

# 1330 Carling Avenue & 815 Archibald Street Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Prepared for:

1343678 Ontario Ltd.  
1330 Carling Avenue  
Ottawa, On K1Z 7K8

Prepared by:



13 Markham Avenue  
Nepean, ON K2G 3Z1

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PN: 2019-62

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- Appendix D – Collision Data
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## 1 Screening

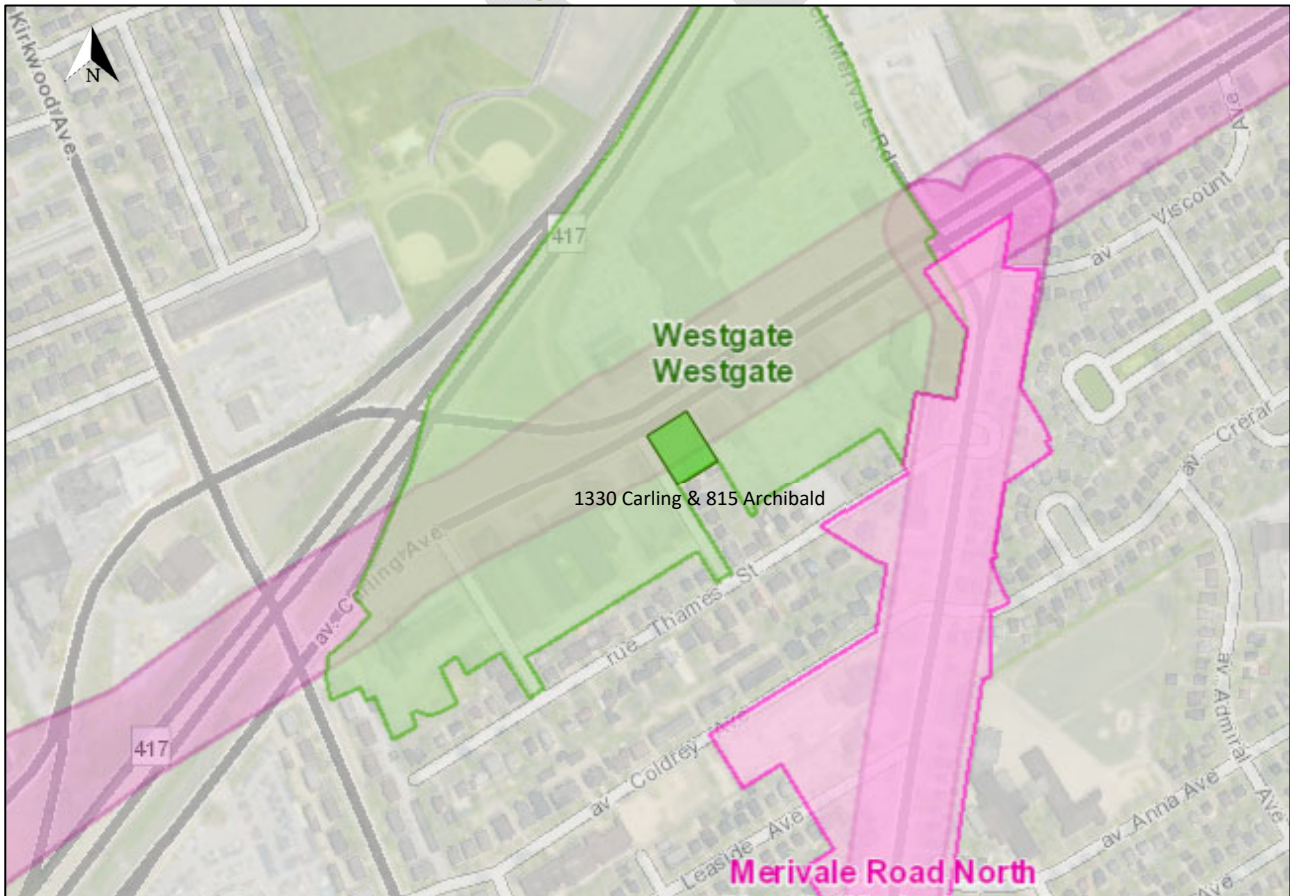
This study has been prepared according to the City of Ottawa’s 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component.

## 2 Existing and Planned Conditions

### 2.1 Proposed Development

The proposed development is located at 1330 Carling Avenue and 815 Archibald Street and is currently zoned as Arterial Mainstreet (AM). The existing site is a used car lot and sales building. The proposed redevelopment would include a total of 175 apartment units and approximately 792 m<sup>2</sup> of ground floor retail space to be built in a single phase. Underground parking will be provided for 58 residential spaces and eight retail spaces will be provided on the surface, with the access located along Archibald Street. The site is located within the area considered by the Westgate Secondary Plan and within the Carling Arterial Mainstreet Design Priority Area. The anticipated full build-out and occupancy horizon is 2023. Figure 1 illustrates the Study Area Context and Figure 2 illustrates the proposed concept plan.

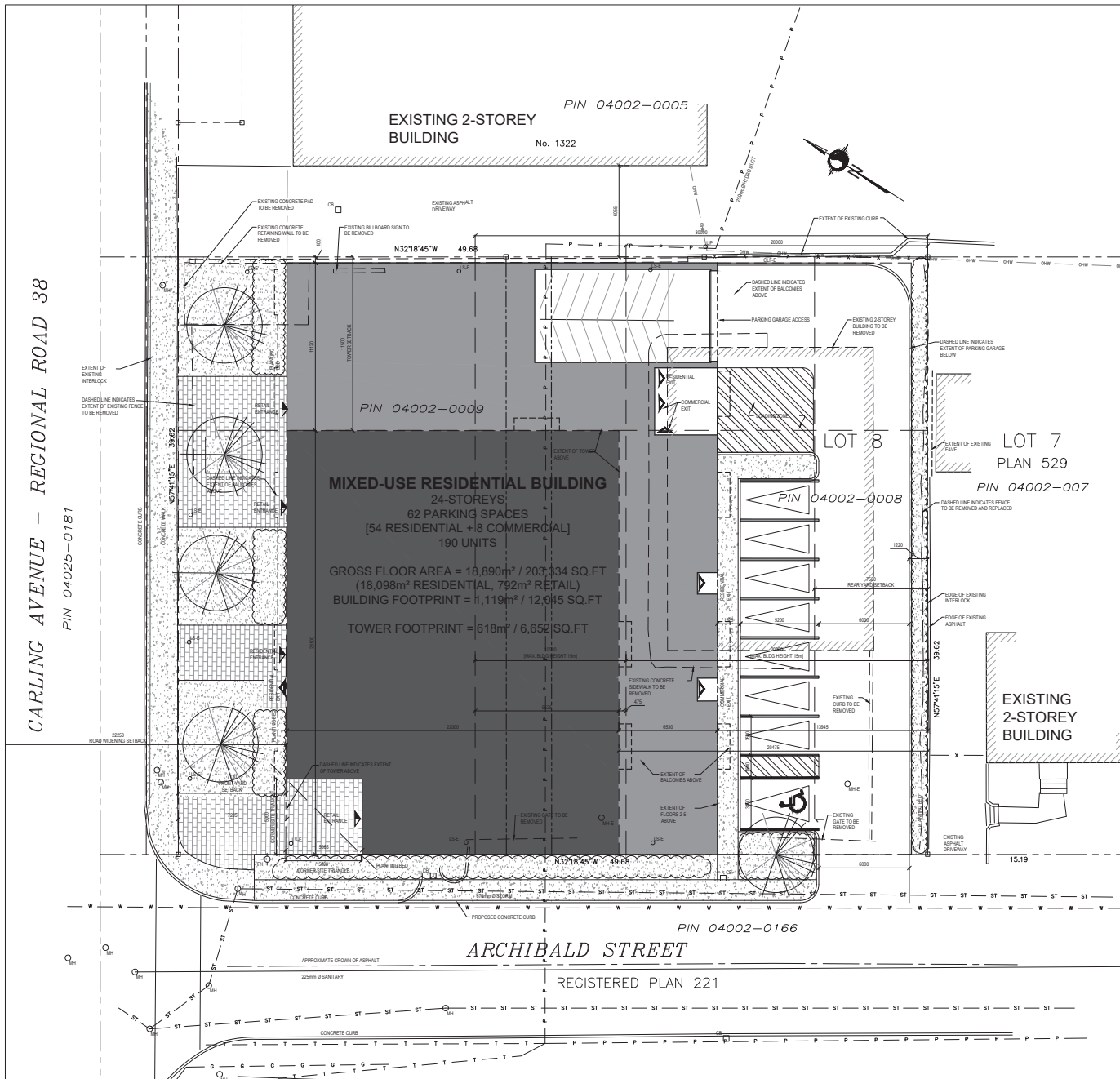
Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: December 31, 2019

CARLING AVENUE - REGIONAL ROAD 38

PIN 04025-0181



**KEY PLAN**

**PROPERTY DESCRIPTION**

24 STOREY RESIDENTIAL BUILDING  
 CITY OF OTTAWA PIN NUMBER: 04025-0008  
 MUNICIPAL ADDRESS: 1330 Carling Avenue

**SITE INFORMATION**

LOT AREA: 1,969m<sup>2</sup>  
 LOT FRONTAGE: 38.62m  
 LOT DEPTH: 49.68m

**BUILDING INFORMATION**

BUILDING AREA: 1,118m<sup>2</sup>  
 BUILDING FLOOR AREA: 16,887m<sup>2</sup>

**PROPOSED USE: MIXED-USE RESIDENTIAL HIGH-RISE**

**UNIT BREAKDOWN:**

FLOORS 2:	9 UNITS	7-1BD, 2-2BD
FLOORS 3-6:	12 UNITS	1- STUDIO, 1- 1BD, 2- 2BD
FLOORS 6:	4 UNITS	1- STUDIO, 1- 1BD, 2- 2BD
TYPICAL FLOORS 7-24:	7 UNITS	2- STUDIO, 1- 1BD, 4- 2BD
TOTAL:	32 UNITS	2- 3' STUCK, 3- 1' BCL, 2- 80'

**ZONING TABLE**

CITY OF OTTAWA ZONING BY-LAW No. 2009-259	REQUIRED	PROPOSED
LOT AREA	No minimum	
LOT WIDTH	No minimum	
FRONT YARD SETBACK	0m	7.21m (as per road widening)
MINIMUM INTERIOR SIDE YARD SETBACK	0m	0.6m
MINIMUM REAR YARD SETBACK	3m for the first 20m from Archibald; 7.5m otherwise	13.9m
MAXIMUM BUILDING HEIGHT	Within 20m of R4 zone: 15m 20-30m from R4 zone: 20m 30-m from R4 zone: 30m (up to 9 stories)	Commercial Ground Floor: 14.8m Residential: 24.27m Total: 22/16.8m
MAXIMUM FLOOR SPACE INDEX	N/A	
LANDSCAPED AREA	10% + 20m <sup>2</sup> 3m buffer between parking lots and lot lines (10-99 parking spaces)	10.4% + 204m <sup>2</sup>
VEHICLE PARKING REQUIREMENTS (AREA Y, SCHEDULE 1A)	Residential: 0.5 spaces/unit after first 12 units (175 x 0.5 = 88) Residential visitor: 0.1/unit after first 12 units (175 x 0.1 = 18) At-grade restaurant use (GFA < 350m <sup>2</sup> ): 0 spaces At-grade non-residential use (GFA < 500m <sup>2</sup> ): 0 spaces Other non-residential: 1.5 spaces/100m <sup>2</sup> GFA	62 SPACES TOTAL VISITOR = 18 RESIDENTIAL = 36 COMMERCIAL = 8
LOADING	1 space for 2,000-4,999m <sup>2</sup> non-residential GFA	1 SPACE
AMENITY AREA REQUIREMENTS	8m <sup>2</sup> per unit 50% commercial and at least one area of min. 54m <sup>2</sup> Total = 1,110m <sup>2</sup>	COMMUNAL AMENITY: 525m <sup>2</sup> BALCONIES: 578m <sup>2</sup> TOTAL AMENITY: 1,403m <sup>2</sup>
BICYCLE PARKING SPACES	0.5 per dwelling unit + 0.5/100m <sup>2</sup> non-residential GFA	156 SPACES

**LEGEND**

- SOFT LANDSCAPING REFER TO LANDSCAPE
- UNIT FENCES REFER TO LANDSCAPE
- ASPHALT PAVING
- CONCRETE
- EXISTING BUILDING ELEMENT TO BE REMOVED
- EXISTING FENCE
- NEW FENCE REFER TO LANDSCAPE
- LOT LINE
- SETBACK LINE
- DESIGNED BUILDING ENTRANCE / EXIT
- FIRE HYDRANT REFER TO CIVIL
- CATCH BASIN
- MANHOLE
- FLOOR DRAIN
- UTILITY POLE
- OVERHEAD UTILITY WIRES
- LIGHT STANDARD
- DEPRESSED CURB
- EXISTING TREE TO REMAIN (REFER TO LANDSCAPE DRAWINGS)
- NEW TREE REFER TO LANDSCAPE DRAWINGS
- NEW SHRUBS REFER TO LANDSCAPE DRAWINGS
- NEW EVERGREEN SHRUBS REFER TO LANDSCAPE DRAWINGS
- FIRE DEPARTMENT CONNECTION
- EXISTING GROUND ELEVATION/TO DETERMINE EXISTING AVERAGE (GSE)
- NEW GROUND ELEVATION REFER TO CIVIL

**FIGURR**

**MIXED-USE RESIDENTIAL BUILDING**

1330 Carling Avenue  
Ottawa, ON

**SITE PLAN**

Scale: 1:500  
 No. of Pages: 1  
 Date: 2020-01-26  
 Project: 2020-01-26 PRELIMINATION  
 2020-02-18 COORDINATION  
 2020-03-26 COORDINATION

## 2.2 Existing Conditions

### 2.2.1 Area Road Network

*Highway 417:* Highway 417 is a Ministry of Transportation of Ontario freeway with a six-lane divided urban cross-section throughout the study area. The current widening will expand the freeway to eight lanes. It has a posted speed limit of 100 km/h and it is a truck route.

*Carling Avenue:* Carling Avenue is a City of Ottawa arterial road with a six-lane divided urban cross-section, with bike lanes and sidewalks on both sides of the road. The posted speed limit is 60 km/h. The Ottawa Official Plan reserves a 44.5 metre right of way within the study area. Carling Avenue is a truck route.

*Kirkwood Avenue:* Kirkwood Avenue is a City of Ottawa arterial road with a four-lane urban cross-section, sidewalks on both sides of the road within the study area and on-street parking permitted on both sides of the road outside of 7:00am-9:00am and 3:30pm-5:30pm on weekdays south of Carling Avenue. The posted speed limit is 50 km/h and the City reserves a right of way of 26 metres in the study area. Kirkwood Avenue is a truck route.

*Merivale Road:* Merivale Road is a City of Ottawa arterial road with a two-lane urban cross-section, sidewalks on both sides of the road, and cycle lanes on both sides of the road north of Carling Avenue. South of Carling Avenue, Merivale Road has a four-lane urban cross-section with sidewalks on both sides of the road and on-street parking permitted on the east side of the road. The posted speed limit is 50 km/h throughout the study area, and the City-protected right of way is 30 metres north of Carling Avenue and 34 metres south of Carling Avenue. Merivale Road is a truck route south of the first mall access.

*Archibald Street:* Archibald Street is a City of Ottawa local road with two-lane urban cross-section and on-street parking permitted on the west side of the road. Southbound drivers are restricted from exiting Archibald Street. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 15.0 metres.

*Coldrey Avenue:* Coldrey Avenue is a City of Ottawa local road with a two-lane urban cross-section, a sidewalk on the south side of the road, and on-street parking permitted for 320 metres east of Merivale Road on the north side of the road. West of this point, within the study area, parking is permitted between 4:30pm and 7:30am. The posted speed limit is 40 km/h and the existing right of way varies between 15.0 metres and 20.0 metres within the study area.

*Crerar Avenue:* Crerar Avenue is a City of Ottawa local road with a two-lane urban cross-section, sidewalks on both sides of the road, and on-street parking permitted on both sides of the road. The unposted speed limit is assumed to be 40 km/h and the existing right of way is 20.0 metres.

### 2.2.2 Existing Intersections

The existing area intersections adjacent to the proposed site and additional signalized intersections within 400 metres of the site have been summarized below:

*Carling Avenue (westbound) & Kirkwood Avenue*

The intersection of Kirkwood Avenue and Carling Avenue (westbound) is a signalized intersection. The northbound approach consists of a left-turn lane and a through lane and the southbound lane consists of two through lanes and an auxiliary right-turn lane. The westbound approach consists of an auxiliary left-turn lane, a shared left-turn/through lane, a through lane and a shared through/right-turn lane. An LED southbound right turn restriction is present at the intersection for the adjacent fire station, which has pre-emptive measures to permit access to and from

*Carling Avenue (eastbound) & Kirkwood Avenue*

the station during an emergency call. No other turn restrictions are noted.

The intersection of Kirkwood Avenue and Carling Avenue (eastbound) is a signalized intersection. The northbound approach consists of a two through lanes and an auxiliary right-turn lane, and the southbound lane consists of a shared left-turn/through lane and a through lane. The eastbound approach consists of an auxiliary left-turn lane, a shared left-turn/through lane, two through lanes and a channelized, auxiliary right-turn lane. Northbound right turns on red are restricted.

*Carling Avenue & Archibald Street*

The intersection of Carling Avenue and Archibald Street is a stop-controlled intersection on the minor approach. The northbound approach consists of a right-turn lane. The eastbound approach consists of two through lanes and a shared through/right-turn lane, and the westbound approach consists of three through lanes. No turn restrictions are noted.

*Carling Avenue & Westgate Mall Access W*

The intersection of Carling Avenue and the western Westgate Mall access is a signalized T-intersection. The southbound approach consists of a shared left-turn/right-turn lane. The eastbound approach consists of three through lanes, and the westbound approach consists of two through lanes and a shared through/right-turn lane. Left turns and U-turns are not permitted from the eastbound and westbound approaches.

*Carling Avenue & Westgate Mall Access E/Best Western*

The intersection of Carling Avenue and the eastern Westgate Mall access is a signalized intersection. The northbound approach consists of an all movements lane, and the southbound approach consists of a shared left-turn/through lane and a right-turn lane. The eastbound approach consists of an auxiliary left-turn, two through lanes, and a shared through/right-turn lane and the westbound approach consists of an auxiliary left-turn lane, two through lanes and a shared through/right-turn lane. No turn restrictions are noted.

*Carling Avenue & Merivale Road*

The intersection of Carling Avenue & Merivale Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a through lane, and a channelized right-turn lane providing local access to residential units and Viscount Avenue with a stop-control at Carling Avenue. The southbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane. The eastbound approach consists of two through lanes and a shared through/right-turn lane and the westbound approach consists of an auxiliary left-turn lane, two through lanes and a shared through/right-turn lane. Eastbound left turns from Carling Avenue onto Merivale Road are restricted.

*Merivale Road & Westgate Mall Access N*

The intersection of the northern Westgate Mall access and Merivale Road is a signalized T-intersection. The northbound approach consists of an auxiliary left-turn lane and a through lane, the southbound approach consists of a through lane and an auxiliary right-turn lane, and the eastbound approach consists of a left-turn lane and a right-turn lane. No turn restrictions are noted.

*Merivale Road & Coldrey Avenue/Crerar Avenue*

The intersection of Coldrey Street, Crerar Street, and Merivale Road is a signalized intersection. The northbound and southbound approaches each consist of a shared left-turn/through lane and a shared through lane/right-turn lane. The eastbound and westbound approaches each consist of an all-movements lane. No turn restrictions are noted.

2.2.3 Existing Driveways

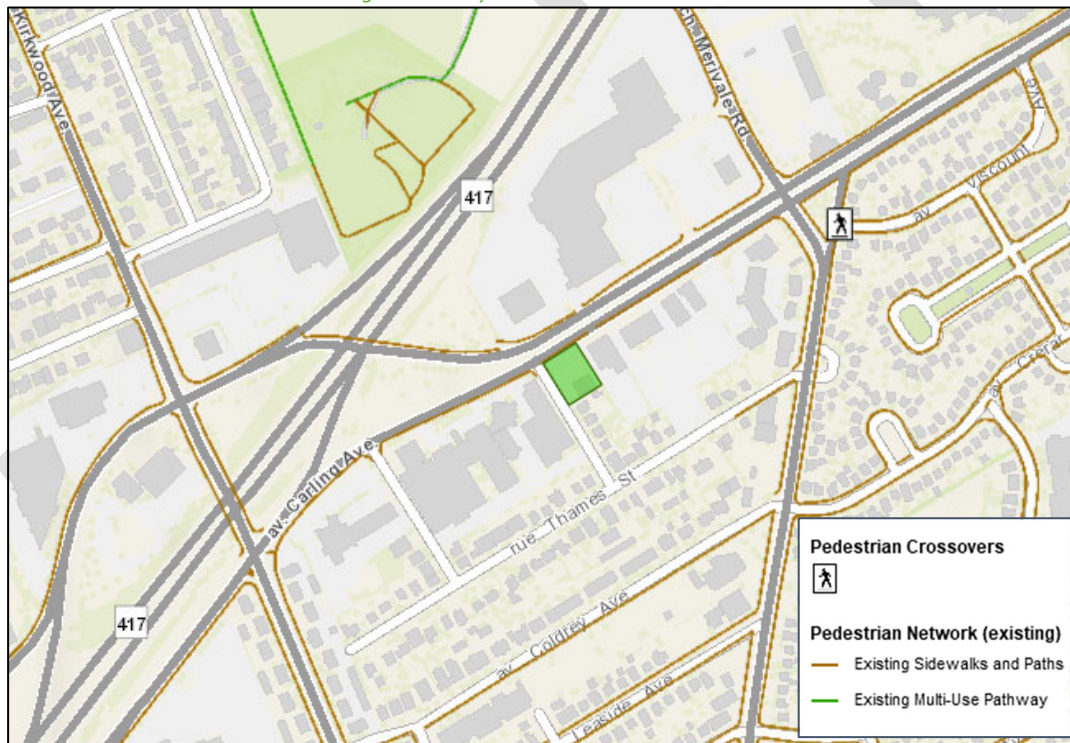
Along Archibald Street, private approaches are located within 200 metres of the proposed driveway. Along Carling Avenue, driveways are located along the south side of the roadway to the east of the site.

2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

Sidewalks are provided along both sides of arterial roads within the study area and generally along one side of local roads, except in the vicinity of the proposed site. Bike lanes are located along Carling Avenue and on Merivale Road, north of Carling Avenue, and Kirkwood is a designated local route. Carling Avenue and Merivale Road are both designated as spine routes.

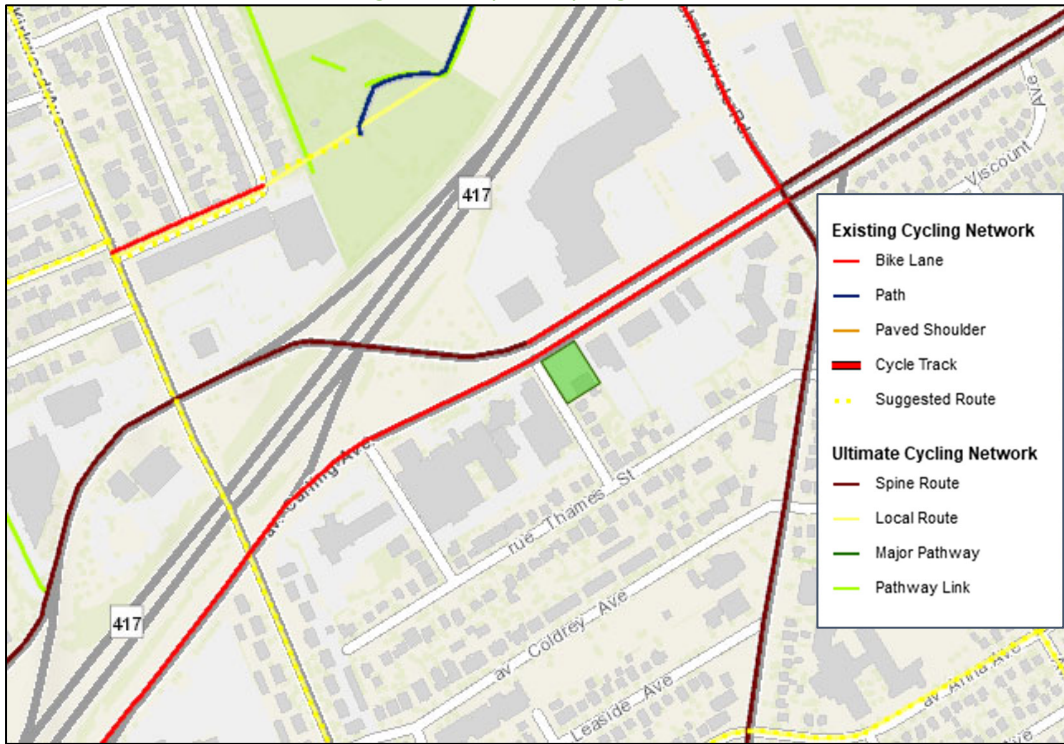
Figure 3: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: December 31, 2019



Figure 4: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: December 31, 2019

### 2.2.5 Existing Transit

Within the study area, the route #55 travels along highway 417 and Carling Avenue, #85 travels along Carling Avenue, #81 travels along Kirkwood avenue, and route #80 travels along Merivale Road. Stops are located on Carling Avenue (eastbound) at Archibald Street, Carling Avenue (westbound) between the two mall accesses and at the intersection of Carling Avenue and Merivale Road. The frequency of these routes within proximity of the proposed site currently are:

- Route #55 – 30-minute service all day, 15-20-minute service asymmetrically during peak periods
- Route #80 – 15-minute service all day, 30-minute service before 6am and after 8pm
- Route #81 – 30-minute service all day, 15-minute service asymmetrically during peak periods
- Route #85 – 15-minute service all day, 20-minute service after 7:30pm

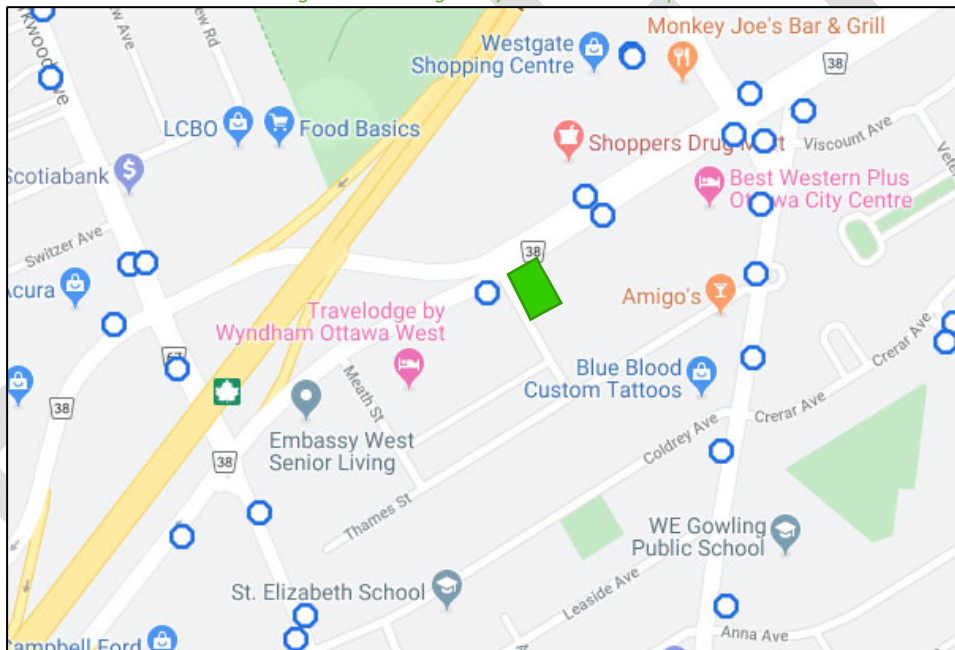
Figure 5 illustrates the transit system map in the study area and Figure 6 illustrates nearby transit stops.

Figure 5: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: December 31, 2019

Figure 6: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: December 31, 2019

### 2.2.6 Existing Area Traffic Management Measures

While Archibald street currently restricts southbound drivers from continuing through to the southern network through signage, it is currently planned that it be separated from southern network through the use of physical barriers.

### 2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa and The Traffic Specialist for the existing Study Area intersections. Table 1 summarizes the intersection count dates and sources.

Table 1: Intersection Count Date

Intersection	Count Date	Source
Kirkwood Ave & Carling Ave (westbound)	Tuesday, April 10, 2018	City of Ottawa
Kirkwood Ave & Carling Ave (eastbound)	Tuesday, April 10, 2018	City of Ottawa
Carling Ave & Archibald St	Tuesday, March 10, 2020	The Traffic Specialist
Carling Ave & Westgate SC W	Wednesday, January 31, 2018	City of Ottawa
Carling Ave & Westgate SC E	Tuesday, March 10, 2020	The Traffic Specialist
Carling Ave & Merivale Rd	Tuesday, April 5, 2018	City of Ottawa
Merivale Rd & Westgate SC N	Wednesday, March 21, 2018	City of Ottawa
Merivale Rd & Coldrey Ave/ Crerar Ave	Wednesday, January 31, 2018	City of Ottawa

Figure 7 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. U-turn movements have been included in left-turning volumes within the volume figures and have been modelled as separate movements within Synchro™. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 7: 2018 Adjusted Traffic Counts

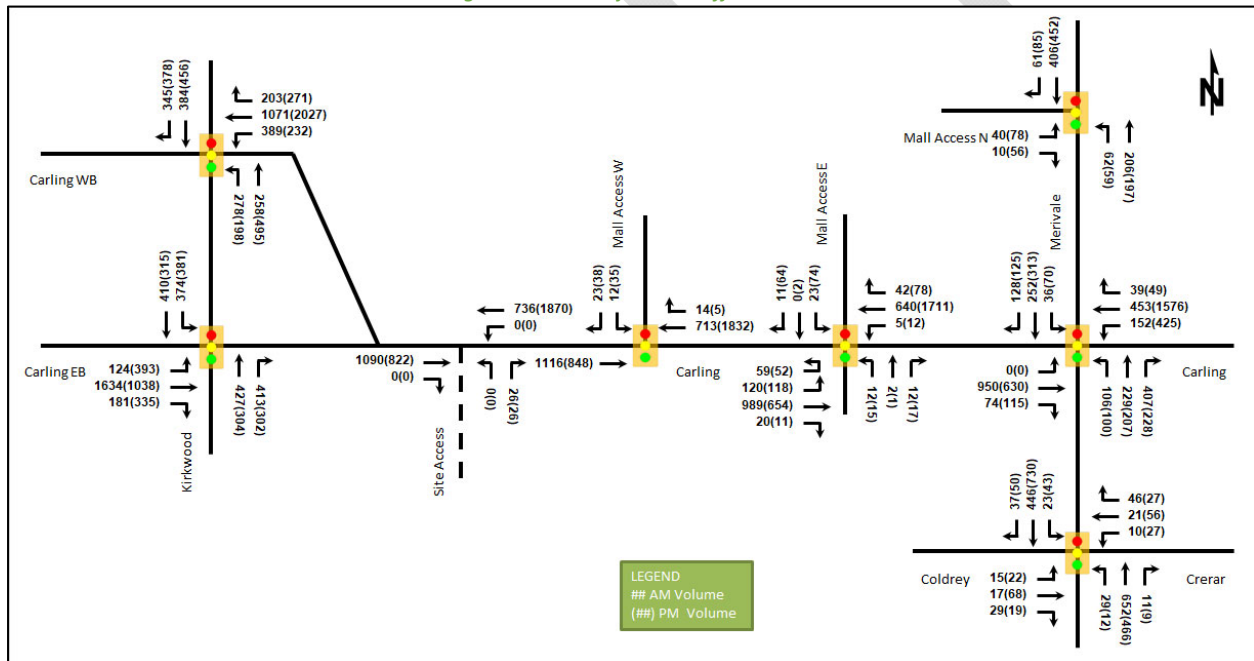


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
Carling Avenue (westbound) & Kirkwood Avenue Signalized	WBL	B	0.61	25.6	95.5	A	0.32	19.1	56.7
	WBL/T/R	C	0.74	24.9	100.1	F	1.16	105.3	#307.7
	NBL	C	0.76	36.3	m86.3	C	0.73	43.8	#66.6
	NBT	A	0.37	23.1	m80.9	D	0.81	55.4	#174.2
	SBT	A	0.52	41.1	60.3	B	0.68	47.7	76.5
	SBR	E	0.93	63.5	#123.5	F	1.09	106.8	#157.3
Overall	C	-	32.5	-	F	-	85.4	-	

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
Merivale Road & Westgate SC <i>Signalized</i>	EBL	A	0.14	19.8	9.5	A	0.29	24.9	17.6
	EBR	A	0.04	10.0	2.9	A	0.20	8.0	7.3
	NBL	A	0.11	1.8	3.9	A	0.12	4.1	m13.4
	NBT	A	0.17	1.7	9.9	A	0.18	4.5	m56.4
	SBT	A	0.34	6.5	51.4	A	0.41	7.3	57.8
	SBR	A	0.06	2.3	4.7	A	0.09	1.9	5.2
	<b>Overall</b>	<b>A</b>	-	<b>5.2</b>	-	-	<b>A</b>	-	<b>7.6</b>
Carling Avenue (eastbound) & Kirkwood Avenue <i>Signalized</i>	EBL	A	0.20	22.4	35.9	A	0.59	29.3	113.9
	EBL/T	E	0.94	43.7	#194.1	A	0.59	25.7	95.0
	EBR	A	0.27	3.8	13.4	A	0.45	6.1	29.0
	NBT	A	0.38	28.3	56.3	A	0.29	28.9	41.9
	NBR	D	0.82	47.5	#150.5	B	0.65	39.8	98.7
	SBL/T	<b>F</b>	<b>1.21</b>	<b>42.8</b>	<b>#123.5</b>	<b>F</b>	<b>1.10dl</b>	<b>21.7</b>	<b>m92.4</b>
	<b>Overall</b>	<b>D</b>	-	<b>39.4</b>	-	<b>B</b>	-	<b>24.8</b>	-
Carling Avenue & Archibald Street <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	NBR	C	-	15.9	2.25	B	-	13.1	1.5
	<b>Overall</b>	<b>A</b>	-	<b>0.4</b>	-	<b>A</b>	-	<b>0.4</b>	-
Carling Avenue & Westgate SC (west) <i>Signalized</i>	EBT	A	0.34	5.6	m35.9	A	0.27	6.9	40.7
	WBT/R	A	0.23	3.1	2.4	A	0.58	4.8	49.0
	SBL/R	A	0.13	17.7	10.8	A	0.29	37.6	27.4
	<b>Overall</b>	<b>A</b>	-	<b>4.8</b>	-	<b>A</b>	-	<b>6.3</b>	-
Carling Avenue & Westgate SC (east) <i>Signalized</i>	EBL/U	A	0.39	4.8	13.1	C	0.80	52.7	36.0
	EBT	A	0.28	1.4	10.9	A	0.21	2.4	7.0
	WBL/U	A	0.02	5.0	m1.4	A	0.04	5.3	m1.2
	WBT/R	A	0.19	3.1	19.0	C	0.73	13.2	208.3
	NB	A	0.17	29.9	10.2	A	0.15	25.2	12.9
	SBL/T	A	0.17	47.0	12.2	A	0.41	51.2	33.2
	SBR	A	0.06	6.3	2.7	A	0.24	10.8	12.2
	<b>Overall</b>	<b>A</b>	-	<b>3.3</b>	-	<b>B</b>	-	<b>14.1</b>	-
Carling Avenue & Merivale Road <i>Signalized</i>	EBT/R	B	0.69	27.1	82.6	C	0.72	44.7	86.5
	WBL	C	0.78	77.1	#103.6	<b>F</b>	<b>1.17</b>	<b>141.2</b>	<b>#222.5</b>
	WBT/R	A	0.22	16.4	36.0	C	0.72	27.9	151.6
	NBL	B	0.68	70.6	46.1	C	0.71	<b>80.8</b>	<b>#50.4</b>
	NBT	A	0.55	42.3	74.6	A	0.51	46.5	77.4
	NBR	C	0.76	22.7	74.4	A	0.46	7.5	21.3
	SBL	A	0.35	57.6	0.0	A	0.56	65.9	35.4
	SBT	C	0.76	52.3	60.2	D	0.88	<b>90.0</b>	<b>#124.3</b>
	SBR	A	0.34	10.0	18.6	A	0.34	14.9	26.5
	<b>Overall</b>	<b>C</b>	-	<b>32.0</b>	-	<b>D</b>	-	<b>50.2</b>	-
Merivale Road & Coldrey Avenue/ Crerar Avenue <i>Signalized</i>	EB	A	0.28	20.6	13.9	A	0.48	33.4	27.7
	WB	A	0.32	17.5	14.8	A	0.49	32.0	27.2
	NB	A	0.33	5.0	38.5	A	0.23	4.7	25.4
	SB	A	0.25	4.4	26.3	A	0.41	5.9	48.8
	<b>Overall</b>	<b>A</b>	-	<b>6.2</b>	-	<b>A</b>	-	<b>9.3</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
PHF = 0.90

During the AM peak, the study area intersections generally operate well. The Carling Avenue and Kirkwood Avenue intersections are noted to be congested with some extended queuing issues and the southbound left-turn at the south intersection being over capacity. The westbound left-turn at the Carling Avenue and Merivale Road is noted to have extended queues.

During the PM peak, similar issues are noted for the Carling Avenue and Kirkwood Avenue intersections with the southbound left-turn/through lane at the south intersection acting as a defacto left-turn lane during peak. At the north intersection, the westbound shared left-turn/through/right-turn lanes and the southbound right-turn lane are all over capacity, experiencing long queues and delays. The intersection of Carling Avenue and Merivale Road is over capacity in the westbound left-turn lane with extended queues noted at the northbound left-turn, westbound left-turn and southbound through movements as well.

### 2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Highway 417 and ramps are not considered in this analysis. Table 3 summarizes the collisions types and conditions in the study area, Figure 8 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data is included in Appendix D.

*Table 3: Study Area Collision Summary, 2014-2018*

		<b>Number</b>	<b>%</b>
<b>Total Collisions</b>		<b>361</b>	<b>100%</b>
<b>Classification</b>	<b>Fatality</b>	0	0%
	<b>Non-Fatal Injury</b>	60	17%
	<b>Property Damage Only</b>	301	83%
<b>Initial Impact Type</b>	<b>Angled</b>	41	11%
	<b>Rear end</b>	106	29%
	<b>Sideswipe</b>	100	28%
	<b>Turning Movement</b>	88	24%
	<b>SMV Unattended</b>	1	0%
	<b>SMV Other</b>	22	6%
	<b>Other</b>	3	1%
<b>Road Surface Condition</b>	<b>Dry</b>	255	71%
	<b>Wet</b>	66	18%
	<b>Loose Snow</b>	21	6%
	<b>Slush</b>	8	2%
	<b>Packed Snow</b>	4	1%
	<b>Ice</b>	6	2%
	<b>Unknown</b>	1	0%
<b>Pedestrian Involved</b>		5	1%
<b>Cyclists Involved</b>		1	0%

Figure 8: Study Area Collision Records – Representation of 2014-2016



Source: <https://maps.bikeottawa.ca/collisions/> Accessed: December 31, 2019

Table 4: Summary of Collision Locations, 2014-2018

Intersections / Segments	Number	%
	<b>361</b>	<b>100%</b>
Carling Ave WB @ Kirkwood Ave	120	33%
Merivale Rd @ 112 N of Carling Ave/Westgate SC	1	0%
Carling Ave EB @ Kirkwood Ave	104	29%
Carling Ave @ Hwy 417 Carling IC124r67	11	3%
Carling Ave @ Meath St	1	0%
Carling Ave @ 73 E of Archibald St/Westgate SC	2	1%
Carling Ave @ Westgate Sc E	11	3%
Carling Ave @ Merivale Rd	59	16%
Carling Ave @ Merivale Rd Extension	3	1%
Merivale Rd @ Thames St	4	1%
Merivale Rd @ Coldrey Ave/Crerar Ave	7	2%
Carling Ave WB btwn Kirkwood Ave & Hwy417 Ic124 Ramp67	11	3%
Carling Ave WB btwn Hwy417 IC124 Ramp67 & Hwy417 IC124 Ramp65	5	1%
Merivale Rd btwn Westgate SC & Carling Ave	1	0%
Kirkwood Ave btwn Carling Ave & Carling Ave	4	1%
Carling Ave EB btwn Kirkwood Ave & Hwy417 IC124 Ramp55	6	2%

Carling Ave WB btwn Hwy417 IC124 Ramp65 & 73 E of Archibald St/Westgate	1	0%
Carling Ave btwn Archibald St & 73 E of Archibald St/Westgate SC W	1	0%
Carling Ave EB btwn Westgate Sc E & 73 E of Archibald St/Westgate SC W	3	1%
Carling Ave EB btwn Westgate Sc E & Merivale Rd	1	0%
Merivale Rd btwn Carling Ave & Carling Ave	1	0%
Merivale Rd btwn Carling Ave & To Be Determined	1	0%
Merivale Rd btwn Merivale Rd & Merivale Rd	2	1%
Merivale Rd btwn Coldrey Ave & Thames St	4	1%

Within the study area, the intersections of Carling Avenue (westbound) at Kirkwood Avenue, Carling Avenue (eastbound) at Kirkwood Avenue, and Carling Avenue at Merivale Road are noted to have experienced higher collisions than other intersections. Table 5, Table 6, and Table 7 summarize the collision types and conditions for each of the Carling Avenue (westbound) at Kirkwood Avenue, Carling Avenue (eastbound) at Kirkwood Avenue, and Carling Avenue at Merivale Road intersections.

The highest number of collisions on any segment in the study area is Carling Avenue (westbound) between Kirkwood Avenue and the Highway 417 off-ramp, with 11 collisions occurring on this segment during the 2014-2018 period, eight of them sideswipe, two being rear end and one being single motor vehicle other. The improvements illustrated in Figure 9 in Section 2.3.1 should have a positive effect on collisions at this location.

*Table 5: Carling Avenue (Westbound) at Kirkwood Avenue Collision Summary*

<b>Total Collisions</b>		<b>Number</b>	<b>%</b>
		<b>120</b>	<b>100%</b>
Classification	Fatality	0	0%
	Non-Fatal Injury	17	14%
	Property Damage Only	103	86%
Initial Impact Type	Angle	10	8%
	Rear end	21	18%
	Sideswipe	42	35%
	Turning Movement	39	33%
	SMV Other	7	6%
	Other	1	1%
Road Surface Condition	Dry	88	73%
	Wet	24	20%
	Loose Snow	3	3%
	Slush	1	1%
	Packed Snow	1	1%
	Ice	3	3%
Pedestrian Involved		2	2%
Cyclists Involved		0	0%

The Carling Avenue (westbound) at Kirkwood Avenue intersection had a total of 120 collisions during the 2014-2018 time period, with 103 involving property damage only and the remaining 17 having non-fatal injuries. The collision types are most represented by sideswipe at 42 collisions, and turning movement at 39 collisions, followed by 21 rear end collisions, ten angle, seven single motor vehicle other and one other. Very shortly upstream from the westbound approach, a freeway off-ramp intersects Carling Avenue and drivers must weave across several lanes to make a left turn onto Kirkwood Avenue, often in several stages, possibly affecting the incidence of sideswipe on immediate approach of the intersection. Planned modifications to the east leg of this intersection, will restrict drivers exiting the freeway from entering the westbound left-turn lanes at this intersection, reducing

sideswipe, rear end and angled collisions. Turning movements will also be reduced slightly although the two movements (southbound and westbound) will remain. Weather conditions do not affect collisions at this location.

*Table 6: Carling Avenue (Eastbound) at Kirkwood Avenue Collision Summary*

<b>Total Collisions</b>		<b>Number</b>	<b>%</b>
		<b>104</b>	<b>100%</b>
Classification	Fatality	0	0%
	Non-Fatal Injury	18	17%
	Property Damage Only	86	83%
Initial Impact Type	Angle	9	9%
	Rear end	43	41%
	Sideswipe	24	23%
	Turning Movement	22	21%
	SMV Other	5	5%
	Other	1	1%
Road Surface Condition	Dry	68	65%
	Wet	20	19%
	Loose Snow	9	9%
	Slush	5	5%
	Packed Snow	68	65%
	Ice	1	1%
	Unknown	1	1%
Pedestrian Involved		1	1%
Cyclists Involved		0	0%

The Carling Avenue (eastbound) at Kirkwood Avenue intersection had a total of 104 collisions during the 2014-2018 time period, with 86 involving property damage only, and the remaining 18 having non-fatal injuries. The collision types are most represented by rear end, with 43 collisions, followed by sideswipe at 24 and turning movement at 22, with the remainder represented by angle, single motor vehicle other, and other in descending frequency. Rear end and sideswipe collisions are consistent with congested intersections, as several movements at this intersection experience significant queuing. The northbound right-turning vehicles are likely the cause of the turning movement collisions through a combination of violating the ‘no right on red’ restriction and weaving towards the Highway 417 on-ramp. Weather conditions are not considered to have an effect on collisions at this location.

*Table 7: Carling Avenue at Merivale Road Collision Summary*

<b>Total Collisions</b>		<b>Number</b>	<b>%</b>
		<b>56</b>	<b>100%</b>
Classification	Fatality	0	0%
	Non-Fatal Injury	13	23%
	Property Damage Only	43	77%
Initial Impact Type	Angle	15	27%
	Rear end	17	30%
	Sideswipe	8	14%
	Turning Movement	16	29%
Road Surface Condition	Dry	40	71%
	Wet	8	14%
	Loose Snow	6	11%
	Slush	2	4%
Pedestrian Involved		0	0%



	Number	%
<b>Total Collisions</b>	<b>56</b>	<b>100%</b>
Cyclists Involved	0	0%

The Carling Avenue at Merivale Road intersection had a total of 56 collisions during the 2014-2018 time period, with 86 involving property damage only, and the remaining 18 having non-fatal injuries. The collision types are mostly split between rear end with 17, turning movement with 16, and angle with 15, additionally with eight sideswipe collisions occurring in this period. The high volumes at this intersection do not . Weather conditions do not affect collisions at this location.

## 2.3 Planned Conditions

### 2.3.1 Changes to the Area Transportation Network

No roadway improvements are included within the Ottawa TMP for the Study Area. The Rapid Transit and Transit Priority Network includes continuous transit priority corridor along Carling Avenue, with the City's Planned Construction Projects portal providing a window of three-to-five years for this work to be undertaken, and Merivale Road is identified for isolated transit priority measures south of Carling Avenue. As part of the Rapid Transit and Transit Priority Network Concept, a new LRT line is identified along Carling Avenue and continuous bus lanes are identified along Merivale Road south of Carling Avenue.

