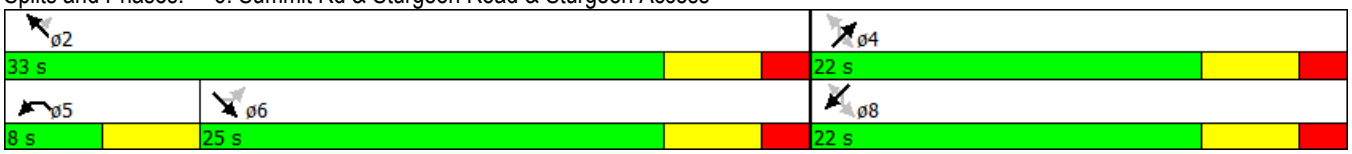


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	840	45	155	555	260	85	5	310	160	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		50.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3550	0	3471	3579	1601	0	1799	1601	0	1789	1601
Flt Permitted	0.424			0.950				0.618			0.694	
Satd. Flow (perm)	799	3550	0	3471	3579	1601	0	1164	1601	0	1307	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				283			215			139
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			145.5			370.1	
Travel Time (s)		29.0			9.7			10.5			26.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	962	0	168	603	283	0	97	337	0	174	49
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		8.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0		8.0	33.0	33.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	45.5%	45.5%		14.5%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	21.0	21.0		4.0	27.2	27.2		11.5	11.5		11.5	11.5
Actuated g/C Ratio	0.41	0.41		0.08	0.54	0.54		0.23	0.23		0.23	0.23
v/c Ratio	0.02	0.65		0.61	0.31	0.29		0.37	0.64		0.59	0.10
Control Delay	11.8	16.4		35.8	7.8	2.1		20.3	12.7		25.9	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	11.8	16.4		35.8	7.8	2.1		20.3	12.7		25.9	0.4
LOS	B	B		D	A	A		C	B		C	A
Approach Delay		16.4			10.7			14.4			20.3	
Approach LOS		B			B			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 55	
Actuated Cycle Length: 50.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	

Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

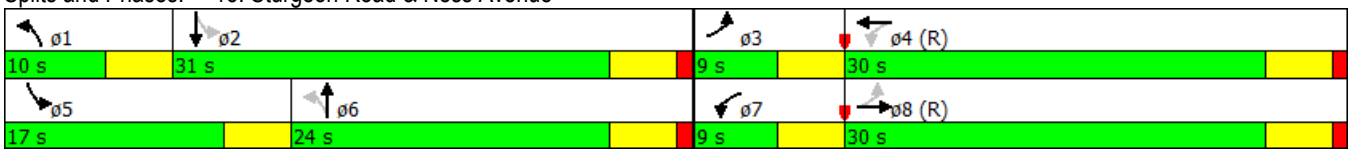
Splits and Phases: 6: Summit Rd & Sturgeon Road & Sturgeon Access



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	745	180	110	370	145	100	460	150	290	665	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3428	0	1789	3446	0	1789	3568	0
Flt Permitted	0.340			0.160			0.315			0.174		
Satd. Flow (perm)	640	3475	0	301	3428	0	593	3446	0	328	3568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			75			52			3	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	1006	0	120	560	0	109	663	0	315	739	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	9.0	30.0		9.0	30.0		10.0	24.0		17.0	31.0	
Total Split (%)	11.3%	37.5%		11.3%	37.5%		12.5%	30.0%		21.3%	38.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	31.0	25.0		31.0	25.0		26.0	19.0		37.0	26.0	
Actuated g/C Ratio	0.39	0.31		0.39	0.31		0.32	0.24		0.46	0.32	
v/c Ratio	0.22	0.90		0.57	0.50		0.39	0.77		0.81	0.64	
Control Delay	15.2	38.4		26.2	22.2		17.5	33.4		34.4	25.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.2	38.4		26.2	22.2		17.5	33.4		34.4	25.9	
LOS	B	D		C	C		B	C		C	C	
Approach Delay		36.9			22.9			31.2			28.4	
Approach LOS		D			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 30.5		Intersection LOS: C	
Intersection Capacity Utilization 81.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

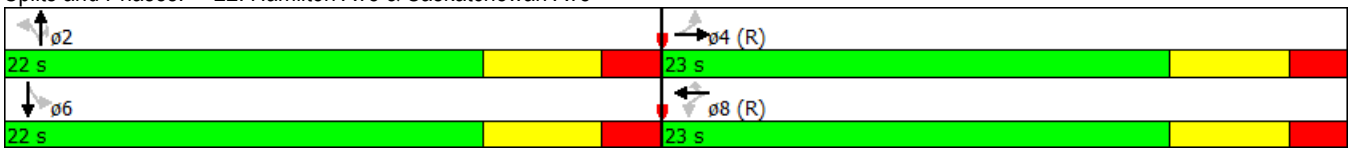


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	430	15	35	150	65	20	15	110	130	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	0.0		20.0	50.0		0.0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1876	0	0	1866	1601	0	1831	1601	1789	1883	0
Flt Permitted					0.872			0.806		0.732		
Satd. Flow (perm)	0	1876	0	0	1642	1601	0	1518	1601	1379	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				73			120			
Link Speed (k/h)		60			60			50			48	
Link Distance (m)		1044.0			533.1			524.6			162.3	
Travel Time (s)		62.6			32.0			37.8			12.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	483	0	0	201	71	0	38	120	141	27	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	23.0	23.0		23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%	51.1%	48.9%	48.9%	48.9%	48.9%	48.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		26.7			26.7	26.7		9.8	9.8	9.8	9.8	
Actuated g/C Ratio		0.59			0.59	0.59		0.22	0.22	0.22	0.22	
v/c Ratio		0.43			0.21	0.07		0.12	0.27	0.47	0.07	
Control Delay		9.4			7.8	2.8		13.2	5.0	19.6	12.5	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		9.4			7.8	2.8		13.2	5.0	19.6	12.5	
LOS		A			A	A		B	A	B	B	
Approach Delay		9.4			6.5			7.0			18.4	
Approach LOS		A			A			A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 22: Hamilton Ave & Saskatchewan Ave

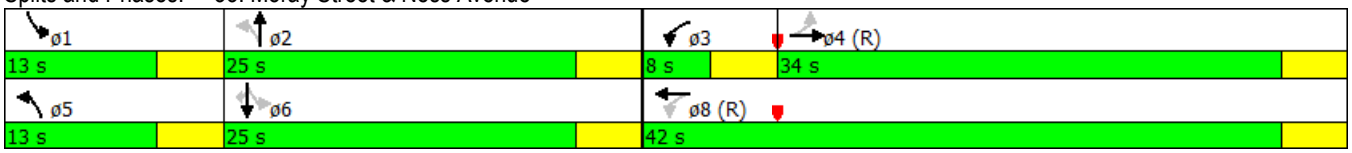


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	905	115	75	445	255	170	520	140	275	215	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3518	0	1789	3382	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.363			0.112			0.602			0.202		
Satd. Flow (perm)	684	3518	*0	211	3382	*0	1134	3464	*0	380	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			191			41				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1109	0	82	761	0	185	717	0	299	234	43
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	34.0	34.0		8.0	42.0		13.0	25.0		13.0	25.0	25.0
Total Split (%)	42.5%	42.5%		10.0%	52.5%		16.3%	31.3%		16.3%	31.3%	31.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	32.7	32.7		39.5	39.5		28.2	19.5		28.8	19.8	19.8
Actuated g/C Ratio	0.41	0.41		0.49	0.49		0.35	0.24		0.36	0.25	0.25
v/c Ratio	0.12	0.77		0.41	0.43		0.39	0.82		1.01	0.26	0.09
Control Delay	11.8	17.1		17.9	10.6		18.2	35.4		78.5	24.8	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	11.8	17.1		17.9	10.6		18.2	35.4		78.5	24.8	0.3
LOS	B	B		B	B		B	D		E	C	A
Approach Delay		17.0			11.3			31.9			50.8	
Approach LOS		B			B			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 25.1	Intersection LOS: C
Intersection Capacity Utilization 97.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

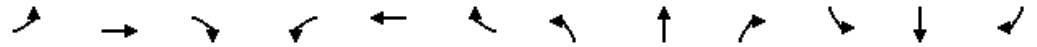
Splits and Phases: 33: Moray Street & Ness Avenue



Intersection	
Intersection Delay, s/veh	66.7
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	316	180	700	1108
Demand Flow Rate, veh/h	323	184	714	1130
Vehicles Circulating, veh/h	1164	620	499	84
Vehicles Exiting, veh/h	50	593	988	720
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	64.2	10.2	70.4	74.3
Approach LOS	F	B	F	F

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	323	184	714	1130
Cap Entry Lane, veh/h	353	608	686	1039
Entry HV Adj Factor	0.979	0.980	0.981	0.980
Flow Entry, veh/h	316	180	700	1108
Cap Entry, veh/h	346	596	673	1019
V/C Ratio	0.916	0.303	1.041	1.088
Control Delay, s/veh	64.2	10.2	70.4	74.3
LOS	F	B	F	F
95th %tile Queue, veh	9	1	18	27



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	40	5	65	45	25	15	75	120	45	135	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	43	5	71	49	27	16	82	130	49	147	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	43	5	147	98	130	196
Volume Left (vph)	0	0	71	16	0	49
Volume Right (vph)	0	5	27	0	130	0
Hadj (s)	0.03	-0.57	0.02	0.07	-0.57	0.08
Departure Headway (s)	4.8	3.2	4.7	4.7	3.2	4.6
Degree Utilization, x	0.06	0.00	0.19	0.13	0.12	0.25
Capacity (veh/h)	684	1121	723	728	1121	752
Control Delay (s)	8.1	6.2	8.8	8.4	6.6	9.1
Approach Delay (s)	7.9		8.8	7.4		9.1
Approach LOS	A		A	A		A

Intersection Summary				
Delay	8.3			
Level of Service	A			
Intersection Capacity Utilization	37.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	275	10	45	130	20	155
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	299	11	49	141	22	168
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			299		538	299
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			299		538	299
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	77
cM capacity (veh/h)			1262		485	741

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	299	11	190	190
Volume Left	0	0	49	22
Volume Right	0	11	0	168
cSH	1700	1700	1262	836
Volume to Capacity	0.18	0.01	0.04	0.23
Queue Length 95th (m)	0.0	0.0	0.9	6.6
Control Delay (s)	0.0	0.0	2.3	11.5
Lane LOS			A	B
Approach Delay (s)	0.0		2.3	11.5
Approach LOS				B

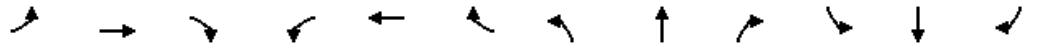
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	115	180	80	100	30	95	170	50	40	285	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	125	196	87	109	33	103	185	54	43	310	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	152	196	196	33	342	375
Volume Left (vph)	27	0	87	0	103	43
Volume Right (vph)	0	196	0	33	54	22
Hadj (s)	0.12	-0.67	0.26	-0.67	0.00	0.02
Departure Headway (s)	7.7	6.8	8.0	7.0	6.7	6.6
Degree Utilization, x	0.32	0.37	0.43	0.06	0.63	0.69
Capacity (veh/h)	432	472	402	453	507	511
Control Delay (s)	13.1	12.6	15.8	9.3	20.6	23.0
Approach Delay (s)	12.8		14.9		20.6	23.0
Approach LOS	B		B		C	C

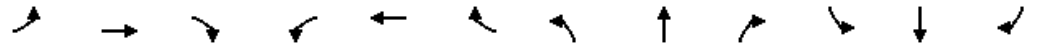
Intersection Summary				
Delay	18.2			
Level of Service	C			
Intersection Capacity Utilization	58.4%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	25	0	15	0	135	170	115	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	27	0	16	0	147	185	125	136	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	43	147	185	261	0
Volume Left (vph)	0	27	0	0	125	0
Volume Right (vph)	5	16	0	185	0	0
Hadj (s)	-0.27	-0.07	0.03	-0.67	0.27	0.00
Departure Headway (s)	5.0	5.2	4.9	4.2	5.2	4.9
Degree Utilization, x	0.02	0.06	0.20	0.22	0.38	0.00
Capacity (veh/h)	634	624	718	836	679	733
Control Delay (s)	8.1	8.5	7.9	7.2	10.1	6.7
Approach Delay (s)	8.1	8.5	7.5		10.1	
Approach LOS	A	A	A		B	

Intersection Summary				
Delay	8.6			
Level of Service	A			
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	675	10	60	245	10	10	0	120	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	734	11	65	266	11	11	0	130	5	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	277			745			1141	1147	739	1272	1147	272
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			745			1141	1147	739	1272	1147	271
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			94	100	69	94	100	100
cM capacity (veh/h)	1286			863			167	184	417	94	184	767

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	745	342	141	5
Volume Left	0	65	11	5
Volume Right	11	11	130	0
cSH	1286	863	374	94
Volume to Capacity	0.00	0.08	0.38	0.06
Queue Length 95th (m)	0.0	1.9	13.1	1.4
Control Delay (s)	0.0	2.5	20.3	45.8
Lane LOS		A	C	E
Approach Delay (s)	0.0	2.5	20.3	45.8
Approach LOS			C	E

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	70.6%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	95	15	55	40	25	5	145	55	30	220	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	103	16	60	43	27	5	158	60	33	239	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	147	103	27	163	60	272	11
Volume Left (vph)	27	60	0	5	0	33	0
Volume Right (vph)	16	0	27	0	60	0	11
Hadj (s)	0.00	0.32	-0.67	0.05	-0.67	0.09	-0.67
Departure Headway (s)	6.1	6.4	5.4	5.8	5.1	5.7	5.0
Degree Utilization, x	0.25	0.18	0.04	0.26	0.08	0.43	0.01
Capacity (veh/h)	551	517	603	592	670	602	686
Control Delay (s)	11.0	9.7	7.5	9.6	7.3	11.8	6.8
Approach Delay (s)	11.0	9.2		9.0		11.6	
Approach LOS	B	A		A		B	

Intersection Summary				
Delay	10.4			
Level of Service	B			
Intersection Capacity Utilization	45.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	180	95	45	75	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	196	103	49	82	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	152				345	128
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152				345	128
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	98
cM capacity (veh/h)	1429				647	922

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	207	152	98
Volume Left	11	0	82
Volume Right	0	49	16
cSH	1429	1700	680
Volume to Capacity	0.01	0.09	0.14
Queue Length 95th (m)	0.2	0.0	3.8
Control Delay (s)	0.5	0.0	11.2
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	11.2
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

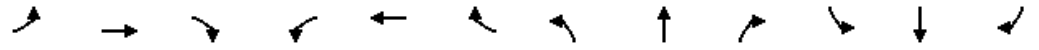
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	215	0	455	0	455	95	910	890	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						530			201			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			641.6			424.4			1266.9	
Travel Time (s)		4.3			33.0			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	234	0	495	0	495	103	989	967	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	23.0	29.0	29.0
Total Split (%)	32.3%	32.3%		32.3%	32.3%	32.3%	23.1%	32.3%	32.3%	35.4%	44.6%	44.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				14.4		14.4		14.1	14.1	18.1	37.2	
Actuated g/C Ratio				0.23		0.23		0.23	0.23	0.29	0.60	
v/c Ratio				0.70		0.63		0.61	0.20	0.97	0.45	
Control Delay				35.2		5.9		25.0	0.9	47.5	7.7	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				35.2		5.9		25.0	0.9	47.5	7.7	
LOS				D		A		C	A	D	A	
Approach Delay								20.8			27.8	
Approach LOS								C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 61.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	

Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Road



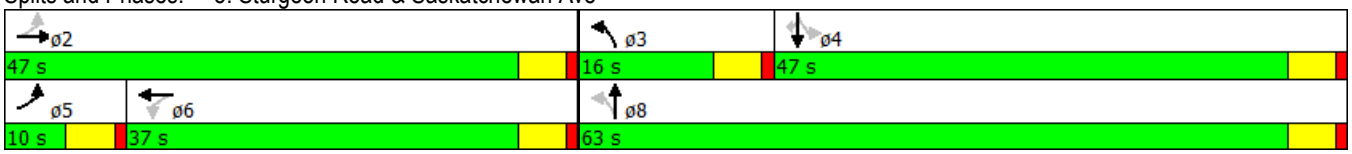


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	90	255	10	200	375	365	665	5	100	755	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1674	0	1789	1699	0	1789	1882	0	0	3557	1601
Flt Permitted	0.108			0.490			0.141				0.633	
Satd. Flow (perm)	203	1674	0	923	1699	0	266	1882	0	0	2265	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		150			87							370
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	375	0	11	625	0	397	728	0	0	930	370
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	10.0	47.0		37.0	37.0		16.0	63.0		47.0	47.0	47.0
Total Split (%)	9.1%	42.7%		33.6%	33.6%		14.5%	57.3%		42.7%	42.7%	42.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	42.0	42.0		32.0	32.0		58.0	58.0			42.0	42.0
Actuated g/C Ratio	0.38	0.38		0.29	0.29		0.53	0.53			0.38	0.38
v/c Ratio	1.17	0.51		0.04	1.13		1.36	0.73			1.08	0.44
Control Delay	154.1	17.9		28.7	110.1		204.2	25.6			86.9	4.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	154.1	17.9		28.7	110.1		204.2	25.6			86.9	4.2
LOS	F	B		C	F		F	C			F	A
Approach Delay		61.1			108.7			88.6			63.4	
Approach LOS		E			F			F			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.36	

Intersection Signal Delay: 78.9	Intersection LOS: E
Intersection Capacity Utilization 118.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

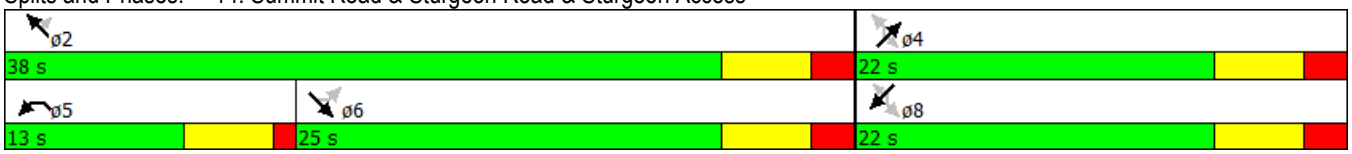


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	15	815	110	395	580	315	85	0	300	190	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	0.0		130.0	0.0		50.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3514	0	3471	3579	1601	0	1789	1601	0	1799	1601
Flt Permitted	0.413			0.950				0.618			0.671	
Satd. Flow (perm)	778	3514	0	3471	3579	1601	0	1164	1601	0	1264	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				342			326			145
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		641.6			217.5			151.7			297.6	
Travel Time (s)		28.9			9.8			10.9			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1006	0	429	630	342	0	92	326	0	218	16
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0		13.0	38.0	38.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	41.7%	41.7%		21.7%	63.3%	63.3%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	19.0	19.0		8.0	32.1	32.1		13.6	13.6		13.6	13.6
Actuated g/C Ratio	0.33	0.33		0.14	0.56	0.56		0.24	0.24		0.24	0.24
v/c Ratio	0.06	0.86		0.89	0.32	0.33		0.34	0.52		0.73	0.03
Control Delay	15.3	27.6		49.7	7.9	2.0		21.7	5.9		36.4	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	15.3	27.6		49.7	7.9	2.0		21.7	5.9		36.4	0.1
LOS	B	C		D	A	A		C	A		D	A
Approach Delay		27.5			19.2			9.4			33.9	
Approach LOS		C			B			A			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 57.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	

Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

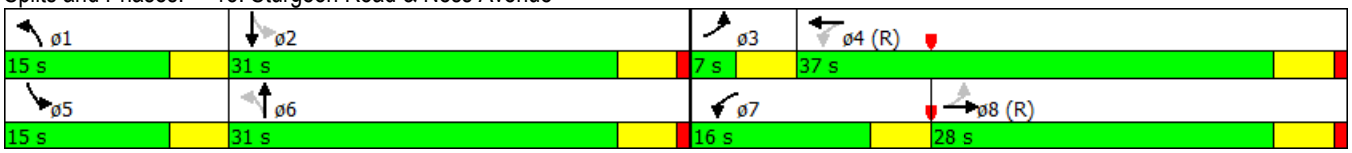
Splits and Phases: 14: Summit Road & Sturgeon Road & Sturgeon Access



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	470	115	195	895	275	260	805	135	260	720	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3453	0	1789	3500	0	1789	3521	0
Flt Permitted	0.174			0.193			0.154			0.154		
Satd. Flow (perm)	328	3475	0	364	3453	0	290	3500	0	290	3521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			50			21			14	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	636	0	212	1272	0	283	1022	0	283	875	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	7.0	28.0		16.0	37.0		15.0	31.0		15.0	31.0	
Total Split (%)	7.8%	31.1%		17.8%	41.1%		16.7%	34.4%		16.7%	34.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	27.0	23.0		40.0	32.0		38.0	26.0		38.0	26.0	
Actuated g/C Ratio	0.30	0.26		0.44	0.36		0.42	0.29		0.42	0.29	
v/c Ratio	0.48	0.70		0.60	1.01		0.93	1.00		0.93	0.85	
Control Delay	28.7	33.5		15.0	46.2		58.6	59.8		58.6	39.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.7	33.5		15.0	46.2		58.6	59.8		58.6	39.3	
LOS	C	C		B	D		E	E		E	D	
Approach Delay		33.1			41.7			59.5			44.0	
Approach LOS		C			D			E			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 46.0		Intersection LOS: D	
Intersection Capacity Utilization 93.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

