1034 McGarry Terrace

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Rev #1)

Prepared for:

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August 2023

PN: 2022-160

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1 Screening

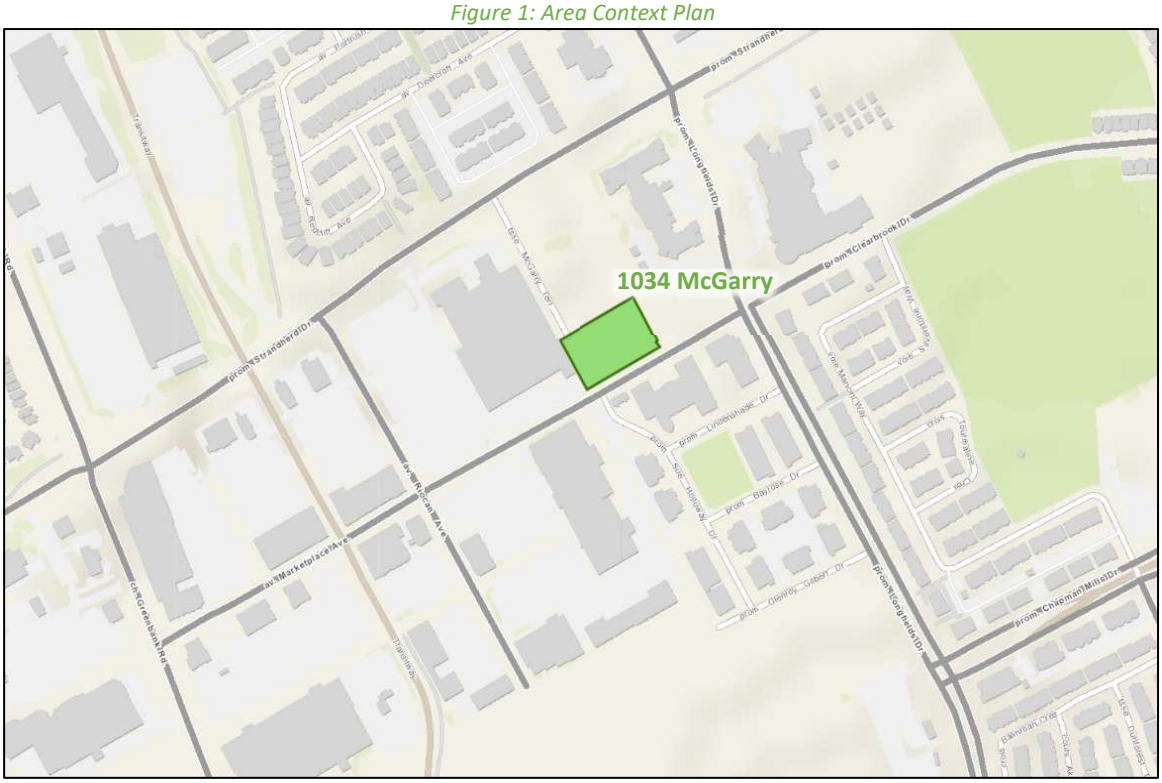
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, prior to the June 2023 updates. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This study has been prepared to support the current official plan amendment and zoning by-law amendment applications, and a future site plan control application.

2 Existing and Planned Conditions

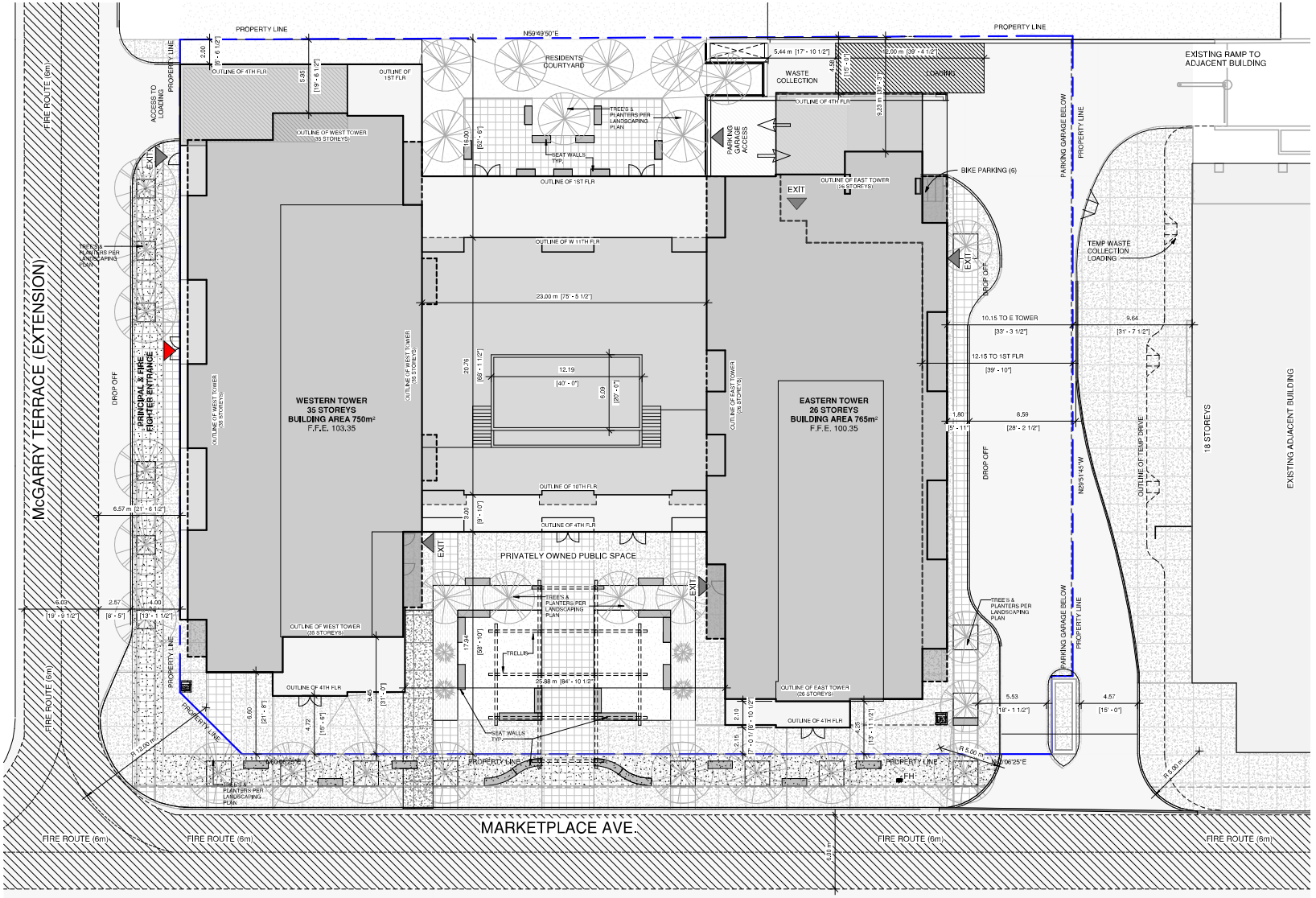
2.1 Proposed Development

The existing site, located at 1034 McGarry Terraced, is zoned as Mixed-Use Centre Zone (MC[2573]). Two additional towers at 26 and 35 storeys are proposed on the parcel for 1034 McGarry Terrace. The total unit count will be 592 residential units and 1,104.3 sq. m commercial spaces. A total of 653 parking spaces and 295 bicycle parking spaces are proposed. McGarry Terrace will be extended to the Marketplace Avenue at Sue Holloway intersection. Two access are proposed, one on Marketplace Avenue and one on extended McGarry Terrace. The Marketplace Avenue access will expand the existing access for Haven Towers. The access on McGarry Terrace will be for loading operations only. The anticipated full build-out and occupancy horizon is 2026 with construction occurring in a single phase. The subject development is within the Barrhaven Downtown Secondary Plan Area. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

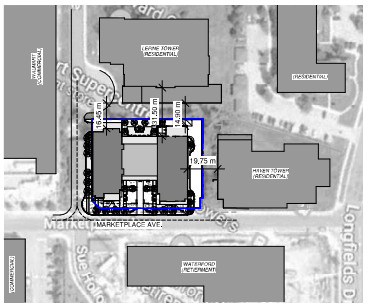
Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 19, 2023



1 ARCHITECTURAL SITE PLAN
1 : 150



2 KEYPLAN
1 : 1500

PROGRESSIVE ARCHITECTS, LTD.
5255 COUNTY RD. 42, UNIT C, WINDSOR ON, N8N2M1 TEL: 519-256-1607

rev.	date	issued for	rev.	date	issued for
8			16		
7			15		
6			14		
5			13		
4			12		
3			11		
2			10		
1			9		

project:
MARKET PLACE WEST

address: 1034 MCGARRY TERRACE, OTTAWA ON

sheet name:
ARCHITECTURAL SITE PLAN

project no.:
22-0039

sheet no.:
A001

2.2 Existing Conditions

2.2.1 Area Road Network

Longfields Drive: Longfields Drive is a City of Ottawa arterial road south of Strandherd Drive with a divided four-lane urban cross-section including bike lanes and sidewalks on both sides of the road, and a major collector road north of Strandherd Drive including sidewalks on both sides of the road and bike lane on the east side of the road between Deercroft Avenue and Strandherd Drive. North of Strandherd Drive, the posted speed limit is 40 km/h, between Strandherd Drive and Lindenshade Drive, the posted limit is 50 km/h, and south of Lindenshade Drive, the posted limit is 60 km/h. The City of Ottawa protects for a 37.5 metre right-of-way. Longfields Drive south of Strandherd Drive is a truck route.

Strandherd Drive: Strandherd Drive is a City of Ottawa arterial road with a divided four-lane urban cross-section including sidewalks on both sides of the road, and bike lanes and on both sides of the road east of Greenbank Road. The posted speed limit is 60 km/h west of Walmart Supercentre (Chapman Mills Marketplace) access and 70 km/h east of Walmart Supercentre (Chapman Mills Marketplace) access. The City of Ottawa protects a 44.5 metre right-of-way. Strandherd Drive is a truck route.

Chapman Mills Drive: Chapman Mills Drive is a City of Ottawa major collector road with a divided two-lane urban cross-section including sidewalks, cycle tracks, and on-street parking in laybys on both sides of the road, and a median rapid bus transit corridor. The unposted speed limit is 50 km/h outside of the large school zone surrounding (40 km/h during school commuting hours) the three schools fronting the road, and the right-of-way is reserved as 41.5 metres within Chapman Mills Drive Extension EA. Currently, the Chapman Mills Drive corridor ends at Longfields Drive and will extend to the west once development proceeds.

Riocan Avenue: Riocan Avenue is a City of Ottawa collector road with a two-lane urban cross-section including sidewalks, and on-street parking permitted on both sides of the road. The unposted speed limit is 50 km/h and the existing right-of-way is 20.0 metres

Marketplace Avenue: Marketplace Avenue is a City of Ottawa collector road with a two-lane urban cross-section including sidewalks. On-street parking is restricted on the south side of the road east of Sue Holloway Drive between 7:00 AM and 5:00 PM and permitted on both sides of the road east of Riocan Avenue for approximately 160 metres. The posted speed limit is 50 km/h and the right-of-way within the study area is 20.5 metres.

Sue Holloway Drive: Sue Holloway Drive is a City of Ottawa local road with a two-lane urban cross-section including sidewalks and on-street parking permitted on both sides of the road. The posted speed limit is 40 km/h and the existing right-of-way is 20.0 metres.

McGarry Terrace: McGarry Terrace is a City of Ottawa local road with a two-lane urban cross-section including sidewalks on the east side of the road and on-street parking permitted on the west side of the road. The unposted speed limit is 50 km/h and the existing right-of-way is 18.0 metres. Currently, McGarry Terrace ends on the north property boundary of the 1034 McGarry Terrace and the property will be dedicated to the City as part of this application to connect the roadway to Marketplace Avenue.

2.2.2 Existing Intersections

The existing signalized area key intersections within one kilometre of the site have been summarized below:

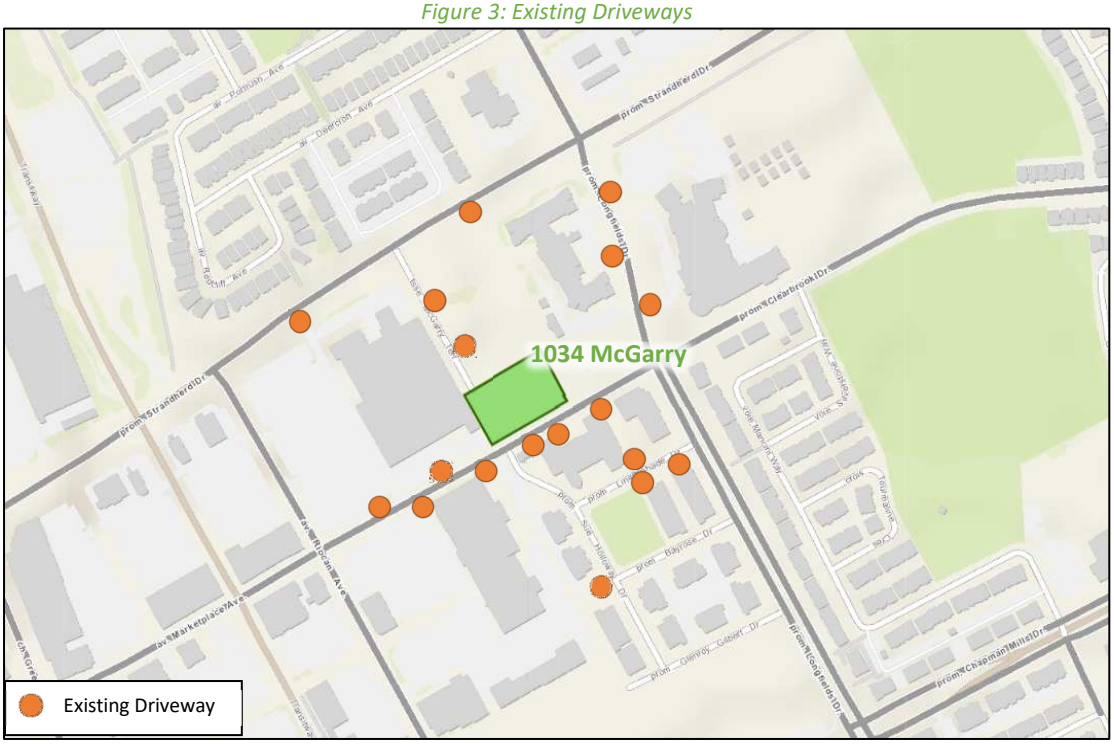
Strandherd Drive at Longfields Drive	The intersection of Strandherd Drive at Longfields Drive is a signalized intersection. The northbound approach consists of dual left-turn lanes, a through lane, a bike lane, and an auxiliary channelized right-turn lane. The southbound approach consists of an auxiliary left-turn

	lane, a through lane, and a shared through/right-turn lane. The eastbound and westbound approaches each consist of dual auxiliary left-turn lanes, two through lanes, a bike lane, and an auxiliary channelized right-turn lane. No turn restrictions were noted.
Strandherd Drive at McGarry Terrace	The intersection of Strandherd Drive at McGarry Terrace is a T-intersection with stop-control on McGarry Terrace. The northbound approach is restricted to a right-out only due to the Strandherd Drive median and the eastbound approach consists of a through lane, a shared through/right-turn lane, and a bike lane.
Strandherd Drive at Riocan Avenue	The intersection of Strandherd Drive at Riocan Avenue is a signalized T- intersection. The northbound approach consists of an auxiliary left-turn lane, a left-turn lane, and a right-turn lane. The eastbound approach has two through lanes, a bike lane, and an auxiliary right-turn lane. The westbound approach has an auxiliary left-turn lane, two through lanes, and a bike lane. No turn restrictions were noted.
Marketplace Avenue/ Clearbrook Drive at Longfields Drive	The intersection of Marketplace Avenue/Clearbrook Drive at Longfields Drive is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane, a through lane, a shared through/right-turn lane, and a bike lane. The eastbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane, and the westbound approach consists of a shared all-movement lane. No turn restrictions were noted.
Marketplace Avenue at Sue Holloway Drive	The intersection of Marketplace Avenue at Sue Holloway Drive is a T-intersection with stop-control on Sue Holloway Drive. Each approach consists of a shared all-movement lane. No turn restrictions were noted.
Marketplace Avenue at Riocan Avenue	The intersection of Marketplace Avenue at Riocan Avenue is an all-way stop-controlled intersection. Each approach has an auxiliary left-turn lane and a shared through/right-turn lane. No turn restrictions were noted.
Chapman Mills Drive at Longfields Drive	The intersection of Chapman Mills Drive at Longfields Drive is a signalized intersection. The northbound and southbound approaches consist of an auxiliary left-turn lane (currently unpainted in the northbound), two through lanes, an auxiliary right-turn lane (currently unpainted in the southbound), and a protected intersection bike lane. The westbound approach has an auxiliary left-turn lane, one through lane, an auxiliary right-turn lane, and a cycle track. The eastbound approach serves as a private access for construction activities and OC Transpo, with approximately 9.6 metres reserved for an undetermined lane configuration. The median BRT run is provided on Chapman Mills Drive in the east-west direction. Northbound U-turns and right-turn on red are prohibited, and no other signed turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, one driveway on Standherd Drive and four driveways on Marketplace are provided to Chapman Mills Marketplace commercial plaza. One driveway on Standherd Drive and two driveways on McGarry Terrace are provided to storage units. Three driveways to a retirement community are provided on Marketplace and two driveways to a catholic school are provided on Longfields Drive. On Lindenshade Drive, one driveway to high-rise buildings, and two driveways to townhouses are provided. One driveway on the west approach at Sue Holloway Drive at Bayrose Drive is provided to offices. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 19, 2023

2.2.4 Cycling and Pedestrian Facilities

Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities.

Sidewalks are provided on the east side of McGarry Terrace, on both sides of Longfields Drive, Strandherd Drive between Greenbank Road and Longfields Drive, Chapman Mills Drive, Riocan Avenue, Marketplace Avenue, and Sue Holloway Drive.

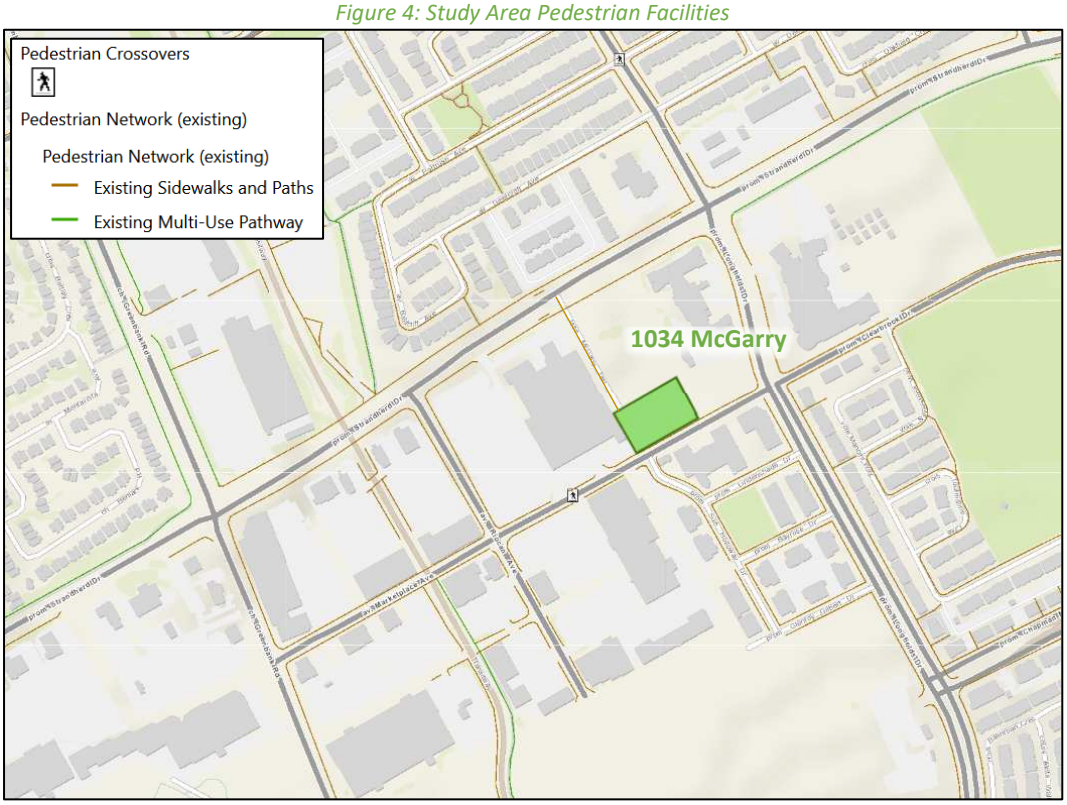
On the west side of Greenbank Road, approximately 210 metres north of Strandherd Drive, the pathway transits to the sidewalk to the south, and sidewalks are provided on the east side of Greenbank Road.

A mixed-use path (MUP) is provided on the north side and a sidewalk is provided on the south side of Strandherd Drive west of Greenbank Road. A MUP is also provided on the south side of Strandherd Drive east of Longfields Drive. A MUP is located on the east side and a sidewalk on the west side of the Transitway to the south and sidewalks are along both sides of the Transitway to the north of Marketplace Avenue.

Cycling facilities include cycletracks along Chapman Mills Drive west of Langrell Crescent/Temagami Drive, curbside bike lanes along both sides of Greenbank Road north of Marketplace Avenue, along both sides of Strandherd Drive east of Greenbank Road and on the north side of Strandherd Drive east of Longfields Drive, and along Longfields Drive south of Strandherd Drive. A paved shoulder is found along the west side of Greenbank

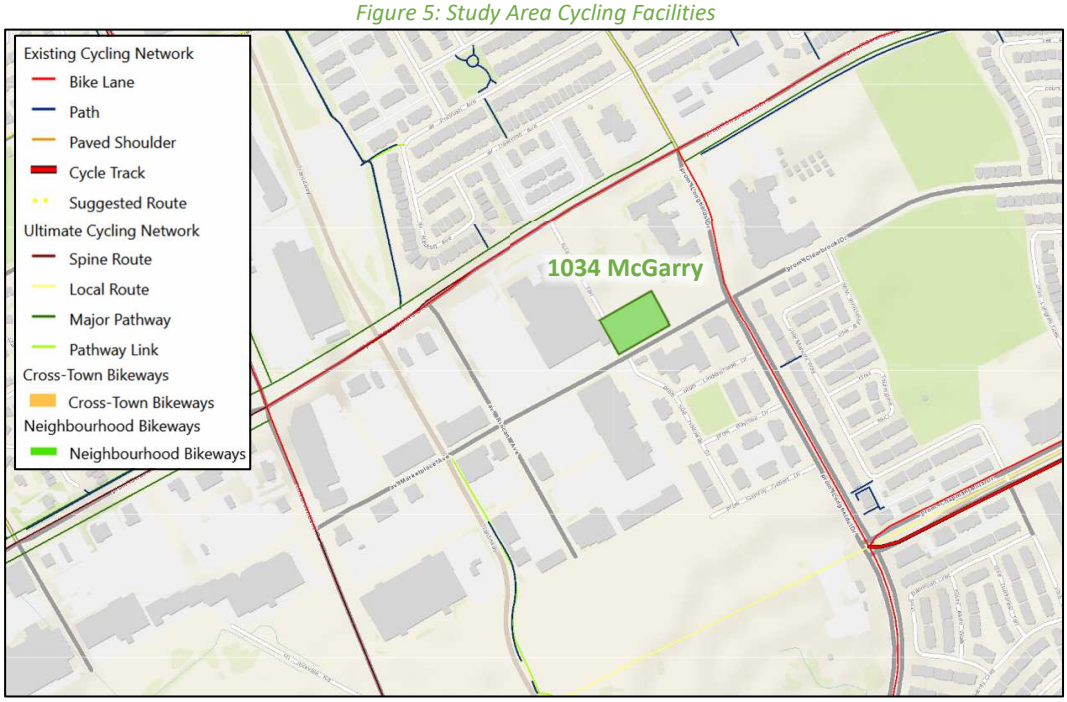
Road south of Marketplace Drive. Strandherd Drive and Greenbank Road are spine cycling routes and Chapman Mills Drive, Paul Metivier Drive, Longfields Drive, and Beatrice Drive are local routes.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 19, 2023

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 19, 2023

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively. No pedestrian and cyclist volumes are available at Strandherd Drive at McGarry Terrace intersection.

Figure 6: Existing Pedestrian Volumes

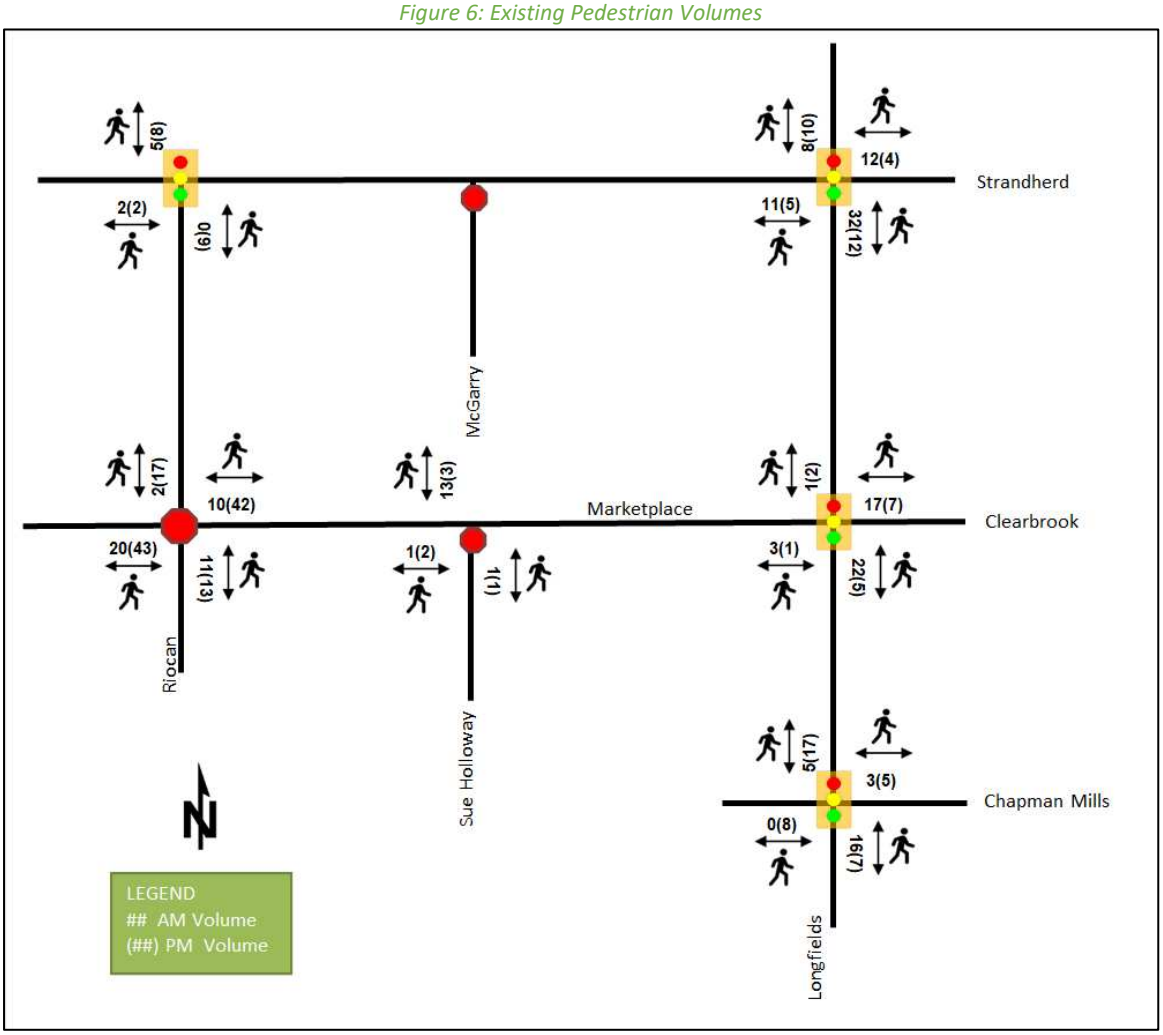
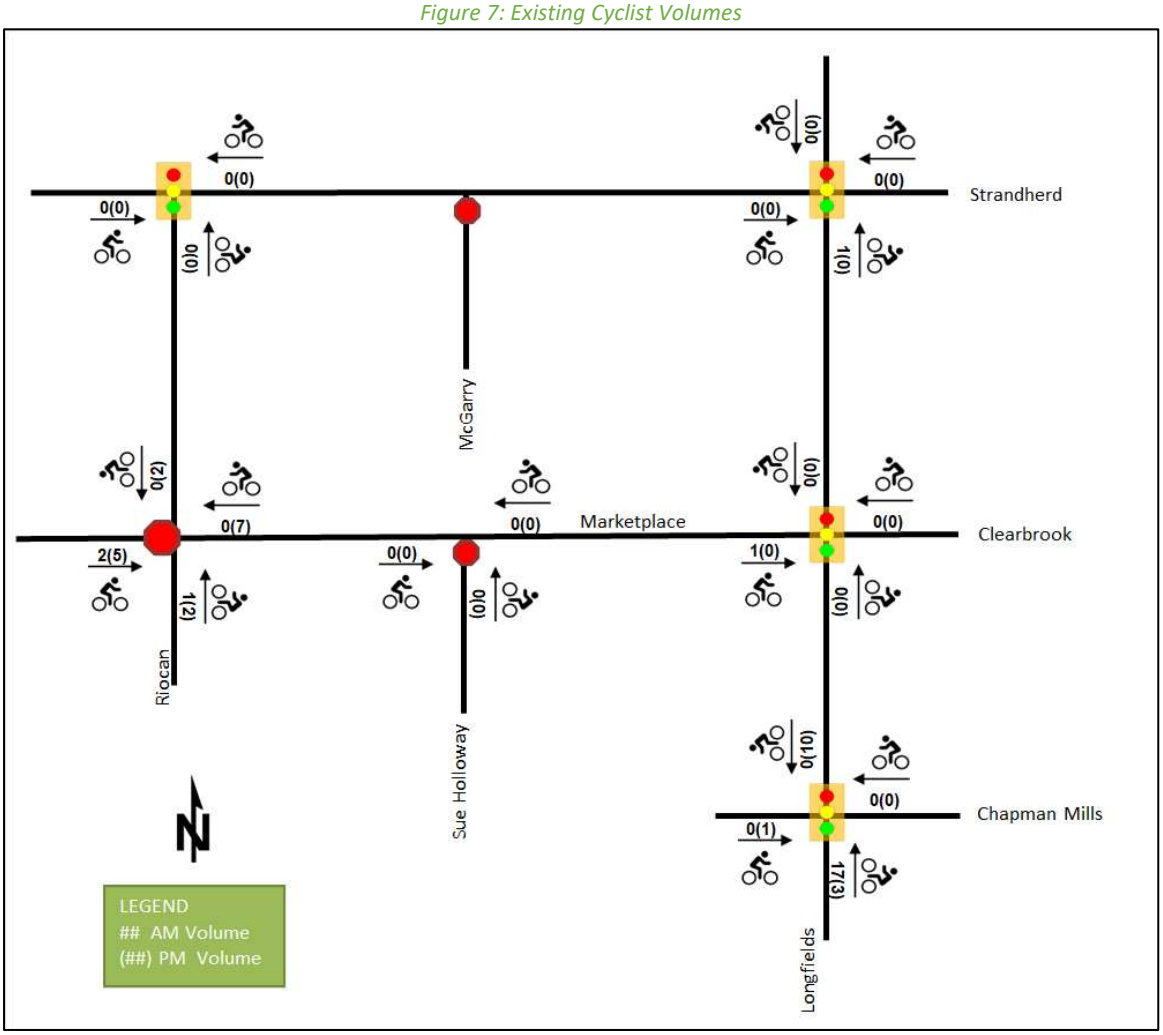


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

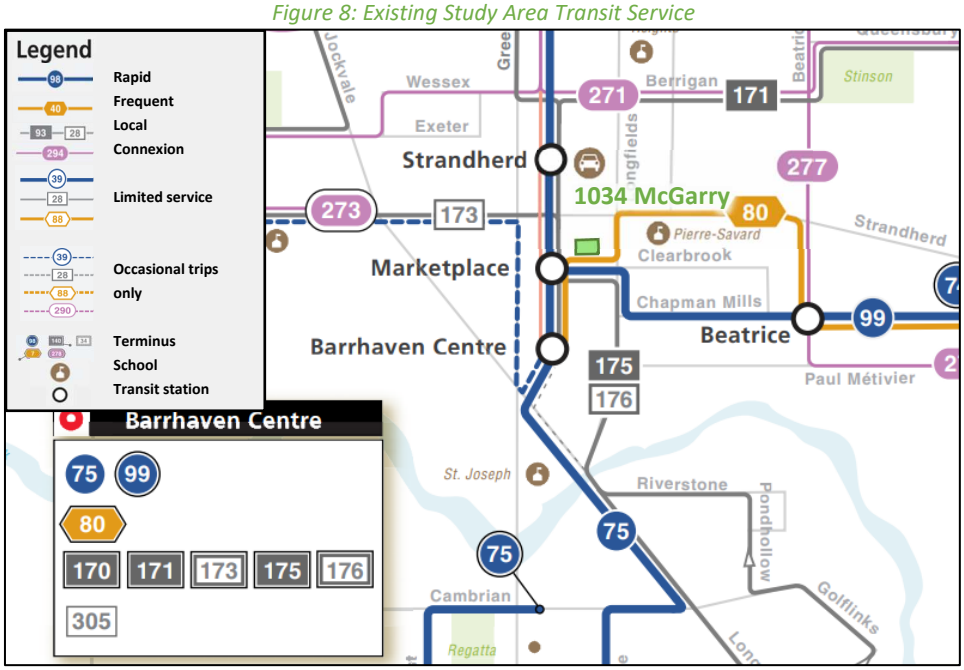
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from January 17, 2023 and is included for general information purposes and context to the surrounding area.

Within the study area, routes #75, 80, 99, 170, 171, 173, 175, and 176 service the Barrhaven Centre BRT station, with routes #175 and 176 continuing along Longfields Drive, #99 along Chapman Mills Drive, and #75 continuing along Jockvale Road within proximity of the site. The frequency of these routes within proximity of the proposed site based on January 17, 2023 service levels are:

- Route # 75 – 5-10 minutes service in the peak direction, 10-15 minutes in the off-peak direction, and 15-30 minutes during off-peak times
- Route # 80 – 30-minute service all day
- Route # 99 – 15 minutes service in the peak direction, and 30 minutes during off-peak times
- Route # 170 – 30-minute service all day
- Route # 171 – 30-minute service all day
- Route # 173 – 30-minute service all day
- Route # 175 – one-hour service during peak hours, sporadic arrivals during off-peak times

- Route # 176 – one-hour service, operating during peak times only

Figure 8: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: January 17, 2023

Figure 9: Existing Study Area Transit Stops

Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 19, 2023

2.2.6 Existing Area Traffic Management Measures

Painted on-street speed limit of 40 km/h and "slow down" signs are present on Sue Halloway Drive. Type D pedestrian crossover is also present on Marketplace Avenue.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing study area intersection, with the 1012 McGarry Terrace and 1024 McGarry Terrace TIS (Parsons, 2017) used for the McGarry Terrace intersection. Table 1 summarizes the intersection count dates. The development of 101 Lindenshade Drive, 125 Marketplace Avenue and the development of 1012-1024 McGarry Terrace have been included in the existing condition. The existing traffic counts were balanced along the roadways and grown to 2022 existing condition. It is noted that subsequent to this study, the City's direction has been discontinued the prior request for balancing.