#### *Carling Interchange Modifications*

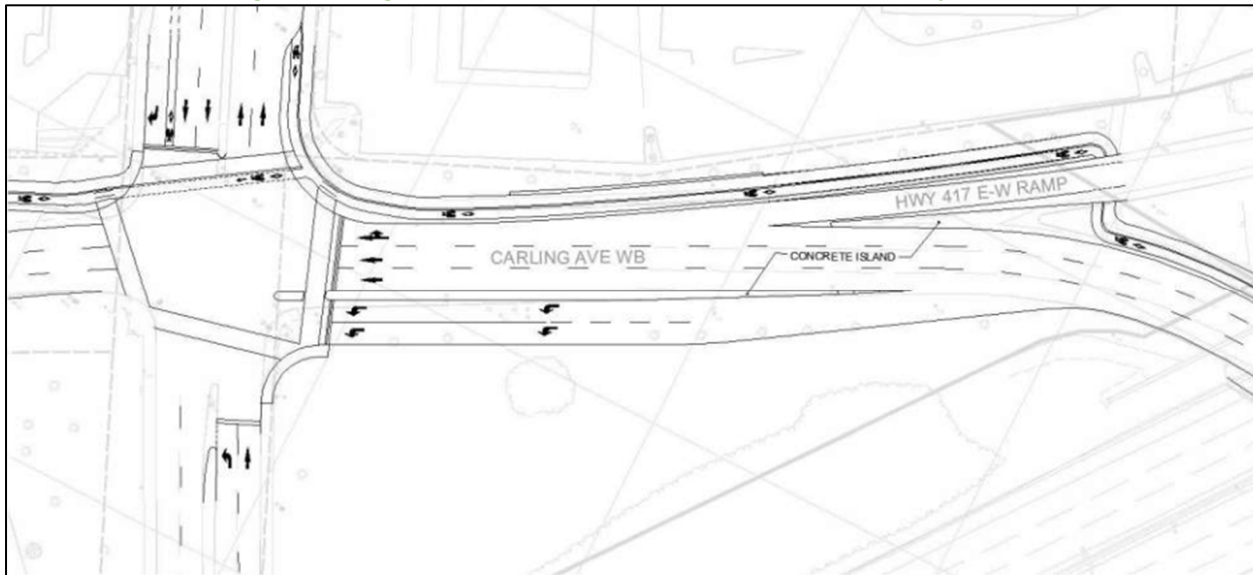
The Ministry of Transportation of Ontario is currently in the process of expanding Highway 417 and is modifying the interchange at Carling Avenue and Kirkwood Avenue.

One major modification to this interchange has been the closure of the Carling Avenue (westbound) on-ramp to Highway 417 (eastbound) in March of 2018. Drivers travelling westbound on Carling Avenue looking to access the eastbound Highway 417 will now primarily divert to Kirkwood Avenue, continuing to Carling Avenue (eastbound) to merge onto the Carling Avenue (eastbound) on-ramp to Highway 417 (eastbound). This modification was predicted to increase traffic at both the Carling Avenue (westbound) at Kirkwood Avenue, and Carling Avenue (eastbound) at Kirkwood Avenue intersections.

Another major modification to the interchange includes the addition of raised concrete islands to the intersections of Carling Avenue (westbound) and the Highway 417 off-ramp, and Carling Avenue (westbound) and Kirkwood Avenue. As drivers will be prevented from exiting the freeway onto Carling Avenue (westbound) and completing a left turn onto Kirkwood Avenue, they must instead continue along Carling Avenue (westbound) to complete this maneuver downstream of this intersection. The changes to the Carling Avenue (westbound) and Kirkwood Avenue intersection are illustrated in Figure 9.

Saigon Court will also be signalized creating a loop that replaces the westbound left-turn from the highway and westbound right-turn from Carling Avenue.

Figure 9: Carling Avenue (Westbound) & Kirkwood Avenue Planned Modifications



Source: Transportation Environmental Study Report, Appendix E: Traffic Summary Report (WSP, 2017)

### 2.3.2 Other Study Area Developments

#### *1354 Carling Avenue & 1376 Carling Avenue*

The proposed development includes a zoning amendment to increase permitted height to 20 storeys and a site plan for the construction of four buildings; two mixed-use high-rise buildings fronting onto Carling Avenue, and two mid-rise residential buildings fronting onto the adjacent local side streets. The site consists of 403 Units and 619m<sup>2</sup> of ground floor retail.

#### *1400 Carling Avenue*

The proposed development includes a zoning amendment to increase permitted height to 13 storeys and a site plan for the addition of one ten-storey and one 12-storey tower onto an existing retirement home.

#### *1272 Carling Avenue*

The proposed development includes a site plan for the addition of two storeys onto an existing hotel, comprising 24 additional units.

#### *1309 Carling Avenue*

The proposed development includes a site plan which includes the demolition of the existing mall and surrounding retail structures, and the addition of mixed-use towers. The site plan does not modify any existing accesses and development is to take place in three phases. Beyond its current traffic generation, all three phases are anticipated to generate 360 new two-way AM peak hour auto trips and 400 new two-way PM peak hour auto trips. (Parsons 2016)

#### *900 Merivale Road*

The development includes a site plan for a four-storey addition connected to the existing building by a one-storey link. The site consists of 42 new seniors' residential units, in addition to the expansion of an existing health clinic, which were constructed in 2019.

### 3 Study Area and Time Periods

#### 3.1 Study Area

The study area will include the intersections of:

- Carling Avenue at:
  - Kirkwood Avenue (North)
  - Kirkwood Avenue (South)
  - Westgate Shopping Centre Access (West)
  - Westgate Shopping Centre Access (East)
  - Merivale Road
  - Archibald Street
- Merivale Road at Westgate Shopping Centre Access (North)
- Merivale Road at Coldrey Avenue at Crerar Avenue

The boundary roads are Archibald Street and Carling Avenue and no screenlines are present near the proposed site and none will be reviewed as part of this study.

#### 3.2 Time Periods

As the proposed development is composed of residential units and retail, the AM and PM peak hours will be examined.

#### 3.3 Horizon Years

The anticipated build-out year is 2023. As a result, the full build-out plus five years horizon year is 2028.

### 4 Exemption Review

Table 8 summarizes the exemptions for this TIA.

*Table 8: Exemption Review*

Module	Element	Explanation	Exempt/Required
<b>Design Review Component</b>			
<b>4.1 Development Design</b>	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
<b>4.2 Parking</b>	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
<b>Network Impact Component</b>			
<b>4.5 Transportation Demand Management</b>	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
<b>4.6 Neighbourhood Traffic Management</b>	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt

Module	Element	Explanation	Exempt/Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt (As-of-right permits approximately 88 units. Total difference of approximately 70 people trips.)

## 5 Development Generated Travel Demand

### 5.1 Trip Generation and Travel Modes

This TIA has been prepared using the vehicle and person trip rates for the mid-rise apartment using the TRANS Trip Generation Study Report (2009) and shopping centre for the ground floor retail using the ITE Trip Generation Manual 10<sup>th</sup> Edition (2017). Table 9 summarizes the person trip rates for the proposed land uses.

Table 9: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Mid-rise Apartments	222 (TRANS)	AM	0.24	0.65
		PM	0.27	0.68
Shopping Centre	820 (ITE)	AM	0.94	1.20
		PM	3.81	4.88

Using the above Person Trip rates, the total person trip generation has been estimated. Table 10 below illustrates the total person trip generation by dwelling type.

Table 10: Total Person Trip Generation

Land Use	Units/ sq ft	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Mid-rise Apartments	175	27	87	114	74	45	119
Shopping Centre	8525	6	4	10	20	22	42
<b>Total Person Trips</b>		<b>33</b>	<b>91</b>	<b>124</b>	<b>94</b>	<b>67</b>	<b>161</b>

Using the most recent National Capital Region Origin-Destination survey (OD Survey), the existing mode shares for the Merivale district have been summarized in Table 11.

Table 11: Mode Share – Merivale

Travel Mode	Ottawa Inner
Auto Driver	60%
Auto Passenger	15%
Transit	20%
Bicycle	1%
Walk	4%
<b>Total</b>	<b>100%</b>

Using the above mode shares and person trip rates the person trips by mode have been projected. Table 12 summarizes the trip generation by mode.

Table 12: Trip Generation by Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto Driver	60%	20	54	74	56	40	96
Auto Passenger	15%	5	13	18	13	9	22
Transit	20%	6	18	25	19	13	32
Bicycle	1%	0	1	2	2	1	3
Walk	4%	1	3	6	4	3	7
<b>Total</b>	<b>100%</b>	<b>33</b>	<b>90</b>	<b>125</b>	<b>94</b>	<b>66</b>	<b>160</b>

As shown above, 74 AM and 96 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

### 5.2 Trip Distribution

To understand the travel patterns of the subject development the OD Survey has been reviewed to determine the travel for the residential development patterns were applied based on the build-out of Merivale. Table 13 below summarizes the distributions.

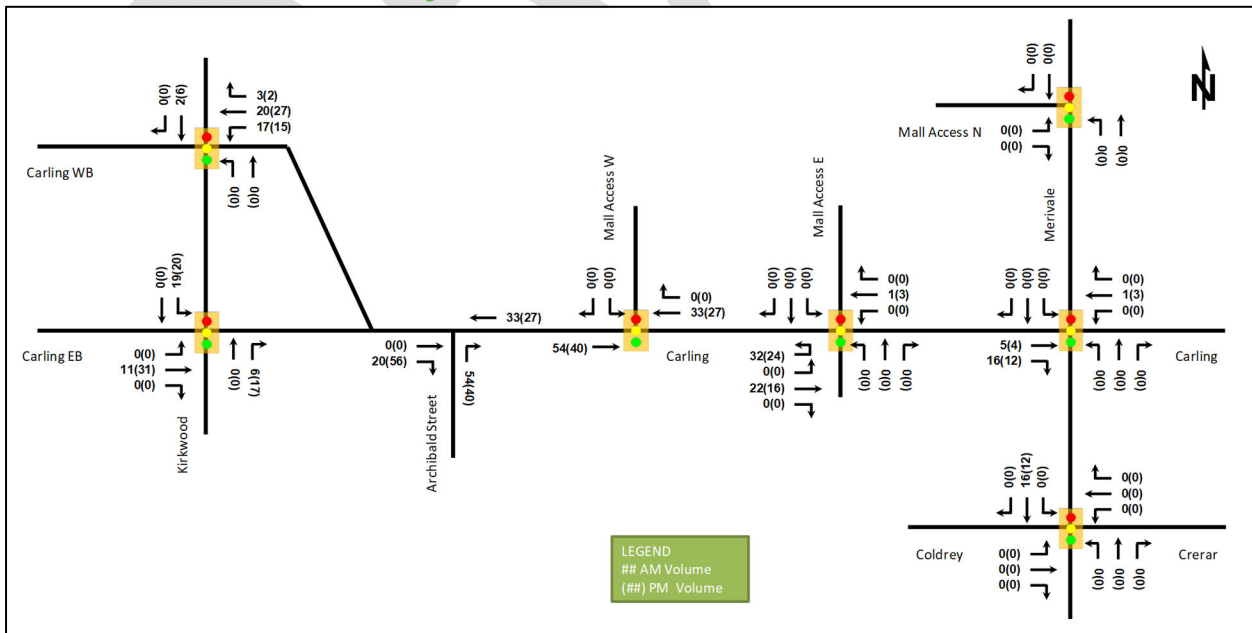
Table 13: OD Survey Existing Mode Share – Merivale

To/From	% of Trips
North	15%
South	40%
East	30%
West	15%
<b>Total</b>	<b>100%</b>

### 5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network. Figure 10 illustrates the new site generated volumes.

Figure 10: New Site Generation Auto Volumes



## 6 Background Network Travel Demand

### 6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and while the closure of the ramp onto Carling Avenue (westbound) will have been captured by the count data, traffic changes from the adjacent median installation, as illustrated in Figure 9 must still be explicitly accounted for. Projected adjustments to area traffic associated with this treatment are outlined in appendix E of the MTO Traffic Summary Report (WSP, 2017) and have been included as part of all future traffic projections within this report.

### 6.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. Table 14 summarizes the results of the model and the projections are provided in Appendix E.

*Table 14: TRANS Regional Model Projections – Study Area Growth Rates*

Street	Direction Growth Percentage	
	Eastbound	Westbound
Carling	0.45%	-0.06%
Coldrey/Crerar	0.00%	-3.36%
	Northbound	Southbound
Kirkwood	0.72%	-1.39%
Merivale	0.09%	1.39%

In general, the TRANS projections identify a growth rate range of -3.36% and 1.39%. Therefore, a growth rate of 1% will be applied to the mainline arterial volumes and to all movements at the major intersections of Carling Avenue westbound and Kirkwood Avenue, Carling Avenue eastbound and Kirkwood Avenue, and Carling Avenue and Merivale Road.

### 6.3 Other Developments

The other area developments are noted in Section 2.3. The development of 1354 Carling Avenue, and that of 1309 Carling Avenue will be explicitly accounted for in the future background volumes using the projected volumes from their respective Transportation Impact Assessments (Parsons, 2017; 2019).

## 7 Demand Rationalization

### 7.1 2023 Future Background Intersection Operations

Figure 11 illustrates the 2023 background volumes and Table 15 summarizes the background intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. U-turn movements have been included in left-turning volumes within the volume figures and have been modelled as separate movements within Synchro™. The Synchro worksheets are provided in Appendix F.

Figure 11: 2023 Future Background Volumes

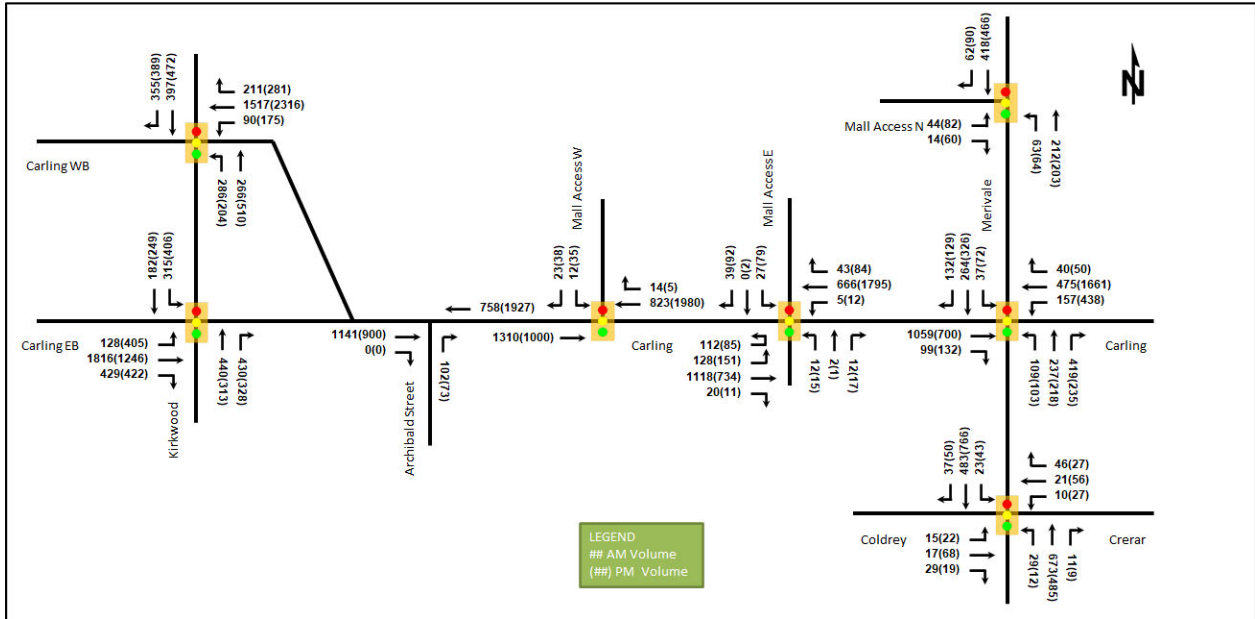


Table 15: 2023 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
Carling Avenue (westbound) & Kirkwood Avenue <i>Signalized</i>	WBL	A	0.07	16.2	8.7	A	0.12	15.9	18.2
	WBT/R	E	0.92	35.5	#192.7	F	1.22	131.6	#332.8
	NBL	C	0.78	37.9	m#91.5	C	0.77	46.2	m#72.4
	NBT	A	0.38	23.2	m83.3	D	0.83	60.9	#184.0
	SBT	A	0.53	40.9	62.3	C	0.70	48.6	79.1
	SBR	E	0.94	65.3	#129.9	F	1.12	118.2	#163.3
	<b>Overall</b>	<b>D</b>	-	<b>43.6</b>	-	<b>F</b>	-	<b>104.4</b>	-
Merivale Road & Westgate SC <i>Signalized</i>	EBL	A	0.15	20.0	10.2	A	0.31	25.0	18.3
	EBR	A	0.05	9.4	3.5	A	0.21	7.9	7.6
	NBL	A	0.11	1.8	3.9	A	0.13	4.1	m15.4
	NBT	A	0.18	1.6	10.1	A	0.18	4.3	m52.0
	SBT	A	0.35	6.6	53.2	A	0.42	7.5	60.5
	SBR	A	0.06	2.2	4.7	A	0.09	1.8	5.3
<b>Overall</b>	<b>A</b>	-	<b>5.4</b>	-	<b>A</b>	-	<b>7.6</b>	-	
Carling Avenue (eastbound) & Kirkwood Avenue <i>Signalized</i>	EBL	A	0.21	22.5	36.9	B	0.62	30.8	121.5
	EBL/T	F	1.05	67.4	#232.1	C	0.70	28.5	119.7
	EBR	A	0.54	4.4	19.2	A	0.55	7.0	38.1
	NBT	A	0.39	28.4	58.1	A	0.30	29.0	43.0
	NBR	D	0.86	50.7	#160.8	C	0.71	42.4	108.9
	SBL/T	F	1.04dl	34.9	m83.9	F	1.18dl	19.9	92.7
<b>Overall</b>	<b>D</b>	-	<b>47.9</b>	-	<b>C</b>	-	<b>25.8</b>	-	
Carling Avenue & Archibald Street <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	NBR	C	0.33	20.5	10.5	C	0.18	15.0	5.2
	<b>Overall</b>	<b>A</b>	-	<b>1.7</b>	-	<b>A</b>	-	<b>1.1</b>	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
<b>Carling Avenue &amp; Westgate SC (west)</b> <i>Signalized</i>	EBT	A	0.40	5.6	m37.1	A	0.30	7.0	49.6
	WBT/R	A	0.26	3.9	9.5	B	0.60	5.4	57.2
	SBL/R	A	0.13	17.7	10.8	A	0.29	40.0	28.3
	<b>Overall</b>	<b>A</b>	-	<b>5.1</b>	-	<b>A</b>	-	<b>6.7</b>	-
<b>Carling Avenue &amp; Westgate SC (east)</b> <i>Signalized</i>	EBL/U	A	0.30	3.5	5.2	C	0.77	56.1	35.7
	EBT	A	0.33	1.9	12.0	A	0.24	2.6	7.3
	WBL/U	A	0.02	5.2	m1.3	A	0.04	5.1	m1.1
	WBT/R	A	0.21	3.6	19.3	C	0.75	13.1	218.5
	NB	A	0.17	29.9	10.2	A	0.15	25.2	12.9
	SBL/T	A	0.20	47.9	13.3	A	0.43	52.1	35.3
	SBR	A	0.21	14.1	9.0	A	0.31	10.0	14.2
	<b>Overall</b>	<b>A</b>	-	<b>3.8</b>	-	<b>B</b>	-	<b>13.7</b>	-
<b>Carling Avenue &amp; Merivale Road</b> <i>Signalized</i>	EBT/R	C	0.78	31.8	98.5	D	0.80	49.3	97.8
	WBL	D	0.84	<b>84.6</b>	<b>#107.0</b>	<b>F</b>	<b>1.23</b>	<b>163.8</b>	<b>#231.0</b>
	WBT/R	A	0.23	16.8	37.8	C	0.76	31.3	164.8
	NBL	B	0.69	71.5	47.1	C	0.72	<b>81.7</b>	<b>#52.0</b>
	NBT	A	0.56	42.3	77.3	A	0.53	46.8	81.5
	NBR	C	0.78	25.1	81.2	A	0.46	7.4	21.6
	SBL	A	0.36	57.7	0.0	A	0.57	66.0	36.2
	SBT	C	0.78	53.9	63.8	E	0.90	<b>100.3</b>	<b>#133.0</b>
	SBR	A	0.35	9.9	18.8	A	0.34	15.3	27.9
<b>Overall</b>	<b>C</b>	-	<b>34.6</b>	-	<b>E</b>	-	<b>55.7</b>	-	
<b>Merivale Road &amp; Coldrey Avenue/ Crerar Avenue</b> <i>Signalized</i>	EB	A	0.28	20.6	13.9	A	0.48	33.4	27.7
	WB	A	0.32	17.5	14.8	A	0.49	32.0	27.2
	NB	A	0.34	5.1	40.3	A	0.24	4.8	26.6
	SB	A	0.27	4.5	28.5	A	0.43	6.0	52.0
	<b>Overall</b>	<b>A</b>	-	<b>6.2</b>	-	<b>A</b>	-	<b>9.3</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
PHF = 0.90

The study area intersection operations for the 2023 future background horizon generally operate similarly to existing operations at peak hours. During the AM peak hour, the intersection of Carling Avenue (westbound) and Kirkwood Avenue sees several additional movements show long queues, the Carling Avenue (eastbound) and Kirkwood Avenue intersection’s eastbound through lanes move from a LOS of E to a LOS of F, and the Carling Avenue and Merivale Road intersection shows its westbound left turn lane’s delay push beyond 80 seconds. During the PM peak hour, no capacity, delay, or queuing issues are noted beyond the existing conditions.

### 7.2 2028 Future Background Intersection Operations

Figure 12 illustrates the 2028 background volumes and Table 16 summarizes the background intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. U-turn movements have been included in left-turning volumes within the volume figures and have been modelled as separate movements within Synchro™. The Synchro worksheets are provided in Appendix G.



Figure 12: 2028 Future Background Volumes

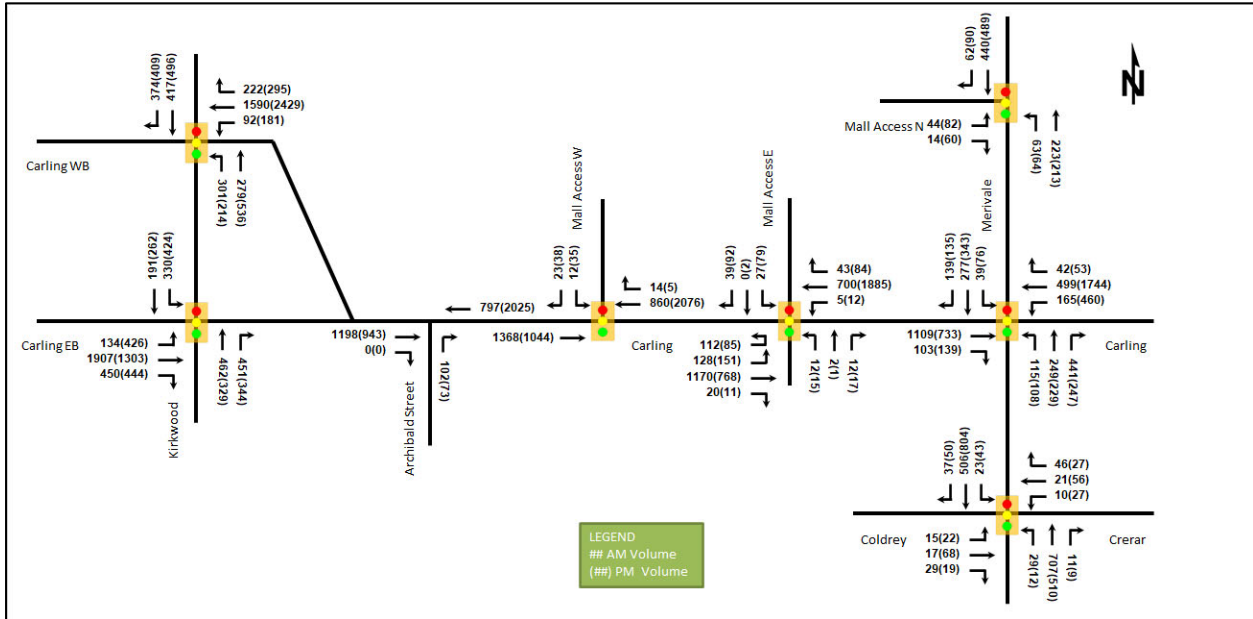


Table 16: 2028 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
Carling Avenue (westbound) & Kirkwood Avenue <i>Signalized</i>	WBL	A	0.07	16.4	8.8	A	0.12	15.9	18.9
	WBT/R	E	0.98	45.3	#209.4	F	1.28	157.5	#358.1
	NBL	D	0.82	41.6	m#101.5	D	0.83	52.5	m#70.3
	NBT	A	0.39	23.2	m86.3	D	0.87	74.9	#199.2
	SBT	A	0.54	40.7	65.5	C	0.74	50.1	83.5
	SBR	E	0.97	71.0	#141.9	F	1.18	139.4	#175.3
	<b>Overall</b>	<b>D</b>	-	<b>44.6</b>	-	<b>F</b>	-	<b>123.9</b>	-
Merivale Road & Westgate SC <i>Signalized</i>	EBL	A	0.15	20.0	10.2	A	0.31	25.0	18.3
	EBR	A	0.05	9.4	3.5	A	0.21	8.3	7.6
	NBL	A	0.11	1.7	m3.8	A	0.13	3.9	m12.8
	NBT	A	0.19	1.5	10.6	A	0.19	4.1	m49.4
	SBT	A	0.37	6.8	57.2	A	0.44	7.8	64.6
	SBR	A	0.06	2.2	4.7	A	0.09	1.8	5.3
	<b>Overall</b>	<b>A</b>	-	<b>5.4</b>	-	<b>A</b>	-	<b>7.7</b>	-
Carling Avenue (eastbound) & Kirkwood Avenue <i>Signalized</i>	EBL	A	0.22	22.6	38.4	B	0.65	33.4	130.5
	EBL/T	F	1.10	86.1	#251.3	C	0.73	29.9	127.4
	EBR	A	0.55	4.5	19.5	A	0.58	8.8	48.9
	NBT	A	0.41	28.7	61.1	A	0.31	29.2	45.1
	NBR	E	0.90	55.7	#173.0	C	0.74	44.3	115.8
	SBL/T	F	1.13dl	36.4	88.3	F	1.27dl	22.5	97.8
	<b>Overall</b>	<b>E</b>	-	<b>57.9</b>	-	<b>C</b>	-	<b>27.5</b>	-
Carling Avenue & Archibald Street <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	NBR	C	0.34	21.6	11.2	C	0.19	15.4	5.2
	<b>Overall</b>	<b>A</b>	-	<b>1.7</b>	-	<b>A</b>	-	<b>1.1</b>	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 <sup>th</sup> )	LOS	V/C	Delay	Q (95 <sup>th</sup> )
<b>Carling Avenue &amp; Westgate SC (west)</b> <i>Signalized</i>	EBT	A	0.42	5.6	m37.6	A	0.32	7.1	52.2
	WBT/R	A	0.27	3.9	9.6	B	0.63	6.8	59.8
	SBL/R	A	0.13	17.7	10.8	A	0.29	41.2	28.8
	<b>Overall</b>	<b>A</b>	-	<b>5.1</b>	-	<b>A</b>	-	<b>7.7</b>	-
<b>Carling Avenue &amp; Westgate SC (east)</b> <i>Signalized</i>	EBL/U	A	0.31	3.7	5.1	C	0.77	57.0	36.2
	EBT	A	0.34	1.9	12.2	A	0.25	2.6	7.5
	WBL/U	A	0.02	5.0	m1.2	A	0.04	4.9	m1.0
	WBT/R	A	0.22	3.7	20.3	C	0.79	14.3	#233.6
	NB	A	0.17	29.9	10.2	A	0.15	25.2	12.9
	SBL/T	A	0.20	47.9	13.3	A	0.43	52.1	35.3
	SBR	A	0.21	14.1	9.0	A	0.31	10.0	14.2
	<b>Overall</b>	<b>A</b>	-	<b>3.8</b>	-	<b>B</b>	-	<b>14.4</b>	-
<b>Carling Avenue &amp; Merivale Road</b> <i>Signalized</i>	EBT/R	D	0.82	33.6	106.1	D	0.84	53.1	102.9
	WBL	E	0.93	<b>103.0</b>	<b>#112.4</b>	<b>F</b>	<b>1.33</b>	<b>204.5</b>	<b>#244.8</b>
	WBT/R	A	0.25	17.3	39.8	D	0.81	47.0	178.7
	NBL	C	0.71	72.9	<b>#50.7</b>	C	0.75	<b>84.1</b>	<b>#56.8</b>
	NBT	A	0.57	42.4	81.8	A	0.59	49.3	85.7
	NBR	D	0.82	28.9	93.2	A	0.49	7.7	21.9
	SBL	A	0.37	57.9	22.3	A	0.59	66.3	37.6
	SBT	D	0.80	55.9	68.1	E	0.92	<b>115.1</b>	<b>#144.4</b>
	SBR	A	0.35	9.9	19.5	A	0.35	15.9	30.1
<b>Overall</b>	<b>D</b>	-	<b>37.1</b>	-	<b>E</b>	-	<b>68.9</b>	-	
<b>Merivale Road &amp; Coldrey Avenue/ Crerar Avenue</b> <i>Signalized</i>	EB	A	0.28	20.6	13.9	A	0.48	33.4	27.7
	WB	A	0.32	17.5	14.8	A	0.49	32.0	27.2
	NB	A	0.36	5.2	42.7	A	0.26	4.8	28.0
	SB	A	0.28	4.6	30.0	A	0.45	6.2	55.5
	<b>Overall</b>	<b>A</b>	-	<b>6.3</b>	-	<b>A</b>	-	<b>9.3</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
PHF = 0.90

The study area intersection operations for the 2028 future background horizon operate similar to the 2023 future background horizon. During the AM peak hour, the northbound left lane at the intersection of Carling Avenue and Merivale Road experiences substantial queuing. During the PM peak hour, the westbound through/right lanes at the intersection of Carling Avenue and Merivale Road additionally experience substantial queuing.

## 8 Next Steps

Following the circulation and review of this Forecasting Report, any outstanding comments will be addressed within the context of the site plan submission and the Strategy Report. Following the completion of the remaining TIA Steps and sign-off has been received from City Transportation Project Manager, a signed and stamped final report will be provided to City staff.

# Appendix A

TIA Screening Form and PM Certification Form

DRAFT

City of Ottawa 2017 TIA Guidelines  
Step 1 - Screening Form

Date: 14-Apr-20  
Project Number: 2019-62  
Project Reference: Kevlar 1330 Carling, 815 Archibald

1.1 Description of Proposed Development	
Municipal Address	1330 Carling Avenue & 815 Archibald Street
Description of Location	PLAN 221 PT BLK 8 PLAN 529; LOT 8 PT LOT 7 RP 4R15037; PART 1
Land Use Classification	Arterial Mainstreet - AM10
Development Size	175 apartment units, 792 sq. m ground floor retail
Accesses	One access Archibald
Phase of Development	Single Phase
Buildout Year	2024
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Townhomes or apartments
Development Size	175 Units
Trip Generation Trigger	Yes

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes Carling Arterial Mainstreet
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	Yes
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes
Does the development include a drive-thru facility?	No
Safety Trigger	Yes



## **TIA Plan Reports**

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

### **CERTIFICATION**

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed<sup>1</sup> or registered<sup>2</sup> professional in good standing, whose field of expertise [check  appropriate field(s)] is either transportation engineering  or transportation planning .

**1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**


City Of Ottawa  
Infrastructure Services and Community  
Sustainability  
Planning and Growth Management  
110 Laurier Avenue West, 4th fl.  
Ottawa, ON K1P 1J1  
Tel. : 613-580-2424  
Fax: 613-560-6006

Ville d'Ottawa  
Services d'infrastructure et Viabilité des  
collectivités  
Urbanisme et Gestion de la croissance  
110, avenue Laurier Ouest  
Ottawa (Ontario) K1P 1J1  
Tél. : 613-580-2424  
Télécopieur: 613-560-6006

Dated at Ottawa this 20 day of September, 2018.  
(City)

Name: Andrew Harte  
(Please Print)

Professional Title: Professional Engineer

  
\_\_\_\_\_  
Signature of Individual certifier that s/he meets the above four criteria

<b>Office Contact Information (Please Print)</b>
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com



# Appendix B

Turning Movement Counts

DRAFT



## Turning Movement Count Bicycle Summary Flow Diagram

Automobiles, Taxis, Light Trucks, Vans, SUVs, Motorcycles, Heavy Trucks, Buses, and School Buses

Tuesday, 10 March 2020  
0600-0900 & 1500-1800  
6 Hour Survey  
City of Ottawa Ward 15

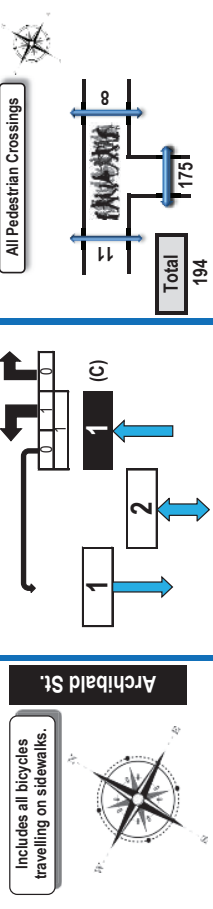
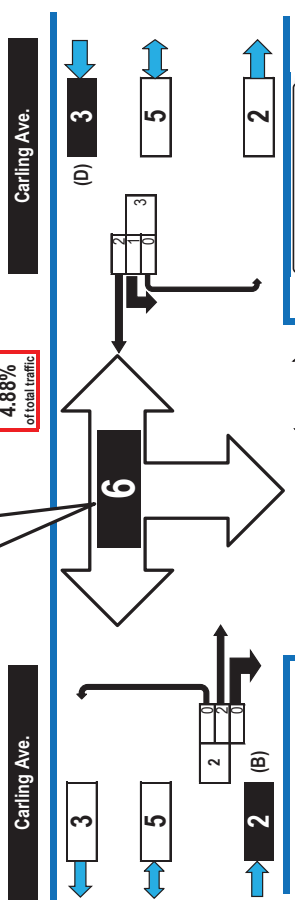
### Archibald Street & Carling Avenue

**All Vehicles**  
(Exclp. Bicycles & Electric Scooters)

Total vehicle volume, all approaches. (B + C + D)

**117**

Through traffic on Carling Avenue not included.



Time Period	Carling Ave. Eastbound				Carling Ave. Westbound				Archibald St. Northbound				Archibald St. Southbound				N/A
	L	T	R	T	L	T	R	T	L	T	R	T	L	T	R	T	
0600-0700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0800-0900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1500-1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>



## Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUVs, Motorcycles, Heavy Trucks, Buses, and School Buses

Tuesday, 10 March 2020  
0600-0900 & 1500-1800  
6 Hour Survey  
City of Ottawa Ward 15

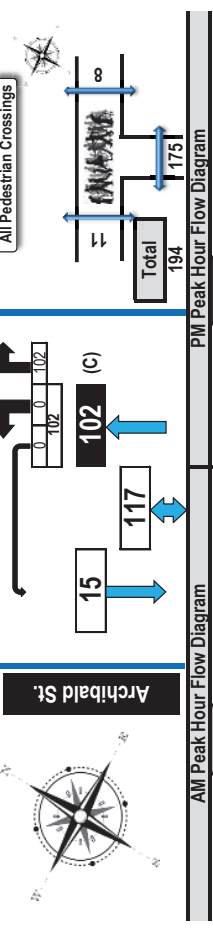
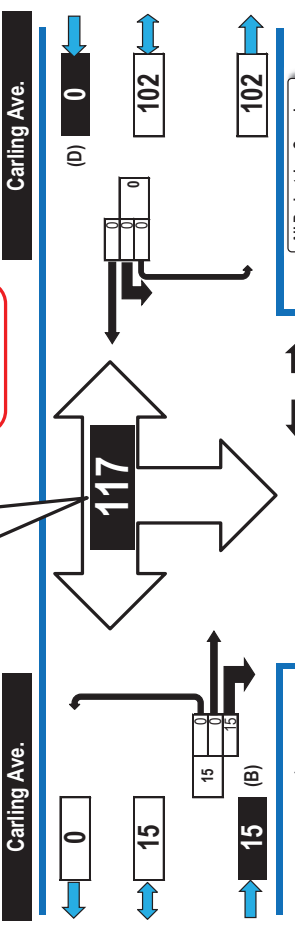
### Archibald Street & Carling Avenue

**All Vehicles**  
(Exclp. Bicycles & Electric Scooters)

Total vehicle volume, all approaches. (B + C + D)

**117**

Through traffic on Carling Avenue not included.



Time Period	Carling Ave. Eastbound				Carling Ave. Westbound				Archibald St. Northbound				Archibald St. Southbound				N/A
	L	T	R	T	L	T	R	T	L	T	R	T	L	T	R	T	
0600-0700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0800-0900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1500-1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>



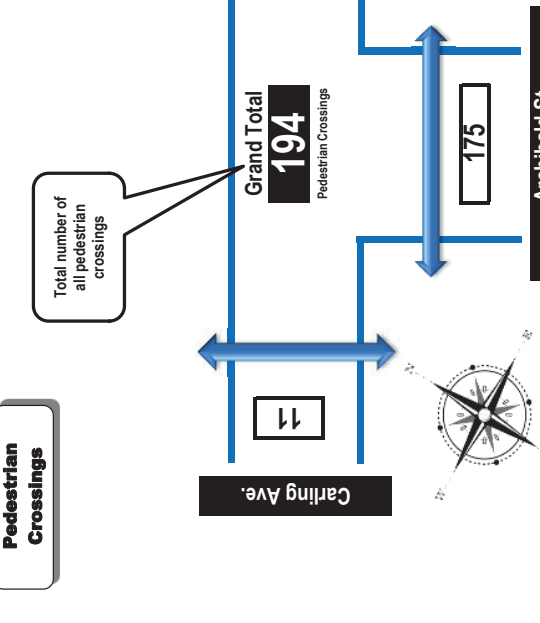


# Turning Movement Count Heavy Vehicle Summary and Flow Diagram



**Archibald Street & Carling Avenue** Ottawa, ON

Tuesday, 10 March 2020  
0600-0900 & 1500-1800  
6 Hour Survey  
City of Ottawa Ward 15



Time Period	Carling Ave. Eastbound				Carling Ave. Westbound				Archibald St. Northbound				Archibald St. Southbound			
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT
0600-0700	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0700-0800	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
1600-1700	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Heavy Vehicles**  
(Construction Vehicles, Heavy Trucks, Buses & School Buses). Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Through traffic on Carling Avenue not included. Heavy Vehicles Comprise **5.98%** of Total Traffic.



Time Period	Carling Ave.		Archibald St.		Archibald St.	
	West Side	East Side	West Side	East Side	West Side	East Side
0600-0700	0	1	0	0	0	0
0700-0800	0	0	0	1	0	0
0800-0900	3	1	4	27	0	0
1500-1600	0	0	0	0	0	0
1600-1700	2	4	6	54	0	0
1700-1800	6	2	8	31	0	0
<b>Totals</b>	<b>11</b>	<b>8</b>	<b>19</b>	<b>175</b>	<b>0</b>	<b>0</b>

**Note**  
The values in the summary table below and the flow diagram represent the number of pedestrian crossings. NOT the number of individual pedestrian crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two approaches will be recorded as two crossings.

Comments:  
Through traffic on Carling Avenue not included. The peak hours are based only on traffic to and from Archibald Street.



## Turning Movement Count Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

Automobiles, Taxis,  
Light Trucks, Vans,  
SUV's, Motorcycles,  
Heavy Trucks, Buses,  
and School Buses

### Archibald Street & Carling Avenue

Survey Date: Tuesday, 10 March 2020      Start Time: 0600      AADT Factor: 1.0  
 Weather AM: Light Rain +4° C      Survey Duration: 6 Hrs.      Survey Hours: 0600-0900 & 1500-1800  
 Weather PM: Overcast +4° C      Surveyor(s): T. Carmody

Time Period	Carling Ave. Eastbound						Carling Ave. Westbound						Archibald St. Northbound						Archibald St. Southbound											
	LT	ST	RT	UT	TOT	St. Tot	WB	ST	RT	UT	TOT	St. Tot	LT	ST	RT	UT	TOT	N/B Tot	LT	ST	RT	UT	TOT	S/B Tot						
0600-0700	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0
0700-0800	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	23	0	23	0	0	0	0	0	0	0	0	0	0	0	0
Through traffic on Carling Avenue not included.																														
1500-1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	23	0	0	0	0	0	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	5	0	0	5	0	0	0	0	0	0	5	0	0	19	0	19	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	15	0	0	15	0	0	0	0	0	0	15	0	0	102	0	102	0	0	0	0	0	0	0	0	0	0	0	0

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

AM Peak Hr	LT	ST	RT	UT	TOT	AM Peak Hr	LT	ST	RT	UT	TOT	OFF Peak Hr	LT	ST	RT	UT	TOT	OFF Peak Hr	LT	ST	RT	UT	TOT	PM Peak Hr	LT	ST	RT	UT	TOT	PM Peak Hr	LT	ST	RT	UT	TOT	EVNG Peak Hr	LT	ST	RT	UT	TOT	EVNG Peak Hr	LT	ST	RT	UT	TOT
0745-0845	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1515-1615	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Comments:**  
 Through traffic on Carling Avenue not included. The peak hours are based only on traffic to and from Archibald Street.

- Notes:**
1. Includes all vehicle types except bicycles and electric scooters.
  2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

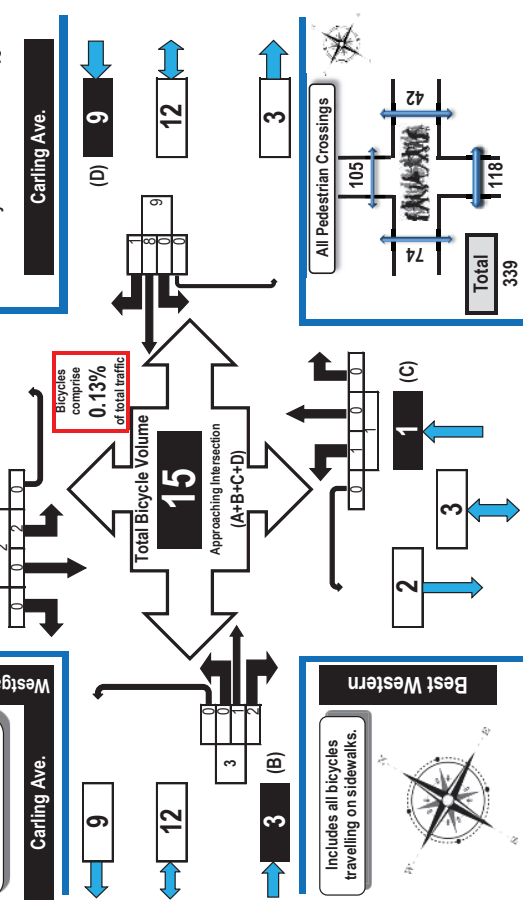


## Turning Movement Count Bicycle Summary Flow Diagram



### Carling Avenue & Westgate Shopping Centre - EAST Access

Tuesday, 10 March 2020  
 0600-0900 & 1500-1800  
 6 Hour Survey  
 City of Ottawa Ward 15



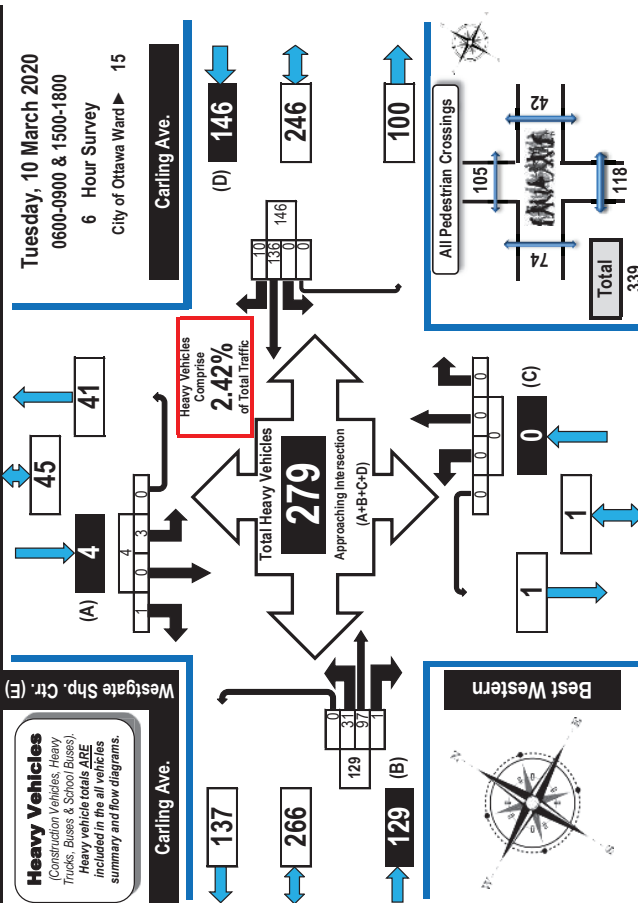
Time Period	Carling Ave. Eastbound						Carling Ave. Westbound						Westgate Shp. Ctr. (E) Southbound					
	LT	ST	RT	UT	TOT	S. Tot	WB	ST	RT	UT	TOT	S. Tot	LT	ST	RT	UT	TOT	S. Tot
0600-0700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



### Turning Movement Count Heavy Vehicle Summary Flow Diagram

ACCURATE  
TRAFFIC  
DATA

Carling Avenue & Westgate Shopping Centre - EAST Access  
Ottawa, ON



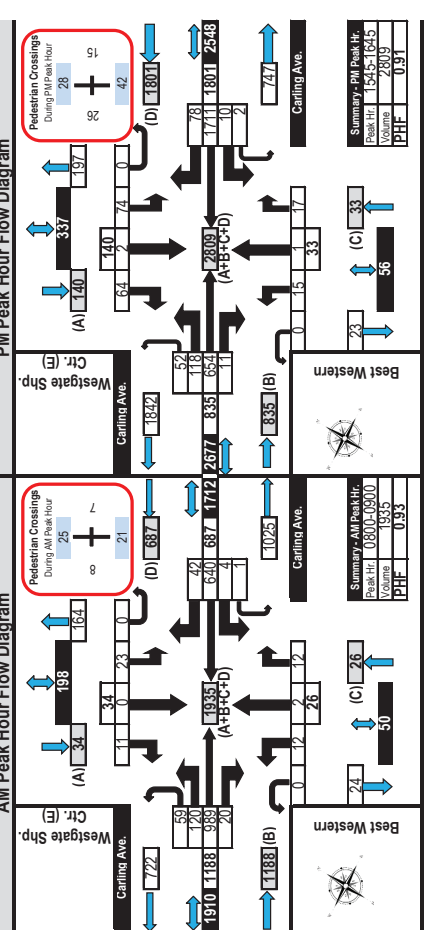
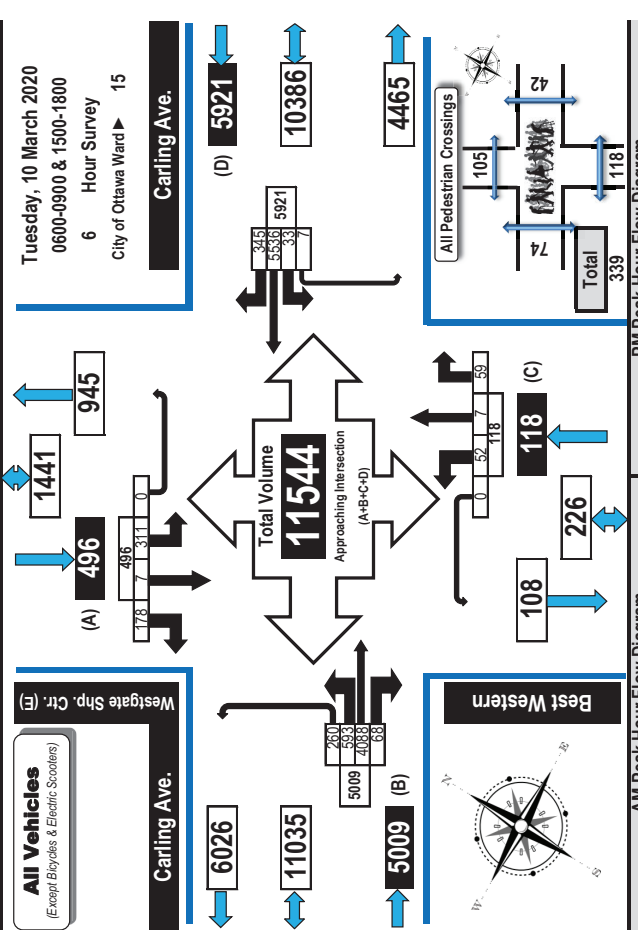
Time Period	Carling Ave. Eastbound				Carling Ave. Westbound				Westgate Shp. Ctr. (E) Southbound				S.Tot	RT	LT	UT	S.Tot	RT	LT	UT						
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT														
0600-0700	6	7	0	0	13	0	9	2	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
0700-0800	7	22	0	0	29	0	29	3	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	62
0800-0900	7	22	1	0	30	0	33	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
1500-1600	3	20	0	0	23	0	30	4	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1600-1700	6	13	0	0	19	0	21	1	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
1700-1800	2	13	0	0	15	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
<b>Totals</b>	<b>31</b>	<b>97</b>	<b>1</b>	<b>0</b>	<b>129</b>	<b>0</b>	<b>136</b>	<b>10</b>	<b>0</b>	<b>146</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

### Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams

ACCURATE  
TRAFFIC  
DATA

Carling Avenue & Westgate Shopping Centre - EAST Access  
Ottawa, ON





### Turning Movement Count

Pedestrian Crossings Summary  
and Flow Diagram



## Carling Avenue & Westgate Shopping Centre - EAST Access

Tuesday, 10 March 2020

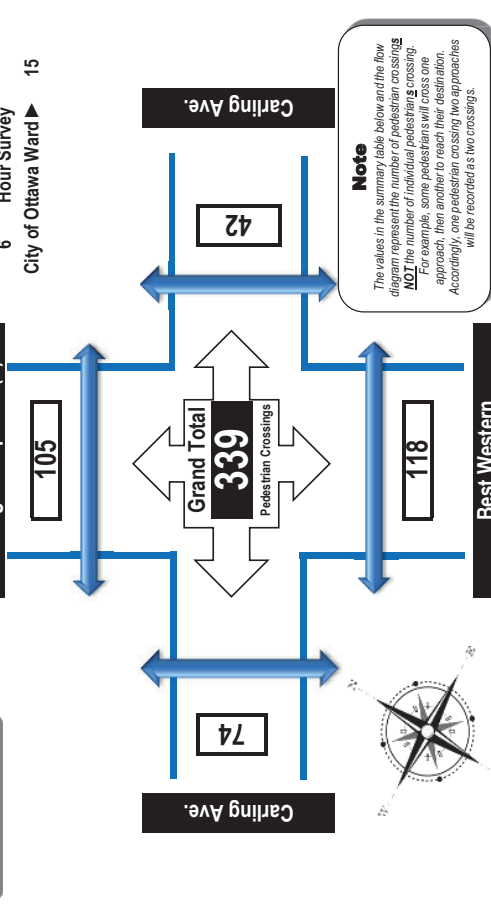
0600-0900 & 1500-1800

6 Hour Survey

City of Ottawa Ward 15

**Pedestrian Crossings**

**Westgate Shp. Ctr. (E)**



**Note**  
The values in the summary table below and the flow diagram represent the number of pedestrian crossing. NOT the number of individual pedestrian crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two approaches will be recorded as two crossings.