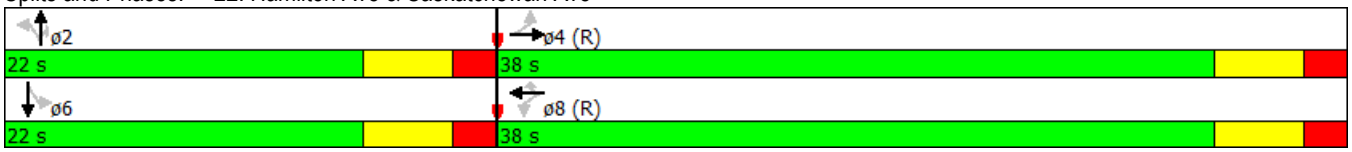


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	285	25	150	485	165	15	35	45	125	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	0.0		20.0	50.0		0.0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1863	0	0	1861	1601	0	1855	1601	1789	1883	0
Flt Permitted					0.824			0.899		0.722		
Satd. Flow (perm)	0	1863	0	0	1552	1601	0	1693	1601	1360	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				121			55			
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1044.0			533.1			524.6			206.2	
Travel Time (s)		62.6			32.0			37.8			14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	0	0	690	179	0	54	49	136	27	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	38.0	38.0		38.0	38.0	38.0	22.0	22.0	22.0	22.0	22.0	
Total Split (%)	63.3%	63.3%		63.3%	63.3%	63.3%	36.7%	36.7%	36.7%	36.7%	36.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		40.5			40.5	40.5		11.0	11.0	11.2	11.2	
Actuated g/C Ratio		0.68			0.68	0.68		0.18	0.18	0.19	0.19	
v/c Ratio		0.27			0.66	0.16		0.17	0.14	0.54	0.08	
Control Delay		6.5			13.9	2.9		20.1	6.5	29.1	18.6	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		6.5			13.9	2.9		20.1	6.5	29.1	18.6	
LOS		A			B	A		C	A	C	B	
Approach Delay		6.5			11.6			13.6			27.4	
Approach LOS		A			B			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 22: Hamilton Ave & Saskatchewan Ave

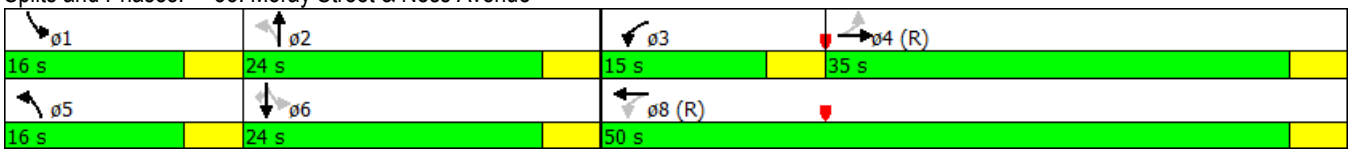


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	590	95	335	1160	205	185	220	130	350	475	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3503	0	1789	3496	0	1789	3378	0	1789	3579	1601
Flt Permitted	0.129			0.195			0.249			0.338		
Satd. Flow (perm)	243	3503	*0	367	3496	*0	469	3378	*0	637	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			33			123				109
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.2	
Travel Time (s)		73.2			21.7			28.5			30.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	744	0	364	1484	0	201	380	0	380	516	76
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	35.0	35.0		15.0	50.0		16.0	24.0		16.0	24.0	24.0
Total Split (%)	38.9%	38.9%		16.7%	55.6%		17.8%	26.7%		17.8%	26.7%	26.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	30.9	30.9		49.1	49.1		27.7	16.5		30.1	17.8	17.8
Actuated g/C Ratio	0.34	0.34		0.55	0.55		0.31	0.18		0.33	0.20	0.20
v/c Ratio	0.13	0.61		0.86	0.77		0.65	0.53		1.02	0.73	0.19
Control Delay	18.6	20.6		37.8	19.9		30.4	24.2		80.0	40.3	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.6	20.6		37.8	19.9		30.4	24.2		80.0	40.3	3.8
LOS	B	C		D	B		C	C		F	D	A
Approach Delay		20.6			23.4			26.4			53.0	
Approach LOS		C			C			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 30.2	Intersection LOS: C
Intersection Capacity Utilization 106.6%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Intersection	
Intersection Delay, s/veh	156.2
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	87	538	1055	1038
Demand Flow Rate, veh/h	89	549	1077	1059
Vehicles Circulating, veh/h	1159	1043	200	377
Vehicles Exiting, veh/h	277	234	1048	1215
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	15.1	213.4	104.6	190.7
Approach LOS	C	F	F	F

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	89	549	1077	1059
Cap Entry Lane, veh/h	355	398	925	775
Entry HV Adj Factor	0.975	0.980	0.980	0.980
Flow Entry, veh/h	87	538	1055	1038
Cap Entry, veh/h	346	390	906	760
V/C Ratio	0.251	1.379	1.164	1.366
Control Delay, s/veh	15.1	213.4	104.6	190.7
LOS	C	F	F	F
95th %tile Queue, veh	1	26	31	44



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	145	210	105	15	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	158	228	114	16	92
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	342				486	285
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342				486	285
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				97	88
cM capacity (veh/h)	1217				530	754

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	179	342	109
Volume Left	22	0	16
Volume Right	0	114	92
cSH	1217	1700	709
Volume to Capacity	0.02	0.20	0.15
Queue Length 95th (m)	0.4	0.0	4.1
Control Delay (s)	1.1	0.0	11.0
Lane LOS	A		B
Approach Delay (s)	1.1	0.0	11.0
Approach LOS			B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	50	25	65	120	65	15	190	50	50	150	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	27	71	130	71	16	207	54	54	163	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	54	27	272	223	54	217
Volume Left (vph)	0	0	71	16	0	54
Volume Right (vph)	0	27	71	0	54	0
Hadj (s)	0.03	-0.57	-0.07	0.05	-0.57	0.08
Departure Headway (s)	5.6	3.2	5.1	5.2	3.2	5.2
Degree Utilization, x	0.08	0.02	0.38	0.32	0.05	0.31
Capacity (veh/h)	569	1121	654	653	1121	648
Control Delay (s)	9.1	6.3	11.2	10.6	6.4	10.6
Approach Delay (s)	8.1		11.2	9.7		10.6
Approach LOS	A		B	A		B

Intersection Summary				
Delay	10.3			
Level of Service	B			
Intersection Capacity Utilization	52.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	225	30	185	315	20	75
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	245	33	201	342	22	82
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			245		989	245
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			245		989	245
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			85		91	90
cM capacity (veh/h)			1322		232	794

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	245	33	543	103
Volume Left	0	0	201	22
Volume Right	0	33	0	82
cSH	1700	1700	1322	1006
Volume to Capacity	0.14	0.02	0.15	0.10
Queue Length 95th (m)	0.0	0.0	4.1	2.6
Control Delay (s)	0.0	0.0	4.0	12.6
Lane LOS			A	B
Approach Delay (s)	0.0		4.0	12.6
Approach LOS				B

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	115	140	125	150	70	120	225	90	25	270	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	125	152	136	163	76	130	245	98	27	293	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	152	152	299	76	473	342
Volume Left (vph)	27	0	136	0	130	27
Volume Right (vph)	0	152	0	76	98	22
Hadj (s)	0.12	-0.67	0.26	-0.67	-0.03	0.01
Departure Headway (s)	9.1	8.3	8.9	7.9	7.5	8.0
Degree Utilization, x	0.38	0.35	0.74	0.17	0.99	0.76
Capacity (veh/h)	393	430	400	455	473	448
Control Delay (s)	16.4	14.4	31.7	11.3	65.2	32.0
Approach Delay (s)	15.4		27.6		65.2	32.0
Approach LOS	C		D		F	D

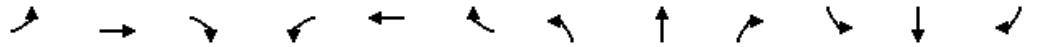
Intersection Summary				
Delay	38.0			
Level of Service	E			
Intersection Capacity Utilization	76.3%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	155	5	95	5	180	65	30	220	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	168	5	103	5	196	71	33	239	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	277	201	71	272	0
Volume Left (vph)	0	168	5	0	33	0
Volume Right (vph)	0	103	0	71	0	0
Hadj (s)	0.03	-0.07	0.05	-0.67	0.09	0.00
Departure Headway (s)	5.9	5.3	5.7	5.0	5.7	5.7
Degree Utilization, x	0.01	0.41	0.32	0.10	0.43	0.00
Capacity (veh/h)	521	636	600	679	598	617
Control Delay (s)	9.0	11.9	10.2	7.3	11.9	7.5
Approach Delay (s)	9.0	11.9	9.4		11.9	
Approach LOS	A	B	A		B	

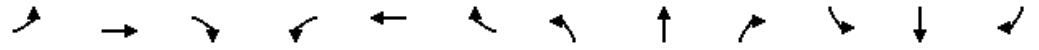
Intersection Summary				
Delay	11.0			
Level of Service	B			
Intersection Capacity Utilization	54.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	55	15	75	50	20	20	335	80	25	255	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	60	16	82	54	22	22	364	87	27	277	27

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	92	136	22	386	87	304	27
Volume Left (vph)	16	82	0	22	0	27	0
Volume Right (vph)	16	0	22	0	87	0	27
Hadj (s)	-0.04	0.33	-0.67	0.06	-0.67	0.08	-0.67
Departure Headway (s)	6.8	7.1	6.1	5.9	5.2	6.1	5.3
Degree Utilization, x	0.18	0.27	0.04	0.63	0.12	0.51	0.04
Capacity (veh/h)	469	460	527	591	669	571	640
Control Delay (s)	11.3	11.5	8.1	17.2	7.7	14.1	7.3
Approach Delay (s)	11.3	11.0		15.5		13.5	
Approach LOS	B	B		C		B	

Intersection Summary				
Delay	13.8			
Level of Service	B			
Intersection Capacity Utilization	54.3%	ICU Level of Service		A
Analysis Period (min)	15			

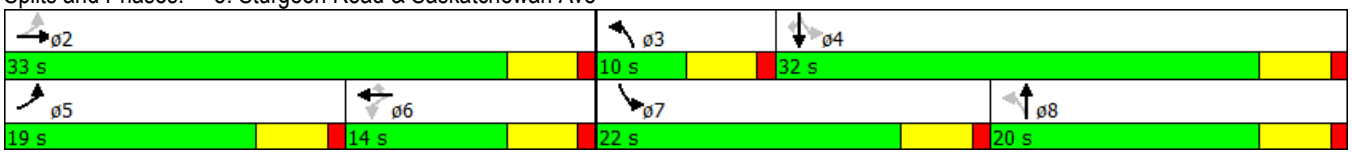


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	260	315	5	50	145	135	485	15	405	695	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		30.0	40.0		50.0	150.0		0.0	75.0		75.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1729	0	1789	1883	1601	1789	3564	0	1789	3579	1601
Flt Permitted	0.469			0.430			0.365			0.212		
Satd. Flow (perm)	883	1729	0	810	1883	1601	687	3564	0	399	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93				247		4				175
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	625	0	5	54	158	147	543	0	440	755	130
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Detector Phase	5	2		6	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0	5.0	4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0	10.0	9.0	17.0		9.0	17.0	17.0
Total Split (s)	19.0	33.0		14.0	14.0	14.0	10.0	20.0		22.0	32.0	32.0
Total Split (%)	25.3%	44.0%		18.7%	18.7%	18.7%	13.3%	26.7%		29.3%	42.7%	42.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	27.1	27.1		9.3	9.3	9.3	19.9	14.9		36.7	28.9	28.9
Actuated g/C Ratio	0.37	0.37		0.13	0.13	0.13	0.27	0.20		0.50	0.39	0.39
v/c Ratio	0.61	0.90		0.05	0.23	0.38	0.57	0.75		0.85	0.54	0.18
Control Delay	23.9	37.9		30.6	32.5	3.5	23.1	35.5		33.7	20.1	1.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	23.9	37.9		30.6	32.5	3.5	23.1	35.5		33.7	20.1	1.9
LOS	C	D		C	C	A	C	D		C	C	A
Approach Delay		33.4			11.3			32.9			22.8	
Approach LOS		C			B			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 73.8	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	

Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

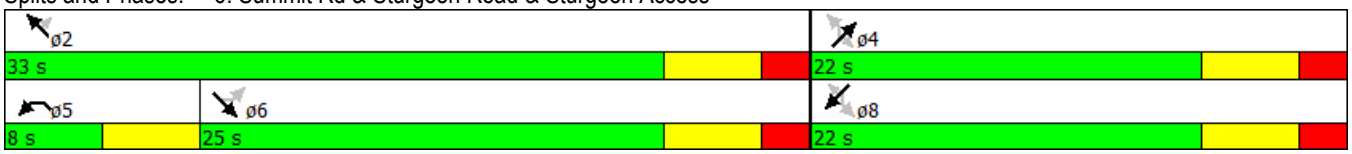


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	840	45	155	555	260	85	5	310	160	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		50.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3550	0	3471	3579	1601	0	1799	1601	0	1789	1601
Flt Permitted	0.424			0.950				0.618			0.694	
Satd. Flow (perm)	799	3550	0	3471	3579	1601	0	1164	1601	0	1307	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				283			215			139
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			145.5			370.1	
Travel Time (s)		29.0			9.7			10.5			26.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	962	0	168	603	283	0	97	337	0	174	49
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		8.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0		8.0	33.0	33.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	45.5%	45.5%		14.5%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	21.0	21.0		4.0	27.2	27.2		11.5	11.5		11.5	11.5
Actuated g/C Ratio	0.41	0.41		0.08	0.54	0.54		0.23	0.23		0.23	0.23
v/c Ratio	0.02	0.65		0.61	0.31	0.29		0.37	0.64		0.59	0.10
Control Delay	11.8	16.4		35.8	7.8	2.1		20.3	12.7		25.9	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	11.8	16.4		35.8	7.8	2.1		20.3	12.7		25.9	0.4
LOS	B	B		D	A	A		C	B		C	A
Approach Delay		16.4			10.7			14.4			20.3	
Approach LOS		B			B			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 55	
Actuated Cycle Length: 50.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	

Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Summit Rd & Sturgeon Road & Sturgeon Access

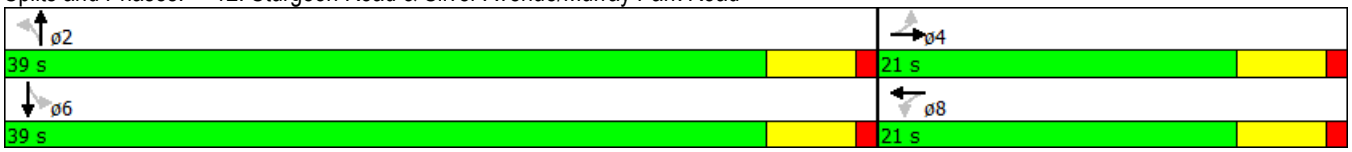


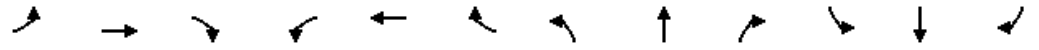
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	215	75	30	30	105	15	545	85	235	785	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	100.0		0.0	0.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1818	0	0	1706	0	0	3503	0	0	3539	0
Flt Permitted					0.753			0.923			0.658	
Satd. Flow (perm)	0	1818	0	0	1296	0	0	3237	0	0	2355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			114			46				
Link Speed (k/h)		50			50			60			70	
Link Distance (m)		803.5			448.1			682.3			471.4	
Travel Time (s)		57.9			32.3			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	180	0	0	700	0	0	1108	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	21.0	21.0		21.0	21.0		39.0	39.0		39.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
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)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		13.3			13.3			34.3			34.3	
Actuated g/C Ratio		0.23			0.23			0.60			0.60	
v/c Ratio		0.72			0.47			0.36			0.79	
Control Delay		28.3			12.3			6.6			15.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		28.3			12.3			6.6			15.4	
LOS		C			B			A			B	
Approach Delay		28.3			12.3			6.6			15.4	
Approach LOS		C			B			A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 57.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.79	

Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue/Murray Park Road



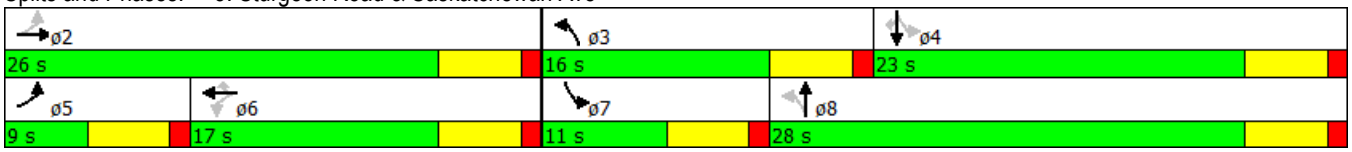


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	90	255	10	200	375	365	665	5	100	755	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		30.0	40.0		50.0	150.0		0.0	75.0		75.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1674	0	1789	1883	1601	1789	3575	0	1789	3579	1601
Flt Permitted	0.350			0.539			0.167			0.375		
Satd. Flow (perm)	659	1674	0	1015	1883	1601	315	3575	0	706	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		231				317		1				357
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	375	0	11	217	408	397	728	0	109	821	370
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Detector Phase	5	2		6	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0	5.0	4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0	10.0	9.0	17.0		10.0	17.0	17.0
Total Split (s)	9.0	26.0		17.0	17.0	17.0	16.0	28.0		11.0	23.0	23.0
Total Split (%)	13.8%	40.0%		26.2%	26.2%	26.2%	24.6%	43.1%		16.9%	35.4%	35.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	20.9	20.9		11.9	11.9	11.9	34.0	25.2		23.9	18.0	18.0
Actuated g/C Ratio	0.32	0.32		0.18	0.18	0.18	0.52	0.39		0.37	0.28	0.28
v/c Ratio	0.62	0.54		0.06	0.63	0.74	0.96	0.52		0.30	0.83	0.53
Control Delay	28.5	10.2		22.9	33.8	16.2	52.8	17.8		11.2	31.1	6.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	28.5	10.2		22.9	33.8	16.2	52.8	17.8		11.2	31.1	6.0
LOS	C	B		C	C	B	D	B		B	C	A
Approach Delay		16.0			22.3			30.1			22.3	
Approach LOS		B			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 64.9	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	

Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

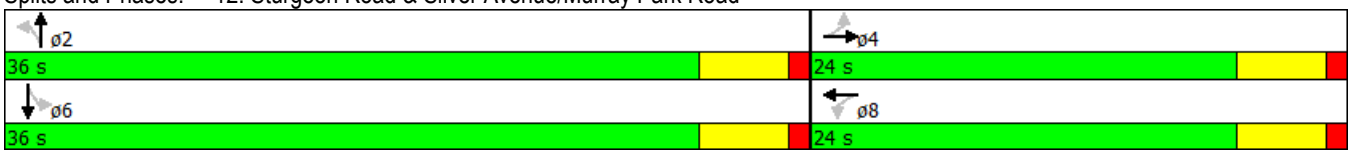


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	55	25	95	175	225	70	870	30	125	825	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	100.0		0.0	0.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1804	0	0	1753	0	0	3546	0	0	3550	0
Flt Permitted					0.914			0.778			0.622	
Satd. Flow (perm)	0	1804	0	0	1616	0	0	2770	0	0	2224	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			73			8			1	
Link Speed (k/h)		50			50			60			70	
Link Distance (m)		800.8			446.9			682.3			471.4	
Travel Time (s)		57.7			32.2			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	87	0	0	538	0	0	1055	0	0	1038	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	24.0	24.0		24.0	24.0		36.0	36.0		36.0	36.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
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)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		19.0			19.0			31.0			31.0	
Actuated g/C Ratio		0.32			0.32			0.52			0.52	
v/c Ratio		0.15			0.96			0.74			0.90	
Control Delay		11.8			50.2			15.1			26.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.8			50.2			15.1			26.7	
LOS		B			D			B			C	
Approach Delay		11.8			50.2			15.1			26.7	
Approach LOS		B			D			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	

Intersection Signal Delay: 26.4	Intersection LOS: C
Intersection Capacity Utilization 101.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue/Murray Park Road