Table 1: Intersection Count Date

Intersection	Count Date
Strandherd Drive at Longfields Drive	Thursday, January 16, 2020
Strandherd Drive at McGarry Terrace	1012 McGarry Terrace, 1024 McGarry Terrace TIS (Parsons, 2017)
Strandherd Drive at Riocan Avenue	Thursday, January 16, 2020
Marketplace Avenue/ Clearbrook Drive at Longfields Drive	Wednesday, November 21, 2018
Marketplace Avenue at Sue Holloway Drive	Wednesday, October 07, 2020
Marketplace Avenue at Riocan Avenue	Thursday, July 07, 2022
Chapman Mills Drive at Longfields Drive	Tuesday, June 19, 2018

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

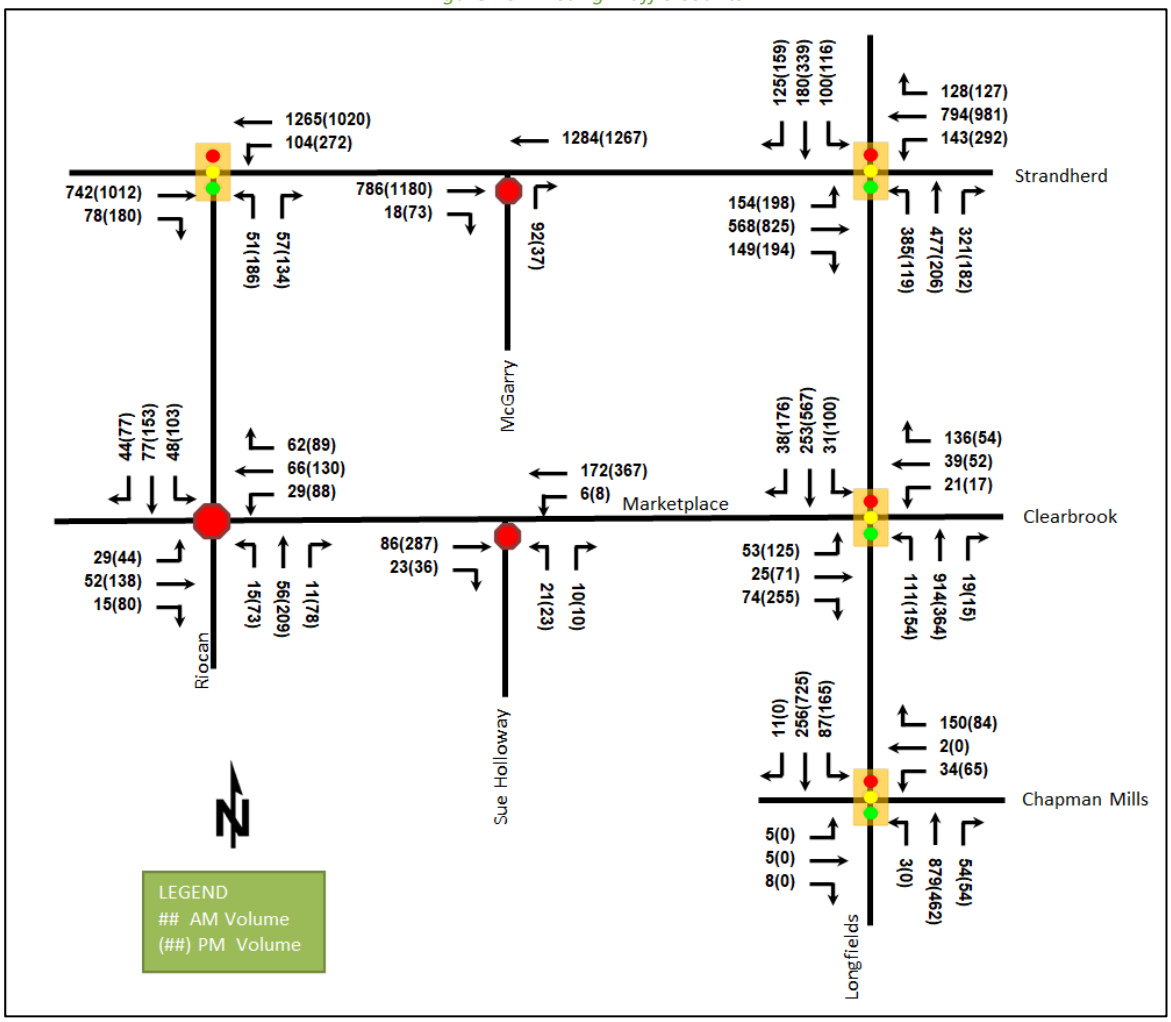


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at Riocan Avenue *Signalized*	EBT	A	0.40	12.5	71.3	E	0.93	50.2	**#178.7**
	EBR	A	0.09	2.6	6.8	A	0.31	6.3	18.5
	WBL	A	0.26	1.6	m1.5	B	0.67	27.1	**m#117.4**
	WBT	A	0.56	1.9	m10.0	A	0.52	5.8	155.7
	NBL	A	0.30	57.2	13.2	B	0.67	63.8	37.0
	NBR	A	0.25	12.8	11.9	A	0.33	6.4	12.4
	Overall	**A**	**0.58**	**6.8**	-	**C**	**0.73**	**27.8**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Marketplace Avenue at Riocan Avenue ***Unsignalized***	EBL	A	0.05	9.0	1.5	B	0.12	12.3	3.0
	EBT/R	A	0.11	8.8	3.0	C	0.52	18.6	21.8
	WBL	A	0.05	9.1	1.5	B	0.23	13.6	6.8
	WBT/R	A	0.21	9.3	6.0	C	0.52	18.2	21.8
	NBL	A	0.03	8.9	0.8	B	0.18	12.7	5.3
	NBT/R	A	0.11	8.9	3.0	C	0.66	23.4	35.3
	SBL	A	0.09	9.2	2.3	B	0.26	13.9	7.5
	SBT/R	A	0.19	9.1	5.3	C	0.53	18.4	23.3
	Overall	**A**	**-**	**9.1**	**-**	**C**	**-**	**18.3**	**-**
Strandherd Drive at McGarry Terrace ***Unsignalized***	EBT	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	NB	C	0.30	19.8	9.0	D	0.23	30.3	6.0
	Overall	**A**	**-**	**0.8**	**-**	**A**	**-**	**0.4**	**-**
Marketplace Avenue at Sue Holloway Drive ***Unsignalized***	EB	-	-	-	-	-	-	-	-
	WB	A	0.01	7.6	0.0	A	0.01	8.2	0.0
	NB	B	0.05	10.3	1.5	B	0.09	14.2	2.3
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.7**	**-**
Strandherd Drive at Longfields Drive ***Signalized***	EBL	A	0.56	48.1	30.7	**F**	**1.40**	**241.1**	**m#43.5**
	EBT	B	0.69	55.4	101.7	D	0.90	46.9	**m#137.0**
	EBR	A	0.33	23.7	35.1	A	0.36	15.4	m35.6
	WBL	A	0.54	58.2	28.8	C	0.76	61.8	53.1
	WBT	E	0.96	63.7	**#160.0**	D	0.84	40.2	149.0
	WBR	A	0.28	5.8	12.8	A	0.21	3.7	10.1
	NBL	D	0.90	72.2	**#78.3**	A	0.51	59.4	25.4
	NBT	**F**	**1.06**	**99.6**	**#220.5**	A	0.53	44.8	72.5
	NBR	A	0.56	8.3	29.0	A	0.39	6.6	16.2
	SBL	B	0.61	64.3	42.1	D	0.84	**94.2**	**#63.7**
	SBT	A	0.47	43.1	63.5	D	0.84	60.9	**#139.1**
	SBR	A	0.29	6.3	13.0	A	0.34	4.2	10.3
	Overall	**E**	**0.98**	**55.3**	**-**	**D**	**0.89**	**52.7**	**-**
Marketplace Avenue at Longfields Drive ***Signalized***	EBL	A	0.28	25.8	14.7	A	0.58	38.3	29.8
	EBT/R	A	0.28	9.1	12.8	C	0.72	17.8	34.9
	WB	A	0.58	25.4	36.4	A	0.60	28.0	23.6
	NBL	A	0.22	10.8	20.7	A	0.45	11.6	27.5
	NBT/R	A	0.52	12.7	85.7	A	0.20	7.7	29.5
	SBL	A	0.15	22.5	12.0	A	0.26	19.2	29.8
	SBT/R	A	0.21	16.3	30.9	A	0.53	18.5	**#92.8**
	Overall	**A**	**0.56**	**15.0**	**-**	**A**	**0.53**	**17.7**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Chapman Mills Drive at Longfields Drive ***Signalized***	EBL	A	0.06	45.2	5.1	-	-	-	-
	EBT	A	0.04	34.8	4.1	-	-	-	-
	EBR	A	0.03	0.1	0.0	-	-	-	-
	WBL	A	0.29	48.0	16.6	A	0.43	49.8	26.3
	WBT	A	0.01	28.0	2.0	-	-	-	-
	WBR	A	0.45	8.6	14.9	A	0.16	0.6	0.0
	NBL	A	0.00	12.7	2.0	-	-	-	-
	NBT	A	0.45	12.0	100.7	A	0.22	9.1	52.4
	NBR	A	0.07	10.8	14.4	A	0.06	10.7	16.0
	SBL	A	0.38	19.5	**#36.8**	A	0.31	13.5	53.0
	SBT	A	0.14	9.4	26.3	A	0.34	10.1	87.4
	SBR	A	0.02	0.0	0.0	-	-	-	-
	Overall	**A**	**0.44**	**12.5**	**-**	**A**	**0.37**	**11.4**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections generally operate well with some exceptions.

The intersection of Strandherd Drive at Riocan Avenue may experience queuing on the eastbound through and westbound left movements during the PM peak hour.

The intersection of Strandherd Drive and Longfields Drive may experience queuing on the westbound through, northbound left, and northbound through movements during the AM peak hour, with the northbound through additionally being at theoretical capacity and potentially experiencing high delays. During the PM peak hour, the eastbound left is at theoretical capacity. The eastbound through, southbound left, and southbound through movements during the PM peak hour may exhibit extended queuing, with the southbound left movement potentially experiencing high delays. Further optimized signal timings may address the constraints at this intersection and reduce the v/c of all movements to be 1.00 or below.

The intersection of Marketplace Avenue at Longfields Drive may experience queuing on the southbound shared through/right-turn movement during the PM peak hour.

The intersection of Chapman Mills Drive at Longfields Drive may experience queuing on the southbound left-turn movement during the AM peak hour.

2.2.8 Collision Analysis

Collision data have 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. Table 3 summarizes the collision types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

		Number	%
Total Collisions		**113**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	24	21%
	Property Damage Only	89	79%
Initial Impact Type	**Angle**	19	17%
	Rear end	55	49%
	Sideswipe	17	15%
	Turning Movement	14	12%
	SMV Other	6	5%
	Other	2	2%
Road Surface Condition	**Dry**	81	72%
	Wet	19	17%
	Loose Snow	7	6%
	Slush	2	2%
	Ice	4	4%
Pedestrian Involved		2	2%
Cyclists Involved		4	4%

Figure 11: Study Area Collision Records – Representation of 2015-2019

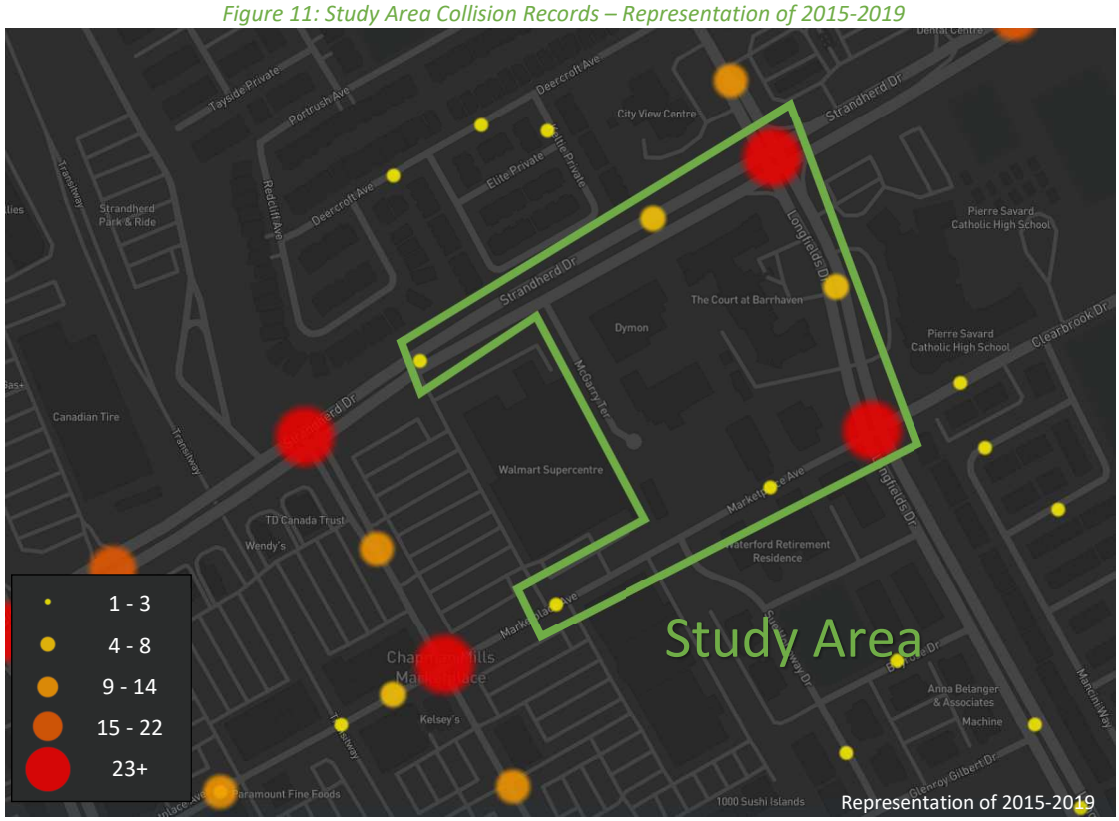


Table 4: Summary of Collision Locations, 2016-2020

Intersections / Segments	Number 113	% 100%
Strandherd Dr @ Longfields Dr	76	67%
Clearbrook Dr/Marketplace Ave @ Longfields Dr	25	22%
Strandherd Dr btwn McGarry Ter & Longfields Dr	4	4%
Longfields Dr btwn Strandherd Dr & Marketplace Ave	4	4%
Marketplace Ave btwn Riocan Ave & Continuation of Marketplace Ave	2	2%
Marketplace Ave btwn Continuation of Marketplace Ave & Longfields Dr	2	2%

Within the study area, the intersection of Strandherd Drive at Longfields Drive and Clearbrook Drive/Marketplace Avenue at Longfields Drive are noted to have experienced higher collisions than other locations. Table 5 and Table 6 summarize the collision types and conditions for each location.

Table 5: Strandherd Drive at Longfields Drive Collision Summary

		Number	%
Total Collisions		**76**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	14	18%
	Property Damage Only	62	82%
Initial Impact Type	**Angle**	9	12%
	Rear end	48	63%
	Sideswipe	13	17%
	Turning Movement	3	4%
	SMV Other	2	3%
	Other	1	1%
Road Surface Condition	**Dry**	55	72%
	Wet	14	18%
	Loose Snow	3	4%
	Slush	2	3%
	Ice	2	3%
Pedestrian Involved		0	0%
Cyclists Involved		1	1%

The Strandherd Drive at Longfields Drive intersection had a total of 76 collisions during the 2016-2020 time period, with 62 involving property damage only and the remaining 14 having non-fatal injuries. The collision types are most represented by the rear end with 48 collisions, followed by sideswipe with 13, angle with nine, three as turning movement, and one as SMV (other). Rear end collisions and sideswipe are generally more represented in congested areas, such as Strandherd Drive. Weather conditions do not affect collisions at this location. No geometric issues are noted for the intersection. No further examination is required as part of this study.

Table 6: Clearbrook Drive/Marketplace Avenue at Longfields Drive Collision Summary

		Number	%
Total Collisions		**25**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	8	32%
	Property Damage Only	17	68%
Initial Impact Type	**Angle**	7	28%
	Rear end	5	20%
	Sideswipe	2	8%
	Turning Movement	10	40%
	SMV Other	1	4%
Road Surface Condition	**Dry**	17	68%
	Wet	4	16%
	Loose Snow	3	12%
	Ice	1	4%
Pedestrian Involved		1	4%
Cyclists Involved		2	8%

The Clearbrook Drive/Marketplace Avenue at Longfields Drive intersection had a total of 25 collisions during the 2016-2020 time period, with 17 involving property damage only and the remaining eight having non-fatal injuries. The collision types are most represented by turning movement with ten collisions, followed by the angle with seven collisions, rear end with five collisions, and one collision as SMV (other). No pattern is noted although the adjacent school may result in atypical vehicle movements and contribute to some of the collision numbers. The construction activities may also be an influence on the rates, as there have been 5-6 collisions per year during construction activities, with only three noted in 2017 when no construction was ongoing. Weather conditions do not affect collisions at this location. No further examination is required as part of this study as construction activities will be completed adjacent to the intersection prior to the initiation of the subject site.

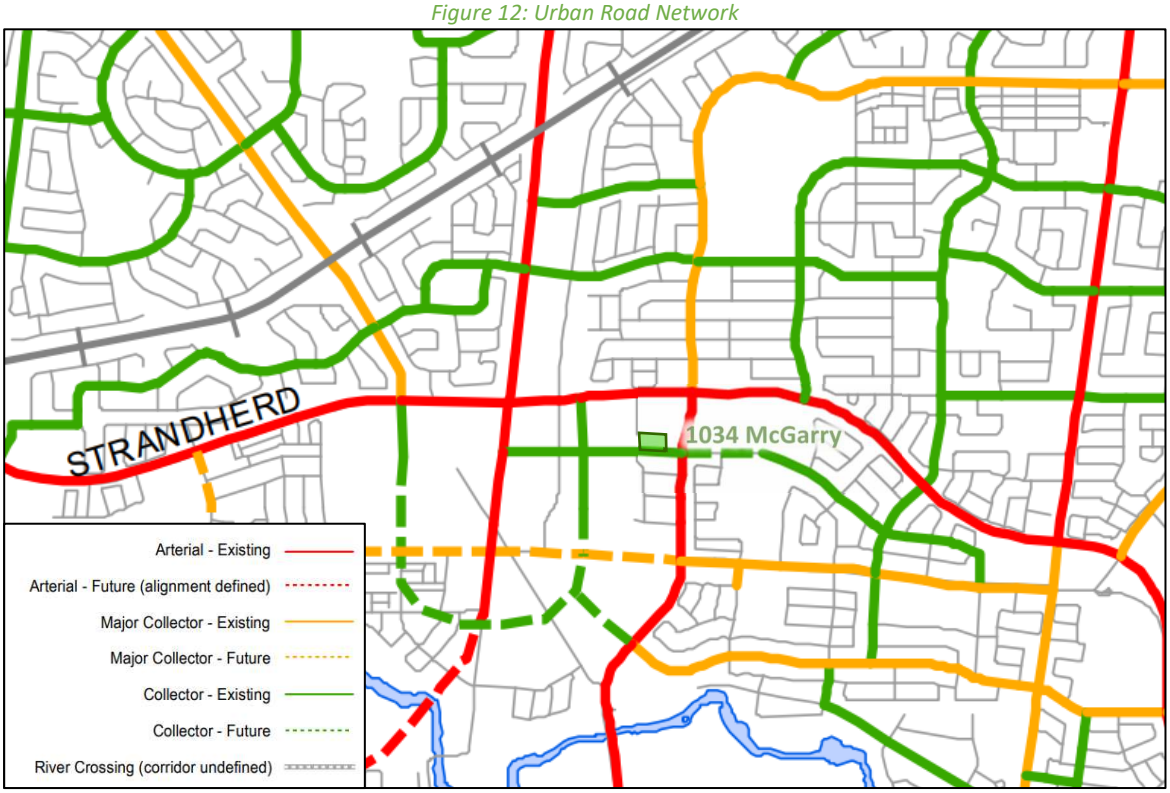
2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 City Official Plan (2021)

From the Urban Road Network map in the City Official Plan, illustrated in Figure 12, Chapman Mills Drive is to be extended to meet Strandherd Drive at its current intersection. The current Riocan Avenue is also to be extended, past Chapman Mills Drive and loop past Greenbank Road to meet Strandherd Drive at its intersection with Jockvale Road. The realignment of Greenbank Road will be south of St. Joseph High School.

Figure 12: Urban Road Network

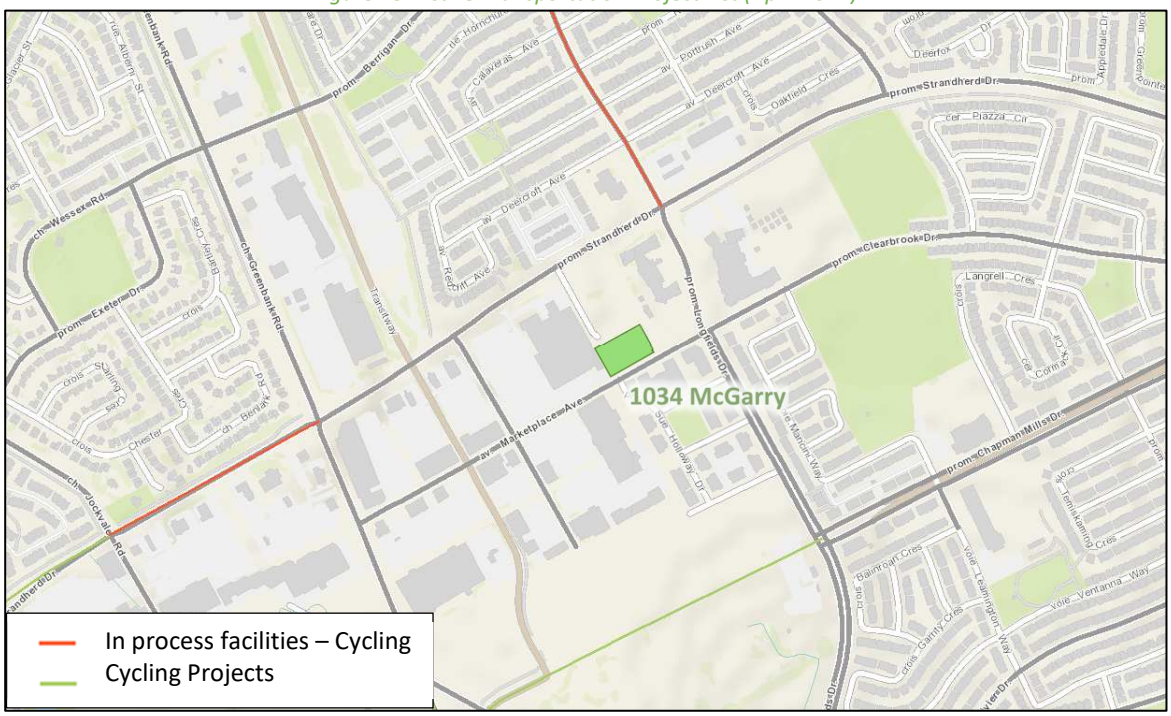


Source: https://engage.ottawa.ca/the-new-official-plan Accessed: July 18, 2023

2.3.1.2 City Transportation Master Plan (draft 2024)

Cycling projects are identified along Longfields Drive between Berrigan Drive and Strandherd Drive and along Strandherd Drive between Jockvale Road and Greenbank Road in the Active Transportation Project List (April 2022). Chapman Mills Drive between Jockvale Road and Longfields Drive is identified as the in-process cycling facility in the Active Transportation Project List (April 2022) Figure 13 illustrates the Active Transportation Project List (April 2022).

Figure 13: Active Transportation Project List (April 2022)

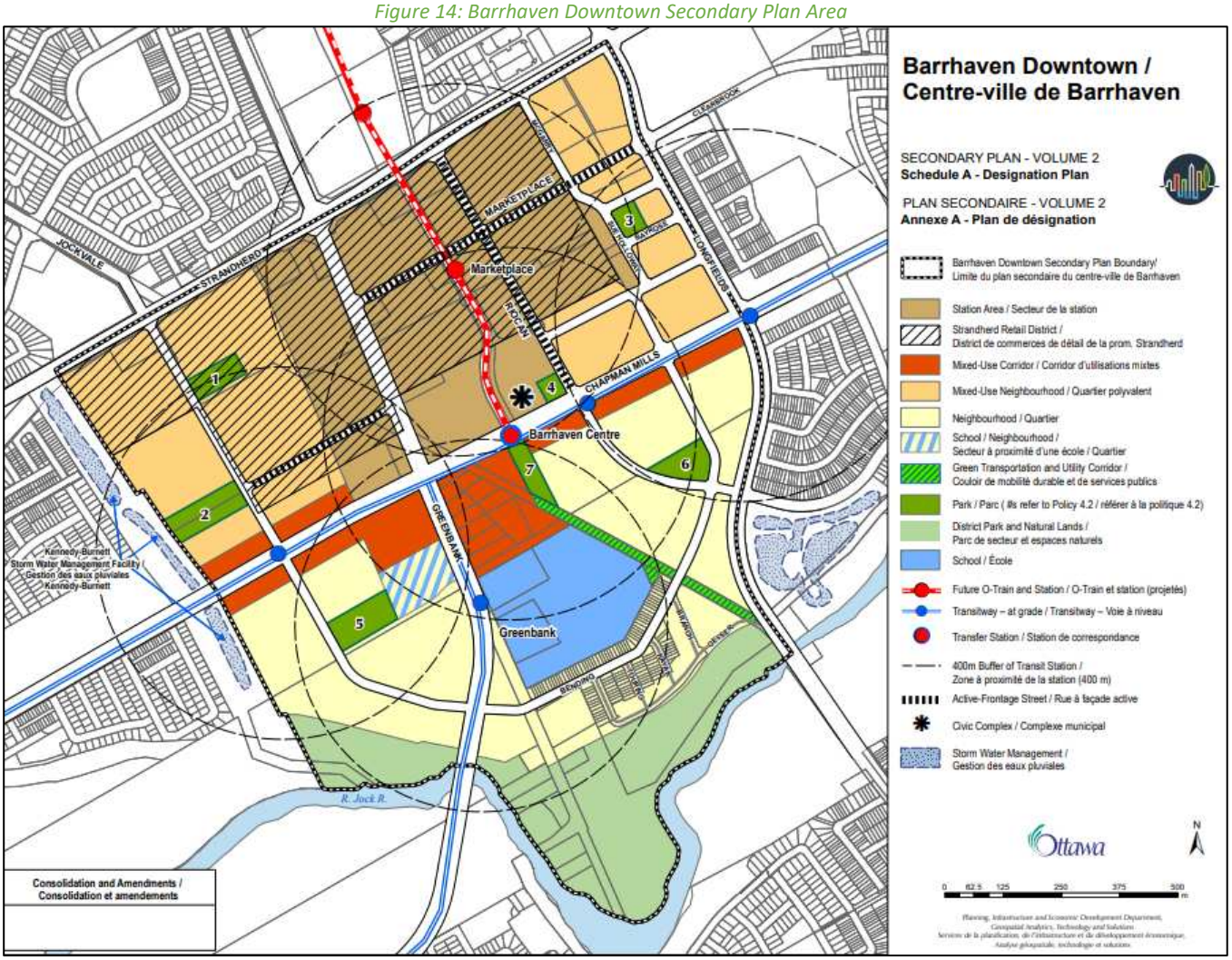


Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 25, 2023

2.3.1.3 Barrhaven Downtown Secondary Plan

The subject development is within the Barrhaven Downtown Secondary Plan Area. As such, it is subject to the planning policies outlined in the Secondary Plan. The Secondary Plan identifies two transit lines, the east-west Chapman Mills Drive BRT and the north-south transit corridor LRT, as serving the community. It also details that the development surrounding these facilities must follow transit-supportive design principles. In terms of consideration for active modes, the plan recommends adequate bicycle parking be provided near transit and high activity areas, proposes all streets within the Station Area, Mixed-Use Corridor and Mixed-Use Neighbourhood designations aim to have sidewalks on both sides of the street. Figure 14 illustrates the Barrhaven Downtown Secondary Plan Area.

Figure 14: Barrhaven Downtown Secondary Plan Area



Source: https://engage.ottawa.ca/the-new-official-plan Accessed: January 25, 2023

2.3.1.4 Chapman Mills Drive Extension EA

The Chapman Mills Drive Extension has a proposed standard cross section throughout the study area for a 41-metre right-of-way including median bus rapid transit lanes, as well as a travel lane, a parking lane, a cycletrack, and a sidewalk in each direction. Since approval, the signalized intersection originally identified at Sue Holloway Drive has been shifted to Riocan Avenue to support the civic complex/station area.

2.3.1.5 Barrhaven Light Rail Transit (LRT)

As part of LRT Phase Three, Barrhaven LRT will include the conversion of the BRT corridor between the Nepean Sportsplex and Barrhaven Centre Station to an LRT line. The plan proposes a new Park and Ride at Barrhaven Centre Station, which is to become a transfer station to the Chapman Mills Drive BRT line.

2.3.2 Other Study Area Developments

101 Lindenshade Drive, 125 Marketplace Avenue

The proposed development application includes a site plan application to include approximately 291 dwelling units. 101 Lindenshade Drive, 125 Marketplace Avenue has been constructed and the traffic for this site was added to the existing turning movement counts. (Parson, 2016)

1012, 1024 McGarry Terrace

The proposed development application includes a site plan application to include approximately 237 dwelling units. 1012, 1024 McGarry Terrace has been constructed and the traffic for this site was added to the existing turning movement counts. (Parson, 2017)

3265 Jockvale Road

The proposed development application includes a site plan application to include 604 stacked townhouse units. It is estimated that the development will be constructed by 2026. The development is anticipated to generate 78 new AM and 84 new PM peak hour two-way auto trips. (CGH Transportation, 2022)

3194 Jockvale Road

The proposed development application includes a zoning by-law amendment and draft plan of subdivision to include a mix of 216 stacked townhome units and approximately 200,000 sq. ft. of retail space, located between the Barrhaven Town Centre and the On The Green golf range. The development will extend Jockvale Road south of the Barrhaven Town Centre and include a new signalized intersection on Greenbank Road. It is estimated that the development will be constructed by 2026. The development is anticipated to generate 221 new AM and 589 new PM peak hour two-way auto trips. (CGH Transportation, 2019).

105, 4051, 4050 Sencha Terrace & 2 Unaddressed Parcels

The proposed development application includes a zoning by-law amendment to include five high-rise residential buildings, one mid-rise residential building, and one mid-rise retirement home for a total of 1125 units. The tentative build-out would occur over five phases between 2025 and 2040. No TIA is available at this time.

1117 Longfields Drive

The proposed development application includes two towers totaling 174 units and 2,100 m^2 of retail/commercial in the first phase, and Phase One is anticipated to be constructed by 2023. The development is anticipated to generate 140 new AM and 190 new PM peak hour two-way auto trips in the first phase. (Parsons, 2018).

3288 Greenbank Road

The development is proposed to be a mix of 310 apartment units and 602 townhome units, located between the future Chapman Mills Drive alignment on the north and the Claridge development (3370 Greenbank Road) to the south. It is estimated that the development will be constructed by 2025. Phase One of the development is anticipated to generate 62 new AM and 73 new PM peak hour two-way auto trips. (CGH Transportation, 2020)

3370 Greenbank Road

The Burnett Lands are located at 3370 Greenbank Road and is proposed to include 177 townhomes in Phase One, 70 townhomes in Phase Two and 720 condo units in Phase Three. Originally proposed to be completed by 2020, the plan of subdivision application is currently pending, and the Official Plan and Zoning By-Law Amendment have been adopted. Phase One is assumed to be completed in 2023, and it is estimated to generate 19 new AM and 27 new PM peak hour two-way auto trips. (Novatech, 2018)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Marketplace Avenue at:
  - Riocan Avenue
  - Sue Holloway Drive
  - Longfields Drive
- Strandherd Drive at:
  - Riocan Avenue
  - McGarry Terrace
  - Longfields Drive
- Chapman Mills Drive at:
  - Longfields Drive

The TIA Guidelines suggest the review of all signalized intersections within 1.0km of the site. It is recommended that the intersections listed below be excluded from this study, given the site will be transit-oriented, the access to the arterial road network is within close proximity to the site for any auto modes, and the existing intersection operations provide capacity for the site. The intersections noted below will have zero or negligible site volumes added once trips are assigned or will only be mainline trip additions. Marketplace Avenue was noted during the Step 2 review by City staff as a possible intersection to review. Given the general unattractiveness of navigating this roadway, and the north-south priority on Greenbank Road, it is unlikely any traffic will use this route over access via Riocan Avenue.

- Greenbank Road at:
  - Wessex Road/Berrigan Drive
  - Village Square Retail
  - Strandherd Drive
  - Marketplace Avenue
  - Jockvale Road
- Strandherd Drive at:
  - Jockvale Road
  - Barrhaven Town Centre Retail
  - Claridge Drive
- Longfields Drive at:
  - Paul Metivier Drive
- Chapman Mills Drive at:
  - Leamington Way

The boundary road will be Marketplace Avenue and McGarry Terrace, and no screenlines are present within proximity to the site.

3.2 Time Periods

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

3.3 Horizon Years

The anticipated build-out year is 2026. As a result, the full build-out plus five years horizon year is 2031.

4 Exemption Review

Table 7 summarizes the exemptions for this TIA.

Table 7: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	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
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	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	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	Required

5 Development-Generated Travel Demand

5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for South Nepean have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – South Nepean

Travel Mode	Multi-Unit (High-Rise)		Commercial Generator	
	AM	PM	AM	PM
Auto Driver	58%	54%	74%	61%
Auto Passenger	6%	15%	14%	27%
Transit	30%	25%	1%	1%
Cycling	2%	0%	0%	0%
Walking	4%	7%	11%	11%
Total	**100%**	**100%**	**100%**	**100%**

Based upon the site's context of being within 450 metres walk of the Marketplace station and within 800 metres walk of the Barrhaven Town Centre BRT station, and located adjacent to Chapman Mills Marketplace commercial

plaza which has a high density of residential-supportive land uses, modified mode share targets are proposed for the development and are summarized in Table 9.

Table 9: Proposed Development Mode Shares

Travel Mode	Multi-Unit (High-Rise)		Commercial Generator	
	AM	PM	AM	PM
Auto Driver	20%	20%	62%	56%
Auto Passenger	4%	6%	14%	27%
Transit	56%	54%	6%	4%
Cycling	3%	2%	0%	0%
Walking	17%	18%	18%	13%
Total	**100%**	**100%**	**100%**	**100%**

5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020) and the vehicle trip rates and derived person trip rates for commercial components from the ITE Trip Generation Manual 11th Edition (2021) using the City-prescribed conversion factor of 1.28. Table 10 summarizes the person trip rates for the proposed residential land uses for each peak period and the person trip rates for the commercial land use by peak hour.

Table 10: Trip Generation Person Trip Rates

Land Use	Land Use Code	Peak	Peak Period		Peak Hour	
			Vehicle Trip Rate	Person Trip Rates	Vehicle Trip Rate	Person Trip Rates
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	-	0.80	-	-
		PM	-	0.90	-	
Strip Retail Plaza (<40k)	822 (ITE)	AM	-	-	2.36	3.02
		PM	-	-	6.59	8.44

Using the above person trip rates, the total person trip generation has been estimated. Table 11 summarizes the total person trip generation for the residential land uses and for the commercial land uses.

Table 11: Total Person Trip Generation

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	592	147	327	474	309	224	533
Land Use	**GFA**	**AM Peak Hour**			**PM Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
Strip Retail Plaza (<40k)	19,626 sq. ft	22	14	36	50	50	100

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition have been assigned to the development's commercial components for mixed-use developments. The rates summarized in Table 12 represent the percentage of trips to/from the commercial land uses based on the residential component.

Table 12: Internal Capture Rates

Land Use	AM		PM	
	In	Out	In	Out
Residential to/from Strip Retail Plaza (<40k)	17%	14%	10%	26%

Pass-by reduction applied to the Strip Retail Plaza(<40k) at a rate of 40% has been included using the recommended value presented in the ITE Trip Generation Manual 11th Edition (2021) for the most similar land use with a recommended rate, "Retail (40k – 150k sq. ft.)".

Using the above mode share targets for a BRT area, the internal capture and pass-by rates, and the person trip rates, the person trips by mode have been projected. Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 13 summarizes the residential trip generation and the non-residential trip generation by mode and peak hour.

Table 13: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	**20%**	14	31	46	**20%**	27	20	47
	Auto Passenger	**4%**	3	6	9	**6%**	8	6	14
	Transit	**56%**	45	101	146	**54%**	78	57	135
	Cycling	**3%**	2	6	8	**2%**	3	2	5
	Walking	**17%**	15	32	47	**18%**	29	21	50
	Total	**100%**	**79**	**176**	**256**	**100%**	**145**	**106**	**251**
Strip Retail Plaza (<40k)	Auto Driver	**62%**	3	2	6	**56%**	6	4	10
	Auto Passenger	**14%**	3	2	5	**27%**	13	11	24
	Transit	**6%**	1	1	2	**4%**	2	2	4
	Cycling	**0%**	0	0	0	**0%**	0	0	0
	Walking	**18%**	4	2	6	**13%**	6	5	12
	Total	**100%**	**11**	**7**	**19**	**100%**	**27**	**22**	**50**
	Pass-by	*40%*	*-9*	*-6*	*-14*	*40%*	*-20*	*-20*	*-40*
	Internal Capture	*varies*	*-2*	*-1*	*-3*	*varies*	*-3*	*-8*	*-11*
Total	Auto Driver	-	17	33	52	-	33	24	57
	Auto Passenger	-	6	8	14	-	21	17	38
	Transit	-	46	102	148	-	80	59	139
	Cycling	-	2	6	8	-	3	2	5
	Walking	-	19	34	53	-	35	26	62
	Total	-	**90**	**183**	**275**	-	**172**	**128**	**301**
	Pass-by	*40%*	*-9*	*-6*	*-14*	*40%*	*-20*	*-20*	*-40*
	Internal Capture	*varies*	*-2*	*-1*	*-3*	*varies*	*-3*	*-8*	*-11*

As shown above, a total of 52 AM and 57 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel, and these patterns were applied based on the build-out of South Nepean. Table 14 below summarizes the distributions.

Table 14: OD Survey Distribution – South Nepean

To/From	% of Trips
North	65%
South	10%
East	15%
West	10%
Total	**100%**

5.4 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. Table 15 summarizes the proportional assignment to the study area roadways. Figure 15 illustrates the new site-generated volumes, and Figure 16 illustrates the pass-by volumes.