Time Period	West Side Crossing Carling Ave.		East Side Crossing Carling Ave.		South Side Crossing Westgate Shp. Ctr. (E)		North Side Crossing Westgate Shp. Ctr. (E)		Grand Total	
	Street	Total	Street	Total	Street	Total	Street	Total	Street	Total
0600-0700	0	0	0	0	5	5	1	1	6	6
0700-0800	3	21	1	18	4	21	3	25	21	25
0800-0900	8	7	7	21	15	46	25	61	46	61
1500-1600	23	35	12	19	35	36	17	17	36	71
1600-1700	20	32	12	38	32	65	27	32	65	97
1700-1800	20	30	10	17	30	49	32	49	49	79
<b>Totals</b>	<b>74</b>	<b>116</b>	<b>42</b>	<b>118</b>	<b>116</b>	<b>273</b>	<b>105</b>	<b>339</b>	<b>273</b>	<b>339</b>

**Comments:**  
Many of the heavy trucks to and from the Westgate Shopping Centre are associated with construction activity on site. A high percentage of the heavy vehicle traffic in general is comprised of OC Transpo buses, school and other buses. There was occasional backup, eastbound on Carling Avenue, from Merivale Road during the PM peak period. There were some conflicts between eastbound left-turning vehicles and pedestrians crossing the



### Turning Movement Count

Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

Automobiles, Taxis,  
Light Trucks, Vans,  
SUV's, Motorcycles,  
Heavy Trucks, Buses,  
and School Buses

## Carling Avenue & Westgate Shopping Centre - EAST Access

Tuesday, 10 March 2020

0600-0900 & 1500-1800

6 Hrs. Survey Duration:

Surveyor(s): T. Carmody

**Best Western**

**Carling Ave.**

Time Period	Eastbound				Westbound				Northbound				Southbound				Grand Total					
	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	N/B Tot	LT		ST	RT	UT	S/B Tot	
0600-0700	49	386	7	20	462	2	132	19	0	153	4	1	17	0	22	17	2	4	0	23	45	660
0700-0800	65	874	10	52	1001	0	360	33	0	393	7	1	5	0	13	25	1	10	0	36	49	1443
0800-0900	120	989	20	59	1188	4	640	42	1	687	12	2	12	0	26	23	0	11	0	34	60	1935
1500-1600	134	540	6	50	730	4	1531	80	2	1617	11	1	12	0	24	84	1	50	0	135	159	2506
1600-1700	109	657	10	49	825	10	1653	93	3	1759	6	1	8	0	15	67	2	62	0	131	146	2730
1700-1800	116	642	15	30	803	13	1220	78	1	1312	12	1	5	0	18	95	1	41	0	137	155	2270
<b>Totals</b>	<b>593</b>	<b>4088</b>	<b>68</b>	<b>260</b>	<b>5009</b>	<b>33</b>	<b>5536</b>	<b>345</b>	<b>7</b>	<b>5921</b>	<b>52</b>	<b>7</b>	<b>59</b>	<b>0</b>	<b>118</b>	<b>311</b>	<b>7</b>	<b>178</b>	<b>0</b>	<b>496</b>	<b>614</b>	<b>11544</b>

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

Time Period	AM Peak Hr				OFF Peak Hr				PM Peak Hr				EVNG Peak Hr				Grand Total					
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT						
0600-0900	120	989	20	59	1188	4	640	42	1	687	12	2	12	0	26	23	0	11	0	34	60	1935
1500-1800	134	540	6	50	730	4	1531	80	2	1617	11	1	12	0	24	84	1	50	0	135	159	2506
<b>Totals</b>	<b>254</b>	<b>1529</b>	<b>26</b>	<b>109</b>	<b>1918</b>	<b>8</b>	<b>1671</b>	<b>122</b>	<b>3</b>	<b>1759</b>	<b>23</b>	<b>3</b>	<b>24</b>	<b>0</b>	<b>48</b>	<b>128</b>	<b>1</b>	<b>100</b>	<b>0</b>	<b>170</b>	<b>215</b>	<b>4441</b>

**Comments:**  
Many of the heavy trucks to and from the Westgate Shopping Centre are associated with construction activity on site. A high percentage of the heavy vehicle traffic in general is comprised of OC Transpo buses, school and other buses. There was occasional backup, eastbound on Carling Avenue, from Merivale Road during the PM peak period. There were some conflicts between eastbound left-turning vehicles and pedestrians crossing the Westgate Shopping Centre access.

**Notes:**  
1. Includes all vehicle types except bicycles and electric scooters.  
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.



# Transportation Services - Traffic Services

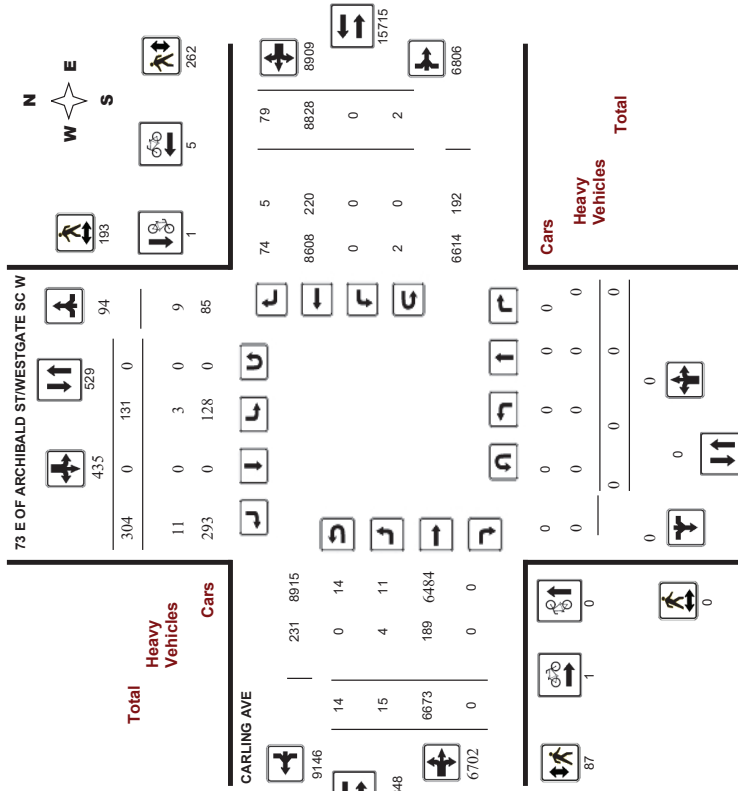
## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

#### Full Study Diagram



# Transportation Services - Traffic Services

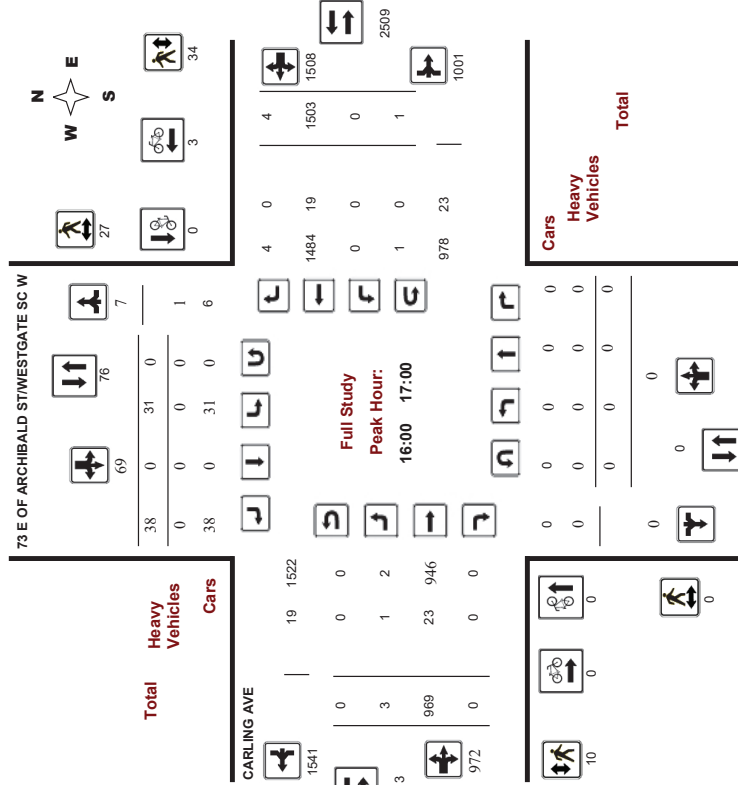
## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

#### Full Study Peak Hour Diagram





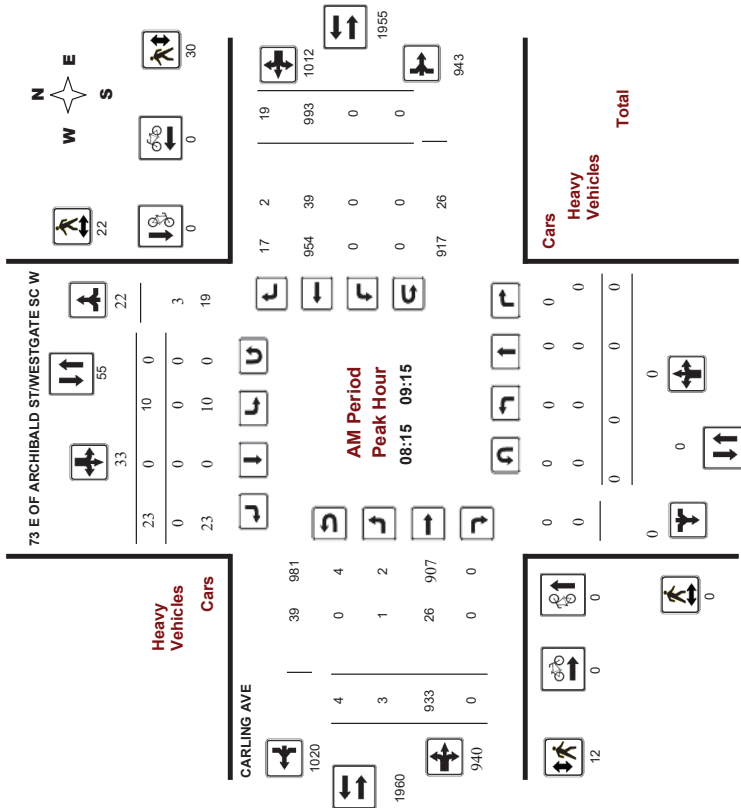
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision



Comments



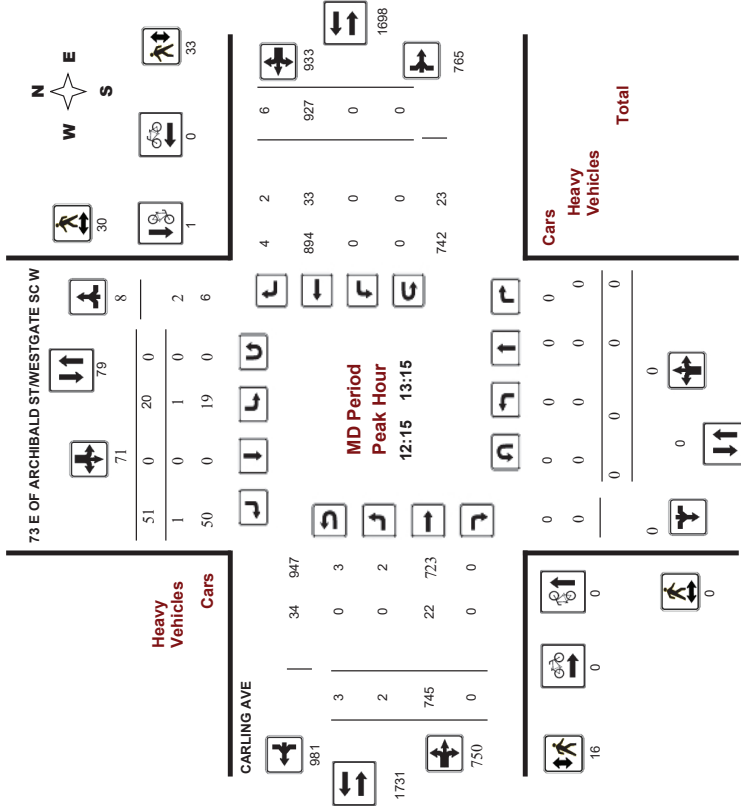
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision



Comments

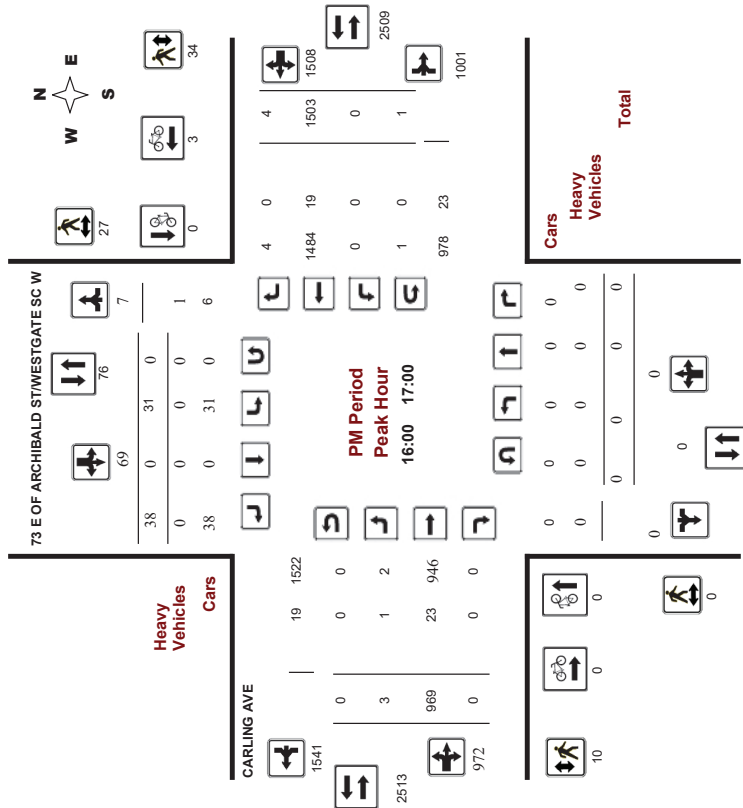


**Transportation Services - Traffic Services**  
**Turning Movement Count - Peak Hour Diagram**

**CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC**

**Survey Date:** Wednesday, January 31, 2018  
**Start Time:** 07:00

**WO No:** 37476  
**Device:** Miovision



**Comments**



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**

**CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC**

**Survey Date:** Wednesday, January 31, 2018  
**Start Time:** 07:00

**WO No:** 37476  
**Device:** Miovision

**Full Study Summary (8 HR Standard)**

**Survey Date:** Wednesday, January 31, 2018  
**Total Observed U-Turns:** 1.00  
**AADT Factor:** 1.00

**Northbound:** 0  
**Southbound:** 0  
**Eastbound:** 14  
**Westbound:** 2

**73 E OF ARCHIBALD ST/WESTGATE SC W**  
**CARLING AVE**

Period	Northbound			Southbound			Eastbound			Westbound			WB TOT	STR TOT	Grand Total			
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	LT	ST	RT	EB TOT				LT	ST	RT
07:00-08:00	0	0	0	0	3	0	7	10	10	1	917	0	918	0	695	13	708	1636
08:00-09:00	0	0	0	0	8	0	17	25	25	4	958	0	962	0	939	17	956	1918
09:00-10:00	0	0	0	0	14	0	48	62	62	0	815	0	815	0	875	20	895	1710
11:30-12:30	0	0	0	0	21	0	61	82	82	2	652	0	694	0	917	11	928	1622
12:30-13:30	0	0	0	0	17	0	55	72	72	3	702	0	705	0	928	4	932	1637
15:00-16:00	0	0	0	0	18	0	45	63	63	1	658	0	659	0	1601	5	1606	2328
16:00-17:00	0	0	0	0	31	0	38	69	69	3	969	0	972	0	1503	4	1507	2479
17:00-18:00	0	0	0	0	19	0	33	52	52	1	962	0	963	0	1370	5	1375	2338
<b>Sub Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>131</b>	<b>0</b>	<b>304</b>	<b>435</b>	<b>435</b>	<b>15</b>	<b>6673</b>	<b>0</b>	<b>6688</b>	<b>0</b>	<b>8828</b>	<b>79</b>	<b>8907</b>	<b>15595</b>
<b>U-Turns</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>2</b>	<b>16</b>	<b>16</b>	<b>16</b>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>131</b>	<b>0</b>	<b>304</b>	<b>435</b>	<b>435</b>	<b>15</b>	<b>6673</b>	<b>0</b>	<b>6702</b>	<b>0</b>	<b>8828</b>	<b>79</b>	<b>8909</b>	<b>15611</b>
<b>EQ 12hr</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>182</b>	<b>0</b>	<b>423</b>	<b>605</b>	<b>605</b>	<b>21</b>	<b>9275</b>	<b>0</b>	<b>9316</b>	<b>0</b>	<b>12271</b>	<b>110</b>	<b>12384</b>	<b>21699</b>

Note: These values are calculated by multiplying the totals by the appropriate expansion factor: 1.39

**AVG 12hr** 0 0 0 0 172 0 398 570 605 20 8742 0 8780 0 11955 103 11671 21699 22304

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.

**AVG 24hr** 0 0 0 0 225 0 522 747 747 26 11452 0 11501 0 15150 136 15289 26790 27537

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor: 1.31

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

### 73 E OF ARCHIBALD ST/WESTGATE SC W

### Full Study 15 Minute Increments

### CARLING AVE

Time Period	Northbound			Eastbound			Westbound			Grand Total
	LT	ST	TOT	LT	ST	TOT	LT	ST	TOT	
07:00	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0
Total:	0	0	0	0	0	0	0	0	0	0

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

### 73 E OF ARCHIBALD ST/WESTGATE SC W

### Full Study Cyclist Volume

### CARLING AVE

Time Period	Northbound			Eastbound			Westbound			Grand Total
	Street	Southbound	Street Total	Street	Eastbound	Street Total	Street	Westbound	Street Total	
07:00	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

### 73 E OF ARCHIBALD ST/WESTGATE SC W

### Full Study Pedestrian Volume

#### CARLING AVE

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	4	4	1	3	4	8
07:15 07:30	0	4	4	1	5	6	10
07:30 07:45	0	2	2	2	2	4	6
07:45 08:00	0	3	3	2	11	13	16
08:00 08:15	0	1	1	1	11	12	13
08:15 08:30	0	4	4	1	5	6	10
08:30 08:45	0	4	4	2	10	12	16
08:45 09:00	0	6	6	6	6	12	18
09:00 09:15	0	8	8	3	9	12	20
09:15 09:30	0	1	1	0	5	5	6
09:30 09:45	0	7	7	3	7	10	17
09:45 10:00	0	7	7	5	19	24	31
11:30 11:45	0	4	4	3	7	10	14
11:45 12:00	0	11	11	7	14	21	32
12:00 12:15	0	13	13	4	7	11	24
12:15 12:30	0	7	7	2	11	13	20
12:30 12:45	0	9	9	9	7	16	25
12:45 13:00	0	11	11	3	6	9	20
13:00 13:15	0	3	3	2	9	11	14
13:15 13:30	0	8	8	4	10	14	22
15:00 15:15	0	8	8	2	6	8	16
15:15 15:30	0	4	4	1	6	7	11
15:30 15:45	0	7	7	0	8	8	15
15:45 16:00	0	8	8	1	13	14	22
16:00 16:15	0	2	2	2	7	9	11
16:15 16:30	0	11	11	1	9	10	21
16:30 16:45	0	7	7	4	8	12	19
16:45 17:00	0	7	7	3	10	13	20
17:00 17:15	0	9	9	5	7	12	21
17:15 17:30	0	6	6	4	8	12	18
17:30 17:45	0	3	3	3	6	9	12
17:45 18:00	0	4	4	0	10	10	14
Total	193	193	386	87	262	349	542



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37476  
Device: Miovision

### 73 E OF ARCHIBALD ST/WESTGATE SC W

### Full Study Heavy Vehicles

#### CARLING AVE

Time Period	Northbound			Southbound			Eastbound			Westbound			W	STR	Grand Total						
	LT	ST	RT	N	ST	RT	S	STR	TOT	LT	ST	RT				E	LT	ST	RT		
07:00 07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	24	12	
07:15 07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	24	12	
07:30 07:45	0	0	0	0	0	0	1	2	2	0	4	0	4	0	13	0	8	1	13	26	14
07:45 08:00	0	0	0	0	0	0	0	0	0	6	0	4	0	10	0	4	0	10	20	10	
08:00 08:15	0	0	0	0	0	0	0	0	0	6	0	6	0	12	0	6	0	12	24	12	
08:15 08:30	0	0	0	0	0	0	0	0	0	5	0	8	0	13	0	8	0	13	26	13	
08:30 08:45	0	0	0	0	0	0	2	2	2	0	6	0	18	0	12	2	20	38	20		
08:45 09:00	0	0	0	0	0	0	1	1	1	11	0	16	0	4	0	4	0	15	31	16	
09:00 09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	19	38	19			
09:15 09:30	0	0	0	0	0	0	0	0	0	8	0	11	0	11	0	19	38	19			
09:30 09:45	0	0	0	0	0	0	1	1	1	0	7	0	17	0	9	0	16	33	17		
09:45 10:00	0	0	0	0	0	0	6	7	7	0	7	0	22	0	9	0	17	39	23		
11:30 11:45	0	0	0	0	0	0	0	0	0	6	0	13	0	7	0	13	26	13			
11:45 12:00	0	0	0	0	0	0	1	2	2	1	7	0	18	0	9	0	16	34	18		
12:00 12:15	0	0	0	0	0	0	1	1	1	0	9	0	16	0	6	0	15	31	16		
12:15 12:30	0	0	0	0	0	0	1	1	1	0	5	0	18	0	13	1	19	37	19		
12:30 12:45	0	0	0	0	0	0	1	2	2	0	6	0	14	0	7	0	14	28	15		
12:45 13:00	0	0	0	0	0	0	0	0	0	5	0	12	0	7	0	12	24	12			
13:00 13:15	0	0	0	0	0	0	1	1	1	0	6	0	12	0	6	1	13	25	13		
13:15 13:30	0	0	0	0	0	0	1	1	1	1	7	0	14	0	6	0	13	27	14		
15:00 15:15	0	0	0	0	0	0	0	0	0	0	7	0	13	0	6	0	13	26	13		
15:15 15:30	0	0	0	0	0	0	0	0	0	7	0	16	0	9	0	16	32	16			
15:30 15:45	0	0	0	0	0	0	0	0	0	5	0	13	0	8	0	13	26	13			
15:45 16:00	0	0	0	0	0	0	0	0	0	6	0	13	0	7	0	13	26	13			
16:00 16:15	0	0	0	0	0	0	0	0	0	2	0	7	0	5	0	7	14	7	14	7	
16:15 16:30	0	0	0	0	0	0	0	0	0	0	7	0	11	0	4	0	11	22	11		
16:30 16:45	0	0	0	0	0	0	0	0	0	0	7	0	10	0	3	0	10	20	10		
16:45 17:00	0	0	0	0	0	0	1	1	1	1	7	0	15	0	7	0	14	29	15		
17:00 17:15	0	0	0	0	0	0	0	0	0	4	0	5	0	1	0	5	10	5	10	5	
17:15 17:30	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	2	4	2	
17:30 17:45	0	0	0	0	0	0	0	0	0	7	0	13	0	6	0	13	26	13			
17:45 18:00	0	0	0	0	0	0	0	0	0	4	189	0	424	0	220	5	417	841	432	13	
Total	None	0	0	0	0	0	11	23	23	4	189	0	424	0	220	5	417	841	432	13	



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results CARLING AVE @ 73 E OF ARCHIBALD ST/WESTGATE SC

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00  
WO No: 37476  
Device: Miovision

### Full Study 15 Minute U-Turn Total

Time Period	WESTGATE SC W		ARCHIBALD		CARLING AVE		Total
	Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	U-Turn Total	U-Turn Total	
07:00	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0
08:00	0	0	1	0	0	0	1
08:15	0	0	1	0	0	0	1
08:30	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0
09:00	0	0	3	0	0	0	3
09:15	0	0	1	0	0	0	1
09:30	0	0	1	0	0	0	1
09:45	0	0	0	0	1	0	1
10:00	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0
11:45	0	0	1	0	0	0	1
12:00	0	0	0	0	0	0	0
12:15	0	0	1	0	0	0	1
12:30	0	0	2	0	0	0	2
12:45	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0
13:30	0	0	1	0	0	0	1
15:00	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0
15:30	0	0	1	0	0	0	1
15:45	0	0	0	0	0	0	0
16:00	0	0	0	0	1	0	1
16:15	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0
17:15	0	0	1	0	0	0	1
17:30	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0
Total	0	0	14	0	2	16	16

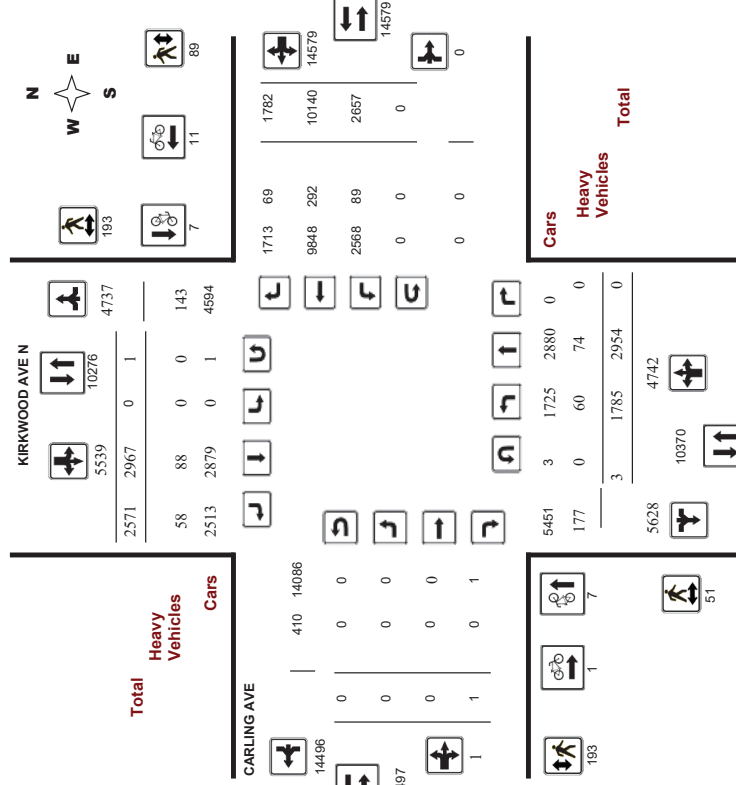


# Transportation Services - Traffic Services

## Turning Movement Count - Study Results CARLING AVE @ KIRKWOOD AVE N

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00  
WO No: 37707  
Device: Miovision

### Full Study Diagram





## Transportation Services - Traffic Services

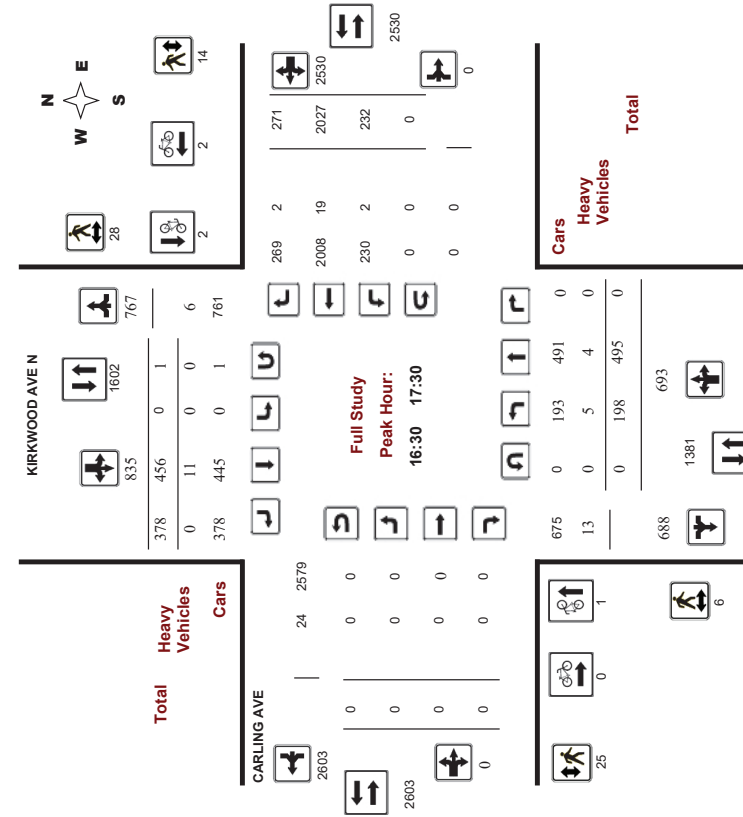
### Turning Movement Count - Study Results

#### CARLING AVE @ KIRKWOOD AVE N

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision

### Full Study Peak Hour Diagram



Comments



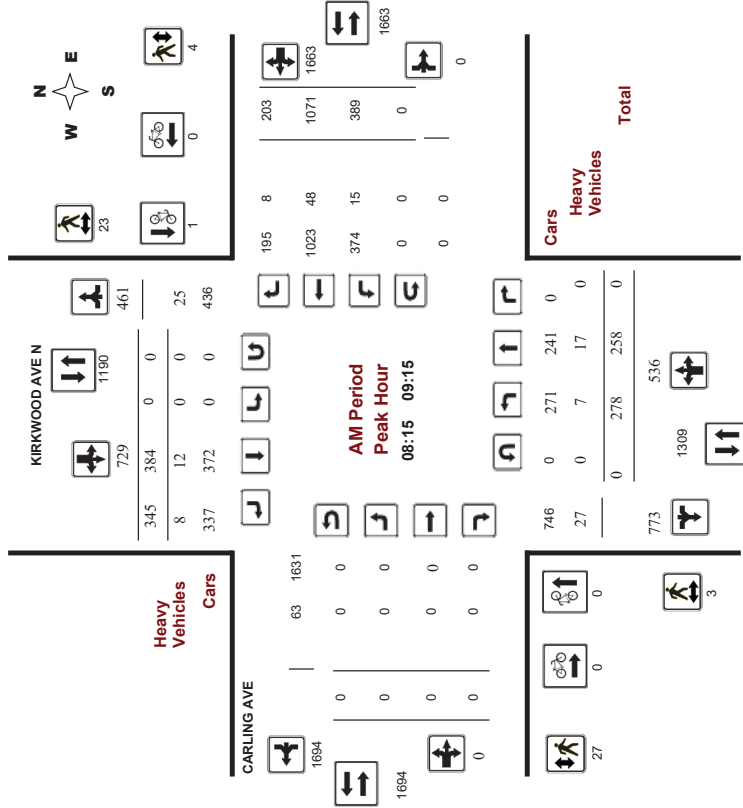
## Transportation Services - Traffic Services

### Turning Movement Count - Peak Hour Diagram

#### CARLING AVE @ KIRKWOOD AVE N

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision



Comments



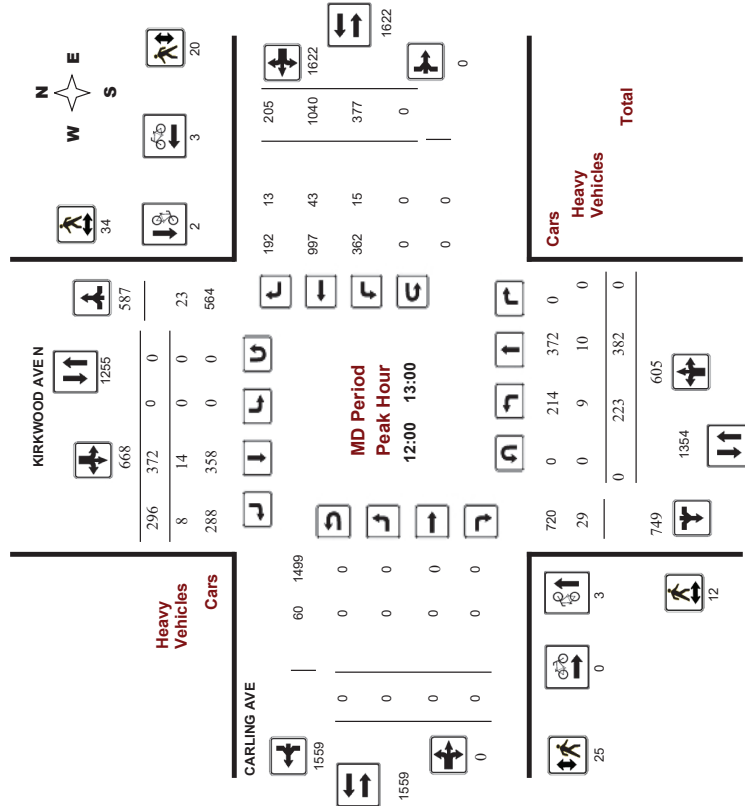
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CARLING AVE @ KIRKWOOD AVE N

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00

WO No: 37707  
Device: Miovision



Comments



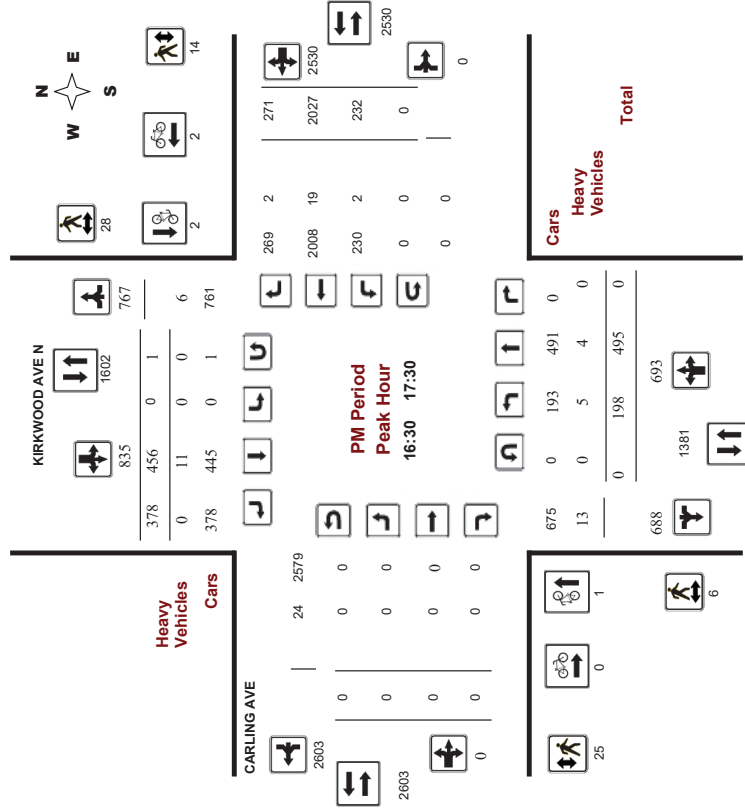
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CARLING AVE @ KIRKWOOD AVE N

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00

WO No: 37707  
Device: Miovision



Comments





**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ KIRKWOOD AVE N**

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision

**Full Study Cyclist Volume**

Time Period	KIRKWOOD AVE N		Street Total	CARLING AVE		Street Total	Grand Total
	Northbound	Southbound		Eastbound	Westbound		
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	1	0	1	0	0	1	2
07:45 08:00	0	0	0	2	2	2	2
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	1	1	0	0	0	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	1	1	0	0	0	1
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0
10:15 10:30	0	0	0	0	0	0	0
10:30 10:45	0	0	0	0	0	0	0
10:45 11:00	0	0	0	0	0	0	0
11:00 11:15	1	0	1	0	0	0	1
11:15 11:30	1	0	1	0	0	0	1
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	1	0	1	0	0	0	1
12:15 12:30	1	0	1	0	0	0	1
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	1	0	1	0	0	0	1
13:00 13:15	0	1	1	0	0	0	1
13:15 13:30	1	0	1	0	0	0	1
13:30 13:45	0	0	0	0	0	0	0
13:45 14:00	0	0	0	0	0	0	0
14:00 14:15	0	0	0	0	0	0	0
14:15 14:30	0	0	0	0	0	0	0
14:30 14:45	0	0	0	0	0	0	0
14:45 15:00	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	1	0	1	0	0	0	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	2	2	0	0	0	2
17:15 17:30	1	0	1	0	0	0	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
<b>Total</b>	<b>7</b>	<b>7</b>	<b>14</b>	<b>1</b>	<b>11</b>	<b>12</b>	<b>26</b>



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ KIRKWOOD AVE N**

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision

**Full Study Pedestrian Volume**

Time Period	KIRKWOOD AVE N		Total	CARLING AVE		Total	Grand Total
	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)		EB Approach (N or S Crossing)	WB Approach (N or S Crossing)		
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	3	3	5	0	5	8
07:30 07:45	0	4	4	5	0	5	9
07:45 08:00	0	5	5	5	0	5	10
08:00 08:15	1	17	18	4	4	8	26
08:15 08:30	1	9	10	7	1	8	18
08:30 08:45	0	2	2	6	0	6	8
08:45 09:00	1	9	10	7	1	8	18
09:00 09:15	1	3	4	7	2	9	13
09:15 09:30	1	1	2	3	2	5	7
09:30 09:45	0	7	7	5	1	6	13
09:45 10:00	1	6	7	5	0	5	12
10:00 10:15	0	5	5	7	1	8	13
10:15 10:30	1	4	5	7	2	9	14
10:30 10:45	3	12	15	4	4	8	23
10:45 11:00	6	9	15	4	5	9	24
11:00 11:15	5	7	12	7	10	17	29
11:15 11:30	1	9	10	7	1	8	18
11:30 11:45	0	12	12	8	1	9	21
11:45 12:00	0	6	6	4	3	7	13
12:00 12:15	0	4	4	7	1	8	12
12:15 12:30	0	4	4	7	5	12	19
12:30 12:45	5	7	12	7	2	9	21
12:45 13:00	1	9	10	7	1	8	18
13:00 13:15	0	12	12	8	1	9	21
13:15 13:30	0	6	6	4	3	7	13
13:30 13:45	0	4	4	7	1	8	12
13:45 14:00	3	4	7	7	5	12	19
14:00 14:15	2	5	7	10	2	12	19
14:15 14:30	6	3	9	6	7	13	22
14:30 14:45	5	7	12	6	8	14	26
14:45 15:00	8	6	14	13	9	22	36
15:00 15:15	2	5	7	9	4	13	20
15:15 15:30	2	4	6	3	4	7	13
15:30 15:45	0	5	5	3	4	7	12
15:45 16:00	0	3	3	3	0	3	6
16:00 16:15	2	14	16	10	6	16	32
16:15 16:30	2	4	6	4	4	8	14
16:30 16:45	0	5	5	5	1	6	11
16:45 17:00	0	4	4	4	4	8	12
17:00 17:15	0	5	5	3	0	3	8
17:15 17:30	2	14	16	10	6	16	32
17:30 17:45	2	4	6	4	4	8	14
17:45 18:00	0	5	5	5	1	6	11
<b>Total</b>	<b>51</b>	<b>193</b>	<b>244</b>	<b>193</b>	<b>89</b>	<b>282</b>	<b>526</b>



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ KIRKWOOD AVE N**

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision

**Full Study Heavy Vehicles**

Time Period	Northbound						Southbound						Eastbound						Westbound						Grand Total
	LT		ST		RT		LT		ST		RT		LT		ST		RT		LT		ST		RT		
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	1	3	0	0	1	1	1	9	18	0	0	0	0	13	4	11	4	19	32	25					
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	2	2	0	0	1	2	8	18	0	0	0	0	10	5	6	3	14	24	21						
07:45	0	4	0	0	1	1	7	15	0	0	0	0	10	3	9	1	13	23	19						
08:00	0	1	0	0	0	1	5	9	0	0	0	0	10	3	9	3	15	25	17						
08:15	0	8	0	0	17	0	6	2	19	36	0	0	0	14	3	12	3	18	32	34					
08:30	0	4	0	0	12	0	1	7	19	0	0	0	20	4	16	1	21	41	30						
08:45	0	4	0	0	12	0	1	3	10	22	0	0	15	4	9	2	15	30	26						
09:00	1	1	0	0	10	0	4	2	9	19	0	0	14	4	11	2	17	31	25						
09:15	0	4	0	0	18	0	4	2	14	32	0	0	16	5	9	4	18	34	33						
09:30	6	4	0	0	19	0	2	3	11	30	0	0	21	7	12	2	21	42	36						
09:45	1	0	0	0	8	0	3	0	8	16	0	0	23	2	21	4	27	50	33						
10:00	1	2	0	0	11	0	5	6	17	28	0	0	19	3	12	4	19	38	33						
10:15	5	1	0	0	11	0	3	2	10	21	0	0	18	2	11	4	17	35	28						
10:30	4	5	0	0	17	0	3	2	12	29	0	0	16	5	10	2	17	33	31						
10:45	2	2	0	0	12	0	5	1	14	26	0	0	18	3	15	6	24	42	34						
11:00	1	1	0	0	8	0	2	2	7	15	0	0	11	4	8	2	14	25	20						
11:15	2	2	0	0	11	0	4	3	12	23	0	0	17	3	10	3	16	31	27						
11:30	1	1	0	0	9	0	1	3	7	16	0	0	17	5	13	1	19	36	26						
11:45	3	4	0	0	13	0	2	4	13	26	0	0	14	4	7	3	14	28	27						
12:00	1	6	0	0	13	0	4	2	13	26	0	0	16	2	13	1	16	32	29						
12:15	2	3	0	0	12	0	5	3	14	26	0	0	13	2	8	3	13	26	26						
12:30	2	1	0	0	5	0	1	6	9	14	0	0	14	1	6	1	8	22	18						
12:45	2	1	0	0	10	0	5	1	8	16	0	0	10	2	7	1	10	20	19						
13:00	1	0	0	0	5	0	1	4	9	0	0	0	10	1	7	1	9	19	14						
13:15	1	0	0	0	6	0	5	1	7	13	0	0	8	0	6	1	7	15	14						
13:30	1	1	0	0	6	0	4	0	5	11	0	0	8	0	7	0	7	15	13						
13:45	3	0	0	0	7	0	2	0	3	10	0	0	6	2	3	1	6	12	11						
14:00	0	2	0	0	6	0	4	0	6	12	0	0	4	0	4	0	4	8	10						
14:15	1	1	0	0	3	0	1	0	3	6	0	0	6	0	5	1	6	12	9						
14:30	0	0	0	0	4	0	3	0	4	8	0	0	5	1	5	1	7	12	10						
14:45	1	0	0	0	4	0	4	0	2	6	0	0	3	2	2	1	5	8	7						
Total	60	74	0	0	311	0	88	58	289	600	0	0	410	89	292	69	450	860	730						



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ KIRKWOOD AVE N**

**Survey Date:** Tuesday, April 10, 2018  
**Start Time:** 07:00

**WO No:** 37707  
**Device:** Miovision

**Full Study 15 Minute U-Turn Total**

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	KIRKWOOD AVE N		KIRKWOOD AVE N		CARLING AVE		CARLING AVE		
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	1	0	0	0	0	0	0	0	1
11:30	1	0	0	0	0	0	0	0	1
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	0	0	0	0	1
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	1	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	3	1	1	0	0	0	0	0	4



# Transportation Services - Traffic Services

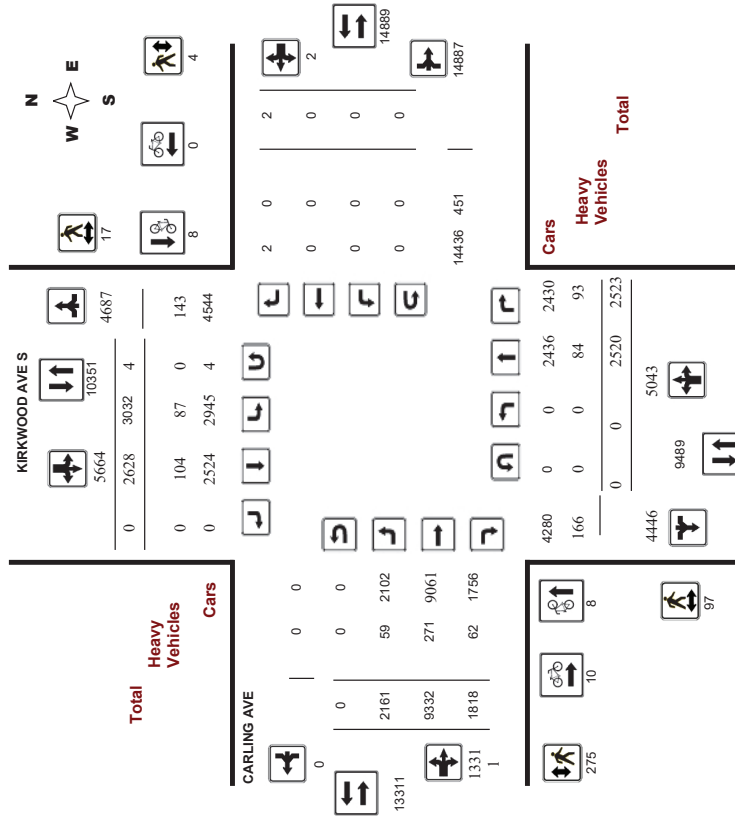
## Turning Movement Count - Study Results

### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00

WO No: 37699  
Device: Miovision

### Full Study Diagram



# Transportation Services - Traffic Services

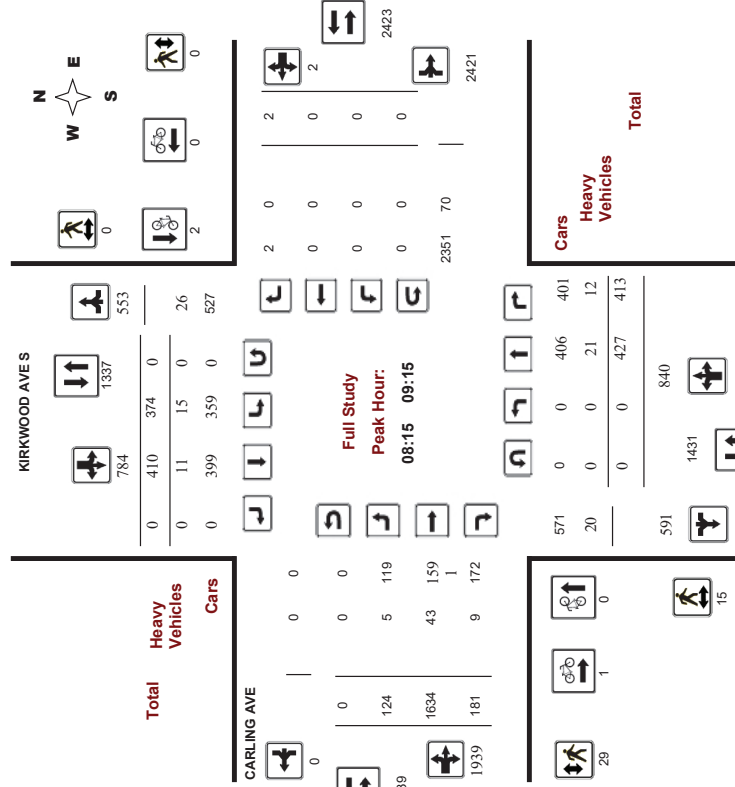
## Turning Movement Count - Study Results

### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00

WO No: 37699  
Device: Miovision

### Full Study Peak Hour Diagram







# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

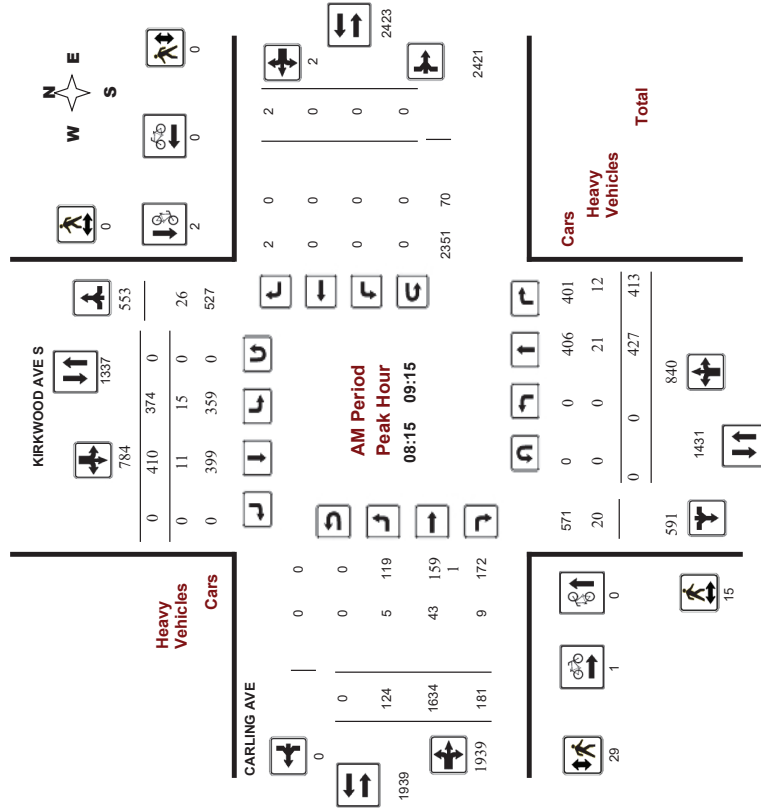
### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018

Start Time: 07:00

WO No: 37699

Device: Miovision



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

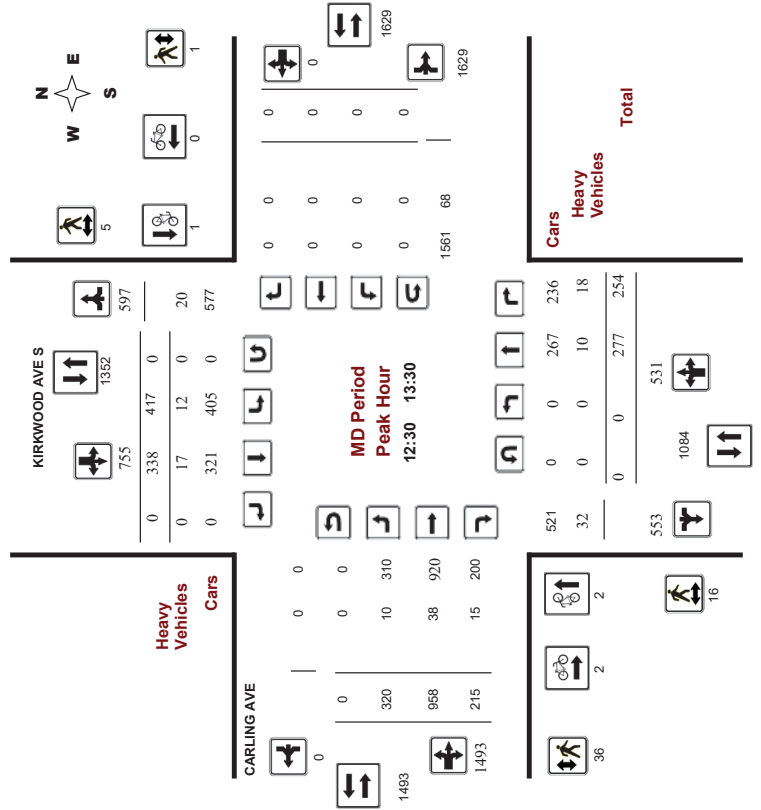
### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018

Start Time: 07:00

WO No: 37699

Device: Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

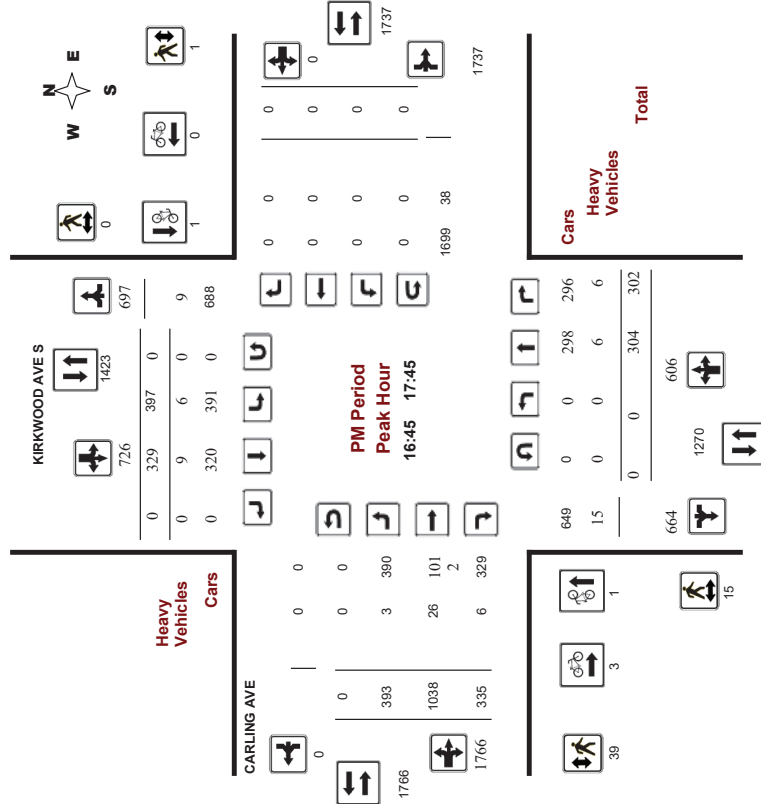
### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018

Start Time: 07:00

WO No: 37699

Device: Miovision



Comments



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018

Start Time: 07:00

WO No: 37699

Device: Miovision

## Full Study Summary (8 HR Standard)

Survey Date: Tuesday, April 10, 2018

AADT Factor

Total Observed U-Turns: 90

Northbound: 4

Southbound: 4

Eastbound: 0

Westbound: 0

Period	KIRKWOOD AVE S								CARLING AVE								WB TOT	STR TOT	Grand Total						
	Northbound				Southbound				Eastbound				Westbound												
	LT	ST	RT	TOT	NB	LT	ST	RT	TOT	SB	STR	LT	ST	RT	TOT	EB				EB	LT	ST	RT	TOT	
07:00	0	0	0	0	316	318	634	343	336	0	679	4313	140	1511	150	1801	0	0	0	0	0	0	1801	3114	
08:00	0	0	0	0	440	424	864	369	375	0	734	1588	122	1610	174	1906	0	0	0	0	0	0	2	1908	3506
09:00	0	0	0	0	284	334	618	350	374	0	724	1342	224	1343	151	1718	0	0	0	0	0	0	0	1718	3060
11:30	0	0	0	0	282	239	521	384	309	0	693	1214	289	910	202	1401	0	0	0	0	0	0	0	1401	2615
12:30	0	0	0	0	277	254	531	417	338	0	755	1286	320	958	215	1483	0	0	0	0	0	0	0	1483	2779
15:00	0	0	0	0	322	330	652	417	283	0	700	1352	302	979	286	1567	0	0	0	0	0	0	0	1567	2919
16:00	0	0	0	0	291	350	641	378	283	0	671	1312	365	1016	306	1687	0	0	0	0	0	0	0	1687	2999
17:00	0	0	0	0	308	274	582	384	320	0	704	1286	399	1005	334	1738	0	0	0	0	0	0	0	1738	3024
<b>Sub Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2520</b>	<b>2523</b>	<b>5043</b>	<b>3032</b>	<b>2628</b>	<b>0</b>	<b>5660</b>	<b>10703</b>	<b>2161</b>	<b>9332</b>	<b>1818</b>	<b>13311</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>13313</b>	<b>24016</b>
<b>U-Turns</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2520</b>	<b>2523</b>	<b>5043</b>	<b>3032</b>	<b>2628</b>	<b>0</b>	<b>5664</b>	<b>10707</b>	<b>2161</b>	<b>9332</b>	<b>1818</b>	<b>13311</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>13313</b>	<b>24020</b>
<b>EQ 12hr</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3503</b>	<b>3507</b>	<b>7010</b>	<b>4214</b>	<b>3653</b>	<b>0</b>	<b>7873</b>	<b>14883</b>	<b>3004</b>	<b>12971</b>	<b>2527</b>	<b>18592</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>18505</b>	<b>33388</b>

Note: These values are calculated by multiplying the totals by the appropriate expansion factor: 1.39

**AVG 12hr** 0 2971 2975 5946 3575 3088 0 6678 13395 2548 11002 2143 15894 0 0 2 2 16654 30049

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor: 0.9

**AVG 24hr** 0 3882 3897 7789 4683 4059 0 8748 16537 3338 14413 2808 20559 0 0 3 3 20562 37099

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor: 1.31

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.







Transportation Services - Traffic Services  
Turning Movement Count - Study Results  
CARLING AVE @ KIRKWOOD AVE S

Survey Date: Tuesday, April 10, 2018  
Start Time: 07:00

WO No: 37699  
Device: Miovision

Full Study 15 Minute U-Turn Total  
CARLING AVE

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	1	0	0	0	0	0	0	1
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	1	0	0	0	0	0	0	1
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	1	0	0	0	0	0	0	1
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	1	0	0	0	0	0	0	1
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	0	4	0	0	0	0	0	0	4

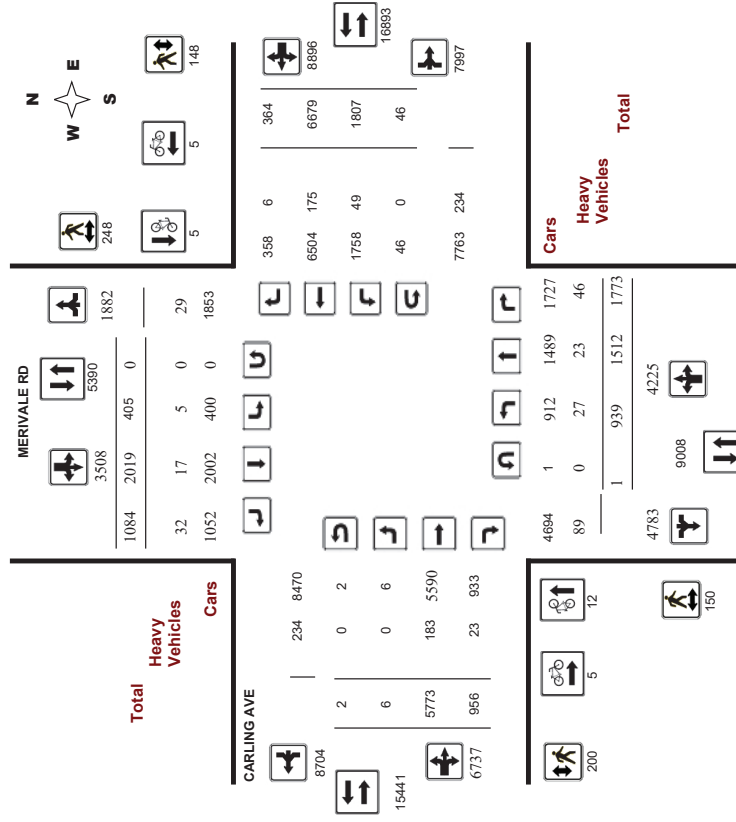


Transportation Services - Traffic Services  
Turning Movement Count - Study Results  
CARLING AVE @ MERIVALE RD

Survey Date: Thursday, April 05, 2018  
Start Time: 07:00

WO No: 37685  
Device: Miovision

Full Study Diagram





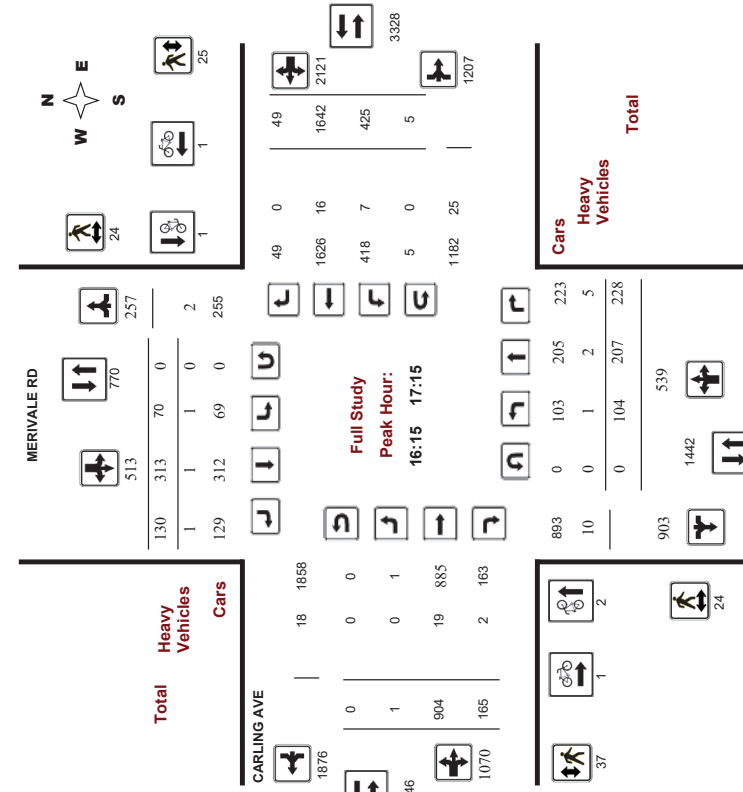
**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**

**CARLING AVE @ MERIVALE RD**

Survey Date: Thursday, April 05, 2018  
 Start Time: 07:00

WO No: 37685  
 Device: Miovision

**Full Study Peak Hour Diagram**



Comments

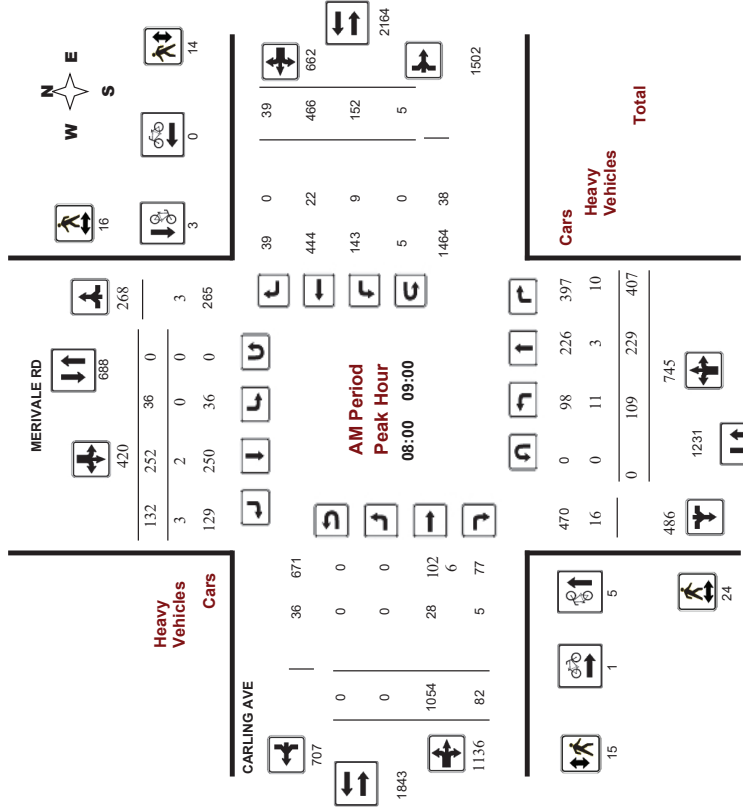


**Transportation Services - Traffic Services**  
**Turning Movement Count - Peak Hour Diagram**

**CARLING AVE @ MERIVALE RD**

Survey Date: Thursday, April 05, 2018  
 Start Time: 07:00

WO No: 37685  
 Device: Miovision



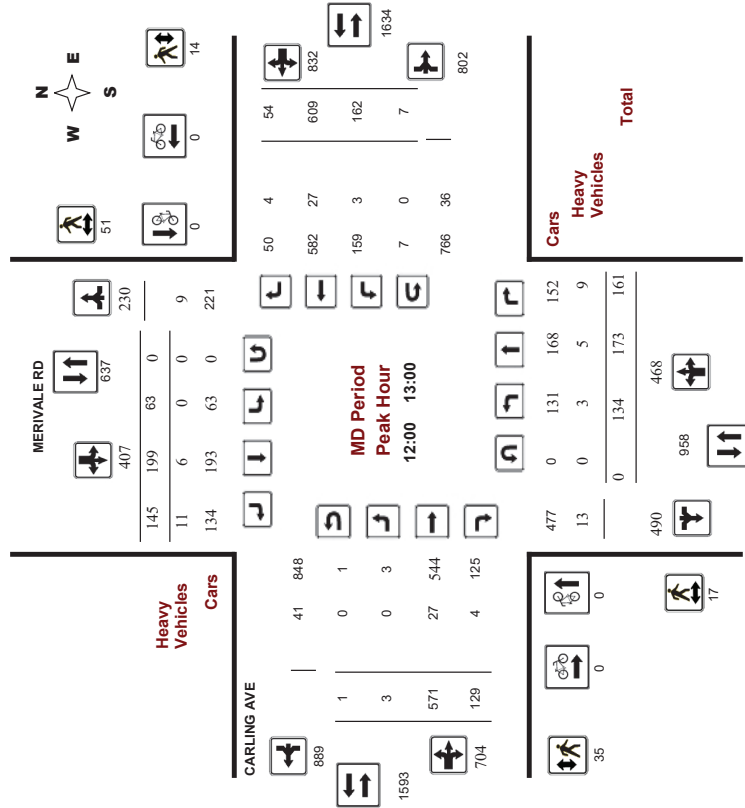


**Transportation Services - Traffic Services**  
**Turning Movement Count - Peak Hour Diagram**

**CARLING AVE @ MERIVALE RD**

Survey Date: Thursday, April 05, 2018  
 Start Time: 07:00

WO No: 37685  
 Device: Miovision



Comments

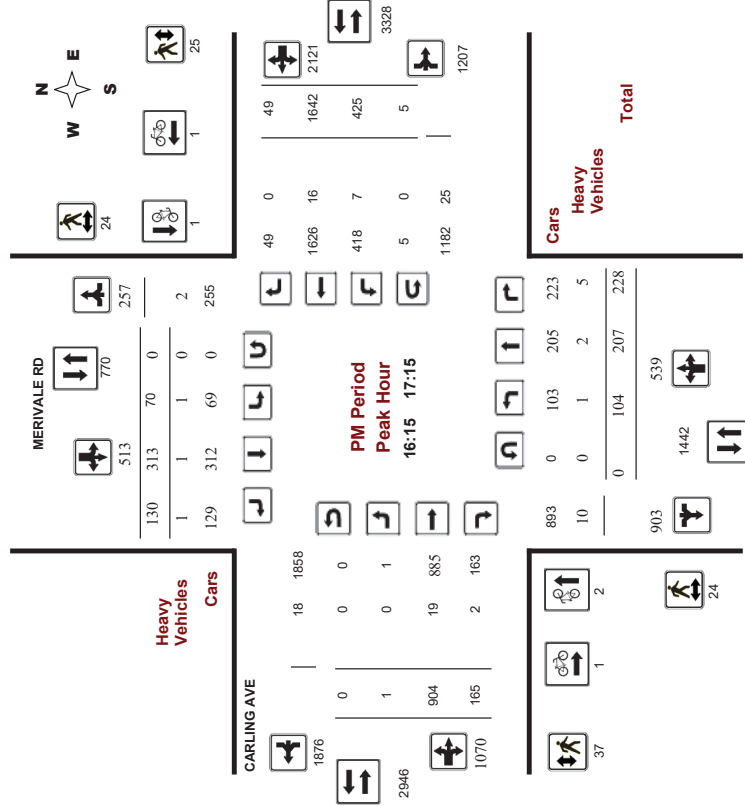


**Transportation Services - Traffic Services**  
**Turning Movement Count - Peak Hour Diagram**

**CARLING AVE @ MERIVALE RD**

Survey Date: Thursday, April 05, 2018  
 Start Time: 07:00

WO No: 37685  
 Device: Miovision



Comments



Transportation Services - Traffic Services  
Turning Movement Count - Study Results  
CARLING AVE @ MERIVALE RD

WO No: 37685  
Device: Miovision

Survey Date: Thursday, April 05, 2018  
Start Time: 07:00

Full Study Summary (8 HR Standard)

Survey Date: Thursday, April 05, 2018  
Total Observed U-Turns: 90  
Northbound: 1 Southbound: 0 AADT Factor: 90  
Eastbound: 2 Westbound: 46

MERIVALE RD

Table with columns: Northbound, Eastbound, Westbound. Rows include SB, STR, RT, ST, LT, RT, ST, LT, RT, STR, TOT, Grand Total.



Transportation Services - Traffic Services  
Turning Movement Count - Study Results  
CARLING AVE @ MERIVALE RD

WO No: 37685  
Device: Miovision

Survey Date: Thursday, April 05, 2018  
Start Time: 07:00

Full Study 15 Minute Increments

Large table with columns: Time Period, Northbound, Eastbound, Westbound. Rows include LT, ST, RT, STR, TOT for each direction and Grand Total.

Note: U-Turns are included in Totals.





**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ MERIVALE RD**

**Survey Date:** Thursday, April 05, 2018  
**Start Time:** 07:00

**WO No:** 37685  
**Device:** Miovision

**Full Study Cyclist Volume**

Time Period	MERIVALE RD			Street Total	CARLING AVE			Street Total	Grand Total
	Northbound	Southbound	Westbound		Eastbound	Westbound	Street Total		
07:00 07:15	0	0	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0	0	0
07:45 08:00	1	0	0	0	0	0	0	0	1
08:00 08:15	3	1	0	0	0	0	0	0	4
08:15 08:30	1	0	0	1	0	0	1	1	2
08:30 08:45	1	0	0	0	0	0	0	0	1
08:45 09:00	0	2	0	0	0	0	0	0	2
09:00 09:15	1	0	0	0	0	0	0	0	1
09:15 09:30	0	0	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0	0	0
10:15 10:30	1	0	0	0	0	0	0	0	1
10:30 10:45	1	0	0	0	0	0	0	0	2
10:45 11:00	0	0	0	0	0	0	0	0	0
11:00 11:15	0	0	0	0	0	0	0	0	0
11:15 11:30	0	0	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0	0	0
13:30 13:45	0	0	0	0	0	0	0	0	0
13:45 14:00	0	0	0	0	0	0	0	0	0
14:00 14:15	0	0	0	0	0	0	0	0	0
14:15 14:30	1	0	0	0	0	0	0	0	1
14:30 14:45	0	0	0	0	0	0	0	0	0
14:45 15:00	0	0	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0	0	0
16:45 17:00	1	0	0	0	0	0	0	0	1
17:00 17:15	1	1	0	0	0	0	0	0	2
17:15 17:30	1	0	0	0	0	0	0	0	1
17:30 17:45	0	1	0	0	0	0	0	0	1
17:45 18:00	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>12</b>	<b>5</b>	<b>5</b>	<b>17</b>	<b>5</b>	<b>5</b>	<b>10</b>	<b>27</b>	<b>27</b>



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CARLING AVE @ MERIVALE RD**

**Survey Date:** Thursday, April 05, 2018  
**Start Time:** 07:00

**WO No:** 37685  
**Device:** Miovision

**Full Study Pedestrian Volume**

Time Period	MERIVALE RD			CARLING AVE			Total	Grand Total
	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total		
07:00 07:15	3	4	7	5	2	7	14	14
07:15 07:30	1	1	2	1	2	3	5	5
07:30 07:45	4	6	10	5	3	8	18	18
07:45 08:00	5	2	7	7	9	16	16	16
08:00 08:15	4	4	8	0	9	9	17	17
08:15 08:30	3	4	7	4	3	7	14	14
08:30 08:45	9	3	12	5	1	6	18	18
08:45 09:00	8	5	13	6	1	7	20	20
09:00 09:15	2	6	8	4	2	6	14	14
09:15 09:30	6	11	17	7	5	12	29	29
09:30 09:45	4	5	9	2	3	5	14	14
09:45 10:00	0	6	6	4	0	4	10	10
10:00 10:15	4	12	16	2	5	7	23	23
10:15 10:30	1	6	7	4	5	9	16	16
10:30 10:45	8	11	19	6	1	7	26	26
10:45 11:00	4	12	16	8	3	11	27	27
11:00 11:15	4	13	17	12	4	16	33	33
11:15 11:30	15	14	29	9	7	16	45	45
11:30 11:45	0	7	7	4	1	5	12	12
11:45 12:00	0	12	12	3	8	11	23	23
12:00 12:15	0	8	8	4	0	4	12	12
12:15 12:30	0	12	12	11	4	15	27	27
12:30 12:45	0	13	13	12	4	16	33	33
12:45 13:00	15	14	29	9	7	16	45	45
13:00 13:15	0	7	7	4	1	5	12	12
13:15 13:30	0	12	12	3	8	11	23	23
13:30 13:45	0	8	8	4	0	4	12	12
13:45 14:00	12	9	21	11	13	24	45	45
14:00 14:15	3	7	10	6	5	11	21	21
14:15 14:30	1	10	11	13	6	19	30	30
14:30 14:45	2	8	10	5	2	7	17	17
14:45 15:00	15	7	22	13	11	24	46	46
15:00 15:15	2	4	6	9	2	11	17	17
15:15 15:30	5	5	10	10	10	20	30	30
15:30 15:45	3	7	10	8	3	11	21	21
15:45 16:00	13	11	24	12	4	16	40	40
16:00 16:15	5	13	18	5	14	21	39	39
<b>Total</b>	<b>150</b>	<b>248</b>	<b>398</b>	<b>200</b>	<b>148</b>	<b>348</b>	<b>746</b>	<b>746</b>

# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ MERIVALE RD

Survey Date: Thursday, April 05, 2018  
Start Time: 07:00

WO No: 37685  
Device: Miovision

#### Full Study Heavy Vehicles

##### MERIVALE RD CARLING AVE

Time Period	Northbound			Southbound			Eastbound			Westbound			W STR TOT	R STR TOT	Grand Total						
	L	S	T	L	S	T	L	S	T	L	S	T									
07:00	0	0	1	3	0	0	0	0	0	3	0	3	1	8	1	4	0	9	17	10	
07:15	0	1	4	1	0	1	2	6	0	5	1	13	1	5	0	13	26	16	16	16	
07:30	0	3	9	0	0	0	9	0	4	2	13	3	6	0	16	29	19	0	13	19	
07:45	0	3	9	0	0	0	9	0	6	1	19	4	11	0	24	43	26	0	24	43	
08:00	0	2	5	0	1	1	2	7	0	9	1	20	1	9	0	21	41	24	0	24	
08:15	0	3	11	0	1	1	12	0	8	1	18	4	5	0	20	38	25	0	20	38	
08:30	0	2	11	0	0	2	13	0	7	2	17	2	5	0	16	33	23	0	16	33	
08:45	0	3	13	0	1	1	16	0	4	1	14	2	3	0	12	28	21	0	12	28	
09:00	0	1	13	0	1	1	3	16	0	4	1	14	2	3	0	12	26	0	12	26	
09:15	0	1	7	2	1	0	4	11	0	6	1	13	1	4	0	14	27	0	14	27	
09:30	0	0	3	0	1	2	4	7	0	6	1	19	1	10	1	18	37	0	18	37	
09:45	0	2	4	0	0	2	4	8	0	5	1	15	1	7	0	13	28	0	13	28	
10:00	1	1	4	0	1	1	3	8	0	9	0	17	2	6	0	17	34	0	17	34	
11:30	0	2	1	0	5	0	1	3	8	0	9	0	12	2	6	0	13	25	0	13	25
11:45	0	2	1	6	0	1	2	5	11	0	4	0	17	2	6	0	19	38	0	19	38
12:00	0	2	4	0	2	4	0	3	4	8	0	10	0	5	1	9	38	0	9	38	
12:15	0	1	4	9	0	2	1	5	14	0	4	0	14	2	9	1	20	34	0	20	34
12:30	0	1	6	0	1	2	6	12	0	7	1	17	0	6	1	15	32	0	15	32	
12:45	0	2	11	0	3	5	11	22	0	6	3	22	0	7	1	16	38	0	16	38	
13:00	0	2	1	5	1	1	5	10	0	9	0	15	1	5	0	17	32	0	17	32	
13:15	0	1	4	0	1	1	3	7	0	8	0	12	1	3	0	13	25	0	13	25	
13:30	0	1	0	1	0	2	3	4	0	5	0	12	0	5	0	10	22	0	10	22	
15:00	0	1	0	7	0	1	0	2	9	0	6	3	15	1	5	0	12	27	0	12	27
15:15	0	2	4	0	1	0	1	5	0	2	0	9	0	6	0	10	19	0	10	19	
15:30	0	3	5	0	0	1	2	7	0	6	1	13	1	5	1	16	29	0	16	29	
16:00	0	1	7	0	1	1	3	10	0	4	0	8	3	2	0	10	18	0	10	18	
16:15	0	0	0	3	1	1	0	2	5	0	6	0	12	2	6	0	15	27	0	15	27
16:30	0	3	7	0	0	0	0	7	0	4	1	9	2	3	0	12	21	0	12	21	
16:45	0	2	0	2	0	1	3	5	0	5	0	9	0	3	0	8	17	0	8	17	
17:00	0	2	6	0	0	0	0	6	0	4	1	9	3	4	0	13	22	0	13	22	
17:15	0	0	4	0	0	1	1	5	0	3	0	8	2	2	0	7	15	0	7	15	
17:30	0	0	1	3	0	0	0	1	5	0	6	0	11	2	5	0	14	25	0	14	25
17:45	0	0	2	4	0	0	1	1	3	0	3	0	7	2	3	0	10	17	0	10	17
Total	27	23	46	185	5	17	32	83	268	0	183	23	440	49	175	6	464	904	566	566	

# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CARLING AVE @ MERIVALE RD

Survey Date: Thursday, April 05, 2018  
Start Time: 07:00

WO No: 37685  
Device: Miovision

#### Full Study 15 Minute U-Turn Total

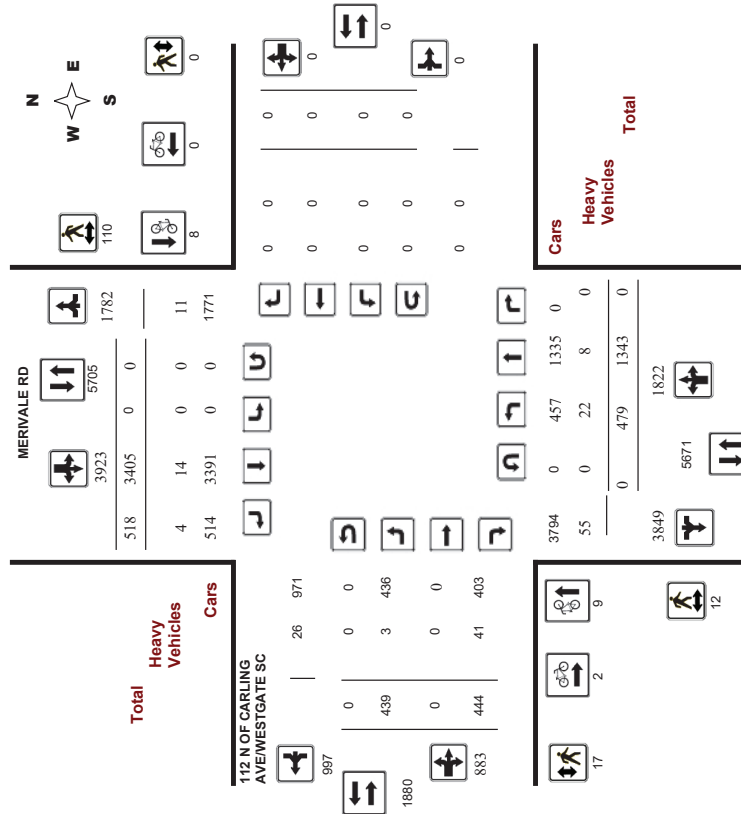
##### MERIVALE RD CARLING AVE

Time Period	Northbound U-Turn Total		Southbound U-Turn Total		Eastbound U-Turn Total		Westbound U-Turn Total		Total
	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	
07:00	0	0	0	0	0	0	0	1	1
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	4	4	4
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	3	3	3
09:45	0	0	0	0	0	0	0	1	1
10:00	0	0	0	0	0	0	1	1	1
11:30	0	0	0	0	0	0	1	1	1
11:45	0	0	0	0	0	0	5	5	5
12:00	0	0	0	0	0	0	1	1	1
12:15	0	0	0	0	0	0	1	1	1
12:30	0	0	0	0	1	1	1	1	2
12:45	0	0	0	0	0	0	2	2	2
13:00	0	0	0	0	0	0	3	3	3
13:15	0	0	0	0	0	0	2	2	2
13:30	0	0	0	0	0	0	2	2	2
15:00	0	0	0	0	1	1	3	3	4
15:15	0	0	0	0	0	0	3	3	3
15:30	0	0	0	0	0	0	1	1	1
15:45	0	0	0	0	0	0	0	0	0
16:00	1	1	0	0	0	0	0	0	1
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	1	1	1
16:45	0	0	0	0	0	0	2	2	2
17:00	0	0	0	0	0	0	1	1	1
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	3	3
Total	1	1	0	0	2	2	46	46	49

Survey Date: Wednesday, March 21, 2018  
 Start Time: 07:00

WO No: 37625  
 Device: Miovision

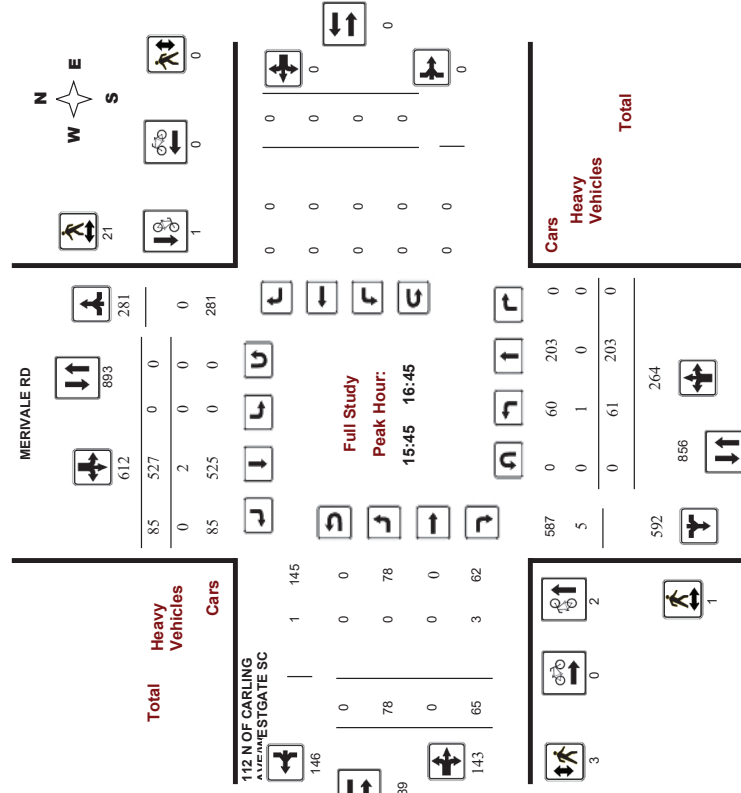
Full Study Diagram



Survey Date: Wednesday, March 21, 2018  
 Start Time: 07:00

WO No: 37625  
 Device: Miovision

Full Study Peak Hour Diagram





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

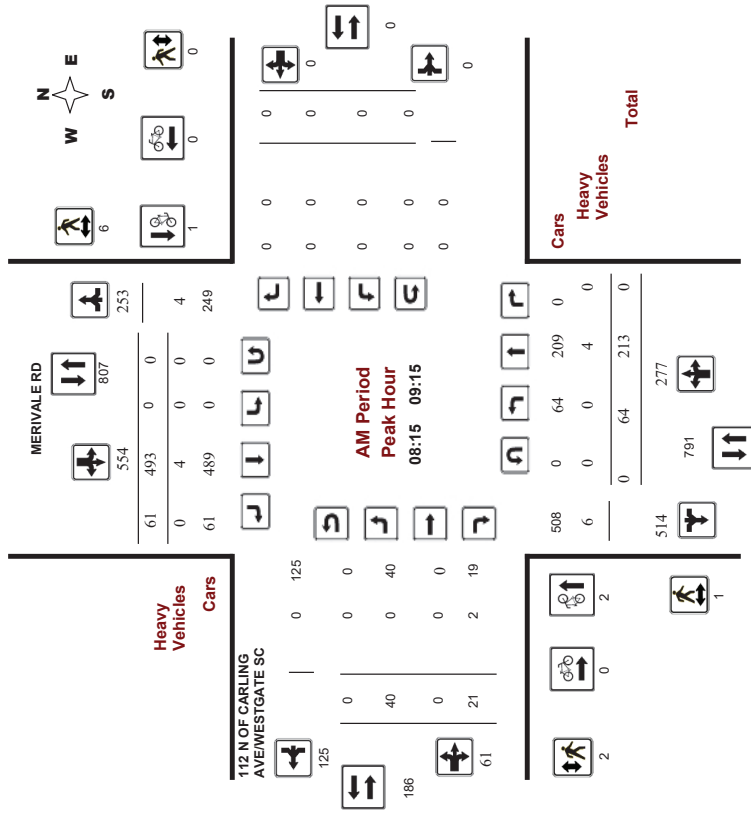
MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Device: MiOVision

Start Time: 07:00



Comments



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

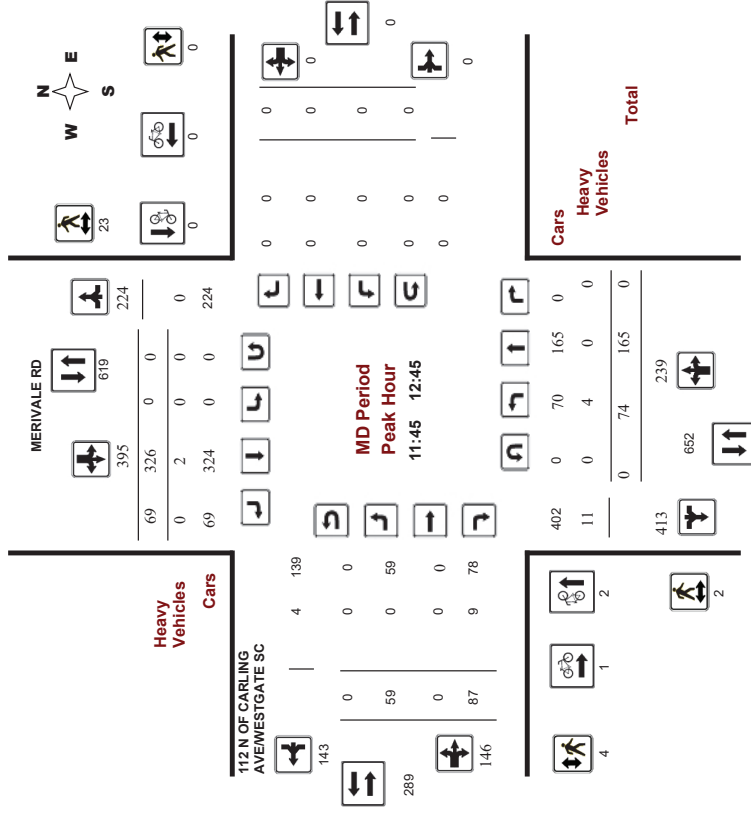
MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Device: MiOVision

Start Time: 07:00



Comments

# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

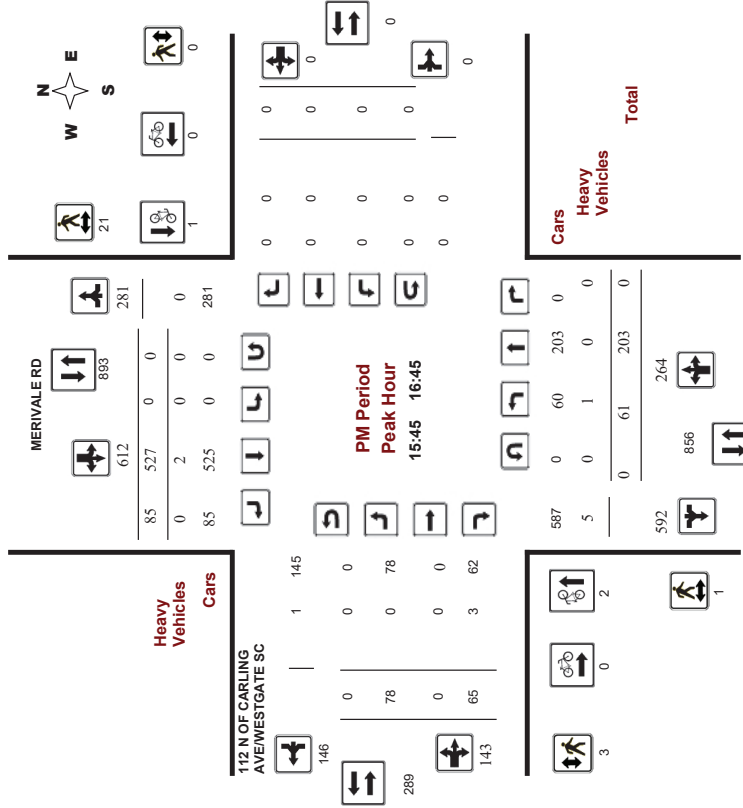
MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Start Time: 07:00

Device: Miovision



Comments

# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Start Time: 07:00

Device: Miovision

## Full Study Summary (8 HR Standard)

Survey Date: Wednesday, March 21, 2018

AADT Factor: 1.00

Total Observed U-Turns:  
 Northbound: 0  
 Southbound: 0  
 Eastbound: 0  
 Westbound: 0

112 N OF CARLING AVE/WESTGATE SC

Period	Northbound				Southbound				Eastbound				Westbound				STR TOT	WB TOT	STR TOT	Grand Total	
	LT	ST	RT	TOT	NB	LT	ST	RT	TOT	SB	LT	ST	RT	TOT	EB	LT					ST
07:00-08:00	40	125	0	165	0	462	48	510	675	24	0	15	39	0	0	0	0	0	0	39	714
08:00-09:00	57	216	0	273	0	500	52	552	825	43	0	18	61	0	0	0	0	0	0	61	886
09:00-10:00	96	108	0	204	0	434	67	501	705	36	0	42	78	0	0	0	0	0	0	78	783
11:30-12:30	75	155	0	230	0	328	75	403	633	59	0	84	143	0	0	0	0	0	0	143	776
12:30-13:30	66	158	0	224	0	276	66	342	566	64	0	93	157	0	0	0	0	0	0	157	723
15:00-16:00	55	204	0	259	0	473	84	557	816	66	0	77	143	0	0	0	0	0	0	143	959
16:00-17:00	51	206	0	257	0	514	76	590	847	77	0	62	139	0	0	0	0	0	0	139	986
17:00-18:00	39	171	0	210	0	418	50	468	678	70	0	53	123	0	0	0	0	0	0	123	801
<b>Sub Total</b>	<b>479</b>	<b>1343</b>	<b>0</b>	<b>1822</b>	<b>0</b>	<b>3405</b>	<b>518</b>	<b>3923</b>	<b>5745</b>	<b>439</b>	<b>0</b>	<b>444</b>	<b>883</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>883</b>	<b>6628</b>
<b>U-Turns</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>479</b>	<b>1343</b>	<b>0</b>	<b>1822</b>	<b>0</b>	<b>3405</b>	<b>518</b>	<b>3923</b>	<b>5745</b>	<b>439</b>	<b>0</b>	<b>444</b>	<b>883</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>883</b>	<b>6628</b>
EQ 12hr	666	1867	0	2533	0	4733	720	5453	7986	610	0	617	1227	0	0	0	0	0	0	1227	9213
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			<b>1.39</b>		
AVG 12hr	627	1759	0	2387	0	4461	679	5139	7986	575	0	582	1157	0	0	0	0	0	0	1157	9213
Note: These values are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																			<b>1</b>		
AVG 24hr	822	2305	0	3127	0	5843	889	6732	9859	753	0	762	1515	0	0	0	0	0	0	1515	11374
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			<b>1.31</b>		
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																					





Transportation Services - Traffic Services

Turning Movement Count - Study Results

MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Start Time: 07:00

Miovision

Device:

Full Study Pedestrian Volume

MERIVALE RD  
112 N OF CARLING AVE/WESTGATE SC

Time Period	SB Approach (E or W Crossing)		EB Approach (N or S Crossing)		Total	Grand Total
	E or W	W or E	N or S	S or N		
07:00 - 07:15	0	0	0	0	0	0
07:15 - 07:30	0	1	1	0	1	2
07:30 - 07:45	0	0	0	0	0	0
07:45 - 08:00	0	1	0	0	1	1
08:00 - 08:15	0	3	1	0	3	4
08:15 - 08:30	1	2	1	0	3	4
08:30 - 08:45	0	0	0	0	0	0
08:45 - 09:00	0	2	0	0	2	2
09:00 - 09:15	0	2	1	0	3	3
09:15 - 09:30	0	0	0	0	0	0
09:30 - 09:45	1	5	3	0	6	9
09:45 - 10:00	2	2	1	0	4	5
11:30 - 11:45	0	5	0	0	5	5
11:45 - 12:00	1	4	0	0	5	5
12:00 - 12:15	0	3	1	0	3	4
12:15 - 12:30	1	10	3	0	11	14
12:30 - 12:45	0	6	0	0	6	6
12:45 - 13:00	2	9	0	0	11	11
13:00 - 13:15	1	5	0	0	6	6
13:15 - 13:30	0	4	1	0	4	5
15:00 - 15:15	1	3	0	0	4	4
15:15 - 15:30	1	1	0	0	2	2
15:30 - 15:45	0	3	0	0	3	3
15:45 - 16:00	1	3	1	0	4	5
16:00 - 16:15	0	10	2	0	10	12
16:15 - 16:30	0	5	0	0	5	5
16:30 - 16:45	0	3	0	0	3	3
16:45 - 17:00	0	3	0	0	3	3
17:00 - 17:15	0	6	1	0	6	7
17:15 - 17:30	0	4	0	0	4	4
17:30 - 17:45	0	3	0	0	3	3
17:45 - 18:00	0	2	0	0	2	2
Total	12	110	17	0	122	139



Transportation Services - Traffic Services

Turning Movement Count - Study Results

MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC

Survey Date: Wednesday, March 21, 2018

WO No: 37625

Start Time: 07:00

Miovision

Device:

Full Study Heavy Vehicles

MERIVALE RD  
112 N OF CARLING AVE/WESTGATE SC

Time Period	Northbound			Southbound			Eastbound			Westbound			W TOT	STR TOT	Grand Total	
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	LT	ST	RT	E TOT				LT
07:00 - 07:15	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1
07:15 - 07:30	0	1	0	3	0	1	0	2	5	0	0	1	0	0	0	1
07:30 - 07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	1	0	0	2	0	0	0	2	0	0	1	2	0	0	0	2
08:00 - 08:15	0	0	0	2	0	2	0	3	5	1	0	0	0	0	0	1
08:15 - 08:30	0	2	0	3	0	1	0	3	6	0	0	0	0	0	0	3
08:30 - 08:45	0	2	0	3	0	0	0	2	5	0	1	1	0	0	0	1
08:45 - 09:00	0	0	0	3	0	2	0	2	5	0	1	1	0	0	0	1
09:00 - 09:15	0	0	0	1	0	1	0	1	2	0	0	0	0	0	0	1
09:15 - 09:30	1	0	0	3	0	0	0	3	0	2	3	0	0	0	0	3
09:30 - 09:45	0	0	0	3	0	0	1	4	0	3	4	0	0	0	0	4
09:45 - 10:00	3	0	0	6	0	1	0	7	0	2	5	0	0	0	0	6
11:30 - 11:45	2	0	0	7	0	1	0	8	0	4	6	0	0	0	0	7
11:45 - 12:00	1	0	0	4	0	0	0	4	0	3	4	0	0	0	0	4
12:00 - 12:15	1	0	0	5	0	1	0	6	0	3	4	0	0	0	0	5
12:15 - 12:30	1	0	0	3	0	1	0	4	0	1	2	0	0	0	0	3
12:30 - 12:45	1	0	0	3	0	0	0	3	0	2	3	0	0	0	0	3
12:45 - 13:00	1	0	0	3	0	0	0	3	0	2	3	0	0	0	0	3
13:00 - 13:15	1	0	0	5	0	0	0	5	0	4	5	0	0	0	0	5
13:15 - 13:30	2	1	0	5	0	0	1	6	0	2	4	0	0	0	0	5
15:00 - 15:15	3	0	0	5	0	0	0	5	0	2	5	0	0	0	0	5
15:15 - 15:30	2	0	0	3	0	0	0	3	0	1	3	0	0	0	0	3
15:30 - 15:45	0	1	0	3	0	1	0	2	5	0	1	1	0	0	0	1
15:45 - 16:00	0	1	0	3	0	1	0	2	5	0	1	1	0	0	0	1
16:00 - 16:15	0	1	0	3	0	1	0	2	5	0	1	1	0	0	0	1
16:15 - 16:30	1	0	0	3	0	1	0	4	0	1	2	0	0	0	0	2
16:30 - 16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	0	2	0	1	0	1	3	0	1	1	0	0	0	1
17:00 - 17:15	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	1
17:15 - 17:30	1	0	0	1	0	1	2	3	1	0	1	3	0	0	0	3
17:30 - 17:45	0	0	0	1	0	0	1	2	0	0	2	0	0	0	0	2
17:45 - 18:00	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0	1
17:45 - 18:00	0	1	0	1	0	0	1	2	0	0	0	0	0	0	0	1
Total	22	8	0	85	0	14	4	29	114	3	0	41	70	0	0	92

Survey Date: Wednesday, March 21, 2018  
 Start Time: 07:00

WO No: 37625  
 Device: Miovision

Full Study 15 Minute U-Turn Total

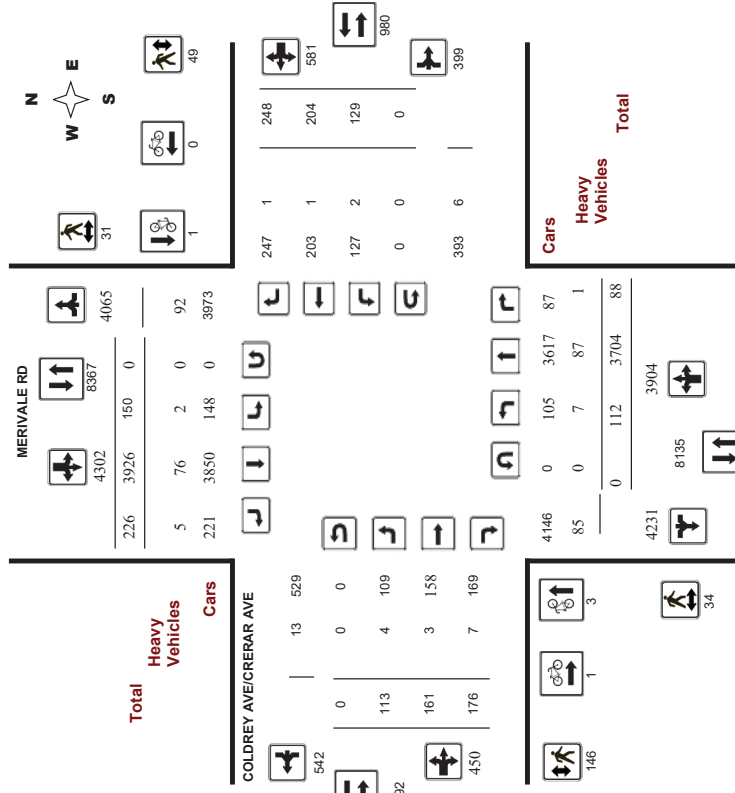
MERIVALE RD 112 N OF CARLING AVE/WESTGATE

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total		
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

Survey Date: Wednesday, January 31, 2018  
 Start Time: 07:00

WO No: 37475  
 Device: Miovision

Full Study Diagram

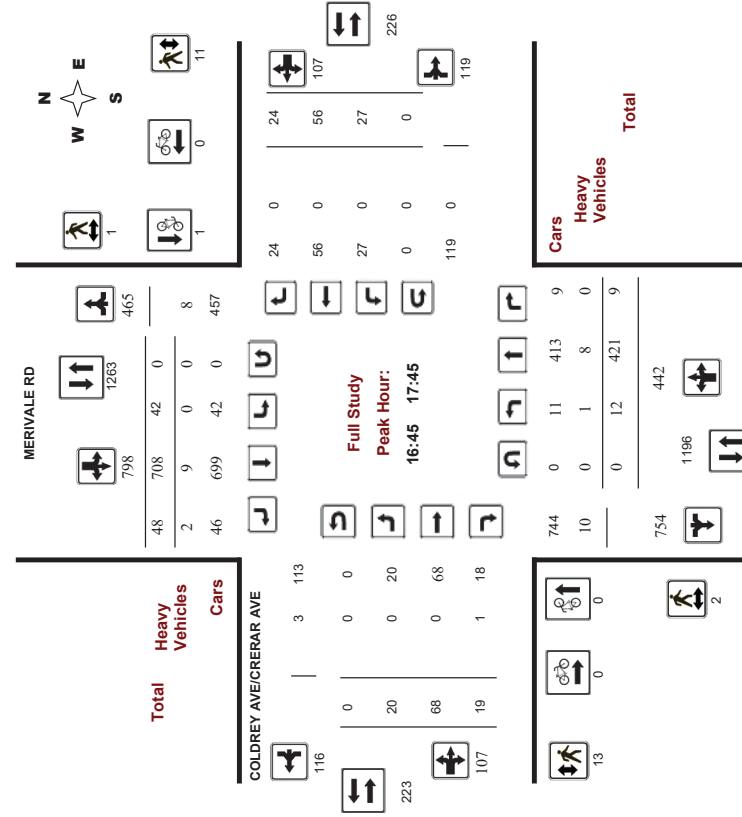




Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37475  
Device: Miovision

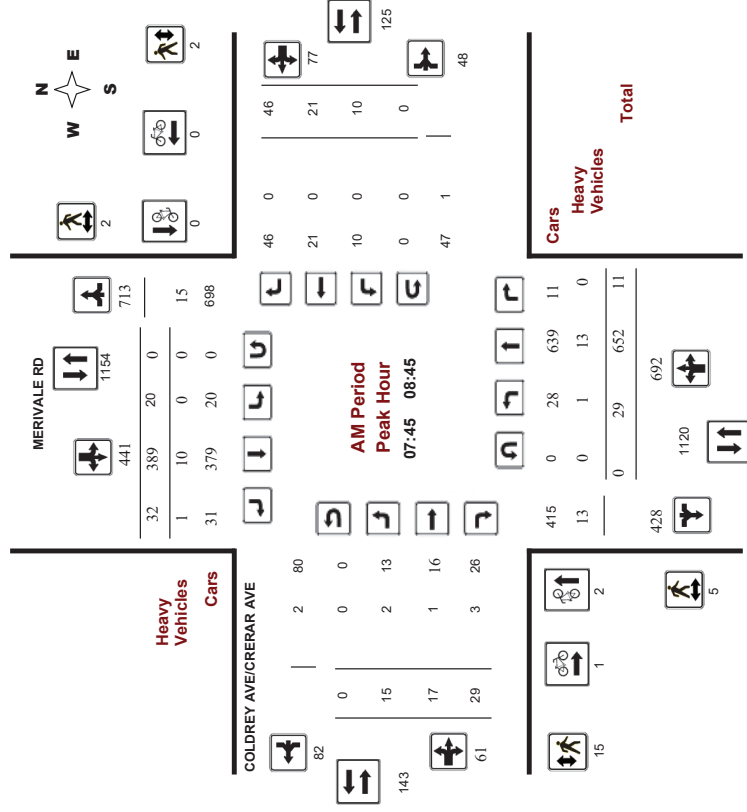
#### Full Study Peak Hour Diagram



Comments

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37475  
Device: Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

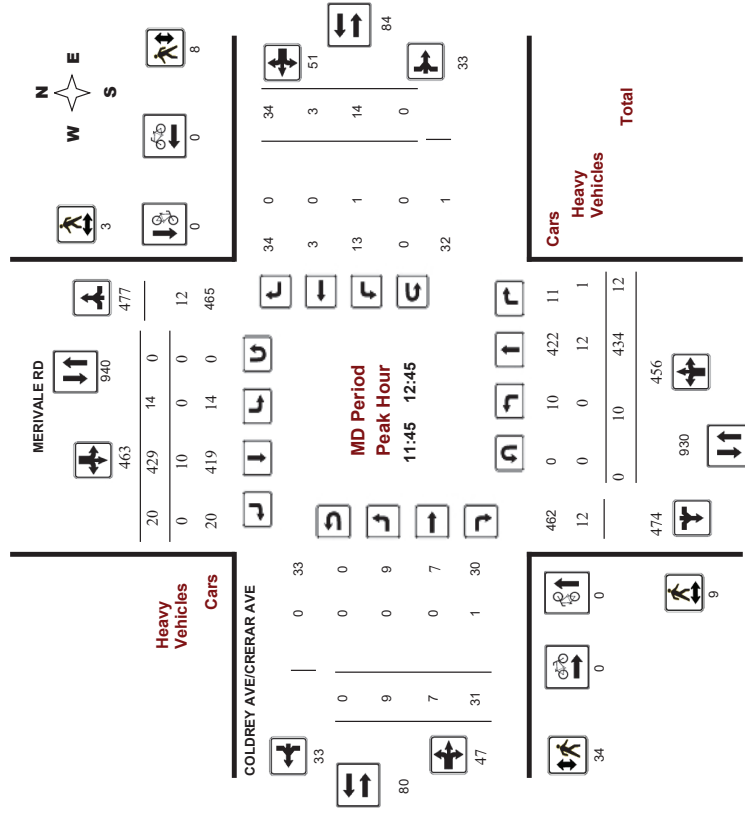
### MERIVALE RD @ COLDREY AVE/CRERAR AVE

Survey Date: Wednesday, January 31, 2018

WO No: 37475

Start Time: 07:00

Device: Miovision



Comments



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

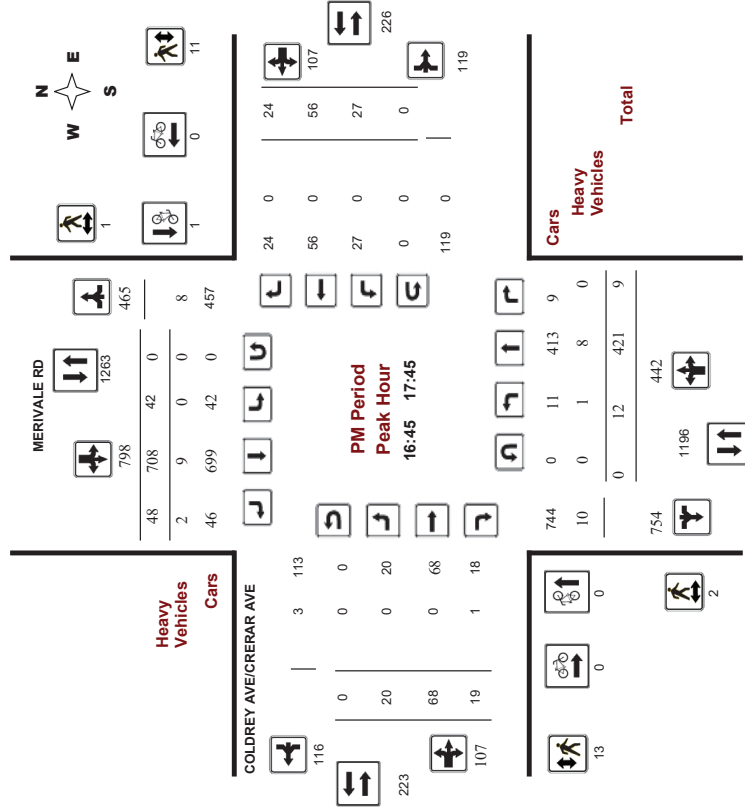
### MERIVALE RD @ COLDREY AVE/CRERAR AVE

Survey Date: Wednesday, January 31, 2018

WO No: 37475

Start Time: 07:00

Device: Miovision



Comments





**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**MERIVALE RD @ COLDREY AVE/CRERAR AVE**

**Survey Date:** Wednesday, January 31, 2018  
**Start Time:** 07:00

**WO No:** 37475  
**Device:** Miovision

**Full Study Cyclist Volume**

**MERIVALE RD**      **COLDREY AVE/CRERAR AVE**

Time Period	Northbound		Southbound		Street Total		Eastbound		Westbound		Street Total		Grand Total
	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	
07:00	1	0	0	0	1	0	0	0	0	0	0	0	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	1	0	0	2	0	0	0	0	0	0	0	2
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	1	0	1	0	0	0	0	0	0	1
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	1	0	0	1	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:55	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>5</b>



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**MERIVALE RD @ COLDREY AVE/CRERAR AVE**

**Survey Date:** Wednesday, January 31, 2018  
**Start Time:** 07:00

**WO No:** 37475  
**Device:** Miovision

**Full Study Pedestrian Volume**

**MERIVALE RD**      **COLDREY AVE/CRERAR AVE**

Time Period	NB Approach (E or W Crossing)		SB Approach (E or W Crossing)		Total		EB Approach (N or S Crossing)		WB Approach (N or S Crossing)		Total		Grand Total
	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	3	4	3	4	2	2	2	2	2	2	5
07:30	0	0	1	1	1	1	0	0	0	0	0	0	4
07:45	2	2	1	2	3	3	2	0	0	0	0	0	5
08:00	3	1	4	4	7	8	6	0	0	0	0	0	10
08:15	0	0	0	0	0	0	0	0	0	0	0	0	4
08:30	0	0	0	0	0	0	0	0	0	0	0	0	4
08:45	0	0	1	1	2	2	2	2	2	2	2	2	5
09:00	1	1	1	1	2	2	3	3	3	3	3	3	9
09:15	3	4	4	5	7	9	2	2	2	2	2	2	14
09:30	3	1	4	4	7	5	2	2	2	2	2	2	11
09:45	1	0	0	1	1	1	7	2	2	2	2	2	10
10:00	2	2	2	4	4	4	9	0	0	0	0	0	13
11:30	2	1	3	3	5	6	10	0	0	0	0	0	13
11:45	6	0	6	6	12	12	6	6	6	6	6	6	15
12:00	1	0	0	1	1	1	8	0	0	0	0	0	9
12:15	0	0	0	0	0	0	1	0	0	0	0	0	1
12:30	2	2	2	2	4	4	13	2	2	2	2	2	17
12:45	2	0	0	0	2	2	5	0	0	0	0	0	8
13:00	1	0	0	0	1	0	4	4	4	4	4	4	9
13:15	0	1	1	1	2	2	5	0	0	0	0	0	6
13:30	0	1	1	1	2	2	5	0	0	0	0	0	6
15:00	2	2	2	2	4	4	3	1	1	1	1	1	5
15:15	2	2	2	2	4	4	2	2	2	2	2	2	9
15:30	0	3	3	3	6	6	4	0	0	0	0	0	7
15:45	1	1	2	2	3	3	2	2	2	2	2	2	7
16:00	0	1	1	1	2	2	5	1	1	1	1	1	7
16:15	0	1	1	1	2	2	4	0	0	0	0	0	4
16:30	1	1	2	2	3	3	2	2	2	2	2	2	4
16:45	1	0	1	1	2	2	4	0	0	0	0	0	5
16:55	1	0	1	1	2	2	3	3	3	3	3	3	7
17:00	0	0	1	1	1	1	3	1	1	1	1	1	4
17:15	0	0	1	1	1	1	3	1	1	1	1	1	5
17:30	0	0	0	0	0	0	4	4	4	4	4	4	8
17:45	1	0	1	1	1	1	3	3	3	3	3	3	7
17:55	0	0	2	2	2	2	5	0	0	0	0	0	5
18:00	0	0	2	2	2	2	4	0	0	0	0	0	7
<b>Total</b>	<b>34</b>	<b>31</b>	<b>65</b>	<b>65</b>	<b>130</b>	<b>130</b>	<b>146</b>	<b>49</b>	<b>49</b>	<b>98</b>	<b>98</b>	<b>196</b>	<b>260</b>



## Transportation Services - Traffic Services

### Turning Movement Count - Study Results

#### MERVALE RD @ COLDREY AVE/CRERAR AVE

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37475  
Device: Miovision

### Full Study Heavy Vehicles

#### MERVALE RD COLDREY AVE/CRERAR AVE

Time Period	Northbound				Southbound				Eastbound				Westbound				W STR TOT	R TOT	T TOT	Grand Total
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT				
07:00	0	2	0	5	0	3	0	5	10	0	0	0	0	0	0	0	0	0	5	
07:15	0	3	0	4	0	1	0	4	8	0	0	0	0	0	0	0	0	0	4	
07:30	0	1	0	7	1	3	0	7	14	2	0	1	5	0	0	0	1	6	10	
07:45	0	4	0	9	0	2	0	8	17	2	0	3	5	0	0	0	5	11		
08:00	1	2	0	6	0	3	1	6	12	0	0	0	2	0	0	0	2	7		
08:15	0	3	0	7	0	4	0	7	14	0	1	0	1	0	0	0	1	2	8	
08:30	0	4	0	5	0	1	0	5	10	0	0	0	0	0	0	0	0	5		
08:45	0	7	0	11	0	4	0	11	22	0	0	0	0	0	0	0	0	11		
09:00	0	4	0	6	0	2	0	6	12	0	0	0	0	0	0	0	0	6		
09:15	0	2	0	4	0	4	0	6	12	0	0	0	0	0	0	0	0	6		
09:30	0	2	0	4	0	2	0	4	8	0	0	0	0	0	0	0	0	4		
09:45	0	4	0	6	0	2	1	7	13	0	0	0	1	0	0	0	1	7		
11:30	0	3	0	3	0	0	0	3	6	0	0	0	0	0	0	0	0	3		
11:45	0	6	0	6	0	5	0	5	11	0	0	1	1	0	0	0	1	6		
12:00	0	5	1	8	0	2	0	7	15	0	0	0	0	0	0	0	1	8		
12:15	0	4	0	8	0	3	0	7	15	0	0	0	0	1	0	0	1	8		
12:30	0	4	0	9	0	4	0	8	17	0	0	0	1	0	0	0	1	9		
12:45	0	2	0	6	0	4	0	6	12	0	0	0	0	0	0	0	0	6		
13:00	0	2	0	5	0	1	0	5	10	0	0	0	0	0	0	0	0	5		
13:15	0	2	0	6	0	3	0	5	11	0	0	0	1	0	0	0	1	6		
13:30	1	2	0	5	0	2	1	4	9	0	0	0	2	1	0	0	3	6		
15:00	1	2	0	6	1	3	0	7	13	0	1	0	2	0	0	1	3	9		
15:15	0	4	0	5	0	1	0	5	10	0	0	0	0	0	0	0	0	5		
15:30	0	4	0	6	0	2	0	6	12	0	0	0	0	0	0	0	0	6		
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16:30	0	0	0	3	0	3	0	3	6	0	1	0	2	0	1	0	2	4	5	
16:45	0	2	0	4	0	2	0	4	8	0	0	0	0	0	0	0	0	4		
17:00	0	1	0	2	0	1	2	4	6	0	0	0	2	0	0	0	2	4		
17:15	0	2	0	6	0	4	0	6	12	0	0	0	0	0	0	0	0	6		
17:30	1	3	0	7	0	2	0	5	12	0	0	1	2	0	0	0	2	7		
17:45	0	4	0	5	0	1	0	5	10	0	0	0	0	0	0	0	0	5		
Total	7	87	1	180	2	76	5	175	355	4	3	7	27	2	1	1	10	37	196	



## Transportation Services - Traffic Services

### Turning Movement Count - Study Results

#### MERVALE RD @ COLDREY AVE/CRERAR AVE

Survey Date: Wednesday, January 31, 2018  
Start Time: 07:00

WO No: 37475  
Device: Miovision

### Full Study 15 Minute U-Turn Total

#### MERVALE RD COLDREY AVE/CRERAR AVE

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total	U-Turn Total		
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

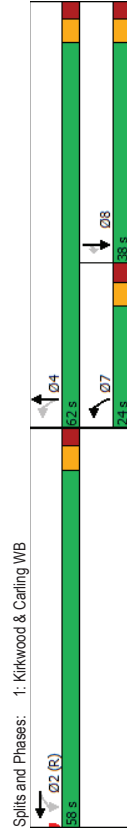
# Appendix C

Synchro Worksheets – Existing Conditions

DRAFT

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
0	0	0	389	1071	203	278	258	0	0	384	345			
0	0	0	389	1071	203	278	258	0	0	384	345			
1.00	1.00	1.00	0.86	0.86	0.91	1.00	1.00	1.00	1.00	0.95	1.00			
			1.00	0.99	0.98									
Frt														
FIT Protected			0.950			0.999			0.950			0.850		
Satd. Flow (prot)			1426			4354			0			1688		
FIT Permitted			0.950			0.999			0.320					
Satd. Flow (perm)			1421			4353			0			550		
Adj. Flow (RTOR)			35									86		
Lane Group Flow (vph)			0			0			432			1190		
Turn Type			0			0			389			1459		
Permitted Phases			Perm			NA			p1n+pt			NA		
Detector Phase			2			2			4			4		
Switch Phase			2			2			7			4		
Minimum Initial (s)			10.0			10.0			5.0			10.0		
Minimum Split (s)			40.3			40.3			14.5			32.0		
Total Split (s)			58.0			58.0			24.0			62.0		
Total Split (%)			48.3%			48.3%			20.0%			51.7%		
Yellow Time (s)			3.7			3.7			3.3			3.3		
All-Red Time (s)			2.6			2.6			2.9			2.7		
Lost Time Adjust (s)			0.0			0.0			0.0			0.0		
Total Lost Time (s)			6.3			6.3			6.2			6.0		
Lead/Lag			Lead			Lead			Lag			Lag		
Lead-Lag Optimize?			Yes			Yes			Yes			Yes		
Recall Mode			C-Max			C-Max			Min			Min		
Act Effct Green (s)			54.0			54.0			53.5			53.7		
Actuated G/C Ratio			0.45			0.45			0.45			0.25		
v/c Ratio			0.61			0.74			0.76			0.37		
Control Delay			25.6			24.9			36.3			23.1		
Queue Delay			0.0			0.0			0.0			0.0		
Total Delay			25.6			24.9			36.3			23.1		
LOS			C			C			D			C		
Approach Delay			25.0			25.0			29.9			51.7		
Approach LOS			C			C			C			D		
Queue Length 50th (m)			67.3			111.6			61.2			55.7		
Queue Length 95th (m)			95.5			100.1			m86.3			m80.9		
Internal Link Dist (m)			193.0			341.6			139.1			131.1		
Turn Bay Length (m)			38.0									30.0		
Base Capacity (vph)			640			1979			409			814		
Starvation Cap Reductn			0			0			0			0		
Spillback Cap Reductn			0			0			0			0		
Storage Cap Reductn			0			0			0			0		
Reduced v/c Ratio			0.61			0.74			0.76			0.35		
Intersection Summary														

Cycle Length: 120  
Actuated Cycle Length: 120  
Offset: 66 (55%), Referenced to phase 2:WBTL, Start of Green  
Natural Cycle: 90  
Control Type: Actuated-Coordinated  
Maximum v/c Ratio: 0.93  
Intersection Signal Delay: 32.5  
Intersection LOS: C  
Intersection Capacity Utilization 65.0%  
ICU Level of Service E  
Analysis Period (min) 15  
Description: As per the signal timing plan provided February 12, 2020.  
# 95th percentile volume exceeds capacity, queue may be longer.  
m Volume for 95th percentile queue is metered by upstream signal.



Lanes, Volumes, Timings  
2: Merivale & SC N

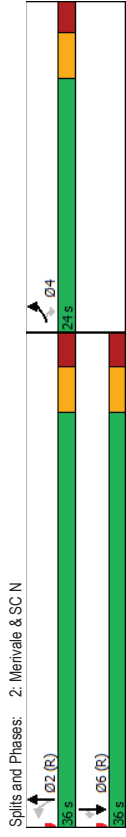
03-24-2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	40	10	62	206	406	61
Future Volume (vph)	40	10	62	206	406	61
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.98	1.00			0.98
Frt	0.950	0.850				0.850
Flt Protected			0.950			
Satd. Flow (prot)	1668	1483	1668	1745	1745	1483
Flt Permitted	0.950	0.496				
Satd. Flow (perm)	1641	1451	865	1745	1745	1450
Satd. Flow (RTOR)	11					68
Adj. Flow (vph)	44	11	69	229	451	68
Lane Group Flow (vph)	44	11	69	229	451	68
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	2	6
Permitted Phases	4	4	2	2	2	6
Detector Phase	4	4	2	2	2	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	35.9	35.9	35.9
Total Split (s)	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
Yellow Time (%)	2.3	2.3	2.6	2.6	2.6	2.6
All-Red Time (s)	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
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.6	11.6	45.5	45.5	45.5	45.5
Actuated G/C Ratio	0.19	0.19	0.76	0.76	0.76	0.76
v/c Ratio	0.14	0.04	0.11	0.17	0.34	0.06
Control Delay	19.8	10.0	1.8	1.7	6.5	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	10.0	1.8	1.7	6.5	2.3
LOS	B	A	A	A	A	A
Approach Delay	17.8		1.7	5.9		
Approach LOS	B		A	A		
Queue Length 50th (m)	4.2	0.0	1.5	5.0	20.0	0.0
Queue Length 95th (m)	9.5	2.9	3.9	9.9	51.4	4.7
Internal Link Dist (m)	51.1			82.7	69.7	
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	508	452	656	1323	1323	1116
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.11	0.17	0.34	0.06
<b>Intersection Summary</b>						

Lanes, Volumes, Timings  
2: Merivale & SC N

03-24-2020

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 8 (13%) Referenced to phase 2:NBT.L and 6:SBT. Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 5.2
Intersection LOS: A
Intersection Capacity Utilization: 56.4%
ICU Level of Service B
Analysis Period (min): 15
Description: As per the signal timing plan provided on February 12, 2020.





Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

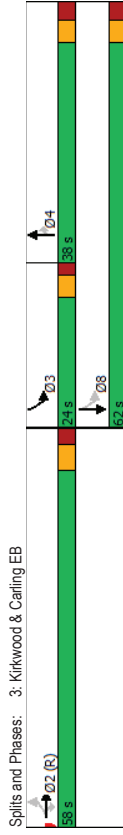
03-24-2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	0	0	0	0	0	0	0	0	0
Traffic Volume (vph)	124	1634	181	0	0	0	0	427	413	374	410	0
Future Volume (vph)	124	1634	181	0	0	0	0	427	413	374	410	0
Lane Util. Factor	0.86	0.86	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor			0.96									
Flt	0.950	0.850						0.850				
Flt Protected											0.977	
Satd. Flow (prot)	1426	4502	1483	0	0	0	0	3316	1483	0	3239	0
Flt Permitted	0.950										0.982	
Satd. Flow (perm)	1426	4502	1431	0	0	0	0	3316	1483	0	1930	0
Satd. Flow (RTOR)			201									
Adj. Flow (vph)	138	1816	201	0	0	0	0	474	459	416	456	0
Lane Group Flow (vph)	124	1830	201	0	0	0	0	474	459	0	872	0
Turn Type	Perm	NA	Perm	NA	NA	NA	NA	Perm	pm+pt	NA	NA	NA
Protected Phases		2					4			3	8	
Permitted Phases	2	2	2				4	4	4	3	8	
Detector Phase	2	2	2				4	4	4	3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0				10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	29.2	29.2	29.2				26.1	26.1	23.1	26.1		
Total Split (s)	58.0	58.0	58.0				38.0	38.0	24.0	62.0		
Total Split (%)	48.3%	48.3%	48.3%				31.7%	31.7%	20.0%	51.7%		
Yellow Time (s)	3.7	3.7	3.7				3.3	3.3	3.3	3.3		
Yellow Time (s)	3.7	3.7	3.7				3.3	3.3	3.3	3.3		
All-Red Time (s)	2.5	2.5	2.5				2.8	2.8	1.8	2.8		
Lost Time Adjust (s)	0.0	0.0	0.0				0.0	0.0	0.0	0.0		
Lost Time (s)	0.0	0.0	0.0				0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.2	6.2	6.2				6.1	6.1	6.1	6.1		
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode							Yes	Yes	Yes	Yes		
C-Max	51.8	51.8	51.8				45.3	45.3	45.3	55.9		
Act Effct Green (s)	0.43	0.43	0.43				0.38	0.38	0.38	0.47		
Actuated g/C Ratio	0.20	0.94	0.27				0.38	0.82	1.21	1.21		
v/c Ratio	22.4	43.7	3.8				28.3	47.5	39.8			
Control Delay	0.0	0.0	0.0				0.0	0.0	0.0	6.0		
Queue Delay	22.4	43.7	3.8				28.3	47.5	45.8			
Total Delay	0.0	0.0	0.0				0.0	0.0	0.0	6.0		
LOS	C	D	A				C	D	D	D		
Approach Delay							37.7			45.8		
Approach LOS							D			D		
Queue Length 50th (m)	20.6	157.0	0.0				42.2	96.4		77.0		
Queue Length 95th (m)	35.9	#194.1	13.4				56.3	#150.5	#108.1			
Internal Link Dist (m)				320.1			71.9			139.1		
Turn Bay Length (m)	50.0	200.0					80.0					
Base Capacity (vph)	615	1943	731				1251	559		948		
Starvation Cap Reductn	0	0	0				0	0	0	54		
Spillback Cap Reductn	0	0	0				0	0	0	0		
Storage Cap Reductn	0	0	0				0	0	0	0		
Reduced v/c Ratio	0.20	0.94	0.27				0.38	0.82		0.98		
Intersection Summary												

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

03-24-2020

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 15 (13%): Referenced to phase 2 EBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 40.0
Intersection LOS: D
Intersection Capacity Utilization: 96.1%
ICU Level of Service: F
Analysis Period (min): 15
Description: As per the signal timing plan provided February 12, 2020.
# 95th percentile volume exceeds capacity, queue may be longer.
dl Defacto Left Lane. Record with 1 though lane as a left lane.



Lanes, Volumes, Timings  
4: Carling & SC W

03-24-2020

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1116	713	14	12	23
Future Volume (vph)	0	1116	713	14	12	23
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00		0.97		
Flt Protected		0.997		0.910		
Satd. Flow (prot)	0	4764	4745	0	1536	0
Flt Permitted		0.984		0.984		
Satd. Flow (perm)	0	4764	4745	0	1519	0
Satd. Flow (RTOR)		5		26		
Adj. Flow (vph)	0	1240	792	16	13	26
Lane Group Flow (vph)	0	1240	808	0	39	0
Turn Type	NA	NA	Prot	Prot		
Protected Phases	2	6		4		
Permitted Phases						
Detector Phase	2	6		4		
Switch Phase						
Minimum Initial (s)	10.0	10.0		5.0		
Minimum Split (s)	15.3	42.3		38.1		
Total Split (s)	81.0	81.0		39.0		
Total Split (%)	67.5%	67.5%		32.5%		
Yellow Time (s)	3.7	3.7		3.0		
All-Red Time (s)	1.6	1.6		3.1		
Lost Time Adjust (s)	0.0	0.0		0.0		
Total Lost Time (s)	5.3	5.3		6.1		
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max		None		
Act Effct Green (s)	90.6	90.6		21.4		
Actuated G/C Ratio	0.76	0.76		0.18		
v/c Ratio	0.34	0.23		0.13		
Control Delay	5.6	3.1		17.7		
Queue Delay	0.0	0.0		0.0		
Total Delay	5.6	3.1		17.7		
LOS	A	A		B		
Approach Delay	5.6	3.1		17.7		
Approach LOS	A	A		B		
Queue Length 50th (m)	32.8	18.8		2.3		
Queue Length 95th (m)	m35.9	2.4		10.8		
Internal Link Dist (m)	43.8	112.1		39.0		
Turn Bay Length (m)						
Base Capacity (vph)	3596	3582		439		
Starvation Cap Reductn	0	0		0		
Spillback Cap Reductn	0	0		0		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.34	0.23		0.09		
<b>Intersection Summary</b>						

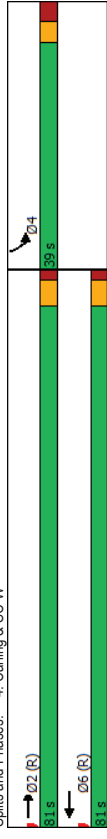
1330 Carling 815 Archibald AM Peak Hour Existing

Lanes, Volumes, Timings  
4: Carling & SC W

03-24-2020

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 38 (32%). Referenced to phase 2,EBT and 6,WBT, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 4.8
Intersection LOS: A
Intersection Capacity Utilization 51.9%
ICU Level of Service A
Analysis Period (min) 15
Description: As per the signal timing plan provided February 12, 2020.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Carling & SC W



1330 Carling 815 Archibald AM Peak Hour Existing

Lanes, Volumes, Timings  
5: Carling & SCE

03-24-2020

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	59	120	989	20	1	5	640	42	12	2	12	23
Future Volume (vph)	59	120	989	20	1	5	640	42	12	2	12	23
Lane Util. Factor	0.91	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	1.00	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt	0.950	0.937	0.937	0.937	0.950	0.950	0.937	0.937	0.937	0.937	0.937	0.937
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	0	1658	4742	0	0	1658	4691	0	0	1583	0	0
Flt Permitted	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352
Satd. Flow (perm)	0	597	4742	0	0	412	4691	0	0	1353	0	0
Satd. Flow (RTOR)	5	17	17	17	17	17	17	17	17	17	17	17
Adj. Flow (vph)	66	133	1099	22	1	6	711	47	13	2	13	26
Lane Group Flow (vph)	0	199	1121	0	0	7	758	0	0	28	0	0
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	2	6	6	6	6	4	4	4	4
Permitted Phases	2	2	2	2	6	6	6	6	4	4	4	4
Detector Phase	2	2	2	2	6	6	6	6	4	4	4	4
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	10.0
Minimum Split (s)	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
Total Split (%)	69.2%	69.2%	69.2%	69.2%	69.2%	69.2%	69.2%	69.2%	30.8%	30.8%	30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	4.0	4.0	4.0	4.0
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	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	None	None	None	None
Actuated g/C Ratio	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.12	0.12	0.12	0.12
v/c Ratio	0.39	0.28	0.02	0.19	0.02	0.19	0.17	0.17	29.9	29.9	29.9	29.9
Control Delay	4.8	1.4	5.0	3.1	5.0	3.1	2.9	2.9	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.4	5.0	3.1	5.0	3.1	2.9	2.9	0.0	0.0	0.0	0.0
LOS	A	A	A	A	A	A	A	A	C	C	C	C
Approach Delay	1.9	1.9	1.9	1.9	3.2	3.2	2.9	2.9	2.9	2.9	2.9	2.9
Approach LOS	A	A	A	A	A	A	A	A	C	C	C	C
Queue Length 50th (m)	3.1	6.1	6.1	0.3	13.0	13.0	3.3	3.3	3.3	3.3	3.3	3.3
Queue Length 95th (m)	13.1	10.9	10.9	10.2	19.0	19.0	10.2	10.2	10.2	10.2	10.2	10.2
Internal Link Dist (m)	112.1	112.1	112.1	112.1	81.1	81.1	65.8	65.8	65.8	65.8	65.8	65.8
Turn Bay Length (m)	65.0	65.0	65.0	65.0	30.0	30.0	34.8	34.8	34.8	34.8	34.8	34.8
Base Capacity (vph)	509	4048	4048	351	4007	4007	4007	4007	4007	4007	4007	4007
Starvation Cap Reductn	0	833	833	0	1806	1806	0	0	0	0	0	0
Spillback Cap Reductn	0	101	101	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.35	0.35	0.02	0.32	0.32	0.08	0.08	0.08	0.08	0.08	0.08
Intersection Summary												

1330 Carling 815 Archibald AM Peak Hour Existing

Synchro 10 Light Report  
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Lanes, Volumes, Timings  
5: Carling & SCE

03-24-2020

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	0	11
Future Volume (vph)	0	11
Lane Util. Factor	1.00	1.00
Ped Bike Factor	0.99	0.98
Frt	0.950	0.850
Flt Protected	0.950	0.850
Satd. Flow (prot)	0	1483
Flt Permitted	0.739	0.739
Satd. Flow (perm)	0	1452
Satd. Flow (RTOR)	24	24
Adj. Flow (vph)	0	12
Lane Group Flow (vph)	26	12
Turn Type	NA	Perm
Protected Phases	8	8
Permitted Phases	8	8
Detector Phase	8	8
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	37.0	37.0
Total Split (s)	37.0	37.0
Total Split (%)	30.8%	30.8%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	4.0	4.0
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	7.0	7.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)	14.0	14.0
Actuated g/C Ratio	0.12	0.12
v/c Ratio	0.17	0.06
Control Delay	47.0	6.3
Queue Delay	0.0	0.0
Total Delay	47.0	6.3
LOS	D	A
Approach Delay	34.2	34.2
Approach LOS	C	C
Queue Length 50th (m)	5.8	0.0
Queue Length 95th (m)	12.2	2.7
Internal Link Dist (m)	63.4	63.4
Turn Bay Length (m)	319	381
Base Capacity (vph)	0	0
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.08	0.03
Intersection Summary		

1330 Carling 815 Archibald AM Peak Hour Existing

Synchro 10 Light Report  
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Lanes, Volumes, Timings  
5: Carling & SCE

03-24-2020

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 26 (22%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Neutral Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.39  
 Intersection Signal Delay: 3.3  
 Intersection LOS: A  
 Intersection Capacity Utilization 70.5%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carling & SCE



Lanes, Volumes, Timings  
6: Merivale & Carling

03-24-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	950	74	152	453	39	106	229	407	36	252	128
Future Volume (vph)	0	950	74	152	453	39	106	229	407	36	252	128
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99	1.00	0.99	0.99	0.99	1.00	1.00	1.00	0.99	0.99	0.97
Flt	0.989	0.950	0.988	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.850
Flt Protected	0	4695	0	1658	4684	0	1658	1745	1483	1658	1745	1483
Satd. Flow (prot)	0	4695	0	1645	4684	0	1639	1745	1437	1639	1745	1437
Flt Permitted	0	4695	0	1645	4684	0	1639	1745	1437	1639	1745	1437
Satd. Flow (perm)	11	1056	82	169	503	43	118	254	452	40	280	142
Adj. Flow (vph)	0	1056	82	169	503	43	118	254	452	40	280	142
Lane Group Flow (vph)	0	1138	0	169	546	0	118	254	452	40	280	142
Turn Type	NA	NA	NA	Prot	NA	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	2	1	1	6	7	4	7	4	3	8	8	8
Permitted Phases	2	1	1	6	7	4	7	4	4	3	8	8
Detector Phase	2	1	1	6	7	4	7	4	4	3	8	8
Switch Phase	2	1	1	6	7	4	7	4	4	3	8	8
Minimum Initial (s)	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	38.7	38.7	11.3	38.7	38.7
Total Split (s)	48.0	12.0	60.0	21.0	39.0	39.0	39.0	39.0	39.0	21.0	39.0	39.0
Total Split (%)	40.0%	10.0%	50.0%	17.5%	32.5%	17.5%	32.5%	32.5%	32.5%	17.5%	32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.4	3.4	3.0	3.4	3.0	3.4	3.4	3.4
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	0.0
Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.3	6.7	6.3	6.7	6.7	6.7
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.3	6.7	6.3	6.7	6.7	6.7
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	42.0	15.6	63.0	12.6	32.0	32.0	32.0	32.0	32.0	8.3	25.3	25.3
Actuated g/C Ratio	0.35	0.13	0.52	0.10	0.27	0.27	0.27	0.27	0.27	0.07	0.21	0.21
v/c Ratio	0.69	0.78	0.22	0.68	0.55	0.76	0.35	0.76	0.35	0.76	0.34	0.34
Control Delay	26.0	77.1	16.4	70.6	42.3	22.7	57.6	51.7	10.0	51.7	10.0	10.0
Queue Delay	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	77.1	16.4	70.6	42.3	22.7	57.6	52.3	10.0	52.3	10.0	10.0
LOS	C	E	B	E	D	C	E	D	C	E	D	B
Approach Delay	27.1	30.8	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C
Queue Length 50th (m)	50.1	39.2	23.7	26.9	52.7	36.7	9.4	48.6	6.3	48.6	6.3	6.3
Queue Length 95th (m)	82.6	#103.6	36.0	46.1	74.6	74.4	0.0	60.2	18.6	60.2	18.6	18.6
Internal Link Dist (m)	81.1	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4
Turn Bay Length (m)	1650	70.0	216	2467	203	493	614	203	469	490	490	490
Base Capacity (vph)	278	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.78	0.22	0.58	0.52	0.74	0.20	0.65	0.29	0.65	0.29	0.29

Intersection Summary

1330 Carling 815 Archibald AM Peak Hour Existing

Lanes, Volumes, Timings  
5: Carling & SCE

03-24-2020

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 26 (22%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Neutral Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.39  
 Intersection Signal Delay: 3.3  
 Intersection LOS: A  
 Intersection Capacity Utilization 70.5%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carling & SCE

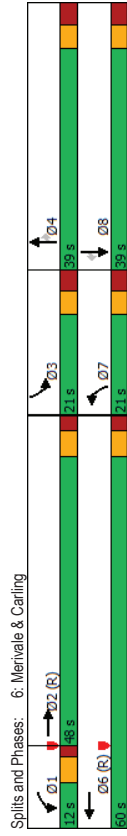


1330 Carling 815 Archibald AM Peak Hour Existing

Lanes, Volumes, Timings  
6: Merivale & Carling

03-24-2020

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 52 (43%), Referenced to phase 2,EBT and 6,WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 32.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 75.7%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crear

03-24-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	17	29	10	21	46	29	662	11	23	446	37
Future Volume (vph)	15	17	29	10	21	46	29	662	11	23	446	37
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.936	0.936	0.936	0.919	0.919	0.936	0.936	0.936	0.936	0.936	0.936	0.936
Flt Protected	0.988	0.988	0.988	0.994	0.994	0.988	0.988	0.988	0.988	0.988	0.988	0.988
Satd. Flow (prot)	0	1599	0	0	1580	0	0	3301	0	0	3263	0
Flt Permitted	0.915	0.915	0.915	0.948	0.948	0.915	0.915	0.915	0.915	0.915	0.915	0.915
Satd. Flow (perm)	0	1480	0	0	1506	0	0	3029	0	0	2952	0
Satd. Flow (RTOR)	32	32	32	51	51	32	32	4	4	32	32	19
Adj. Flow (vph)	17	19	32	11	23	51	32	724	12	26	496	41
Lane Group Flow (vph)	0	68	0	0	85	0	0	768	0	0	563	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	2	6
Detector Phase	4	4	4	8	8	8	2	2	2	2	2	6
Switch Phase	4	4	4	8	8	8	2	2	2	2	2	6
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	10.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8	33.8
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	11.8	11.8	11.8	11.8	11.8	11.8	60.9	60.9	60.9	60.9	60.9	60.9
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio	0.28	0.28	0.32	0.32	0.32	0.33	0.33	0.33	0.33	0.33	0.25	0.25
Control Delay	20.6	20.6	17.5	17.5	17.5	5.0	5.0	5.0	5.0	5.0	4.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	20.6	17.5	17.5	17.5	5.0	5.0	5.0	5.0	5.0	4.4	4.4
LOS	C	C	B	B	B	A	A	A	A	A	A	A
Approach Delay	20.6	20.6	17.5	17.5	17.5	5.0	5.0	5.0	5.0	5.0	4.4	4.4
Approach LOS	C	C	B	B	B	A	A	A	A	A	A	A
Queue Length 50th (m)	5.0	5.0	4.7	4.7	4.7	17.6	17.6	17.6	17.6	17.6	11.5	11.5
Queue Length 95th (m)	13.9	13.9	14.8	14.8	14.8	38.5	38.5	38.5	38.5	38.5	26.3	26.3
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	113.1	113.1	113.1	113.1	113.1	304.1	304.1
Turn Bay Length (m)												
Base Capacity (vph)	379	379	400	400	400	2307	2307	2307	2307	2307	2252	2252
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.18	0.21	0.21	0.21	0.33	0.33	0.33	0.33	0.33	0.25	0.25
Intersection Summary												