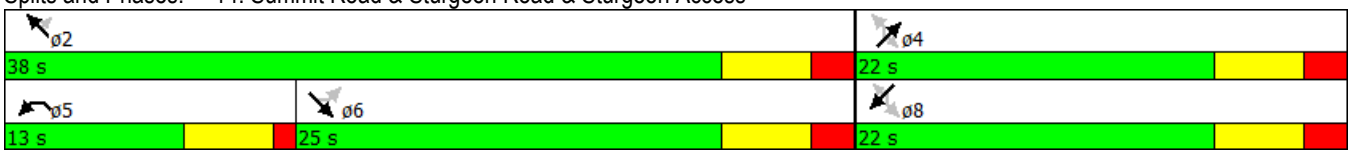


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	15	815	110	395	580	315	85	0	300	190	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		50.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3514	0	3471	3579	1601	0	1789	1601	0	1799	1601
Flt Permitted	0.413			0.950				0.618			0.671	
Satd. Flow (perm)	778	3514	0	3471	3579	1601	0	1164	1601	0	1264	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				342			326			145
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		641.6			217.5			151.7			297.6	
Travel Time (s)		28.9			9.8			10.9			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1006	0	429	630	342	0	92	326	0	218	16
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0		13.0	38.0	38.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	41.7%	41.7%		21.7%	63.3%	63.3%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	19.0	19.0		8.0	32.1	32.1		13.6	13.6		13.6	13.6
Actuated g/C Ratio	0.33	0.33		0.14	0.56	0.56		0.24	0.24		0.24	0.24
v/c Ratio	0.06	0.86		0.89	0.32	0.33		0.34	0.52		0.73	0.03
Control Delay	15.3	27.6		49.7	7.9	2.0		21.7	5.9		36.4	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	15.3	27.6		49.7	7.9	2.0		21.7	5.9		36.4	0.1
LOS	B	C		D	A	A		C	A		D	A
Approach Delay		27.5			19.2			9.4			33.9	
Approach LOS		C			B			A			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 57.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	

Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 14: Summit Road & Sturgeon Road & Sturgeon Access

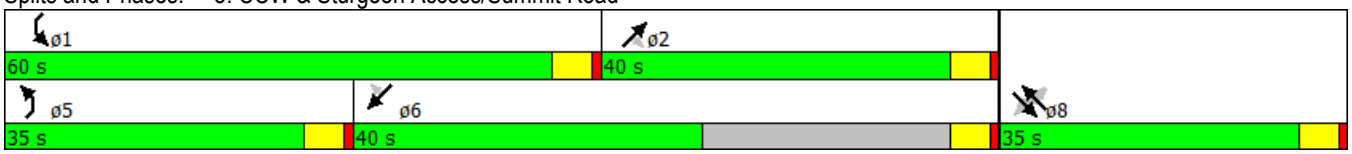


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	60	0	515	0	1015	290	775	525	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						643			276			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	65	0	560	0	1103	315	842	571	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				12.3		12.3		35.3	35.3	29.4	69.7	
Actuated g/C Ratio				0.13		0.13		0.38	0.38	0.32	0.76	
v/c Ratio				0.34		0.73		0.80	0.40	0.76	0.21	
Control Delay				43.2		7.3		32.4	6.3	33.2	3.6	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				43.2		7.3		32.4	6.3	33.2	3.6	
LOS				D		A		C	A	C	A	
Approach Delay								26.6			21.2	
Approach LOS								C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 92.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	

Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road

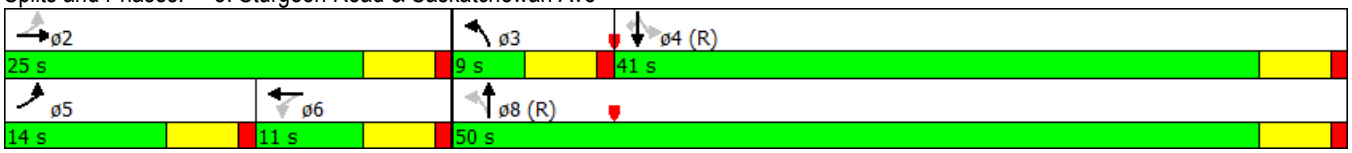


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	275	130	5	45	140	30	380	20	430	440	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1793	0	1789	1671	0	1789	1868	0	0	3493	1601
Flt Permitted	0.339			0.588			0.189				0.651	
Satd. Flow (perm)	638	1793	0	1107	1671	0	356	1868	0	0	2330	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			152			6				175
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	277	440	0	5	201	0	33	435	0	0	945	120
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	14.0	25.0		11.0	11.0		9.0	50.0		41.0	41.0	41.0
Total Split (%)	18.7%	33.3%		14.7%	14.7%		12.0%	66.7%		54.7%	54.7%	54.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	C-Min
Act Effct Green (s)	23.0	23.0		6.8	6.8		42.0	42.0			38.4	38.4
Actuated g/C Ratio	0.31	0.31		0.09	0.09		0.56	0.56			0.51	0.51
v/c Ratio	0.75	0.77		0.05	0.70		0.12	0.42			0.95dl	0.13
Control Delay	39.7	34.6		33.2	25.4		7.4	10.3			22.0	1.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	39.7	34.6		33.2	25.4		7.4	10.3			22.0	1.0
LOS	D	C		C	C		A	B			C	A
Approach Delay		36.6			25.6			10.1			19.6	
Approach LOS		D			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 89.1%	ICU Level of Service E
Analysis Period (min) 15	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

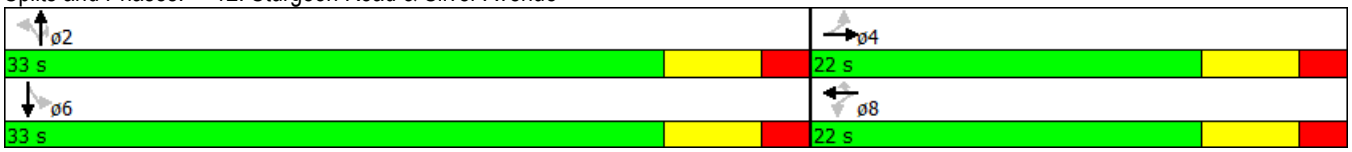


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	225	80	30	30	130	20	310	95	295	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	70.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3439	0	1789	1883	1601	0	1878	1601	1789	1883	0
Flt Permitted				0.551				0.971		0.547		
Satd. Flow (perm)	0	3439	0	1038	1883	1601	0	1829	1601	1030	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				141			103			
Link Speed (k/h)		50			48			60			70	
Link Distance (m)		803.2			1346.5			682.3			471.4	
Travel Time (s)		57.8			101.0			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	332	0	33	33	141	0	359	103	321	321	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	33.0	33.0	33.0	33.0	33.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max	
Act Effct Green (s)		8.9		8.9	8.9	8.9		27.5	27.5	27.5	27.5	
Actuated g/C Ratio		0.18		0.18	0.18	0.18		0.57	0.57	0.57	0.57	
v/c Ratio		0.47		0.17	0.10	0.34		0.35	0.11	0.55	0.30	
Control Delay		14.9		18.3	16.3	6.4		7.4	2.0	11.9	7.0	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		14.9		18.3	16.3	6.4		7.4	2.0	11.9	7.0	
LOS		B		B	B	A		A	A	B	A	
Approach Delay		14.9			9.9			6.2			9.4	
Approach LOS		B			A			A			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 55	
Actuated Cycle Length: 48.5	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.55	

Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

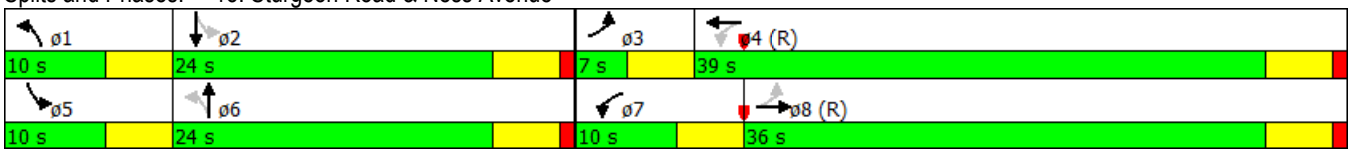
Splits and Phases: 12: Sturgeon Road & Silver Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	820	200	120	410	75	110	300	165	150	320	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3496	0	1789	3389	0	1789	3546	0
Flt Permitted	0.450			0.118			0.464			0.330		
Satd. Flow (perm)	848	3475	0	222	3496	0	874	3389	0	622	3546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			33			121			8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	1108	0	130	528	0	120	505	0	163	370	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	7.0	36.0		10.0	39.0		10.0	24.0		10.0	24.0	
Total Split (%)	8.8%	45.0%		12.5%	48.8%		12.5%	30.0%		12.5%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	35.0	31.0		41.0	34.0		26.0	19.0		26.0	19.0	
Actuated g/C Ratio	0.44	0.39		0.51	0.42		0.32	0.24		0.32	0.24	
v/c Ratio	0.19	0.81		0.56	0.35		0.34	0.56		0.56	0.44	
Control Delay	11.2	26.6		19.8	13.8		20.0	22.9		26.4	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.2	26.6		19.8	13.8		20.0	22.9		26.4	27.3	
LOS	B	C		B	B		B	C		C	C	
Approach Delay		25.6			15.0			22.4			27.0	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 22.9		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

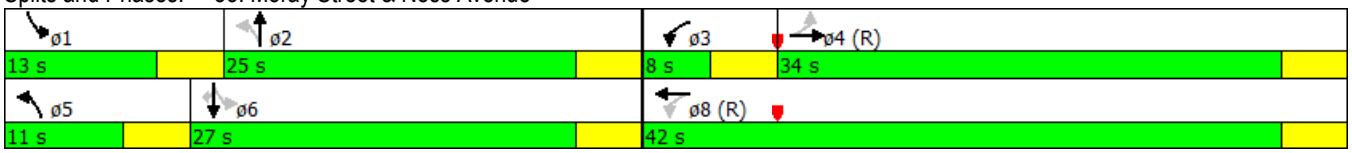


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	820	130	85	405	265	185	575	155	275	235	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3507	0	1789	3367	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.375			0.114			0.594			0.179		
Satd. Flow (perm)	706	3507	*0	215	3367	*0	1119	3464	*0	337	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			260			41				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			220.5	
Travel Time (s)		73.2			21.7			28.5			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1032	0	92	728	0	201	793	0	299	255	49
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	34.0	34.0		8.0	42.0		11.0	25.0		13.0	27.0	27.0
Total Split (%)	42.5%	42.5%		10.0%	52.5%		13.8%	31.3%		16.3%	33.8%	33.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	32.3	32.3		38.7	38.7		27.3	20.3		31.3	22.3	22.3
Actuated g/C Ratio	0.40	0.40		0.48	0.48		0.34	0.25		0.39	0.28	0.28
v/c Ratio	0.12	0.72		0.49	0.41		0.46	0.87		1.01	0.26	0.09
Control Delay	10.0	13.5		20.8	9.1		19.7	39.0		78.0	23.0	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.0	13.5		20.8	9.1		19.7	39.0		78.0	23.0	0.3
LOS	A	B		C	A		B	D		E	C	A
Approach Delay		13.4			10.4			35.1			48.4	
Approach LOS		B			B			D			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 74 (93%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 24.9	Intersection LOS: C
Intersection Capacity Utilization 99.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	5	905	0	0	570	290	0	5	0	170	0	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	984	0	0	620	315	0	5	0	185	0	49
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	620			984			1304	1614	492	1125	1614	310
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620			984			1304	1614	492	1125	1614	310
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	95	100	0	100	93
cM capacity (veh/h)	957			698			109	102	523	153	102	686

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	5	656	328	207	413	315	5	234
Volume Left	5	0	0	0	0	0	0	185
Volume Right	0	0	0	0	0	315	0	49
cSH	957	1700	1700	698	1700	1700	102	193
Volume to Capacity	0.01	0.39	0.19	0.00	0.24	0.19	0.05	1.21
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.0	1.3	93.0
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	0.0	42.1	159.3
Lane LOS	A						E	F
Approach Delay (s)	0.0			0.0			42.1	159.3
Approach LOS							E	F

Intersection Summary				
Average Delay	17.3			
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	40	5	50	45	15	115
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	54	49	16	125
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			43		201	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			43		201	43
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	88
cM capacity (veh/h)			1565		760	1027

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	43	5	103	141
Volume Left	0	0	54	16
Volume Right	0	5	0	125
cSH	1700	1700	1565	1161
Volume to Capacity	0.03	0.00	0.03	0.12
Queue Length 95th (m)	0.0	0.0	0.8	3.2
Control Delay (s)	0.0	0.0	4.0	9.1
Lane LOS			A	A
Approach Delay (s)	0.0		4.0	9.1
Approach LOS				A

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	175	15	50	65	25	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	190	16	54	71	27	179
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			190		370	190
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			190		370	190
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	79
cM capacity (veh/h)			1384		606	852

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	190	16	125	207
Volume Left	0	0	54	27
Volume Right	0	16	0	179
cSH	1700	1700	1384	981
Volume to Capacity	0.11	0.01	0.04	0.21
Queue Length 95th (m)	0.0	0.0	0.9	6.0
Control Delay (s)	0.0	0.0	3.5	10.5
Lane LOS			A	B
Approach Delay (s)	0.0		3.5	10.5
Approach LOS				B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	110	185	85	80	35	100	180	50	40	300	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	120	201	92	87	38	109	196	54	43	326	27

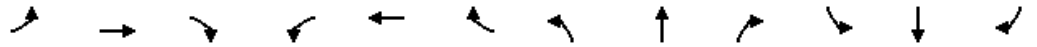
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	152	201	179	38	359	397
Volume Left (vph)	33	0	92	0	109	43
Volume Right (vph)	0	201	0	38	54	27
Hadj (s)	0.14	-0.67	0.29	-0.67	0.00	0.01
Departure Headway (s)	7.8	7.0	8.2	7.2	6.7	6.7
Degree Utilization, x	0.33	0.39	0.41	0.08	0.67	0.73
Capacity (veh/h)	415	465	386	437	505	511
Control Delay (s)	13.4	13.1	15.6	9.6	22.5	25.9
Approach Delay (s)	13.3		14.5		22.5	25.9
Approach LOS	B		B		C	D

Intersection Summary				
Delay	19.7			
Level of Service	C			
Intersection Capacity Utilization	60.4%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	340	20	40	90	25	115
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	370	22	43	98	27	125
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			391		565	380
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			391		565	380
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	81
cM capacity (veh/h)			1167		468	667

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	391	141	152
Volume Left	0	43	27
Volume Right	22	0	125
cSH	1700	1167	812
Volume to Capacity	0.23	0.04	0.19
Queue Length 95th (m)	0.0	0.9	5.2
Control Delay (s)	0.0	2.7	11.9
Lane LOS		A	B
Approach Delay (s)	0.0	2.7	11.9
Approach LOS			B

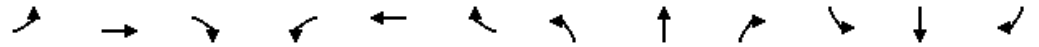
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	30	0	15	0	125	180	120	110	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	33	0	16	0	136	196	130	120	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	49	136	196	250	0
Volume Left (vph)	0	33	0	0	130	0
Volume Right (vph)	5	16	0	196	0	0
Hadj (s)	-0.27	-0.03	0.03	-0.67	0.29	0.00
Departure Headway (s)	5.0	5.2	4.9	4.2	5.2	4.9
Degree Utilization, x	0.02	0.07	0.19	0.23	0.36	0.00
Capacity (veh/h)	636	624	716	834	674	730
Control Delay (s)	8.1	8.6	7.8	7.3	9.9	6.7
Approach Delay (s)	8.1	8.6	7.5		9.9	
Approach LOS	A	A	A		A	

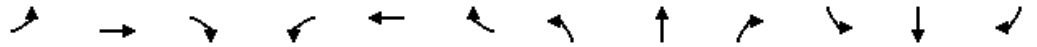
Intersection Summary				
Delay	8.5			
Level of Service	A			
Intersection Capacity Utilization	38.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	470	15	65	130	10	10	0	125	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	511	16	71	141	11	11	0	136	5	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	152			527			807	812	519	943	815	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152			527			807	812	519	943	815	147
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			96	100	76	97	100	100
cM capacity (veh/h)	1429			1040			284	292	557	174	291	900

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	527	223	147	5
Volume Left	0	71	11	5
Volume Right	16	11	136	0
cSH	1429	1040	520	174
Volume to Capacity	0.00	0.07	0.28	0.03
Queue Length 95th (m)	0.0	1.7	8.8	0.7
Control Delay (s)	0.0	3.2	14.6	26.4
Lane LOS		A	B	D
Approach Delay (s)	0.0	3.2	14.6	26.4
Approach LOS			B	D

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	100	15	55	40	0	5	0	55	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	109	16	60	43	0	5	0	60	0	0	0

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	125	103	65
Volume Left (vph)	0	60	5
Volume Right (vph)	16	0	60
Hadj (s)	-0.04	0.15	-0.50
Departure Headway (s)	4.1	4.3	3.9
Degree Utilization, x	0.14	0.12	0.07
Capacity (veh/h)	857	816	867
Control Delay (s)	7.8	7.9	7.2
Approach Delay (s)	7.8	7.9	7.2
Approach LOS	A	A	A

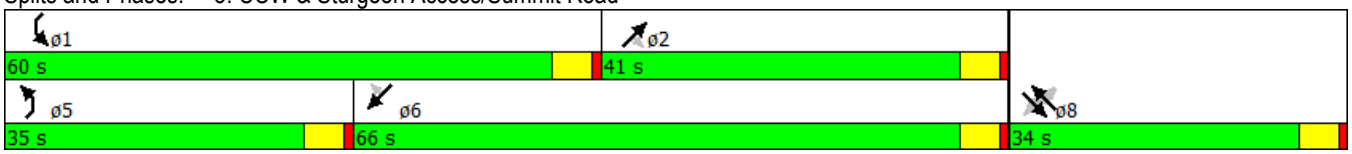
Intersection Summary				
Delay	7.7			
Level of Service	A			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

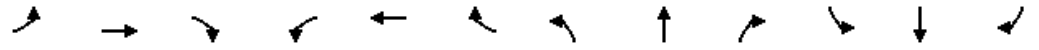
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	225	0	380	0	555	105	930	1085	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						656			114			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	245	0	413	0	603	114	1011	1179	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	34.0	34.0		34.0	34.0	34.0	35.0	41.0	41.0	60.0	66.0	66.0
Total Split (%)	25.2%	25.2%		25.2%	25.2%	25.2%	25.9%	30.4%	30.4%	44.4%	48.9%	48.9%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				24.3		24.3		26.3	26.3	39.6	71.1	
Actuated g/C Ratio				0.23		0.23		0.25	0.25	0.37	0.67	
v/c Ratio				0.75		0.47		0.68	0.24	0.78	0.49	
Control Delay				56.3		1.8		41.8	8.1	34.9	9.3	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				56.3		1.8		41.8	8.1	34.9	9.3	
LOS				E		A		D	A	C	A	
Approach Delay								36.5			21.1	
Approach LOS								D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 105.9	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	

Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road



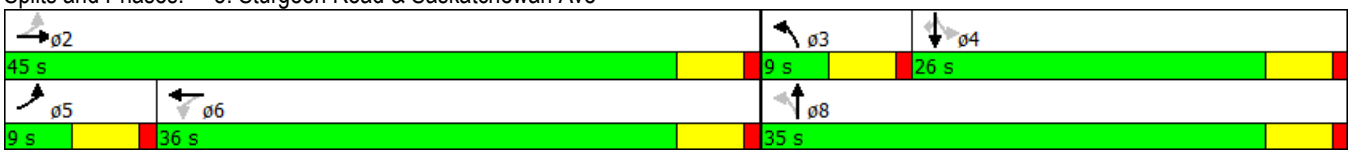


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	90	60	10	195	375	110	320	5	95	520	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	75.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1770	0	1789	1697	0	1789	1880	0	0	3550	1601
Flt Permitted	0.121			0.654			0.188				0.821	
Satd. Flow (perm)	228	1770	0	1232	1697	0	354	1880	0	0	2938	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60			141			1				342
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	163	0	11	620	0	120	353	0	0	668	342
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	9.0	45.0		36.0	36.0		9.0	35.0		26.0	26.0	26.0
Total Split (%)	11.3%	56.3%		45.0%	45.0%		11.3%	43.8%		32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	37.1	37.1		27.9	27.9		27.2	27.2			20.4	20.4
Actuated g/C Ratio	0.50	0.50		0.37	0.37		0.37	0.37			0.27	0.27
v/c Ratio	0.74	0.18		0.02	0.86		0.58	0.51			0.83	0.50
Control Delay	37.4	7.7		15.5	30.5		29.9	22.0			37.5	5.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	37.4	7.7		15.5	30.5		29.9	22.0			37.5	5.8
LOS	D	A		B	C		C	C			D	A
Approach Delay		21.8			30.2			24.0			26.8	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 74.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	

Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	55	30	105	190	245	75	255	30	255	255	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	70.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3389	0	1789	1883	1601	0	1863	1601	1789	1878	0
Flt Permitted				0.694				0.863		0.547		
Satd. Flow (perm)	0	3389	0	1307	1883	1601	0	1625	1601	1030	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				266			65		2	
Link Speed (k/h)		50			48			60			70	
Link Distance (m)		803.4			1330.0			682.3			471.4	
Travel Time (s)		57.8			99.8			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	114	207	266	0	359	33	277	282	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	28.0	28.0	28.0	28.0	28.0	
Total Split (%)	44.0%	44.0%		44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%	56.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max	
Act Effct Green (s)		11.0		11.0	11.0	11.0		23.2	23.2	23.2	23.2	
Actuated g/C Ratio		0.24		0.24	0.24	0.24		0.50	0.50	0.50	0.50	
v/c Ratio		0.11		0.37	0.46	0.46		0.44	0.04	0.54	0.30	
Control Delay		9.3		17.3	17.9	5.1		10.6	1.3	14.2	8.8	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		9.3		17.3	17.9	5.1		10.6	1.3	14.2	8.8	
LOS		A		B	B	A		B	A	B	A	
Approach Delay		9.3			12.0			9.9			11.5	
Approach LOS		A			B			A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 46.3	
Natural Cycle: 50	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.54	

Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

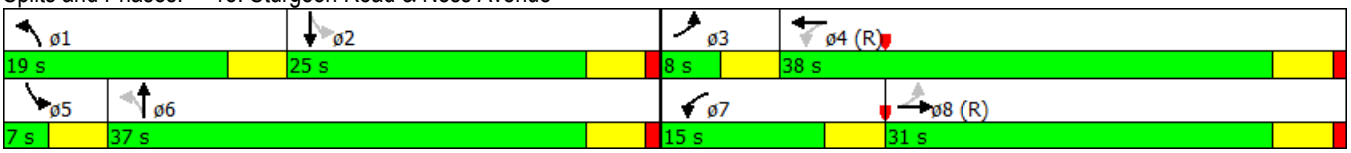
Splits and Phases: 12: Sturgeon Road & Silver Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	520	130	220	985	120	290	360	145	30	390	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3471	0	1789	3521	0	1789	3425	0	1789	3475	0
Flt Permitted	0.154			0.183			0.233			0.447		
Satd. Flow (perm)	290	3471	0	345	3521	0	439	3425	0	842	3475	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			16			75			30	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	706	0	239	1201	0	315	549	0	33	527	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	8.0	31.0		15.0	38.0		19.0	37.0		7.0	25.0	
Total Split (%)	8.9%	34.4%		16.7%	42.2%		21.1%	41.1%		7.8%	27.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	31.0	26.0		42.0	33.0		40.0	32.0		24.0	20.0	
Actuated g/C Ratio	0.34	0.29		0.47	0.37		0.44	0.36		0.27	0.22	
v/c Ratio	0.46	0.69		0.71	0.92		0.75	0.43		0.13	0.66	
Control Delay	23.9	31.1		19.3	31.6		29.8	20.1		16.9	34.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.9	31.1		19.3	31.6		29.8	20.1		16.9	34.7	
LOS	C	C		B	C		C	C		B	C	
Approach Delay		30.4			29.6			23.7			33.7	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Pretimed			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 79.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

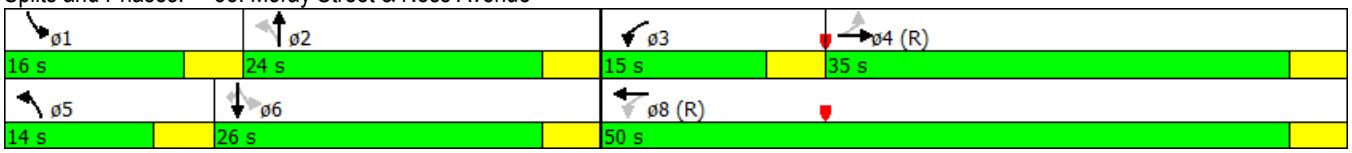


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	400	105	370	1100	190	205	245	140	360	525	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3468	0	1789	3500	0	1789	3382	0	1789	3579	1601
Flt Permitted	0.144			0.305			0.237			0.283		
Satd. Flow (perm)	271	3468	*0	574	3500	*0	446	3382	*0	533	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			32			115				109
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			424.6	
Travel Time (s)		73.2			21.7			28.5			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	549	0	402	1403	0	223	418	0	391	571	82
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	35.0	35.0		15.0	50.0		14.0	24.0		16.0	26.0	26.0
Total Split (%)	38.9%	38.9%		16.7%	55.6%		15.6%	26.7%		17.8%	28.9%	28.9%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	31.4	31.4		48.5	48.5		27.2	16.9		31.7	19.1	19.1
Actuated g/C Ratio	0.35	0.35		0.54	0.54		0.30	0.19		0.35	0.21	0.21
v/c Ratio	0.17	0.44		0.83	0.74		0.77	0.57		1.08	0.75	0.19
Control Delay	17.6	14.1		31.9	19.0		40.3	26.6		95.1	39.7	4.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	14.1		31.9	19.0		40.3	26.6		95.1	39.7	4.2
LOS	B	B		C	B		D	C		F	D	A
Approach Delay		14.2			21.9			31.4			57.7	
Approach LOS		B			C			C			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 31.5	Intersection LOS: C
Intersection Capacity Utilization 106.0%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	20	840	0	0	595	345	0	0	0	200	10	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	913	0	0	647	375	0	0	0	217	11	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												11
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	647			913			1285	1603	457	1147	1603	323
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	647			913			1285	1603	457	1147	1603	323
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	0	89	98
cM capacity (veh/h)	935			742			107	102	551	151	102	672

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	NE 1	SW 1
Volume Total	22	609	304	216	431	375	0	245
Volume Left	22	0	0	0	0	0	0	217
Volume Right	0	0	0	0	0	375	0	16
cSH	935	1700	1700	742	1700	1700	1700	158
Volume to Capacity	0.02	0.36	0.18	0.00	0.25	0.22	0.00	1.55
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.0	0.0	124.8
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	0.0	0.0	328.1
Lane LOS	A						A	F
Approach Delay (s)	0.2			0.0			0.0	328.1
Approach LOS							A	F

Intersection Summary				
Average Delay	36.5			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	50	30	50	125	15	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	33	54	136	16	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		299	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		299	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	95
cM capacity (veh/h)			1551		668	1013

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	54	33	190	71
Volume Left	0	0	54	16
Volume Right	0	33	0	54
cSH	1700	1700	1551	1316
Volume to Capacity	0.03	0.02	0.04	0.05
Queue Length 95th (m)	0.0	0.0	0.8	1.3
Control Delay (s)	0.0	0.0	2.3	9.2
Lane LOS			A	A
Approach Delay (s)	0.0		2.3	9.2
Approach LOS				A

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	105	30	205	160	25	80
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	33	223	174	27	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			114		734	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		734	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			85		92	91
cM capacity (veh/h)			1475		329	938

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	114	33	397	114
Volume Left	0	0	223	27
Volume Right	0	33	0	87
cSH	1700	1700	1475	1232
Volume to Capacity	0.07	0.02	0.15	0.09
Queue Length 95th (m)	0.0	0.0	4.0	2.3
Control Delay (s)	0.0	0.0	5.0	11.1
Lane LOS			A	B
Approach Delay (s)	0.0		5.0	11.1
Approach LOS				B

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	85	145	130	130	75	125	240	95	30	285	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	92	158	141	141	82	136	261	103	33	310	27

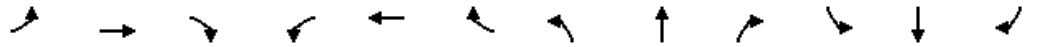
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	125	158	283	82	500	370
Volume Left (vph)	33	0	141	0	136	33
Volume Right (vph)	0	158	0	82	103	27
Hadj (s)	0.16	-0.67	0.28	-0.67	-0.04	0.01
Departure Headway (s)	8.8	8.0	8.6	7.7	7.4	7.6
Degree Utilization, x	0.31	0.35	0.68	0.17	1.0	0.78
Capacity (veh/h)	388	427	408	454	500	460
Control Delay (s)	14.5	14.1	26.6	11.1	74.0	33.3
Approach Delay (s)	14.3		23.2		74.0	33.3
Approach LOS	B		C		F	D

Intersection Summary				
Delay	40.7			
Level of Service	E			
Intersection Capacity Utilization	77.0%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	175	25	165	345	15	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	190	27	179	375	16	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			217		938	204
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		938	204
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			87		94	94
cM capacity (veh/h)			1352		255	837

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	217	554	65
Volume Left	0	179	16
Volume Right	27	0	49
cSH	1700	1352	1019
Volume to Capacity	0.13	0.13	0.06
Queue Length 95th (m)	0.0	3.5	1.6
Control Delay (s)	0.0	3.5	12.2
Lane LOS		A	B
Approach Delay (s)	0.0	3.5	12.2
Approach LOS			B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	165	5	100	5	155	70	35	205	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	179	5	109	5	168	76	38	223	0

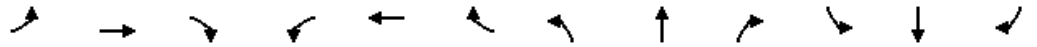
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	293	174	76	261	0
Volume Left (vph)	0	179	5	0	38	0
Volume Right (vph)	0	109	0	76	0	0
Hadj (s)	0.03	-0.07	0.05	-0.67	0.11	0.00
Departure Headway (s)	5.9	5.2	5.7	5.0	5.8	5.7
Degree Utilization, x	0.01	0.42	0.28	0.11	0.42	0.00
Capacity (veh/h)	530	648	595	673	594	614
Control Delay (s)	8.9	12.0	9.7	7.4	11.7	7.5
Approach Delay (s)	8.9	12.0	9.0		11.7	
Approach LOS	A	B	A		B	

Intersection Summary				
Delay	10.9			
Level of Service	B			
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	235	5	155	550	0	5	0	70	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	255	5	168	598	0	5	0	76	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked												
vC, conflicting volume	598			261			1193	1193	258	1269	1196	598
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	598			261			1193	1193	258	1269	1196	598
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			87			96	100	90	100	100	100
cM capacity (veh/h)	979			1304			148	163	780	118	162	502

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	261	766	82	0
Volume Left	0	168	5	0
Volume Right	5	0	76	0
cSH	979	1304	607	1700
Volume to Capacity	0.00	0.13	0.13	0.00
Queue Length 95th (m)	0.0	3.4	3.5	0.0
Control Delay (s)	0.0	3.1	11.9	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	3.1	11.9	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	55	15	80	50	25	25	130	85	30	95	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	60	16	87	54	27	27	141	92	33	103	33

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	92	141	27	168	92	136	33
Volume Left (vph)	16	87	0	27	0	33	0
Volume Right (vph)	16	0	27	0	92	0	33
Hadj (s)	-0.04	0.34	-0.67	0.11	-0.67	0.15	-0.67
Departure Headway (s)	5.8	6.0	5.0	5.6	4.8	5.7	4.9
Degree Utilization, x	0.15	0.24	0.04	0.26	0.12	0.22	0.04
Capacity (veh/h)	576	559	662	617	710	595	689
Control Delay (s)	9.8	9.7	7.0	9.3	7.3	9.1	6.9
Approach Delay (s)	9.8	9.3		8.6		8.7	
Approach LOS	A	A		A		A	

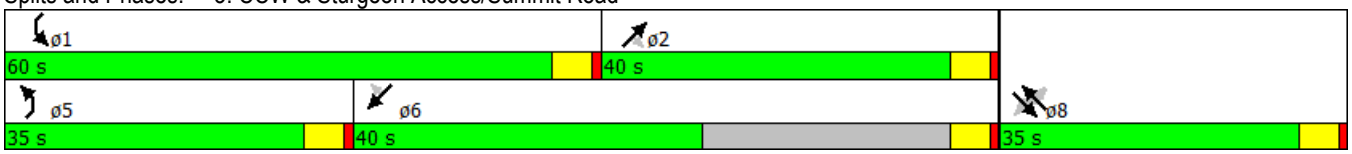
Intersection Summary				
Delay	8.9			
Level of Service	A			
Intersection Capacity Utilization	38.6%	ICU Level of Service	A	
Analysis Period (min)	15			

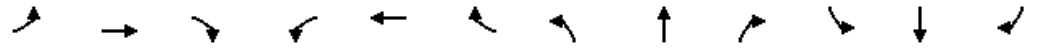
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	75	0	705	0	1015	295	865	525	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						643			282			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	82	0	766	0	1103	321	940	571	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	35.0	35.0		35.0	35.0	35.0	35.0	40.0	40.0	60.0	40.0	40.0
Total Split (%)	25.9%	25.9%		25.9%	25.9%	25.9%	25.9%	29.6%	29.6%	44.4%	29.6%	29.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				21.9		21.9		35.8	35.8	37.1	78.1	
Actuated g/C Ratio				0.20		0.20		0.32	0.32	0.34	0.71	
v/c Ratio				0.29		0.92		0.95	0.45	0.80	0.23	
Control Delay				41.6		25.2		55.4	8.8	39.5	6.5	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				41.6		25.2		55.4	8.8	39.5	6.5	
LOS				D		C		E	A	D	A	
Approach Delay								44.9			27.0	
Approach LOS								D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 135	
Actuated Cycle Length: 110.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	

Intersection Signal Delay: 33.7	Intersection LOS: C
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road





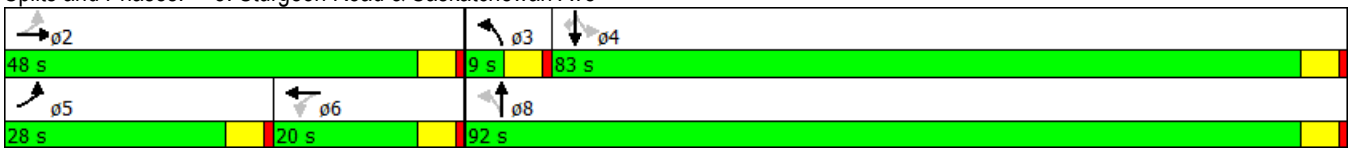
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	290	480	5	50	150	195	605	20	455	935	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	0.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1706	0	1789	1671	0	1789	1874	0	0	3521	1601
Flt Permitted	0.200			0.267			0.070				0.572	
Satd. Flow (perm)	377	1706	0	503	1671	0	132	1874	0	0	2047	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			87			2				121
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	837	0	5	217	0	212	680	0	0	1511	152
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		12.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		17.0	17.0	17.0
Total Split (s)	28.0	48.0		20.0	20.0		9.0	92.0		83.0	83.0	83.0
Total Split (%)	20.0%	34.3%		14.3%	14.3%		6.4%	65.7%		59.3%	59.3%	59.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)	43.0	43.0		15.0	15.0		87.0	87.0			78.0	78.0
Actuated g/C Ratio	0.31	0.31		0.11	0.11		0.62	0.62			0.56	0.56
v/c Ratio	1.02	1.48		0.09	0.85		1.64	0.58			1.51dl	0.16
Control Delay	95.1	257.7		61.0	64.5		340.4	18.2			181.4	4.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	95.1	257.7		61.0	64.5		340.4	18.2			181.4	4.3
LOS	F	F		E	E		F	B			F	A
Approach Delay		209.5			64.4			94.8			165.2	
Approach LOS		F			E			F			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.64	

Intersection Signal Delay: 157.0	Intersection LOS: F
Intersection Capacity Utilization 137.7%	ICU Level of Service H
Analysis Period (min) 15	

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

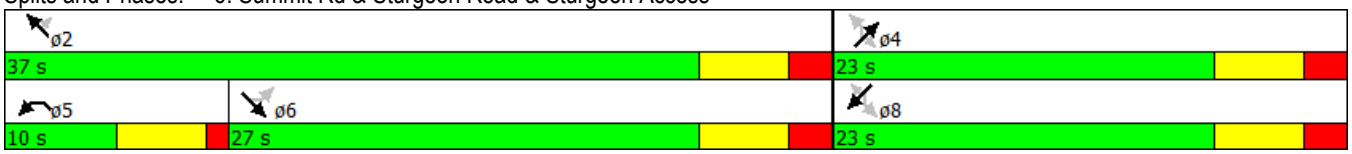


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	935	65	235	640	290	135	5	520	170	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		100.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3543	0	3471	3579	1601	0	1797	1601	0	1789	1601
Flt Permitted	0.387			0.950				0.606			0.660	
Satd. Flow (perm)	729	3543	0	3471	3579	1601	0	1141	1601	0	1243	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				315			227			145
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			151.6			381.4	
Travel Time (s)		29.0			9.7			10.9			27.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1087	0	255	696	315	0	152	565	0	185	49
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	27.0	27.0		10.0	37.0	37.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	45.0%	45.0%		16.7%	61.7%	61.7%	38.3%	38.3%	38.3%	38.3%	38.3%	38.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	21.0	21.0		5.0	31.0	31.0		16.2	16.2		16.2	16.2
Actuated g/C Ratio	0.35	0.35		0.08	0.52	0.52		0.27	0.27		0.27	0.27
v/c Ratio	0.02	0.86		0.87	0.37	0.32		0.49	0.94		0.54	0.09
Control Delay	13.2	26.8		59.0	9.2	2.1		24.1	39.5		25.2	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	13.2	26.8		59.0	9.2	2.1		24.1	39.5		25.2	0.3
LOS	B	C		E	A	A		C	D		C	A
Approach Delay		26.8			17.5			36.2			20.0	
Approach LOS		C			B			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 59.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 24.8	Intersection LOS: C
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Summit Rd & Sturgeon Road & Sturgeon Access



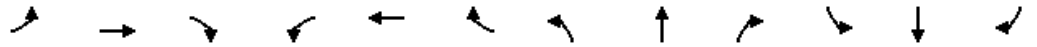
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	225	80	30	30	245	20	585	95	545	890	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	70.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3439	0	1789	1883	1601	0	1880	1601	1789	1883	0
Flt Permitted				0.463				0.952		0.145		
Satd. Flow (perm)	0	3439	0	872	1883	1601	0	1793	1601	273	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				266			97			
Link Speed (k/h)		50			48			60			70	
Link Distance (m)		803.2			1315.4			682.3			471.4	
Travel Time (s)		57.8			98.7			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	332	0	33	33	266	0	658	103	592	967	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	9.0	22.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	43.0	43.0	43.0	25.0	68.0	
Total Split (%)	24.4%	24.4%		24.4%	24.4%	24.4%	47.8%	47.8%	47.8%	27.8%	75.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0		6.0	6.0	5.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Act Effct Green (s)		12.3		12.3	12.3	12.3		37.0	37.0	63.1	62.1	
Actuated g/C Ratio		0.14		0.14	0.14	0.14		0.43	0.43	0.73	0.72	
v/c Ratio		0.63		0.27	0.12	0.58		0.86	0.14	1.08	0.72	
Control Delay		35.1		38.4	32.9	10.1		36.0	4.6	83.0	11.4	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		35.1		38.4	32.9	10.1		36.0	4.6	83.0	11.4	
LOS		D		D	C	B		D	A	F	B	
Approach Delay		35.1			15.2			31.8			38.6	
Approach LOS		D			B			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 86.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.08	

Intersection Signal Delay: 33.9	Intersection LOS: C
Intersection Capacity Utilization 110.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue

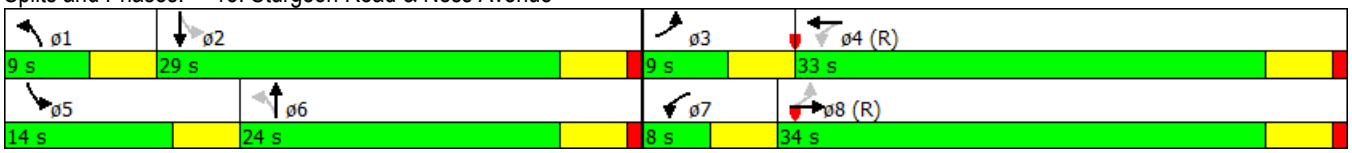




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	820	200	120	410	120	110	525	165	250	815	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3475	0	1789	3457	0	1789	3450	0	1789	3564	0
Flt Permitted	0.337			0.143			0.211			0.174		
Satd. Flow (perm)	635	3475	0	269	3457	0	397	3450	0	328	3564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			52			49			3	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	1108	0	130	576	0	120	750	0	272	908	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	28.0		7.0	24.0		7.0	24.0		7.0	24.0	
Total Split (s)	9.0	34.0		8.0	33.0		9.0	24.0		14.0	29.0	
Total Split (%)	11.3%	42.5%		10.0%	41.3%		11.3%	30.0%		17.5%	36.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	35.0	29.0		33.0	28.0		25.0	19.0		34.0	24.0	
Actuated g/C Ratio	0.44	0.36		0.41	0.35		0.31	0.24		0.42	0.30	
v/c Ratio	0.22	0.86		0.70	0.46		0.57	0.88		0.84	0.85	
Control Delay	13.2	31.3		34.4	19.5		27.1	40.7		41.8	35.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.2	31.3		34.4	19.5		27.1	40.7		41.8	35.4	
LOS	B	C		C	B		C	D		D	D	
Approach Delay		30.1			22.2			38.8			36.9	
Approach LOS		C			C			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 32.6		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue

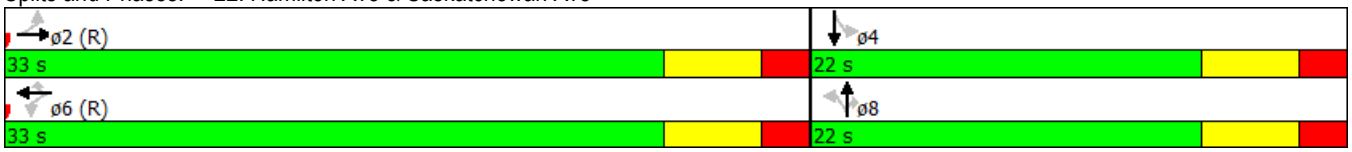


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	555	20	40	195	100	25	20	115	220	45	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	0.0		20.0	50.0		0.0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1874	0	0	1868	1601	0	1833	1601	1789	1883	0
Flt Permitted					0.854			0.834		0.725		
Satd. Flow (perm)	0	1874	0	0	1608	1601	0	1571	1601	1365	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				109			125			
Link Speed (k/h)		60			60			50			48	
Link Distance (m)		1044.0			533.1			524.6			204.8	
Travel Time (s)		62.6			32.0			37.8			15.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	625	0	0	255	109	0	49	125	239	49	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	2	2		6	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	33.0	33.0		33.0	33.0	33.0	22.0	22.0	22.0	22.0	22.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		29.6			29.6	29.6		13.4	13.4	13.4	13.4	
Actuated g/C Ratio		0.54			0.54	0.54		0.24	0.24	0.24	0.24	
v/c Ratio		0.62			0.30	0.12		0.13	0.26	0.72	0.11	
Control Delay		13.0			9.0	2.4		15.7	5.1	31.3	15.4	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		13.0			9.0	2.4		15.7	5.1	31.3	15.4	
LOS		B			A	A		B	A	C	B	
Approach Delay		13.0			7.0			8.1			28.6	
Approach LOS		B			A			A			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 73.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 22: Hamilton Ave & Saskatchewan Ave