Table 15: Trip Assignment

To/From	Inbound Via
North	35% Strandherd Drive (W) 10% Longfields Drive (N) 20% Strandherd Drive (E)
South	10% Longfields Drive (S)
East	10% Strandherd Drive (E) 5% Chapman Mills Drive (E)
West	10% Strandherd Drive (W)
Total	**100%**

Figure 15: New Site Generation Auto Volumes

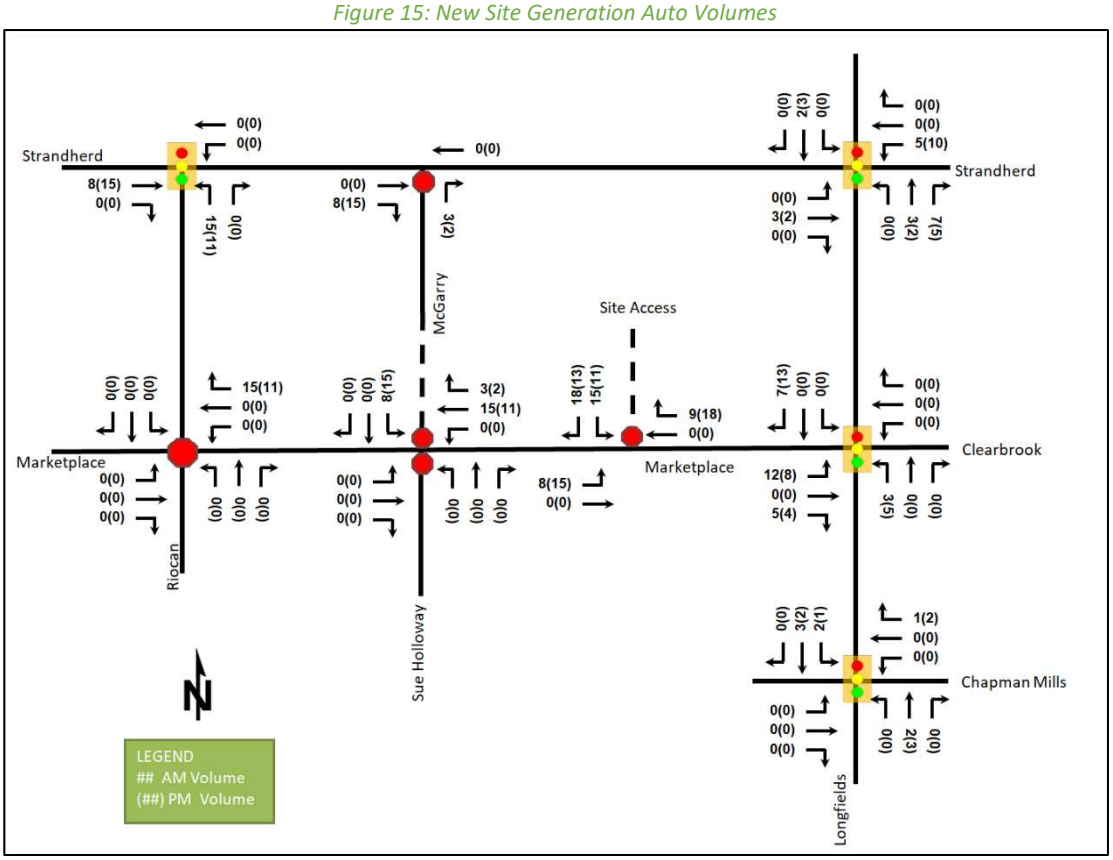
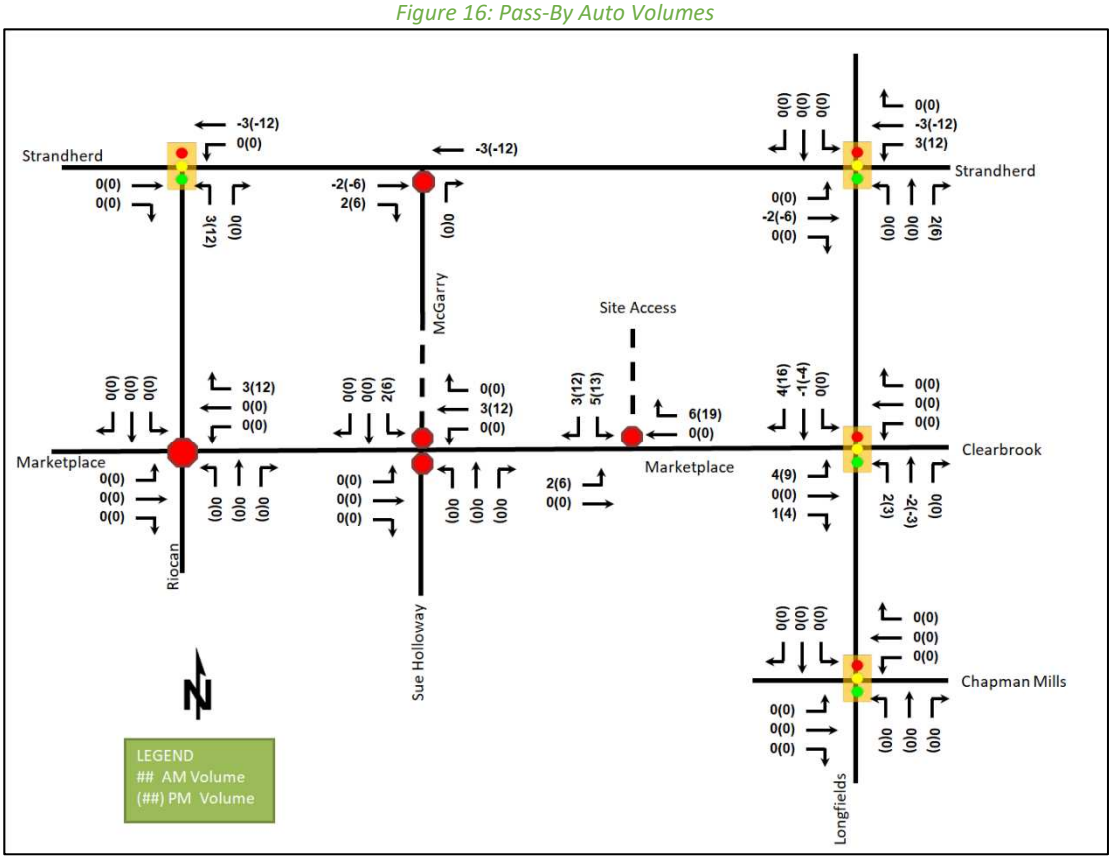


Figure 16: Pass-By Auto Volumes

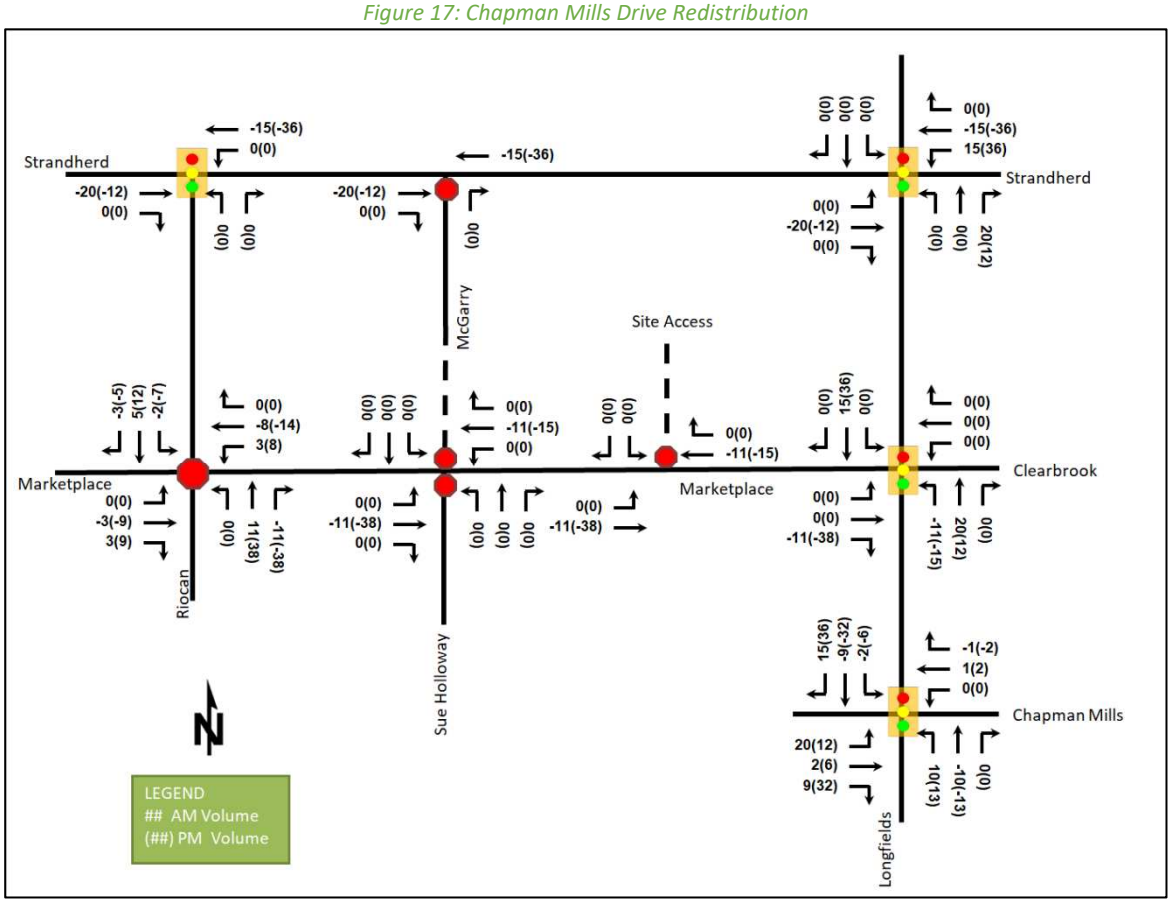


6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. The extension of Chapman Mills Drive from Longfields Drive to Greenbank Road is assumed to complete by 2031, although it will not impact the site-generated trips and trips distribution, the background volumes will be redistributed, and background volumes will be consistent with the study area TIAs. The projected associated redistribution of volumes is illustrated in Figure 17.

Figure 17: Chapman Mills Drive Redistribution



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. The background TRANS model growth rates are summarized in Table 16 and the TRANS model plots are provided in Appendix E.

Table 16: TRANS Regional Model Projections – Study Area Growth Rates

Street	TRANS Rate		2011 to Existing		Existing to 2031	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Strandherd Dr	3.18%	3.13%	2.98%	8.14%	3.34%	-0.80%
	Northbound	**Southbound**	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Longfields Dr	8.90%	5.15%	22.23%	17.28%	-0.92%	-3.83%
Riocan Ave	1.61%	0.43%	5.10%	-2.10%	-1.16%	2.54%

In general, TRANS forecasted growth within the study area has been largely achieved by the existing horizon. The existing volumes on Longfields Drive, in the westbound direction on Strandherd Drive, and in the northbound direction on Riocan Ave in the study area have exceeded the forecasted volumes. A comparison of 2011 to Existing volumes and the Existing to 2031 volumes illustrates a situation that development has not progressed linearly and has been front loaded within the 2011 to 2031 timeframe. Although it is unlikely that the growth rates will decrease or become negative as the Existing to 2031 summary outlines, it is expected that they will be lower than the 2011 to Existing rates that have been experienced. Table 17 summarizes the growth rates applied within the study area.

Table 17: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Strandherd Dr	1.50%	0.25%	0.25%	1.50%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Longfields Dr	2.50%	2.50%	2.50%	2.50%
Riocan Ave	-	-	-	-

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.2) include:

- 3265 Jockvale Road
- 3194 Jockvale Road
- 1034 McGarry Terrace, 1117 Longfields Drive
- 3288 Greenbank Road
- 3370 Greenbank Road

Figure 18 and Figure 19 illustrate the 2026 and 2031 total background development volumes within the study area, and the background development volumes within the study area have been provided in Appendix F.

Figure 18: 2026 Total Background Development Volumes

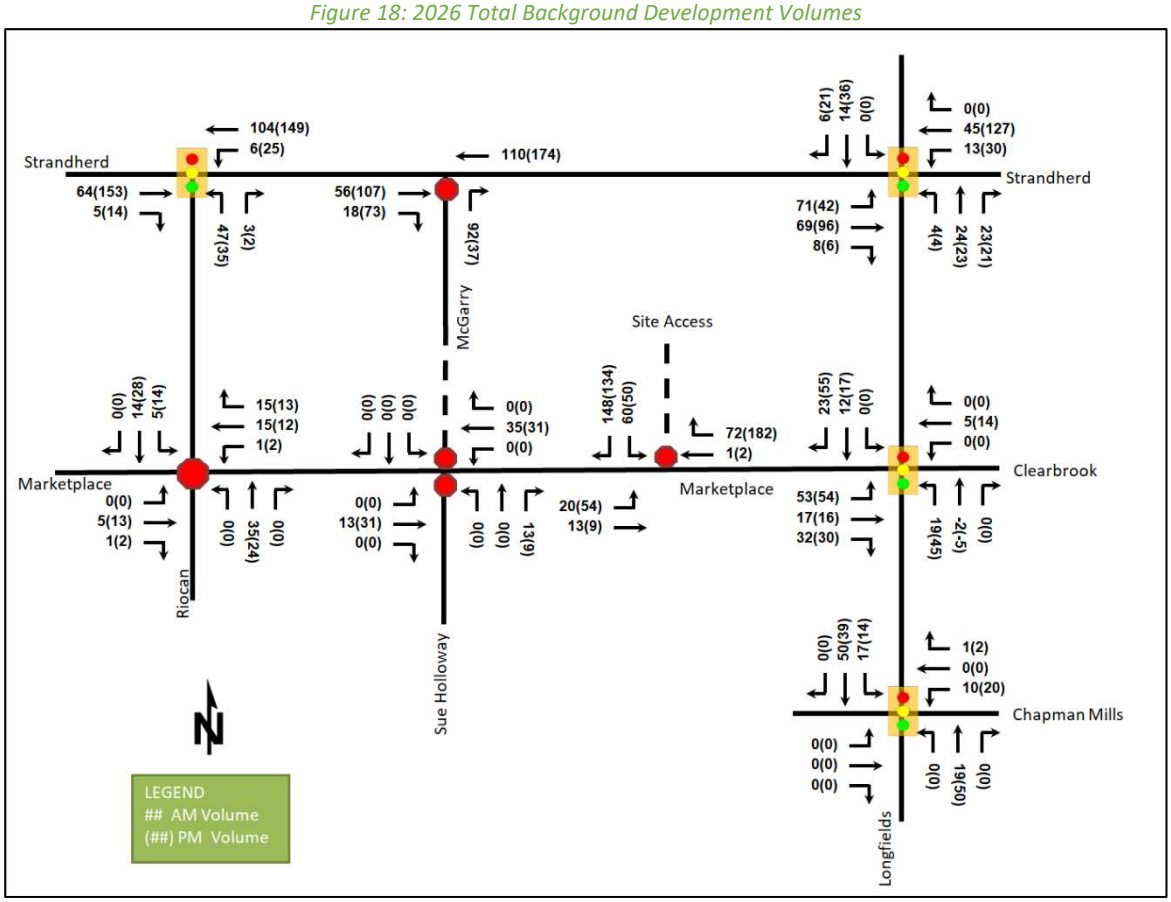
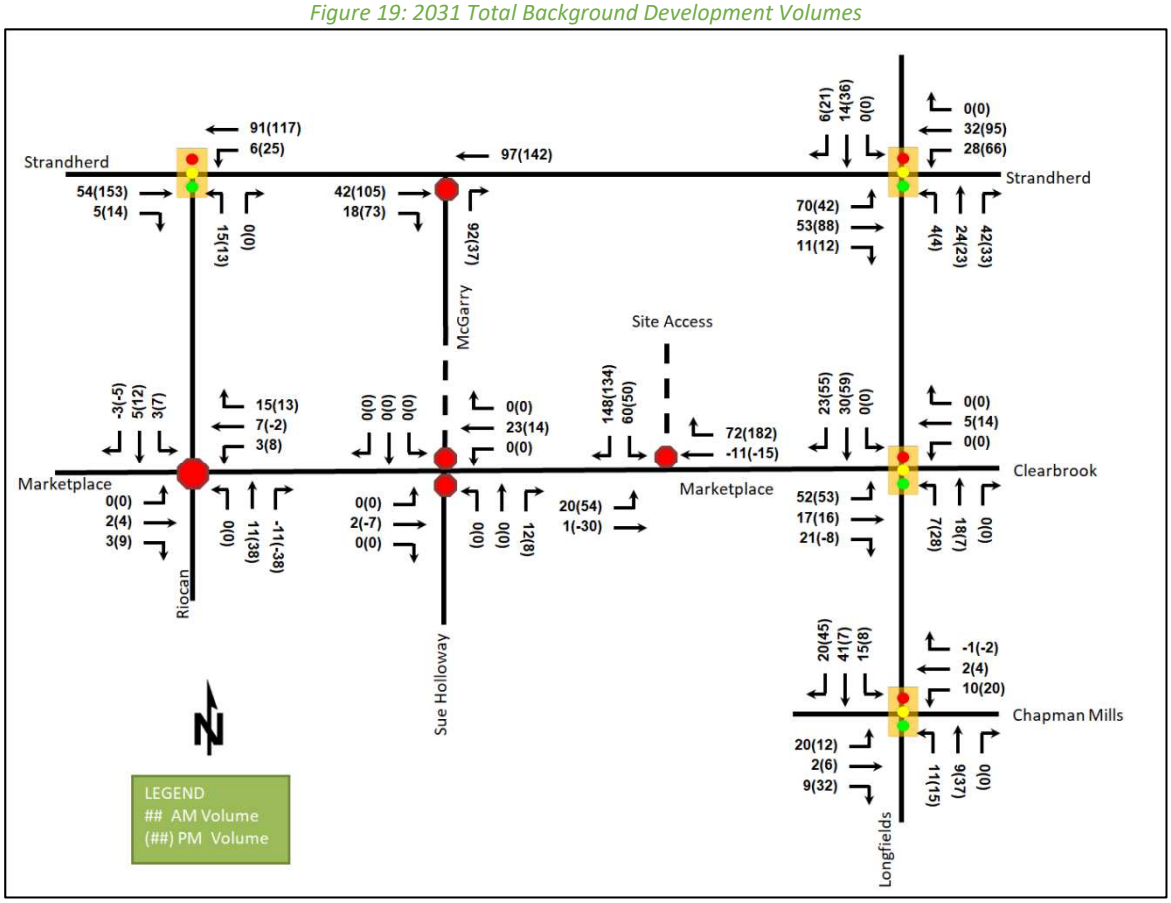


Figure 19: 2031 Total Background Development Volumes



7 Demand Rationalization

7.1 2026 Future Background Operations

Figure 20 illustrates the 2026 background volumes and Table 18 summarizes the 2026 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2026 future background horizon are provided in Appendix G.

Figure 20: 2026 Future Background Volumes

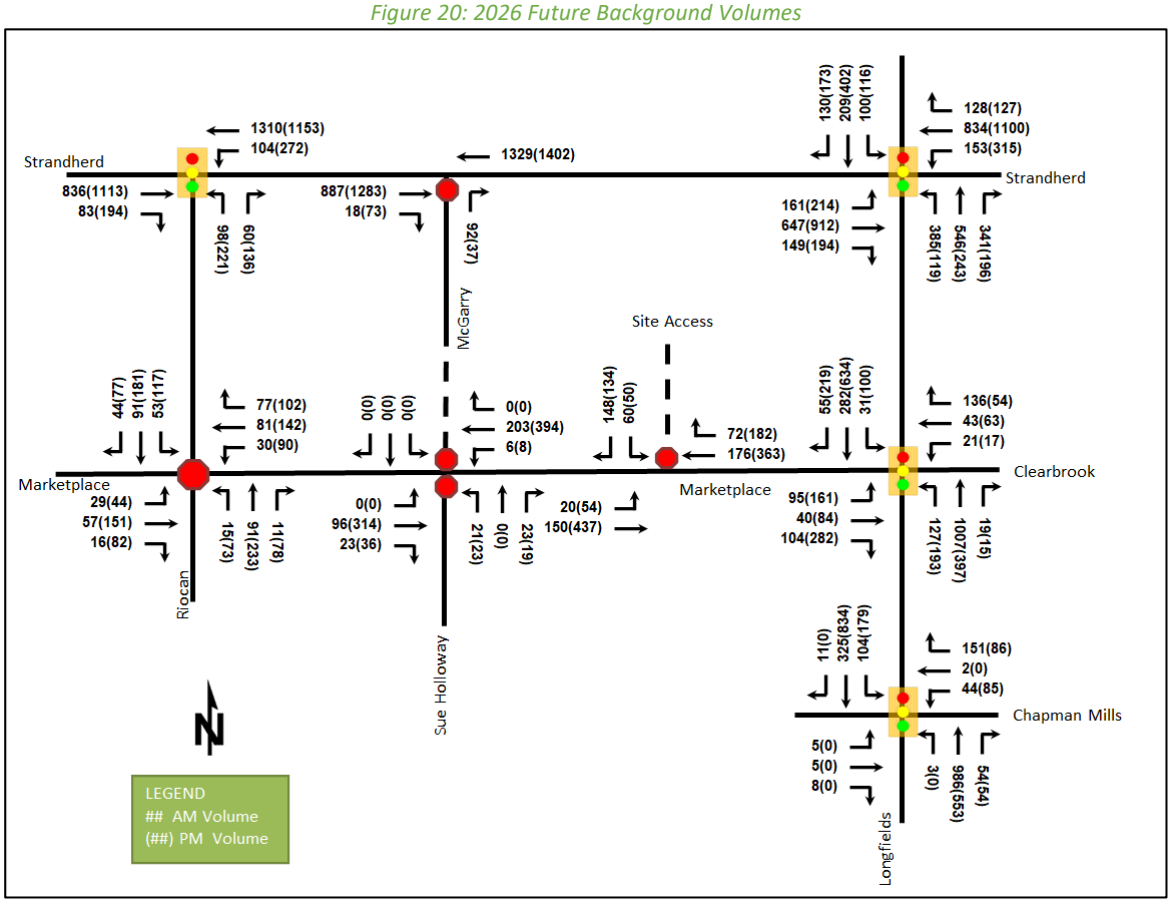


Table 18: 2026 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at Riocan Avenue *Signalized*	EBT	A	0.42	13.6	72.3	D	0.88	44.0	**#176.1**
	EBR	A	0.09	2.7	6.7	A	0.30	5.9	17.8
	WBL	A	0.25	1.7	m1.3	B	0.64	28.2	**m#99.5**
	WBT	A	0.55	1.7	m8.5	A	0.53	6.0	166.4
	NBL	A	0.46	59.9	20.1	C	0.71	65.6	39.3
	NBR	A	0.21	12.0	11.5	A	0.30	6.5	12.0
	Overall	**A**	**0.56**	**8.3**	-	**C**	**0.71**	**25.9**	-
Marketplace Avenue at Riocan Avenue *Unsignalized*	EBL	A	0.05	9.1	1.5	B	0.10	12.1	2.3
	EBT/R	A	0.11	8.9	3.0	C	0.50	17.7	20.3
	WBL	A	0.05	9.1	1.5	B	0.21	13.2	6.0
	WBT/R	A	0.23	9.6	6.8	C	0.51	17.9	21.0
	NBL	A	0.05	9.1	1.5	B	0.16	12.4	4.5
	NBT/R	A	0.23	9.6	6.8	C	0.63	22.1	33.0
	SBL	A	0.03	8.9	0.8	B	0.27	13.7	7.5
	SBT/R	A	0.16	9.3	4.5	C	0.53	18.1	22.5
	Overall	**A**	-	**9.3**	-	**C**	-	**17.7**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at McGarry Terrace ***Unsignalized***	EBT	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	NB	C	0.27	19.6	8.3	D	0.19	28.3	5.3
	Overall	**A**	**-**	**0.8**	**-**	**A**	**-**	**0.4**	**-**
Marketplace Avenue at Sue Holloway Drive ***Unsignalized***	EB	-	-	-	-	-	-	-	-
	WB	A	0.00	7.6	0.0	A	0.01	8.2	0.0
	NB	B	0.06	10.2	1.5	B	0.10	14.3	2.3
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**
Strandherd Drive at Longfields Drive ***Signalized***	EBL	A	0.54	47.2	29.4	**F**	**1.36**	**225.3**	**m#44.0**
	EBT	B	0.70	58.1	103.9	D	0.89	47.8	**m#146.0**
	EBR	A	0.30	23.3	31.9	A	0.33	14.9	m32.3
	WBL	A	0.53	58.3	27.8	C	0.74	61.2	51.9
	WBT	D	0.89	54.8	**#145.6**	D	0.85	40.7	151.1
	WBR	A	0.25	4.2	9.5	A	0.19	2.6	7.5
	NBL	D	0.83	65.4	**#66.4**	A	0.47	58.7	23.1
	NBT	**F**	**1.07**	**101.8**	**#226.4**	A	0.56	45.5	76.9
	NBR	A	0.54	8.8	30.5	A	0.38	6.1	14.8
	SBL	A	0.58	63.8	38.8	C	0.78	**85.8**	#55.8
	SBT	A	0.49	43.3	66.4	D	0.89	66.4	**#152.9**
	SBR	A	0.27	5.2	10.8	A	0.33	3.9	9.5
	Overall	**E**	**0.95**	**53.8**	**-**	**D**	**0.90**	**52.5**	**-**
Marketplace Avenue at Longfields Drive ***Signalized***	EBL	A	0.44	31.1	22.1	B	0.63	39.6	34.2
	EBT/R	A	0.35	9.7	15.6	C	0.72	19.0	38.4
	WB	A	0.54	23.8	32.7	A	0.52	24.5	23.0
	NBL	A	0.23	10.7	21.2	A	0.51	13.4	30.9
	NBT/R	A	0.51	12.4	84.5	A	0.20	8.0	29.0
	SBL	A	0.14	22.2	11.3	A	0.25	20.2	26.8
	SBT/R	A	0.23	16.3	31.7	A	0.58	20.3	**#97.5**
	Overall	**A**	**0.54**	**15.0**	**-**	**A**	**0.58**	**18.9**	**-**
Chapman Mills Drive at Longfields Drive ***Signalized***	EBL	A	0.05	45.2	4.5	-	-	-	-
	EBT	A	0.03	35.0	3.7	-	-	-	-
	EBR	A	0.03	0.1	0.0	-	-	-	-
	WBL	A	0.33	48.6	18.2	A	0.50	51.9	30.0
	WBT	A	0.01	28.0	2.0	-	-	-	-
	WBR	A	0.42	8.6	14.1	A	0.15	0.6	0.0
	NBL	A	0.00	12.7	2.0	-	-	-	-
	NBT	A	0.45	12.1	101.6	A	0.23	9.3	56.9
	NBR	A	0.06	10.8	13.4	A	0.05	10.8	14.9
	SBL	A	0.41	20.9	**#41.3**	A	0.32	13.9	52.7
	SBT	A	0.16	9.5	29.9	A	0.35	10.4	91.2
	SBR	A	0.02	0.0	0.0	-	-	-	-
	Overall	**A**	**0.44**	**12.8**	**-**	**A**	**0.39**	**11.9**	**-**
Marketplace Avenue at Access ***Unsignalized***	EB	A	0.02	7.8	0.0	A	0.05	8.7	1.5
	WB	-	-	-	-	-	-	-	-
	SB	B	0.28	11.7	8.3	C	0.42	19.0	15.0
	Overall	**A**	**-**	**4.1**	**-**	**A**	**-**	**3.3**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Intersections within the study area will operate similarly to existing conditions except for the southbound left movement at Chapman Mills Drive at Longfields Drive intersection may experience queuing during the PM peak hour. No additional capacity issues are noted.

Capacity issues remain at the intersection of Strandherd Drive at Longfields Drive, similar to the existing condition, further optimized signal timings may address the constraints and reduce the v/c of all movements to be 1.00 or below.

7.2 2031 Future Background Operations

The extension of Chapman Mills Drive from Longfields Drive to Greenbank Road is assumed to complete by 2031, although it will not impact the site-generated trips and trips distribution, the background volumes will be redistributed, and background volumes will be consistent with the study area TIAs.

Figure 21 illustrates the 2031 background volumes and Table 19 summarizes the 2031 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2031 future background horizon are provided in Appendix H.

Figure 21: 2031 Future Background Volumes

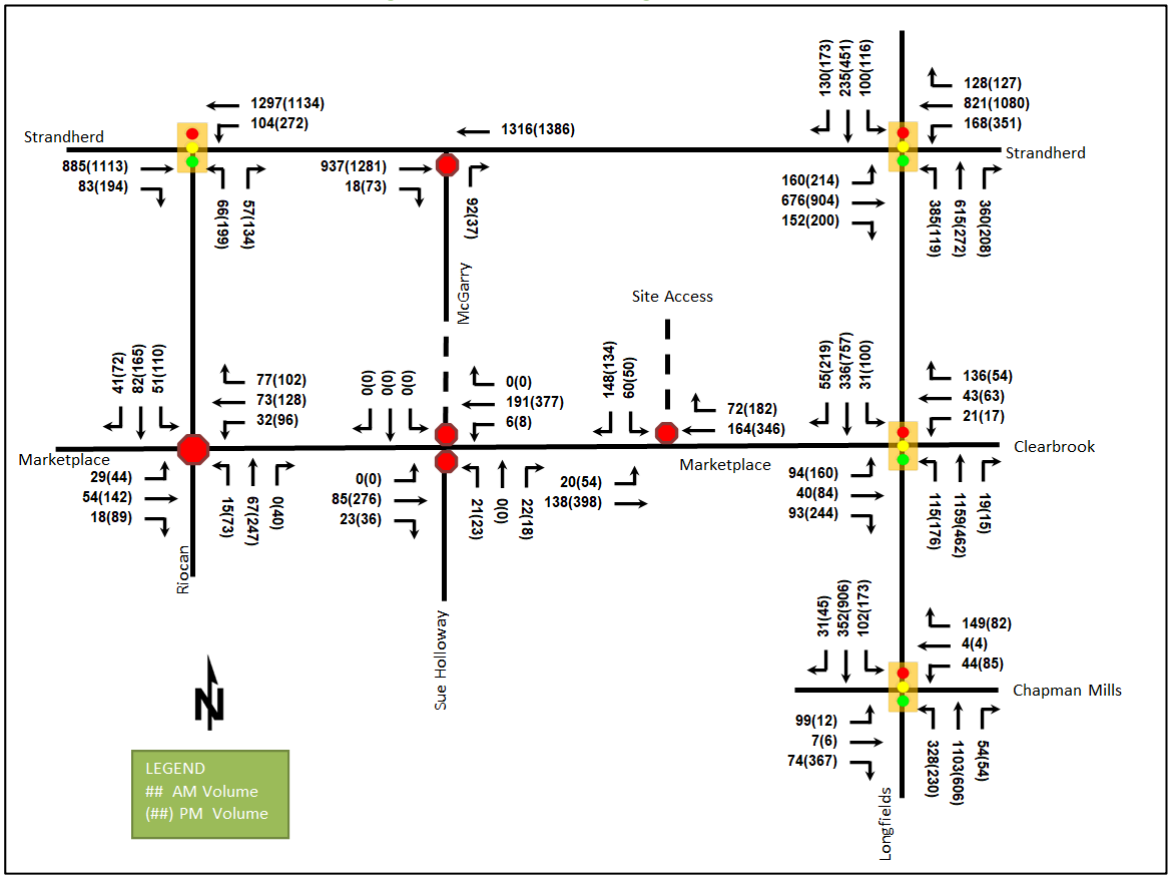


Table 19:2031 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at Riocan Avenue *Signalized*	EBT	A	0.42	12.8	77.6	D	0.88	43.6	**#176.1**
	EBR	A	0.09	2.6	6.7	A	0.29	5.9	17.8
	WBL	A	0.25	1.7	m1.3	B	0.63	28.0	**m#100.8**
	WBT	A	0.52	1.5	8.5	A	0.52	5.9	159.5
	NBL	A	0.34	57.7	14.7	B	0.65	62.9	35.7
	NBR	A	0.23	13.0	11.3	A	0.30	6.5	11.8
	Overall	**A**	**0.54**	**7.3**	-	**B**	**0.70**	**25.4**	-
Marketplace Avenue at Riocan Avenue *Unsignalized*	EBL	A	0.05	9.0	1.5	B	0.10	11.8	2.3
	EBT/R	A	0.11	8.7	3.0	C	0.47	16.6	18.8
	WBL	A	0.05	9.0	1.5	B	0.22	13.0	6.0
	WBT/R	A	0.21	9.2	6.0	C	0.47	16.2	18.0
	NBL	A	0.03	8.9	0.8	B	0.16	12.1	4.5
	NBT/R	A	0.10	8.9	2.3	C	0.58	19.6	27.0
	SBL	A	0.08	9.2	2.3	B	0.24	13.2	6.8
	SBT/R	A	0.18	9.0	4.5	C	0.47	16.3	18.8
	Overall	**A**	-	**9.0**	-	**C**	-	**16.2**	-
Strandherd Drive at McGarry Terrace *Unsignalized*	EBT	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	NB	C	0.29	21.0	9.0	D	0.19	28.2	5.3
	Overall	**A**	-	**0.8**	-	**A**	-	**0.4**	-
Marketplace Avenue at Sue Holloway Drive *Unsignalized*	EB	-	-	-	-	-	-	-	-
	WB	A	0.00	7.6	0.0	A	0.01	8.1	0.0
	NB	B	0.06	10.1	1.5	B	0.09	13.6	2.3
	Overall	**A**	-	**1.4**	-	**A**	-	**0.9**	-
Strandherd Drive at Longfields Drive *Signalized*	EBL	A	0.54	47.3	28.9	**F**	**1.36**	**225.2**	**m#44.2**
	EBT	C	0.75	57.6	**#109.1**	D	0.90	48.9	**m#144.4**
	EBR	A	0.31	23.8	33.1	A	0.34	15.6	m34.0
	WBL	A	0.56	58.3	30.1	C	0.80	64.2	**#57.8**
	WBT	D	0.88	53.3	**#142.1**	D	0.83	39.8	147.0
	WBR	A	0.25	4.2	9.5	A	0.19	2.6	7.5
	NBL	D	0.83	65.4	**#66.4**	A	0.47	58.7	23.1
	NBT	**F**	**1.21**	**148.6**	**#262.2**	B	0.63	47.9	86.6
	NBR	A	0.59	12.0	43.0	A	0.40	7.1	17.6
	SBL	A	0.58	63.8	38.8	C	0.78	**85.8**	**#55.8**
	SBT	A	0.55	45.1	74.7	E	1.00	**87.6**	**#178.8**
	SBR	A	0.27	5.2	10.8	A	0.33	3.9	9.5
	Overall	**E**	**0.99**	**61.8**	-	**E**	**0.93**	**55.3**	-
Marketplace Avenue at Longfields Drive *Signalized*	EBL	A	0.42	30.1	21.9	B	0.63	39.6	34.0
	EBT/R	A	0.33	9.8	15.1	B	0.68	18.3	35.5
	WB	A	0.56	27.1	35.6	A	0.45	22.0	22.1
	NBL	A	0.22	10.8	19.4	A	0.53	14.3	28.2
	NBT/R	A	0.59	13.8	103.3	A	0.23	8.2	33.7
	SBL	A	0.16	23.2	11.7	A	0.26	20.1	27.3
	SBT/R	A	0.26	16.7	37.4	B	0.65	22.0	**#122.5**
	Overall	**B**	**0.62**	**16.0**	-	**B**	**0.63**	**19.2**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Chapman Mills Drive at Longfields Drive ***Signalized***	EBL	A	0.54	52.8	33.3	A	0.11	46.1	7.7
	EBT	A	0.03	30.6	4.1	A	0.02	27.0	3.8
	EBR	A	0.20	2.0	2.2	D	0.87	43.3	72.6
	WBL	A	0.34	49.7	18.2	A	0.51	53.0	30.0
	WBT	A	0.02	32.8	3.1	A	0.01	19.5	2.8
	WBR	A	0.48	12.4	15.4	A	0.15	1.9	3.5
	NBL	B	0.62	26.4	**#117.6**	**F**	**1.23**	**171.4**	**#110.4**
	NBT	A	0.59	19.4	**#149.3**	A	0.38	19.6	63.3
	NBR	A	0.07	15.4	15.4	A	0.08	19.0	15.0
	SBL	B	0.63	41.8	**#52.8**	A	0.54	31.1	**#62.3**
	SBT	A	0.20	14.0	37.1	A	0.56	22.5	102.3
	SBR	A	0.05	0.2	0.0	A	0.06	0.2	0.0
	Overall	**A**	**0.56**	**21.3**	**-**	**F**	**1.06**	**38.7**	**-**
Marketplace Avenue at Access ***Unsignalized***	EB	A	0.02	7.7	0.0	A	0.05	8.7	1.5
	WB	-	-	-	-	-	-	-	-
	SB	B	0.27	11.5	8.3	C	0.40	17.9	14.3
	Overall	**A**	**-**	**4.2**	**-**	**A**	**-**	**3.2**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections at the 2031 future background horizon operate similarly to the 2026 future background conditions with further degradation of the conditions due to background growths and the redistribution of Chapman Mills Drive extension.

With the background growth at the intersection of Strandherd Drive and Longfields Drive, the eastbound through movement during the AM peak hour and the westbound left movement during the PM peak hour may experience queuing. The southbound through movement during the PM peak hour may experience high delays. Capacity issues remain at the intersection of Strandherd Drive at Longfields Drive. Similar to the existing condition, further optimized signal timings may address the constraints and reduce the v/c of all movements to be 1.00 or below.

At Chapman Mills Drive at Longfields Drive intersection, the northbound left-turn, northbound through, and southbound left-turn movements during the AM peak hour may experience queuing, and the northbound left-turn movement during the PM peak hour will be over theoretical capacity due to the background growths and the extension of Chapman Mills Drive. The capacity issues noted at this intersection are a result of the existing signal timing. An increase of the cycle length from 100 seconds to 105 seconds and a protected phase on the northbound left-turn movement would be required to reduce the v/c of all movements at the intersection to 1.00 or below.

7.3 2026 Future Total Operations

Figure 22 illustrates the 2026 total volumes and Table 20 summarizes the 2026 total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection The synchro worksheets for the 2026 total horizon are provided in Appendix I.

Figure 22: 2026 Future Total Volumes

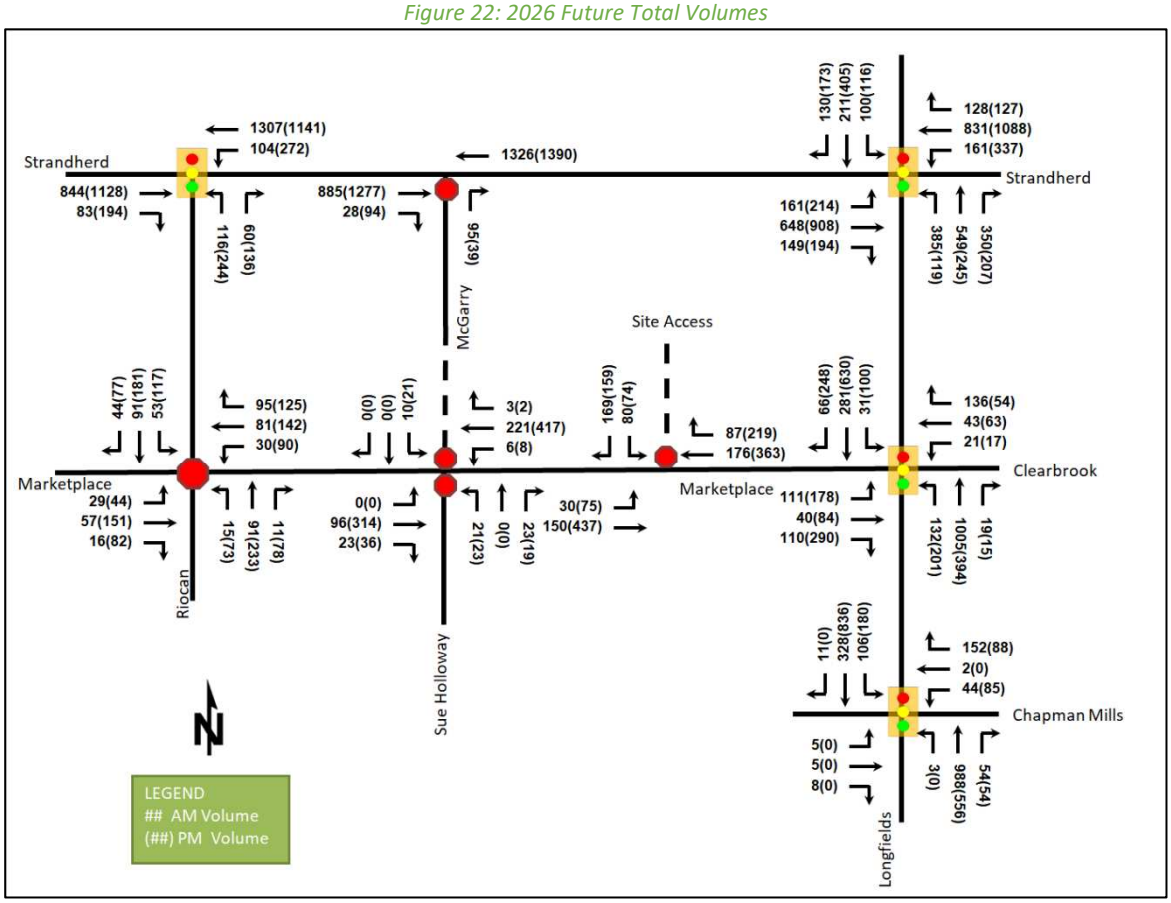


Table 20: 2026 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at Riocan Avenue *Signalized*	EBT	A	0.43	13.8	73.1	D	0.89	45.2	**#180.0**
	EBR	A	0.10	2.7	6.7	A	0.30	6.2	18.4
	WBL	A	0.25	1.8	m1.4	B	0.65	28.9	**m#101.6**
	WBT	A	0.55	1.8	m8.8	A	0.53	5.9	162.8
	NBL	A	0.52	61.6	23.2	C	0.77	69.2	**#46.3**
	NBR	A	0.21	12.0	11.5	A	0.30	6.5	12.0
	Overall	**A**	**0.57**	**8.8**	-	**C**	**0.73**	**27.2**	-
Marketplace Avenue at Riocan Avenue *Unsignalized*	EBL	A	0.05	9.2	1.5	B	0.10	12.2	2.3
	EBT/R	A	0.11	8.9	3.0	C	0.50	18.1	20.3
	WBL	A	0.05	9.1	1.5	B	0.21	13.2	6.0
	WBT/R	A	0.26	9.8	7.5	C	0.56	19.4	24.8
	NBL	A	0.03	9.0	0.8	B	0.17	12.5	4.5
	NBT/R	A	0.16	9.4	4.5	C	0.65	22.8	33.8
	SBL	A	0.09	9.4	2.3	B	0.27	13.9	8.3
	SBT/R	A	0.20	9.3	5.3	C	0.54	18.6	23.3
	Overall	**A**	-	**9.4**	-	**C**	-	**18.3**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at McGarry Terrace ***Unsignalized***	EBT	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	NB	C	0.28	19.8	8.3	D	0.21	28.8	5.3
	Overall	**A**	**-**	**0.8**	**-**	**A**	**-**	**0.4**	**-**
Marketplace Avenue at Sue Holloway Drive ***Unsignalized***	EB	-	-	-	-	-	-	-	-
	WB	A	0.00	7.6	0.0	A	0.01	8.2	0.0
	NB	B	0.06	10.4	1.5	B	0.10	14.7	2.3
	SB	B	0.02	11.4	0.8	C	0.07	17.9	1.5
	Overall	**A**	**-**	**1.5**	**-**	**A**	**-**	**1.3**	**-**
Strandherd Drive at Longfields Drive ***Signalized***	EBL	A	0.54	47.0	29.1	**F**	**1.36**	**225.3**	**m#43.1**
	EBT	C	0.71	58.6	104.2	D	0.89	48.2	**m#141.5**
	EBR	A	0.31	23.5	32.2	A	0.34	15.1	m31.8
	WBL	A	0.55	58.3	29.0	C	0.78	63.0	55.2
	WBT	D	0.89	54.4	**#144.9**	D	0.84	40.1	148.7
	WBR	A	0.25	4.2	9.5	A	0.19	2.6	7.5
	NBL	D	0.83	65.4	**#66.4**	A	0.47	58.7	23.1
	NBT	**F**	**1.08**	**103.6**	**#227.9**	A	0.57	45.6	77.5
	NBR	A	0.55	8.9	31.8	A	0.40	7.0	17.4
	SBL	A	0.58	63.8	38.8	C	0.78	**85.8**	**#55.8**
	SBT	A	0.49	43.4	67.1	D	0.90	67.3	**#153.8**
	SBR	A	0.29	5.5	10.9	A	0.33	3.9	9.5
	Overall	**E**	**0.95**	**54.1**	**-**	**D**	**0.89**	**52.6**	**-**
Marketplace Avenue at Longfields Drive ***Signalized***	EBL	A	0.51	33.9	25.7	B	0.67	40.9	37.9
	EBT/R	A	0.37	9.6	15.8	C	0.72	18.2	39.0
	WB	A	0.55	24.2	33.0	A	0.49	23.0	22.8
	NBL	A	0.25	10.9	22.0	A	0.55	15.1	**#33.8**
	NBT/R	A	0.51	12.4	84.2	A	0.20	8.3	28.8
	SBL	A	0.14	22.2	11.3	A	0.26	21.0	26.8
	SBT/R	A	0.24	16.2	32.2	B	0.62	21.7	**#102.6**
	Overall	**A**	**0.55**	**15.3**	**-**	**B**	**0.62**	**19.7**	**-**
Chapman Mills Drive at Longfields Drive ***Signalized***	EBL	A	0.05	45.2	4.5	-	-	-	-
	EBT	A	0.03	35.0	3.7	-	-	-	-
	EBR	A	0.03	0.1	0.0	-	-	-	-
	WBL	A	0.33	48.6	18.2	A	0.50	51.9	30.0
	WBT	A	0.01	28.0	2.0	-	-	-	-
	WBR	A	0.42	8.5	14.2	A	0.15	0.6	0.0
	NBL	A	0.00	12.7	2.0	-	-	-	-
	NBT	A	0.46	12.1	101.6	A	0.23	9.3	57.2
	NBR	A	0.06	10.8	13.4	A	0.05	10.8	14.9
	SBL	A	0.42	21.1	**#42.0**	A	0.32	14.0	53.1
	SBT	A	0.16	9.5	30.1	A	0.35	10.4	91.5
	SBR	A	0.02	0.0	0.0	-	-	-	-
	Overall	**A**	**0.44**	**12.8**	**-**	**A**	**0.40**	**11.9**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Marketplace Avenue at Access *Unsignalized*	EB	A	0.03	8.1	0.8	A	0.08	9.3	2.3
	WB	-	-	-	-	-	-	-	-
	SB	B	0.40	14.7	14.3	E	0.70	37.0	36.8
	Overall	**A**	**-**	**5.7**	**-**	**A**	**-**	**7.0**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Intersections within the study area will operate similarly to the 2026 background condition except for the northbound left-turn movement at the intersections of Strandherd Drive at Riocan Avenue and Marketplace Avenue at Longfields Drive may experience queuing during the PM peak hour.