03-24-2020  
**7: Merivale & Coldrey/Crerar**

Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 46 (58%), Referenced to phase 2/NBTL and 6/SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.33  
 Intersection Signal Delay: 6.2  
 Intersection LOS: A  
 Intersection Capacity Utilization 61.1%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 7: Merivale & Coldrey/Crerar



04-14-2020  
**1: Kirkwood & Carling WB**

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	232	2027	271	198	495	0	0	456	378
Future Volume (vph)	0	0	0	232	2027	271	198	495	0	0	456	378
Satd. Flow (prot)	0	0	0	1426	4381	0	1658	1745	0	0	3316	1483
Flt Permitted				0.950	0.989		0.238					
Satd. Flow (perm)	0	0	0	1417	4381	0	410	1745	0	0	3316	1412
Satd. Flow (RTOR)					26							86
Lane Group Flow (vph)	0	0	0	232	2579	0	220	560	0	0	507	420
Turn Type				Perm	NA		prn+pt	NA			NA	Perm
Protected Phases				2	2		7	4			8	8
Permitted Phases				2	2		7	4			8	8
Detector Phase												
Switch Phase												
Minimum Initial (s)				10.0	10.0		5.0	10.0			10.0	10.0
Minimum Split (s)				40.3	40.3		14.5	32.0			32.0	32.0
Total Split (s)				67.0	67.0		20.0	53.0			33.0	33.0
Total Split (%)				55.8%	55.8%		16.7%	44.2%			27.5%	27.5%
Yellow Time (s)				3.7	3.7		3.3	3.3			3.3	3.3
All-Red Time (s)				2.6	2.6		2.9	2.7			2.7	2.7
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				6.3	6.3		6.2	6.0			6.0	6.0
Lead/Lag							Lead	Lag			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Recall Mode							None	Min			Min	Min
Act Effct Green (s)				60.7	60.7		46.8	47.0			27.2	27.2
Actuated g/C Ratio				0.51	0.51		0.39	0.39			0.23	0.23
v/c Ratio				0.32	1.16		0.73	0.81			0.68	1.09
Control Delay				19.1	105.3		43.8	47.5			47.7	106.8
Queue Delay				0.0	0.0		0.0	7.9			0.0	0.0
Total Delay				19.1	105.3		43.8	55.4			47.7	106.8
LOS				B	F		D	E			D	F
Approach Delay					98.2			52.1			74.4	
Approach LOS					F			D			E	
Queue Length 50th (m)				36.2	-278.0		43.6	132.0			57.8	-95.1
Queue Length 95th (m)				56.7	#307.7		#66.6	#174.2			76.5	#157.3
Internal Link Dist (m)					193.0			139.1				
Turn Bay Length (m)					341.6							131.1
Base Capacity (vph)				716	2228		303	683			751	386
Starvation Cap Reductn				0	0		0	101			0	0
Spillback Cap Reductn				0	0		0	0			0	0
Storage Cap Reductn				0	0		0	0			0	0
Reduced v/c Ratio				0.32	1.16		0.73	0.95			0.68	1.09

Intersection Summary  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 39 (33%), Referenced to phase 2/WBTL, Start of Green  
 Natural Cycle: 140  
 Control Type: Actuated-Coordinated

03-24-2020  
**7: Merivale & Coldrey/Crerar**

Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 46 (58%), Referenced to phase 2/NBTL and 6/SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.33  
 Intersection Signal Delay: 6.2  
 Intersection LOS: A  
 Intersection Capacity Utilization 61.1%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 7: Merivale & Coldrey/Crerar

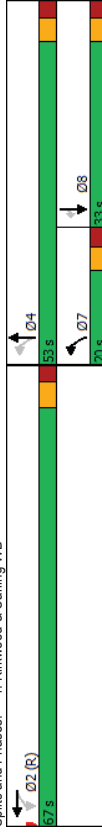


Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

04-14-2020

Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 85.4  
 Intersection Capacity Utilization 96.4%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 ~ Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Kirkwood & Carling WB

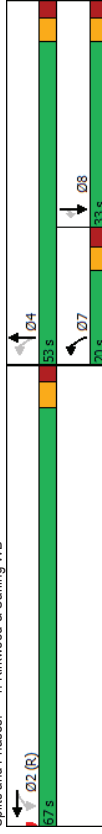


Lanes, Volumes, Timings  
2: Merivale & SC N

04-14-2020

Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 85.4  
 Intersection Capacity Utilization 96.4%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 ~ Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Kirkwood & Carling WB



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	78	56	59	197	462	85
Future Volume (vph)	78	56	59	197	462	85
Satd. Flow (prot)	1668	1483	1668	1745	1745	1483
Flt Permitted	0.950	0.455				
Satd. Flow (perm)	1595	1451	793	1745	1745	1448
Satd. Flow (RTOR)	62	62	66	219	502	94
Lane Group Flow (vph)	Prot	Perm	Perm	NA	NA	Perm
Turn Type	4	4	2	2	6	6
Protected Phases						
Permitted Phases	4	4	2	2	6	6
Detector Phase						
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	41.0	41.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%	63.1%	63.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.6	11.6	46.2	46.2	46.2	46.2
Actuated g/C Ratio	0.18	0.18	0.71	0.71	0.71	0.71
v/c Ratio	0.29	0.20	0.12	0.18	0.41	0.09
Control Delay	24.9	7.9	4.1	4.5	7.3	1.9
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0
Total Delay	24.9	8.0	4.1	4.5	7.3	1.9
LOS	C	A	A	A	A	A
Approach Delay	17.8		4.4	6.5		
Approach LOS	B		A	A		
Queue Length 50th (m)	9.5	0.0	1.1	3.9	23.1	0.0
Queue Length 95th (m)	17.6	7.3	m13.4	m56.4	57.8	5.2
Internal Link Dist (m)	51.1		82.7	69.7		
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	469	455	563	1239	1239	1056
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	74	0	0	113	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.16	0.12	0.18	0.45	0.09

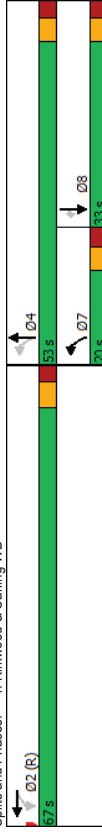
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	27 (42%), Referenced to phase 2:NBLT and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

04-14-2020

Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 85.4  
 Intersection Capacity Utilization 96.4%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 ~ Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Kirkwood & Carling WB



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	78	56	59	197	462	85
Future Volume (vph)	78	56	59	197	462	85
Satd. Flow (prot)	1668	1483	1668	1745	1745	1483
Flt Permitted	0.950	0.455				
Satd. Flow (perm)	1595	1451	793	1745	1745	1448
Satd. Flow (RTOR)	62	62	66	219	502	94
Lane Group Flow (vph)	Prot	Perm	Perm	NA	NA	Perm
Turn Type	4	4	2	2	6	6
Protected Phases						
Permitted Phases	4	4	2	2	6	6
Detector Phase						
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	41.0	41.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%	63.1%	63.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.6	11.6	46.2	46.2	46.2	46.2
Actuated g/C Ratio	0.18	0.18	0.71	0.71	0.71	0.71
v/c Ratio	0.29	0.20	0.12	0.18	0.41	0.09
Control Delay	24.9	7.9	4.1	4.5	7.3	1.9
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0
Total Delay	24.9	8.0	4.1	4.5	7.3	1.9
LOS	C	A	A	A	A	A
Approach Delay	17.8		4.4	6.5		
Approach LOS	B		A	A		
Queue Length 50th (m)	9.5	0.0	1.1	3.9	23.1	0.0
Queue Length 95th (m)	17.6	7.3	m13.4	m56.4	57.8	5.2
Internal Link Dist (m)	51.1		82.7	69.7		
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	469	455	563	1239	1239	1056
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	74	0	0	113	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.16	0.12	0.18	0.45	0.09

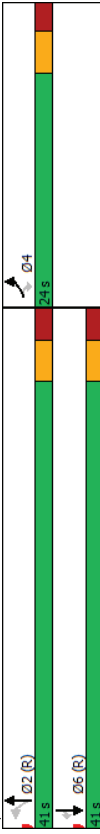
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	27 (42%), Referenced to phase 2:NBLT and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

2: Merivale & SCN

04-14-2020

Maximum v/c Ratio: 0.41  
 Intersection Signal Delay: 7.6  
 Intersection LOS: A  
 ICU Level of Service B  
 Intersection Capacity Utilization 56.5%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided on February 12, 2020.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Merivale & SCN



3: Kirkwood & Carling EB

04-14-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4↑↑↑	4↑↑↑	↑					↑↑	↑	↑	↑
Traffic Volume (vph)	383	1038	335	0	0	0	0	304	302	381	315
Future Volume (vph)	383	1038	335	0	0	0	0	304	302	381	315
Satd. Flow (prot)	1426	4493	1483	0	0	0	0	3316	1483	0	3226
Flt P/Permitted	0.950	0.998									0.617
Satd. Flow (perm)	1426	4493	1429	0	0	0	0	3316	1461	0	2045
Satd. Flow (RTOR)			308								
Lane Group Flow (vph)	385	1205	372	0	0	0	0	388	336	0	773
Turn Type	Perm	NA	Perm					NA	Perm	pm-pt	NA
Permitted Phases	2	2	2					4	3	8	8
Detector Phase	2	2	2					4	4	3	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0					10.0	10.0	5.0	10.0
Minimum Split (s)	29.2	29.2	29.2					26.1	26.1	23.1	26.1
Total Split (s)	61.0	61.0	61.0					29.0	29.0	30.0	59.0
Total Split (%)	50.8%	50.8%	50.8%					24.2%	24.2%	25.0%	49.2%
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5					2.8	2.8	1.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2					6.1	6.1	6.1	6.1
Lead/Lag								Lag	Lag	Lead	Lead
Lead-Lag Optimize?								Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max					Min	Min	Min	Min
Act Effct Green (s)	54.8	54.8	54.8					42.3	42.3	52.9	52.9
Actuated g/C Ratio	0.46	0.46	0.46					0.35	0.35	0.44	0.44
v/c Ratio	0.59	0.59	0.45					0.29	0.65	1.100l	1.100l
Control Delay	28.9	25.7	6.1					28.9	39.8	21.7	21.7
Queue Delay	0.4	0.1	0.0					0.0	0.0	0.0	0.0
Total Delay	29.3	25.7	6.1					28.9	39.8	21.7	21.7
LOS	C	C	A					C	D	C	C
Approach Delay		22.7						34.3		21.7	
Approach LOS		C						C		C	
Queue Length 50th (m)	76.7	79.7	8.4					30.0	66.1	75.6	75.6
Queue Length 95th (m)	113.9	95.0	29.0					41.9	98.7	m82.4	m82.4
Internal Link Dist (m)		150.0				323.9		71.9		139.1	
Turn Bay Length (m)	50.0		200.0					80.0			
Base Capacity (vph)	651	2051	819					1168	515	945	945
Starvation Cap Reductn	0	0	0					0	0	0	0
Spillback Cap Reductn	51	107	0					0	0	0	0
Storage Cap Reductn	0	0	0					0	0	0	0
Reduced v/c Ratio	0.64	0.62	0.45					0.29	0.65	0.82	0.82

Intersection Summary

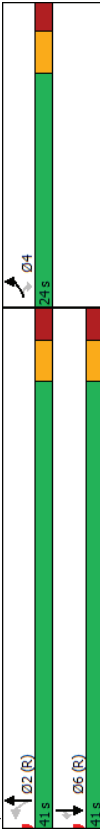
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 81 (68%), Referenced to phase 2EBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated

2: Merivale & SCN

04-14-2020

Maximum v/c Ratio: 0.41  
 Intersection Signal Delay: 7.6  
 Intersection LOS: A  
 ICU Level of Service B  
 Intersection Capacity Utilization 56.5%  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided on February 12, 2020.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Merivale & SCN

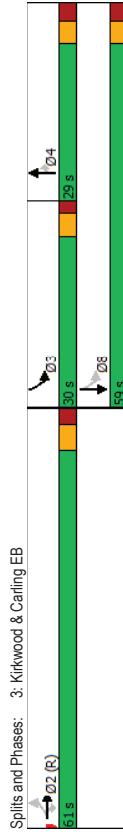




Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

04-14-2020

Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 24.8  
 Intersection Capacity Utilization 79.7%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service D  
 Description: As per the signal timing plan provided February 12, 2020.  
 Volume for 95th percentile queue is metered by upstream signal.  
 Defacto Left Lane. Recode with 1 though lane as a left lane.



Lanes, Volumes, Timings  
4: Carling & SC-W

04-14-2020

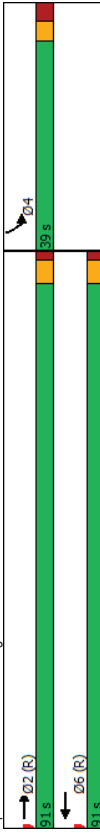
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	848	1832	5	35	38
Future Volume (vph)	0	848	1832	5	35	38
Satd. Flow (prot)	0	4764	4763	0	1564	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	4764	4763	0	1533	0
Satd. Flow (RTOR)			1		14	
Lane Group Flow (vph)	0	942	2042	0	81	0
Turn Type	NA	NA	NA	Prot		
Protected Phases		2	6		4	
Permitted Phases		2	6		4	
Detector Phase		2	6		4	
Switch Phase						
Minimum Initial (s)		10.0	10.0		5.0	
Minimum Split (s)		15.3	59.3		38.1	
Total Split (s)		91.0	91.0		39.0	
Total Split (%)		70.0%	70.0%		30.0%	
Yellow Time (s)		3.7	3.7		3.0	
All-Red Time (s)		1.6	1.6		3.1	
Lost Time Adjust (s)		0.0	0.0		0.0	
Total Lost Time (s)		5.3	5.3		6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode		C-Max	C-Max		None	
Act Effct Green (s)		96.4	96.4		22.2	
Actuated g/C Ratio		0.74	0.74		0.17	
v/c Ratio		0.27	0.58		0.29	
Control Delay		6.9	4.8		37.6	
Queue Delay		0.0	0.0		0.0	
Total Delay		6.9	4.8		37.6	
LOS		A	A		D	
Approach Delay		6.9	4.8		37.6	
Approach LOS		A	A		D	
Queue Length 50th (m)		33.9	13.7		13.6	
Queue Length 95th (m)		40.7	49.0		27.4	
Internal Link Dist (m)		43.8	112.1		39.0	
Turn Bay Length (m)						
Base Capacity (vph)		3534	3533		406	
Starvation Cap Reductn		0	191		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.27	0.61		0.20	
<b>Intersection Summary</b>						
Cycle Length: 130						
Actuated Cycle Length: 130						
Offset: 107 (82%), Referenced to phase 2:EBT and 6:WBT, Start of Green						
Natural Cycle: 100						
Control Type: Actuated-Coordinated						

4: Carling & SC W

04-14-2020

Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 6.3  
 Intersection LOS: A  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 4: Carling & SC W



5: Carling & SC E

04-14-2020

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	52	118	654	11	2	10	1711	78	15	1	17	74
Future Volume (vph)	52	118	654	11	2	10	1711	78	15	1	17	74
Satd. Flow (prot)	0	1658	4742	0	0	1658	4706	0	0	1564	0	0
Flt Permitted	0.052				0.359					0.853		
Satd. Flow (perm)	0	91	4742	0	0	592	4706	0	0	1345	0	0
Satd. Flow (RTOR)			4				7			19		
Lane Group Flow (vph)	0	189	739	0	0	13	1988	0	0	37	0	0
Turn Type	pm-pt	pm-pt	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	2	2	2		6	6	6		4	4		8
Detector Phase	5	5	2		6	6	6		4	4		8
Switch Phase												
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.6	10.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	24.0	24.0	93.0	69.0	69.0	69.0	69.0	69.0	37.0	37.0	37.0	37.0
Total Split (%)	18.5%	18.5%	71.5%	53.1%	53.1%	53.1%	53.1%	53.1%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	4.0	4.0	4.0	4.0
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	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	95.1	95.1	95.1	75.4	75.4	75.4	75.4	75.4	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.73	0.73	0.73	0.58	0.58	0.58	0.58	0.58	0.17	0.17	0.17	0.17
v/c Ratio	0.80	0.21	0.04	0.04	0.73	0.73	0.73	0.73	0.15	0.15	0.15	0.15
Control Delay	52.7	2.4	5.3	12.5	12.5	12.5	12.5	12.5	25.2	25.2	25.2	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	2.4	5.3	13.2	13.2	13.2	13.2	13.2	25.2	25.2	25.2	25.2
LOS	D	A	A	A	A	A	A	A	B	C	C	C
Approach Delay		12.6		13.2		13.2		13.2		25.2		25.2
Approach LOS		B		B		B		B		C		C
Queue Length 50th (m)	21.4	5.7		0.6	171.8		3.6		3.6			3.6
Queue Length 95th (m)	36.0	7.0		m11.2	208.3		12.9		12.9			12.9
Internal Link Dist (m)		112.1			81.1		65.8		65.8			65.8
Turn Bay Length (m)		65.0			30.0							
Base Capacity (vph)	287	3468		343	2733		325		325			325
Starvation Cap Reductn	0	0		0	374		0		0			0
Spillback Cap Reductn	0	204		0	0		0		0			0
Storage Cap Reductn	0	0		0	0		0		0			0
Reduced v/c Ratio	0.66	0.23		0.04	0.84		0.11		0.11			0.11
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 3 (2%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 100												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings  
5: Carling & SCE

04-14-2020

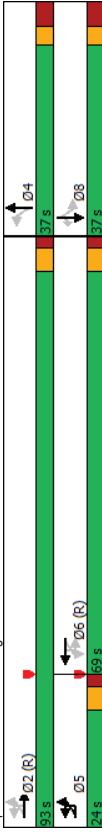
Lane Group	SBT	SBR	
Lane Configurations	4	7	
Traffic Volume (vph)	2	64	
Future Volume (vph)	2	64	
Satd. Flow (prot)	1663	1483	
Flt Permitted	0.704		
Satd. Flow (perm)	1206	1415	
Satd. Flow (RTOR)	71		
Lane Group Flow (vph)	84	71	
Turn Type	NA	Perm	
Protected Phases	8		
Permitted Phases	8		
Detector Phase	8	8	
Switch Phase			
Minimum Initial (s)	10.0	10.0	
Minimum Split (s)	37.0	37.0	
Total Split (s)	37.0	37.0	
Total Split (%)	28.5%	28.5%	
Yellow Time (s)	3.0	3.0	
All-Red Time (s)	4.0	4.0	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	7.0	7.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	
Act Effct Green (s)	22.3	22.3	
Actuated G/C Ratio	0.17	0.17	
v/c Ratio	0.41	0.24	
Control Delay	51.2	10.8	
Queue Delay	0.0	0.0	
Total Delay	51.2	10.8	
LOS	D	B	
Approach Delay	32.7		
Approach LOS	C		
Queue Length 50th (m)	17.9	0.0	
Queue Length 95th (m)	33.2	12.2	
Internal Link Dist (m)	63.4		
Turn Bay Length (m)			
Base Capacity (vph)	278	381	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.30	0.19	
Intersection Summary			

Lanes, Volumes, Timings  
5: Carling & SCE

04-14-2020

Maximum v/c Ratio: 0.80	Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 100.7%	ICU Level of Service G	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 5: Carling & SCE



Lanes, Volumes, Timings  
6: Merivale & Carling

04-14-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	630	115	425	1576	49	100	207	228	70	313	125
Traffic Volume (vph)	0	630	115	425	1576	49	100	207	228	70	313	125
Future Volume (vph)	0	630	115	425	1576	49	100	207	228	70	313	125
Satd. Flow (prot)	0	4617	0	1658	4733	0	1658	1745	1483	1658	1745	1483
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	4617	0	1636	4733	0	1612	1745	1419	1621	1745	1399
Satd. Flow (RTOR)	27			5			253					123
Lane Group Flow (vph)	0	828	0	472	1805	0	111	230	253	78	348	139
Turn Type	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	2	1	6	7	4	4	4	4	4	3	8	8
Permitted Phases	2	1	6	7	4	4	4	4	4	3	8	8
Detector Phase	2	1	6	7	4	4	4	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	5.0	10.0	6.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	11.3	38.7	11.3	38.7	38.7
Total Split (s)	38.0	33.0	71.0	20.0	39.0	39.0	30.0	30.0	30.0	20.0	39.0	39.0
Total Split (%)	29.2%	25.4%	54.6%	15.4%	30.0%	30.0%	30.0%	30.0%	15.4%	30.0%	30.0%	30.0%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.4	3.4	3.0	3.4	3.0	3.4	3.4	3.4
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	0.0
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.7	6.7	6.3	6.7	6.7	6.7
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	32.0	31.8	69.2	12.3	33.4	11.0	29.4	29.4	29.4	29.4	29.4	29.4
Actuated G/C Ratio	0.25	0.24	0.53	0.09	0.26	0.08	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.72	1.17	0.72	0.71	0.51	0.46	0.56	0.88	0.34	0.56	0.88	0.34
Control Delay	43.2	141.2	25.7	80.8	46.5	7.5	65.9	70.5	14.9	65.9	70.5	14.9
Queue Delay	1.5	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	0.0
Total Delay	44.7	141.2	27.9	80.8	46.5	7.5	65.9	90.0	14.9	65.9	90.0	14.9
LOS	D	F	C	F	D	A	E	F	F	E	F	B
Approach Delay	44.7	51.4		36.3								68.2
Approach LOS	D	D		D								E
Queue Length 50th (m)	71.2	~156.5	132.0	27.7	50.2	0.0	19.6	71.1	6.9	19.6	71.1	6.9
Queue Length 95th (m)	86.5	#222.5	151.6	#50.4	77.4	21.3	35.4	#124.3	26.5	35.4	#124.3	26.5
Internal Link Dist (m)	81.1		189.4		304.1							82.7
Turn Bay Length (m)	70.0		50.0		50.0		30.0			30.0		50.0
Base Capacity (vph)	1156	405	2522	174	454	556	174	433	440	433	440	440
Starvation Cap Reductn	164	0	0	0	0	0	0	0	0	0	0	82
Spillback Cap Reductn	0	0	548	0	0	0	0	0	0	0	0	13
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.17	0.91	0.64	0.51	0.46	0.45	0.99	0.33	0.45	0.99	0.33

Intersection Summary	
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	15 (12%), Referenced to phase 2EBT and 6WBT, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated

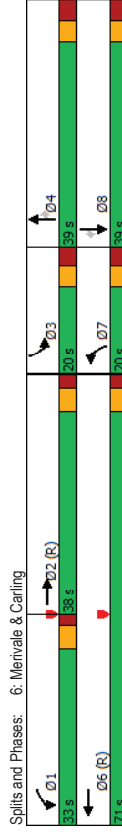
1330 Carling 815 Archibald AM Peak Hour Existing

Synchro 10 Light Report  
Page 12

Lanes, Volumes, Timings  
6: Merivale & Carling

04-14-2020

Maximum v/c Ratio:	1.17
Intersection Signal Delay:	50.2
Intersection Capacity Utilization:	94.2%
Analysis Period (min):	15
Intersection LOS:	D
ICU Level of Service:	F
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Splits and Phases: 6: Merivale & Carling

1330 Carling 815 Archibald AM Peak Hour Existing

Synchro 10 Light Report  
Page 13

Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

04-14-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	68	19	27	56	27	12	466	9	43	730	50
Future Volume (vph)	22	68	19	27	56	27	12	466	9	43	730	50
Satd. Flow (prot)	0	1684	0	0	1682	0	0	3300	0	0	3268	0
Flt Permitted	0.904			0.881			0.930				0.898	
Satd. Flow (perm)	0	1637	0	0	1481	0	0	3072	0	0	2943	0
Satd. Flow (RTOR)	12			19			4				15	
Lane Group Flow (vph)	0	121	0	0	122	0	0	541	0	0	915	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	4	4	8	8	8	2	2	2	6	6	6	6
Detector Phase	4	4	8	8	8	2	2	2	6	6	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	10.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Total Split (s)	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5	60.2	60.2	60.2	60.2	60.2	60.2	60.2
Actuated G/C Ratio	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.48	0.49	0.49	0.49	0.49	0.23	0.23	0.41	0.41	0.41	0.41	0.41
Control Delay	33.4	33.4	32.0	32.0	32.0	4.7	4.7	5.9	5.9	5.9	5.9	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	33.4	32.0	32.0	32.0	4.7	4.7	5.9	5.9	5.9	5.9	5.9
LOS	C	C	C	C	C	A	A	A	A	A	A	A
Approach Delay	33.4	33.4	32.0	32.0	32.0	4.7	4.7	5.9	5.9	5.9	5.9	5.9
Approach LOS	C	C	C	C	C	A	A	A	A	A	A	A
Queue Length 50th (m)	15.6	15.6	14.8	14.8	14.8	11.8	11.8	23.7	23.7	23.7	23.7	23.7
Queue Length 95th (m)	27.7	27.7	27.2	27.2	27.2	25.4	25.4	48.8	48.8	48.8	48.8	48.8
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	113.1	113.1	304.1	304.1	304.1	304.1	304.1
Turn Bay Length (m)												
Base Capacity (vph)	378	378	369	369	369	2312	2312	2217	2217	2217	2217	2217
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.32	0.33	0.33	0.33	0.23	0.23	0.41	0.41	0.41	0.41	0.41

Intersection Summary	
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	63 (79%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

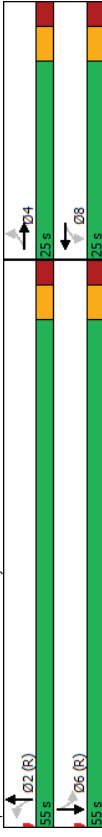
Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

04-14-2020

Maximum v/c Ratio:	0.49
Intersection Signal Delay:	9.3
Intersection LOS:	A
Intersection Capacity Utilization:	71.7%
ICU Level of Service:	C
Analysis Period (min):	15

Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 7: Merivale & Coldrey/Crerar



Intersection	Int Delay, s/veh											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER		
Int Delay, s/veh	0.4											
Movement	<div style="display: flex; justify-content: space-between;"> <span>EBL EBT EBR WBL WBT WBR NBL NBR SEL SER</span> <span style="color: red;">↑↑↑↑</span> <span style="color: red;">↑↑↑↑</span> </div>											
Lane Configurations												
Traffic Vol, veh/h	0	822	0	0	1870	0	0	26	0	0		
Future Vol, veh/h	0	822	0	0	1870	0	0	26	0	0		
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0		
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop		
RT Channelized	-	-	None	-	-	None	-	None	-	-		
Storage Length	-	-	-	-	-	0	-	0	-	-		
Veh in Median Storage, #	-	0	-	-	16983	-	0	-	16983	-		
Grade, %	-	0	-	-	0	-	0	-	0	-		
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90		
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2		
Mvmt Flow	0	913	0	0	2078	0	0	29	0	0		
Major/Minor	Major1 Minor1											
Conflicting Flow All	-	0	0								-	457
Stage 1	-	-	-								-	-
Stage 2	-	-	-								-	-
Critical Hdwy	-	-	-								-	7.14
Critical Hdwy Stg 1	-	-	-								-	-
Critical Hdwy Stg 2	-	-	-								-	-
Follow-up Hdwy	-	-	-								-	3.92
Pot Cap-1 Maneuver	0	-	-								0	471
Stage 1	0	-	-								0	-
Stage 2	0	-	-								0	-
Platoon blocked, %	-	-	-								-	-
Mov Cap-1 Maneuver	-	-	-								-	471
Mov Cap-2 Maneuver	-	-	-								-	-
Stage 1	-	-	-								-	-
Stage 2	-	-	-								-	-
Approach	EB NB											
HCM Control Delay, s	0											
HCM LOS	13.1											
	B											
Minor Lane/Major Mvmt	NBLn1	EBT	EBR									
Capacity (veh/h)	471	-	-									
HCM Lane V/C Ratio	0.061	-	-									
HCM Control Delay (s)	13.1	-	-									
HCM Lane LOS	B	-	-									
HCM 95th %ile Q(veh)	0.2	-	-									

# Appendix D

Collision Data

DRAFT











11125	KIRKWOOD AVE N @ CARLING AVE	364275.1662	5027494.228	2015-12-21	11:24	04 - Freezing Rain	04 - Slush	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
12180	KIRKWOOD AVE N @ CARLING AVE	364275.3041	5027495.027	2015-11-13	20:03	02 - Rain	02 - Wet	01 - Traffic signal	03 - At intersection	07 - Dark	03 - P.D. only	05 - Turning movement
12917	KIRKWOOD AVE N @ CARLING AVE	364276.0248	5027495.027	2015-10-09	14:38	01 - Clear	02 - Wet	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	03 - Rear end
13482	KIRKWOOD AVE N @ CARLING AVE	364274.9702	5027494.256	2015-12-17	17:30	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	07 - Dark	03 - P.D. only	04 - Sideswipe
13509	KIRKWOOD AVE N @ CARLING AVE	364276.4142	5027492.059	2015-11-24	10:20	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
13786	KIRKWOOD AVE N @ CARLING AVE	364274.9702	5027492.812	2015-11-25	18:12	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	07 - Dark	03 - P.D. only	03 - Rear end
14921	KIRKWOOD AVE N @ CARLING AVE	364275.6922	5027492.812	2015-12-14	18:40	01 - Clear	02 - Wet	01 - Traffic signal	03 - At intersection	07 - Dark	03 - P.D. only	05 - Turning movement
425	KIRKWOOD AVE N @ CARLING AVE	364276.3451	5027494.895	2014-03-27	14:57	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	02 - Non-fatal injury	04 - Sideswipe
1324	KIRKWOOD AVE N @ CARLING AVE	364276.1661	5027493.534	2014-02-25	14:07	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	02 - Non-fatal injury	05 - Turning movement
2030	KIRKWOOD AVE N @ CARLING AVE	364276.6411	5027494.794	2014-12-05	15:37	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	02 - Non-fatal injury	05 - Turning movement
3870	KIRKWOOD AVE N @ CARLING AVE	364275.3972	5027494.895	2014-01-31	11:52	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
6086	KIRKWOOD AVE N @ CARLING AVE	364275.3972	5027493.947	2014-02-27	10:47	03 - Snow	02 - Wet	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
6294	KIRKWOOD AVE N @ CARLING AVE	364276.1661	5027495.43	2014-04-28	14:37	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	02 - Angle
6332	KIRKWOOD AVE N @ CARLING AVE	364276.3451	5027494.895	2014-04-19	14:15	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
7014	KIRKWOOD AVE N @ CARLING AVE	364276.3451	5027493.947	2014-05-21	11:39	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
7595	KIRKWOOD AVE N @ CARLING AVE	364274.4493	5027493.947	2014-05-16	17:50	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
7705	KIRKWOOD AVE N @ CARLING AVE	364275.3972	5027493.947	2014-06-16	11:00	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
7912	KIRKWOOD AVE N @ CARLING AVE	364276.3451	5027495.843	2014-06-27	11:00	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
8783	KIRKWOOD AVE N @ CARLING AVE	364275.3972	5027494.895	2014-06-18	10:08	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	04 - Sideswipe
10376	KIRKWOOD AVE N @ CARLING AVE	364276.3451	5027492.051	2014-11-02	13:15	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
11293	KIRKWOOD AVE N @ CARLING AVE	364276.1661	5027494.482	2014-11-02	13:30	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	05 - Turning movement
11531	KIRKWOOD AVE N @ CARLING AVE	364275.7329	5027493.543	2014-09-07	19:57	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	07 - Dark	03 - P.D. only	02 - Angle
12056	KIRKWOOD AVE N @ CARLING AVE	364275.691	5027495.744	2014-10-29	11:30	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
14300	KIRKWOOD AVE N @ CARLING AVE	364274.7421	5027494.009	2014-12-19	13:40	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	03 - Rear end
14427	KIRKWOOD AVE N @ CARLING AVE	364274.7421	5027493.059	2014-12-31	10:59	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	07 - SMV other
10765	MERIVALE RD @ 112 N OF CARLING AVE/WESTGATE SC	364833.25	5027797.539	2015-09-04	15:11	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	03 - Rear end
10209	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364895.79670	5027391.99795	2017-07-20	11:05	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
5721	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364895.4245	5027392.905	2015-06-17	15:07	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	07 - SMV other
12981	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364894.7038	5027392.184	2015-10-09	17:35	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	05 - Dusk	03 - P.D. only	02 - Angle
1498	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364893.7399	5027391.099	2014-12-11	16:53	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	05 - Dusk	02 - Non-fatal injury	05 - Turning movement
6954	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364894.2299	5027393.492	2014-04-22	13:22	02 - Rain	02 - Wet	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	05 - Turning movement
8577	MERIVALE RD @ COLDREY AVE/CRERAR AVE	364894.2299	5027391.597	2014-07-26	18:57	01 - Clear	01 - Dry	01 - Traffic signal	03 - At intersection	01 - Daylight	03 - P.D. only	02 - Angle
10087	MERIVALE RD @ COLDREY AVE/CRERAR AVE (0006176)	364894.70411	5027392.54419	2018-11-01	15:28	01 - Clear	01 - Dry	01 - Traffic signal	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
7338	MERIVALE RD @ THAMES ST	364912.9972	5027525.981	2015-04-13	11:07	01 - Clear	01 - Dry	02 - Stop sign	02 - Intersection related	01 - Daylight	03 - P.D. only	04 - Sideswipe
2757	MERIVALE RD @ THAMES ST (0006168)	364913.96111	5027526.46308	2018-03-10	19:47	01 - Clear	01 - Dry	02 - Stop sign	02 - Intersection related	07 - Dark	03 - P.D. only	03 - Rear end
4082	MERIVALE RD @ THAMES ST (0006168)	364913.63965	5027526.64138	2018-04-29	8:15	01 - Clear	01 - Dry	02 - Stop sign	02 - Intersection related	01 - Daylight	03 - P.D. only	05 - Turning movement
11539	MERIVALE RD @ THAMES ST (0006168)	364913.58664	5027526.78917	2018-12-05	8:10	01 - Clear	01 - Dry	02 - Stop sign	03 - At intersection	01 - Daylight	03 - P.D. only	03 - Rear end
4033	MERIVALE RD btwn CARLING AVE & CARLING AVE ( _3ZA26R)	364893.14684	5027703.06433	2018-04-27	12:08	01 - Clear	01 - Dry	10 - No control	01 - Non intersection	01 - Daylight	03 - P.D. only	04 - Sideswipe
9762	MERIVALE RD btwn CARLING AVE & TO BE DETERMINED	364902.2933	5027689.275	2016-04-05	9:00	01 - Clear	01 - Dry	10 - No control	01 - Non intersection	01 - Daylight	03 - P.D. only	06 - SMV unattended vehicle
9770	MERIVALE RD btwn COLDREY AVE & THAMES ST	364907.6776	5027468.207	2016-12-31	11:30	01 - Clear	01 - Dry	10 - No control	04 - At/near private drive	01 - Daylight	03 - P.D. only	03 - Rear end
9648	MERIVALE RD btwn COLDREY AVE & THAMES ST	364911.4585	5027503.549	2014-08-08	9:53	01 - Clear	01 - Dry	10 - No control	04 - At/near private drive	01 - Daylight	03 - P.D. only	07 - SMV other
10417	MERIVALE RD btwn COLDREY AVE & THAMES ST	364908.2604	5027502.235	2014-11-22	16:21	02 - Rain	02 - Wet	10 - No control	01 - Non intersection	05 - Dusk	03 - P.D. only	04 - Sideswipe
11386	MERIVALE RD btwn COLDREY AVE & THAMES ST ( _3ZA4NW)	364906.13052	5027469.97428	2018-11-30	17:27	01 - Clear	01 - Dry	10 - No control	01 - Non intersection	07 - Dark	03 - P.D. only	04 - Sideswipe
10328	MERIVALE RD btwn MERIVALE RD & MERIVALE RD	364929.89693	5027618.14077	2017-01-14	16:40	01 - Clear	01 - Dry	10 - No control	04 - At/near private drive	05 - Dusk	03 - P.D. only	03 - Rear end
10329	MERIVALE RD btwn MERIVALE RD & MERIVALE RD	364922.29214	5027582.53718	2017-03-01	17:57	02 - Rain	02 - Wet	10 - No control	04 - At/near private drive	05 - Dusk	02 - Non-fatal injury	05 - Turning movement
10344	MERIVALE RD btwn WESTGATE SC & CARLING AVE	364840.26593	5027787.17142	2017-12-22	14:17	03 - Snow	03 - Loose snow	10 - No control	01 - Non intersection	01 - Daylight	03 - P.D. only	03 - Rear end

# Appendix E

TRANS Model Plots

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# TRANS Regional Model

Version 2.11 - Assigned February 19, 2020

**AM Peak Hour Total Traffic Volume**

**1330 Carling Ave**

2031 Model - Affordable Road & Transit Network

*No Modifications from Base Version*

User Initials: MM

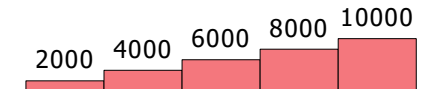
Plot Prepared: February 20, 2020

EMME Scenario: 21131

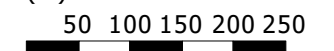


## Legend

AM Peak Hour Total Traffic Volume



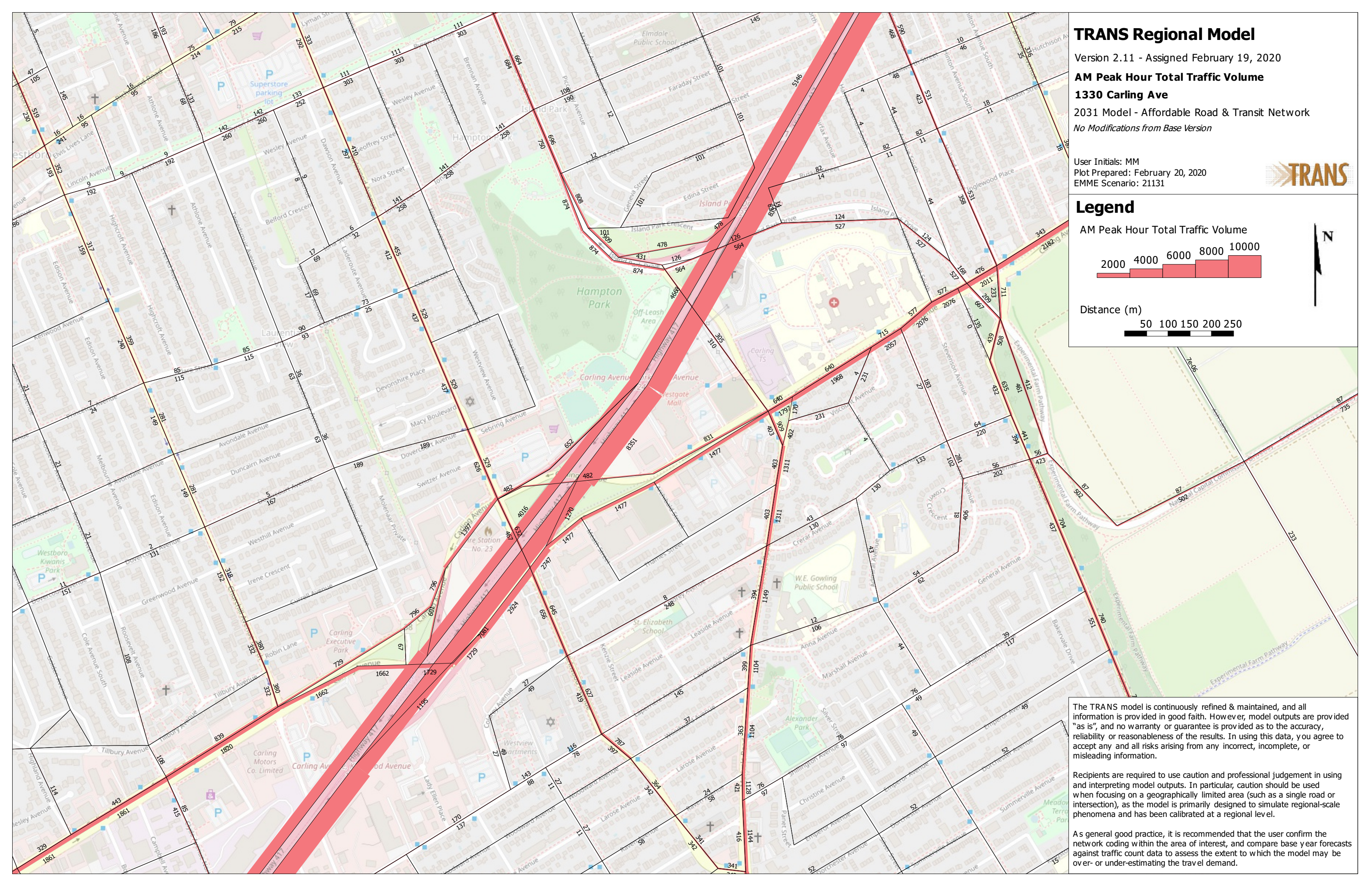
Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.



# TRANS Regional Model

Version 2.13 - Assigned December 11, 2019

## AM Peak Hour Total Traffic Volume

### 1330 Carling Ave

2011 Model - Base Scenario

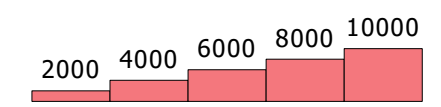
No Modifications from Base Version

User Initials: MM  
Plot Prepared: February 20, 2020  
EMME Scenario: 21311

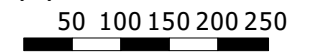


## Legend

AM Peak Hour Total Traffic Volume



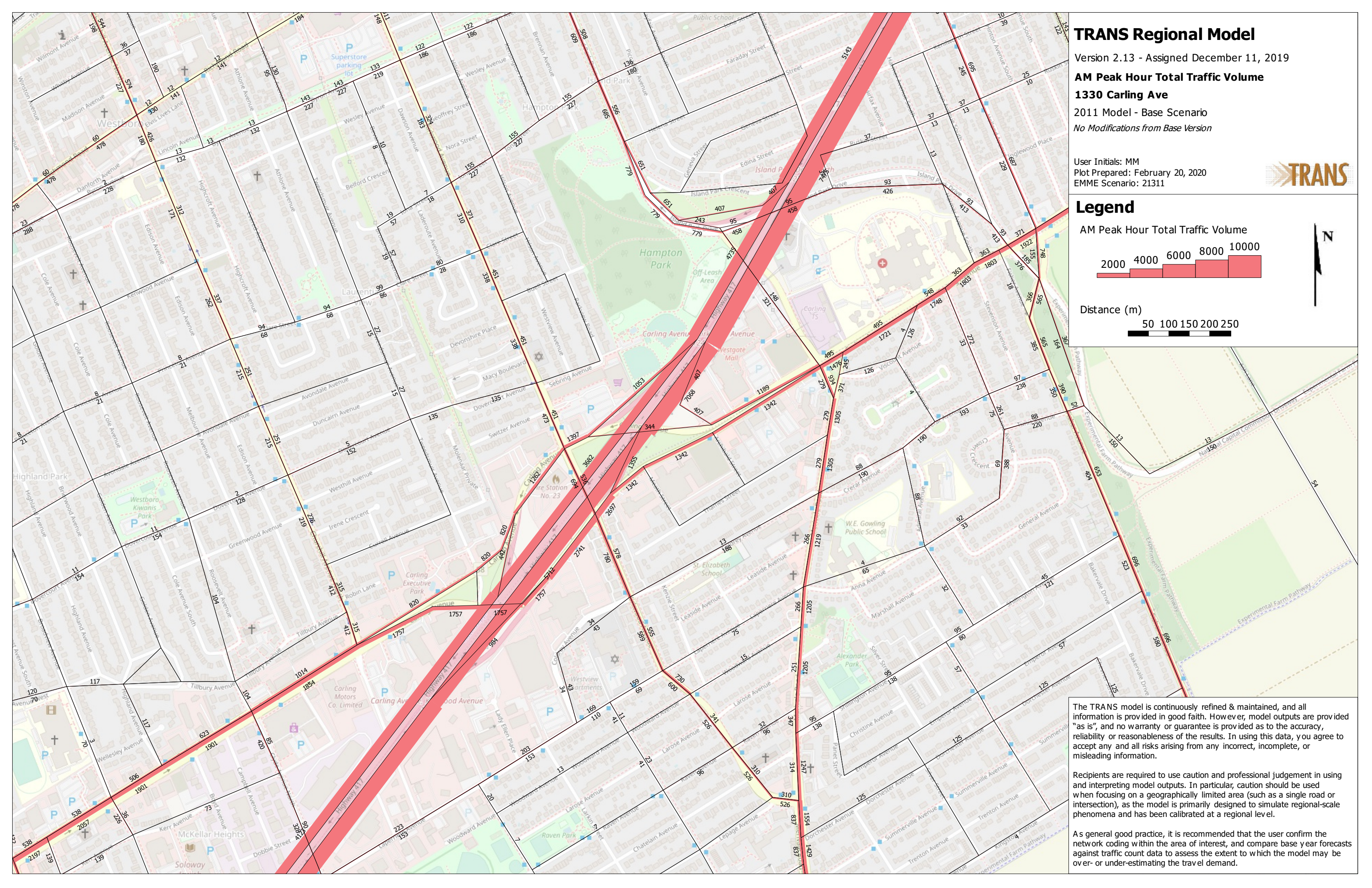
Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.