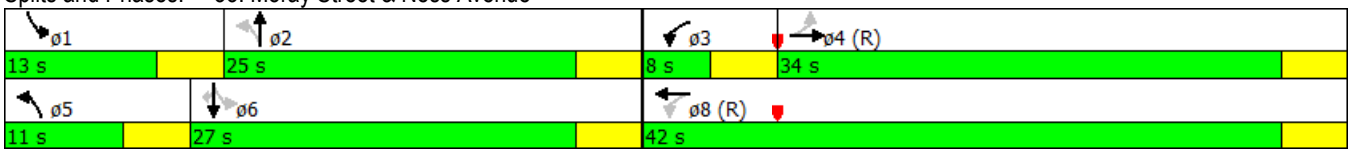


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	930	130	85	450	265	185	575	155	275	235	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3514	0	1789	3378	0	1789	3464	0	1789	3579	1601
Flt Permitted	0.347			0.113			0.594			0.179		
Satd. Flow (perm)	654	3514	*0	213	3378	*0	1119	3464	*0	337	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			204			41				123
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			401.5	
Travel Time (s)		73.2			21.7			28.5			28.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1152	0	92	777	0	201	793	0	299	255	49
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	25.0		8.0	25.0	25.0
Total Split (s)	34.0	34.0		8.0	42.0		11.0	25.0		13.0	27.0	27.0
Total Split (%)	42.5%	42.5%		10.0%	52.5%		13.8%	31.3%		16.3%	33.8%	33.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		None	C-Min		None	Min		None	Min	Min
Act Effct Green (s)	32.3	32.3		38.7	38.7		27.3	20.3		31.3	22.3	22.3
Actuated g/C Ratio	0.40	0.40		0.48	0.48		0.34	0.25		0.39	0.28	0.28
v/c Ratio	0.12	0.81		0.49	0.45		0.46	0.87		1.01	0.26	0.09
Control Delay	13.0	17.1		21.0	10.8		19.7	39.0		78.0	23.0	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	13.0	17.1		21.0	10.8		19.7	39.0		78.0	23.0	0.3
LOS	B	B		C	B		B	D		E	C	A
Approach Delay		17.0			11.9			35.1			48.4	
Approach LOS		B			B			D			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 68 (85%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 99.4%	ICU Level of Service F
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	40	5	75	45	45	15	90	125	95	190	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	43	5	82	49	49	16	98	136	103	207	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	43	5	179	114	136	310
Volume Left (vph)	0	0	82	16	0	103
Volume Right (vph)	0	5	49	0	136	0
Hadj (s)	0.03	-0.57	-0.04	0.06	-0.57	0.10
Departure Headway (s)	5.3	3.2	5.0	4.9	3.2	4.7
Degree Utilization, x	0.06	0.00	0.25	0.16	0.12	0.41
Capacity (veh/h)	612	1121	671	680	1121	730
Control Delay (s)	8.6	6.2	9.6	8.9	6.6	11.0
Approach Delay (s)	8.3		9.6	7.7		11.0
Approach LOS	A		A	A		B

Intersection Summary				
Delay	9.4			
Level of Service	A			
Intersection Capacity Utilization	44.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	390	15	50	170	25	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	424	16	54	185	27	179
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			424		717	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			424		717	424
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		93	72
cM capacity (veh/h)			1135		377	630

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	424	16	239	207
Volume Left	0	0	54	27
Volume Right	0	16	0	179
cSH	1700	1700	1135	726
Volume to Capacity	0.25	0.01	0.05	0.28
Queue Length 95th (m)	0.0	0.0	1.1	8.9
Control Delay (s)	0.0	0.0	2.2	13.3
Lane LOS			A	B
Approach Delay (s)	0.0		2.2	13.3
Approach LOS				B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	130	185	85	125	35	100	180	50	40	300	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	141	201	92	136	38	109	196	54	43	326	27

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	174	201	228	38	359	397
Volume Left (vph)	33	0	92	0	109	43
Volume Right (vph)	0	201	0	38	54	27
Hadj (s)	0.13	-0.67	0.24	-0.67	0.00	0.01
Departure Headway (s)	8.2	7.4	8.5	7.5	7.2	7.1
Degree Utilization, x	0.40	0.41	0.54	0.08	0.72	0.79
Capacity (veh/h)	398	440	386	430	463	484
Control Delay (s)	15.3	14.3	19.6	10.0	26.7	31.5
Approach Delay (s)	14.7		18.3		26.7	31.5
Approach LOS	B		C		D	D

Intersection Summary				
Delay	23.2			
Level of Service	C			
Intersection Capacity Utilization	67.9%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	30	0	15	0	145	180	120	155	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	33	0	16	0	158	196	130	168	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	49	158	196	299	0
Volume Left (vph)	0	33	0	0	130	0
Volume Right (vph)	5	16	0	196	0	0
Hadj (s)	-0.27	-0.03	0.03	-0.67	0.25	0.00
Departure Headway (s)	5.2	5.3	5.0	4.3	5.2	4.9
Degree Utilization, x	0.02	0.07	0.22	0.23	0.43	0.00
Capacity (veh/h)	611	602	708	824	676	726
Control Delay (s)	8.3	8.8	8.1	7.3	10.9	6.7
Approach Delay (s)	8.3	8.8	7.7		10.9	
Approach LOS	A	A	A		B	

Intersection Summary				
Delay	9.1			
Level of Service	A			
Intersection Capacity Utilization	41.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	905	15	65	330	10	10	0	125	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	984	16	71	359	11	11	0	136	5	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	370			1000			1497	1503	992	1633	1505	364
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	327			1000			1497	1503	992	1638	1506	321
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			88	100	54	86	100	100
cM capacity (veh/h)	1188			692			90	105	298	39	105	693

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1000	440	147	5
Volume Left	0	71	11	5
Volume Right	16	11	136	0
cSH	1188	692	254	39
Volume to Capacity	0.00	0.10	0.58	0.14
Queue Length 95th (m)	0.0	2.6	25.0	3.4
Control Delay (s)	0.0	2.9	36.8	112.1
Lane LOS		A	E	F
Approach Delay (s)	0.0	2.9	36.8	112.1
Approach LOS			E	F

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	88.1%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	230	115	60	120	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	250	125	65	130	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	190				429	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	190				429	158
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				77	97
cM capacity (veh/h)	1384				578	888

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	261	190	158
Volume Left	11	0	130
Volume Right	0	65	27
cSH	1384	1700	615
Volume to Capacity	0.01	0.11	0.26
Queue Length 95th (m)	0.2	0.0	7.7
Control Delay (s)	0.4	0.0	12.9
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	12.9
Approach LOS			B

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	100	15	55	40	30	5	165	55	35	285	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	109	16	60	43	33	5	179	60	38	310	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	158	103	33	185	60	348	11
Volume Left (vph)	33	60	0	5	0	38	0
Volume Right (vph)	16	0	33	0	60	0	11
Hadj (s)	0.01	0.32	-0.67	0.05	-0.67	0.09	-0.67
Departure Headway (s)	6.4	6.8	5.8	6.0	5.3	5.9	5.1
Degree Utilization, x	0.28	0.19	0.05	0.31	0.09	0.57	0.02
Capacity (veh/h)	519	484	559	569	638	593	669
Control Delay (s)	11.8	10.2	7.9	10.4	7.6	15.1	7.0
Approach Delay (s)	11.8	9.6		9.7		14.8	
Approach LOS	B	A		A		B	

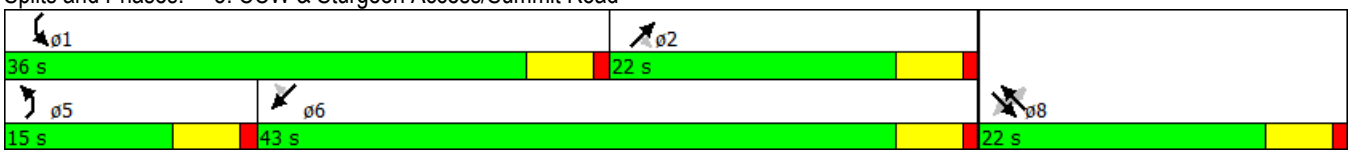
Intersection Summary				
Delay	12.1			
Level of Service	B			
Intersection Capacity Utilization	50.4%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	235	0	545	0	555	120	1155	1085	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		120.0	150.0		100.0	130.0		130.0
Storage Lanes	0		0	1		1	1		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3579	0	1789	1883	1601	1883	3579	1601	3471	3579	1883
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	3579	0	1426	1883	1601	1883	3579	1601	3471	3579	1883
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						669			164			
Link Speed (k/h)		50			70			90			90	
Link Distance (m)		60.4			644.4			424.4			1266.9	
Travel Time (s)		4.3			33.1			17.0			50.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	255	0	592	0	603	130	1255	1179	0
Turn Type				Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8			8		8			2			6
Detector Phase	8	8		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	15.0	21.0	21.0	15.0	21.0	21.0
Total Split (s)	22.0	22.0		22.0	22.0	22.0	15.0	22.0	22.0	36.0	43.0	43.0
Total Split (%)	27.5%	27.5%		27.5%	27.5%	27.5%	18.8%	27.5%	27.5%	45.0%	53.8%	53.8%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)				16.4		16.4		16.5	16.5	30.6	52.1	
Actuated g/C Ratio				0.21		0.21		0.21	0.21	0.39	0.66	
v/c Ratio				0.86		0.69		0.80	0.28	0.93	0.50	
Control Delay				58.1		5.8		39.2	4.3	36.8	7.6	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				58.1		5.8		39.2	4.3	36.8	7.6	
LOS				E		A		D	A	D	A	
Approach Delay								33.0			22.6	
Approach LOS								C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 78.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	

Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: CCW & Sturgeon Access/Summit Road



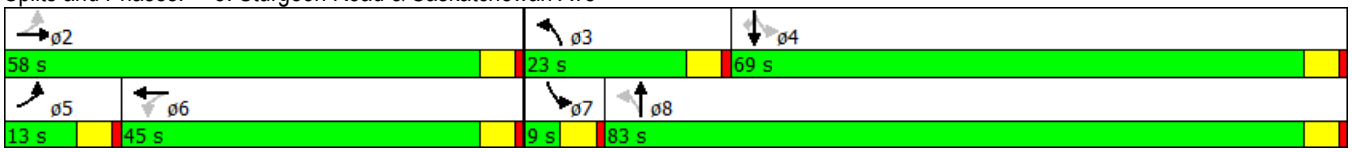
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	105	370	10	215	405	530	895	5	115	945	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		0.0	60.0		0.0	0.0		75.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1663	0	1789	1699	0	1789	1882	0	0	3561	1601
Flt Permitted	0.089			0.225			0.090				0.495	
Satd. Flow (perm)	168	1663	0	424	1699	0	170	1882	0	0	1771	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		131			62							322
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.8			242.9	
Travel Time (s)		15.1			73.4			15.7			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	516	0	11	674	0	576	978	0	0	1152	429
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0		5.0	5.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.0	13.0		10.0	10.0		9.0	17.0		9.0	17.0	17.0
Total Split (s)	13.0	58.0		45.0	45.0		23.0	83.0		9.0	69.0	69.0
Total Split (%)	8.7%	38.7%		30.0%	30.0%		15.3%	55.3%		6.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effct Green (s)	53.0	53.0		40.0	40.0		87.0	87.0			64.0	64.0
Actuated g/C Ratio	0.35	0.35		0.27	0.27		0.58	0.58			0.43	0.43
v/c Ratio	1.46	0.77		0.10	1.35		1.97	0.90			1.92dl	0.49
Control Delay	271.3	40.4		44.4	209.7		474.5	39.8			275.4	9.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	271.3	40.4		44.4	209.7		474.5	39.8			275.4	9.4
LOS	F	D		D	F		F	D			F	A
Approach Delay		107.6			207.0			200.9			203.2	
Approach LOS		F			F			F			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.97	

Intersection Signal Delay: 187.7	Intersection LOS: F
Intersection Capacity Utilization 140.5%	ICU Level of Service H
Analysis Period (min) 15	

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

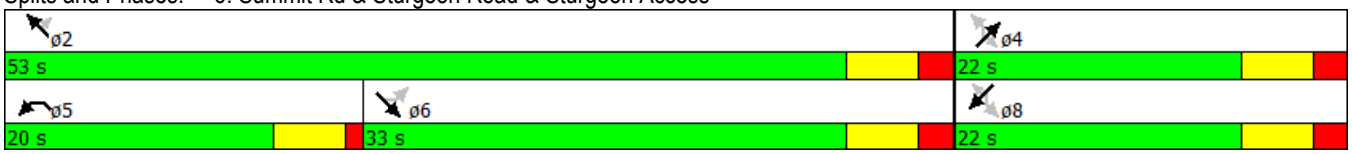


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	20	920	160	605	655	345	120	0	445	200	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		100.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3500	0	3471	3579	1601	0	1789	1601	0	1799	1601
Flt Permitted	0.381			0.950				0.515			0.645	
Satd. Flow (perm)	718	3500	0	3471	3579	1601	0	970	1601	0	1215	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				375			406			116
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			150.9			288.9	
Travel Time (s)		29.0			9.7			10.9			20.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1174	0	658	712	375	0	130	484	0	228	16
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		9.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	33.0	33.0		20.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	44.0%	44.0%		26.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	27.0	27.0		15.0	47.0	47.0		15.6	15.6		15.6	15.6
Actuated g/C Ratio	0.36	0.36		0.20	0.63	0.63		0.21	0.21		0.21	0.21
v/c Ratio	0.08	0.91		0.94	0.32	0.33		0.65	0.74		0.90	0.04
Control Delay	17.1	34.8		54.0	6.9	1.5		43.9	13.5		67.8	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.1	34.8		54.0	6.9	1.5		43.9	13.5		67.8	0.1
LOS	B	C		D	A	A		D	B		E	A
Approach Delay		34.5			23.5			19.9			63.3	
Approach LOS		C			C			B			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 74.6	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Summit Rd & Sturgeon Road & Sturgeon Access



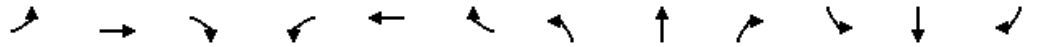
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	55	30	105	190	545	75	955	30	475	770	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	70.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	3389	0	1789	1883	1601	0	1876	1601	1789	1882	0
Flt Permitted				0.694				0.872		0.045		
Satd. Flow (perm)	0	3389	0	1307	1883	1601	0	1642	1601	85	1882	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				343			58		1	
Link Speed (k/h)		50			48			60			70	
Link Distance (m)		803.4			1347.5			682.3			470.7	
Travel Time (s)		57.8			101.1			40.9			24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	114	207	592	0	1120	33	516	842	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	9.0	22.0	
Total Split (s)	28.0	28.0		28.0	28.0	28.0	89.0	89.0	89.0	33.0	122.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	59.3%	59.3%	59.3%	22.0%	81.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0		6.0	6.0	5.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Act Effct Green (s)		22.0		22.0	22.0	22.0		83.0	83.0	117.0	116.0	
Actuated g/C Ratio		0.15		0.15	0.15	0.15		0.55	0.55	0.78	0.77	
v/c Ratio		0.18		0.60	0.75	1.12		1.23	0.04	1.34	0.58	
Control Delay		37.0		73.8	78.8	101.0		145.9	1.1	209.7	8.9	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		37.0		73.8	78.8	101.0		145.9	1.1	209.7	8.9	
LOS		D		E	E	F		F	A	F	A	
Approach Delay		37.0			92.6			141.7			85.2	
Approach LOS		D			F			F			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.34	

Intersection Signal Delay: 104.4	Intersection LOS: F
Intersection Capacity Utilization 122.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue

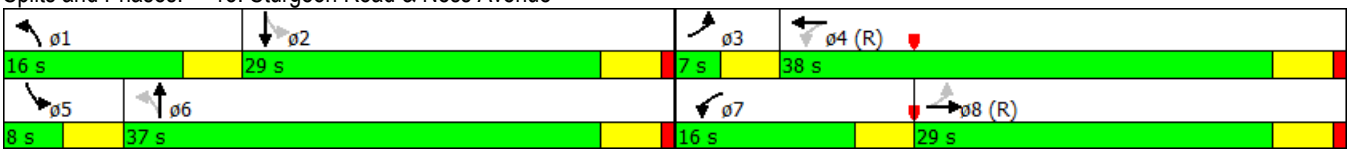




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	520	130	220	985	240	290	940	145	120	815	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	65.0		0.0	70.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3471	0	1789	3475	0	1789	3507	0	1789	3521	0
Flt Permitted	0.167			0.162			0.143			0.167		
Satd. Flow (perm)	315	3471	0	305	3475	0	269	3507	0	315	3521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			37			21			13	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		577.1			1219.6			469.5			104.1	
Travel Time (s)		34.6			73.2			28.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	706	0	239	1332	0	315	1180	0	130	989	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Minimum Split (s)	7.0	24.0		7.0	24.0		7.0	25.0		7.0	25.0	
Total Split (s)	7.0	29.0		16.0	38.0		16.0	37.0		8.0	29.0	
Total Split (%)	7.8%	32.2%		17.8%	42.2%		17.8%	41.1%		8.9%	32.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.0		0.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Act Effct Green (s)	28.0	24.0		41.0	33.0		41.0	32.0		29.0	24.0	
Actuated g/C Ratio	0.31	0.27		0.46	0.37		0.46	0.36		0.32	0.27	
v/c Ratio	0.52	0.74		0.71	1.03		0.97	0.94		0.78	1.04	
Control Delay	30.1	34.3		20.3	50.4		66.2	42.6		50.8	74.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.1	34.3		20.3	50.4		66.2	42.6		50.8	74.4	
LOS	C	C		C	D		E	D		D	E	
Approach Delay		33.9			45.8			47.6			71.6	
Approach LOS		C			D			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 50.3		Intersection LOS: D	
Intersection Capacity Utilization 95.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 15: Sturgeon Road & Ness Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	370	25	165	610	255	15	50	45	185	35	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	0.0		20.0	50.0		0.0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	0	1868	0	0	1863	1601	0	1863	1601	1789	1883	0
Flt Permitted					0.783			0.931		0.711		
Satd. Flow (perm)	0	1868	0	0	1475	1601	0	1753	1601	1339	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				154			49			
Link Speed (k/h)		60			60			50			48	
Link Distance (m)		1044.0			533.1			524.6			246.7	
Travel Time (s)		62.6			32.0			37.8			18.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	429	0	0	842	277	0	70	49	201	38	0
Turn Type		NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	2	2		6	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	53.0	53.0		53.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	
Total Split (%)	70.7%	70.7%		70.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		48.6			48.6	48.6		14.4	14.4	14.4	14.4	
Actuated g/C Ratio		0.65			0.65	0.65		0.19	0.19	0.19	0.19	
v/c Ratio		0.35			0.88	0.25		0.21	0.14	0.78	0.10	
Control Delay		7.3			25.3	3.3		26.2	8.9	50.5	24.7	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		7.3			25.3	3.3		26.2	8.9	50.5	24.7	
LOS		A			C	A		C	A	D	C	
Approach Delay		7.3			19.9			19.1			46.4	
Approach LOS		A			B			B			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 94.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 22: Hamilton Ave & Saskatchewan Ave