It is noted that 9.4% (23 of 244) trips on the northbound left-turn movement at the intersection of Strandherd Drive at Riocan Avenue and 4.0% (8 of 201) trips on the northbound left-turn movement at the intersection of Marketplace Avenue at Longfields Drive are expected to be generated by the site during the PM peak hour and are considered to have minimal impact.

Capacity issues remain at the intersection of Strandherd Drive at Longfields Drive, similar to the existing and background conditions, further optimized signal timings may address the constraints and reduce the v/c of all movements to be 1.00 or below.

7.4 2031 Future Total Operations

The extension of Chapman Mills Drive from Longfields Drive to Greenbank Road is assumed to complete by 2031, although it will not impact the site-generated trips and trips distribution, the background volumes will be redistributed, and background volumes will be consistent with the study area TIAs.

Figure 23 illustrates the 2031 total volumes and Table 21 summarizes the 2031 total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2031 future total horizon are provided in Appendix J.

Figure 23: 2031 Future Total Volumes

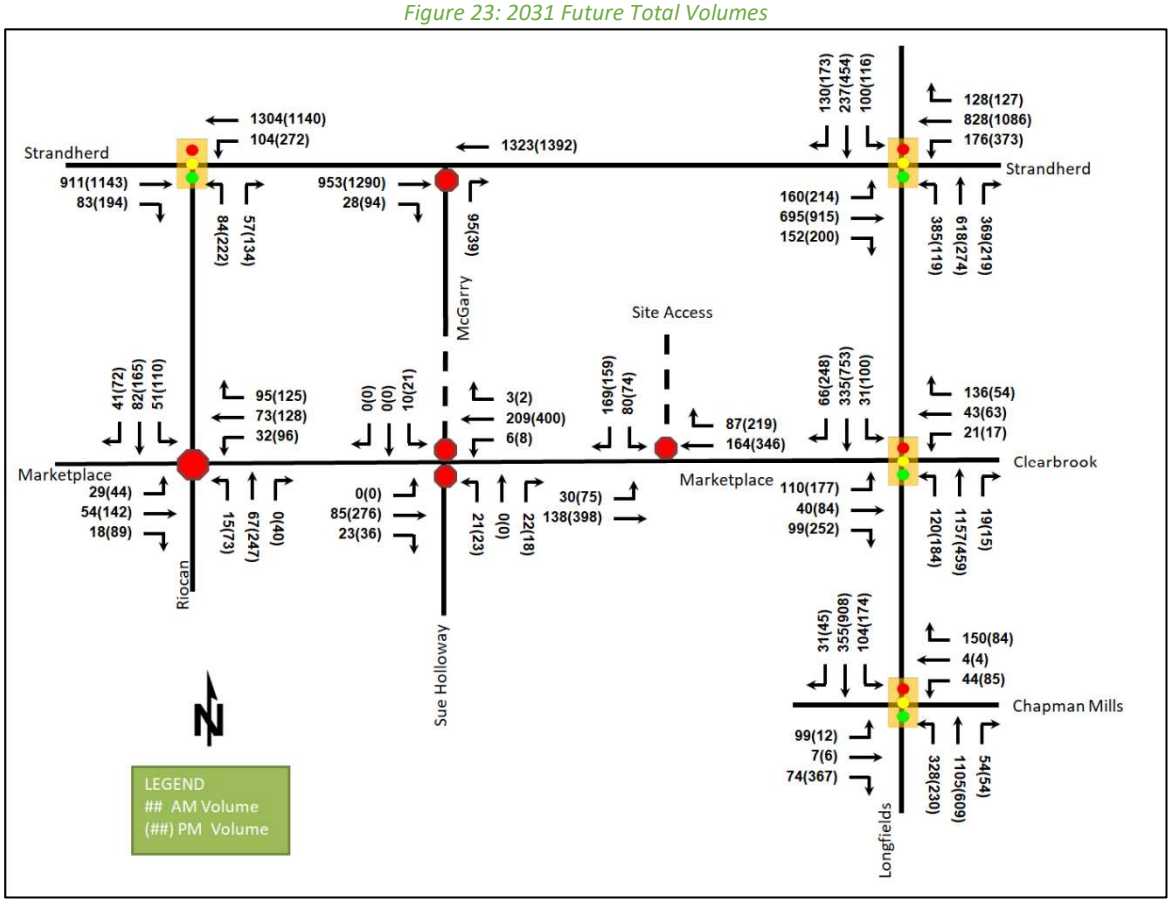


Table 21: 2031 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at Riocan Avenue *Signalized*	EBT	A	0.46	14.0	81.3	E	0.91	46.3	**#183.8**
	EBR	A	0.09	2.7	6.8	A	0.30	6.4	18.8
	WBL	A	0.27	1.9	m1.4	B	0.64	28.8	**m#101.4**
	WBT	A	0.54	1.7	8.9	A	0.53	5.9	162.2
	NBL	A	0.41	58.8	17.8	C	0.71	65.7	39.3
	NBR	A	0.20	12.4	11.3	A	0.30	6.4	11.8
	Overall	**A**	**0.55**	**8.3**	-	**C**	**0.72**	**27.1**	-
Marketplace Avenue at Riocan Avenue *Unsignalized*	EBL	A	0.05	9.0	1.5	B	0.10	11.9	2.3
	EBT/R	A	0.11	8.7	3.0	C	0.48	16.9	18.8
	WBL	A	0.05	9.0	1.5	B	0.22	13.0	6.0
	WBT/R	A	0.24	9.4	6.8	C	0.51	17.4	21.8
	NBL	A	0.03	8.9	0.8	B	0.16	12.3	4.5
	NBT/R	A	0.11	9.0	2.3	C	0.59	20.0	27.8
	SBL	A	0.09	9.2	2.3	B	0.25	13.4	7.5
	SBT/R	A	0.18	9.0	4.5	C	0.48	16.6	19.5
	Overall	**A**	-	**9.1**	-	**C**	-	**16.6**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Strandherd Drive at McGarry Terrace ***Unsignalized***	EBT	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	NB	C	0.31	21.9	9.8	D	0.21	29.3	6.0
	Overall	**A**	**-**	**0.9**	**-**	**A**	**-**	**0.4**	**-**
Marketplace Avenue at Sue Holloway Drive ***Unsignalized***	EB	-	-	-	-	-	-	-	-
	WB	A	0.00	7.6	0.0	A	0.01	8.1	0.0
	NB	B	0.06	10.3	1.5	B	0.09	14.0	2.3
	SB	B	0.02	11.1	0.8	C	0.06	16.7	1.5
	Overall	**A**	**-**	**1.6**	**-**	**A**	**-**	**1.3**	**-**
Strandherd Drive at Longfields Drive ***Signalized***	EBL	A	0.54	46.5	29.0	**F**	**1.36**	**225.0**	**m#42.4**
	EBT	C	0.77	61.0	**#114.7**	E	0.92	50.3	**m#140.7**
	EBR	A	0.32	24.0	33.3	A	0.35	15.6	m33.0
	WBL	A	0.57	58.6	31.2	D	0.83	66.3	**#65.3**
	WBT	D	0.89	54.0	**#143.8**	D	0.84	40.0	148.3
	WBR	A	0.25	4.2	9.5	A	0.19	2.6	7.5
	NBL	D	0.83	65.4	**#66.4**	A	0.47	58.7	23.1
	NBT	**F**	**1.21**	**150.8**	**#264.2**	B	0.63	48.1	87.2
	NBR	A	0.60	12.3	44.5	A	0.42	7.4	18.9
	SBL	A	0.58	63.8	38.8	C	0.78	**85.8**	**#55.8**
	SBT	A	0.55	45.2	75.3	**F**	**1.01**	**89.1**	**#180.3**
	SBR	A	0.29	5.5	10.9	A	0.33	3.9	9.5
	Overall	**E**	**1.00**	**62.8**	**-**	**E**	**0.94**	**55.9**	**-**
Marketplace Avenue at Longfields Drive ***Signalized***	EBL	A	0.50	32.7	25.4	B	0.67	40.8	37.5
	EBT/R	A	0.34	9.6	15.5	B	0.67	17.5	35.9
	WB	A	0.56	27.3	35.8	A	0.43	20.8	22.0
	NBL	A	0.24	10.9	20.1	A	0.57	16.8	**#35.2**
	NBT/R	A	0.59	13.8	103.2	A	0.23	8.5	33.4
	SBL	A	0.16	23.2	11.7	A	0.27	20.9	27.2
	SBT/R	A	0.27	16.7	38.0	B	0.70	23.7	**#128.0**
	Overall	**B**	**0.62**	**16.2**	**-**	**B**	**0.67**	**20.3**	**-**
Chapman Mills Drive at Longfields Drive ***Signalized***	EBL	A	0.54	52.5	33.2	A	0.11	46.1	7.7
	EBT	A	0.03	30.4	4.1	A	0.02	26.8	3.8
	EBR	A	0.19	2.0	2.2	D	0.87	43.6	72.9
	WBL	A	0.34	49.7	18.2	A	0.51	53.0	30.0
	WBT	A	0.02	32.8	3.1	A	0.01	19.5	2.8
	WBR	A	0.48	11.9	15.1	A	0.15	2.0	3.9
	NBL	B	0.63	26.6	**#118.4**	**F**	**1.24**	**173.5**	**#110.5**
	NBT	A	0.59	19.6	**#150.7**	A	0.38	19.6	63.8
	NBR	A	0.07	15.5	15.5	A	0.08	19.1	15.0
	SBL	B	0.64	43.2	**#54.3**	A	0.55	31.5	**#63.0**
	SBT	A	0.20	14.1	37.6	A	0.56	22.5	102.6
	SBR	A	0.05	0.2	0.0	A	0.06	0.2	0.0
	Overall	**A**	**0.56**	**21.4**	**-**	**F**	**1.06**	**38.9**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Marketplace Avenue at Access *Unsignalized*	EB	A	0.03	8.1	0.8	A	0.08	9.3	2.3
	WB	-	-	-	-	-	-	-	-
	SB	B	0.39	14.3	14.3	D	0.66	32.7	33.8
	Overall	**A**	**-**	**5.7**	**-**	**A**	**-**	**6.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Capacity issues remain at the intersection of Strandherd Drive at Longfields Drive. The southbound through movement during the PM peak hour at the intersection of Strandherd Drive at Longfields Drive intersection will be over theoretical capacity at the 2031 future total conditions. It is noted that this movement is near capacity in the 2031 background condition, and the site-generated trips are considered to have minimal impact on this intersection. Similar to the existing and background conditions, further optimized signal timings may address the constraints and reduce the v/c of all movements to be 1.00 or below.

Similar to the 2031 background condition, the capacity issues noted at Chapman Mills Drive at Longfields Drive intersection are a result of the existing signal timing and an increase of the cycle length from 100 seconds to 105 seconds and a protected phase on the northbound left-turn movement would be require to reduce the v/c of all movements at the intersection to 1.00 or below.

7.5 Modal Share Sensitivity and Demand Rationalization Conclusions

7.5.1 Network Rationalization

The existing and background conditions identify capacity constraints at the intersection of Strandherd Drive at Longfields Drive on the northbound through movement during the AM peak hour and on the eastbound left-turn movement during the PM peak hour. The southbound through movement at this intersection is noted to be near capacity in the 2031 background condition.

The capacity constraint on the northbound left-turn movement at the intersection of Chapman Mills Drive at Longfields Drive during the PM peak hour is a result of the existing signal timing. No site-generated trips are expected on the northbound left-turn movement at this intersection. An increase of the cycle length from 100 seconds to 105 seconds and a protected phase on the northbound left-turn movement would be required to reduce the v/c of all movements at the intersection to 1.00 or below.

The existing and background capacity issues are anticipated to be mitigable by optimized signal timings and no further rationalization for background travel demand is required for this study.

7.5.2 Development Rationalization

Being proximity to the existing Marketplace station, existing Barrhaven Centre station on the BRT corridor, and existing and future extended Chapman Mills Drive BRT corridor. The proposed mode shares for the development are appropriate to target and will be supported through TDM measures.

At the intersection of Strandherd Drive at Longfields Drive, a total of 12 to 13 trips on the northbound, two to three trips on the southbound, one trip on the eastbound, and five to ten trips on the westbound movements are expected to be generated by the site, and the site-generated trips are considered to have minimal impact on the intersection.

No further rationalization for site traffic or modal share selection is required.

8 Development Design

8.1 Design for Sustainable Modes

The development proposed mixed-use high-rise buildings. There are a total of 295 bicycle parking spaces proposed, including six bicycle parking at ground level and 289 underground bicycle parking. Hard surface connections are provided between tower entrances and the surrounding pedestrian facilities on Marketplace Avenue and McGarry Terrace. The closest bus stop is located within 100 metres of the site, Marketplace Station is located within 450 metres of the site entrances, and the Barrhaven Centre BRT station is within 800-metre walking distance.

The infrastructure TDM checklist is provided in Appendix L.

8.2 Circulation and Access

Two access are proposed, one on Marketplace Avenue and one on extended McGarry Terrace. The Marketplace Avenue access will expand the existing access for Haven Towers. The access on McGarry Terrace will be for loading operations only. The drop-off areas are proposed for each tower, one on the east side of McGarry Terrace and another on the west side of the internal aisle. An additional loading and garbage collection area is located at the east tower via the site access on Marketplace Avenue. Emergency service will be provided along the frontages of Marketplace Avenue and McGarry Terrace.

To accommodate garbage collections and moving vehicles, it is recommended that a mountable center island, an access widening, or a mountable apron and/or depressed curb accommodating typical truck turning radii be included.

9 Parking

9.1 Parking Supply

The site plan proposes a total of 653 underground vehicle parking spaces for commercial, residential units, and visitors, and it includes a total of 17 accessible parking spaces. A total of 295 bicycle parking spaces are proposed including 289 spaces provided below ground and six spaces at ground level.

From the zoning by-law, the minimum vehicle parking provision for the site is 388 parking spaces including 276 residential parking spaces (as all spaces are located underground), 14 retail parking spaces, and 98 visitor parking spaces. The minimum bicycle parking provision is 296 spaces for residential and four spaces for the commercial component, assuming a land use of retail store.

As the development is within 600 metres of rapid transit, the maximum combined resident and visitor vehicle parking is 1036 spaces, and the maximum retail vehicle parking is 44 spaces.

Therefore, the minimum and maximum vehicle parking requirements are satisfied. The bicycle parking is five spaces less than the requirement. It is recommended that additional bicycle parking spaces be explored through surface racks or vertical racking solutions for internal areas.

10 Boundary Street Design

Table 22 summarizes the MMLOS analysis for the boundary streets of Marketplace Avenue and McGarry Terrace. The existing and future conditions for both streets will be the same and are considered in one row. The boundary street analysis is based on the policy area of “Within 600m of a rapid transit station”. The MMLOS worksheets have been provided in Appendix K.

Table 22: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Marketplace Avenue	D	A	D	D	N/A	N/A	N/A	N/A
McGarry Terrace	C	A	D	D	N/A	N/A	N/A	N/A

The boundary streets of Marketplace Avenue and McGarry Terrace do not meet the pedestrian MMLOS targets. Meeting pedestrian LOS targets on McGarry Terrace would require traffic speed less or equal to 30 km/h, and meeting pedestrian LOS targets on Marketplace Avenue would require traffic speed less or equal to 30 km/h and a boulevard of 0.5 metres in width or greater.

McGarry Terrace unposted speed limit is assumed to be 50 km/h. The posted limit of 30 km/h may be placed once McGarry Terrace is extend.

11 Access Intersections Design

11.1 Location and Design of Access

The development will connect to Marketplace Avenue via a shared access with Haven Towers. The existing access for Haven Towers is a minor stop control intersection. Based upon the projected volumes, this access will stay as a minor stop control intersection.

The proposed access as a two-way access with a median dividing the inbound/outbound lanes. The inbound width is 4.57 metres, the outbound width is 3.63 metres, and the median is approximately 2.79 metres for the underground parking garage vent. The depressed curb length exceeds the Private Approach Bylaw requirements, as this is required to accommodate truck movement. The median meets the minimum width of 2.0 metres. The existing sidewalk is provided along the boundary street of Marketplace Avenue.

To permit the garbage trucks to access the site, it is recommended that the access be widened, include a mountable median, or include a mountable apron and/or depressed curb accommodating typical truck turning radii. It is also recommended that the access comply with the City standard SC7.1.

McGarry Terrace will be extended to the Marketplace Avenue at Sue Holloway intersection and include a 2.0 metre sidewalk along the east side of the road. Trucks are expected to access the west tower loading area via the proposed access on extended McGarry Terrace, and the access will be 6.0 metres wide. The access meets the minimum and maximum width of a private approach. This access is proposed as a minor stop control intersection. Since a future sidewalk will be provided on the east side of McGarry Terrace, it is recommended that the access comply with the City standard SC7.1.

11.2 Intersection Control

Both accesses will be minor stop control access intersections.

11.3 Access Intersection Design

11.3.1 Future Access Intersection Operations

The operations are noted in Section 7.4 and both 2026 and 2031 future total access intersections operate well with all movements and the overall intersection operating at LOS A.

11.3.2 Access Intersection MMLOS

All accesses are stop-controlled, therefore, MMLOS is not required.

11.3.3 Recommended Design Elements

The existing sidewalk is provided on the boundary street of Marketplace Avenue, and future sidewalk will be provided on the boundary street of extended McGarry Terrace. Both accesses will be required to comply with the City standard SC7.1.

12 Transportation Demand Management

12.1 Context for TDM

The subject site has been assumed to rely predominantly on transit mode shares due to in close proximity to Marketplace and Barrhaven Town Centre BRT stations. The convenience of the transit station should provide the opportunity to reach the forecast transit mode share.

12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on transit ridership through the proximity to the existing Marketplace station and Barrhaven Centre station on the BRT corridor. This mode share is further supported by the future proximity to the existing and future extended Chapman Mills Drive BRT corridor. These assumptions have been carried through the analysis, and the increase in transit ridership is achievable. Ultimately, transit adoption may increase once the LRT line is extended to Barrhaven Centre Station which will serve as a transfer station, however such an increase would be outside of the study horizons.

12.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix L. The key TDM measures recommended include:

- Display local area maps with walking/cycling access routes and key destinations at major entrances (multi-family, condominium)
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-year Presto card for new apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from purchase costs

13 Neighbourhood Traffic Management

The proposed development will connect to the arterial network via Marketplace Avenue and McGarry Terrace. The TIA guidelines have outlined thresholds for two-way traffic on collector roads and local roads have been found to be too low for the purposes of this analysis. City Staff have noted that these thresholds are under review and will be updated in the future.

In general, Marketplace Avenue is anticipated to convey between 390 to 1,006 vehicles during the peak hours east of the Marketplace Avenue access and convey between 337 to 976 vehicles during the peak hours west of the Marketplace Avenue access. McGarry Terrace is anticipated to convey between 124 to 144 vehicles during peak hours. The volumes on the Marketplace Avenue for site access have high volumes, based upon the density of surrounding retail development, no changes to the roadway classifications or proposed road network are proposed for the site.

14 Transit

14.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 23 summarizes the transit trip generation.

Table 23: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	Varies	46	102	148	80	59	139

The proposed development is anticipated to generate an additional 148 AM and 139 PM peak hour two-way transit trips. From the trip distribution found in section 5.3, and given area bus routes are presently routed north, south, and east of the site, these values can be contextualized. Table 24 summarizes the forecasted site-generated transit ridership trips by initial/terminal direction relative to the site and provides equivalent bus loads based on this ridership. These high-level estimates are provided for illustrative purposes only as detailed transit planning is outside of the scope of the TIA process. Increases in future service will be subject to future routes, frequencies, and loads.

Table 24: Forecasted Site-Generated Transit Ridership

Routes to/from (relative to the site)	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Peak Direction Bus Loads
	In	Out	In	Out		
North	42	91	73	52	Bus	An articulated bus
East	5	10	8	7	Bus	One-quarter of a standard bus

14.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements at the study area intersections. No specific transit priority measures were considered as part of this development.

15 Network Concept

The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network. Being closer to the local transit, Marketplace station, Barrhaven Town Centre BRT station, and located adjacent to Chapman Mills Marketplace commercial plaza, the transit mode share is achievable. The site-generated trips have minimal impact on the road network. Beyond the study horizons, the future Barrhaven Light Rail Transit (LRT) is expected to increase transit and active mode shares and support the area. No changes are required to the road and transit network.

16 Network Intersection Design

16.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

16.2 Network Intersection Design

16.2.1 2026 & 2031 Future Total Network Intersection Operations

The operations are noted in Section 7.4 and no mitigation of conditions is required for the subject site traffic.

16.2.2 Network Intersection MMLOS

Table 25 summarizes the MMLOS analysis for the network intersections of Strandherd Drive at Longfields Drive, Strandherd Drive at Riocan Avenue, Marketplace Avenue/ Clearbrook Drive at Longfields Drive, and Chapman Mills Drive at Longfields Drive. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection analysis for Strandherd Drive at Longfields Drive and Marketplace Avenue/ Clearbrook Drive at Longfields Drive are based on the policy area of "Within 600m of a rapid transit station", "Within 300m of a school", and on the land use of "General Urban Area", and other intersections are based on the policy area of "Within 600m of a rapid transit station" and on the land use of "General Urban Area". The MMLOS worksheets have been provided in Appendix K.

Table 25: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PROS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Strandherd Drive at Longfields Drive	F	A	F	B	N/A	N/A	B	D	F	D
Strandherd Drive at Riocan Avenue	F	A	F	C	N/A	N/A	N/A	N/A	C	D
Marketplace Avenue/ Clearbrook Drive at Longfields Drive	F	A	F	B	N/A	N/A	N/A	N/A	B	D
Chapman Mills Drive at Longfields Drive	F	A	A	B	D	A	N/A	N/A	F	D

The pedestrian LOS targets will not be met at the study area intersections. To meet pedestrian LOS targets, crossing distances would need to be less than two lane widths on all crossings. Given the nature of arterial roadways, it is not feasible to meet the given targets.

The bicycle LOS targets will not be met at the study area intersections except for Chapman Mills Drive at Longfields Drive. To meet bicycle targets, segregated facilities would be required on the southbound approach at the intersection of Strandherd Drive at Longfields Drive. Two-stage left turns or left-turn boxes would be required on all approaches at the intersection of Strandherd Drive at Longfields Drive, westbound approach at the intersection of Strandherd Drive at Riocan Avenue, all approaches at the intersection of Longfields Drive at Marketplace Avenue/Clearbrook Drive.

16.2.3 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

17 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 592 residential units, 1,104.3 sq. m commercial spaces, 653 parking spaces, and 295 bicycle parking spaces
- McGarry Terrace will be extended to the Marketplace Avenue at Sue Holloway intersection
- Two access are proposed, one on Marketplace Avenue and one on extended McGarry Terrace
- The anticipated full build-out and occupancy horizon is 2026 with construction occurring in a single phase
- The Trip Generation and safety triggers were met for the TIA Screening

Existing Conditions

- Longfields Drive and Strandherd Drive are arterial roads, and Chapman Mills Drive, Riocan Avenue, and Marketplace Avenue are collector roads in the study area
- Sidewalks are provided on the east side of McGarry Terrace and Greenbank Road, on both sides of Longfields Drive, Strandherd Drive between Greenbank Road and Longfields Drive, Chapman Mills Drive, Riocan Avenue, Marketplace Avenue, and Sue Holloway Drive
- Cycletracks are provided along Chapman Mills Drive west of Langrell Crescent/Temagami Drive, curbside bike lanes along both sides of Greenbank Road north of Marketplace Avenue, along both sides of Strandherd Drive east of Greenbank Road and on the north side of Strandherd Drive east of Longfields Drive, and along Longfields Drive south of Strandherd Drive
- Strandherd Drive and Greenbank Road are spine cycling routes and Chapman Mills Drive, Paul Metivier Drive, Longfields Drive, and Beatrice Drive are local routes
- Painted on-street speed limit of 40 km/h and “slow down” signs are present on Sue Halloway Drive. Type D pedestrian crossover is also present on Marketplace Avenue
- The intersection of Strandherd Drive at Longfields Drive and Clearbrook Drive/Marketplace Avenue at Longfields Drive are noted to have experienced higher collisions than other locations
- No further examination is required as part of this study
- The existing and background conditions identify capacity constraints at the intersection of Strandherd Drive at Longfields Drive on the northbound through movement during the AM peak hour and on the eastbound left-turn movement during the PM peak hour due to the existing condition
- Further optimized signal timings may address the constraints at this intersection and reduce the v/c of all movements to be 1.00 or below

Development Generated Travel Demand

- Based upon the site’s context of being within 400 metres walk of the Marketplace station and within 800 metres walk of the Barrhaven Town Centre BRT station, and located adjacent to Chapman Mills Marketplace commercial plaza which has a high density of residential-supportive land uses, modified mode share targets are proposed
- A total of 52 AM and 57 PM new peak hour two-way vehicle trips are projected as a result of the proposed development
- Of the forecasted trips, 65% are anticipated to travel north, 10% to both the south and the west, and 15% to the east

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growth along Strandherd Drive and Longfields Drive on the major turning movements
- The extension of Chapman Mills Drive from Longfields Drive to Greenbank Road is assumed to complete by 2031, although it will not impact the site generated trips and trips distribution, the background volumes will be redistributed, and background volumes will be consistent with the study area TIAs
- The study area intersections in the 2026 and 2031 future background conditions will operate similar to the existing conditions with further degradation of the conditions due to background growths and the redistribution of Chapman Mills Drive extension

- During both peak hours, capacity issues remain at the intersection of Strandherd Drive at Longfields Drive, and further optimized signal timings may address the constraints and reduce the v/c of all movements to be 1.00 or below, which similar to the existing condition
- Capacity issues noted at Chapman Mills Drive at Longfields Drive intersection are a result of the existing signal timing and an increase of the cycle length from 100 seconds to 105 seconds and a protected phase on the northbound left-turn movement would be required to reduce the v/c of all movements at the intersection to 1.00 or below
- The existing and background capacity issues are anticipated to be mitigable by optimized signal timings

Development Design

- Hard surface connections are provided between tower entrances and the surrounding pedestrian facilities on Marketplace Avenue and McGarry Terrace
- Bicycle parking is proposed both underground and at ground level
- Local bus stops and Marketplace station are located within 450 metres of the site entrances and the Barrhaven Centre BRT station is within 800-metre walking distance
- The drop-off area is proposed on the west side of the internal aisle and along the east side of McGarry Terrace
- Loading area are proposed for each tower, the west tower will access the loading area via the access on McGarry Terrace, and the east tower will access the loading area via the shared access with Haven Towers on Marketplace Avenue
- An additional garbage collection area is located at the east tower via the site access on Marketplace Avenue
- Emergency service will be provided along the frontages of Marketplace Avenue and McGarry Terrace
- To accommodate garbage collections and move-in trucks, it is **recommended** that a mountable center island, widening, or a mountable apron and/or depressed curb accommodating typical truck turning radii be provided
- Both accesses are **recommended** to be updated to comply with the City standard SC7.1

Parking

- The site plan proposes a total of 653 vehicle parking spaces for commercial, residential units, and visitors, including a total of 17 accessible parking spaces
- A total of 295 bicycle parking spaces are proposed including 289 spaces provided below ground and six spaces at ground level
- The minimum and maximum vehicle parking requirements are satisfied
- The bicycle parking proposed is five spaces below than the requirement and is recommended that additional bicycle parking spaces be explored through surface racks or vertical racking solutions for internal areas

Boundary Street Design

- The boundary streets of Marketplace Avenue and McGarry Terrace do not meet the pedestrian MMLOS targets
- Meeting pedestrian LOS targets on McGarry Terrace would require traffic speed less or equal to 30 km/h
- McGarry Terrace unposted speed limit is assumed to be 50 km/h. The posted limit of 30 km/h may be placed once McGarry Terrace is extend

- Meeting pedestrian LOS targets on Marketplace Avenue would require traffic speed less or equal to 30 km/h and a boulevard of 0.5 metres in width or greater

Access Intersections Design

- The development will connect to Marketplace Avenue via a shared access with Haven Towers, and a new loading access on McGarry Terrace
- The Marketplace Avenue access is proposed as two-way access with a median between the inbound/outbound lanes and the McGarry Terrace access will be 5.5 metres wide
- The inbound width is 4.57 metres, the outbound width is 3.61 metres, and the median is approximately 2.68 metres for the underground parking garage vent for Marketplace Avenue access
- McGarry Terrace access meet the Private Approach Bylaw requirements
- The depressed curb length for Marketplace Avenue access exceeds the Private Approach Bylaw requirements, as this is required to accommodate truck movement
- Existing sidewalk is provided on Marketplace Avenue and future sidewalk will be provided on the east side of McGarry Terrace
- Both accesses **are recommended** to be updated to comply with the City standard SC7.1
- Both accesses will be minor stop-control intersections
- To permit the garbage trucks to access the site, it is **recommended** that the access be widened, include a mountable median, or include a mountable apron and/or depressed curb accommodating typical truck turning radii

TDM

- Supportive TDM measures to be included within the proposed development should include:
    - Display local area maps with walking/cycling access routes and key destinations at major entrances (multi-family, condominium)
    - Provide a multimodal travel option information package to new residents
    - Inclusion of a 1-year Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
    - Unbundle parking cost from purchase costs

NTM

- Marketplace Avenue is anticipated to convey between 390 to 1,006 vehicles during the peak hours east of the Marketplace Avenue access and convey between 337 to 976 vehicles during the peak hours west of the Marketplace Avenue access
- McGarry Terrace is anticipated to convey between 124 to 144 vehicles during the peak hours
- The volumes on the Marketplace Avenue for site access have high volumes, based upon the density of surrounding retail development, no changes to the roadway classifications or proposed road network are proposed for the site

Transit

- The proposed development is anticipated to generate an additional 148 AM and 139 PM peak hour two-way transit trips

- Peak hour increases in transit ridership resulting from the site equate to an articulated bus load routes to/from north of the site and one quarter of a standard bus load standard bus load routes to/from east of the site
- No specific transit priority measures were considered as part of this development

Network Intersection Design

- Generally, the network intersections will operate similar to the background conditions
- At the intersection of Strandherd Drive at Longfields Drive intersection, it is noted that the overall V/C during the AM peak hour and the southbound through movement during the PM peak hour are near capacity in the 2031 background condition, and the site-generated trips are considered to have minimal impact on this intersection
- The capacity constraint is noted on the northbound left-turn movement at the intersection of Chapman Mills Drive at Longfields Drive during the PM peak hour as a result of the existing signal timing
- An increase of the cycle length from 100 seconds to 105 seconds and a protected phase on the northbound left-turn movement at the intersection of Chapman Mills Drive at Longfields Drive during the PM peak hour would be required to reduce the v/c of all movements at the intersection to 1.00 or below
- The pedestrian LOS targets will not be met at the study area intersections, and the maximum crossing distance on all pedestrian crossings would need to be reduced to two lane-widths
- The bicycle LOS targets will not be met at the study area intersections except for Chapman Mills Drive at Longfields Drive
- To meet bicycle targets, segregated facilities would be required on the southbound approach at the intersection of Strandherd Drive at Longfields Drive. Two-stage left turns or left-turn boxes would be required on all approaches at the intersection of Strandherd Drive at Longfields Drive, westbound approach at the intersection of Strandherd Drive at Riocan Avenue, all approaches at the intersection of Longfields Drive at Marketplace Avenue/Clearbrook Drive
- No study area intersection design elements are proposed as part of this study

18 Conclusion

While the overall site can be recommended to proceed with an official plan amendment and zoning amendment from a transportation perspective, specific site plan related elements are required to be addressed prior to approval of the future site plan.

- Both accesses must be revised to comply with the City standard SC7.1 for the depressed curb and sidewalk
- The Marketplace Avenue access will need to be widened for the inbound lanes, or the median made mountable, or to provide a mountable apron and/or depressed curb accommodating typical truck turning radii to permit inbound truck movements, such as garbage truck access

Once the above have been addressed, the development can be supported to proceed through site plan approval from a transportation perspective.