# Appendix F

Synchro Worksheets – 2023 Future Background Conditions

DRAFT



Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

05-01-2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	1517	211	286	266	0	0	397	355
Future Volume (vph)	0	0	0	90	1517	211	266	266	0	0	397	355
Satd. Flow (prot)	0	0	0	3216	4644	0	1688	1745	0	0	3316	1483
Flt Permitted				0.950		0.313						
Satd. Flow (perm)	0	0	0	3199	4644	0	538	1745	0	0	3316	1410
Satd. Flow (RTOR)				26								86
Lane Group Flow (vph)	0	0	0	100	1920	0	318	296	0	0	441	394
Turn Type				Perm	NA		prn+pt	NA		NA	Perm	
Protected Phases				2	2		4			7	8	
Permitted Phases				2	2		7	4		8		8
Detector Phase				2	2		7	4		8		8

Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.3	40.3	14.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	58.0	58.0	24.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
Total Split (%)	48.3%	48.3%	20.0%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.6	2.6	2.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
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	0.0
Total Lost Time (s)	6.3	6.3	6.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead			Lead			Lag		Lag	
Lead-Lag Optimize?			Yes			Yes			Yes		Yes	
Recall Mode			None			None			Min		Min	
Act Effct Green (s)	53.4	53.4	54.1	54.3	54.3	54.3	54.3	54.3	30.3	30.3	30.3	30.3
Actuated G/C Ratio	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.25	0.25	0.25	0.25
v/c Ratio	0.07	0.92	0.78	0.38	0.38	0.38	0.38	0.38	0.53	0.53	0.53	0.53
Control Delay	16.2	35.5	37.9	23.2	23.2	23.2	23.2	23.2	40.9	40.9	40.9	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	35.5	37.9	23.2	23.2	23.2	23.2	23.2	40.9	40.9	40.9	40.9
LOS	B	D	D	C	C	C	C	C	D	D	D	E
Approach Delay			34.6			30.8			52.4		52.4	
Approach LOS			C			C			D		D	
Queue Length 50th (m)	5.0	158.1	63.4	57.8	57.8	57.8	57.8	57.8	46.3	46.3	46.3	72.5
Queue Length 95th (m)	8.7	#192.7	m#91.5	m#83.3	m#83.3	m#83.3	m#83.3	m#83.3	62.3	62.3	#129.9	
Internal Link Dist (m)		193.0				139.1						
Turn Bay Length (m)			341.6			131.1						
Base Capacity (vph)			38.0			30.0						
Starvation Cap Reductn			1423	2081	408	814	884	439				
Spillback Cap Reductn			0	0	0	0	0	0				
Storage Cap Reductn			0	0	0	0	0	0				
Reduced v/c Ratio			0.07	0.92	0.78	0.36	0.36	0.36	0.50	0.50	0.50	0.90

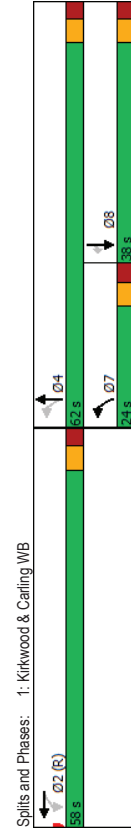
Intersection Summary	
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	66 (55%), Referenced to phase 2/WBTL Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

06-01-2020



Maximum v/c Ratio:	0.94
Intersection Signal Delay:	38.2
Intersection LOS:	D
ICU Level of Service F	
Intersection Capacity Utilization:	94.0%
Analysis Period (min):	15
Description:	As per the signal timing plan provided February 12, 2020.
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 1: Kirkwood & Carling WB	
Phase	Duration (s)
Ø2 (R)	59.5 s
Ø4	62.5 s
Ø7	24.5 s
Ø8	38.5 s

Lanes, Volumes, Timings  
2. Merivale & SC N

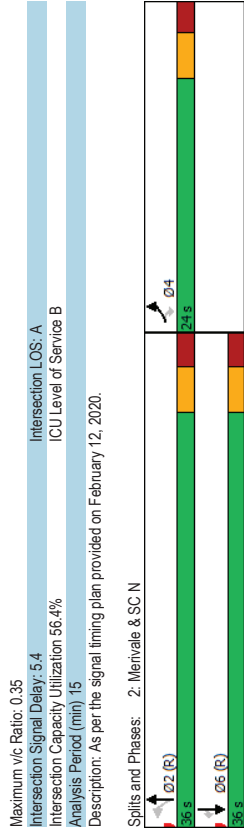
05-01-2020

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	44	14	63	212	418	62
Future Volume (vph)	44	14	63	212	418	62
Satd. Flow (prot)	1658	1483	1658	1745	1745	1483
Flt Permitted	0.950	0.487				
Satd. Flow (perm)	1641	1451	849	1745	1745	1450
Satd. Flow (RTOR)	16					69
Lane Group Flow (vph)	49	16	70	236	464	69
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Permitted Phases	4		2	2	6	6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.6	11.6	45.5	45.5	45.5	45.5
Actuated G/C Ratio	0.19	0.19	0.76	0.76	0.76	0.76
v/c Ratio	0.15	0.05	0.11	0.18	0.35	0.06
Control Delay	20.0	9.4	1.8	1.6	6.6	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	9.4	1.8	1.6	6.6	2.2
LOS	C	A	A	A	A	A
Approach Delay	17.4		1.6	6.0		
Approach LOS	B		A	A		
Queue Length 50th (m)	4.7	0.0	1.5	5.1	20.7	0.0
Queue Length 95th (m)	10.2	3.5	3.9	10.1	53.2	4.7
Internal Link Dist (m)	51.1			82.7	89.7	
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	508	456	643	1323	1323	1116
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	7	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.04	0.11	0.18	0.35	0.06

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	8 (13%), Referenced to phase 2:NBL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
2. Merivale & SC N

06-01-2020



Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

05-01-2020

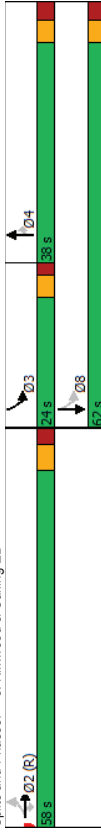
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4									
Traffic Volume (vph)	128	1816	429	0	0	0	0	440	430	315	182	0
Future Volume (vph)	128	1816	429	0	0	0	0	440	430	315	182	0
Satd. Flow (prot)	1426	4502	1483	0	0	0	0	3316	1483	0	3213	0
Flt Permitted	0.950											0.555
Satd. Flow (perm)	1426	4502	1431	0	0	0	0	3316	1483	0	1840	0
Satd. Flow (RTOR)		477										
Lane Group Flow (vph)	128	2032	477	0	0	0	0	489	478	0	552	0
Turn Type	Perm	NA	Perm					NA	Perm	pm-pt	NA	
Protected Phases	2	2	2					4		3	8	
Permitted Phases	2	2	2					4	4	8	8	
Detector Phase								4	4	3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					10.0	10.0	5.0	10.0	
Minimum Split (s)	29.2	29.2	29.2					26.1	26.1	23.1	26.1	
Total Split (s)	58.0	58.0	58.0					38.0	38.0	24.0	62.0	
Total Split (%)	48.3%	48.3%	48.3%					31.7%	31.7%	20.0%	51.7%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3	3.3	3.3	
All-Red Time (s)	2.5	2.5	2.5					2.8	2.8	1.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2					6.1	6.1	6.1	6.1	
Lead/Lag								Lag	Lag	Lead	Lead	
Lead-Lag Optimize?								Yes	Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Min	Min	Min	Min	
Act Effct Green (s)	51.8	51.8	51.8					45.3	45.3	55.9	55.9	
Actuated G/C Ratio	0.43	0.43	0.43					0.38	0.38	0.47	0.47	
v/c Ratio	0.21	1.05	0.54					0.39	0.86	1.04	0.61	
Control Delay	22.5	67.4	4.4					28.4	50.7	35.2	35.2	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	22.5	67.4	4.4					28.4	50.7	35.2	35.2	
LOS	C	E	A					C	D	D	D	
Approach Delay		53.8						39.4		35.2	35.2	
Approach LOS		D						D		D	D	
Queue Length 50th (m)	21.5	~201.3	0.0					43.8	102.4	67.2	67.2	
Queue Length 95th (m)	36.9	#232.1	19.2					58.1	#160.8	84.8	84.8	
Internal Link Dist (m)		150.0						71.9		139.1		
Turn Bay Length (m)	50.0		200.0					80.0				
Base Capacity (vph)	615	1943	888					1251	559	908	908	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.21	1.05	0.54					0.39	0.86	0.61	0.61	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 15 (13%), Referenced to phase 2EBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

06-01-2020

Maximum v/c Ratio: 1.05	Intersection LOS: D
Intersection Signal Delay: 48.0	ICU Level of Service F
Intersection Capacity Utilization 95.0%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided February 12, 2020.	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
dl Defacto Left Lane. Record with 1 though lane as a left lane.	

Splits and Phases: 3: Kirkwood & Carling EB



Lanes, Volumes, Timings  
4: Carling & SC W

05-01-2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1310	823	14	12	23
Future Volume (vph)	0	1310	823	14	12	23
Satd. Flow (prot)	0	4764	4745	0	1536	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	4764	4745	0	1519	0
Satd. Flow (RTOR)			4		26	
Lane Group Flow (vph)	0	1456	930	0	39	0
Turn Type	NA	NA	Prot			
Protected Phases	2	6		4		
Permitted Phases						
Detector Phase	2	6		4		
Switch Phase						
Minimum Initial (s)	10.0	10.0		5.0		
Minimum Split (s)	15.3	42.3		38.1		
Total Split (s)	81.0	81.0		39.0		
Total Split (%)	67.5%	67.5%		32.5%		
Yellow Time (s)	3.7	3.7		3.0		
All-Red Time (s)	1.6	1.6		3.1		
Lost Time Adjust (s)	0.0	0.0		0.0		
Total Lost Time (s)	5.3	5.3		6.1		
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max		None		
Act Effct Green (s)	90.6	90.6		21.4		
Actuated G/C Ratio	0.76	0.76		0.18		
v/c Ratio	0.40	0.26		0.13		
Control Delay	5.6	3.9		17.7		
Queue Delay	0.0	0.0		0.0		
Total Delay	5.6	3.9		17.7		
LOS	A	A		B		
Approach Delay	5.6	3.9		17.7		
Approach LOS	A	A		B		
Queue Length 50th (m)	35.1	24.4		2.3		
Queue Length 95th (m)	m37.1	9.5		10.8		
Internal Link Dist (m)	43.8	112.1		39.0		
Turn Bay Length (m)						
Base Capacity (vph)	3596	3582		439		
Starvation Cap Reductn	0	0		0		
Spillback Cap Reductn	0	0		0		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.40	0.26		0.09		
<b>Intersection Summary</b>						
Cycle Length:	120					
Actuated Cycle Length:	120					
Offset:	38 (32%), Referenced to phase 2EBT and 6.WBT, Start of Green					
Natural Cycle:	85					
Control Type:	Actuated-Coordinated					

Lanes, Volumes, Timings  
4: Carling & SC W

06-01-2020

Maximum v/c Ratio:	0.40
Intersection Signal Delay:	5.2
Intersection LOS:	A
Intersection Capacity Utilization:	51.9%
ICU Level of Service:	A
Analysis Period (min):	15
Description:	As per the signal timing plan provided February 12, 2020.
m	Volume for 95th percentile queue is metered by upstream signal.
Splits and Phases: 4: Carling & SC W	

Lanes, Volumes, Timings  
5: Carling & SCE

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	128	1118	20	5	666	43	12	2	12	27	0	39
Future Volume (vph)	128	1118	20	5	666	43	12	2	12	27	0	39
Satd. Flow (prot)	1658	4742	0	1658	4692	0	0	1583	0	0	1658	1483
Flt Permitted	0.342			0.202			0.840				0.739	
Satd. Flow (perm)	581	4742	0	349	4692	0	0	1355	0	0	1279	1452
Satd. Flow (RTOR)	4			17			13				30	43
Lane Group Flow (vph)	142	1264	0	6	788	0	0	28	0	0	30	43
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	2	2	2	6	6	6	4	4	4	8	8	8
Detector Phase	2	2	2	6	6	6	4	4	4	8	8	8
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	10.0
Minimum Split (s)	23.6	23.6	23.6	23.6	23.6	23.6	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	83.0	83.0	83.0	83.0	83.0	83.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	69.2%	69.2%	69.2%	69.2%	69.2%	69.2%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	1.9	4.0	4.0	4.0	4.0	4.0	4.0
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	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	7.0	7.0	7.0	7.0	7.0	7.0

Lead/Lag Optimize?

Recall Mode	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	97.9	97.9	97.9	14.0	14.0	14.0	14.0
Actuated G/C Ratio	0.82	0.82	0.82	0.12	0.12	0.12	0.12
v/c Ratio	0.30	0.33	0.02	0.21	0.17	0.20	0.21
Control Delay	3.5	1.9	5.2	3.6	29.9	47.9	14.1
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	3.5	1.9	5.2	3.6	29.9	47.9	14.1
LOS	A	A	A	A	C	D	B
Approach Delay	2.1	3.7	29.9	28.0			
Approach LOS	A	A	C	C			
Queue Length 50th (m)	3.4	11.3	0.3	13.4	3.3	6.8	0.0
Queue Length 95th (m)	5.2	12.0	m1.3	19.3	10.2	13.3	9.0
Internal Link Dist (m)	112.1		81.1	65.8			63.4
Turn Bay Length (m)	65.0		30.0				
Base Capacity (vph)	474	3870	285	3831	348	319	395
Starvation Cap Reductn	0	585	0	1552	0	0	0
Spillback Cap Reductn	0	235	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.38	0.02	0.35	0.08	0.09	0.11

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

1330 Carling 815 Archibald AM Peak Hour 2023 Future Background

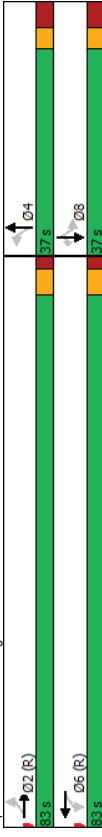
Synchro 10 Light Report  
Page 13

Lanes, Volumes, Timings  
5: Carling & SCE

06-01-2020

Maximum v/c Ratio: 0.33	Intersection LOS: A
Intersection Signal Delay: 3.8	ICU Level of Service B
Intersection Capacity Utilization 59.0%	
Analysis Period (min): 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Carling & SCE



1330 Carling 815 Archibald AM Peak Hour 2023 Future Background

Synchro 10 Light Report  
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Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

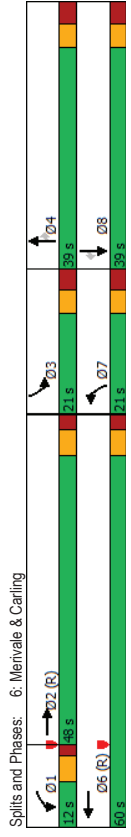
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	0	1059	99	157	475	40	109	237	419	37	264	132
Future Volume (vph)	0	1059	99	157	475	40	109	237	419	37	264	132
Satd. Flow (prot)	0	4682	0	1658	4685	0	1658	1745	1483	1658	1745	1483
Flt Permitted		0.950		0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	0	4682	0	1647	4685	0	1639	1745	1437	1640	1745	1437
Satd. Flow (RTOR)	14			14			285					147
Lane Group Flow (vph)	0	1287	0	174	572	0	121	263	466	41	293	147
Turn Types	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	2	1	6	7	4	4	3	8				
Permitted Phases												
Detector Phase	2	1	6	7	4	4	3	8				
Switch Phase												
Minimum Initial (s)	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	11.3	38.7	11.3	38.7	38.7
Total Split (s)	48.0	12.0	60.0	21.0	39.0	21.0	39.0	21.0	39.0	21.0	39.0	39.0
Total Split (%)	40.0%	10.0%	50.0%	17.5%	32.5%	17.5%	32.5%	17.5%	32.5%	17.5%	32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.4	3.4	3.0	3.4	3.4	3.4	3.4	3.4
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	0.0
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.3	6.7	6.7	6.3	6.7	6.7
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	42.0	15.1	62.5	12.7	32.5	12.7	32.5	12.7	32.5	12.7	32.5	32.5
Actuated G/C Ratio	0.35	0.13	0.52	0.11	0.27	0.11	0.27	0.27	0.27	0.07	0.22	0.22
v/c Ratio	0.78	0.84	0.23	0.69	0.56	0.78	0.36	0.78	0.35	0.36	0.78	0.35
Control Delay	29.9	84.6	16.8	71.5	42.3	25.1	57.7	53.1	9.9	53.1	9.9	9.9
Queue Delay	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	84.6	16.8	71.5	42.3	25.1	57.7	53.9	9.9	53.9	9.9	9.9
LOS	C	F	B	E	D	C	E	D	C	E	D	A
Approach Delay	31.8			32.6			37.0				40.8	
Approach LOS	C			C			D				D	
Queue Length 50th (m)	79.7	41.0	25.7	27.6	54.2	41.6	9.5	54.0	6.4	9.5	54.0	6.4
Queue Length 95th (m)	98.8	#107.0	37.8	47.1	77.3	81.2	0.0	63.8	18.8	0.0	63.8	18.8
Internal Link Dist (m)	81.1			189.4			304.1				82.7	
Turn Bay Length (m)	70.0			50.0			30.0				50.0	
Base Capacity (vph)	1647	208	2445	203	492	610	203	469	494	203	469	494
Starvation Cap Reductn	214	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.84	0.23	0.60	0.53	0.76	0.20	0.69	0.30	0.20	0.69	0.30

Intersection Summary	
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	52 (43%), Referenced to phase 2EBT and 6WBT, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
6: Merivale & Carling

06-01-2020

Maximum v/c Ratio:	0.84
Intersection Signal Delay:	34.6
Intersection LOS:	C
Intersection Capacity Utilization:	79.4%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



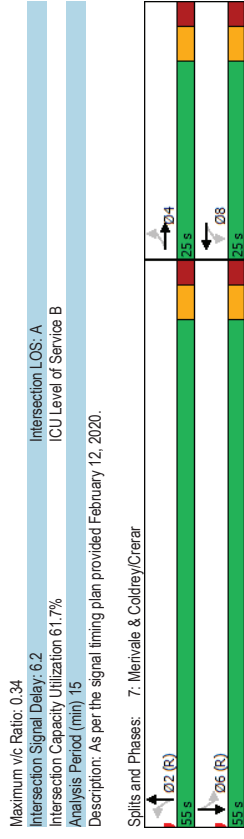
Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	15	17	29	10	21	46	29	673	11	23	483	37
Traffic Volume (vph)	15	17	29	10	21	46	29	673	11	23	483	37
Future Volume (vph)	0	1599	0	0	1580	0	0	3301	0	0	3267	0
Satd. Flow (prot)	0.915	0.948					0.914					0.904
Flt Permitted	0	1480	0	0	1506	0	0	3022	0	0	2959	0
Satd. Flow (RTOR)	32		51				3				17	
Lane Group Flow (vph)	0	68	0	0	85	0	0	792	0	0	604	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8	8	2	2	2	6	6	6
Detector Phase	4	4		8	8	8	2	2	2	6	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	10.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8	33.8
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.8	11.8	11.8	11.8	11.8	11.8	60.9	60.9	60.9	60.9	60.9	60.9
Actuated G/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio	0.28	0.32	0.32	0.32	0.32	0.32	0.34	0.27	0.27	0.27	0.27	0.27
Control Delay	20.6	20.6	17.5	17.5	17.5	5.1	5.1	4.5	4.5	4.5	4.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	20.6	17.5	17.5	17.5	5.1	5.1	4.5	4.5	4.5	4.5	4.5
LOS	C	C	B	B	B	A	A	A	A	A	A	A
Approach Delay	20.6	20.6	17.5	17.5	17.5	5.1	5.1	4.5	4.5	4.5	4.5	4.5
Approach LOS	C	C	B	B	B	A	A	A	A	A	A	A
Queue Length 50th (m)	5.0	4.7	4.7	4.7	4.7	18.5	18.5	12.6	12.6	12.6	12.6	12.6
Queue Length 95th (m)	13.9	14.8	14.8	14.8	14.8	40.3	40.3	28.5	28.5	28.5	28.5	28.5
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	113.1	113.1	304.1	304.1	304.1	304.1	304.1
Turn Bay Length (m)												
Base Capacity (vph)	379	400	400	400	400	2301	2301	2257	2257	2257	2257	2257
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.21	0.21	0.21	0.21	0.34	0.34	0.27	0.27	0.27	0.27	0.27
<b>Intersection Summary</b>												
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 46 (58%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

06-01-2020



Lanes, Volumes, Timings

8: Archibald & Carling EB/Carling & Carling WB

05-01-2020

Lane Group	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations											
Traffic Volume (vph)	0	1141	0	0	0	0	758	0	102	0	0
Future Volume (vph)	0	1141	0	0	0	0	758	0	102	0	0
Satd. Flow (prot)	0	4764	0	0	0	0	3382	0	1510	0	0
FIT Permitted											
Satd. Flow (perm)	0	4764	0	0	0	0	3382	0	1510	0	0
Lane Group Flow (vph)	0	1268	0	0	0	0	842	0	113	0	0
Sign Control	Free										
Intersection Summary											
Control Type: Unsignalized	ICU Level of Service A										
Intersection Capacity Utilization	36.6%										
Analysis Period (min)	15										

HCM 2010 TWSC

8: Archibald & Carling EB/Carling & Carling WB

06-01-2020

Intersection	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
In/Delay, s/veh 1.7											
Movement											
Lane Configurations	←←←										
Traffic Vol. veh/h	0	1141	0	0	0	0	758	0	102	0	0
Future Vol. veh/h	0	1141	0	0	0	0	758	0	102	0	0
Conflicting Peds. #/hr	0	0	21	0	0	0	0	0	0	0	0
Sign Control	Free										
RT Channelized	- None - None - None -										
Storage Length	- - - - -										
Veh in Median Storage. #	- 0 - - - - -										
Grade, %	- 0 - - - - -										
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1268	0	0	0	0	842	0	113	0	0
Major/Minor Major1 Minor1											
Conflicting Flow All	-	0	0	-	-	-	-	-	-	-	655
Stage 1	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	-	-	-	-	0	350	-
Stage 1	0	-	-	-	-	-	-	-	0	-	-
Stage 2	0	-	-	-	-	-	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	-	-	344
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-
Approach EB NB											
HCM Control Delay, s	0	-	-	-	-	-	-	-	20.5	-	-
HCM LOS	-	-	-	-	-	-	-	-	C	-	-
Minor Lane/Major Mvmt NBLn1 EBT EBR											
Capacity (veh/h)	-	-	-	-	-	-	-	-	344	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-	0.329	-	-
HCM Control Delay (s)	-	-	-	-	-	-	-	-	20.5	-	-
HCM Lane LOS	-	-	-	-	-	-	-	-	C	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-	-	-	-	1.4	-	-



Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

05-01-2020

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations												
Traffic Volume (vph)	0	0	0	175	2316	281	204	510	0	0	472	389
Future Volume (vph)	0	0	0	175	2316	281	204	510	0	0	472	389
Satd. Flow (prot)	0	0	0	3216	4652	0	1658	1745	0	0	3316	1483
Flt Permitted				0.950		0.224						
Satd. Flow (perm)	0	0	0	3182	4652	0	387	1745	0	0	3316	1412
Satd. Flow (RTOR)				25								86
Lane Group Flow (vph)	0	0	0	194	2885	0	227	567	0	0	524	482
Turn Type				Perm	NA		prn+pt	NA		NA	Perm	
Protected Phases				2	2		7	4			8	
Permitted Phases				2	2		7	4			8	
Detector Phase				2	2		7	4			8	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.3	40.3	40.3	14.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	67.0	67.0	67.0	20.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Total Split (%)	55.8%	55.8%	55.8%	16.7%	44.2%	44.2%	44.2%	44.2%	44.2%	44.2%	44.2%	44.2%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.6	2.6	2.6	2.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
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	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead			Lead			Lag		Lag
Lead/Lag Optimize?				Yes			Yes			Yes		Yes
Recall Mode				None			None			Min		Min
Act Effct Green (s)	60.7	60.7	60.7	46.8	47.0	47.0	47.1	47.1	47.1	27.1	27.1	27.1
Actuated G/C Ratio	0.51	0.51	0.51	0.39	0.39	0.39	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.12	1.22	1.22	0.77	0.83	0.83	0.70	0.70	0.70	1.12	1.12	1.12
Control Delay	15.9	131.6	131.6	46.2	48.8	48.8	48.6	48.6	48.6	118.2	118.2	118.2
Queue Delay	0.0	0.0	0.0	0.0	12.1	12.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	131.6	131.6	46.2	60.9	60.9	48.6	48.6	48.6	118.2	118.2	118.2
LOS	B	F	F	D	E	E	D	E	D	D	D	F
Approach Delay		124.3			56.7					80.0		
Approach LOS		F			E					F		
Queue Length 50th (m)	11.9	-305.9		43.8	136.9		60.1	-101.0		60.1	-101.0	
Queue Length 95th (m)	18.2	#332.8		m#72.4	#184.0		79.1	#163.3		79.1	#163.3	
Internal Link Dist (m)		193.0		341.6			139.1			131.1		
Turn Bay Length (m)		38.0										30.0
Base Capacity (vph)	1609	2365		297	683		748	385		748	385	0
Starvation Cap Reductn	0	0		0	103		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.12	1.22	1.22	0.76	0.98	0.98	0.70	0.70	0.70	1.12	1.12	1.12

Intersection Summary	
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	39 (33%), Referenced to phase 2/WBTL Start of Green
Natural Cycle:	130
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

06-01-2020

Maximum v/c Ratio:	1.22
Intersection Signal Delay:	104.4
ICU Level of Service H	
Intersection Capacity Utilization:	109.2%
Analysis Period (min):	15
Description:	As per the signal timing plan provided February 12, 2020.
~	Volume exceeds capacity, queue is theoretically infinite.
~	Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer.
~	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.



Splits and Phases: 1: Kirkwood & Carling WB

Lanes, Volumes, Timings  
2: Merivale & SC N

05-01-2020

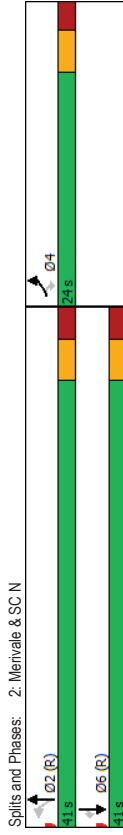
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	82	60	64	203	466	90
Traffic Volume (vph)	82	60	64	203	466	90
Future Volume (vph)	1658	1483	1658	1745	1745	1483
Satd. Flow (prot)	0.950	0.444				
Flt Permitted	1595	1451	774	1745	1745	1448
Satd. Flow (perm)	67					100
Lane Group Flow (vph)	91	67	71	226	518	100
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4		2	2	6	
Permitted Phases	4	4	2	2	6	6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	41.0	41.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%	63.1%	63.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.7	11.7	46.1	46.1	46.1	46.1
Actuated G/C Ratio	0.18	0.18	0.71	0.71	0.71	0.71
v/c Ratio	0.31	0.21	0.13	0.18	0.42	0.09
Control Delay	25.0	7.8	4.1	4.3	7.4	1.8
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0
Total Delay	25.0	7.9	4.1	4.3	7.5	1.8
LOS	C	A	A	A	A	A
Approach Delay	17.8		4.3	6.6		
Approach LOS	B		A	A		
Queue Length 50th (m)	10.0	0.0	1.1	3.7	24.1	0.0
Queue Length 95th (m)	18.3	7.6	15.4	52.0	60.5	5.3
Internal Link Dist (m)	51.1		82.7	89.7		
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	469	458	549	1238	1238	1057
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	82	0	0	127	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.13	0.18	0.47	0.09

Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	27 (42%), Referenced to phase 2:NBLT and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
2: Merivale & SC N

06-01-2020

Maximum v/c Ratio:	0.42
Intersection Signal Delay:	7.6
Intersection LOS:	A
Intersection Capacity Utilization:	57.3%
ICU Level of Service B	
Analysis Period (min):	15
Description:	As per the signal timing plan provided on February 12, 2020.
m	Volume for 95th percentile queue is metered by upstream signal.



Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	0	0	0	0	4	4	4	4	4
Traffic Volume (vph)	405	1246	422	0	0	0	0	313	328	406	249	0
Future Volume (vph)	405	1246	422	0	0	0	0	313	328	406	249	0
Satd. Flow (prot)	1426	4493	1483	0	0	0	0	3316	1483	0	3216	0
Flt Permitted	0.950	0.998									0.601	
Satd. Flow (perm)	1426	4493	1429	0	0	0	0	3316	1461	0	1992	0
Satd. Flow (RTOR)			382									
Lane Group Flow (vph)	405	1429	469	0	0	0	0	348	364	0	728	0
Turn Type	Perm	NA	Perm				NA	Perm	pm-pt	NA		
Protected Phases	2	2	2				4	4	3	8		
Permitted Phases	2	2	2				4	4	3	8		
Detector Phase							4	4	3	8		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0				10.0	10.0	5.0	10.0		
Minimum Split (s)	29.2	29.2	29.2				26.1	26.1	23.1	26.1		
Total Split (s)	61.0	61.0	61.0				29.0	29.0	30.0	59.0		
Total Split (%)	50.8%	50.8%	50.8%				24.2%	24.2%	25.0%	49.2%		
Yellow Time (s)	3.7	3.7	3.7				3.3	3.3	3.3	3.3		
All-Red Time (s)	2.5	2.5	2.5				2.8	2.8	1.8	2.8		
Lost Time Adjust (s)	0.0	0.0	0.0				0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.2	6.2	6.2				6.1	6.1	6.1	6.1		
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	C-Max				Min	Min	Min	Min		
Act Effct Green (s)	54.8	54.8	54.8				42.3	42.3	42.3	52.9		
Actuated G/C Ratio	0.46	0.46	0.46				0.35	0.35	0.35	0.44		
v/c Ratio	0.62	0.70	0.55				0.30	0.71	1.18d			
Control Delay	30.0	28.2	7.0				29.0	42.4	19.9			
Queue Delay	0.8	0.3	0.0				0.0	0.0	0.0			
Total Delay	30.8	28.5	7.0				29.0	42.4	19.9			
LOS	C	C	A				C	D	B			
Approach Delay		24.5					35.8		19.9			
Approach LOS		C					D		B			
Queue Length 50th (m)	82.3	101.5	11.6				31.0	73.4	74.1			
Queue Length 95th (m)	121.5	119.7	38.1				43.0	108.9	92.7			
Internal Link Dist (m)		150.0		323.9			71.9		139.1			
Turn Bay Length (m)	50.0		200.0				80.0					
Base Capacity (vph)	651	2051	860				1168	515	924			
Starvation Cap Reductn	0	0	0				0	0	0			
Spillback Cap Reductn	75	159	0				0	0	0			
Storage Cap Reductn	0	0	0				0	0	0			
Reduced v/c Ratio	0.70	0.76	0.55				0.30	0.71	0.79			

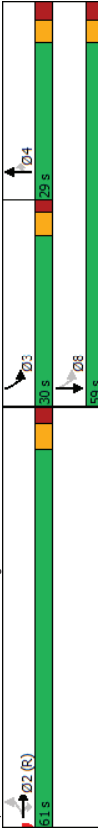
Intersection Summary	
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	81 (68%), Referenced to phase 2EBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

06-01-2020

Maximum v/c Ratio:	0.79
Intersection Signal Delay:	25.8
Intersection LOS:	C
Intersection Capacity Utilization:	66.2%
ICU Level of Service:	E
Analysis Period (min):	15
Description:	As per the signal timing plan provided February 12, 2020.
Defacto Left Lane:	Recode with 1 though lane as a left lane.

Splits and Phases: 3: Kirkwood & Carling EB



Lanes, Volumes, Timings  
4: Carling & SC W

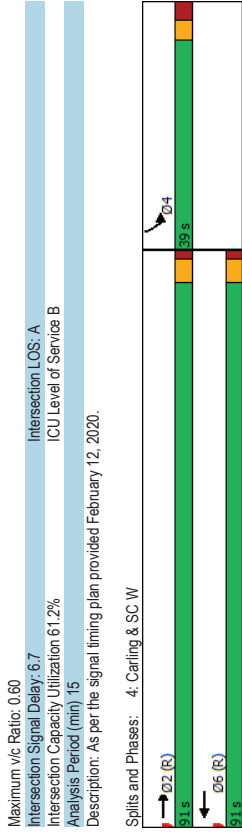
05-01-2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1000	1980	5	35	38
Future Volume (vph)	0	1000	1980	5	35	38
Satd. Flow (prot)	0	4764	4763	0	1564	0
Flt Permitted				0.976		
Satd. Flow (perm)	0	4764	4763	0	1533	0
Satd. Flow (RTOR)		1		10		
Lane Group Flow (vph)	0	1111	2206	0	81	0
Turn Type	NA	NA	Prot			
Protected Phases	2	6		4		
Permitted Phases						
Detector Phase	2	6		4		
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0			
Minimum Split (s)	15.3	59.3	38.1			
Total Split (s)	91.0	91.0	39.0			
Total Split (%)	70.0%	70.0%	30.0%			
Yellow Time (s)	3.7	3.7	3.0			
All-Red Time (s)	1.6	1.6	3.1			
Lost Time Adjust (s)	0.0	0.0	0.0			
Total Lost Time (s)	5.3	5.3	6.1			
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None			
Act Effct Green (s)	99.8	99.8	22.3			
Actuated G/C Ratio	0.77	0.77	0.17			
v/c Ratio	0.30	0.60	0.29			
Control Delay	7.0	5.4	40.0			
Queue Delay	0.0	0.0	0.0			
Total Delay	7.0	5.4	40.0			
LOS	A	A	D			
Approach Delay	7.0	5.4	40.0			
Approach LOS	A	A	D			
Queue Length 50th (m)	41.8	17.8	14.5			
Queue Length 95th (m)	49.6	57.2	28.3			
Internal Link Dist (m)	43.8	112.1	39.0			
Turn Bay Length (m)						
Base Capacity (vph)	3658	3658	403			
Starvation Cap Reductn	0	111	0			
Spillback Cap Reductn	0	0	0			
Storage Cap Reductn	0	0	0			
Reduced v/c Ratio	0.30	0.62	0.20			
<b>Intersection Summary</b>						
Cycle Length: 130						
Actuated Cycle Length: 130						
Offset: 107 (82%), Referenced to phase 2:EBT and 6:WBT, Start of Green						
Natural Cycle: 100						
Control Type: Actuated-Coordinated						

1330 Carling 815 Archibald PM Peak Hour 2023 Future Background

Lanes, Volumes, Timings  
4: Carling & SC W

06-01-2020



1330 Carling 815 Archibald PM Peak Hour 2023 Future Background

Lanes, Volumes, Timings  
5: Carling & SCE

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	151	734	11	12	1795	84	15	1	17	79	2	92
Future Volume (vph)	151	734	11	12	1795	84	15	1	17	79	2	92
Satd. Flow (prot)	1658	4743	0	1658	4705	0	0	1564	0	0	1663	1483
Flt Permitted	0.049			0.328			0.851				0.704	
Satd. Flow (perm)	86	4743	0	545	4705	0	0	1342	0	0	1206	1415
Satd. Flow (RTOR)	3			7			19				90	102
Lane Group Flow (vph)	168	828	0	13	2087	0	0	37	0	0	90	102
Turn Type	pm-pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Permitted Phases	5	2		6	6		4			8		8
Detector Phase	5	2		6	6		4			8		8
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0			10.0		10.0
Minimum Split (s)	10.6	23.6		23.6	23.6		37.0			37.0		37.0
Total Split (s)	24.0	93.0		69.0	69.0		37.0			37.0		37.0
Total Split (%)	18.5%	71.5%		53.1%	53.1%		28.5%			28.5%		28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0			3.0		3.0
All-Red Time (s)	1.9	1.9		1.9	1.9		4.0			4.0		4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0		0.0
Total Lost Time (s)	5.6	5.6		5.6	5.6		7.0			7.0		7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes		Yes
Recall Mode	None	C-Max		C-Max	C-Max		None			None		None
Act Effct Green (s)	95.0	95.0		76.4	76.4		22.4			22.4		22.4
Actuated G/C Ratio	0.73	0.73		0.59	0.59		0.17			0.17		0.17
v/c Ratio	0.77	0.24		0.04	0.75		0.15			0.43		0.31
Control Delay	56.1	2.5		5.1	12.2		25.2			52.1		10.0
Queue Delay	0.0	0.0		0.0	0.9		0.0			0.0		0.0
Total Delay	56.1	2.6		5.1	13.1		25.2			52.1		10.0
LOS	E	A		A	B		C			D		B
Approach Delay		11.6			13.1		25.2			29.7		
Approach LOS		B			B		C			C		
Queue Length 50th (m)	22.8	6.2		0.4	182.7		3.6			19.3		0.0
Queue Length 95th (m)	35.7	7.3		m1.1	218.5		12.9			35.3		14.2
Internal Link Dist (m)		112.1			81.1		65.8			63.4		
Turn Bay Length (m)	65.0			30.0								
Base Capacity (vph)	285	3465		320	2767		324			278		405
Starvation Cap Reductn	0	0		0	373		0			0		0
Spillback Cap Reductn	0	422		0	0		1			0		0
Storage Cap Reductn	0	0		0	0		0			0		0
Reduced v/c Ratio	0.59	0.27		0.04	0.87		0.11			0.32		0.25

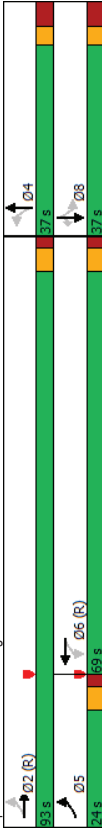
Intersection Summary	
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	3 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
5: Carling & SCE

06-01-2020

Maximum v/c Ratio:	0.77
Intersection Signal Delay:	13.7
Intersection LOS:	B
Intersection Capacity Utilization:	88.0%
ICU Level of Service:	E
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carling & SCE



Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

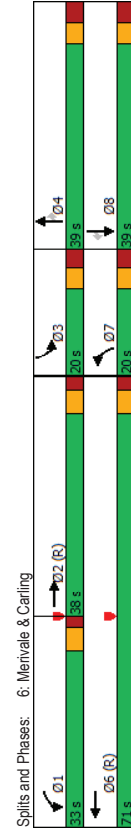
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	700	132	438	1661	50	103	218	235	72	326	129
Traffic Volume (vph)	0	700	132	438	1661	50	103	218	235	72	326	129
Future Volume (vph)	0	4611	0	1658	4733	0	1658	1745	1483	1658	1745	1483
Satd. Flow (prot)	0	0.950	0	0.950	0.950	0	0.950	0.950	0.950	0.950	0.950	0.950
Flt Permitted	0	4611	0	1639	4733	0	1613	1745	1419	1622	1745	1399
Satd. Flow (perm)	0	28	0	5	5	0	114	242	261	80	362	143
Satd. Flow (RTOR)	0	925	0	487	1902	0	114	242	261	80	362	143
Lane Group Flow (vph)	0	925	0	487	1902	0	114	242	261	80	362	143
Turn Type	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	2	1	6	7	4	4	4	4	4	3	8	8
Permitted Phases	2	1	6	7	4	4	4	4	4	3	8	8
Detector Phase	2	1	6	7	4	4	4	4	4	3	8	8
Switch Phase	2	1	6	7	4	4	4	4	4	3	8	8
Minimum Initial (s)	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	11.3	38.7	11.3	38.7	38.7
Total Split (s)	38.0	33.0	71.0	20.0	39.0	39.0	20.0	39.0	39.0	20.0	39.0	39.0
Total Split (%)	29.2%	25.4%	54.6%	15.4%	30.0%	30.0%	15.4%	30.0%	30.0%	15.4%	30.0%	30.0%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.0	3.4	3.0	3.4	3.0	3.4	3.4	3.4
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	0.0
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.7	6.7	6.7	6.3	6.7	6.7
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	32.0	31.2	68.6	12.4	34.0	34.0	11.1	30.0	30.0	30.0	30.0	30.0
Actuated G/C Ratio	0.25	0.24	0.53	0.10	0.26	0.26	0.09	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.80	1.23	0.76	0.72	0.53	0.46	0.57	0.90	0.34	0.34	0.34	0.34
Control Delay	46.0	163.8	27.5	81.7	46.8	7.4	66.0	72.4	15.2	15.2	15.2	15.2
Queue Delay	3.3	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	163.8	31.3	81.7	46.8	7.4	66.0	100.3	15.3	15.3	15.3	15.3
LOS	D	F	C	F	D	A	E	F	F	B	B	B
Approach Delay	49.3	58.3	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6
Approach LOS	D	E	E	E	E	E	E	E	E	E	E	E
Queue Length 50th (m)	81.5	~165.5	144.6	28.5	53.2	0.0	19.9	73.8	7.4	7.4	7.4	7.4
Queue Length 95th (m)	97.8	#231.0	164.8	#52.0	81.5	21.6	36.2	#133.0	27.9	27.9	27.9	27.9
Internal Link Dist (m)	81.1	189.4	304.1	304.1	304.1	304.1	304.1	304.1	304.1	304.1	304.1	304.1
Turn Bay Length (m)	70.0	70.0	70.0	50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	1156	397	2499	174	457	564	174	433	440	433	440	440
Starvation Cap Reductn	147	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	504	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.23	0.95	0.66	0.53	0.46	0.46	1.03	0.33	0.33	0.33	0.33

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 15(12%), Referenced to phase 2EBT and 6WBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

Maximum v/c Ratio: 1.23	Intersection LOS: E
Intersection Signal Delay: 55.7	ICU Level of Service F
Intersection Capacity Utilization 95.3%	
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	68	19	27	56	27	12	485	9	43	766	50
Future Volume (vph)	22	68	19	27	56	27	12	485	9	43	766	50
Satd. Flow (prot)	0	1684	0	0	1682	0	0	3300	0	0	3269	0
Flt Permitted	0.904			0.881				0.929				0.898
Satd. Flow (perm)	0	1537	0	0	1481	0	0	3069	0	0	2943	0
Satd. Flow (RTOR)	12			19			4				15	
Lane Group Flow (vph)	0	121	0	0	122	0	0	562	0	0	955	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	4	4	8	8	8	2	2	2	6	6	6	6
Detector Phase	4	4	8	8	8	2	2	2	6	6	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	10.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Total Split (s)	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5	60.2	60.2	60.2	60.2	60.2	60.2	60.2
Actuated G/C Ratio	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.48	0.48	0.49	0.49	0.49	0.24	0.24	0.43	0.43	0.43	0.43	0.43
Control Delay	33.4	33.4	32.0	32.0	32.0	4.8	4.8	6.0	6.0	6.0	6.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	33.4	32.0	32.0	32.0	4.8	4.8	6.0	6.0	6.0	6.0	6.0
LOS	C	C	C	C	C	A	A	A	A	A	A	A
Approach Delay	33.4	33.4	32.0	32.0	32.0	4.8	4.8	6.0	6.0	6.0	6.0	6.0
Approach LOS	C	C	C	C	C	A	A	A	A	A	A	A
Queue Length 50th (m)	15.6	15.6	14.8	14.8	14.8	12.5	12.5	25.4	25.4	25.4	25.4	25.4
Queue Length 95th (m)	27.7	27.7	27.2	27.2	27.2	26.6	26.6	52.0	52.0	52.0	52.0	52.0
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	113.1	113.1	304.1	304.1	304.1	304.1	304.1
Turn Bay Length (m)												
Base Capacity (vph)	378	378	369	369	369	2309	2309	2217	2217	2217	2217	2217
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.32	0.33	0.33	0.33	0.24	0.24	0.43	0.43	0.43	0.43	0.43

Intersection Summary  
Cycle Length: 80  
Actuated Cycle Length: 80  
Offset: 63 (79%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green  
Natural Cycle: 60  
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

06-01-2020

Maximum v/c Ratio: 0.49	Intersection LOS: A
Intersection Signal Delay: 9.3	ICU Level of Service C
Intersection Capacity Utilization 72.7%	
Analysis Period (min) 15	

Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 7: Merivale & Coldrey/Crerar



Lanes, Volumes, Timings

8: Archibald & Carling EB/Carling & Carling WB

05-01-2020

Lane Group	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations											
Traffic Volume (vph)	0	900	0	0	0	0	1927	0	73	0	0
Future Volume (vph)	0	900	0	0	0	0	1927	0	73	0	0
Satd. Flow (prot)	0	4764	0	0	0	0	3382	0	1510	0	0
Flt Permitted											
Satd. Flow (perm)	0	4764	0	0	0	0	3382	0	1510	0	0
Lane Group Flow (vph)	0	1000	0	0	0	0	2141	0	81	0	0
Sign Control	Free										
Intersection Summary											
Control Type: Unsignalized											
Intersection Capacity Utilization 50.8%											
Analysis Period (min) 15											
	ICU Level of Service A										

HCM 2010 TWSC

8: Archibald & Carling EB/Carling & Carling WB

06-01-2020

Intersection	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
In/Delay, s/veh	1.1										
Movement	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations											
Traffic Vol. veh/h	0	900	0	0	0	0	1927	0	73	0	0
Future Vol. veh/h	0	900	0	0	0	0	1927	0	73	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free										
RT Channelized	None										
Storage Length	-										
Veh in Median Storage. #	-										
Grade, %	-										
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1000	0	0	0	0	2141	0	81	0	0
Major/Minor	Major1 Minor1										
Conflicting Flow All	-										
Stage 1	-										
Stage 2	-										
Critical Hdwy	-										
Critical Hdwy Stg 1	-										
Critical Hdwy Stg 2	-										
Follow-up Hdwy	-										
Pot Cap-1 Maneuver	0										
Stage 1	0										
Stage 2	0										
Platoon blocked, %	-										
Mov Cap-1 Maneuver	-										
Mov Cap-2 Maneuver	-										
Stage 1	-										
Stage 2	-										
Approach	EB NB										
HCM Control Delay, s	0										
HCM LOS	C										
Minor Lane/Major Mvmt	NBLn1	EBT	EBR								
Capacity (veh/h)	442	-	-								
HCM Lane V/C Ratio	0.184	-	-								
HCM Control Delay (s)	15	-	-								
HCM Lane LOS	C	-	-								
HCM 95th %tile Q(veh)	0.7	-	-								



# Appendix G

Synchro Worksheets – 2028 Future Background Conditions

DRAFT

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

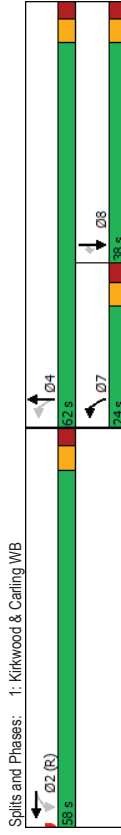
05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	92	1590	222	301	279	0	0	417	374
Future Volume (vph)	0	0	0	92	1590	222	301	279	0	0	417	374
Satd. Flow (prot)	0	0	0	3216	4644	0	1688	1745	0	0	3316	1483
Flt Permitted				0.950		0.303						
Satd. Flow (perm)	0	0	0	3199	4644	0	521	1745	0	0	3316	1410
Satd. Flow (RTOR)				27								86
Lane Group Flow (vph)	0	0	0	102	2014	0	334	310	0	0	463	416
Turn Type				Perm	NA		prn+pt	NA			NA	Perm
Protected Phases												
Permitted Phases	2	2		7	4						8	
Detector Phase	2	2		7	4						8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0						10.0	10.0
Minimum Split (s)	40.3	40.3		14.5	32.0						32.0	32.0
Total Split (s)	58.0	58.0		24.0	62.0						38.0	38.0
Total Split (%)	48.3%	48.3%		20.0%	51.7%						31.7%	31.7%
Yellow Time (s)	3.7	3.7		3.3	3.3						3.3	3.3
All-Red Time (s)	2.6	2.6		2.9	2.7						2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0						0.0	0.0
Total Lost Time (s)	6.3	6.3		6.2	6.0						6.0	6.0
Lead/Lag				Lead	Lag						Lag	Lag
Lead-Lag Optimize?				Yes	Yes						Yes	Yes
Recall Mode				None	Min						Min	Min
Act Effct Green (s)	52.5	52.5		55.0	55.2						31.2	31.2
Actuated G/C Ratio	0.44	0.44		0.46	0.46						0.26	0.26
v/c Ratio	0.07	0.98		0.82	0.39						0.54	0.97
Control Delay	16.4	45.3		41.6	23.2						40.7	71.0
Queue Delay	0.0	0.0		0.0	0.0						0.0	0.0
Total Delay	16.4	45.3		41.6	23.2						40.7	71.0
LOS	B	D		D	C						D	E
Approach Delay				43.9	32.8						55.0	
Approach LOS				D	C						E	
Queue Length 50th (m)	5.1	171.0		67.2	60.9						49.0	79.5
Queue Length 95th (m)	8.8	#209.4		m#101.5	m#6.3						65.5	#141.9
Internal Link Dist (m)	193.0			341.6	139.1						131.1	
Turn Bay Length (m)	38.0											30.0
Base Capacity (vph)	1399	2046		407	814						884	439
Starvation Cap Reductn	0	0		0	0						0	0
Spillback Cap Reductn	0	0		0	0						0	0
Storage Cap Reductn	0	0		0	0						0	0
Reduced v/c Ratio	0.07	0.98		0.82	0.38						0.52	0.95
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 66 (55%), Referenced to phase 2/WBTL Start of Green												
Natural Cycle: 100												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	92	1590	222	301	279	0	0	417	374
Future Volume (vph)	0	0	0	92	1590	222	301	279	0	0	417	374
Satd. Flow (prot)	0	0	0	3216	4644	0	1688	1745	0	0	3316	1483
Flt Permitted				0.950		0.303						
Satd. Flow (perm)	0	0	0	3199	4644	0	521	1745	0	0	3316	1410
Satd. Flow (RTOR)				27								86
Lane Group Flow (vph)	0	0	0	102	2014	0	334	310	0	0	463	416
Turn Type				Perm	NA		prn+pt	NA			NA	Perm
Protected Phases												
Permitted Phases	2	2		7	4						8	
Detector Phase	2	2		7	4						8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0						10.0	10.0
Minimum Split (s)	40.3	40.3		14.5	32.0						32.0	32.0
Total Split (s)	58.0	58.0		24.0	62.0						38.0	38.0
Total Split (%)	48.3%	48.3%		20.0%	51.7%						31.7%	31.7%
Yellow Time (s)	3.7	3.7		3.3	3.3						3.3	3.3
All-Red Time (s)	2.6	2.6		2.9	2.7						2.7	2.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0						0.0	0.0
Total Lost Time (s)	6.3	6.3		6.2	6.0						6.0	6.0
Lead/Lag				Lead	Lag						Lag	Lag
Lead-Lag Optimize?				Yes	Yes						Yes	Yes
Recall Mode				None	Min						Min	Min
Act Effct Green (s)	52.5	52.5		55.0	55.2						31.2	31.2
Actuated G/C Ratio	0.44	0.44		0.46	0.46						0.26	0.26
v/c Ratio	0.07	0.98		0.82	0.39						0.54	0.97
Control Delay	16.4	45.3		41.6	23.2						40.7	71.0
Queue Delay	0.0	0.0		0.0	0.0						0.0	0.0
Total Delay	16.4	45.3		41.6	23.2						40.7	71.0
LOS	B	D		D	C						D	E
Approach Delay				43.9	32.8						55.0	
Approach LOS				D	C						E	
Queue Length 50th (m)	5.1	171.0		67.2	60.9						49.0	79.5
Queue Length 95th (m)	8.8	#209.4		m#101.5	m#6.3						65.5	#141.9
Internal Link Dist (m)	193.0			341.6	139.1						131.1	
Turn Bay Length (m)	38.0											30.0
Base Capacity (vph)	1399	2046		407	814						884	439
Starvation Cap Reductn	0	0		0	0						0	0
Spillback Cap Reductn	0	0		0	0						0	0
Storage Cap Reductn	0	0		0	0						0	0
Reduced v/c Ratio	0.07	0.98		0.82	0.38						0.52	0.95