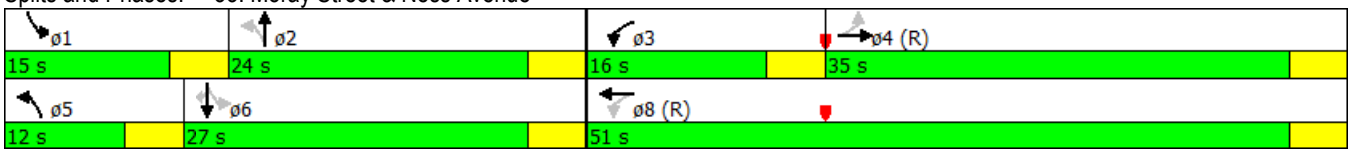


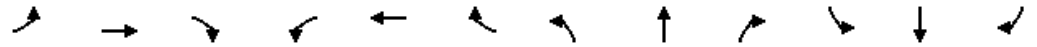
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	490	105	370	1220	190	205	245	140	360	525	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	105.0		0.0	65.0		0.0	90.0		270.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3485	0	1789	3507	0	1789	3382	0	1789	3579	1601
Flt Permitted	0.128			0.248			0.247			0.266		
Satd. Flow (perm)	241	3485	*0	467	3507	*0	465	3382	*0	501	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			29			115				109
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		1219.6			361.9			396.5			417.5	
Travel Time (s)		73.2			21.7			28.5			30.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	647	0	402	1533	0	223	418	0	391	571	82
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	30.0	30.0		4.0	30.0		4.0	10.0		4.0	12.0	12.0
Minimum Split (s)	34.0	34.0		8.0	34.0		8.0	24.0		8.0	24.0	24.0
Total Split (s)	35.0	35.0		16.0	51.0		12.0	24.0		15.0	27.0	27.0
Total Split (%)	38.9%	38.9%		17.8%	56.7%		13.3%	26.7%		16.7%	30.0%	30.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	C-Min	C-Min		Min	C-Min		Min	Min		Min	Min	Min
Act Effct Green (s)	31.3	31.3		50.2	50.2		24.8	16.4		30.8	19.4	19.4
Actuated g/C Ratio	0.35	0.35		0.56	0.56		0.28	0.18		0.34	0.22	0.22
v/c Ratio	0.19	0.53		0.84	0.78		0.89	0.59		1.17	0.74	0.19
Control Delay	22.0	19.4		32.1	19.3		59.7	27.2		130.3	39.0	4.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	22.0	19.4		32.1	19.3		59.7	27.2		130.3	39.0	4.1
LOS	C	B		C	B		E	C		F	D	A
Approach Delay		19.5			22.0			38.5			70.5	
Approach LOS		B			C			D			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 35.9	Intersection LOS: D
Intersection Capacity Utilization 109.3%	ICU Level of Service H
Analysis Period (min) 15	
* User Entered Value	

Splits and Phases: 33: Moray Street & Ness Avenue





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	50	30	70	125	120	15	235	80	85	170	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	33	76	136	130	16	255	87	92	185	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	54	33	342	272	87	277
Volume Left (vph)	0	0	76	16	0	92
Volume Right (vph)	0	33	130	0	87	0
Hadj (s)	0.03	-0.57	-0.15	0.05	-0.57	0.10
Departure Headway (s)	6.2	3.2	5.4	5.6	3.2	5.6
Degree Utilization, x	0.09	0.03	0.51	0.42	0.08	0.43
Capacity (veh/h)	482	1121	622	598	1121	594
Control Delay (s)	9.8	6.3	13.9	12.5	6.5	12.8
Approach Delay (s)	8.5		13.9	11.1		12.8
Approach LOS	A		B	B		B

Intersection Summary				
Delay	12.2			
Level of Service	B			
Intersection Capacity Utilization	61.3%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	300	30	205	425	25	80
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	326	33	223	462	27	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			326		1234	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			326		1234	326
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		83	88
cM capacity (veh/h)			1234		160	715

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	326	33	685	114
Volume Left	0	0	223	27
Volume Right	0	33	0	87
cSH	1700	1700	1234	672
Volume to Capacity	0.19	0.02	0.18	0.17
Queue Length 95th (m)	0.0	0.0	5.0	4.6
Control Delay (s)	0.0	0.0	4.2	15.8
Lane LOS			A	C
Approach Delay (s)	0.0		4.2	15.8
Approach LOS				C

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	135	145	130	165	75	125	240	95	30	285	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	147	158	141	179	82	136	261	103	33	310	27

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	179	158	321	82	500	370
Volume Left (vph)	33	0	141	0	136	33
Volume Right (vph)	0	158	0	82	103	27
Hadj (s)	0.12	-0.67	0.25	-0.67	-0.04	0.01
Departure Headway (s)	9.0	8.3	8.8	7.9	7.9	8.1
Degree Utilization, x	0.45	0.36	0.79	0.18	1.0	0.83
Capacity (veh/h)	373	416	393	441	457	436
Control Delay (s)	18.0	14.7	36.4	11.4	96.8	39.6
Approach Delay (s)	16.5		31.3		96.8	39.6
Approach LOS	C		D		F	E

Intersection Summary				
Delay	50.4			
Level of Service	F			
Intersection Capacity Utilization	81.5%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	165	5	100	5	205	70	35	240	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	179	5	109	5	223	76	38	261	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	293	228	76	299	0
Volume Left (vph)	0	179	5	0	38	0
Volume Right (vph)	0	109	0	76	0	0
Hadj (s)	0.03	-0.07	0.05	-0.67	0.10	0.00
Departure Headway (s)	6.2	5.5	5.8	5.1	5.9	5.8
Degree Utilization, x	0.01	0.44	0.37	0.11	0.49	0.00
Capacity (veh/h)	478	616	588	661	585	603
Control Delay (s)	9.3	12.8	11.1	7.5	13.2	7.6
Approach Delay (s)	9.3	12.8	10.2		13.2	
Approach LOS	A	B	B		B	

Intersection Summary				
Delay	12.0			
Level of Service	B			
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	30	180	265	150	110	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	196	288	163	120	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	451				630	370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	451				630	370
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				72	97
cM capacity (veh/h)	1109				432	676

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	228	451	141
Volume Left	33	0	120
Volume Right	0	163	22
cSH	1109	1700	458
Volume to Capacity	0.03	0.27	0.31
Queue Length 95th (m)	0.7	0.0	9.9
Control Delay (s)	1.4	0.0	16.3
Lane LOS	A		C
Approach Delay (s)	1.4	0.0	16.3
Approach LOS			C

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	615	5	155	1070	0	5	0	70	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	668	5	168	1163	0	5	0	76	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					252							
pX, platoon unblocked	0.79						0.79	0.79		0.79	0.79	0.79
vC, conflicting volume	1163			674			2171	2171	671	2247	2174	1163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1075			674			2346	2346	671	2442	2350	1075
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			82			68	100	83	100	100	100
cM capacity (veh/h)	514			917			17	23	456	12	23	212

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	674	1332	82	0
Volume Left	0	168	5	0
Volume Right	5	0	76	0
cSH	514	917	169	1700
Volume to Capacity	0.00	0.18	0.48	0.00
Queue Length 95th (m)	0.0	5.1	17.6	0.0
Control Delay (s)	0.0	6.2	44.8	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	6.2	44.8	0.0
Approach LOS			E	A

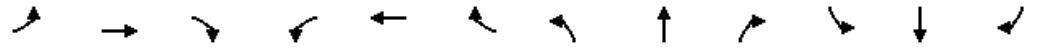
Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	112.2%	ICU Level of Service	H	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	55	15	80	50	25	25	395	85	30	290	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	60	16	87	54	27	27	429	92	33	315	33

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	92	141	27	457	92	348	33
Volume Left (vph)	16	87	0	27	0	33	0
Volume Right (vph)	16	0	27	0	92	0	33
Hadj (s)	-0.04	0.34	-0.67	0.06	-0.67	0.08	-0.67
Departure Headway (s)	7.2	7.5	6.5	6.1	5.3	6.3	5.5
Degree Utilization, x	0.19	0.29	0.05	0.77	0.14	0.61	0.05
Capacity (veh/h)	444	435	499	579	649	553	613
Control Delay (s)	11.9	12.4	8.6	25.2	8.0	17.4	7.6
Approach Delay (s)	11.9	11.8		22.3		16.5	
Approach LOS	B	B		C		C	

Intersection Summary				
Delay	18.2			
Level of Service	C			
Intersection Capacity Utilization	61.7%	ICU Level of Service		B
Analysis Period (min)	15			

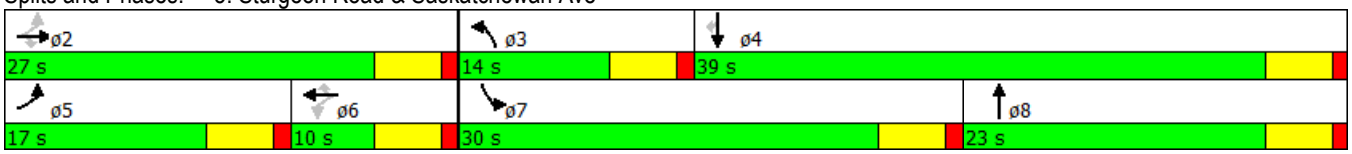


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	290	480	5	50	150	195	605	20	455	935	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		150.0	150.0		0.0	150.0		150.0
Storage Lanes	1		1	1		1	2		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	3471	3561	0	1789	3579	1601
Flt Permitted	0.400			0.800			0.950			0.950		
Satd. Flow (perm)	753	1883	1601	1507	1883	1601	3471	3561	0	1789	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			292			232		4				164
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.1			242.9	
Travel Time (s)		15.1			73.4			15.6			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	315	522	5	54	163	212	680	0	495	1016	152
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6						4
Detector Phase	5	2	2	6	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0	8.0	5.0	5.0	5.0	4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.0	13.0	13.0	10.0	10.0	10.0	9.0	17.0		9.0	17.0	17.0
Total Split (s)	17.0	27.0	27.0	10.0	10.0	10.0	14.0	23.0		30.0	39.0	39.0
Total Split (%)	21.3%	33.8%	33.8%	12.5%	12.5%	12.5%	17.5%	28.8%		37.5%	48.8%	48.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	22.0	22.0	22.0	5.0	5.0	5.0	8.6	18.0		23.9	33.3	33.3
Actuated g/C Ratio	0.28	0.28	0.28	0.06	0.06	0.06	0.11	0.23		0.30	0.42	0.42
v/c Ratio	0.96	0.60	0.80	0.05	0.45	0.51	0.56	0.84		0.91	0.67	0.20
Control Delay	68.0	30.7	22.3	36.6	48.8	7.6	39.7	40.0		50.5	21.2	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	68.0	30.7	22.3	36.6	48.8	7.6	39.7	40.0		50.5	21.2	2.9
LOS	E	C	C	D	D	A	D	D		D	C	A
Approach Delay		38.1			18.3			39.9			28.2	
Approach LOS		D			B			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 78.9	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	

Intersection Signal Delay: 33.2	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave

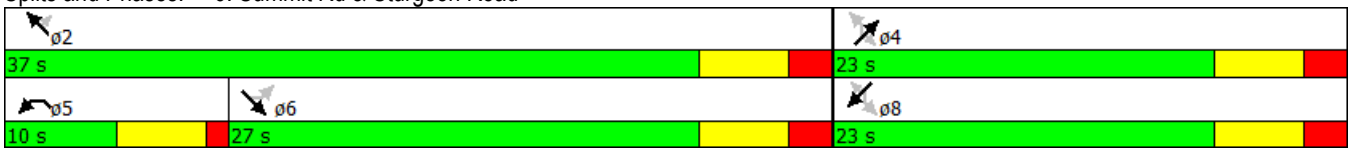


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	935	65	235	640	290	135	5	520	170	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		100.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3543	0	3471	3579	1601	0	1797	1601	0	1789	1601
Flt Permitted	0.387			0.950				0.606			0.660	
Satd. Flow (perm)	729	3543	0	3471	3579	1601	0	1141	1601	0	1243	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				315			227			145
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			151.6			381.4	
Travel Time (s)		29.0			9.7			10.9			27.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1087	0	255	696	315	0	152	565	0	185	49
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		9.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	27.0	27.0		10.0	37.0	37.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	45.0%	45.0%		16.7%	61.7%	61.7%	38.3%	38.3%	38.3%	38.3%	38.3%	38.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	21.0	21.0		5.0	31.0	31.0		16.2	16.2		16.2	16.2
Actuated g/C Ratio	0.35	0.35		0.08	0.52	0.52		0.27	0.27		0.27	0.27
v/c Ratio	0.02	0.86		0.87	0.37	0.32		0.49	0.94		0.54	0.09
Control Delay	13.2	26.8		59.0	9.2	2.1		24.1	39.5		25.2	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	13.2	26.8		59.0	9.2	2.1		24.1	39.5		25.2	0.3
LOS	B	C		E	A	A		C	D		C	A
Approach Delay		26.8			17.5			36.2			20.0	
Approach LOS		C			B			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 59.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 24.8	Intersection LOS: C
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Summit Rd & Sturgeon Road

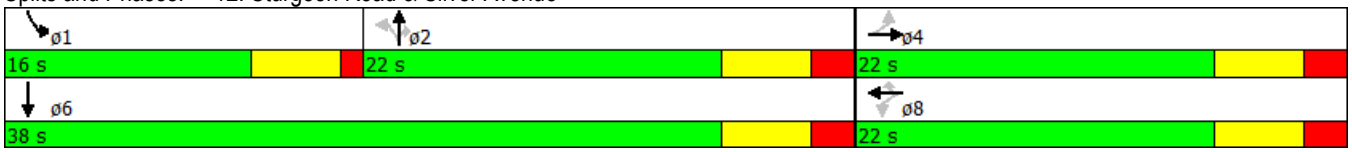


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	225	80	30	30	245	20	585	95	545	890	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	50.0		0.0	0.0		50.0	150.0		0.0
Storage Lanes	1		1	1		1	0		1	2		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1883	3439	0	1789	1883	1601	0	3571	1601	3471	3579	0
Flt Permitted				0.551				0.892		0.950		
Satd. Flow (perm)	1883	3439	0	1038	1883	1601	0	3192	1601	3471	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		81				266			145			
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		803.2			1315.4			682.3			471.4	
Travel Time (s)		57.8			94.7			40.9			28.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	332	0	33	33	266	0	658	103	592	967	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2			
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	16.0	38.0	
Total Split (%)	36.7%	36.7%		36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.7%	63.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0	5.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Act Effct Green (s)		9.4		9.4	9.4	9.4		16.0	16.0	11.0	32.1	
Actuated g/C Ratio		0.18		0.18	0.18	0.18		0.30	0.30	0.21	0.60	
v/c Ratio		0.50		0.18	0.10	0.53		0.69	0.18	0.83	0.45	
Control Delay		17.4		20.9	18.7	7.4		21.7	2.5	33.6	7.1	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		17.4		20.9	18.7	7.4		21.7	2.5	33.6	7.1	
LOS		B		C	B	A		C	A	C	A	
Approach Delay		17.4			9.9			19.1			17.1	
Approach LOS		B			A			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 53.5	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.83	

Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 73.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	105	370	10	215	405	530	895	5	115	945	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	40.0		150.0	150.0		0.0	150.0		150.0
Storage Lanes	1		1	1		1	2		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	3471	3575	0	1789	3579	1601
Flt Permitted	0.338			0.684			0.950			0.950		
Satd. Flow (perm)	637	1883	1601	1288	1883	1601	3471	3575	0	1789	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			298			272		1				296
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		251.9			1222.5			304.8			242.9	
Travel Time (s)		15.1			73.4			15.7			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	114	402	11	234	440	576	978	0	125	1027	429
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6						4
Detector Phase	5	2	2	6	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	8.0	8.0	5.0	5.0	5.0	4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.0	13.0	13.0	10.0	10.0	10.0	9.0	17.0		9.0	17.0	17.0
Total Split (s)	9.0	31.0	31.0	22.0	22.0	22.0	19.0	36.0		13.0	30.0	30.0
Total Split (%)	11.3%	38.8%	38.8%	27.5%	27.5%	27.5%	23.8%	45.0%		16.3%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	16.0	16.0	16.0	14.0	31.2		7.8	25.0	25.0
Actuated g/C Ratio	0.32	0.32	0.32	0.20	0.20	0.20	0.18	0.39		0.10	0.32	0.32
v/c Ratio	0.82	0.19	0.57	0.04	0.61	0.81	0.94	0.69		0.71	0.91	0.61
Control Delay	49.5	20.6	9.6	25.7	36.3	25.1	57.9	23.3		58.2	39.3	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	49.5	20.6	9.6	25.7	36.3	25.1	57.9	23.3		58.2	39.3	11.4
LOS	D	C	A	C	D	C	E	C		E	D	B
Approach Delay		22.9			29.0			36.2			33.3	
Approach LOS		C			C			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 79	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Sturgeon Road & Saskatchewan Ave



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	20	920	160	605	655	345	120	0	445	200	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		0.0	130.0		130.0	0.0		100.0	0.0		80.0
Storage Lanes	1		0	2		1	0		1	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1789	3500	0	3471	3579	1601	0	1789	1601	0	1799	1601
Flt Permitted	0.381			0.950				0.515			0.645	
Satd. Flow (perm)	718	3500	0	3471	3579	1601	0	970	1601	0	1215	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				375			406			116
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		644.4			215.4			150.9			288.9	
Travel Time (s)		29.0			9.7			10.9			20.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1174	0	658	712	375	0	130	484	0	228	16
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			4			8	
Permitted Phases	6					2	4		4	8		8
Detector Phase	6	6		5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		9.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	33.0	33.0		20.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	44.0%	44.0%		26.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	27.0	27.0		15.0	47.0	47.0		15.6	15.6		15.6	15.6
Actuated g/C Ratio	0.36	0.36		0.20	0.63	0.63		0.21	0.21		0.21	0.21
v/c Ratio	0.08	0.91		0.94	0.32	0.33		0.65	0.74		0.90	0.04
Control Delay	17.1	34.8		54.0	6.9	1.5		43.9	13.5		67.8	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.1	34.8		54.0	6.9	1.5		43.9	13.5		67.8	0.1
LOS	B	C		D	A	A		D	B		E	A
Approach Delay		34.5			23.5			19.9			63.3	
Approach LOS		C			C			B			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 74.6	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	

Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Summit Rd & Sturgeon Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	55	30	105	190	545	75	955	30	475	770	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	50.0		0.0	0.0		50.0	150.0		0.0
Storage Lanes	1		1	1		1	0		1	2		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Satd. Flow (prot)	1883	3389	0	1789	1883	1601	0	3564	1601	3471	3575	0
Flt Permitted				0.694				0.795		0.950		
Satd. Flow (perm)	1883	3389	0	1307	1883	1601	0	2845	1601	3471	3575	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				318			109		1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		803.4			1347.5			682.3			470.7	
Travel Time (s)		57.8			97.0			40.9			28.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	114	207	592	0	1120	33	516	842	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2			
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	22.0	22.0	22.0	9.0	22.0	
Total Split (s)	24.0	24.0		24.0	24.0	24.0	39.0	39.0	39.0	17.0	56.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%	30.0%	48.8%	48.8%	48.8%	21.3%	70.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0	5.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Act Effct Green (s)		18.0		18.0	18.0	18.0		33.0	33.0	12.0	50.0	
Actuated g/C Ratio		0.22		0.22	0.22	0.22		0.41	0.41	0.15	0.62	
v/c Ratio		0.12		0.39	0.49	0.98		0.95	0.05	0.99	0.38	
Control Delay		17.5		31.0	31.6	47.9		41.8	0.1	73.8	7.9	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		17.5		31.0	31.6	47.9		41.8	0.1	73.8	7.9	
LOS		B		C	C	D		D	A	E	A	
Approach Delay		17.5			42.1			40.6			33.0	
Approach LOS		B			D			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.99	

Intersection Signal Delay: 37.4	Intersection LOS: D
Intersection Capacity Utilization 77.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 12: Sturgeon Road & Silver Avenue



APPENDIX C – Signal Warrant Analysis

City of Winnipeg Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Saskatchewan Avenue	Direction (EW or NS)	EW
Side Street (name)	Buchanan Boulevard	Direction (EW or NS)	NS
Quadrant / Int #		Comments	2040 Analysis
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Winnipeg
City:	Winnipeg, Manitoba
Analysis Date:	2015 Nov 06, Fri
Count Date:	2014 Oct 17, Fri
Date Entry Format:	(mm-dd-yyyy)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Saskatchewan Avenue	WB	0	1	0	0	0	1	750	1
Saskatchewan Avenue	EB	0	1	0	0	0	1	700	1
Buchanan Boulevard	NB	0	1	0	0	0	1		
Buchanan Boulevard	SB	0	0	0	1	0	0		

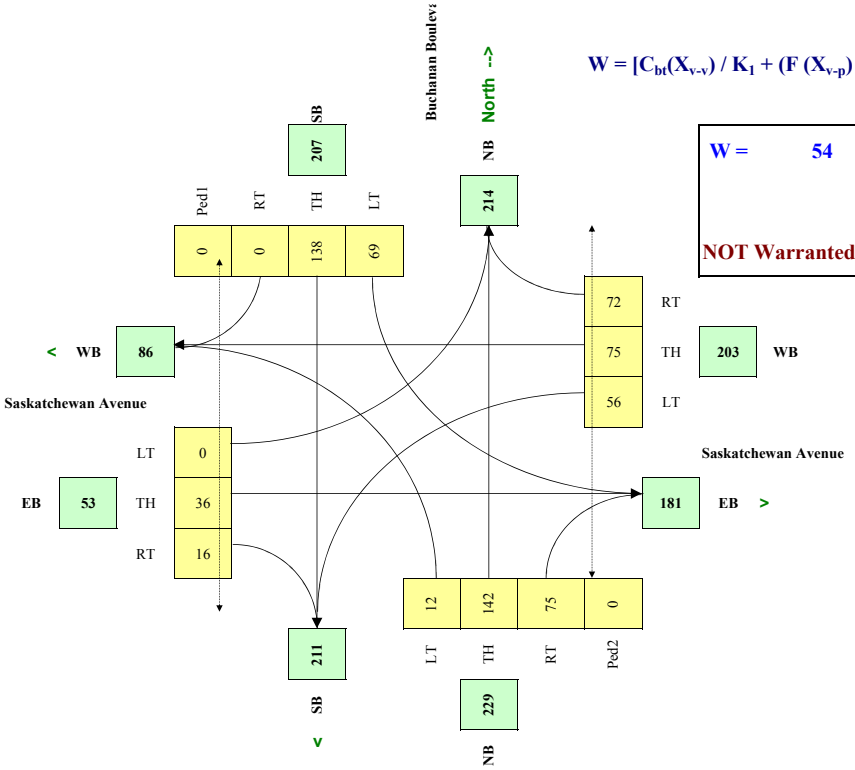
Demographics		
Elem. School/Mobility Impaired	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Saskatchewan Avenue	EW	60	2.0%	n	0.0
Buchanan Boulevard	NS		2.0%	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
AM Hour 1	15	90	125	95	190	0	75	45	45	0	40	5	0	0	0	0
AM Hour 2	11	66	91	69	139	0	55	33	33	0	29	4	0	0	0	0
Midday Hour 1	10	150	51	54	109	0	45	80	77	0	32	19	0	0	0	0
Midday Hour 2	6	92	31	33	66	0	27	49	47	0	20	12	0	0	0	0
PM Hour 1	15	235	80	85	170	0	70	125	120	0	50	30	0	0	0	0
PM Hour 2	14	216	74	78	156	0	64	115	110	0	46	28	0	0	0	0
Total (6-hour peak)	**71**	**849**	**452**	**414**	**830**	**0**	**336**	**447**	**432**	**0**	**217**	**98**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**12**	**142**	**75**	**69**	**138**	**0**	**56**	**75**	**72**	**0**	**36**	**16**	**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 =	54	54	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