Prepared By:

Yu-Chu Chen, EIT
Transportation Engineering-Inter

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

6 Plaza Court
Ottawa, ON K2H 7W1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 25-Jan-23
Project Number: 2022-160
Project Reference: 1034 McGarry Terrace

1.1 Description of Proposed Development	
Municipal Address	1034 McGarry Terrace
Description of Location	North of the intersection of Marketplace Avenue and Sue Holloway Drive
Land Use Classification	Mixed-Use Centre Zone (MC[2573])
Development Size	40 and 30-storey towers, totaling 690 units
Accesses	Existing Phase 1 access on Marketplace Avenue
Phase of Development	Single
Buildout Year	2026
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	690	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?	No	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No	
Location Trigger	No	

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?	No	
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)?	No	
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	High collisions at Strandherd Drive & Longfields Drive intersection
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[1] or registered[2] 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
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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

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa / K2H 7W1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

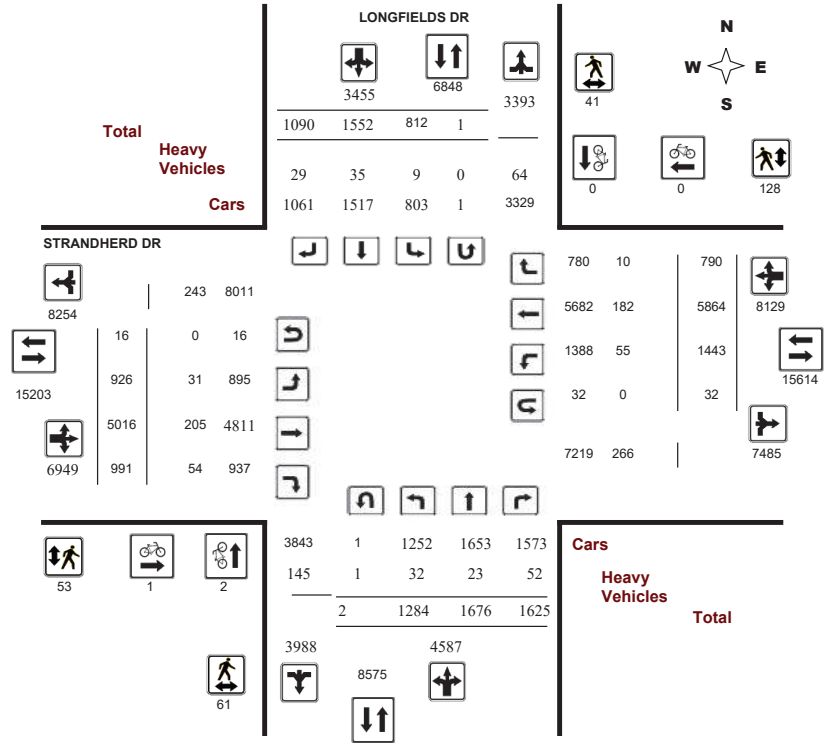
Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

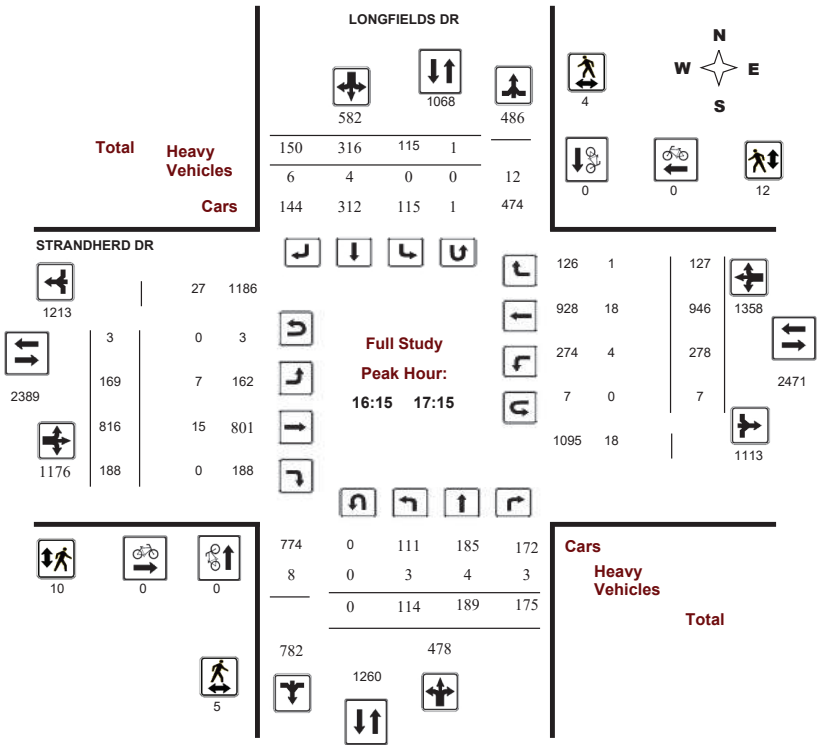
Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

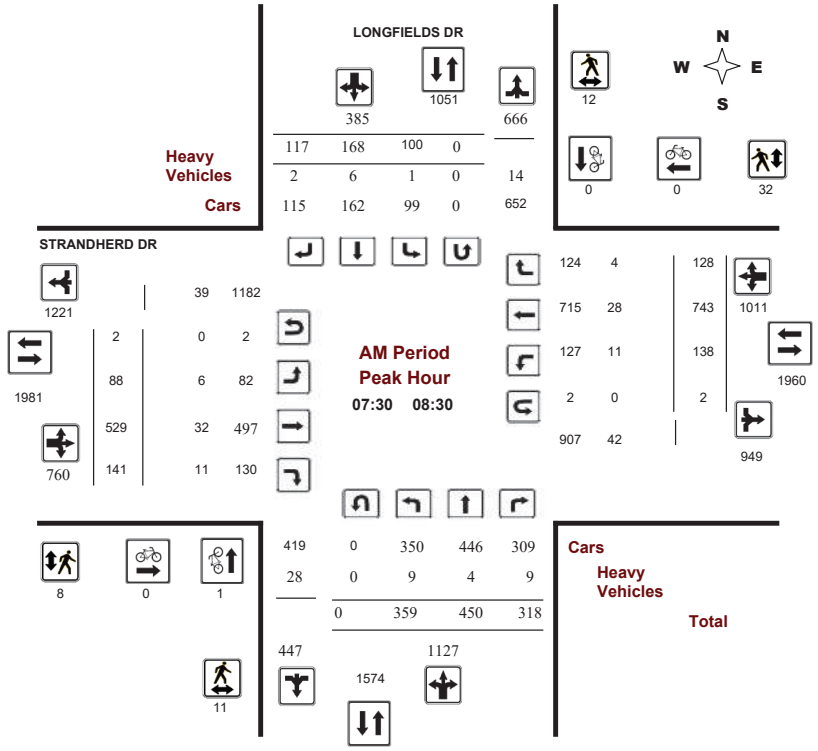
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision



Comments 5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

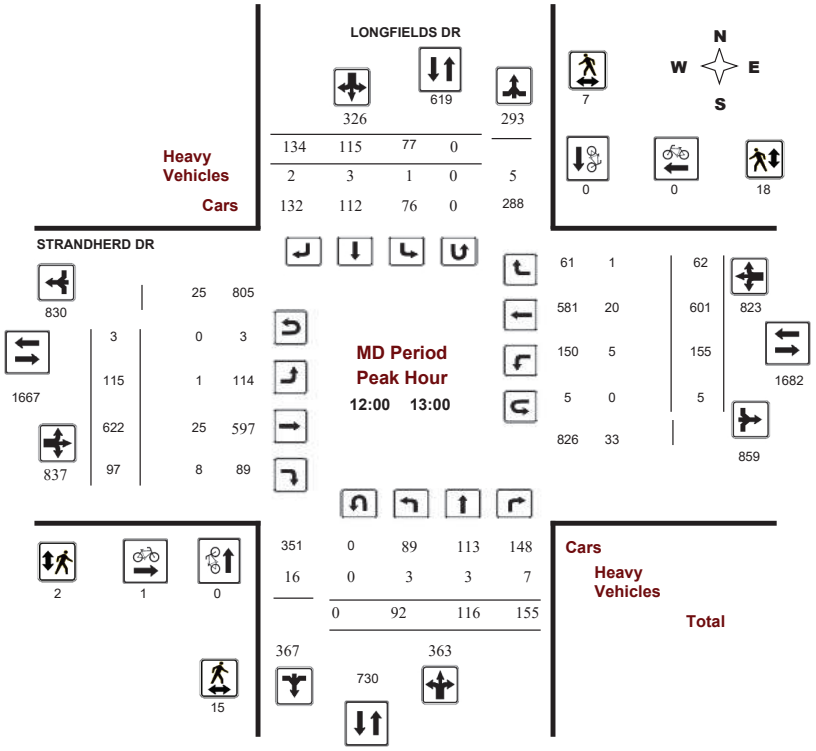
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision



Comments 5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

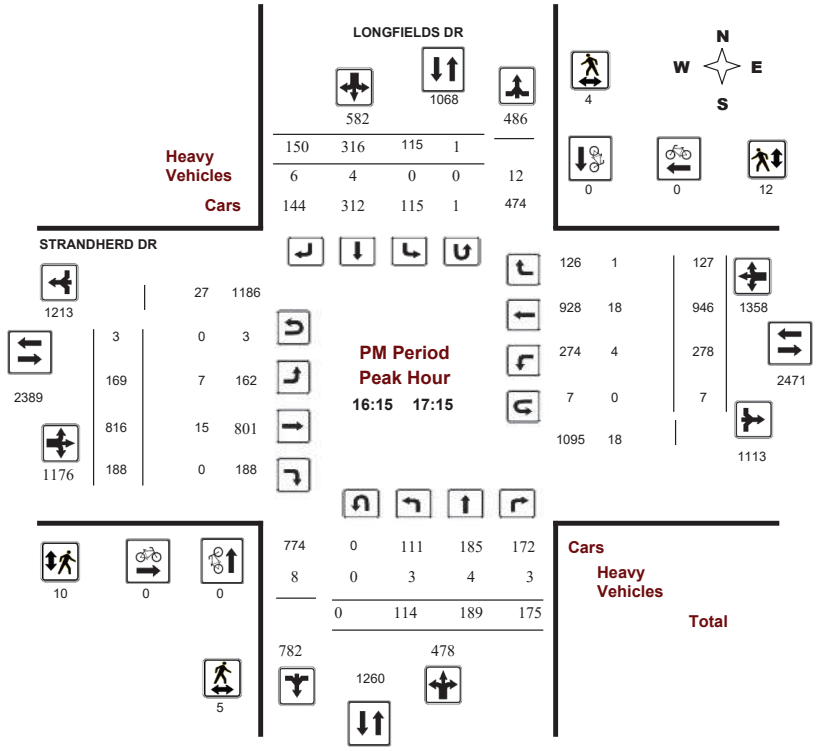
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision



Comments 5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 16, 2020

Total Observed U-Turns

Northbound: 2 Southbound: 1

Eastbound: 16 Westbound: 32

AADT Factor 1.00

	LONGFIELDS DR								STRANDHERD DR								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	284	430	283	**997**	101	128	117	**346**	**1343**	59	495	105	**659**	125	639	74	**838**	**1497**	**2840**
08:00 09:00	324	321	251	**896**	133	176	143	**452**	**1348**	100	542	119	**761**	114	752	186	**1052**	**1813**	**3161**
09:00 10:00	119	163	171	**453**	94	143	119	**356**	**809**	66	482	66	**614**	92	571	45	**708**	**1322**	**2131**
11:30 12:30	87	116	150	**353**	61	123	132	**316**	**669**	119	553	89	**761**	165	638	58	**861**	**1622**	**2291**
12:30 13:30	95	90	152	**337**	68	113	125	**306**	**643**	112	580	100	**792**	145	548	55	**748**	**1540**	**2183**
15:00 16:00	129	187	215	**531**	134	271	147	**552**	**1083**	131	763	147	**1041**	238	881	124	**1243**	**2284**	**3367**
16:00 17:00	113	184	192	**489**	109	300	145	**554**	**1043**	169	818	189	**1176**	292	943	126	**1361**	**2537**	**3580**
17:00 18:00	133	185	211	**529**	112	298	162	**572**	**1101**	170	783	176	**1129**	272	892	122	**1286**	**2415**	**3516**
Sub Total	1284	1676	1625	**4585**	812	1552	1090	**3454**	**8039**	926	5016	991	**6933**	1443	5864	790	**8097**	**15030**	**23069**
U Turns	2			**2**	1			**1**	**3**	**16**			**16**	32			**32**	**48**	**51**
Total	1286	1676	1625	**4587**	813	1552	1090	**3455**	**8042**	942	5016	991	**6949**	1475	5864	790	**8129**	**15078**	**23120**
EQ 12Hr	1788	2330	2259	**6377**	1130	2157	1515	**4802**	**11179**	1309	6972	1377	**9658**	2050	8151	1098	**11299**	**20957**	**32136**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1788	2330	2259	**6377**	1130	2157	1515	**4802**	**11179**	1309	6972	1377	**9658**	2050	8151	1098	**11299**	**20957**	**32136**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.00**					
AVG 24Hr	2342	3052	2959	**8353**	1480	2826	1985	**6291**	**14644**	1715	9133	1804	**12652**	2686	10678	1438	**14802**	**27454**	**42098**
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

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		LONGFIELDS DR									STRANDHERD DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	54	73	63	190	28	15	28	71	**261**	10	110	14	134	14	126	11	151	**285**	**546**
07:15	07:30	47	90	55	192	20	20	32	72	**264**	17	132	17	166	31	150	15	196	**362**	**626**
07:30	07:45	88	164	77	329	34	47	32	113	**442**	18	101	36	155	28	171	22	221	**376**	**818**
07:45	08:00	95	103	88	286	19	46	25	90	**376**	16	152	38	206	53	192	26	271	**477**	**853**
08:00	08:15	109	97	80	286	19	38	19	76	**362**	26	120	32	178	34	184	29	247	**425**	**787**
08:15	08:30	67	86	73	226	28	37	41	106	**332**	30	156	35	221	25	196	51	272	**493**	**825**
08:30	08:45	99	72	45	216	38	52	42	132	**348**	21	125	24	170	30	197	63	290	**460**	**808**
08:45	09:00	49	66	53	168	48	49	41	138	**306**	25	141	28	194	27	175	43	245	**439**	**745**
09:00	09:15	34	51	52	137	42	57	38	137	**274**	20	115	19	154	29	142	12	183	**337**	**611**
09:15	09:30	31	43	46	120	19	34	32	85	**205**	13	127	23	163	28	179	11	218	**381**	**586**
09:30	09:45	30	28	42	100	17	35	21	73	**173**	17	104	8	129	21	126	13	160	**289**	**462**
09:45	10:00	24	41	31	96	16	17	28	61	**157**	17	136	16	169	18	124	9	151	**320**	**477**
11:30	11:45	21	24	38	83	21	33	46	100	**183**	23	105	30	158	32	150	13	195	**353**	**536**
11:45	12:00	30	30	42	102	8	33	29	70	**172**	36	122	15	173	49	155	15	219	**392**	**564**
12:00	12:15	21	37	32	90	18	26	31	75	**165**	29	164	21	214	49	162	17	228	**442**	**607**
12:15	12:30	17	25	38	80	14	31	26	71	**151**	35	162	23	220	39	171	13	223	**443**	**594**
12:30	12:45	23	21	43	87	16	21	38	75	**162**	23	140	19	182	29	145	8	182	**364**	**526**
12:45	13:00	31	33	42	106	29	37	39	105	**211**	31	156	34	221	43	123	24	190	**411**	**622**
13:00	13:15	25	16	28	69	12	30	21	63	**132**	32	141	20	193	36	125	9	170	**363**	**495**
13:15	13:30	16	20	39	75	11	25	27	63	**138**	27	143	27	197	42	155	14	211	**408**	**546**
15:00	15:15	36	67	36	139	29	57	25	111	**250**	18	188	28	234	56	218	38	312	**546**	**796**
15:15	15:30	40	50	67	157	34	85	34	153	**310**	41	189	37	267	66	193	28	287	**554**	**864**
15:30	15:45	24	31	59	114	38	48	41	127	**241**	39	213	42	294	61	224	22	307	**601**	**842**
15:45	16:00	29	39	53	121	33	81	47	161	**282**	35	173	40	248	58	246	36	340	**588**	**870**
16:00	16:15	26	38	65	129	30	59	36	125	**254**	43	205	40	288	80	246	30	356	**644**	**898**
16:15	16:30	32	45	40	117	30	66	30	126	**243**	43	223	47	313	62	216	26	304	**617**	**860**
16:30	16:45	29	48	46	123	22	78	44	144	**267**	36	195	45	276	80	252	33	365	**641**	**908**
16:45	17:00	26	53	41	120	28	97	35	160	**280**	49	195	57	301	74	229	37	340	**641**	**921**
17:00	17:15	27	43	48	118	36	75	41	152	**270**	44	203	39	286	69	249	31	349	**635**	**905**
17:15	17:30	29	33	56	118	27	70	43	140	**258**	39	198	43	280	73	208	27	308	**588**	**846**
17:30	17:45	45	48	51	144	28	77	44	149	**293**	41	199	52	292	65	229	28	322	**614**	**907**
17:45	18:00	32	61	56	149	21	76	34	131	**280**	48	183	42	273	74	206	36	316	**589**	**869**
Total:		1286	1676	1625	4587	813	1552	1090	3455	**8042**	942	5016	991	6949	1475	5864	790	8129	**8042**	**23,120**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		LONGFIELDS DR			STRANDHERD DR			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
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	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	1	0	**1**	0	0	**0**	**1**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	1	0	**1**	0	0	**0**	**1**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
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	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	1	0	**1**	**1**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	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	0	0	**0**	0	0	**0**	**0**
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	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total		2	0	**2**	1	0	**1**	**3**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		LONGFIELDS DR			STRANDHERD DR			
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	0	**0**	0	1	**1**	**1**
07:15	07:30	0	0	**0**	2	0	**2**	**2**
07:30	07:45	2	4	**6**	4	5	**9**	**15**
07:45	08:00	4	6	**10**	2	15	**17**	**27**
08:00	08:15	2	0	**2**	0	10	**10**	**12**
08:15	08:30	3	2	**5**	2	2	**4**	**9**
08:30	08:45	1	0	**1**	1	4	**5**	**6**
08:45	09:00	0	1	**1**	2	6	**8**	**9**
09:00	09:15	2	2	**4**	3	2	**5**	**9**
09:15	09:30	2	0	**2**	1	3	**4**	**6**
09:30	09:45	7	0	**7**	0	7	**7**	**14**
09:45	10:00	2	0	**2**	0	4	**4**	**6**
11:30	11:45	5	1	**6**	5	8	**13**	**19**
11:45	12:00	1	3	**4**	2	3	**5**	**9**
12:00	12:15	4	1	**5**	0	5	**5**	**10**
12:15	12:30	8	6	**14**	1	5	**6**	**20**
12:30	12:45	2	0	**2**	1	6	**7**	**9**
12:45	13:00	1	0	**1**	0	2	**2**	**3**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	1	**1**	1	0	**1**	**2**
15:00	15:15	0	1	**1**	0	5	**5**	**6**
15:15	15:30	4	2	**6**	2	9	**11**	**17**
15:30	15:45	1	1	**2**	2	6	**8**	**10**
15:45	16:00	4	3	**7**	4	3	**7**	**14**
16:00	16:15	0	1	**1**	4	2	**6**	**7**
16:15	16:30	1	1	**2**	2	1	**3**	**5**
16:30	16:45	3	0	**3**	3	7	**10**	**13**
16:45	17:00	1	2	**3**	3	2	**5**	**8**
17:00	17:15	0	1	**1**	2	2	**4**	**5**
17:15	17:30	1	1	**2**	1	3	**4**	**6**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	1	**1**	3	0	**3**	**4**
Total		61	41	**102**	53	128	**181**	**283**

5470812 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		LONGFIELDS DR									STRANDHERD DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	1	**1**	0	1	0	**1**	**2**	0	4	3	**7**	0	3	0	**3**	**10**	**12**
07:15	07:30	0	0	1	**1**	0	1	0	**1**	**2**	1	8	2	**11**	0	2	1	**3**	**14**	**16**
07:30	07:45	1	2	2	**5**	0	0	0	**0**	**5**	1	9	4	**14**	2	4	1	**7**	**21**	**26**
07:45	08:00	5	1	1	**7**	0	3	1	**4**	**11**	3	13	2	**18**	4	10	2	**16**	**34**	**45**
08:00	08:15	3	1	3	**7**	1	1	0	**2**	**9**	1	2	3	**6**	3	6	1	**10**	**16**	**25**
08:15	08:30	0	0	3	**3**	0	2	1	**3**	**6**	1	8	2	**11**	2	8	0	**10**	**21**	**27**
08:30	08:45	3	2	2	**7**	0	2	0	**2**	**9**	1	7	4	**12**	6	6	0	**12**	**24**	**33**
08:45	09:00	4	1	1	**6**	1	0	0	**1**	**7**	2	12	1	**15**	1	13	0	**14**	**29**	**36**
09:00	09:15	1	0	3	**4**	3	5	0	**8**	**12**	1	9	3	**13**	1	11	0	**12**	**25**	**37**
09:15	09:30	2	0	1	**3**	0	1	1	**2**	**5**	0	7	1	**8**	1	14	0	**15**	**23**	**28**
09:30	09:45	0	0	2	**2**	0	1	2	**3**	**5**	1	7	1	**9**	1	6	0	**7**	**16**	**21**
09:45	10:00	2	2	2	**6**	0	2	2	**4**	**10**	3	8	3	**14**	2	7	0	**9**	**23**	**33**
11:30	11:45	0	1	1	**2**	0	2	1	**3**	**5**	0	5	1	**6**	3	7	0	**10**	**16**	**22**
11:45	12:00	0	0	3	**3**	0	3	1	**4**	**7**	1	4	2	**7**	1	7	0	**8**	**15**	**22**
12:00	12:15	1	2	1	**4**	1	1	0	**2**	**6**	0	7	0	**7**	2	4	0	**6**	**13**	**19**
12:15	12:30	1	0	1	**2**	0	1	0	**1**	**3**	0	6	2	**8**	1	5	1	**7**	**15**	**18**
12:30	12:45	0	1	3	**4**	0	1	2	**3**	**7**	0	3	1	**4**	1	6	0	**7**	**11**	**18**
12:45	13:00	1	0	2	**3**	0	0	0	**0**	**3**	1	9	5	**15**	1	5	0	**6**	**21**	**24**
13:00	13:15	1	0	0	**1**	1	1	0	**2**	**3**	1	5	2	**8**	1	3	0	**4**	**12**	**15**
13:15	13:30	0	1	3	**4**	1	0	2	**3**	**7**	1	10	0	**11**	5	4	1	**10**	**21**	**28**
15:00	15:15	1	3	1	**5**	0	0	1	**1**	**6**	0	10	2	**12**	2	4	1	**7**	**19**	**25**
15:15	15:30	0	2	3	**5**	1	1	2	**4**	**9**	2	10	0	**12**	4	6	0	**10**	**22**	**31**
15:30	15:45	2	0	5	**7**	0	0	2	**2**	**9**	0	8	3	**11**	2	7	0	**9**	**20**	**29**
15:45	16:00	0	0	0	**0**	0	1	2	**3**	**3**	1	5	2	**8**	0	3	0	**3**	**11**	**14**
16:00	16:15	0	0	3	**3**	0	1	1	**2**	**5**	1	5	4	**10**	2	6	0	**8**	**18**	**23**
16:15	16:30	2	2	0	**4**	0	1	2	**3**	**7**	3	7	0	**10**	1	4	1	**6**	**16**	**23**
16:30	16:45	0	2	1	**3**	0	2	1	**3**	**6**	1	4	0	**5**	1	6	0	**7**	**12**	**18**
16:45	17:00	1	0	0	**1**	0	1	3	**4**	**5**	1	3	0	**4**	1	5	0	**6**	**10**	**15**
17:00	17:15	0	0	2	**2**	0	0	0	**0**	**2**	2	1	0	**3**	1	3	0	**4**	**7**	**9**
17:15	17:30	1	0	0	**1**	0	0	0	**0**	**1**	1	3	0	**4**	0	6	0	**6**	**10**	**11**
17:30	17:45	0	0	1	**1**	0	0	1	**1**	**2**	0	1	1	**2**	1	1	1	**3**	**5**	**7**
17:45	18:00	0	0	0	**0**	0	0	1	**1**	**1**	0	5	0	**5**	2	0	0	**2**	**7**	**8**
Total:	None	32	23	52	**107**	9	35	29	**73**	**180**	31	205	54	**290**	55	182	10	**247**	**537**	**718**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

STRANDHERD DR @ LONGFIELDS DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39327

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		LONGFIELDS DR Northbound U-Turn Total	LONGFIELDS DR Southbound U-Turn Total	STRANDHERD DR Eastbound U-Turn Total	STRANDHERD DR Westbound U-Turn Total	Total
07:00	07:15	0	0	1	0	**1**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	1	1	**2**
08:00	08:15	0	0	1	0	**1**
08:15	08:30	0	0	0	1	**1**
08:30	08:45	0	0	0	1	**1**
08:45	09:00	0	0	1	0	**1**
09:00	09:15	0	0	0	3	**3**
09:15	09:30	0	0	1	0	**1**
09:30	09:45	0	0	0	1	**1**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	2	0	1	1	**4**
11:45	12:00	0	0	0	1	**1**
12:00	12:15	0	0	1	2	**3**
12:15	12:30	0	0	2	0	**2**
12:30	12:45	0	0	0	2	**2**
12:45	13:00	0	0	0	1	**1**
13:00	13:15	0	0	0	2	**2**
13:15	13:30	0	0	1	0	**1**
15:00	15:15	0	0	1	1	**2**
15:15	15:30	0	0	0	2	**2**
15:30	15:45	0	0	1	0	**1**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	1	**1**
16:15	16:30	0	0	2	2	**4**
16:30	16:45	0	0	0	1	**1**
16:45	17:00	0	1	0	0	**1**
17:00	17:15	0	0	1	4	**5**
17:15	17:30	0	0	1	2	**3**
17:30	17:45	0	0	0	2	**2**
17:45	18:00	0	0	0	1	**1**
Total		2	1	16	32	**51**

Transportation Services - Traffic Services

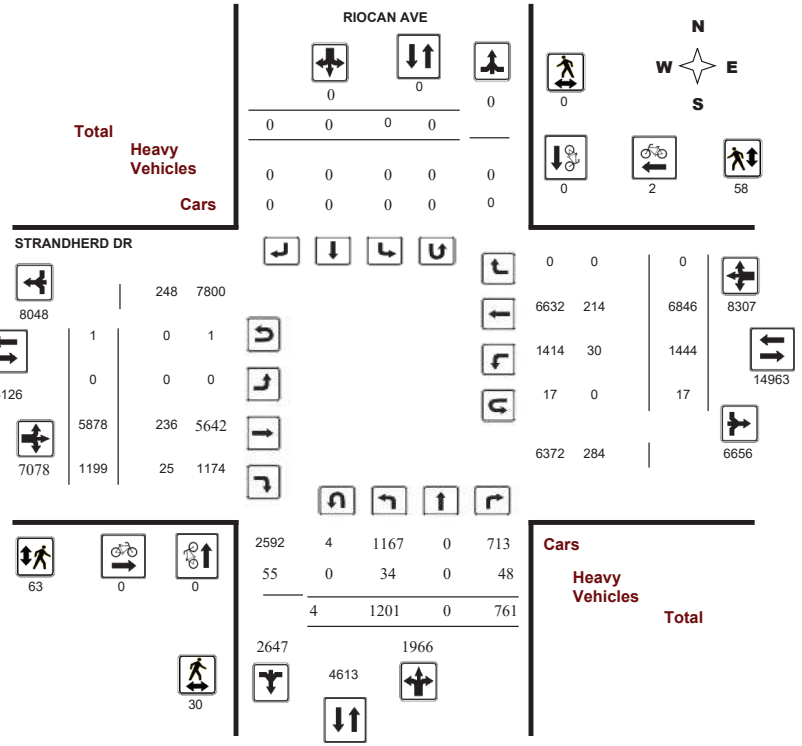
Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

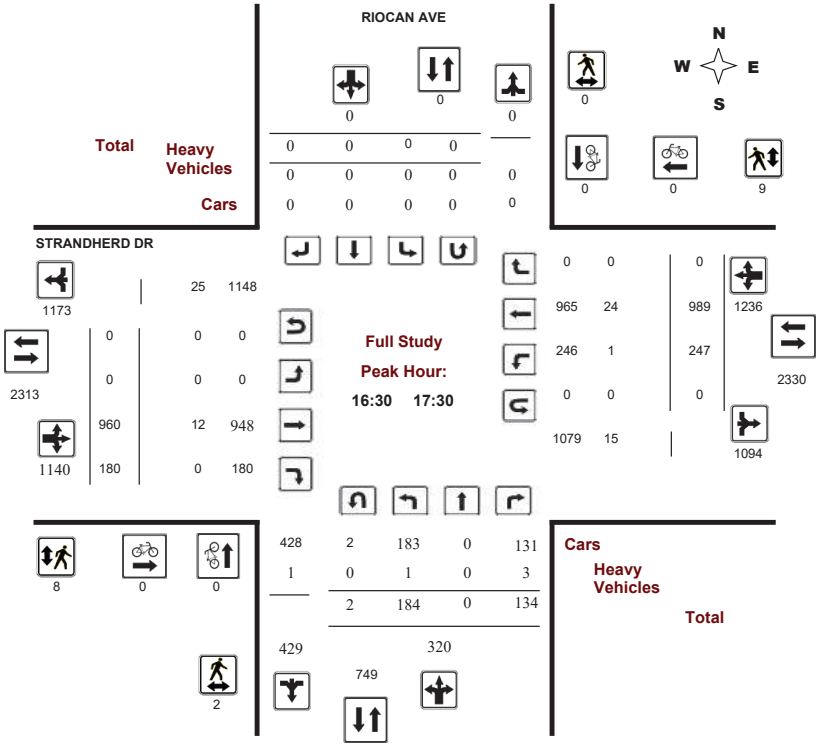
Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

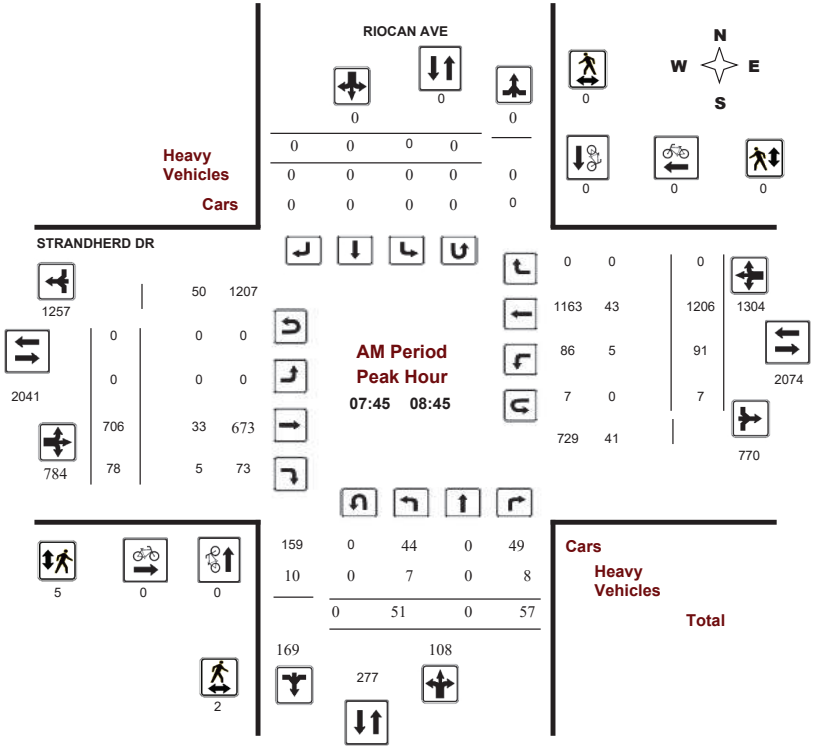
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision



Comments 5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

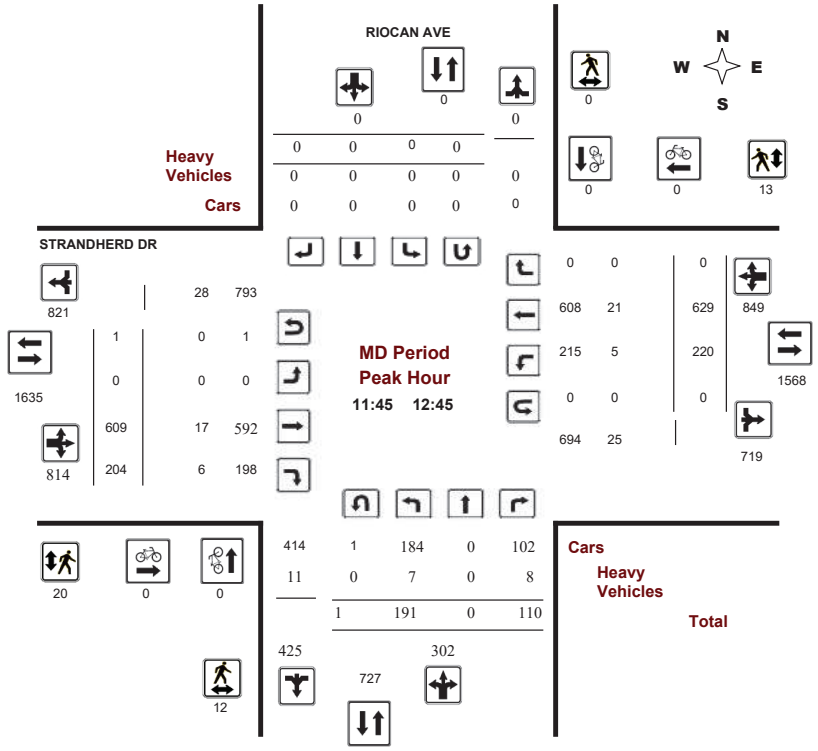
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision



Comments 5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

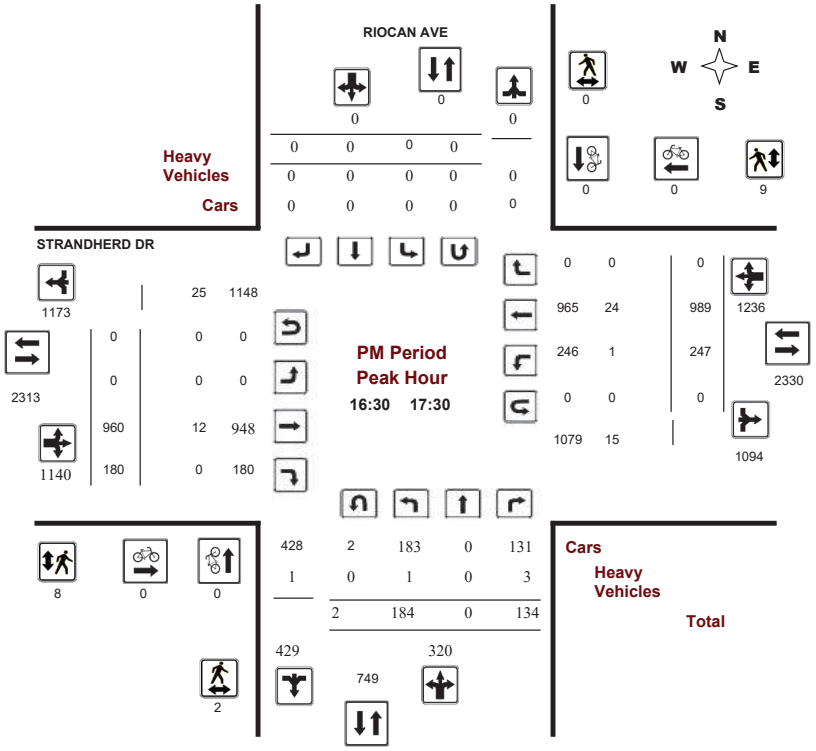
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision



Comments 5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 16, 2020

Total Observed U-Turns

Northbound: 4 Southbound: 0

Eastbound: 1 Westbound: 17

AADT Factor 1.00

	RIOCAN AVE								STRANDHERD DR									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	40	0	33	**73**	0	0	0	**0**	**73**	0	637	68	**705**	73	955	0	**1028**	**1733**	**1806**
08:00 09:00	56	0	61	**117**	0	0	0	**0**	**117**	0	670	76	**746**	116	1170	0	**1286**	**2032**	**2149**
09:00 10:00	100	0	49	**149**	0	0	0	**0**	**149**	0	547	121	**668**	146	660	0	**806**	**1474**	**1623**
11:30 12:30	177	0	106	**283**	0	0	0	**0**	**283**	0	592	186	**778**	202	639	0	**841**	**1619**	**1902**
12:30 13:30	196	0	119	**315**	0	0	0	**0**	**315**	0	645	208	**853**	211	568	0	**779**	**1632**	**1947**
15:00 16:00	248	0	134	**382**	0	0	0	**0**	**382**	0	865	191	**1056**	224	907	0	**1131**	**2187**	**2569**
16:00 17:00	196	0	130	**326**	0	0	0	**0**	**326**	0	979	169	**1148**	251	968	0	**1219**	**2367**	**2693**
17:00 18:00	188	0	129	**317**	0	0	0	**0**	**317**	0	943	180	**1123**	221	979	0	**1200**	**2323**	**2640**
Sub Total	1201	0	761	**1962**	0	0	0	**0**	**1962**	0	5878	1199	**7077**	1444	6846	0	**8290**	**15367**	**17329**
U Turns	4			**4**	0			**0**	**4**	**1**			**1**	17			**17**	**18**	**22**
Total	1205	0	761	**1966**	0	0	0	**0**	**1966**	1	5878	1199	**7078**	1461	6846	0	**8307**	**15385**	**17351**
EQ 12Hr	1675	0	1058	**2733**	0	0	0	**0**	**2733**	1	8170	1667	**9838**	2031	9516	0	**11547**	**21385**	**24118**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1675	0	1058	**2733**	0	0	0	**0**	**2733**	1	8170	1667	**9838**	2031	9516	0	**11547**	**21385**	**24118**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.00**					
AVG 24Hr	2194	0	1386	**3580**	0	0	0	**0**	**3580**	1	10703	2184	**12888**	2661	12466	0	**15127**	**28015**	**31595**
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

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		RIOCAN AVE								STRANDHERD DR									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	5	0	12	17	0	0	0	0	**17**	0	137	17	154	24	189	0	213	**367**	**384**
07:15	07:30	12	0	6	18	0	0	0	0	**18**	0	154	21	175	14	199	0	213	**388**	**406**
07:30	07:45	12	0	6	18	0	0	0	0	**18**	0	157	10	167	17	275	0	292	**459**	**477**
07:45	08:00	11	0	9	20	0	0	0	0	**20**	0	189	20	209	21	292	0	313	**522**	**542**
08:00	08:15	9	0	22	31	0	0	0	0	**31**	0	169	18	187	23	308	0	331	**518**	**549**
08:15	08:30	12	0	15	27	0	0	0	0	**27**	0	184	21	205	18	274	0	292	**497**	**524**
08:30	08:45	19	0	11	30	0	0	0	0	**30**	0	164	19	183	36	332	0	368	**551**	**581**
08:45	09:00	16	0	13	29	0	0	0	0	**29**	0	153	18	171	47	256	0	303	**474**	**503**
09:00	09:15	16	0	12	28	0	0	0	0	**28**	0	158	33	191	34	164	0	198	**389**	**417**
09:15	09:30	27	0	7	34	0	0	0	0	**34**	0	136	24	160	46	206	0	252	**412**	**446**
09:30	09:45	19	0	14	33	0	0	0	0	**33**	0	108	32	140	28	135	0	163	**303**	**336**
09:45	10:00	38	0	16	54	0	0	0	0	**54**	0	145	32	177	40	155	0	195	**372**	**426**
11:30	11:45	36	0	20	56	0	0	0	0	**56**	0	139	40	179	48	164	0	212	**391**	**447**
11:45	12:00	57	0	28	85	0	0	0	0	**85**	1	155	50	206	51	156	0	207	**413**	**498**
12:00	12:15	43	0	28	71	0	0	0	0	**71**	0	141	51	192	56	162	0	218	**410**	**481**
12:15	12:30	41	0	30	71	0	0	0	0	**71**	0	157	45	202	48	157	0	205	**407**	**478**
12:30	12:45	51	0	24	75	0	0	0	0	**75**	0	156	58	214	65	154	0	219	**433**	**508**
12:45	13:00	46	0	34	80	0	0	0	0	**80**	0	168	47	215	54	142	0	196	**411**	**491**
13:00	13:15	47	0	31	78	0	0	0	0	**78**	0	150	50	200	47	127	0	174	**374**	**452**
13:15	13:30	54	0	30	84	0	0	0	0	**84**	0	171	53	224	45	145	0	190	**414**	**498**
15:00	15:15	57	0	42	99	0	0	0	0	**99**	0	185	46	231	57	212	0	269	**500**	**599**
15:15	15:30	73	0	32	105	0	0	0	0	**105**	0	229	39	268	40	227	0	267	**535**	**640**
15:30	15:45	48	0	29	77	0	0	0	0	**77**	0	230	55	285	58	240	0	298	**583**	**660**
15:45	16:00	70	0	31	101	0	0	0	0	**101**	0	221	51	272	70	228	0	298	**570**	**671**
16:00	16:15	50	0	30	80	0	0	0	0	**80**	0	238	44	282	67	255	0	322	**604**	**684**
16:15	16:30	55	0	33	88	0	0	0	0	**88**	0	251	43	294	58	216	0	274	**568**	**656**
16:30	16:45	47	0	30	77	0	0	0	0	**77**	0	234	39	273	65	266	0	331	**604**	**681**
16:45	17:00	45	0	37	82	0	0	0	0	**82**	0	256	43	299	61	231	0	292	**591**	**673**
17:00	17:15	51	0	34	85	0	0	0	0	**85**	0	228	47	275	61	264	0	325	**600**	**685**
17:15	17:30	43	0	33	76	0	0	0	0	**76**	0	242	51	293	60	228	0	288	**581**	**657**
17:30	17:45	41	0	39	80	0	0	0	0	**80**	0	231	36	267	55	250	0	305	**572**	**652**
17:45	18:00	54	0	23	77	0	0	0	0	**77**	0	242	46	288	47	237	0	284	**572**	**649**
Total:		1205	0	761	1966	0	0	0	0	**1966**	1	5878	1199	7078	1461	6846	0	8307	**1966**	**17,351**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		RIOCAN AVE			STRANDHERD DR			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
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	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
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	1	**1**	**1**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	1	**1**	**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	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	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	0	0	**0**	0	0	**0**	**0**
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	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total		0	0	**0**	0	2	**2**	**2**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		RIOCAN AVE			STRANDHERD DR			
		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	0	**0**	1	2	**3**	**3**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	2	0	**2**	0	2	**2**	**4**
07:45	08:00	1	0	**1**	0	0	**0**	**1**
08:00	08:15	0	0	**0**	2	0	**2**	**2**
08:15	08:30	1	0	**1**	2	0	**2**	**3**
08:30	08:45	0	0	**0**	1	0	**1**	**1**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	2	4	**6**	**6**
09:15	09:30	0	0	**0**	2	1	**3**	**3**
09:30	09:45	2	0	**2**	1	0	**1**	**3**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	3	0	**3**	2	2	**4**	**7**
11:45	12:00	0	0	**0**	8	1	**9**	**9**
12:00	12:15	6	0	**6**	6	1	**7**	**13**
12:15	12:30	5	0	**5**	4	6	**10**	**15**
12:30	12:45	1	0	**1**	2	5	**7**	**8**
12:45	13:00	0	0	**0**	2	0	**2**	**2**
13:00	13:15	2	0	**2**	2	2	**4**	**6**
13:15	13:30	0	0	**0**	1	1	**2**	**2**
15:00	15:15	1	0	**1**	1	2	**3**	**4**
15:15	15:30	0	0	**0**	4	0	**4**	**4**
15:30	15:45	0	0	**0**	2	4	**6**	**6**
15:45	16:00	1	0	**1**	2	4	**6**	**7**
16:00	16:15	1	0	**1**	1	4	**5**	**6**
16:15	16:30	1	0	**1**	2	4	**6**	**7**
16:30	16:45	1	0	**1**	1	5	**6**	**7**
16:45	17:00	1	0	**1**	4	2	**6**	**7**
17:00	17:15	0	0	**0**	2	1	**3**	**3**
17:15	17:30	0	0	**0**	1	1	**2**	**2**
17:30	17:45	0	0	**0**	5	2	**7**	**7**
17:45	18:00	1	0	**1**	0	2	**2**	**3**
Total	.....	30	0	**30**	63	58	**121**	**151**