Lanes, Volumes, Timings  
2: Merivale & SC N

05-01-2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	44	14	63	223	440	62
Future Volume (vph)	44	14	63	223	440	62
Satd. Flow (prot)	1658	1483	1658	1745	1745	1483
Flt Permitted	0.950	0.471				
Satd. Flow (perm)	1641	1451	821	1745	1745	1450
Satd. Flow (RTOR)	16					69
Lane Group Flow (vph)	49	16	70	248	489	69
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4		2	2	6	
Permitted Phases	4	4	2	2	6	6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag						
Lead/Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.6	11.6	45.5	45.5	45.5	45.5
Actuated G/C Ratio	0.19	0.19	0.76	0.76	0.76	0.76
v/c Ratio	0.15	0.05	0.11	0.19	0.37	0.06
Control Delay	20.0	9.4	1.7	1.5	6.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	9.4	1.7	1.5	6.8	2.2
LOS	C	A	A	A	A	A
Approach Delay	17.4		1.6	6.2		
Approach LOS	B		A	A		
Queue Length 50th (m)	4.7	0.0	1.5	5.5	22.3	0.0
Queue Length 95th (m)	10.2	3.5	m3.8	10.6	57.2	4.7
Internal Link Dist (m)	51.1		82.7	89.7		
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	508	456	622	1323	1323	1116
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	17	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.04	0.11	0.19	0.37	0.06
<b>Intersection Summary</b>						
Cycle Length: 60						
Actuated Cycle Length: 60						
Offset: 8 (13%), Referenced to phase 2:NBL and 6:SBT, Start of Green						
Natural Cycle: 60						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings  
2: Merivale & SC N

06-01-2020

Maximum v/c Ratio: 0.37	Intersection LOS: A
Intersection Signal Delay: 5.4	ICU Level of Service B
Intersection Capacity Utilization 56.4%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided on February 12, 2020.	
m Volume for 95th percentile queue is metered by upstream signal.	
Splits and Phases: 2: Merivale & SC N	

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4									
Traffic Volume (vph)	134	1907	450	0	0	0	0	462	451	330	191	0
Future Volume (vph)	134	1907	450	0	0	0	0	462	451	330	191	0
Satd. Flow (prot)	1426	4502	1483	0	0	0	0	3316	1483	0	3213	0
Flt Permitted	0.950											0.548
Satd. Flow (perm)	1426	4502	1431	0	0	0	0	3316	1483	0	1817	0
Satd. Flow (RTOR)	500											
Lane Group Flow (vph)	134	2134	500	0	0	0	0	513	501	0	579	0
Turn Type	Perm	NA	Perm					NA	Perm	pm-pt	NA	
Protected Phases	2	2	2					4		3	8	
Permitted Phases	2	2	2					4		4	8	
Detector Phase	2	2	2					4		4	3	8
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					10.0	10.0	5.0	10.0	
Minimum Split (s)	29.2	29.2	29.2					26.1	26.1	23.1	26.1	
Total Split (s)	58.0	58.0	58.0					38.0	38.0	24.0	62.0	
Total Split (%)	48.3%	48.3%	48.3%					31.7%	31.7%	20.0%	51.7%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3	3.3	3.3	
All-Red Time (s)	2.5	2.5	2.5					2.8	2.8	1.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2					6.1	6.1		6.1	
Lead/Lag								Lag	Lag	Lead	Lead	
Lead-Lag Optimize?								Yes	Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Min	Min	Min	Min	
Act Effct Green (s)	51.8	51.8	51.8					45.3	45.3		55.9	
Actuated G/C Ratio	0.43	0.43	0.43					0.38	0.38		0.47	
v/c Ratio	0.22	1.10	0.55					0.41	0.90		1.13d	
Control Delay	22.6	86.1	4.5					28.7	55.7		36.4	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	22.6	86.1	4.5					28.7	55.7		36.4	
LOS	C	F	A					C	E		D	
Approach Delay		68.2						42.1			36.4	
Approach LOS		E						D			D	
Queue Length 50th (m)	22.5	-220.7	0.0					46.3	109.8		70.7	
Queue Length 95th (m)	38.4	#251.3	19.5					61.1	#173.0		88.3	
Internal Link Dist (m)		150.0						71.9			139.1	
Turn Bay Length (m)	50.0		200.0					80.0				
Base Capacity (vph)	615	1943	901					1251	559		898	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.22	1.10	0.55					0.41	0.90		0.64	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 15 (13%), Referenced to phase 2EBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

06-01-2020

Maximum v/c Ratio: 1.10	Intersection LOS: E
Intersection Signal Delay: 57.9	ICU Level of Service F
Intersection Capacity Utilization 98.8%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided February 12, 2020.	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
d1 Defacto Left Lane. Recode with 1 though lane as a left lane.	
Splits and Phases: 3: Kirkwood & Carling EB	

Lanes, Volumes, Timings  
4: Carling & SC W

05-01-2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1368	860	14	12	23
Future Volume (vph)	0	1368	860	14	12	23
Satd. Flow (prot)	0	4764	4750	0	1536	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	4764	4750	0	1519	0
Satd. Flow (RTOR)			4		26	
Lane Group Flow (vph)	0	1520	972	0	39	0
Turn Type	NA	NA	Prot			
Protected Phases	2	6		4		
Permitted Phases						
Detector Phase	2	6		4		
Switch Phase						
Minimum Initial (s)	10.0	10.0		5.0		
Minimum Split (s)	15.3	42.3		38.1		
Total Split (s)	81.0	81.0		39.0		
Total Split (%)	67.5%	67.5%		32.5%		
Yellow Time (s)	3.7	3.7		3.0		
All-Red Time (s)	1.6	1.6		3.1		
Lost Time Adjust (s)	0.0	0.0		0.0		
Total Lost Time (s)	5.3	5.3		6.1		
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max		None		
Act Effct Green (s)	90.6	90.6		21.4		
Actuated G/C Ratio	0.76	0.76		0.18		
v/c Ratio	0.42	0.27		0.13		
Control Delay	5.6	3.9		17.7		
Queue Delay	0.0	0.1		0.0		
Total Delay	5.6	3.9		17.7		
LOS	A	A		B		
Approach Delay	5.6	3.9		17.7		
Approach LOS	A	A		B		
Queue Length 50th (m)	36.9	25.5		2.3		
Queue Length 95th (m)	m37.6	9.6		10.8		
Internal Link Dist (m)	43.8	112.1		39.0		
Turn Bay Length (m)						
Base Capacity (vph)	3596	3586		439		
Starvation Cap Reductn	0	947		0		
Spillback Cap Reductn	0	0		0		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.42	0.37		0.09		
<b>Intersection Summary</b>						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 38 (32%), Referenced to phase 2EBT and 6WBT, Start of Green						
Natural Cycle: 85						
Control Type: Actuated-Coordinated						

1330 Carling 815 Archibald AM Peak Hour 2028 Future Background

Lanes, Volumes, Timings  
4: Carling & SC W

06-01-2020

Maximum v/c Ratio: 0.42	Intersection LOS: A
Intersection Signal Delay: 5.1	ICU Level of Service A
Intersection Capacity Utilization 51.9%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided February 12, 2020.	
m Volume for 95th percentile queue is metered by upstream signal.	
Splits and Phases: 4: Carling & SC W	

1330 Carling 815 Archibald AM Peak Hour 2028 Future Background

Lanes, Volumes, Timings  
5: Carling & SCE

05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	128	1170	20	5	700	43	12	2	12	27	0	39
Future Volume (vph)	128	1170	20	5	700	43	12	2	12	27	0	39
Satd. Flow (prot)	1658	4748	0	1658	4693	0	0	1583	0	0	1658	1483
Flt Permitted	0.329			0.189			0.840				0.739	
Satd. Flow (perm)	559	4748	0	327	4693	0	0	1355	0	0	1279	1452
Satd. Flow (RTOR)	4			16			13				30	43
Lane Group Flow (vph)	142	1322	0	6	826	0	0	28	0	0	30	43
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	2	2	2	6	6	6	4	4	4	8	8	8
Detector Phase	2	2	2	6	6	6	4	4	4	8	8	8
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	10.0
Minimum Split (s)	23.6	23.6	23.6	23.6	23.6	23.6	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	83.0	83.0	83.0	83.0	83.0	83.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	69.2%	69.2%	69.2%	69.2%	69.2%	69.2%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	1.9	4.0	4.0	4.0	4.0	4.0	4.0
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	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	7.0	7.0	7.0	7.0	7.0	7.0

Lead/Lag Optimize?

Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	97.9	97.9	97.9	97.9	14.0	14.0	14.0	14.0
Actuated G/C Ratio	0.82	0.82	0.82	0.82	0.12	0.12	0.12	0.12
v/c Ratio	0.31	0.34	0.02	0.22	0.17	0.20	0.21	0.21
Control Delay	3.7	1.9	5.0	3.6	29.9	47.9	14.1	14.1
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	3.7	1.9	5.0	3.7	29.9	47.9	14.1	14.1
LOS	A	A	A	A	C	C	D	B
Approach Delay	2.1	3.7	3.7	29.9	28.0	28.0	28.0	28.0
Approach LOS	A	A	A	A	C	C	C	C
Queue Length 50th (m)	3.4	11.6	0.3	14.2	3.3	6.8	6.8	0.0
Queue Length 95th (m)	5.1	12.2	m1.2	20.3	10.2	13.3	9.0	9.0
Internal Link Dist (m)	112.1	112.1	81.1	65.8	65.8	63.4	63.4	63.4
Turn Bay Length (m)	65.0	30.0	30.0	3832	348	319	395	395
Base Capacity (vph)	456	3875	266	1493	0	0	0	0
Starvation Cap Reductn	0	511	0	1493	0	0	0	0
Spillback Cap Reductn	0	301	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.39	0.02	0.35	0.08	0.09	0.11	0.11

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

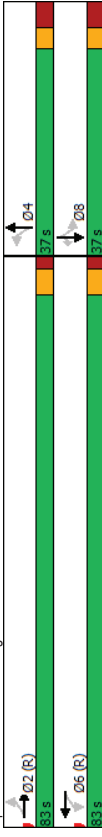
1330 Carling 815 Archibald AM Peak Hour 2028 Future Background

Lanes, Volumes, Timings  
5: Carling & SCE

06-01-2020

Maximum v/c Ratio: 0.34	Intersection LOS: A
Intersection Signal Delay: 3.8	ICU Level of Service B
Intersection Capacity Utilization: 60.1%	
Analysis Period (min): 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: Carling & SCE



1330 Carling 815 Archibald AM Peak Hour 2028 Future Background

Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

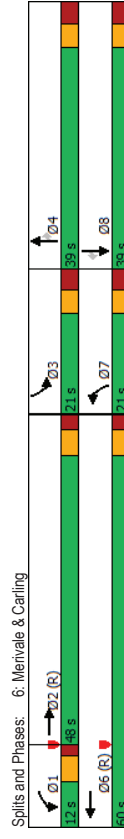
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1109	103	165	499	42	115	249	441	39	277	139
Future Volume (vph)	0	1109	103	165	499	42	115	249	441	39	277	139
Satd. Flow (prot)	0	4683	0	1658	4685	0	1658	1745	1483	1658	1745	1483
Flt Permitted		0.950		0.950		0.950		0.950		0.950		0.950
Satd. Flow (perm)	0	4683	0	1648	4685	0	1639	1745	1437	1640	1745	1437
Satd. Flow (RTOR)	14			15					280			154
Lane Group Flow (vph)	0	1346	0	183	601	0	128	277	490	43	308	154
Turn Type	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	2	1	6	7	4	4	4	4	4	3	8	8
Permitted Phases	2	1	6	7	4	4	4	4	4	3	8	8
Detector Phase	2	1	6	7	4	4	4	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	11.3	38.7	11.3	38.7	38.7
Total Split (s)	48.0	12.0	60.0	21.0	39.0	21.0	39.0	21.0	39.0	21.0	39.0	39.0
Total Split (%)	40.0%	10.0%	50.0%	17.5%	32.5%	17.5%	32.5%	17.5%	32.5%	17.5%	32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.4	3.4	3.0	3.4	3.4	3.0	3.4	3.4
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	0.0
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.3	6.7	6.7	6.3	6.7	6.7
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	42.0	14.2	61.6	13.0	33.2	33.2	8.5	26.4	26.4	26.4	26.4	26.4
Actuated G/C Ratio	0.35	0.12	0.51	0.11	0.28	0.28	0.07	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.82	0.93	0.25	0.71	0.57	0.82	0.37	0.80	0.35	0.80	0.35	0.35
Control Delay	31.2	103.0	17.3	72.9	42.4	28.9	57.9	54.7	9.9	54.7	9.9	9.9
Queue Delay	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Total Delay	33.6	103.0	17.3	72.9	42.4	28.9	57.9	55.9	9.9	55.9	9.9	9.9
LOS	C	F	B	E	D	C	E	E	A	E	E	A
Approach Delay	33.6		37.3		39.4		42.0		42.0		42.0	
Approach LOS	C		D		D		D		D		D	
Queue Length 50th (m)	85.6	-47.0	28.0	29.1	56.7	49.5	10.0	61.0	6.8	61.0	6.8	6.8
Queue Length 95th (m)	106.1	#12.4	39.8	#50.7	81.8	93.2	22.3	88.1	19.5	88.1	19.5	19.5
Internal Link Dist (m)	81.1		189.4		304.1		304.1		304.1		304.1	
Turn Bay Length (m)	70.0		70.0		50.0		50.0		30.0		50.0	
Base Capacity (vph)	1648	196	2412	203	495	608	203	469	489	203	469	489
Starvation Cap Reductn	186	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.93	0.25	0.63	0.56	0.81	0.21	0.73	0.31	0.73	0.31	0.31

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 52 (43%), Referenced to phase 2EBT and 6WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
6: Merivale & Carling

06-01-2020

Maximum v/c Ratio: 0.93	Intersection LOS: D
Intersection Signal Delay: 37.1	ICU Level of Service D
Intersection Capacity Utilization 81.8%	
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

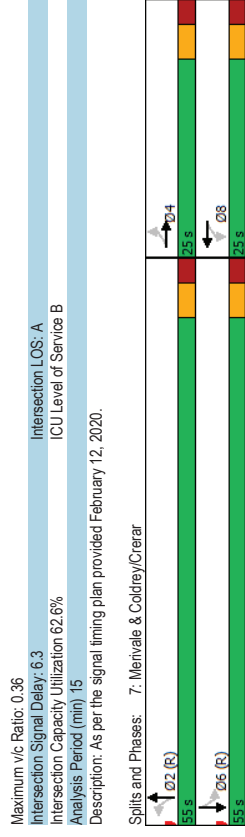
05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	Icons
Lane Configurations	15	17	29	10	21	46	29	707	11	23	506	↔ ↕ ↖ ↗
Traffic Volume (vph)	15	17	29	10	21	46	29	707	11	23	506	↔ ↕ ↖ ↗
Future Volume (vph)	0	1599	0	0	1580	0	0	3301	0	0	3267	↔ ↕ ↖ ↗
Satd. Flow (prot)	0.915	0.948	0	0	0.914	0	0	0.903	0	0	0.903	↔ ↕ ↖ ↗
Flt Permitted	0	1480	0	0	1506	0	0	3022	0	0	2956	↔ ↕ ↖ ↗
Satd. Flow (RTOR)	32	32	0	0	51	0	0	3	0	0	17	↔ ↕ ↖ ↗
Lane Group Flow (vph)	0	68	0	0	85	0	0	880	0	0	629	↔ ↕ ↖ ↗
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	↔ ↕ ↖ ↗
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	↔ ↕ ↖ ↗
Detector Phase	4	4	8	8	8	8	2	2	2	6	6	↔ ↕ ↖ ↗
Switch Phase	4	4	8	8	8	8	2	2	2	6	6	↔ ↕ ↖ ↗
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)	24.8	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8	↔ ↕ ↖ ↗
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	↔ ↕ ↖ ↗
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	↔ ↕ ↖ ↗
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	↔ ↕ ↖ ↗
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	↔ ↕ ↖ ↗
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)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	↔ ↕ ↖ ↗
Lead/Lag Optimize?												↔ ↕ ↖ ↗
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	↔ ↕ ↖ ↗
Act Effct Green (s)	11.8	11.8	11.8	11.8	11.8	11.8	60.9	60.9	60.9	60.9	60.9	↔ ↕ ↖ ↗
Actuated G/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.76	0.76	0.76	0.76	0.76	↔ ↕ ↖ ↗
v/c Ratio	0.28	0.32	0.32	0.32	0.32	0.32	0.36	0.36	0.36	0.36	0.36	↔ ↕ ↖ ↗
Control Delay	20.6	20.6	17.5	17.5	17.5	5.2	5.2	4.6	4.6	4.6	4.6	↔ ↕ ↖ ↗
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	20.6	20.6	17.5	17.5	17.5	5.2	5.2	4.6	4.6	4.6	4.6	↔ ↕ ↖ ↗
LOS	C	C	B	B	B	A	A	A	A	A	A	↔ ↕ ↖ ↗
Approach Delay	20.6	20.6	17.5	17.5	17.5	5.2	5.2	4.6	4.6	4.6	4.6	↔ ↕ ↖ ↗
Approach LOS	C	C	B	B	B	A	A	A	A	A	A	↔ ↕ ↖ ↗
Queue Length 50th (m)	5.0	4.7	4.7	4.7	4.7	19.7	19.7	13.3	13.3	13.3	13.3	↔ ↕ ↖ ↗
Queue Length 95th (m)	13.9	14.8	14.8	14.8	14.8	42.7	42.7	30.0	30.0	30.0	30.0	↔ ↕ ↖ ↗
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	113.1	113.1	304.1	304.1	304.1	304.1	↔ ↕ ↖ ↗
Turn Bay Length (m)												↔ ↕ ↖ ↗
Base Capacity (vph)	379	400	400	400	400	2301	2301	2255	2255	2255	2255	↔ ↕ ↖ ↗
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	↔ ↕ ↖ ↗
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	↔ ↕ ↖ ↗
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	↔ ↕ ↖ ↗
Reduced v/c Ratio	0.18	0.21	0.21	0.21	0.21	0.36	0.36	0.28	0.28	0.28	0.28	↔ ↕ ↖ ↗

Intersection Summary	
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	46 (58%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

06-01-2020





Lanes, Volumes, Timings  
8: Archibald & Carling EB/Carling & Carling WB

05-01-2020

Lane Group	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations		←←←	←←←				←←←	←	←	←	↘
Traffic Volume (vph)	0	1198	0	0	0	0	797	0	102	0	0
Future Volume (vph)	0	1198	0	0	0	0	797	0	102	0	0
Satd. Flow (prot)	0	4764	0	0	0	0	3382	0	1510	0	0
Flt Permitted											
Satd. Flow (perm)	0	4764	0	0	0	0	3382	0	1510	0	0
Lane Group Flow (vph)	0	1331	0	0	0	0	886	0	113	0	0
Sign Control	Free										
<b>Intersection Summary</b>											
Control Type: Unsignalized											
Intersection Capacity Utilization 37.8%											
Analysis Period (min) 15											
ICU Level of Service A											

HCM 2010 TWSC  
8: Archibald & Carling EB/Carling & Carling WB

06-01-2020

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER	
In/Delay, s/veh	1.7										
Movement	←←←	←←←	←←←			←←←	←	←	←	↘	
Lane Configurations											
Traffic Vol. veh/h	0	1198	0	0	0	797	0	102	0	0	
Future Vol. veh/h	0	1198	0	0	0	797	0	102	0	0	
Conflicting Peds. #/hr	0	0	21	0	0	0	0	0	0	0	
Sign Control	Free										
RT Channelized	- None - None - None -										
Storage Length	-										
Veh in Median Storage. #	-										
Grade, %	-										
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	1331	0	0	0	886	0	113	0	0	
<b>Major/Minor</b>											
Major/Minor	Major1 Minor1										
Conflicting Flow All	-										
Stage 1	-										
Stage 2	-										
Critical Hdwy	-										
Critical Hdwy Stg 1	-										
Critical Hdwy Stg 2	-										
Follow-up Hdwy	-										
Pot Cap-1 Maneuver	0										
Stage 1	0										
Stage 2	0										
Platoon blocked, %	-										
Mov Cap-1 Maneuver	-										
Mov Cap-2 Maneuver	-										
Stage 1	-										
Stage 2	-										
<b>Approach</b>											
Approach	EB NB										
HCM Control Delay, s	0 21.6										
HCM LOS	C										
<b>Minor Lane/Major Mvmt</b>											
Minor Lane/Major Mvmt	NBLn1	EBT	EBR								
Capacity (veh/h)	329	-	-								
HCM Lane V/C Ratio	0.344	-	-								
HCM Control Delay (s)	21.6	-	-								
HCM Lane LOS	C	-	-								
HCM 95th %tile Q(veh)	1.5	-	-								

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

05-01-2020

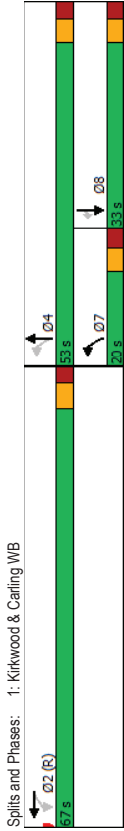
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	181	2423	295	214	536	0	0	496	409
Future Volume (vph)	0	0	0	181	2423	295	214	536	0	0	496	409
Satd. Flow (prot)	0	0	0	3216	4652	0	1688	1745	0	0	3316	1483
Flt Permitted				0.950			0.203					
Satd. Flow (perm)	0	0	0	3182	4652	0	351	1745	0	0	3316	1412
Satd. Flow (RTOR)				25								86
Lane Group Flow (vph)	0	0	0	201	3027	0	238	596	0	0	551	454
Turn Type				Perm	NA		prn+pt	NA		NA	Perm	
Protected Phases				2	2		4			8		
Permitted Phases				2	2		7	4		8		
Detector Phase				2	2		7	4		8		
Switch Phase												
Minimum Initial (s)				10.0	10.0		5.0	10.0		10.0		10.0
Minimum Split (s)				40.3	40.3		14.5	32.0		32.0		32.0
Total Split (s)				67.0	67.0		20.0	53.0		33.0		33.0
Total Split (%)				55.8%	55.8%		16.7%	44.2%		27.5%		27.5%
Yellow Time (s)				3.7	3.7		3.3	3.3		3.3		3.3
All-Red Time (s)				2.6	2.6		2.9	2.7		2.7		2.7
Lost Time Adjust (s)				0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)				6.3	6.3		6.2	6.0		6.0		6.0
Lead/Lag							Lead	Lag		Lag		Yes
Lead-Lag Optimize?							Yes	Yes		Yes		Yes
Recall Mode				C-Max	C-Max		None	Min		Min		Min
Act Effct Green (s)				60.7	60.7		46.8	47.0		27.0		27.0
Actuated G/C Ratio				0.51	0.51		0.39	0.39		0.22		0.22
v/c Ratio				0.12	1.28		0.83	0.87		0.74		1.18
Control Delay				15.9	157.5		52.1	52.1		50.1		135.4
Queue Delay				0.0	0.0		0.0	22.9		0.0		0.0
Total Delay				15.9	157.5		52.1	74.9		50.1		139.4
LOS				B	F		D	E		D		F
Approach Delay				148.7			68.4			90.4		
Approach LOS				F			E			F		
Queue Length 50th (m)				12.4	-331.9		45.5	145.3		63.8		-112.0
Queue Length 95th (m)				18.9	#358.1		#70.2	#199.2		83.5		#175.3
Internal Link Dist (m)				193.0			341.6			131.1		
Turn Bay Length (m)				38.0								30.0
Base Capacity (vph)				1609	2365		287	683		746		384
Starvation Cap Reductn				0	0		0	103		0		0
Spillback Cap Reductn				0	0		0	0		0		0
Storage Cap Reductn				0	0		0	0		0		0
Reduced v/c Ratio				0.12	1.28		0.83	1.03		0.74		1.18

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 39 (33%), Referenced to phase 2/WBTL Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
1: Kirkwood & Carling WB

06-01-2020

Maximum v/c Ratio: 1.28	Intersection LOS: F
Intersection Signal Delay: 123.9	ICU Level of Service H
Intersection Capacity Utilization 113.7%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided February 12, 2020.	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 1: Kirkwood & Carling WB

Lanes, Volumes, Timings  
2: Merivale & SC N

05-01-2020

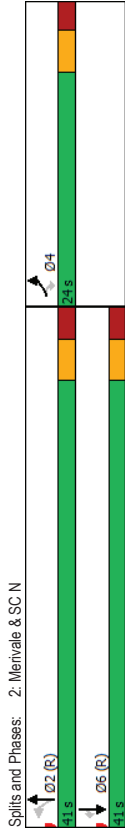
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	82	60	64	213	489	90
Future Volume (vph)	82	60	64	213	489	90
Satd. Flow (prot)	1658	1483	1658	1745	1745	1483
Flt Permitted	0.950	0.427				
Satd. Flow (perm)	1595	1451	744	1745	1745	1448
Satd. Flow (RTOR)	67					100
Lane Group Flow (vph)	91	67	71	237	543	100
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4		2	2	6	
Permitted Phases	4	4	2	2	6	6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.6	23.6	15.9	15.9	35.9	35.9
Total Split (s)	24.0	24.0	41.0	41.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%	63.1%	63.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.9	5.9	5.9	5.9
Lead/Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.7	11.7	46.1	46.1	46.1	46.1
Actuated G/C Ratio	0.18	0.18	0.71	0.71	0.71	0.71
v/c Ratio	0.31	0.21	0.13	0.19	0.44	0.09
Control Delay	25.0	7.8	3.9	4.1	7.7	1.8
Queue Delay	0.0	0.6	0.0	0.0	0.1	0.0
Total Delay	25.0	8.3	3.9	4.1	7.8	1.8
LOS	C	A	A	A	A	A
Approach Delay	18.0		4.1	6.9		
Approach LOS	B		A	A		
Queue Length 50th (m)	10.0	0.0	1.1	3.7	25.9	0.0
Queue Length 95th (m)	18.3	7.6	m12.8	m49.4	64.6	5.3
Internal Link Dist (m)	51.1		82.7	89.7		
Turn Bay Length (m)			35.0			50.0
Base Capacity (vph)	469	458	528	1238	1238	1057
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	206	0	0	140	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.13	0.19	0.49	0.09

Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	27 (42%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
2: Merivale & SC N

06-01-2020

Maximum v/c Ratio:	0.44
Intersection Signal Delay:	7.7
Intersection LOS:	A
Intersection Capacity Utilization:	58.6%
ICU Level of Service:	B
Analysis Period (min):	15
Description:	As per the signal timing plan provided on February 12, 2020.
m	Volume for 95th percentile queue is metered by upstream signal.



Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

05-01-2020

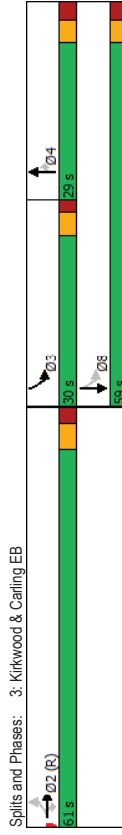
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	0	0	0	0	4	4	4	4	0
Traffic Volume (vph)	426	1303	444	0	0	0	0	329	344	424	262	0
Future Volume (vph)	426	1303	444	0	0	0	0	329	344	424	262	0
Satd. Flow (prot)	1426	4493	1483	0	0	0	0	3316	1483	0	3216	0
Flt Permitted	0.950	0.998									0.594	
Satd. Flow (perm)	1426	4493	1429	0	0	0	0	3316	1461	0	1969	0
Satd. Flow (RTOR)			367									
Lane Group Flow (vph)	426	1495	493	0	0	0	0	366	382	0	762	0
Turn Type	Perm	NA	Perm					NA	Perm	pm-pt	NA	
Protected Phases	2	2	2					4		3	8	
Permitted Phases	2	2	2					4	4	8		
Detector Phase								4	4	3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					10.0	10.0	5.0	10.0	
Minimum Split (s)	29.2	29.2	29.2					26.1	26.1	23.1	26.1	
Total Split (s)	61.0	61.0	61.0					29.0	29.0	30.0	59.0	
Total Split (%)	50.8%	50.8%	50.8%					24.2%	24.2%	25.0%	49.2%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3	3.3	3.3	
All-Red Time (s)	2.5	2.5	2.5					2.8	2.8	1.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2					6.1	6.1		6.1	
Lead/Lag								Lag	Lag	Lead	Lead	
Lead-Lag Optimize?								Yes	Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Min	Min	Min	Min	
Act Effct Green (s)	54.8	54.8	54.8					42.3	42.3		52.9	
Actuated G/C Ratio	0.46	0.46	0.46					0.35	0.35		0.44	
v/c Ratio	0.65	0.73	0.68					0.31	0.74		1.27/dl	
Control Delay	31.2	29.2	8.8					29.2	44.3		22.5	
Queue Delay	2.2	0.7	0.0					0.0	0.0		0.0	
Total Delay	33.4	29.9	8.8					29.2	44.3		22.5	
LOS	C	C	A					C	D		C	
Approach Delay		26.2						36.9			22.5	
Approach LOS		C						D			C	
Queue Length 50th (m)	88.3	108.6	17.3					32.7	78.4		78.5	
Queue Length 95th (m)	130.5	127.4	48.9					45.1	115.8		97.8	
Internal Link Dist (m)		150.0				323.9		71.9			139.1	
Turn Bay Length (m)	50.0		200.0					80.0				
Base Capacity (vph)	651	2051	851					1168	515		914	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	116	244	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.80	0.83	0.68					0.31	0.74		0.83	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 81 (68%), Referenced to phase 2EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
3: Kirkwood & Carling EB

06-01-2020

Maximum v/c Ratio: 0.83	Intersection LOS: C
Intersection Signal Delay: 27.5	ICU Level of Service E
Intersection Capacity Utilization 89.5%	
Analysis Period (min) 15	
Description: As per the signal timing plan provided February 12, 2020.	
Defacto Left Lane. Recode with 1 though lane as a left lane.	



Splits and Phases:	3: Kirkwood & Carling EB
Phase 1	51 s
Phase 2	30 s
Phase 3	29 s
Phase 4	59 s
Phase 5	30 s
Phase 6	29 s
Phase 7	30 s
Phase 8	29 s
Phase 9	30 s
Phase 10	29 s
Phase 11	30 s
Phase 12	29 s

Lanes, Volumes, Timings  
4: Carling & SC W

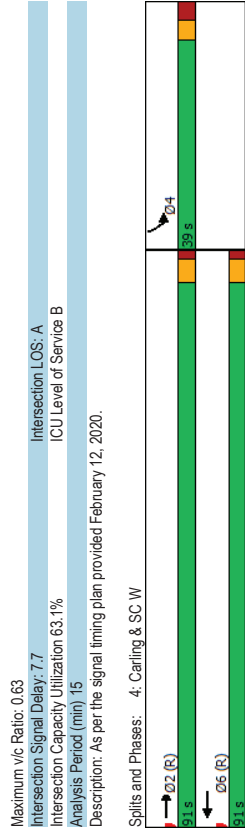
05-01-2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←
Traffic Volume (vph)	0	1044	2076	5	35	38
Future Volume (vph)	0	1044	2076	5	35	38
Satd. Flow (prot)	0	4764	4763	0	1564	0
Flt Permitted				0.976		
Satd. Flow (perm)	0	4764	4763	0	1533	0
Satd. Flow (RTOR)			1		8	
Lane Group Flow (vph)	0	1160	2313	0	81	0
Turn Type	NA	NA	NA	Prot		
Protected Phases	2	6		4		
Permitted Phases						
Detector Phase	2	6		4		
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0			
Minimum Split (s)	15.3	59.3	38.1			
Total Split (s)	91.0	91.0	39.0			
Total Split (%)	70.0%	70.0%	30.0%			
Yellow Time (s)	3.7	3.7	3.0			
All-Red Time (s)	1.6	1.6	3.1			
Lost Time Adjust (s)	0.0	0.0	0.0			
Total Lost Time (s)	5.3	5.3	6.1			
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None			
Act Effct Green (s)	99.8	99.8	22.4			
Actuated G/C Ratio	0.77	0.77	0.17			
v/c Ratio	0.32	0.63	0.29			
Control Delay	7.1	6.7	41.2			
Queue Delay	0.0	0.0	0.0			
Total Delay	7.1	6.8	41.2			
LOS	A	A	D			
Approach Delay	7.1	6.8	41.2			
Approach LOS	A	A	D			
Queue Length 50th (m)	44.3	27.3	14.9			
Queue Length 95th (m)	52.2	59.8	28.8			
Internal Link Dist (m)	43.8	112.1	39.0			
Turn Bay Length (m)						
Base Capacity (vph)	3657	3657	401			
Starvation Cap Reductn	0	102	0			
Spillback Cap Reductn	0	0	0			
Storage Cap Reductn	0	0	0			
Reduced v/c Ratio	0.32	0.65	0.20			

Intersection Summary	
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	107 (82%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
4: Carling & SC W

06-01-2020



Maximum v/c Ratio: 0.63  
Intersection Signal Delay: 7.7  
Intersection LOS: A  
Intersection Capacity Utilization 63.1%  
ICU Level of Service B  
Analysis Period (min) 15  
Description: As per the signal timing plan provided February 12, 2020.

Splits and Phases: 4: Carling & SC W

Lanes, Volumes, Timings  
5: Carling & SCE

05-01-2020

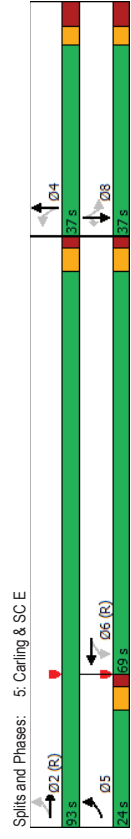
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	151	768	11	12	1885	84	15	1	17	79	2	92
Future Volume (vph)	151	768	11	12	1885	84	15	1	17	79	2	92
Satd. Flow (prot)	1658	4743	0	1658	4711	0	0	1564	0	0	1663	1483
Flt Permitted	0.049			0.316			0.851				0.704	
Satd. Flow (perm)	86	4743	0	526	4711	0	0	1342	0	0	1206	1415
Satd. Flow (RTOR)	3			7			19				102	
Lane Group Flow (vph)	168	865	0	13	2187	0	0	37	0	0	90	102
Turn Type	pm-pt	NA		Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		6	6		4				8	
Permitted Phases	2			6	6		4				8	
Detector Phase	5	2		6	6		4				8	
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0				10.0	10.0
Minimum Split (s)	10.6	23.6		23.6	23.6		37.0				37.0	37.0
Total Split (s)	24.0	93.0		69.0	69.0		37.0				37.0	37.0
Total Split (%)	18.5%	71.5%		53.1%	53.1%		28.5%				28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0				3.0	3.0
All-Red Time (s)	1.9	1.9		1.9	1.9		4.0				4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0				0.0	0.0
Total Lost Time (s)	5.6	5.6		5.6	5.6		7.0				7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead				Lead	Lag
Lead/Lag Optimize?	Yes	Yes		Yes	Yes		Yes				Yes	Yes
Recall Mode	None	C-Max		C-Max	C-Max		None				None	None
Act Effct Green (s)	95.0	95.0		76.4	76.4		22.4				22.4	22.4
Actuated G/C Ratio	0.73	0.73		0.59	0.59		0.17				0.17	0.17
v/c Ratio	0.77	0.25		0.04	0.79		0.15				0.43	0.31
Control Delay	57.0	2.5		4.9	12.8		25.2				52.1	10.0
Queue Delay	0.0	0.0		0.0	1.5		0.0				0.0	0.0
Total Delay	57.0	2.6		4.9	14.3		25.2				52.1	10.0
LOS	E	A		A	B		C				D	B
Approach Delay		11.4			14.3		25.2				29.7	
Approach LOS		B			B		C				C	
Queue Length 50th (m)	23.3	6.4		0.4	198.7		3.6				19.3	0.0
Queue Length 95th (m)	36.2	7.5		m1.0	#233.6		12.9				35.3	14.2
Internal Link Dist (m)		112.1			81.1		65.8				63.4	
Turn Bay Length (m)	65.0			30.0								
Base Capacity (vph)	285	3465		309	2770		324				278	405
Starvation Cap Reductn	0	0		0	377		0				0	0
Spillback Cap Reductn	0	566		0	0		2				0	0
Storage Cap Reductn	0	0		0	0		0				0	0
Reduced v/c Ratio	0.59	0.30		0.04	0.91		0.11				0.32	0.25

Intersection Summary	
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	3 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings  
5: Carling & SCE

06-01-2020

Maximum v/c Ratio:	0.79
Intersection Signal Delay:	14.4
Intersection LOS:	B
Intersection Capacity Utilization:	89.8%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 5: Carling & SCE

Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

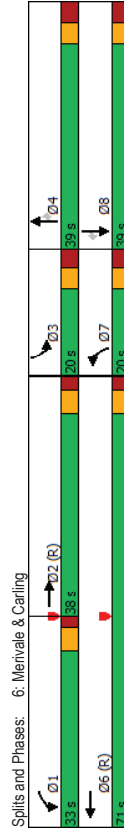
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	733	139	460	1744	53	108	229	247	76	343	135
Future Volume (vph)	0	733	139	460	1744	53	108	229	247	76	343	135
Satd. Flow (prot)	0	4611	0	1658	4733	0	1658	1745	1483	1658	1745	1483
Flt Permitted												
Satd. Flow (perm)	0	4611	0	1640	4733	0	1614	1745	1419	1622	1745	1399
Satd. Flow (RTOR)	28			5				274				123
Lane Group Flow (vph)	0	968	0	511	1997	0	120	254	274	84	381	150
Turn Types	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	2	1	6	7	4							8
Permitted Phases												
Detector Phase	2	1	6	7	4	4	4	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	29.0	10.4	29.0	11.3	38.7	11.3	38.7	11.3	38.7	11.3	38.7	38.7
Total Split (s)	38.0	33.0	71.0	20.0	39.0	39.0	20.0	39.0	39.0	20.0	39.0	39.0
Total Split (%)	29.2%	25.4%	54.6%	15.4%	30.0%	30.0%	15.4%	30.0%	30.0%	15.4%	30.0%	30.0%
Yellow Time (s)	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	1.7	2.3	3.0	3.4	3.4	3.0	3.4	3.4	3.0	3.4	3.4
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	0.0
Total Lost Time (s)	6.0	5.4	6.0	6.3	6.7	6.7	6.3	6.7	6.7	6.3	6.7	6.7
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	32.0	30.2	67.6	12.6	32.2	32.2	11.3	30.8	30.8	11.3	30.8	30.8
Actuated G/C Ratio	0.25	0.23	0.52	0.10	0.25	0.25	0.09	0.24	0.24	0.09	0.24	0.24
v/c Ratio	0.84	1.33	0.81	0.75	0.59	0.49	0.59	0.92	0.35	0.59	0.92	0.35
Control Delay	47.8	204.5	29.8	84.1	49.3	7.7	66.3	74.9	15.9	66.3	74.9	15.9
Queue Delay	5.3	0.0	17.2	0.0	0.0	0.0	0.0	40.2	0.1	40.2	0.1	0.1
Total Delay	53.1	204.5	47.0	84.1	49.3	7.7	66.3	74.9	15.9	66.3	74.9	15.9
LOS	D	F	D	F	D	A	E	F	F	E	F	B
Approach Delay	53.1	79.1		38.2								84.3
Approach LOS	D	E		D								F
Queue Length 50th (m)	86.2	~178.3	157.1	30.1	56.4	0.0	21.0	77.7	8.3	77.7	8.3	8.3
Queue Length 95th (m)	102.9	#244.8	178.7	#56.8	85.7	21.9	37.6	#144.4	30.1	144.4	30.1	30.1
Internal Link Dist (m)	81.1		189.4		304.1							82.7
Turn Bay Length (m)	70.0		189.4		304.1							82.7
Base Capacity (vph)	1156	384	2462	174	442	564	174	433	440	174	433	440
Starvation Cap Reductn	138	0	0	0	0	0	0	0	0	0	0	78
Spillback Cap Reductn	0	0	513	0	0	0	0	0	0	0	0	13
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	1.33	1.02	0.69	0.57	0.49	0.48	1.07	0.35	0.48	1.07	0.35

1330 Carling 815 Archibald PM Peak Hour 2028 Future Background  
Page 11

Lanes, Volumes, Timings  
6: Merivale & Carling

05-01-2020

Maximum v/c Ratio: 1.33	Intersection LOS: E
Intersection Signal Delay: 68.9	ICU Level of Service F
Intersection Capacity Utilization 97.2%	
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



1330 Carling 815 Archibald PM Peak Hour 2028 Future Background  
Page 12

Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

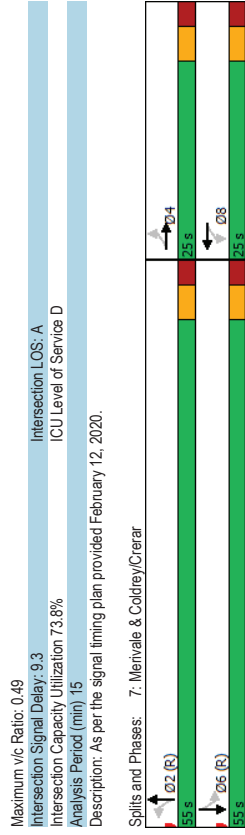
05-01-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	22	68	19	27	56	27	12	510	9	43	804
Traffic Volume (vph)	22	68	19	27	56	27	12	510	9	43	804
Future Volume (vph)	0	1684	0	0	1682	0	0	3300	0	0	3275
Satd. Flow (prot)	0.904			0.881			0.929			0.897	
Flt Permitted	0	1637	0	0	1481	0	0	3069	0	0	2943
Satd. Flow (perm)	12			19			4			14	
Satd. Flow (RTOR)	0	121	0	0	122	0	0	590	0	0	997
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Turn Type	4	4	8	8	8	8	2	2	6	6	6
Protected Phases	4	4	8	8	8	8	2	2	6	6	6
Detector Phase	4	4	8	8	8	8	2	2	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	24.8	24.8	24.8	24.8	24.8	24.8	33.8	33.8	33.8	33.8	33.8
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5	12.5	60.2	60.2	60.2	60.2	60.2
Actuated G/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.48	0.48	0.49	0.49	0.49	0.49	0.26	0.26	0.45	0.45	0.45
Control Delay	33.4	33.4	32.0	32.0	32.0	32.0	4.8	4.8	6.2	6.2	6.2
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	33.4	33.4	32.0	32.0	32.0	32.0	4.8	4.8	6.2	6.2	6.2
LOS	C	C	C	C	C	C	A	A	A	A	A
Approach Delay	33.4	33.4	32.0	32.0	32.0	32.0	4.8	4.8	6.2	6.2	6.2
Approach LOS	C	C	C	C	C	C	A	A	A	A	A
Queue Length 50th (m)	15.6	15.6	14.8	14.8	14.8	14.8	13.3	13.3	27.1	27.1	27.1
Queue Length 95th (m)	27.7	27.7	27.2	27.2	27.2	27.2	28.0	28.0	55.5	55.5	55.5
Internal Link Dist (m)	146.9	146.9	128.0	128.0	128.0	128.0	113.1	113.1	304.1	304.1	304.1
Turn Bay Length (m)											
Base Capacity (vph)	378	378	369	369	369	369	2309	2309	2217	2217	2217
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.32	0.33	0.33	0.33	0.33	0.26	0.26	0.45	0.45	0.45

Intersection Summary	
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	63 (79%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

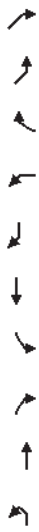
Lanes, Volumes, Timings  
7: Merivale & Coldrey/Crerar

06-01-2020





Lane Group	EBL	EBT	EBR	EBL	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations											
Traffic Volume (vph)	0	943	0	0	0	0	2025	0	73	0	0
Future Volume (vph)	0	943	0	0	0	0	2025	0	73	0	0
Satd. Flow (prot)	0	4764	0	0	0	0	3382	0	1510	0	0
FIT Permitted											
Satd. Flow (perm)	0	4764	0	0	0	0	3382	0	1510	0	0
Lane Group Flow (vph)	0	1048	0	0	0	0	2250	0	81	0	0
Sign Control	Free Stop Stop										
Intersection Summary											
Control Type: Unsignalized	ICU Level of Service A										
Intersection Capacity Utilization 53.2%											
Analysis Period (min) 15											



Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER	
In/Delay, s/veh 1.1											
Movement											
Lane Configurations	←←← →→→										
Traffic Vol. veh/h	0	943	0	0	0	2025	0	73	0	0	
Future Vol. veh/h	0	943	0	0	0	2025	0	73	0	0	
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free Free Free Free Stop Stop Stop										
RT Channelized	- - None - - None - -										
Storage Length	- - - - - 0 - - - -										
Veh in Median Storage. #	- 0 - - - - 0 - - - -										
Grade, %	- 0 - - - - 0 - - - -										
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	1048	0	0	0	2250	0	81	0	0	
Major/Minor Major1 Minor1											
Conflicting Flow All	-	0	0	-	-	-	-	-	-	524	
Stage 1	-	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	-	-	-	-	-	-	-	7.14	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	-	-	-	-	-	-	-	3.92	
Pot Cap-1 Maneuver	0	-	-	-	-	-	0	426	-	-	
Stage 1	0	-	-	-	-	-	0	0	-	-	
Stage 2	0	-	-	-	-	-	0	0	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	-	426	
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	-	
Approach EB NB											
HCM Control Delay, s	0	-	-	-	-	-	15.4	-	-	-	
HCM LOS	-	-	-	-	-	-	C	-	-	-	
Minor Lane/Major Mvmt NBLn1 EBT EBR											
Capacity (veh/h)	-	426	-	-	-	-	-	-	-	-	
HCM Lane V/C Ratio	-	0.19	-	-	-	-	-	-	-	-	
HCM Control Delay (s)	-	15.4	-	-	-	-	-	-	-	-	
HCM Lane LOS	-	C	-	-	-	-	-	-	-	-	
HCM 95th %tile Q(veh)	-	0.7	-	-	-	-	-	-	-	-	