City of Winnipeg Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Saskatchewan Avenue	Direction (EW or NS)	EW
Side Street (name)	Hamilton Avenue	Direction (EW or NS)	NS
Quadrant / Int #		Comments	2040 Analysis

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Road Authority:	City of Winnipeg
City:	Winnipeg, Manitoba
Analysis Date:	2015 Nov 06, Fri
Count Date:	2014 Oct 17, Fri
Date Entry Format:	(mm-dd-yyyy)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Saskatchewan Avenue	WB	0	0	0	1	0	0	750	1
Saskatchewan Avenue	EB	0	0	0	1	0	0	700	1
Hamilton Avenue	NB	0	1	0	0	0	1		
Hamilton Avenue	SB	0	0	0	1	0	0		

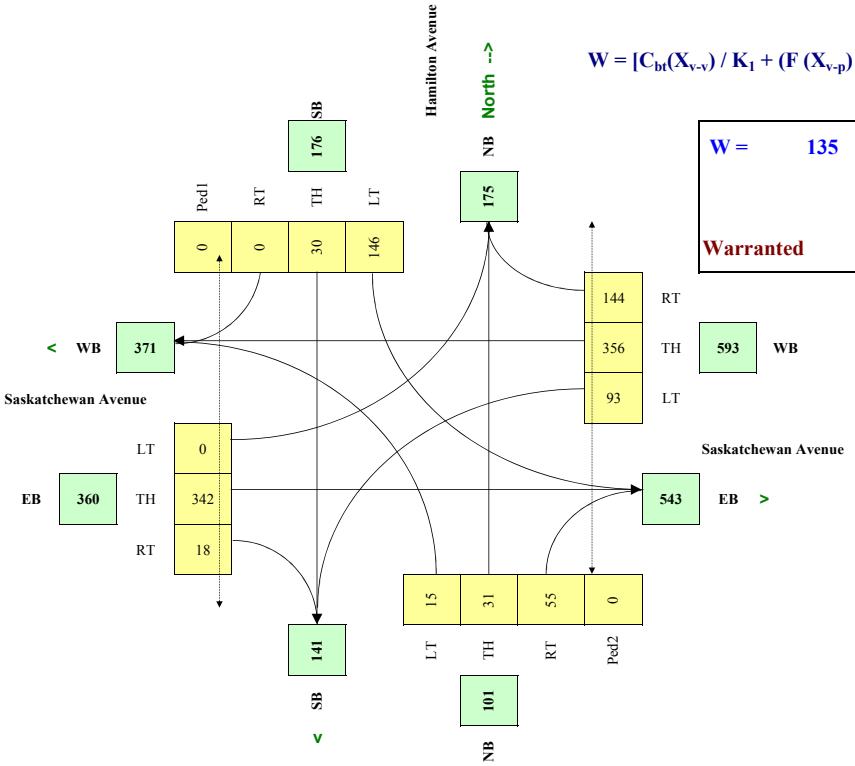
Demographics		
Elem. School/Mobility Impaired	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Saskatchewan Avenue	EW	60	2.0%	n	0.0
Hamilton Avenue	NS		2.0%	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
AM Hour 1	25	20	115	215	45	0	40	195	90	0	555	20	0	0	0	0
AM Hour 2	18	15	84	157	33	0	29	142	66	0	405	15	0	0	0	0
Midday Hour 1	10	32	29	109	22	0	106	390	154	0	237	16	0	0	0	0
Midday Hour 2	6	20	18	66	14	0	64	238	94	0	144	10	0	0	0	0
PM Hour 1	15	50	45	170	35	0	165	610	240	0	370	25	0	0	0	0
PM Hour 2	14	46	41	156	32	0	152	561	221	0	340	23	0	0	0	0
Total (6-hour peak)	**88**	**183**	**332**	**873**	**181**	**0**	**556**	**2,136**	**865**	**0**	**2,051**	**109**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**15**	**31**	**55**	**146**	**30**	**0**	**93**	**356**	**144**	**0**	**342**	**18**	**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 =	135	135	0
		Veh	*Ped*

Warranted

RESET SHEET

City of Winnipeg Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Saskatchewan Avenue	Direction (EW or NS)	EW
Side Street (name)	Summit Road	Direction (EW or NS)	NS
Quadrant / Int #		Comments	2040 Analysis
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Winnipeg
City:	Winnipeg, Manitoba
Analysis Date:	2015 Nov 06, Fri
Count Date:	2014 Oct 17, Fri
Date Entry Format:	(mm-dd-yyyy)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Saskatchewan Avenue	WB	0	0	0	1	0	0	750	1
Saskatchewan Avenue	EB	0	0	0	1	0	0	700	1
Summit Road	NB	0	0	0	0	0	0		
Summit Road	SB	0	0	0	1	0	0		

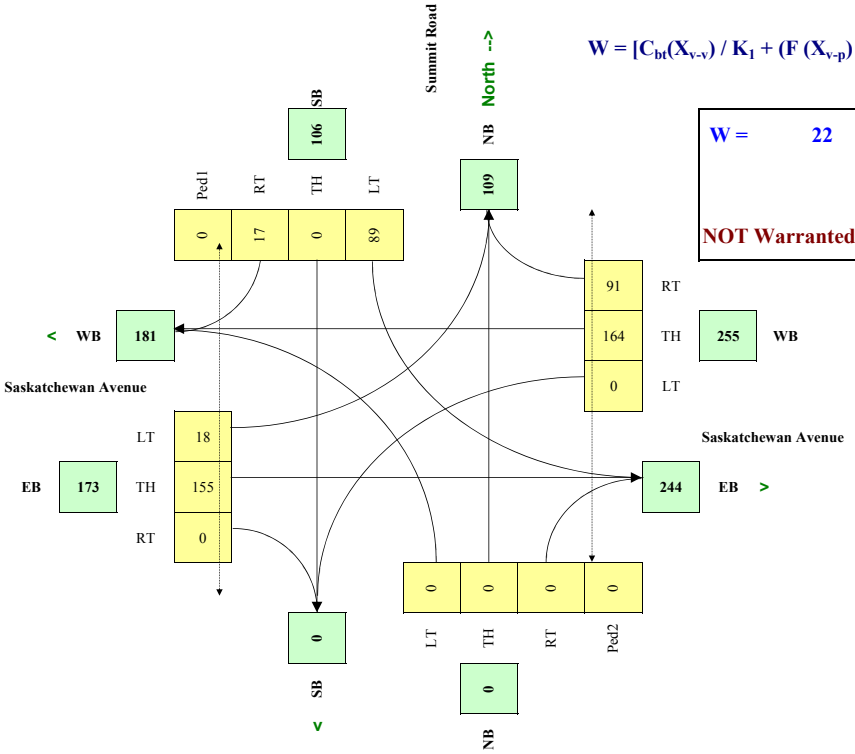
Demographics		
Elem. School/Mobility Impaired	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Saskatchewan Avenue	EW	60	2.0%	n	0.0
Summit Road	NS		2.0%	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
AM Hour 1	0	0	0	120	0	25	0	115	60	10	230	0	0	0	0	0
AM Hour 2	0	0	0	88	0	18	0	84	44	7	168	0	0	0	0	0
Midday Hour 1	0	0	0	70	0	13	0	170	96	19	115	0	0	0	0	0
Midday Hour 2	0	0	0	43	0	8	0	103	59	12	70	0	0	0	0	0
PM Hour 1	0	0	0	110	0	20	0	265	150	30	180	0	0	0	0	0
PM Hour 2	0	0	0	101	0	18	0	244	138	28	166	0	0	0	0	0
Total (6-hour peak)	**0**	**0**	**0**	**532**	**0**	**102**	**0**	**981**	**547**	**106**	**929**	**0**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**0**	**0**	**0**	**89**	**0**	**17**	**0**	**164**	**91**	**18**	**155**	**0**	**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 =	22	22	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

City of Winnipeg Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Sturgeon Road	Direction (EW or NS)	NS
Side Street (name)	Summit Road	Direction (EW or NS)	EW
Quadrant / Int #		Comments	2040 Analysis
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	City of Winnipeg
City:	Winnipeg, Manitoba
Analysis Date:	2015 Nov 06, Fri
Count Date:	2014 Oct 17, Fri
Date Entry Format:	(mm-dd-yyyy)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Sturgeon Road	NB	1	0	2	0	0	1	750	2
Sturgeon Road	SB	1	0	1	0	1	0	700	2
Summit Road	WB	0	1	0	0	0	1		
Summit Road	EB	0	1	0	0	0	1		

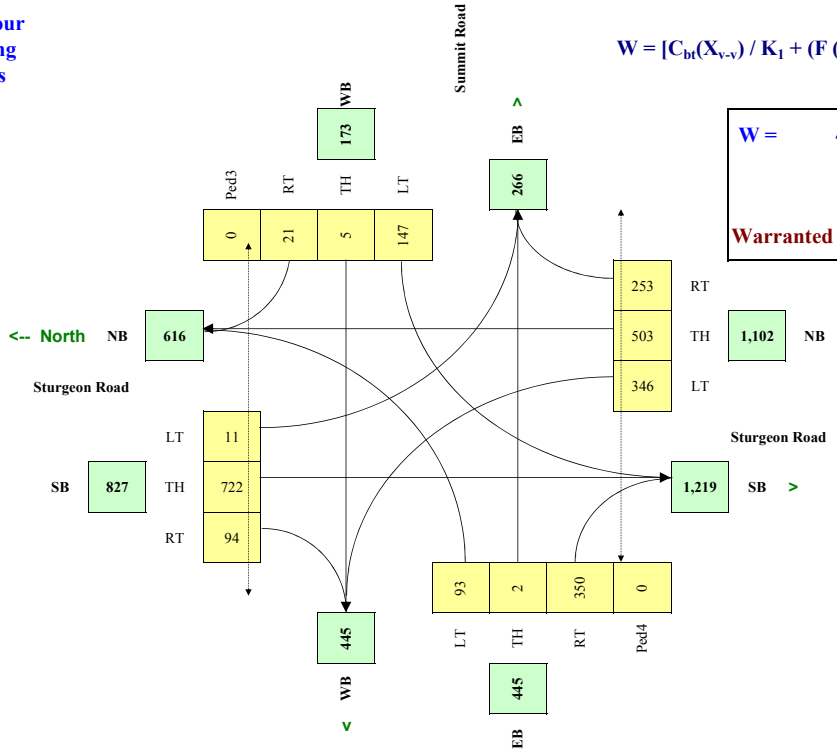
Demographics		
Elem. School/Mobility Impaired	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Sturgeon Road	NS	80	2.0%	n	0.0
Summit Road	EW		2.0%	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
AM Hour 1	220	635	290	5	935	60	170	0	45	135	5	515	0	0	0	0
AM Hour 2	161	464	212	4	683	44	124	0	33	99	4	376	0	0	0	0
Midday Hour 1	368	416	221	13	589	99	128	6	10	70	0	262	0	0	0	0
Midday Hour 2	224	254	135	8	359	60	78	4	6	43	0	160	0	0	0	0
PM Hour 1	575	650	345	20	920	155	200	10	15	110	0	410	0	0	0	0
PM Hour 2	529	598	317	18	846	143	184	9	14	101	0	377	0	0	0	0
Total (6-hour peak)	**2,077**	**3,017**	**1,520**	**68**	**4,332**	**561**	**884**	**29**	**123**	**558**	**9**	**2,100**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**346**	**503**	**253**	**11**	**722**	**94**	**147**	**5**	**21**	**93**	**2**	**350**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



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

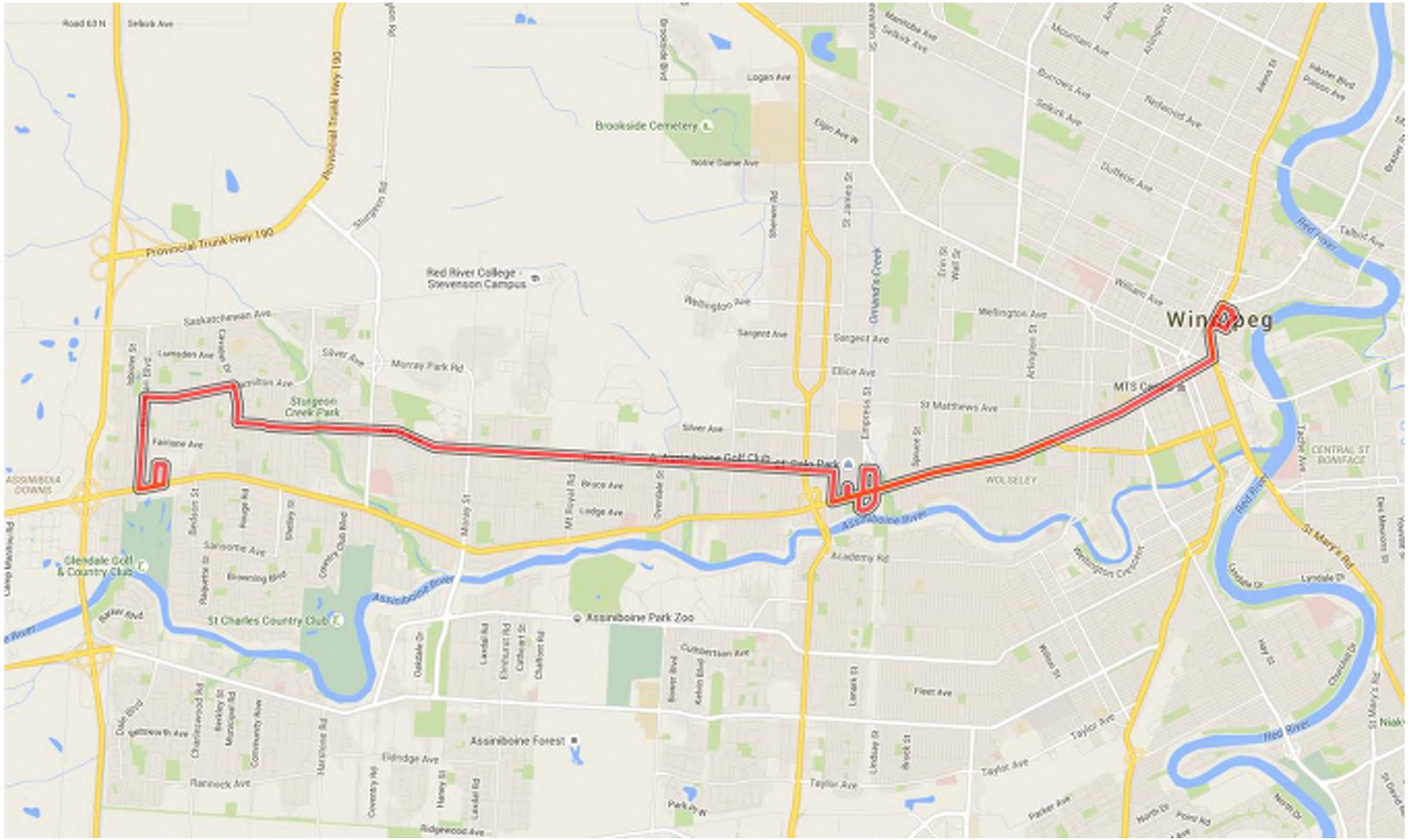
W =	462	462	0
		Veh	*Ped*

Warranted

RESET SHEET

APPENDIX D – Transit Maps

Route 24: Ness Express



Route 83: Unicity



CentrePort Winnipeg AAWSP
Residential Amendment
Servicing Infrastructure

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Prepared for:
Genstar Development Company

Prepared by:
Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB R3B 2B9

Project No. 116809381

March 4, 2016

Sign-off Sheet

This document entitled CentrePort Winnipeg AAWSP Residential Amendment Servicing Infrastructure was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Genstar Development Company (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by draft unsigned
(signature)

Doug Scott, P.Eng.

Reviewed by draft unsigned
(signature)

Dan Mages, CET, P.Eng.

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Sign-off Sheet

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2.3 EXISTING LAND DRAINAGE SYSTEMS 2

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Figure 4 Proposed Watermain Distribution System Concept
Figure 5 Proposed Wastewater Sewer Collection System Concept
Figure 6 Proposed Land Drainage Sewer System Concept

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1.0 INTRODUCTION

The servicing of the CentrePort area of Winnipeg west of the airport has always been a challenge because shallow depths of cover to till and bedrock are constraints to gravity sewer trenching. Precise mapping of till and bedrock elevations should be used to refine road and servicing alignments to achieve the most cost effective gravity sewer systems. To overcome trenching depth constraints, a pump station and forcemain can be a solution, as well as the possibility of low pressure wastewater collection system.

The servicing of the area has been studied over many years and the servicing concept remains generally unchanged from the 1995 City of Winnipeg Servicing Memorandum for Development West of the Airport and North of Saskatchewan Avenue to the latest 2012 wastewater and land drainage studies prepared by AECOM for MIT.

The proposed residential area south of CentrePort Canada Way lies closest to Saskatchewan Avenue, the northern boundary of the existing serviced area of St. James, and within the drainage catchment area of Sturgeon Creek.

This servicing assessment has been based on an existing layout concept prepared for the residential land which considered transportation issues and servicing feasibility. The assessment included a review of previous available servicing and drainage studies, geological studies, discussions with the City of Winnipeg Water and Wastewater Department and Manitoba Conservation and preparation of a new preliminary water distribution analysis.

It is anticipated that shallow utilities including electrical services, natural gas and telecommunication services will be provided by Manitoba Hydro and MTS in the normal arrangement for residential subdivisions.

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2.0 EXISTING INFRASTRUCTURE

2.1 EXISTING WATERMAIN SYSTEM

At the time of the preparation of the 2012 CentrePort Regional Water and Wastewater review study, it was assumed that the City of Winnipeg would supply water to both the Winnipeg and Rosser areas of CentrePort.

For the southern sector of CentrePort the primary water delivery concept was a 750 mm extension of the Silver Avenue feedermain, from Moray Street, with supporting St. James feedermain connections, through the CentrePort Winnipeg and Rosser Lands in the Sturgeon Road alignment to Inkster Boulevard (PR 221) and east in Inkster Boulevard to connect to the existing feedermain at Brookside Boulevard. It was envisioned that this new feedermain loop would be constructed in stages, with the first stage in Winnipeg extending north in Sturgeon Road to approximately the Truro Creek crossing.

A subsequent ruling that Winnipeg was ineligible to provide water to Rosser led to the development of a new water supply source in Headingley for the Rosser lands in CentrePort (Figure 1).

2.2 EXISTING WASTEWATER SEWER SYSTEM

The existing Winnipeg wastewater sewer system in St. James south and west of CentrePort generally consists of a series of 250 to 300 mm wastewater sewers draining south from Saskatchewan Avenue in existing streets toward the Charleswood Interceptor system and eventually the West End Wastewater Treatment Facility. There are only a few premises serviced by the system north of Saskatchewan Avenue, including the Air Canada hangar, the RCMP hangar, the Stars base, Red River College Training Centre and the WAA Combined Services Building. There is very limited remaining capacity in the St. James System (Figure 2).

2.3 EXISTING LAND DRAINAGE SYSTEMS

The CentrePort Industrial lands in Winnipeg are located within the catchment areas of 2 creek systems. The larger northeast sector drains to the relatively small Truro Creek System, across the airport and a St. James residential area to the Assiniboine River. The remainder of the CentrePort Winnipeg Industrial area and the proposed CentrePort Residential area drain to the much larger Strugeon Creek System (Figure 3).

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3.0 PROPOSED INFRASTRUCTURE CONCEPT

3.1 PROPOSED WATERMAIN SYSTEM

In discussion with the City's Water and Wastewater Department, Stantec has prepared a water distribution model based on the assumed land use and general street layout for the CentrePort Winnipeg lands (Figure 4). The model was then tested to determine the extent to which development meeting the design domestic and fire flows can be achieved with supply from the existing watermain system at Saskatchewan Avenue and with no existing system upgrades such as feedermain extension. The resulting output showed that it appears there is adequate supply to meet design criteria for the proposed residential area immediately north of Saskatchewan Avenue, but for very little of the proposed industrial area. The model of the proposed distribution system and the test results where then submitted to the City to be assessed in the overall City water distribution model, to identify the feedermain extension needs for the Winnipeg lands of CentrePort.