5470811 - THU JAN 16, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		RIOCAN AVE									STRANDHERD DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	1	2	0	**3**	**12**	**12**
07:15	07:30	0	0	1	**1**	0	0	0	**0**	**1**	0	9	1	**10**	1	1	0	**2**	**12**	**13**
07:30	07:45	0	0	1	**1**	0	0	0	**0**	**1**	0	15	0	**15**	0	4	0	**4**	**19**	**20**
07:45	08:00	1	0	3	**4**	0	0	0	**0**	**4**	0	10	1	**11**	0	15	0	**15**	**26**	**30**
08:00	08:15	2	0	4	**6**	0	0	0	**0**	**6**	0	4	1	**5**	1	15	0	**16**	**21**	**27**
08:15	08:30	1	0	0	**1**	0	0	0	**0**	**1**	0	10	2	**12**	0	6	0	**6**	**18**	**19**
08:30	08:45	3	0	1	**4**	0	0	0	**0**	**4**	0	9	1	**10**	4	7	0	**11**	**21**	**25**
08:45	09:00	2	0	1	**3**	0	0	0	**0**	**3**	0	10	0	**10**	1	15	0	**16**	**26**	**29**
09:00	09:15	1	0	4	**5**	0	0	0	**0**	**5**	0	13	4	**17**	0	5	0	**5**	**22**	**27**
09:15	09:30	2	0	0	**2**	0	0	0	**0**	**2**	0	6	0	**6**	6	15	0	**21**	**27**	**29**
09:30	09:45	0	0	4	**4**	0	0	0	**0**	**4**	0	6	0	**6**	3	5	0	**8**	**14**	**18**
09:45	10:00	1	0	2	**3**	0	0	0	**0**	**3**	0	9	0	**9**	0	6	0	**6**	**15**	**18**
11:30	11:45	0	0	2	**2**	0	0	0	**0**	**2**	0	6	0	**6**	0	7	0	**7**	**13**	**15**
11:45	12:00	2	0	3	**5**	0	0	0	**0**	**5**	0	5	1	**6**	2	7	0	**9**	**15**	**20**
12:00	12:15	2	0	2	**4**	0	0	0	**0**	**4**	0	5	3	**8**	1	2	0	**3**	**11**	**15**
12:15	12:30	3	0	3	**6**	0	0	0	**0**	**6**	0	3	0	**3**	0	7	0	**7**	**10**	**16**
12:30	12:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	2	**6**	2	5	0	**7**	**13**	**13**
12:45	13:00	2	0	2	**4**	0	0	0	**0**	**4**	0	13	0	**13**	2	4	0	**6**	**19**	**23**
13:00	13:15	1	0	0	**1**	0	0	0	**0**	**1**	0	8	1	**9**	1	3	0	**4**	**13**	**14**
13:15	13:30	3	0	0	**3**	0	0	0	**0**	**3**	0	13	3	**16**	0	8	0	**8**	**24**	**27**
15:00	15:15	1	0	5	**6**	0	0	0	**0**	**6**	0	9	3	**12**	1	4	0	**5**	**17**	**23**
15:15	15:30	1	0	2	**3**	0	0	0	**0**	**3**	0	11	0	**11**	0	9	0	**9**	**20**	**23**
15:30	15:45	3	0	0	**3**	0	0	0	**0**	**3**	0	7	2	**9**	2	11	0	**13**	**22**	**25**
15:45	16:00	0	0	2	**2**	0	0	0	**0**	**2**	0	6	0	**6**	0	3	0	**3**	**9**	**11**
16:00	16:15	1	0	1	**2**	0	0	0	**0**	**2**	0	9	0	**9**	0	9	0	**9**	**18**	**20**
16:15	16:30	0	0	1	**1**	0	0	0	**0**	**1**	0	9	0	**9**	0	7	0	**7**	**16**	**17**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	1	7	0	**8**	**12**	**12**
16:45	17:00	1	0	2	**3**	0	0	0	**0**	**3**	0	2	0	**2**	0	6	0	**6**	**8**	**11**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	6	0	**6**	**8**	**8**
17:15	17:30	0	0	1	**1**	0	0	0	**0**	**1**	0	4	0	**4**	0	5	0	**5**	**9**	**10**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	1	3	0	**4**	**5**	**5**
17:45	18:00	1	0	1	**2**	0	0	0	**0**	**2**	0	5	0	**5**	0	5	0	**5**	**10**	**12**
Total:	None	34	0	48	**82**	0	0	0	**0**	**82**	0	236	25	**261**	30	214	0	**244**	**505**	**587**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RIOCAN AVE @ STRANDHERD DR

Survey Date: Thursday, January 16, 2020 **WO No:** 39326

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		RIOCAN AVE	STRANDHERD DR			
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	1	**1**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	2	**2**
08:00	08:15	0	0	0	1	**1**
08:15	08:30	0	0	0	1	**1**
08:30	08:45	0	0	0	3	**3**
08:45	09:00	0	0	0	3	**3**
09:00	09:15	0	0	0	1	**1**
09:15	09:30	0	0	0	0	**0**
09:30	09:45	0	0	0	1	**1**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	0	0	0	1	**1**
11:45	12:00	0	0	1	0	**1**
12:00	12:15	0	0	0	0	**0**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	1	0	0	0	**1**
12:45	13:00	1	0	0	0	**1**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	1	**1**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	0	0	**0**
16:45	17:00	1	0	0	0	**1**
17:00	17:15	1	0	0	0	**1**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	2	**2**
Total		4	0	1	17	**22**

Transportation Services - Traffic Services

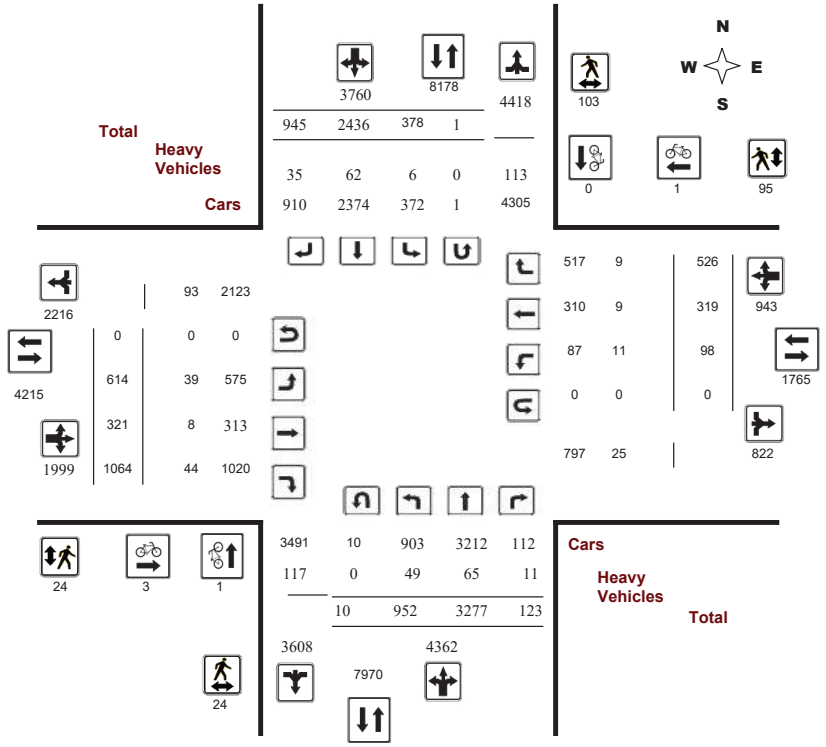
Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

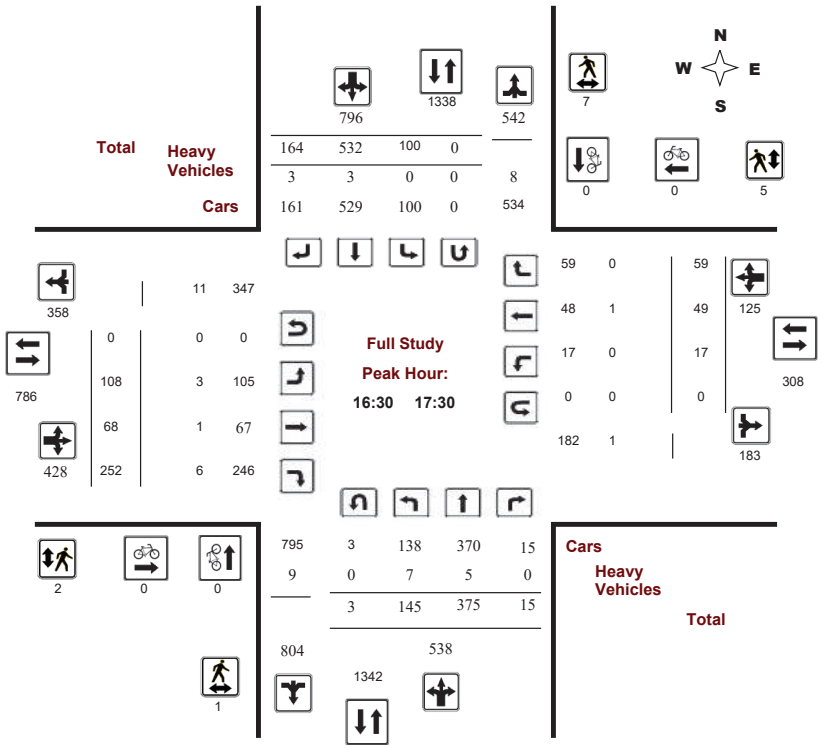
Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



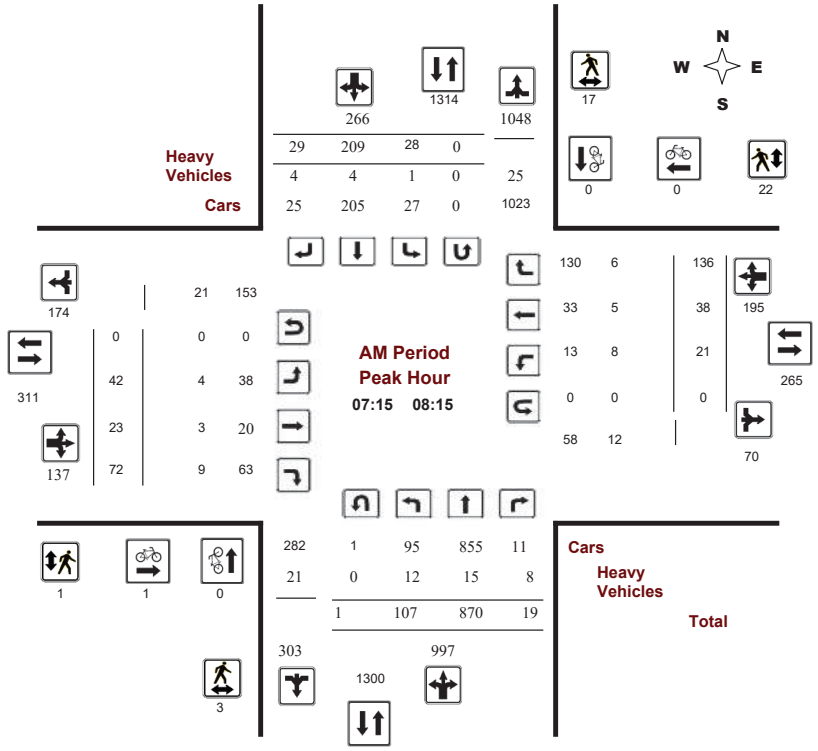
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision



Comments

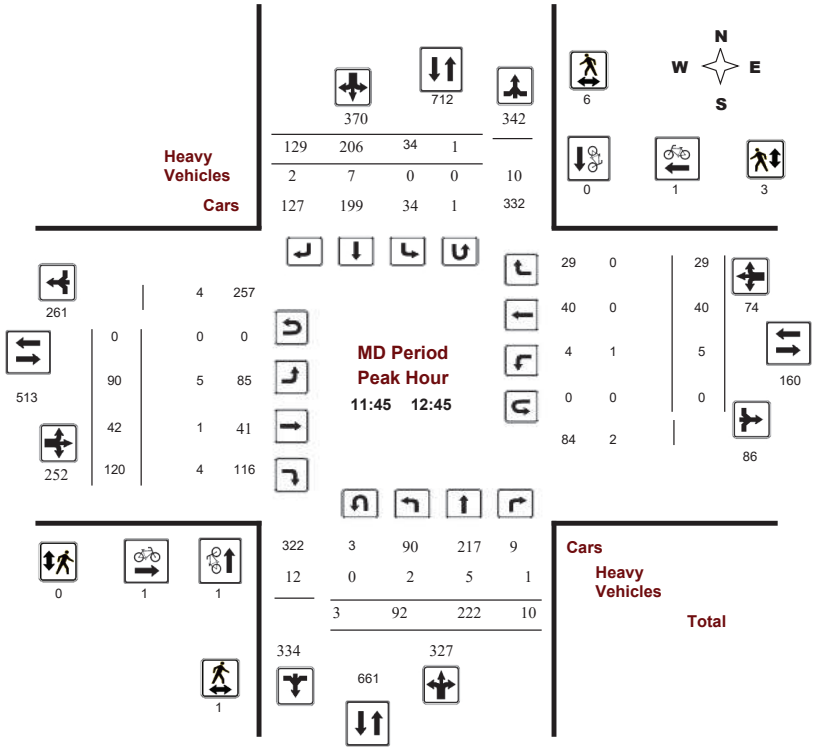
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision



Comments

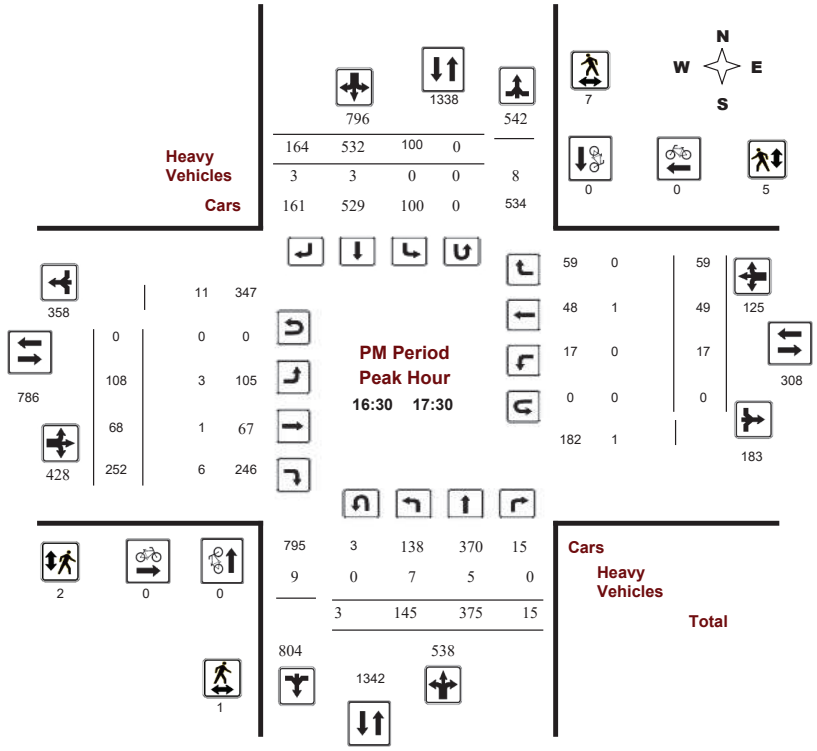
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 21, 2018

Total Observed U-Turns

Northbound: 10 Southbound: 1

Eastbound: 0 Westbound: 0

AADT Factor

.90

	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	102	823	18	**943**	26	204	25	**255**	**1198**	39	18	69	**126**	20	40	130	**190**	**316**	**1514**
08:00 09:00	110	627	21	**758**	31	259	72	**362**	**1120**	32	23	55	**110**	8	37	107	**152**	**262**	**1382**
09:00 10:00	132	339	10	**481**	15	184	111	**310**	**791**	46	22	69	**137**	5	49	49	**103**	**240**	**1031**
11:30 12:30	98	221	9	**328**	30	206	128	**364**	**692**	83	36	119	**238**	5	40	34	**79**	**317**	**1009**
12:30 13:30	93	200	4	**297**	36	161	124	**321**	**618**	100	40	122	**262**	4	27	30	**61**	**323**	**941**
15:00 16:00	126	338	21	**485**	63	385	165	**613**	**1098**	102	46	171	**319**	17	39	51	**107**	**426**	**1524**
16:00 17:00	138	330	19	**487**	85	501	169	**755**	**1242**	116	68	221	**405**	13	45	66	**124**	**529**	**1771**
17:00 18:00	153	399	21	**573**	92	536	151	**779**	**1352**	96	68	238	**402**	26	42	59	**127**	**529**	**1881**
Sub Total	952	3277	123	**4352**	378	2436	945	**3759**	**8111**	614	321	1064	**1999**	98	319	526	**943**	**2942**	**11053**
U Turns	10			**10**	1			**1**	**11**	**0**			**0**	0			**0**	**0**	**11**
Total	962	3277	123	**4362**	379	2436	945	**3760**	**8122**	614	321	1064	**1999**	98	319	526	**943**	**2942**	**11064**
EQ 12Hr	1337	4555	171	**6063**	527	3386	1314	**5227**	**11290**	853	446	1479	**2778**	136	443	731	**1310**	**4088**	**15378**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1203	4100	154	**5457**	474	3047	1183	**4704**	**10161**	768	401	1331	**2500**	122	399	658	**1179**	**3679**	**13840**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	1576	5371	202	**7149**	621	3992	1550	**6163**	**13312**	1006	525	1744	**3275**	160	523	862	**1545**	**4820**	**18132**
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

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

Time Period		Northbound				Southbound					Eastbound				Westbound					Grand Total
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	
07:00	07:15	21	156	3	180	5	46	3	54	**234**	9	3	14	26	3	11	16	30	**56**	**290**
07:15	07:30	21	218	1	240	6	46	8	60	**300**	9	4	15	28	2	9	26	37	**65**	**365**
07:30	07:45	25	206	2	233	6	43	5	54	**287**	9	6	17	32	1	5	34	40	**72**	**359**
07:45	08:00	36	243	12	291	9	69	9	87	**378**	12	5	23	40	14	15	54	83	**123**	**501**
08:00	08:15	26	203	4	233	7	51	7	65	**298**	12	8	17	37	4	9	22	35	**72**	**370**
08:15	08:30	35	165	6	206	6	57	24	87	**293**	5	4	15	24	2	7	21	30	**54**	**347**
08:30	08:45	25	149	6	180	9	68	22	99	**279**	5	7	9	21	1	11	42	54	**75**	**354**
08:45	09:00	25	110	5	140	9	83	19	111	**251**	10	4	14	28	1	10	22	33	**61**	**312**
09:00	09:15	46	103	3	152	6	58	39	103	**255**	11	5	17	33	2	15	12	29	**62**	**317**
09:15	09:30	30	80	3	113	4	47	21	72	**185**	4	5	13	22	1	12	11	24	**46**	**231**
09:30	09:45	31	82	3	116	3	38	29	70	**186**	13	8	22	43	1	9	11	21	**64**	**250**
09:45	10:00	26	74	1	101	2	41	22	65	**166**	18	4	17	39	1	13	15	29	**68**	**234**
11:30	11:45	31	60	1	92	6	44	29	79	**171**	15	7	27	49	2	8	14	24	**73**	**244**
11:45	12:00	23	67	5	95	10	55	36	101	**196**	26	9	23	58	3	6	9	18	**76**	**272**
12:00	12:15	28	42	2	72	12	58	33	103	**175**	22	7	31	60	0	13	7	20	**80**	**255**
12:15	12:30	19	52	1	72	2	49	30	81	**153**	20	13	38	71	0	13	4	17	**88**	**241**
12:30	12:45	25	61	2	88	11	44	30	85	**173**	22	13	28	63	2	8	9	19	**82**	**255**
12:45	13:00	27	54	0	81	7	46	27	80	**161**	25	10	33	68	0	5	9	14	**82**	**243**
13:00	13:15	25	39	2	66	8	31	35	74	**140**	23	13	27	63	1	7	9	17	**80**	**220**
13:15	13:30	17	46	0	63	11	40	32	83	**146**	30	4	34	68	1	7	3	11	**79**	**225**
15:00	15:15	31	88	6	125	10	69	27	106	**231**	28	14	42	84	2	7	17	26	**110**	**341**
15:15	15:30	31	86	5	122	24	110	35	169	**291**	21	12	33	66	5	12	10	27	**93**	**384**
15:30	15:45	31	72	4	107	14	89	49	152	**259**	24	8	49	81	2	12	15	29	**110**	**369**
15:45	16:00	33	92	6	131	15	117	54	186	**317**	29	12	47	88	8	8	9	25	**113**	**430**
16:00	16:15	39	87	8	134	17	124	45	186	**320**	29	8	57	94	4	7	19	30	**124**	**444**
16:15	16:30	27	83	4	114	23	123	33	179	**293**	27	22	45	94	2	10	14	26	**120**	**413**
16:30	16:45	34	78	4	116	25	153	45	223	**339**	28	16	68	112	3	14	18	35	**147**	**486**
16:45	17:00	40	82	3	125	20	101	46	167	**292**	32	22	51	105	4	14	15	33	**138**	**430**
17:00	17:15	30	94	1	125	32	146	40	218	**343**	26	18	66	110	2	8	9	19	**129**	**472**
17:15	17:30	44	121	7	172	23	132	33	188	**360**	22	12	67	101	8	13	17	38	**139**	**499**
17:30	17:45	40	90	5	135	22	136	38	196	**331**	28	19	53	100	8	10	13	31	**131**	**462**
17:45	18:00	40	94	8	142	15	122	40	177	**319**	20	19	52	91	8	11	20	39	**130**	**449**
Total:		962	3277	123	4362	379	2436	945	3760	**8122**	614	321	1064	1999	98	319	526	943	**8122**	**11,064**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

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	3	**3**	0	4	**4**	**7**
07:15 07:30	0	3	**3**	1	2	**3**	**6**
07:30 07:45	0	5	**5**	0	4	**4**	**9**
07:45 08:00	2	6	**8**	0	12	**12**	**20**
08:00 08:15	1	3	**4**	0	4	**4**	**8**
08:15 08:30	1	3	**4**	1	11	**12**	**16**
08:30 08:45	0	5	**5**	0	9	**9**	**14**
08:45 09:00	0	1	**1**	0	2	**2**	**3**
09:00 09:15	0	4	**4**	1	2	**3**	**7**
09:15 09:30	1	5	**6**	1	3	**4**	**10**
09:30 09:45	1	2	**3**	0	1	**1**	**4**
09:45 10:00	0	0	**0**	1	1	**2**	**2**
11:30 11:45	0	0	**0**	1	0	**1**	**1**
11:45 12:00	1	2	**3**	0	2	**2**	**5**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:15 12:30	0	2	**2**	0	0	**0**	**2**
12:30 12:45	0	2	**2**	0	1	**1**	**3**
12:45 13:00	2	4	**6**	0	4	**4**	**10**
13:00 13:15	1	4	**5**	3	0	**3**	**8**
13:15 13:30	1	1	**2**	1	0	**1**	**3**
15:00 15:15	2	3	**5**	2	5	**7**	**12**
15:15 15:30	1	9	**10**	3	11	**14**	**24**
15:30 15:45	0	3	**3**	0	6	**6**	**9**
15:45 16:00	6	10	**16**	5	3	**8**	**24**
16:00 16:15	2	2	**4**	2	1	**3**	**7**
16:15 16:30	0	7	**7**	0	2	**2**	**9**
16:30 16:45	0	3	**3**	0	1	**1**	**4**
16:45 17:00	0	0	**0**	1	0	**1**	**1**
17:00 17:15	1	4	**5**	1	4	**5**	**10**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	1	7	**8**	0	0	**0**	**8**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
Total	24	103	**127**	24	95	**119**	**246**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	0	**3**	1	3	0	**4**	**7**	1	0	3	**4**	0	0	0	**0**	**4**	**11**
07:15	07:30	3	5	0	**8**	0	2	3	**5**	**13**	1	0	1	**2**	1	0	2	**3**	**5**	**18**
07:30	07:45	2	4	1	**7**	0	1	0	**1**	**8**	1	0	2	**3**	0	0	0	**0**	**3**	**11**
07:45	08:00	3	3	7	**13**	1	1	1	**3**	**16**	2	2	4	**8**	7	4	4	**15**	**23**	**39**
08:00	08:15	4	3	0	**7**	0	0	0	**0**	**7**	0	1	2	**3**	0	1	0	**1**	**4**	**11**
08:15	08:30	3	4	0	**7**	0	7	2	**9**	**16**	1	0	2	**3**	0	0	0	**0**	**3**	**19**
08:30	08:45	1	4	0	**5**	1	2	3	**6**	**11**	1	0	2	**3**	1	0	1	**2**	**5**	**16**
08:45	09:00	1	2	1	**4**	0	6	1	**7**	**11**	1	0	1	**2**	0	0	2	**2**	**4**	**15**
09:00	09:15	4	3	0	**7**	0	4	1	**5**	**12**	1	0	1	**2**	0	0	0	**0**	**2**	**14**
09:15	09:30	0	0	0	**0**	0	1	1	**2**	**2**	0	0	0	**0**	1	0	0	**1**	**1**	**3**
09:30	09:45	1	0	0	**1**	0	3	2	**5**	**6**	2	0	1	**3**	0	0	0	**0**	**3**	**9**
09:45	10:00	1	2	0	**3**	0	2	3	**5**	**8**	1	0	1	**2**	0	0	0	**0**	**2**	**10**
11:30	11:45	1	4	0	**5**	0	1	0	**1**	**6**	3	0	1	**4**	0	0	0	**0**	**4**	**10**
11:45	12:00	0	0	0	**0**	0	3	0	**3**	**3**	1	0	1	**2**	1	0	0	**1**	**3**	**6**
12:00	12:15	0	2	1	**3**	0	0	1	**1**	**4**	1	0	1	**2**	0	0	0	**0**	**2**	**6**
12:15	12:30	1	2	0	**3**	0	3	0	**3**	**6**	1	1	1	**3**	0	0	0	**0**	**3**	**9**
12:30	12:45	1	1	0	**2**	0	1	1	**2**	**4**	2	0	1	**3**	0	0	0	**0**	**3**	**7**
12:45	13:00	1	3	0	**4**	0	2	2	**4**	**8**	1	1	0	**2**	0	0	0	**0**	**2**	**10**
13:00	13:15	0	1	0	**1**	1	4	0	**5**	**6**	1	0	3	**4**	0	0	0	**0**	**4**	**10**
13:15	13:30	2	1	0	**3**	0	0	2	**2**	**5**	3	0	0	**3**	0	0	0	**0**	**3**	**8**
15:00	15:15	1	1	1	**3**	0	2	1	**3**	**6**	1	0	2	**3**	0	0	0	**0**	**3**	**9**
15:15	15:30	2	1	0	**3**	0	2	1	**3**	**6**	2	0	0	**2**	0	1	0	**1**	**3**	**9**
15:30	15:45	0	4	0	**4**	0	0	3	**3**	**7**	5	0	2	**7**	0	0	0	**0**	**7**	**14**
15:45	16:00	3	2	0	**5**	0	3	1	**4**	**9**	0	0	1	**1**	0	0	0	**0**	**1**	**10**
16:00	16:15	2	1	0	**3**	2	3	1	**6**	**9**	1	0	1	**2**	0	0	0	**0**	**2**	**11**
16:15	16:30	2	3	0	**5**	0	3	1	**4**	**9**	0	1	1	**2**	0	2	0	**2**	**4**	**13**
16:30	16:45	2	1	0	**3**	0	1	1	**2**	**5**	0	0	2	**2**	0	1	0	**1**	**3**	**8**
16:45	17:00	1	1	0	**2**	0	0	0	**0**	**2**	1	0	2	**3**	0	0	0	**0**	**3**	**5**
17:00	17:15	1	3	0	**4**	0	0	0	**0**	**4**	2	1	2	**5**	0	0	0	**0**	**5**	**9**
17:15	17:30	3	0	0	**3**	0	2	2	**4**	**7**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
17:30	17:45	1	0	0	**1**	0	0	1	**1**	**2**	1	0	1	**2**	0	0	0	**0**	**2**	**4**
17:45	18:00	2	1	0	**3**	0	0	0	**0**	**3**	1	1	2	**4**	0	0	0	**0**	**4**	**7**
Total:	None	49	65	11	**125**	6	62	35	**103**	**228**	39	8	44	**91**	11	9	9	**29**	**120**	**348**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR

Survey Date: Wednesday, November 21, 2018 **WO No:** 38150

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

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

Transportation Services - Traffic Services

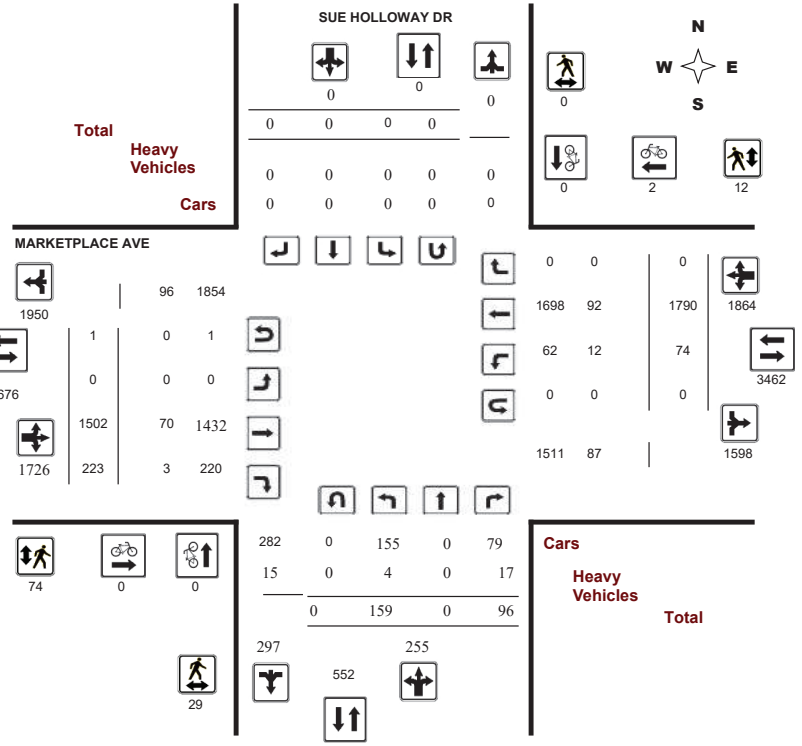
Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

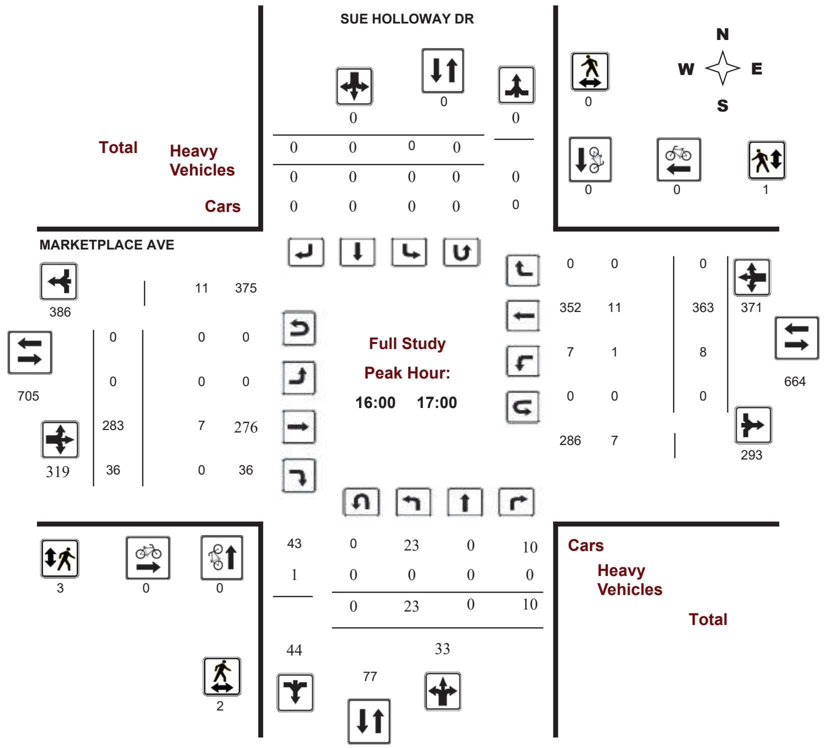
Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



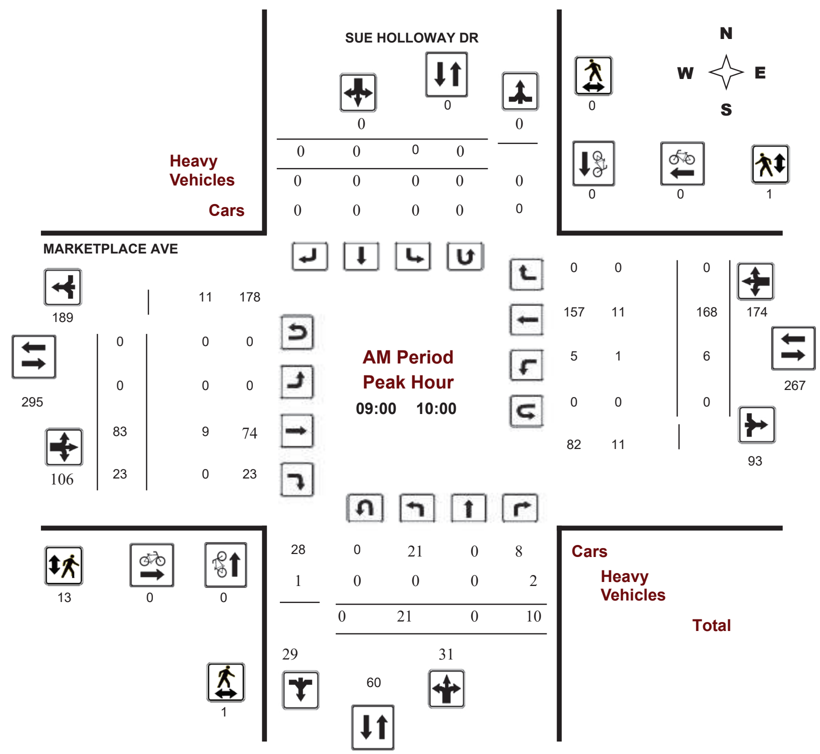
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision



Comments

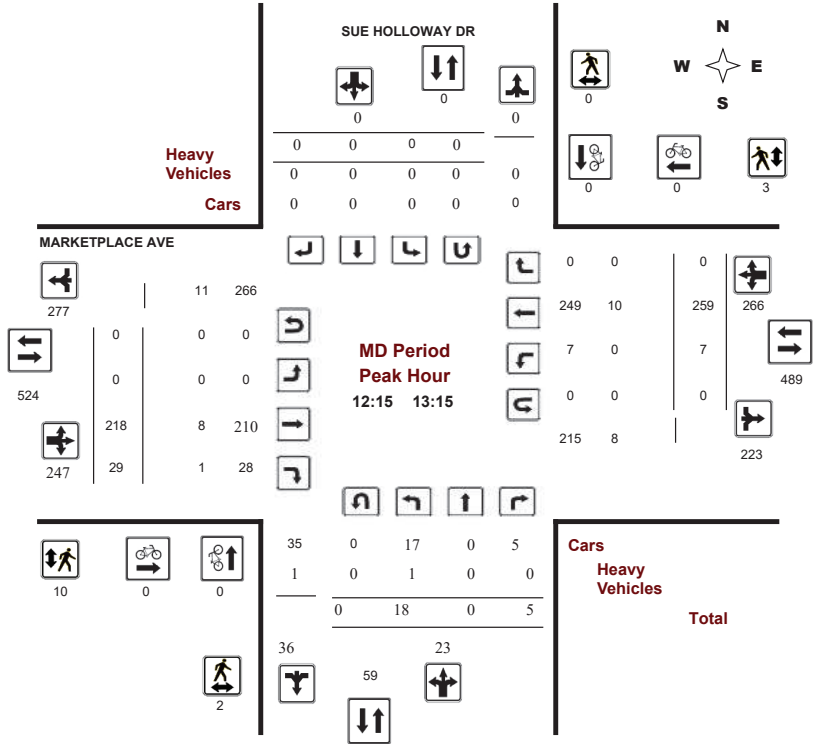
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision



Comments

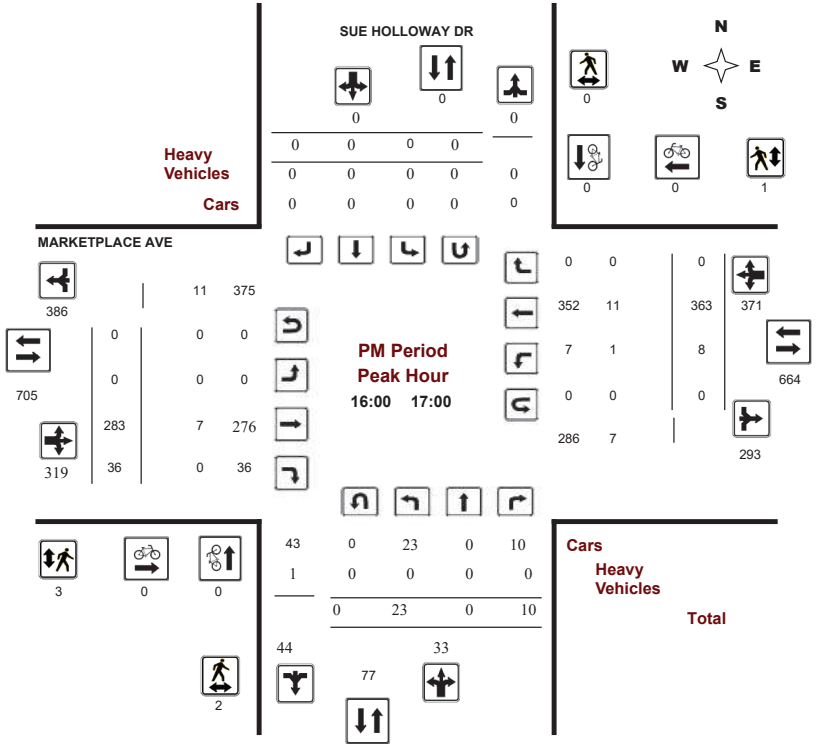
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, October 07, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

AADT Factor .90

	SUE HOLLOWAY DR								MARKETPLACE AVE									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	14	0	19	**33**	0	0	0	**0**	**33**	0	42	19	**61**	14	81	0	**95**	**156**	**189**
08:00 09:00	12	0	19	**31**	0	0	0	**0**	**31**	0	69	20	**89**	9	113	0	**122**	**211**	**242**
09:00 10:00	21	0	10	**31**	0	0	0	**0**	**31**	0	83	23	**106**	6	168	0	**174**	**280**	**311**
11:30 12:30	17	0	7	**24**	0	0	0	**0**	**24**	0	182	26	**208**	9	239	0	**248**	**456**	**480**
12:30 13:30	22	0	5	**27**	0	0	0	**0**	**27**	0	216	33	**249**	8	240	0	**248**	**497**	**524**
15:00 16:00	28	0	18	**46**	0	0	0	**0**	**46**	0	297	39	**336**	8	278	0	**286**	**622**	**668**
16:00 17:00	23	0	10	**33**	0	0	0	**0**	**33**	0	283	36	**319**	8	363	0	**371**	**690**	**723**
17:00 18:00	22	0	8	**30**	0	0	0	**0**	**30**	0	330	27	**357**	12	308	0	**320**	**677**	**707**
Sub Total	159	0	96	**255**	0	0	0	**0**	**255**	0	1502	223	**1725**	74	1790	0	**1864**	**3589**	**3844**
U Turns				**0**				**0**	**0**				**1**				**0**	**1**	**1**
Total	159	0	96	**255**	0	0	0	**0**	**255**	0	1502	223	**1726**	74	1790	0	**1864**	**3590**	**3845**
EQ 12Hr	221	0	133	**354**	0	0	0	**0**	**354**	0	2088	310	**2399**	103	2488	0	**2591**	**4990**	**5345**