While there appears to be adequate domestic and fire flow from the existing St. James water distribution system, the residential area will benefit from a proposed CentrePort Feedermain extension with a feedpoint in the vicinity of the Sturgeon Road/Silver Avenue Extension intersection.

On January 4, 2016 the City provided results of the overall CentrePort distribution model assessment, which indicates that a 750 mm feedermain interconnection between the existing 900 mm Silver Avenue Feedermain at Moray Street and the 600 mm Carriage Road Feedermain at Sturgeon Road is required, plus the extension of a 750 mm feedermain north into CentrePort approximately 2850 mm on the Sturgeon Road general alignment, with a feederpoint at the Silver Avenue Extension and Sturgeon Road roughly 1400 mm south of Selkirk Avenue (City boundary).

The City also advised that a 300 mm watermain connection from the northeast corner of the CentrePort Winnipeg servicing area to Omand's Creek industrial park will be required to meet design requirements.

It is expected that watermain servicing to the industrial area will be a minimum 300 mm size.

3.2 PROPOSED WASTEWATER SEWER SYSTEM

The wastewater system concept to service CentrePort City of Winnipeg lands has been developed in the comprehensive 2012 CenterPort Regional Water and Wastewater Review study prepared by AECOM for Manitoba Infrastructure and Transportation (MIT) (Figure 5).

The study proposes that all of the City lands be serviced by a gravity sewer system draining to a regional pump station optimally located on the east side of Sturgeon Road and the north side of

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Truro Creek. The pump station would transfer sewage by forcemain to the new 1350 mm gravity interceptor sewer in Inkster Boulevard. The pump station and forcemain system concept would be developed to full capacity to service the CentrePort Winnipeg lands in 2 stages. To provide for ultimate development, a capacity improvement on a section of the existing Northwest Interceptor in Adsum Drive may be required.

A system of contributing wastewater subtrunk sewers (of interceptor size) would be routed to this pump station on alignments that minimize the impacts of shallow depths to till and bedrock. Based on available geotechnical information, in the residential area there is a north south high till and bedrock "ridge" crossing the site on an approximate alignment of a northerly extension of Hamilton Avenue. As a result, the conceptual design for the major wastewater subtrunk sewers assumes that the residential area would be serviced as 2 general catchment areas. The area east of the ridge (about 25%) would drain to a subtrunk sewer in Sturgeon Road while the remainder of the area west of the ridge would drain to a subtrunk sewer in Canada CentrePort Way (CCW). Both subtrunk sewer systems would also provide capacity for adjacent industrial areas.

Additional geotechnical investigation during the preliminary design stage should be carried out to further refine this catchment split and routing of streets and services.

3.3 PROPOSED LAND DRAINAGE SYSTEMS

To minimize waterfowl activity near the airport the CentrePort Winnipeg land drainage systems would incorporate dry bottom linear stormwater retention basins (SRB's). To minimize construction costs, the alignment of the dry bottom SRB systems must consider varying shallow depths to till and bedrock in the CentrePort area.

The residential area straddles Sturgeon Creek. All residential lands would drain to dry bottom linear storm retention basins which would discharge to Sturgeon Creek by at least 2 outfalls. The outfall servicing the west sector of the development could discharge to the creek east of the Summit Road bridge, while the outfall for the east sector could discharge south of Saskatchewan Avenue. These locations would be beneficial to the drainage system hydraulics. It is envisioned that generally the west sector of the industrial lands north and west of CentrePort Canada Way (CCW) would also drain to Sturgeon Creek, possibly with an independent or common outfall within the east sector residential area, while the industrial area east of CCW would drain to the Truro Creek system.

Sturgeon Creek provides a deep channel which is beneficial to land drainage system hydraulics during normal flow levels. However, under high flow conditions there is a capacity deficiency at downstream road and rail crossings, which results in high water levels in the CentrePort drainage area. The primary crossing constraint is the Saskatchewan Avenue road crossing, planned for replacement in the next few years, and the adjacent CPR rail crossing. These two constraints should be improved before significant development occurs. Even so, periods of creek high water levels would require flood protection measures including outfall gates and pumping

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facilities to isolate and discharge the SRB system. The feasibility of a common outfall for the east sector with that of the industrial area to the north should be evaluated.

A detailed land drainage study should be undertaken, based on updated flow forecasts and topographic mapping to further refine the CentrePort Winnipeg primary land drainage system concept.

The land drainage component of the AAWSP industrial area amendment servicing evaluation is based on a review of the following available background data:

- Winnipeg Area Airports System Study 1976 Storm Drainage Study for Transport Canada (Dillon) – provided by WAA
- University of Manitoba Geological Engineering 1983 mapping for "Geological Report for Urban Development Winnipeg"
- Existing 1985 design drawings of Truro Creek drainage system within the WIA boundaries provided by WAA
- Geological investigation data from 1988 report on "Sewer Alignment Investigation and Property Investigation Lands North of Saskatchewan Avenue" and 1989 report "Municipal Servicing Lands North of Saskatchewan Avenue District 2" prepared for Genstar and Qualico by UMA
- 1995 City of Winnipeg memorandum on Land Drainage Servicing Requirements for Industrial Development west of the airport and north of Saskatchewan Avenue
- 1996 Airport Area Plan study
- 2003 Winnipeg Flood activity/Emergency Manual – Natural Channels (UMA – KGS)
- 2004 Environmental Impact Assessment – Airport Site Redevelopment Project / Winnipeg International Airport – provided by WAA
- 2009 Water Stewardship report on Sturgeon Creek & Hydrodynamic Model and Economic study (AECOM)
- 2014 LiDar top survey of Winnipeg International Airport and adjacent lands (WAA)
- 2015 Topographic survey of Logan Farms land (Barnes & Duncan/Sturgeon Business Park)
- 2011 LiDar survey of CentrePort area related to CCW design (Manitoba Conservation & Water Stewardship)
- Sturgeon Creek flood levels and profile mapping from west of PTH 101 to Sturgeon Road bridge from prior to CCW development – provided by City of Winnipeg (2015)

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- Meeting and discussion with Geoff Reimer, P.Eng. of Manitoba Conservation and Water Stewardship (2015)

- 2015 City of Winnipeg email on recommended references re: Truro Creek and CentrePort Drainage including the 2012 CentrePort Drainage Study Draft – Phase 1 lands within the City of Winnipeg for MIT (AECOM)

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FIGURES

CentrePort Winnipeg AAWSP Residential Amendment

SERVICING INFRASTRUCTURE

Figure : 1

Existing Water Distribution System

SERVICING LEGEND:

- SERVICING AREA BOUNDARY
- EXISTING WM
- EXISTING FM

Scale : 35,000

February 29, 2016

0 500 Meters

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CentrePort Winnipeg AAWSP Residential Amendment

SERVICING INFRASTRUCTURE

Figure : 2

Existing Wastewater Sewer Collection System

SERVICING LEGEND:

- SERVICING AREA BOUNDARY
- EXISTING WWS
- EXISTING INTERCEPTER SEWER
- SEWER DISTRICT BOUNDARY

Scale : 35,000
February 29, 2016
Meters

0 500

INKSTER BLVD.
1350 interceptor sewer
BROOKSIDE BLVD.
R.M. OF ROSSER
CITY OF WINNIPEG
KLIMPKE ROAD
PERIMETER (PTH 101)
SELKIRK AVE.
R.M. OF ROSSER
R.M. OF HEADINGLEY
R.M. OF ROSSER
CITY OF WINNIPEG
CCW (PTH 190)
STURGEON ROAD
CPR GLENBORO RAIL
INDUSTRIAL
SUMMIT ROAD
R.M. OF HEADINGLEY
CITY OF WINNIPEG
INDUSTRIAL
SILVER AVE.
RESIDENTIAL AREA
SASKATCHEWAN
R.M. OF ROSSER
CITY OF WINNIPEG
RUNWAY 13-31
TRURO CREEK
250WWS
300WWS
300WWS
250WWS
MORAY STREET
300WWS
WHYTEWOLD ROAD
200 WWS
300WWS
375WWS
HAMILTON AVE
STURGEON RD.
AINSLIE S.D.
LUMSDEN AVE
375WWS
CAVALIER DR.
250WWS
BUCHANNAN BLVD.
250WWS
PERIMETER (PTH 101)
WESTWOOD S.D.
HAMILTON AVE.
HERITAGE S.D.
SILVER AVENUE
DND OUTFALL
NESS AVE.
NESS AVENUE

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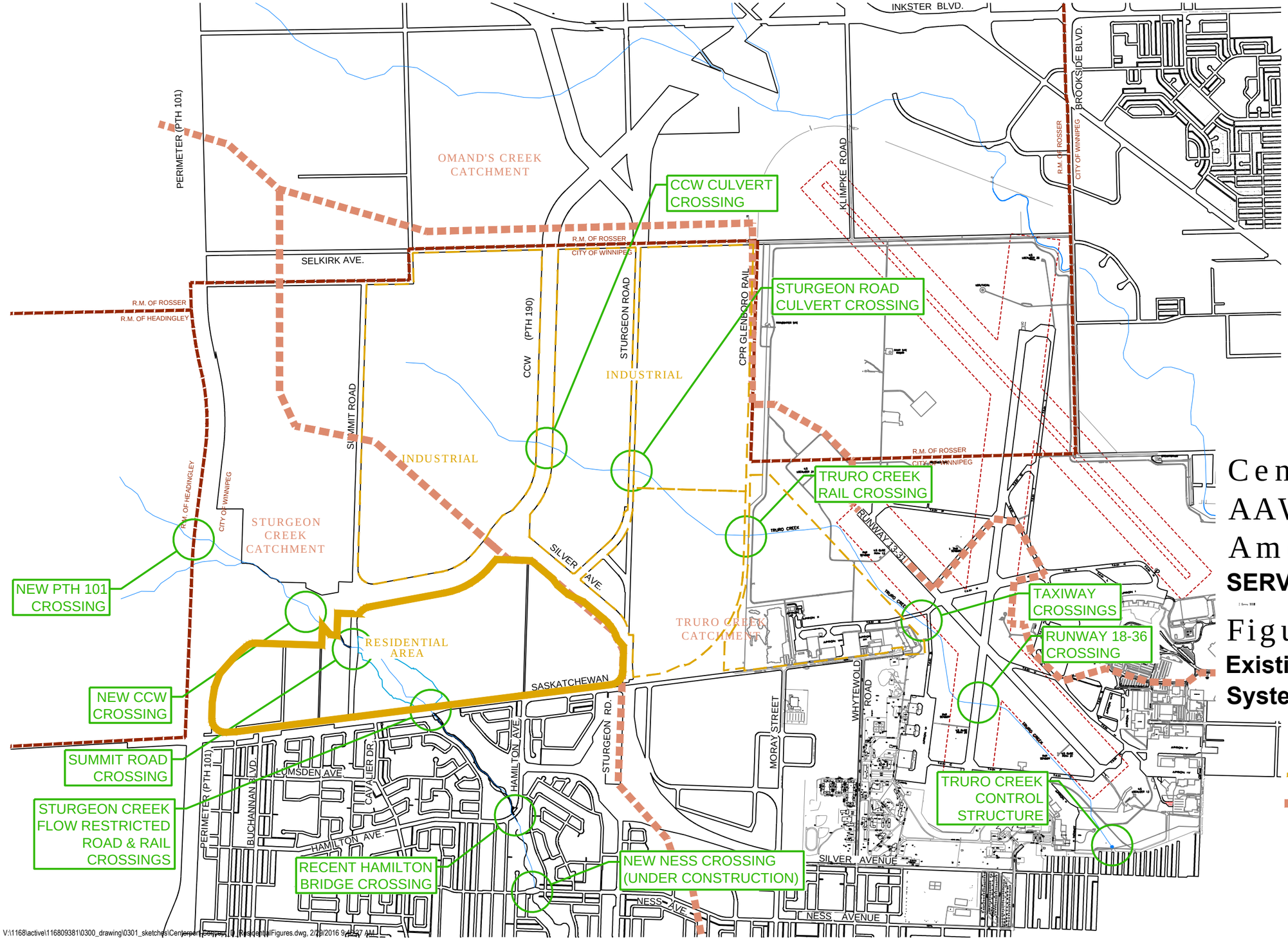

CentrePort Winnipeg AAWSP Residential Amendment

SERVICING INFRASTRUCTURE

Figure : 3

Existing Land Drainage Systems

SERVICING LEGEND:

- SERVICING AREA BOUNDARY
- APPROXIMATE EXISTING CATCHMENT BOUNDARIES

Scale : 35,000
February 29, 2016
0 500
Meters

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CentrePort Winnipeg
AAWSP Residential Amendment
SERVICING INFRASTRUCTURE

Figure : 4
Proposed Water Distribution System

SERVICING LEGEND:
- SERVICING AREA BOUNDARY
- EXISTING WM
- EXISTING FM
- PROPOSED WM
- PROPOSED FM

Scale : 35,000
February 29, 2016
Meters

0 500

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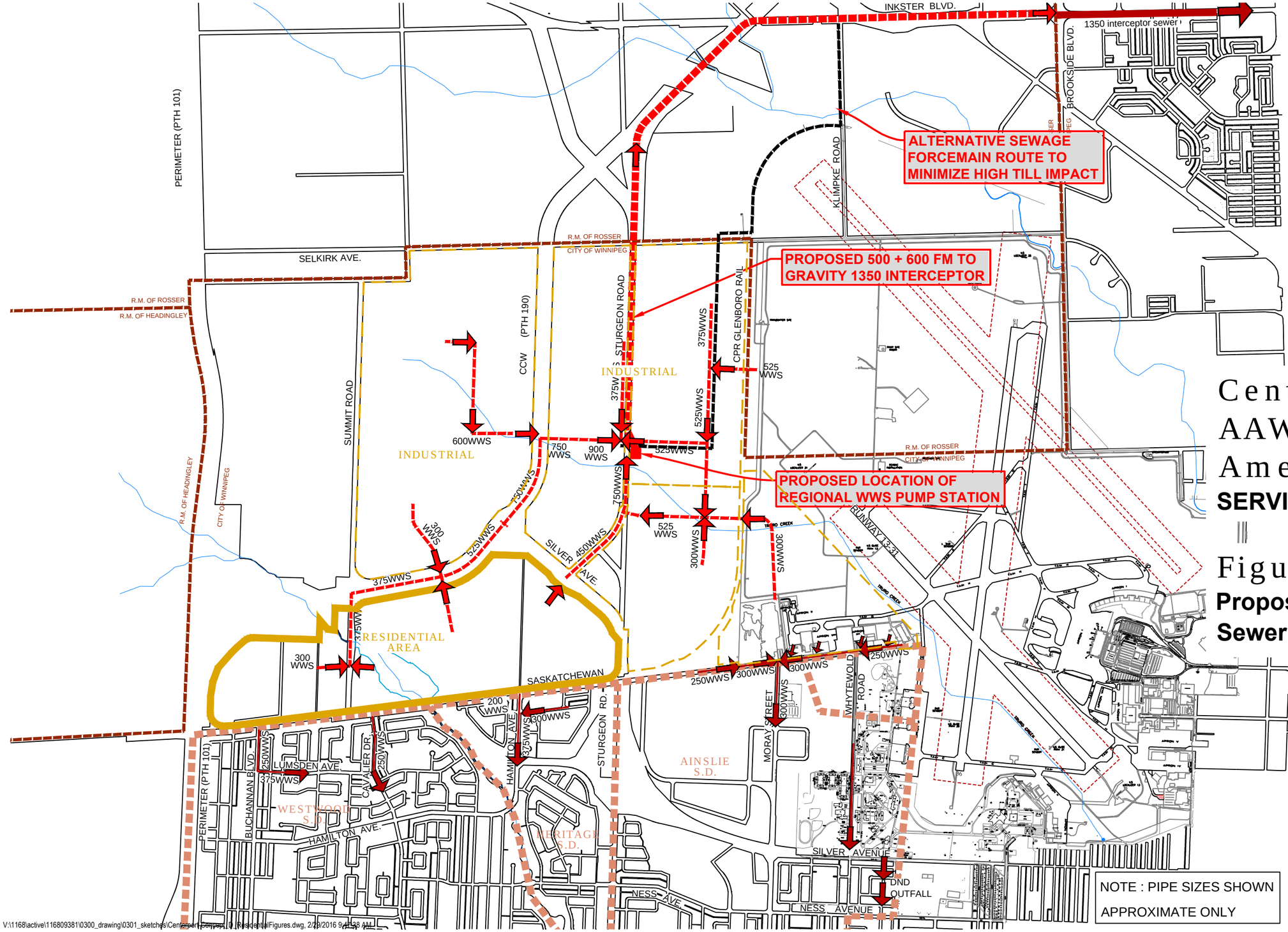


CentrePort Winnipeg AAWSP Residential Amendment

SERVICING INFRASTRUCTURE

Figure : 5

Proposed Wastewater Sewer Collection System

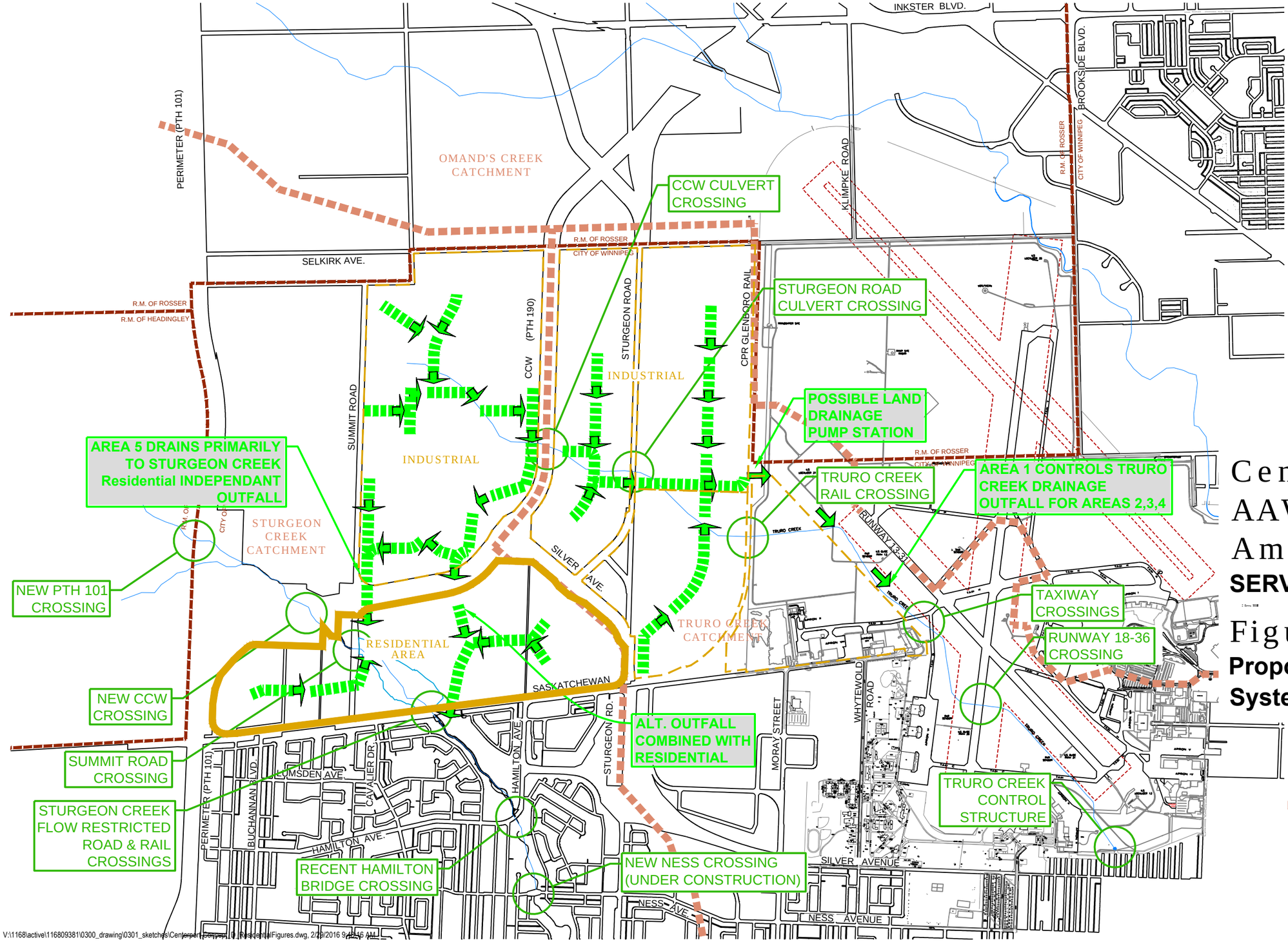
SERVICING LEGEND:

- SERVICING AREA BOUNDARY
- EXISTING WWS
- EXISTING INTERCEPTER SEWER
- SEWER DISTRICT BOUNDARY
- PROPOSED WWS
- PROPOSED FM

NOTE : PIPE SIZES SHOWN APPROXIMATE ONLY

0 500 Meters

Scale : 35,000
February 29, 2016



CentrePort Winnipeg AAWSP Residential Amendment

SERVICING INFRASTRUCTURE

Figure : 6

Proposed Land Drainage Systems

Scale : 35,000

February 29, 2016

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