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

AVG 12Hr	199	0	120	**319**	0	0	0	**0**	**319**	0	1879	279	**2159**	93	2239	0	**2332**	**4491**	**4810**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr	261	0	157	**418**	0	0	0	**0**	**418**	0	2461	365	**2828**	122	2933	0	**3055**	**5883**	**6301**

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

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		SUE HOLLOWAY DR									MARKETPLACE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	5	0	5	10	0	0	0	0	10	0	5	4	9	6	18	0	24	33	43
07:15	07:30	3	0	3	6	0	0	0	0	6	0	6	3	9	2	16	0	18	27	33
07:30	07:45	2	0	6	8	0	0	0	0	8	0	14	1	15	3	23	0	26	41	49
07:45	08:00	4	0	5	9	0	0	0	0	9	0	17	11	28	3	24	0	27	55	64
08:00	08:15	4	0	1	5	0	0	0	0	5	0	13	2	15	3	32	0	35	50	55
08:15	08:30	3	0	8	11	0	0	0	0	11	0	19	2	21	3	29	0	32	53	64
08:30	08:45	2	0	5	7	0	0	0	0	7	0	25	4	29	3	21	0	24	53	60
08:45	09:00	3	0	5	8	0	0	0	0	8	0	12	12	25	0	31	0	31	56	64
09:00	09:15	6	0	4	10	0	0	0	0	10	0	28	5	33	3	46	0	49	82	92
09:15	09:30	8	0	1	9	0	0	0	0	9	0	24	5	29	1	26	0	27	56	65
09:30	09:45	4	0	3	7	0	0	0	0	7	0	18	8	26	1	39	0	40	66	73
09:45	10:00	3	0	2	5	0	0	0	0	5	0	13	5	18	1	57	0	58	76	81
11:30	11:45	5	0	3	8	0	0	0	0	8	0	39	8	47	3	53	0	56	103	111
11:45	12:00	1	0	1	2	0	0	0	0	2	0	40	5	45	5	54	0	59	104	106
12:00	12:15	9	0	3	12	0	0	0	0	12	0	46	8	54	1	70	0	71	125	137
12:15	12:30	2	0	0	2	0	0	0	0	2	0	57	5	62	0	62	0	62	124	126
12:30	12:45	7	0	3	10	0	0	0	0	10	0	46	8	54	1	62	0	63	117	127
12:45	13:00	6	0	0	6	0	0	0	0	6	0	57	12	69	3	59	0	62	131	137
13:00	13:15	3	0	2	5	0	0	0	0	5	0	58	4	62	3	76	0	79	141	146
13:15	13:30	6	0	0	6	0	0	0	0	6	0	55	9	64	1	43	0	44	108	114
15:00	15:15	6	0	7	13	0	0	0	0	13	0	77	8	85	5	59	0	64	149	162
15:15	15:30	8	0	3	11	0	0	0	0	11	0	83	13	96	1	73	0	74	170	181
15:30	15:45	7	0	4	11	0	0	0	0	11	0	70	9	79	0	67	0	67	146	157
15:45	16:00	7	0	4	11	0	0	0	0	11	0	67	9	76	2	79	0	81	157	168
16:00	16:15	6	0	4	10	0	0	0	0	10	0	69	8	77	2	105	0	107	184	194
16:15	16:30	5	0	3	8	0	0	0	0	8	0	79	7	86	3	86	0	89	175	183
16:30	16:45	6	0	3	9	0	0	0	0	9	0	67	7	74	1	90	0	91	165	174
16:45	17:00	6	0	0	6	0	0	0	0	6	0	68	14	82	2	82	0	84	166	172
17:00	17:15	6	0	2	8	0	0	0	0	8	0	76	9	85	1	67	0	68	153	161
17:15	17:30	5	0	1	6	0	0	0	0	6	0	71	12	83	4	81	0	85	168	174
17:30	17:45	6	0	2	8	0	0	0	0	8	0	80	5	85	6	79	0	85	170	178
17:45	18:00	5	0	3	8	0	0	0	0	8	0	103	1	104	1	81	0	82	186	194
Total:		159	0	96	255	0	0	0	0	255	0	1502	223	1726	74	1790	0	1864	3590	3,845

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		SUE HOLLOWAY DR			MARKETPLACE AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
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	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
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	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	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	0	0	0	0	0	0	0
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	0	0	0	0	0	0
17:15	17:30	0	0	0	0	1	1	1
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	1	1	1
Total		0	0	**0**	0	2	2	2

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		SUE HOLLOWAY DR			MARKETPLACE AVE			
		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	5	0	**5**	4	1	**5**	**10**
07:15	07:30	3	0	**3**	4	0	**4**	**7**
07:30	07:45	2	0	**2**	0	0	**0**	**2**
07:45	08:00	2	0	**2**	0	1	**1**	**3**
08:00	08:15	0	0	**0**	0	1	**1**	**1**
08:15	08:30	1	0	**1**	0	0	**0**	**1**
08:30	08:45	1	0	**1**	4	0	**4**	**5**
08:45	09:00	2	0	**2**	1	0	**1**	**3**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	1	**1**	**1**
09:30	09:45	1	0	**1**	6	0	**6**	**7**
09:45	10:00	0	0	**0**	7	0	**7**	**7**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	1	0	**1**	1	1	**2**	**3**
12:00	12:15	3	0	**3**	6	1	**7**	**10**
12:15	12:30	1	0	**1**	4	1	**5**	**6**
12:30	12:45	1	0	**1**	2	0	**2**	**3**
12:45	13:00	0	0	**0**	3	2	**5**	**5**
13:00	13:15	0	0	**0**	1	0	**1**	**1**
13:15	13:30	0	0	**0**	1	0	**1**	**1**
15:00	15:15	2	0	**2**	14	2	**16**	**18**
15:15	15:30	0	0	**0**	11	0	**11**	**11**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	2	0	**2**	0	1	**1**	**3**
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**	3	0	**3**	**3**
17:00	17:15	1	0	**1**	0	0	**0**	**1**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	2	0	**2**	**2**
17:45	18:00	1	0	**1**	0	0	**0**	**1**
Total	.....	29	0	**29**	74	12	**86**	**115**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		SUE HOLLOWAY DR									MARKETPLACE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	1	**2**	0	0	0	**0**	**2**	0	4	0	**6**	1	2	0	**8**	**14**	**8**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**3**	0	2	0	**3**	**6**	**3**
07:30	07:45	0	0	1	**1**	0	0	0	**0**	**1**	0	3	0	**6**	0	3	0	**7**	**13**	**7**
07:45	08:00	0	0	1	**4**	0	0	0	**0**	**4**	0	3	1	**8**	2	4	0	**10**	**18**	**11**
08:00	08:15	0	0	0	**1**	0	0	0	**0**	**1**	0	4	0	**9**	1	5	0	**10**	**19**	**10**
08:15	08:30	0	0	5	**7**	0	0	0	**0**	**7**	0	1	1	**4**	1	2	0	**9**	**13**	**10**
08:30	08:45	0	0	2	**3**	0	0	0	**0**	**3**	0	3	0	**10**	1	7	0	**13**	**23**	**13**
08:45	09:00	1	0	2	**3**	0	0	0	**0**	**3**	0	1	0	**3**	0	1	0	**4**	**7**	**5**
09:00	09:15	0	0	1	**2**	0	0	0	**0**	**2**	0	2	0	**5**	1	3	0	**7**	**12**	**7**
09:15	09:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**4**	0	2	0	**4**	**8**	**4**
09:30	09:45	0	0	1	**1**	0	0	0	**0**	**1**	0	4	0	**7**	0	3	0	**8**	**15**	**8**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**4**	0	3	0	**4**	**8**	**4**
11:30	11:45	0	0	1	**2**	0	0	0	**0**	**2**	0	2	0	**6**	1	4	0	**8**	**14**	**8**
11:45	12:00	0	0	0	**1**	0	0	0	**0**	**1**	0	1	0	**2**	1	1	0	**3**	**5**	**3**
12:00	12:15	1	0	1	**2**	0	0	0	**0**	**2**	0	2	0	**7**	0	4	0	**7**	**14**	**8**
12:15	12:30	1	0	0	**1**	0	0	0	**0**	**1**	0	1	0	**2**	0	0	0	**1**	**3**	**2**
12:30	12:45	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**7**	0	6	0	**7**	**14**	**7**
12:45	13:00	0	0	0	**1**	0	0	0	**0**	**1**	0	1	1	**3**	0	1	0	**2**	**5**	**3**
13:00	13:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**8**	0	3	0	**8**	**16**	**8**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**5**	0	3	0	**5**	**10**	**5**
15:00	15:15	1	0	0	**2**	0	0	0	**0**	**2**	0	3	0	**8**	1	4	0	**8**	**16**	**9**
15:15	15:30	0	0	1	**2**	0	0	0	**0**	**2**	0	0	0	**1**	1	1	0	**3**	**4**	**3**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**10**	0	3	0	**10**	**20**	**10**
15:45	16:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**4**	0	2	0	**4**	**8**	**4**
16:00	16:15	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**5**	0	2	0	**5**	**10**	**5**
16:15	16:30	0	0	0	**1**	0	0	0	**0**	**1**	0	1	0	**6**	1	5	0	**7**	**13**	**7**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**4**	0	2	0	**4**	**8**	**4**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**3**	0	2	0	**3**	**6**	**3**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**6**	0	3	0	**6**	**12**	**6**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**3**	0	3	0	**3**	**6**	**3**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**5**	0	2	0	**5**	**10**	**5**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**5**	0	4	0	**5**	**10**	**5**
Total:	None	4	0	17	**36**	0	0	0	**0**	**36**	0	70	3	**169**	12	92	0	**191**	**360**	**198**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARKETPLACE AVE @ SUE HOLLOWAY DR

Survey Date: Wednesday, October 07, 2020 **WO No:** 39690

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

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

Transportation Services - Traffic Services

W.O. 37053

Turning Movement Count - 15 Minute Summary Report

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 0

Eastbound: 0 Westbound: 0

		RIOCAN AVE								MARKETPLACE AVE									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	3	7	4	**14**	10	5	1	**16**	**30**	1	10	1	**12**	8	11	9	**28**	**40**	**70**
07:15	07:30	2	4	3	**9**	7	3	7	**17**	**26**	3	6	2	**11**	12	12	13	**37**	**48**	**74**
07:30	07:45	1	10	7	**18**	6	3	5	**14**	**32**	4	20	0	**24**	12	21	21	**54**	**78**	**110**
07:45	08:00	3	6	12	**21**	17	7	5	**29**	**50**	1	14	2	**17**	23	25	13	**61**	**78**	**128**
08:00	08:15	2	10	11	**23**	14	5	6	**25**	**48**	4	14	1	**19**	19	16	15	**50**	**69**	**117**
08:15	08:30	3	11	5	**19**	10	12	5	**27**	**46**	2	8	1	**11**	19	23	22	**64**	**75**	**121**
08:30	08:45	2	7	8	**17**	12	8	11	**31**	**48**	3	14	2	**19**	3	25	23	**51**	**70**	**118**
08:45	09:00	2	13	6	**21**	16	14	6	**36**	**57**	4	8	2	**14**	9	28	20	**57**	**71**	**128**
09:00	09:15	1	12	2	**15**	15	13	8	**36**	**51**	2	15	5	**22**	7	21	13	**41**	**63**	**114**
09:15	09:30	2	8	3	**13**	14	17	14	**45**	**58**	5	12	4	**21**	12	23	25	**60**	**81**	**139**
09:30	09:45	5	12	9	**26**	23	26	10	**59**	**85**	5	17	9	**31**	12	20	22	**54**	**85**	**170**
09:45	10:00	5	7	8	**20**	20	22	17	**59**	**79**	2	22	2	**26**	13	29	9	**51**	**77**	**156**
11:30	11:45	11	32	18	**61**	16	30	17	**63**	**124**	5	42	6	**53**	20	34	18	**72**	**125**	**249**
11:45	12:00	14	34	24	**72**	27	29	20	**76**	**148**	15	27	15	**57**	28	36	22	**86**	**143**	**291**
12:00	12:15	13	26	14	**53**	40	26	22	**88**	**141**	10	32	14	**56**	15	25	34	**74**	**130**	**271**
12:15	12:30	16	35	20	**71**	30	31	21	**82**	**153**	14	36	15	**65**	19	35	16	**70**	**135**	**288**
12:30	12:45	11	33	14	**58**	33	27	24	**84**	**142**	5	28	12	**45**	15	31	22	**68**	**113**	**255**
12:45	13:00	10	41	14	**65**	26	30	12	**68**	**133**	8	31	10	**49**	11	27	20	**58**	**107**	**240**
13:00	13:15	9	27	17	**53**	33	33	16	**82**	**135**	6	39	11	**56**	12	17	23	**52**	**108**	**243**
13:15	13:30	13	39	18	**70**	25	19	16	**60**	**130**	9	25	12	**46**	23	32	15	**70**	**116**	**246**
15:00	15:15	15	44	16	**75**	25	29	22	**76**	**151**	12	45	12	**69**	22	29	25	**76**	**145**	**296**
15:15	15:30	14	42	17	**73**	29	29	16	**74**	**147**	5	42	14	**61**	19	34	17	**70**	**131**	**278**
15:30	15:45	9	51	22	**82**	25	29	13	**67**	**149**	8	37	19	**64**	18	25	12	**55**	**119**	**268**
15:45	16:00	12	36	27	**75**	19	37	16	**72**	**147**	6	40	13	**59**	24	30	17	**71**	**130**	**277**
16:00	16:15	12	47	19	**78**	31	32	20	**83**	**161**	10	32	12	**54**	25	38	13	**76**	**130**	**291**
16:15	16:30	12	28	28	**68**	29	33	14	**76**	**144**	8	39	10	**57**	27	37	19	**83**	**140**	**284**
16:30	16:45	11	33	26	**70**	38	41	15	**94**	**164**	9	48	14	**71**	20	29	15	**64**	**135**	**299**
16:45	17:00	7	46	25	**78**	39	40	15	**94**	**172**	11	49	17	**77**	41	40	9	**90**	**167**	**339**
17:00	17:15	9	49	37	**95**	35	31	12	**78**	**173**	14	64	16	**94**	41	32	19	**92**	**186**	**359**
17:15	17:30	9	49	25	**83**	35	42	19	**96**	**179**	5	52	18	**75**	30	31	18	**79**	**154**	**333**
17:30	17:45	8	41	35	**85**	27	35	17	**79**	**164**	5	65	19	**89**	35	37	11	**83**	**172**	**336**
17:45	18:00	10	33	25	**68**	33	36	19	**88**	**156**	7	48	11	**66**	39	40	18	**97**	**163**	**319**
TOTAL:		256	873	519	**1649**	759	774	441	**1974**	**3623**	208	981	301	**1490**	633	893	568	**2094**	**3584**	**7207**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 37053

MARKETPLACE AVE @ RIOCAN AVE

Count Date: Thursday, May 25, 2017 **Start Time:** 07:00

	RIOCAN AVE			MARKETPLACE AVE			
Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 08:00	1	0	**1**	3	1	**4**	**5**
08:00 09:00	0	1	**1**	0	0	**0**	**1**
09:00 10:00	0	1	**1**	0	0	**0**	**1**
11:30 12:30	0	0	**0**	1	3	**4**	**4**
12:30 13:30	0	0	**0**	1	0	**1**	**1**
15:00 16:00	0	0	**0**	0	0	**0**	**0**
16:00 17:00	0	0	**0**	0	0	**0**	**0**
17:00 18:00	0	0	**0**	1	0	**1**	**1**
Total	1	2	**3**	6	4	**10**	**13**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

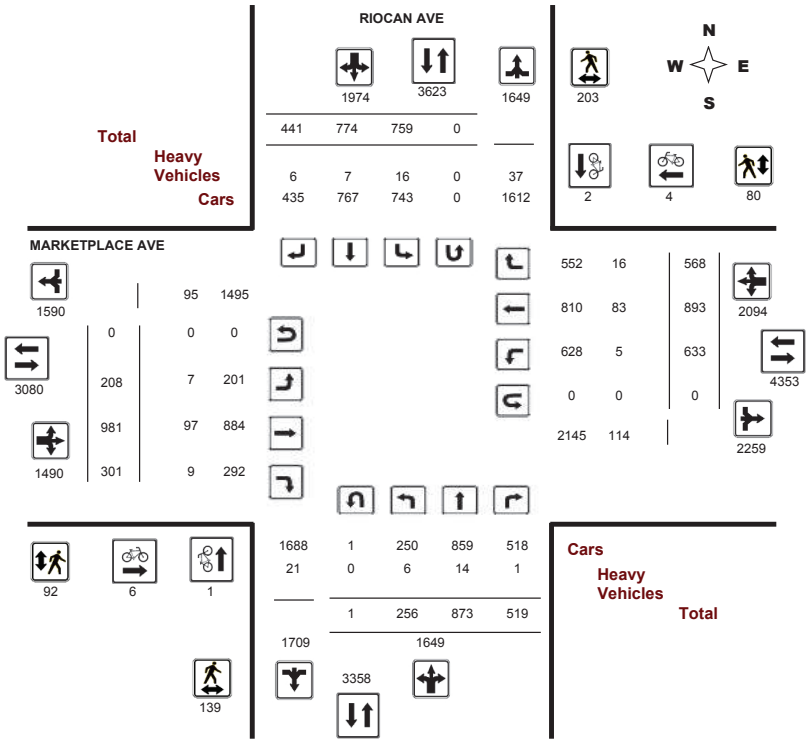
Turning Movement Count - Full Study Diagram

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017

WO#: 37053

Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 37053

Turning Movement Count - Heavy Vehicle Report

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017

		RIOCAN AVE								MARKETPLACE AVE										
		Northbound				Southbound				Eastbound				Westbound						
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	0	1	0	**1**	1	1	1	**3**	**4**	3	19	1	**23**	1	11	2	**14**	**37**	**41**
08:00	09:00	2	0	0	**2**	5	0	1	**6**	**8**	0	12	1	**13**	0	15	4	**19**	**32**	**40**
09:00	10:00	0	2	0	**2**	3	2	2	**7**	**9**	1	8	0	**9**	2	8	2	**12**	**21**	**30**
11:30	12:30	1	6	0	**7**	5	0	1	**6**	**13**	1	10	2	**13**	1	12	4	**17**	**30**	**43**
12:30	13:30	1	3	0	**4**	0	2	1	**3**	**7**	0	9	1	**10**	0	9	1	**10**	**20**	**27**
15:00	16:00	1	0	0	**1**	1	1	0	**2**	**3**	0	17	1	**18**	0	9	1	**10**	**28**	**31**
16:00	17:00	0	1	1	**2**	1	0	0	**1**	**3**	1	11	1	**13**	1	11	2	**14**	**27**	**30**
17:00	18:00	1	1	0	**2**	0	1	0	**1**	**3**	1	11	2	**14**	0	8	0	**8**	**22**	**25**
Sub Total		6	14	1	**21**	16	7	6	**29**	**50**	7	97	9	**113**	5	83	16	**104**	**217**	**267**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		6	14	1	**0**	16	7	6	**29**	**50**	7	97	9	**113**	5	83	16	**104**	**217**	**267**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 37053

Turning Movement Count - Pedestrian Volume Report

MARKETPLACE AVE @ RIOCAN AVE

Count Date: Thursday, May 25, 2017 **Start Time:** 07:00

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	2	2	0	1	1	3
07:15 07:30	4	5	9	0	0	0	9
07:30 07:45	3	4	7	3	2	5	12
07:45 08:00	1	3	4	0	1	1	5
07:00 08:00	8	14	22	3	4	7	29
08:00 08:15	1	2	3	1	0	1	4
08:15 08:30	2	1	3	0	0	0	3
08:30 08:45	3	4	7	2	2	4	11
08:45 09:00	2	5	7	1	2	3	10
08:00 09:00	8	12	20	4	4	8	28
09:00 09:15	4	6	10	0	4	4	14
09:15 09:30	0	5	5	2	1	3	8
09:30 09:45	2	7	9	2	2	4	13
09:45 10:00	0	2	2	0	2	2	4
09:00 10:00	6	20	26	4	9	13	39
11:30 11:45	9	8	17	3	3	6	23
11:45 12:00	10	8	18	10	3	13	31
12:00 12:15	5	8	13	4	3	7	20
12:15 12:30	3	6	9	5	5	10	19
11:30 12:30	27	30	57	22	14	36	93
12:30 12:45	7	9	16	10	5	15	31
12:45 13:00	2	9	11	6	3	9	20
13:00 13:15	1	13	14	4	6	10	24
13:15 13:30	3	8	11	1	3	4	15
12:30 13:30	13	39	52	21	17	38	90
15:00 15:15	3	4	7	5	1	6	13
15:15 15:30	10	12	22	5	1	6	28
15:30 15:45	12	9	21	4	3	7	28
15:45 16:00	13	14	27	6	8	14	41
15:00 16:00	38	39	77	20	13	33	110
16:00 16:15	3	11	14	2	3	5	19
16:15 16:30	10	6	16	2	4	6	22
16:30 16:45	3	1	4	3	1	4	8
16:45 17:00	7	6	13	0	3	3	16
16:00 17:00	23	24	47	7	11	18	65
17:00 17:15	7	14	21	1	1	2	23
17:15 17:30	6	1	7	4	3	7	14
17:30 17:45	3	7	10	4	1	5	15
17:45 18:00	0	3	3	2	3	5	8
17:00 18:00	16	25	41	11	8	19	60
Total	139	203	342	92	80	172	514

Comment:

Transportation Services - Traffic Services

Work Order 37053

Turning Movement Count - Full Study Summary Report

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	RIOCAN AVE									MARKETPLACE AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	9	27	26	62	40	18	18	76	138	9	50	5	64	55	69	56	180	244	382
08:00 09:00	9	41	30	80	52	39	28	119	199	13	44	6	63	50	92	80	222	285	484
09:00 10:00	13	39	22	74	72	78	49	199	273	14	66	20	100	44	93	69	206	306	579
11:30 12:30	54	127	76	257	113	116	80	309	566	44	137	50	231	82	130	90	302	533	1099
12:30 13:30	43	140	63	246	117	109	68	294	540	28	123	45	196	61	107	80	248	444	984
15:00 16:00	50	173	82	305	98	124	67	289	594	31	164	58	253	83	118	71	272	525	1119
16:00 17:00	42	154	98	294	137	146	64	347	641	38	168	53	259	113	144	56	313	572	1213
17:00 18:00	36	172	122	330	130	144	67	341	671	31	229	64	324	145	140	66	351	675	1346
Sub Total	256	873	519	1648	759	774	441	1974	3622	208	981	301	1490	633	893	568	2094	3584	7206
U Turns				1				0	1				0				0	0	1
Total	256	873	519	1649	759	774	441	1974	3623	208	981	301	1490	633	893	568	2094	3584	7207
EQ 12Hr	356	1213	721	2292	1055	1076	613	2744	5036	289	1364	418	2071	880	1241	790	2911	4982	10018
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	320	1092	649	2063	950	968	552	2469	4532	260	1227	377	1864	792	1117	711	2620	4484	9016
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	420	1431	851	2702	1244	1268	723	3235	5937	341	1608	493	2442	1037	1463	931	3432	5874	11811
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

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

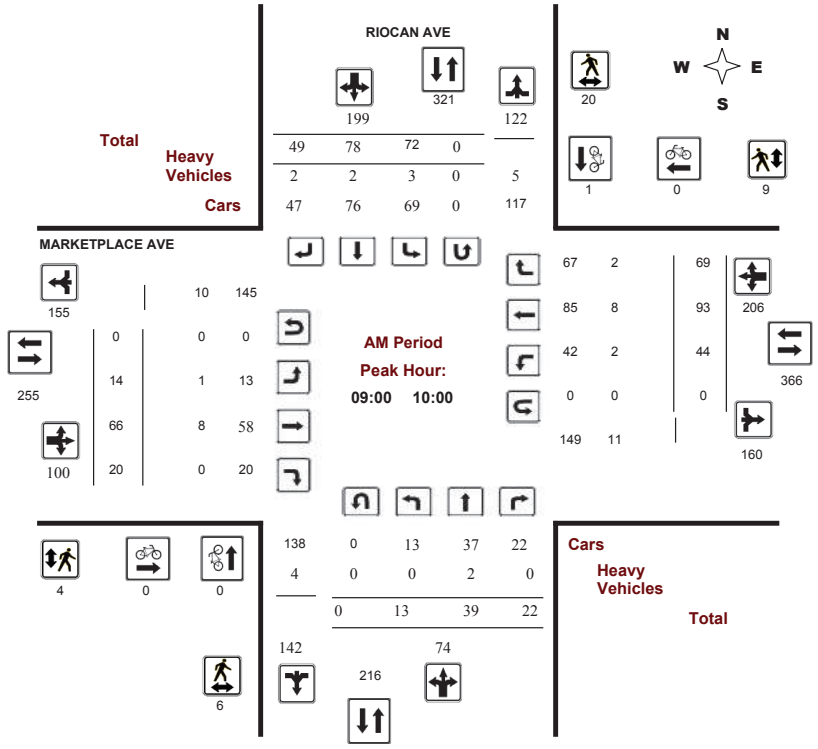
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017 **WO No:** 37053

Start Time: 07:00 **Device:** Miovision



Comments

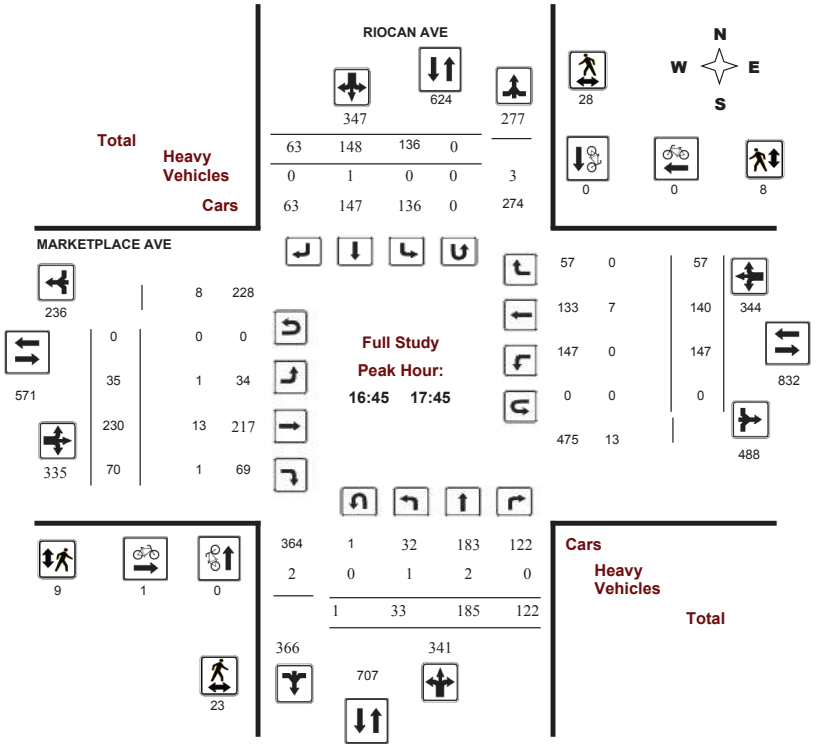
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017 **WO No:** 37053

Start Time: 07:00 **Device:** Miovision



Comments

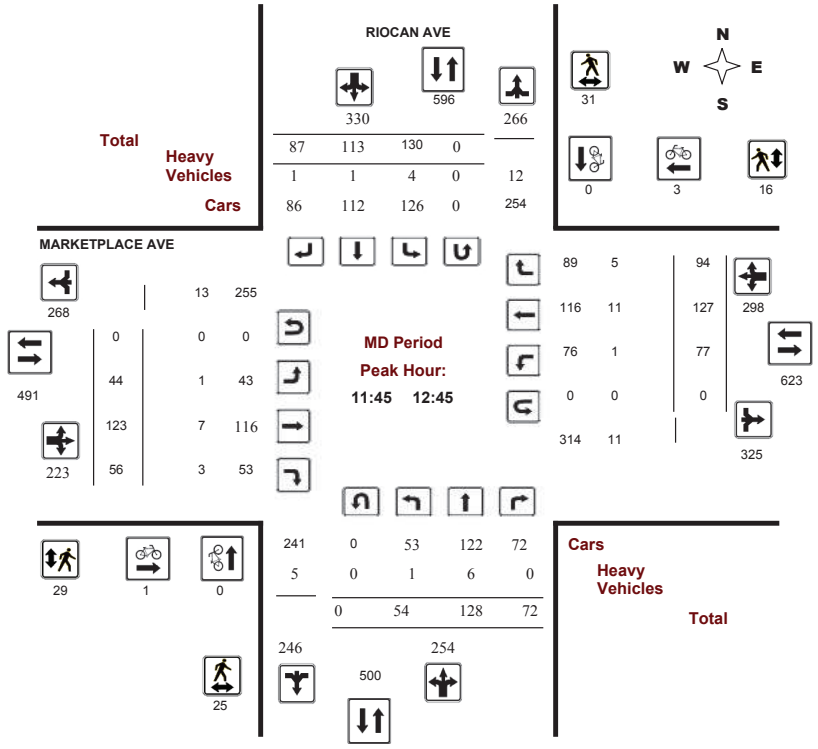
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017 **WO No:** 37053

Start Time: 07:00 **Device:** Miovision



Comments

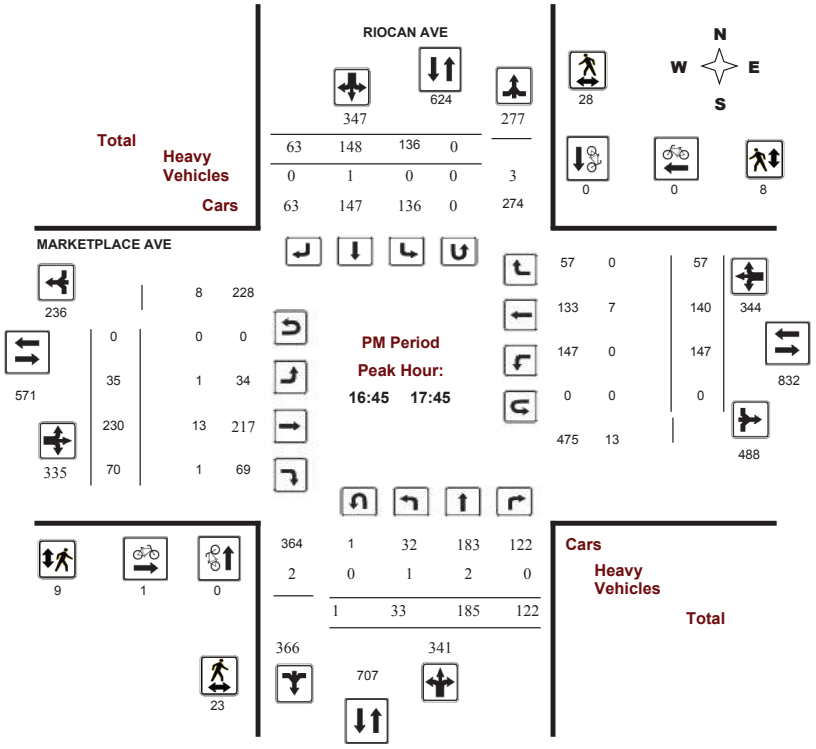
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017 **WO No:** 37053

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Work Order 37053

Turning Movement Count - 15 Min U-Turn Total Report

MARKETPLACE AVE @ RIOCAN AVE

Survey Date: Thursday, May 25, 2017

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

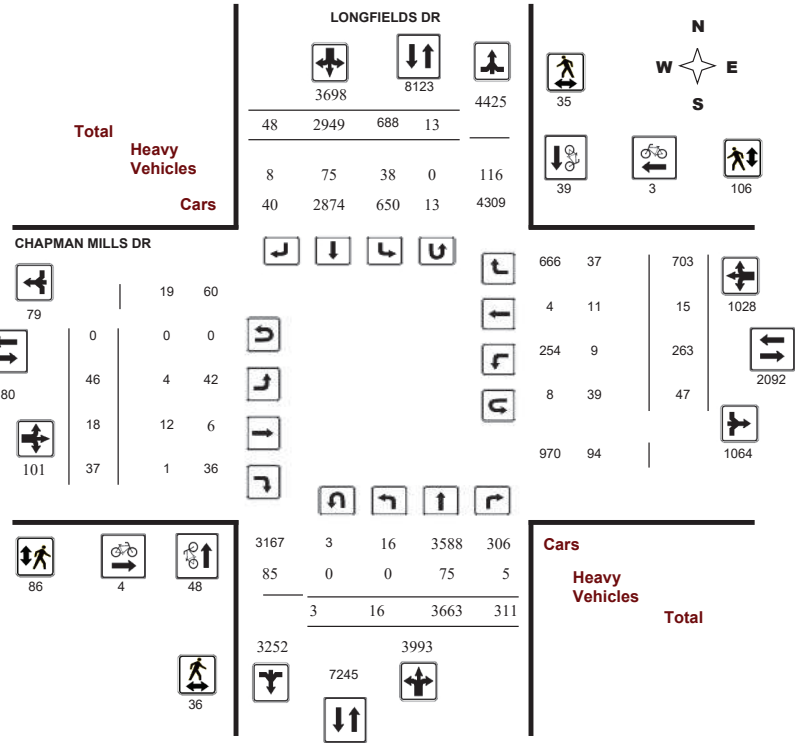
Survey Date: Tuesday, June 19, 2018

Start Time: 07:00

WO No: 37883

Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

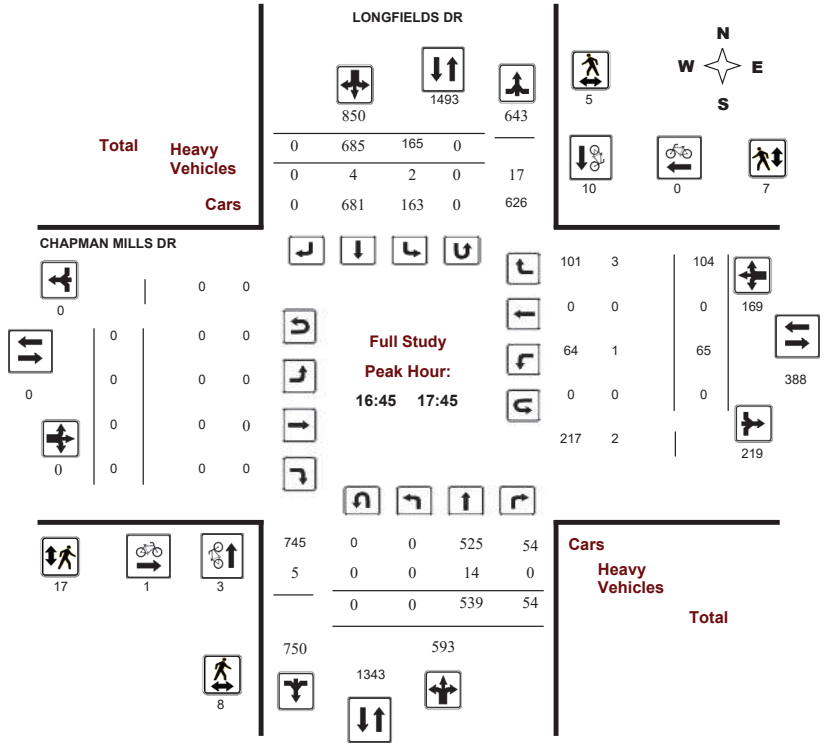
Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



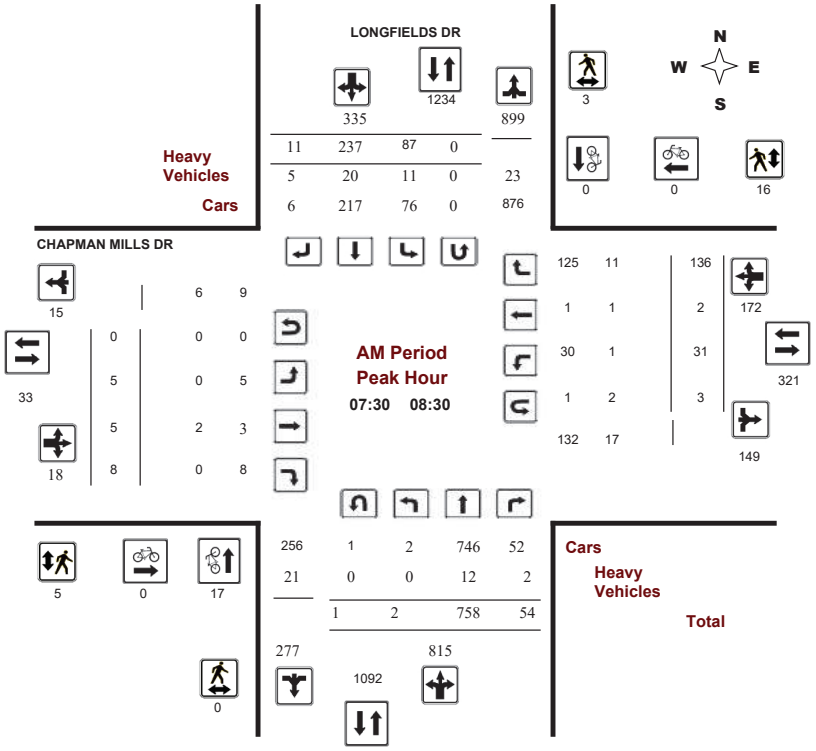
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision



Comments

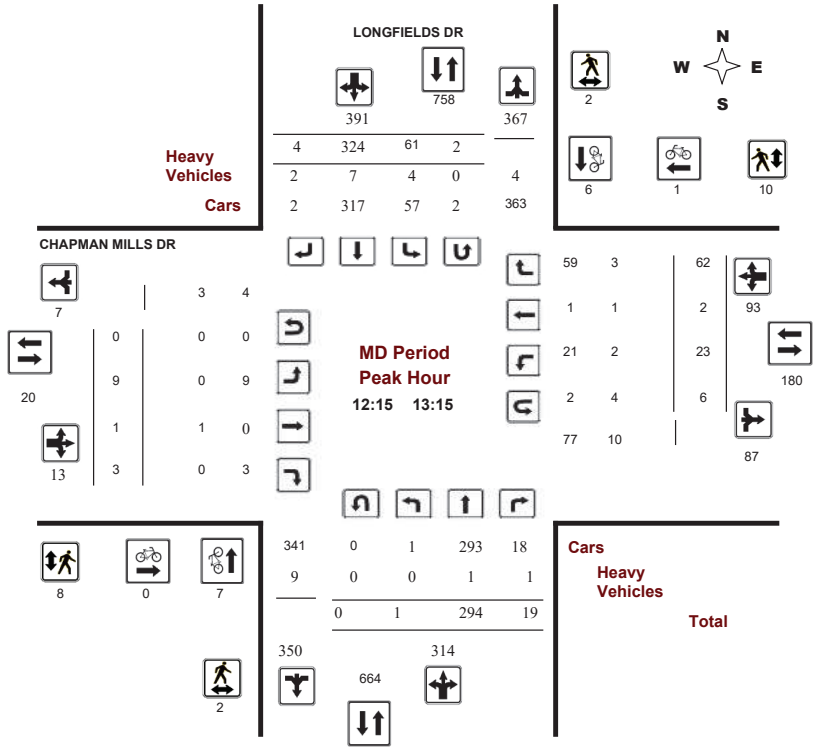
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision



Comments

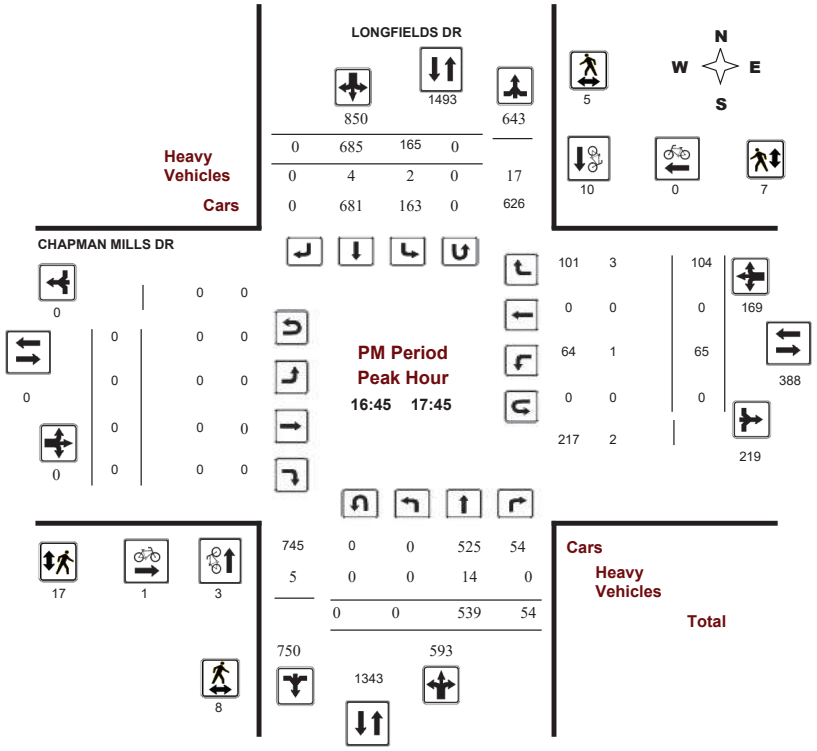
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, June 19, 2018

Total Observed U-Turns

Northbound: 3 Southbound: 13

Eastbound: 0 Westbound: 47

AADT Factor .90

	LONGFIELDS DR								CHAPMAN MILLS DR									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	1	708	54	**763**	66	197	16	**279**	**1042**	6	3	9	**18**	18	1	110	**129**	**147**	**1189**
08:00 09:00	2	650	57	**709**	72	241	6	**319**	**1028**	6	3	6	**15**	31	1	139	**171**	**186**	**1214**
09:00 10:00	5	400	38	**443**	49	201	5	**255**	**698**	8	2	5	**15**	28	5	69	**102**	**117**	**815**
11:30 12:30	4	313	20	**337**	44	273	10	**327**	**664**	8	2	4	**14**	28	2	53	**83**	**97**	**761**
12:30 13:30	2	318	17	**337**	61	309	4	**374**	**711**	5	1	2	**8**	22	0	57	**79**	**87**	**798**
15:00 16:00	2	337	29	**368**	106	480	5	**591**	**959**	8	5	6	**19**	27	5	89	**121**	**140**	**1099**
16:00 17:00	0	431	53	**484**	122	569	2	**693**	**1177**	5	2	5	**12**	43	1	102	**146**	**158**	**1335**
17:00 18:00	0	506	43	**549**	168	679	0	**847**	**1396**	0	0	0	**0**	66	0	84	**150**	**150**	**1546**
Sub Total	16	3663	311	**3990**	688	2949	48	**3685**	**7675**	46	18	37	**101**	263	15	703	**981**	**1082**	**8757**
U Turns	3			**3**	13			**13**	**16**	**0**			**0**	47			**47**	**47**	**63**
Total	19	3663	311	**3993**	701	2949	48	**3698**	**7691**	46	18	37	**101**	310	15	703	**1028**	**1129**	**8820**
EQ 12Hr	26	5092	432	**5550**	974	4099	67	**5140**	**10690**	64	25	51	**140**	431	21	977	**1429**	**1569**	**12259**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	23	4583	389	**4995**	877	3689	60	**4626**	**9621**	58	22	46	**126**	388	19	879	**1286**	**1412**	**11033**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	30	6004	510	**6544**	1149	4833	79	**6061**	**12605**	76	29	60	**165**	508	25	1151	**1684**	**1849**	**14454**
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

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		LONGFIELDS DR									CHAPMAN MILLS DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	150	9	160	7	38	2	47	**207**	3	0	2	5	2	0	30	32	**37**	**244**
07:15	07:30	0	161	11	172	8	43	4	55	**227**	1	0	1	2	6	0	26	32	**34**	**261**
07:30	07:45	0	187	11	198	18	43	5	66	**264**	1	3	1	5	4	1	27	32	**37**	**301**
07:45	08:00	0	210	23	233	33	73	5	111	**344**	1	0	5	6	6	0	27	33	**39**	**383**
08:00	08:15	0	192	4	196	14	70	1	85	**281**	1	0	0	1	10	0	34	44	**45**	**326**
08:15	08:30	3	169	16	188	22	51	0	73	**261**	2	2	2	6	14	1	48	63	**69**	**330**
08:30	08:45	0	141	7	148	16	61	4	81	**229**	2	0	1	3	5	0	38	43	**46**	**275**
08:45	09:00	0	148	30	178	20	59	1	80	**258**	1	1	3	5	6	0	19	25	**30**	**288**
09:00	09:15	1	126	17	144	15	53	0	68	**212**	6	0	1	7	9	0	18	27	**34**	**246**
09:15	09:30	3	86	7	96	13	47	2	62	**158**	1	0	2	3	11	2	14	27	**30**	**188**
09:30	09:45	1	95	5	101	14	54	1	69	**170**	1	0	2	3	8	0	21	29	**32**	**202**
09:45	10:00	1	93	9	103	8	47	2	57	**160**	0	2	0	2	4	3	16	23	**25**	**185**
11:30	11:45	2	98	2	102	11	58	4	73	**175**	2	1	1	4	7	0	15	22	**26**	**201**
11:45	12:00	2	76	5	83	11	65	2	78	**161**	2	0	1	3	17	0	10	27	**30**	**191**
12:00	12:15	0	68	6	74	14	71	2	87	**161**	0	1	1	2	11	0	7	18	**20**	**181**
12:15	12:30	0	71	7	78	11	79	2	92	**170**	4	0	1	5	5	2	21	28	**33**	**203**
12:30	12:45	0	82	5	87	18	91	0	109	**196**	2	1	1	4	6	0	12	18	**22**	**218**
12:45	13:00	1	74	2	77	17	80	2	99	**176**	2	0	0	2	9	0	16	25	**27**	**203**
13:00	13:15	0	67	5	72	17	74	0	91	**163**	1	0	1	2	9	0	13	22	**24**	**187**
13:15	13:30	1	95	5	101	12	64	2	78	**179**	0	0	0	0	6	0	16	22	**22**	**201**
15:00	15:15	0	65	6	71	28	98	0	126	**197**	1	1	2	4	3	1	24	28	**32**	**229**
15:15	15:30	2	102	11	115	29	108	3	140	**255**	2	2	1	5	7	2	16	25	**30**	**285**
15:30	15:45	0	94	2	96	23	117	2	142	**238**	4	1	2	7	9	2	21	32	**39**	**277**
15:45	16:00	0	76	10	86	29	157	0	186	**272**	1	1	1	3	17	0	28	45	**48**	**320**
16:00	16:15	1	102	14	117	27	153	1	181	**298**	0	0	2	2	18	0	15	33	**35**	**333**
16:15	16:30	0	106	10	116	24	140	1	165	**281**	1	2	3	6	10	1	25	36	**42**	**323**
16:30	16:45	0	87	14	101	36	129	0	165	**266**	4	0	0	4	13	0	23	36	**40**	**306**
16:45	17:00	0	136	15	151	36	147	0	183	**334**	0	0	0	0	12	0	39	51	**51**	**385**
17:00	17:15	0	127	15	142	35	174	0	209	**351**	0	0	0	0	14	0	23	37	**37**	**388**
17:15	17:30	0	152	16	168	44	170	0	214	**382**	0	0	0	0	21	0	16	37	**37**	**419**
17:30	17:45	0	124	8	132	50	194	0	244	**376**	0	0	0	0	18	0	26	44	**44**	**420**
17:45	18:00	0	103	4	107	41	141	0	182	**289**	0	0	0	0	13	0	19	32	**32**	**321**
Total:		19	3663	311	3993	701	2949	48	3698	**7691**	46	18	37	101	310	15	703	1028	**7691**	**8,820**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		LONGFIELDS DR Northbound	LONGFIELDS DR Southbound	LONGFIELDS DR Street Total	CHAPMAN MILLS DR Eastbound	CHAPMAN MILLS DR Westbound	CHAPMAN MILLS DR Street Total	Grand Total
07:00	07:15	0	1	**1**	0	0	**0**	**1**
07:15	07:30	1	0	**1**	0	0	**0**	**1**
07:30	07:45	6	0	**6**	0	0	**0**	**6**
07:45	08:00	6	0	**6**	0	0	**0**	**6**
08:00	08:15	3	0	**3**	0	0	**0**	**3**
08:15	08:30	2	0	**2**	0	0	**0**	**2**
08:30	08:45	2	0	**2**	0	0	**0**	**2**
08:45	09:00	2	0	**2**	0	0	**0**	**2**
09:00	09:15	1	0	**1**	0	1	**1**	**2**
09:15	09:30	1	1	**2**	0	0	**0**	**2**
09:30	09:45	0	1	**1**	1	0	**1**	**2**
09:45	10:00	1	4	**5**	0	0	**0**	**5**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	2	**2**	0	0	**0**	**2**
12:00	12:15	2	2	**4**	0	0	**0**	**4**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	7	4	**11**	0	0	**0**	**11**
12:45	13:00	0	1	**1**	0	0	**0**	**1**
13:00	13:15	0	1	**1**	0	1	**1**	**2**
13:15	13:30	0	1	**1**	0	0	**0**	**1**
15:00	15:15	0	2	**2**	0	0	**0**	**2**
15:15	15:30	1	1	**2**	1	0	**1**	**3**
15:30	15:45	5	3	**8**	1	1	**2**	**10**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	2	**2**	0	0	**0**	**2**
16:15	16:30	3	1	**4**	0	0	**0**	**4**
16:30	16:45	1	1	**2**	0	0	**0**	**2**
16:45	17:00	1	5	**6**	0	0	**0**	**6**
17:00	17:15	1	2	**3**	1	0	**1**	**4**
17:15	17:30	0	3	**3**	0	0	**0**	**3**
17:30	17:45	1	0	**1**	0	0	**0**	**1**
17:45	18:00	1	1	**2**	0	0	**0**	**2**
Total		48	39	**87**	4	3	**7**	**94**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		LONGFIELDS DR NB Approach (E or W Crossing)	LONGFIELDS DR SB Approach (E or W Crossing)	LONGFIELDS DR Total	CHAPMAN MILLS DR EB Approach (N or S Crossing)	CHAPMAN MILLS DR WB Approach (N or S Crossing)	CHAPMAN MILLS DR Total	Grand Total
07:00	07:15	0	0	**0**	2	2	**4**	**4**
07:15	07:30	0	0	**0**	3	4	**7**	**7**
07:30	07:45	0	1	**1**	0	1	**1**	**2**
07:45	08:00	0	1	**1**	5	8	**13**	**14**
08:00	08:15	0	1	**1**	0	4	**4**	**5**
08:15	08:30	0	0	**0**	0	3	**3**	**3**
08:30	08:45	1	0	**1**	2	4	**6**	**7**
08:45	09:00	3	0	**3**	2	5	**7**	**10**
09:00	09:15	0	1	**1**	2	4	**6**	**7**
09:15	09:30	1	0	**1**	3	2	**5**	**6**
09:30	09:45	2	0	**2**	1	1	**2**	**4**
09:45	10:00	1	1	**2**	1	1	**2**	**4**
11:30	11:45	0	2	**2**	1	3	**4**	**6**
11:45	12:00	0	1	**1**	0	6	**6**	**7**
12:00	12:15	0	0	**0**	3	4	**7**	**7**
12:15	12:30	2	2	**4**	3	2	**5**	**9**
12:30	12:45	0	0	**0**	1	2	**3**	**3**
12:45	13:00	0	0	**0**	1	2	**3**	**3**
13:00	13:15	0	0	**0**	3	4	**7**	**7**
13:15	13:30	0	2	**2**	6	3	**9**	**11**
15:00	15:15	2	2	**4**	6	5	**11**	**15**
15:15	15:30	3	4	**7**	4	7	**11**	**18**
15:30	15:45	0	2	**2**	1	2	**3**	**5**
15:45	16:00	7	0	**7**	5	3	**8**	**15**
16:00	16:15	1	0	**1**	4	1	**5**	**6**
16:15	16:30	1	6	**7**	2	6	**8**	**15**
16:30	16:45	2	3	**5**	3	8	**11**	**16**
16:45	17:00	0	0	**0**	3	2	**5**	**5**
17:00	17:15	0	3	**3**	2	4	**6**	**9**
17:15	17:30	4	0	**4**	9	1	**10**	**14**
17:30	17:45	4	2	**6**	3	0	**3**	**9**
17:45	18:00	2	1	**3**	5	2	**7**	**10**
Total	.....	36	35	**71**	86	106	**192**	**263**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		LONGFIELDS DR									CHAPMAN MILLS DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	2	2	0	**4**	**4**	1	0	0	**1**	0	0	0	**0**	**1**	**5**
07:15	07:30	0	5	0	**5**	1	3	0	**4**	**9**	0	0	0	**0**	1	0	1	**2**	**2**	**11**
07:30	07:45	0	2	0	**2**	1	5	3	**9**	**11**	0	2	0	**2**	0	0	1	**1**	**3**	**14**
07:45	08:00	0	6	1	**7**	4	7	2	**13**	**20**	0	0	0	**0**	0	0	2	**2**	**2**	**22**
08:00	08:15	0	1	0	**1**	2	4	0	**6**	**7**	0	0	0	**0**	0	0	5	**5**	**5**	**12**
08:15	08:30	0	3	1	**4**	4	4	0	**8**	**12**	0	0	0	**0**	1	1	3	**5**	**5**	**19**
08:30	08:45	0	2	0	**2**	2	5	0	**7**	**9**	1	0	0	**1**	0	0	0	**0**	**1**	**11**
08:45	09:00	0	5	1	**6**	1	3	0	**4**	**10**	1	1	0	**2**	0	0	3	**3**	**5**	**15**
09:00	09:15	0	5	0	**5**	1	3	0	**4**	**9**	1	0	0	**1**	0	0	0	**0**	**1**	**11**
09:15	09:30	0	5	0	**5**	1	1	0	**2**	**7**	0	0	0	**0**	0	1	1	**2**	**2**	**11**
09:30	09:45	0	1	0	**1**	3	1	0	**4**	**5**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	3	2	**5**	**7**	**7**
11:30	11:45	0	1	0	**1**	1	0	1	**2**	**3**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
11:45	12:00	0	2	0	**2**	1	0	0	**1**	**3**	0	0	1	**1**	0	0	2	**2**	**3**	**13**
12:00	12:15	0	1	1	**2**	2	0	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
12:15	12:30	0	1	1	**2**	0	1	1	**2**	**4**	0	0	0	**0**	1	1	1	**3**	**3**	**7**
12:30	12:45	0	0	0	**0**	1	1	0	**2**	**2**	0	1	0	**1**	0	0	0	**0**	**1**	**3**
12:45	13:00	0	0	0	**0**	2	2	1	**5**	**5**	0	0	0	**0**	1	0	2	**3**	**3**	**10**
13:00	13:15	0	0	0	**0**	1	3	0	**4**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
13:15	13:30	0	1	0	**1**	0	3	0	**3**	**4**	0	0	0	**0**	0	0	1	**1**	**1**	**7**
15:00	15:15	0	0	0	**0**	1	2	0	**3**	**3**	0	1	0	**1**	1	1	2	**4**	**5**	**8**
15:15	15:30	0	7	0	**7**	1	6	0	**7**	**14**	0	2	0	**2**	0	2	1	**3**	**5**	**19**
15:30	15:45	0	2	0	**2**	1	3	0	**4**	**6**	0	1	0	**1**	0	2	0	**2**	**3**	**11**
15:45	16:00	0	2	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	1	0	2	**3**	**3**	**13**
16:00	16:15	0	3	0	**3**	1	5	0	**6**	**9**	0	0	0	**0**	2	0	1	**3**	**3**	**18**
16:15	16:30	0	4	0	**4**	0	4	0	**4**	**8**	0	2	0	**2**	0	0	0	**0**	**2**	**10**
16:30	16:45	0	2	0	**2**	1	1	0	**2**	**4**	0	0	0	**0**	0	0	4	**4**	**4**	**10**
16:45	17:00	0	3	0	**3**	0	0	0	**0**	**3**	0	0	0	**0**	1	0	1	**2**	**2**	**5**
17:00	17:15	0	7	0	**7**	2	3	0	**5**	**12**	0	0	0	**0**	0	0	1	**1**	**1**	**13**
17:15	17:30	0	2	0	**2**	0	0	0	**0**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
17:30	17:45	0	2	0	**2**	0	1	0	**1**	**3**	0	0	0	**0**	0	0	1	**1**	**1**	**4**
17:45	18:00	0	0	0	**0**	1	0	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
Total:	None	0	75	5	**80**	38	75	8	**121**	**201**	4	12	1	**17**	9	11	37	**57**	**74**	**314**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHAPMAN MILLS DR @ LONGFIELDS DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37883

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		LONGFIELDS DR		CHAPMAN MILLS DR		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	0	0	0	**0**
08:15	08:30	1	0	0	3	**4**
08:30	08:45	0	0	0	1	**1**
08:45	09:00	0	0	0	0	**0**
09:00	09:15	0	0	0	1	**1**
09:15	09:30	0	0	0	2	**2**
09:30	09:45	1	0	0	1	**2**
09:45	10:00	0	1	0	0	**1**
11:30	11:45	0	2	0	3	**5**
11:45	12:00	0	0	0	8	**8**
12:00	12:15	0	1	0	1	**2**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	2	0	2	**4**
13:00	13:15	0	0	0	4	**4**
13:15	13:30	0	1	0	2	**3**
15:00	15:15	0	1	0	0	**1**
15:15	15:30	0	1	0	0	**1**
15:30	15:45	0	0	0	2	**2**
15:45	16:00	0	1	0	7	**8**
16:00	16:15	1	0	0	6	**7**
16:15	16:30	0	1	0	2	**3**
16:30	16:45	0	0	0	2	**2**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	2	0	0	**2**
Total		3	13	0	47	**63**

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	742	78	104	1265	51	57	
Future Volume (vph)	742	78	104	1265	51	57	
Satd. Flow (prot)	3221	1427	1610	3252	2878	1327	
Flt Permitted			0.282		0.950		
Satd. Flow (perm)	3221	1393	478	3252	2793	1327	
Satd. Flow (RTOR)		87				63	
Lane Group Flow (vph)	824	87	116	1406	57	63	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	48.0	48.0	18.0	66.0	17.0		37.0
Total Split (%)	40.0%	40.0%	15.0%	55.0%	14.2%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	77.7	77.7	92.0	92.9	7.8	17.7	
Actuated g/C Ratio	0.65	0.65	0.77	0.77	0.06	0.15	
v/c Ratio	0.40	0.09	0.26	0.56	0.30	0.25	
Control Delay	12.5	2.6	1.6	1.9	57.2	12.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.5	2.6	1.6	1.9	57.2	12.8	
LOS	B	A	A	A	E	B	
Approach Delay	11.5			1.9	33.9		
Approach LOS	B			A	C		
Queue Length 50th (m)	50.7	0.0	1.0	6.9	6.7	0.0	
Queue Length 95th (m)	71.3	6.8	m1.5	m10.0	13.2	11.9	
Internal Link Dist (m)	78.8			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	2085	932	479	2518	244	467	
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	0.40	0.09	0.24	0.56	0.23	0.13	

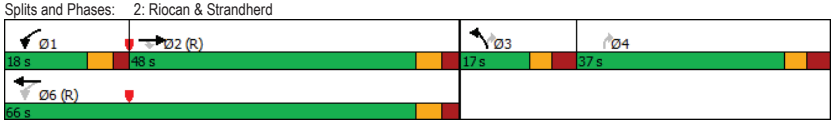
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 52.0%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	52	15	29	66	62	15	56	11	48	77	44
Future Vol, veh/h	29	52	15	29	66	62	15	56	11	48	77	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	6	7	7	11	5	2	7	2	4	2	2
Mvmt Flow	32	58	17	32	73	69	17	62	12	53	86	49
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	8.9	9.3	8.9	9.1
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	84%	0%	78%	0%	52%	0%	64%
Vol Right, %	0%	16%	0%	22%	0%	48%	0%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	67	29	67	29	128	48	121
LT Vol	15	0	29	0	29	0	48	0
Through Vol	0	56	0	52	0	66	0	77
RT Vol	0	11	0	15	0	62	0	44
Lane Flow Rate	17	74	32	74	32	142	53	134
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.028	0.113	0.053	0.111	0.053	0.205	0.087	0.191
Departure Headway (Hd)	5.979	5.445	5.952	5.359	5.964	5.188	5.905	5.112
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	597	655	599	666	599	688	605	699
Service Time	3.738	3.204	3.712	3.119	3.719	2.943	3.657	2.863
HCM Lane V/C Ratio	0.028	0.113	0.053	0.111	0.053	0.206	0.088	0.192
HCM Control Delay	8.9	8.9	9	8.8	9.1	9.3	9.2	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.4	0.2	0.4	0.2	0.8	0.3	0.7

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	786	18	0	1284	0	92
Future Vol, veh/h	786	18	0	1284	0	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	873	20	0	1427	0	102

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	883
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	344
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	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	344	-	-	-
HCM Lane V/C Ratio	0.297	-	-	-
HCM Control Delay (s)	19.8	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.2	-	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	86	23	6	172	21	10
Future Vol, veh/h	86	23	6	172	21	10
Conflicting Peds, #/hr	0	1	1	0	13	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	11	2	17	7	2	20
Mvmt Flow	96	26	7	191	23	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	328	111
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	218	-
Critical Hdwy	-	-	4.27	-	6.42	6.4
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.353	-	3.518	3.48
Pot Cap-1 Maneuver	-	-	1376	-	666	896
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	818	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1375	-	655	895
Mov Cap-2 Maneuver	-	-	-	-	655	-
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	805	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	717	-	-	1375	-
HCM Lane V/C Ratio	0.048	-	-	0.005	-
HCM Control Delay (s)	10.3	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	568	149	143	794	128	385	477	321	100	180	125
Future Volume (vph)	154	568	149	143	794	128	385	477	321	100	180	125
Satd. Flow (prot)	3066	3191	1401	3038	3252	1469	3185	1745	1469	1658	1712	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3044	3191	1365	3009	3252	1430	3145	1745	1393	1626	1712	1451
Satd. Flow (RTOR)			166			155			343			152
Lane Group Flow (vph)	171	631	166	159	882	142	428	530	357	111	200	139
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	22.0	37.0	37.0	22.0	37.0	37.0	25.0	36.0	36.0	25.0	36.0	36.0
Total Split (%)	18.3%	30.8%	30.8%	18.3%	30.8%	30.8%	20.8%	30.0%	30.0%	20.8%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	12.0	34.4	34.4	11.6	34.0	34.0	18.0	34.3	34.3	13.3	29.6	29.6
Actuated g/C Ratio	0.10	0.29	0.29	0.10	0.28	0.28	0.15	0.29	0.29	0.11	0.25	0.25
v/c Ratio	0.56	0.69	0.33	0.54	0.96	0.28	0.90	1.06	0.56	0.61	0.47	0.29
Control Delay	48.1	55.4	23.7	58.2	63.7	5.8	72.2	99.6	8.3	64.3	43.1	6.3
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	48.1	55.4	23.7	58.2	63.7	5.8	72.2	99.6	8.3	64.3	43.1	6.3
LOS	D	E	C	E	E	A	E	F	A	E	D	A
Approach Delay		48.7			56.0			65.9			37.0	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	20.1	82.1	12.1	18.7	107.6	0.0	51.4	~137.5	2.4	25.3	40.5	0.0
Queue Length 95th (m)	30.7	101.7	35.1	28.8	#160.0	12.8	#78.3	#220.5	29.0	42.1	63.5	13.0
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	393	914	509	389	922	516	485	499	643	252	422	472
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	0.44	0.69	0.33	0.41	0.96	0.28	0.88	1.06	0.56	0.44	0.47	0.29

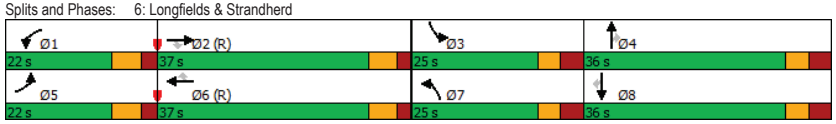
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 55.3	Intersection LOS: E
Intersection Capacity Utilization 83.2%	ICU Level of Service E
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.

Splits and Phases: 6: Longfields & Strandherd



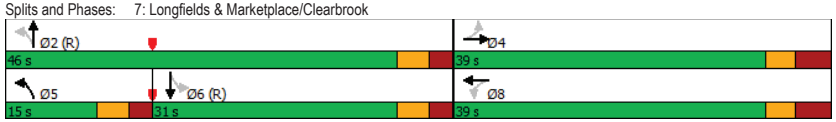
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	25	74	21	39	136	111	914	19	31	253	38
Future Volume (vph)	53	25	74	21	39	136	111	914	19	31	253	38
Satd. Flow (prot)	1537	1383	0	0	1441	0	1523	3275	0	1626	3191	0
Flt Permitted	0.548				0.958		0.487			0.276		
Satd. Flow (perm)	878	1383	0	0	1387	0	780	3275	0	467	3191	0
Satd. Flow (RTOR)		82			54			3			20	
Lane Group Flow (vph)	59	110	0	0	217	0	123	1037	0	34	323	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.4	20.4			20.4		52.2	52.0		40.7	40.7	
Actuated g/C Ratio	0.24	0.24			0.24		0.61	0.61		0.48	0.48	
v/c Ratio	0.28	0.28			0.58		0.22	0.52		0.15	0.21	
Control Delay	25.8	9.1			25.4		10.8	12.7		22.5	16.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	25.8	9.1			25.4		10.8	12.7		22.5	16.3	
LOS	C	A			C		B	B		C	B	
Approach Delay		14.9			25.4			12.5			16.9	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	8.5	3.8			25.0		6.3	37.5		2.8	13.3	
Queue Length 95th (m)	14.7	12.8			36.4		20.7	85.7		12.0	30.9	
Internal Link Dist (m)		158.6			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	332	574			558		561	2003		223	1537	
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	0.18	0.19			0.39		0.22	0.52		0.15	0.21	

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	8	34	2	150	3	879	54	87	256	11
Future Volume (vph)	5	5	8	34	2	150	3	879	54	87	256	11
Satd. Flow (prot)	1658	1271	1483	1551	1187	1401	1658	3316	1455	1496	3131	1043
Flt Permitted	0.950			0.950			0.578			0.250		
Satd. Flow (perm)	1653	1271	1483	1551	1187	1380	1004	3316	1368	392	3131	1015
Satd. Flow (RTOR)			127			167						129
Lane Group Flow (vph)	6	6	9	38	2	167	3	977	60	97	284	12
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	22.0	35.7	35.7	22.0	35.7	35.7	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (%)	22.0%	35.7%	35.7%	22.0%	35.7%	35.7%	42.3%	42.3%	42.3%	42.3%	42.3%	42.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	6.0	12.8	12.8	8.4	16.9	16.9	65.5	65.5	65.5	65.5	65.5	65.5
Actuated g/C Ratio	0.06	0.13	0.13	0.08	0.17	0.17	0.66	0.66	0.66	0.66	0.66	0.66
v/c Ratio	0.06	0.04	0.03	0.29	0.01	0.45	0.00	0.45	0.07	0.38	0.14	0.02
Control Delay	45.2	34.8	0.1	48.0	28.0	8.6	12.7	12.0	10.8	19.5	9.4	0.0
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	45.2	34.8	0.1	48.0	28.0	8.6	12.7	12.0	10.8	19.5	9.4	0.0
LOS	D	C	A	D	C	A	B	B	B	B	A	A
Approach Delay		22.9			16.0			12.0			11.6	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	1.1	1.1	0.0	6.9	0.4	0.0	0.2	28.9	2.5	5.1	6.5	0.0
Queue Length 95th (m)	5.1	4.1	0.0	16.6	2.0	14.9	2.0	100.7	14.4	#36.8	26.3	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	243	358	509	227	334	509	657	2171	895	256	2050	709
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	0.02	0.02	0.02	0.17	0.01	0.33	0.00	0.45	0.07	0.38	0.14	0.02

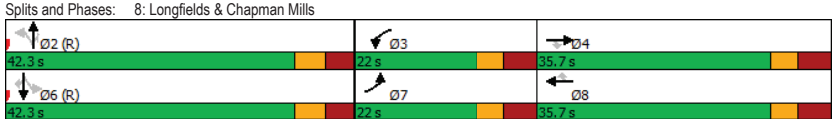
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Longfields & Chapman Mills



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	1012	180	272	1020	186	134	
Future Volume (vph)	1012	180	272	1020	186	134	
Satd. Flow (prot)	3316	1483	1658	3316	3216	1483	
Flt Permitted			0.080		0.950		
Satd. Flow (perm)	3316	1448	140	3316	3090	1438	
Satd. Flow (RTOR)		181				149	
Lane Group Flow (vph)	1124	200	302	1133	207	149	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	49.0	49.0	15.0	64.0	19.0		37.0
Total Split (%)	40.8%	40.8%	12.5%	53.3%	15.8%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	43.9	43.9	78.7	78.4	11.5	28.5	
Actuated g/C Ratio	0.37	0.37	0.66	0.65	0.10	0.24	
v/c Ratio	0.93	0.31	0.67	0.52	0.67	0.33	
Control Delay	50.2	6.3	27.1	5.8	63.8	6.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	50.2	6.3	27.1	5.8	63.8	6.4	
LOS	D	A	C	A	E	A	
Approach Delay	43.6			10.3	39.8		
Approach LOS	D			B	D		
Queue Length 50th (m)	131.4	2.8	14.0	6.2	24.5	0.0	
Queue Length 95th (m)	#178.7	18.5	m#117.4	155.7	37.0	12.4	
Internal Link Dist (m)	83.7			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1213	644	452	2166	326	648	
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	0.93	0.31	0.67	0.52	0.63	0.23	

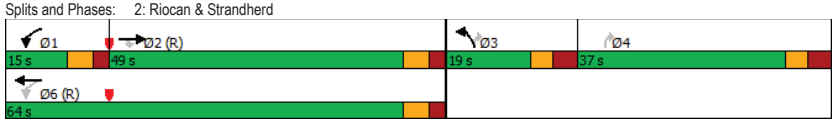
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	138	80	88	130	89	73	209	78	103	153	77
Future Vol, veh/h	44	138	80	88	130	89	73	209	78	103	153	77
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	4	2	2	6	2	2	2	2	2	2	2
Mvmt Flow	49	153	89	98	144	99	81	232	87	114	170	86
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.5	16.9	21.2	17
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	73%	0%	63%	0%	59%	0%	67%
Vol Right, %	0%	27%	0%	37%	0%	41%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	287	44	218	88	219	103	230
LT Vol	73	0	44	0	88	0	103	0
Through Vol	0	209	0	138	0	130	0	153
RT Vol	0	78	0	80	0	89	0	77
Lane Flow Rate	81	319	49	242	98	243	114	256
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.183	0.657	0.115	0.518	0.227	0.514	0.261	0.53
Departure Headway (Hd)	8.13	7.42	8.448	7.702	8.349	7.611	8.217	7.461
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	440	485	423	465	428	472	436	480
Service Time	5.909	5.198	6.231	5.485	6.131	5.392	5.998	5.241
HCM Lane V/C Ratio	0.184	0.658	0.116	0.52	0.229	0.515	0.261	0.533
HCM Control Delay	12.7	23.4	12.3	18.6	13.6	18.2	13.9	18.4
HCM Lane LOS	B	C	B	C	B	C	B	C
HCM 95th-tile Q	0.7	4.7	0.4	2.9	0.9	2.9	1	3.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑↑		↱
Traffic Vol, veh/h	1180	73	0	1267	0	37
Future Vol, veh/h	1180	73	0	1267	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1311	81	0	1408	0	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1352
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	183
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	183
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	30.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	183	-	-	-
HCM Lane V/C Ratio	0.225	-	-	-
HCM Control Delay (s)	30.3	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.8	-	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↱	
Traffic Vol, veh/h	287	36	8	367	23	10
Future Vol, veh/h	287	36	8	367	23	10
Conflicting Peds, #/hr	0	2	2	0	3	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	13	3	2	2
Mvmt Flow	319	40	9	408	26	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	361	0	770	342
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	429	-
Critical Hdwy	-	-	4.23	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.317	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1139	-	369	701
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1137	-	364	699
Mov Cap-2 Maneuver	-	-	-	-	364	-
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	649	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	426	-	-	1137	-
HCM Lane V/C Ratio	0.086	-	-	0.008	-
HCM Control Delay (s)	14.2	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	825	194	292	981	127	119	206	182	116	339	159
Future Volume (vph)	198	825	194	292	981	127	119	206	182	116	339	159
Satd. Flow (prot)	3154	3316	1483	3216	3316	1483	3185	1745	1483	1658	1745	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3149	3316	1457	3207	3316	1458	3146	1745	1444	1640	1745	1420
Satd. Flow (RTOR)			215			155			212			212
Lane Group Flow (vph)	220	917	216	324	1090	141	132	229	202	129	377	177
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	12.6	42.0	42.0	24.0	53.4	53.4	18.0	36.0	36.0	18.0	36.0	36.0
Total Split (%)	10.5%	35.0%	35.0%	20.0%	44.5%	44.5%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	6.0	37.0	37.0	16.0	47.0	47.0	9.9	29.5	29.5	11.1	30.7	30.7
Actuated g/C Ratio	0.05	0.31	0.31	0.13	0.39	0.39	0.08	0.25	0.25	0.09	0.26	0.26
v/c Ratio	1.40	0.90	0.36	0.76	0.84	0.21	0.51	0.53	0.39	0.84	0.84	0.34
Control Delay	241.1	46.9	15.4	61.8	40.2	3.7	59.4	44.8	6.6	94.2	60.9	4.2
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	241.1	46.9	15.4	61.8	40.2	3.7	59.4	44.8	6.6	94.2	60.9	4.2
LOS	F	D	B	E	D	A	E	D	A	F	E	A
Approach Delay		73.5			41.4			34.5			52.5	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	~34.5	120.2	27.9	37.9	120.9	0.0	15.5	47.2	0.0	30.3	85.1	0.0
Queue Length 95th (m)	m#43.5	m#137.0	m35.6	53.1	149.0	10.1	25.4	72.5	16.2	#63.7	#139.1	10.3
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	157	1021	597	466	1298	665	299	429	514	156	447	521
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	1.40	0.90	0.36	0.70	0.84	0.21	0.44	0.53	0.39	0.83	0.84	0.34

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

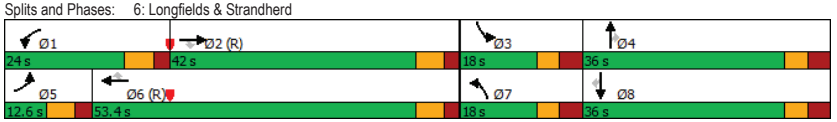
Maximum v/c Ratio: 1.40
Intersection Signal Delay: 52.7 Intersection LOS: D
Intersection Capacity Utilization 87.5% ICU Level of Service E
Analysis Period (min) 15

~ 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.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Longfields & Strandherd



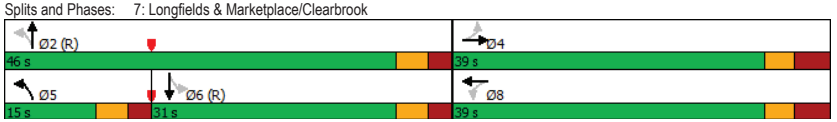
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	71	255	17	52	54	154	364	15	100	567	176
Future Volume (vph)	125	71	255	17	52	54	154	364	15	100	567	176
Satd. Flow (prot)	1642	1526	0	0	1618	0	1610	3292	0	1658	3178	0
Flt Permitted	0.684				0.566		0.238			0.506		
Satd. Flow (perm)	1177	1526	0	0	922	0	403	3292	0	878	3178	0
Satd. Flow (RTOR)		244			53			7			49	
Lane Group Flow (vph)	139	362	0	0	137	0	171	421	0	111	826	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	17.4	17.4			17.4		55.2	55.0		40.7	40.7	
Actuated g/C Ratio	0.20	0.20			0.20		0.65	0.65		0.48	0.48	
v/c Ratio	0.58	0.72			0.60		0.45	0.20		0.26	0.53	
Control Delay	38.3	17.8			28.0		11.6	7.7		19.3	18.6	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	38.3	17.8			28.0		11.6	7.7		19.3	18.6	
LOS	D	B			C		B	A		B	B	
Approach Delay		23.5			28.0			8.8			18.7	
Approach LOS		C			C			A			B	
Queue Length 50th (m)	21.3	17.3			12.5		8.7	11.3		9.7	41.7	
Queue Length 95th (m)	29.8	34.9			23.6		27.5	29.5		29.8	#92.8	
Internal Link Dist (m)		158.6			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	445	729			382		398	2132		420	1547	
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	0.31	0.50			0.36		0.43	0.20		0.26	0.53	

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72
Intersection Signal Delay: 17.7 — Intersection LOS: B
Intersection Capacity Utilization 70.4% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



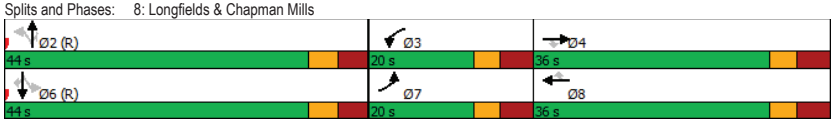
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	65	0	84	0	462	54	165	725	0
Future Volume (vph)	0	0	0	65	0	84	0	462	54	165	725	0
Satd. Flow (prot)	1745	1745	1745	1658	1745	1469	1745	3283	1483	1658	3316	1745
Flt Permitted				0.950						0.463		
Satd. Flow (perm)	1745	1745	1745	1644	1745	1444	1745	3283	1435	804	3316	1745
Satd. Flow (RTOR)						403						
Lane Group Flow (vph)	0	0	0	72	0	93	0	513	60	183	806	0
Turn Type	Prot		Perm	Prot		Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	20.0	36.0	36.0	20.0	36.0	36.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	20.0%	36.0%	36.0%	20.0%	36.0%	36.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)				10.0		17.8		72.4	72.4	72.4	72.4	
Actuated g/C Ratio				0.10		0.18		0.72	0.72	0.72	0.72	
v/c Ratio				0.43		0.16		0.22	0.06	0.31	0.34	
Control Delay				49.8		0.6		9.1	10.7	13.5	10.1	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				49.8		0.6		9.1	10.7	13.5	10.1	
LOS				D		A		A	B	B	B	
Approach Delay					22.1			9.3			10.8	
Approach LOS					C			A			B	
Queue Length 50th (m)				13.3		0.0		12.6	2.5	9.5	22.2	
Queue Length 95th (m)				26.3		0.0		52.4	16.0	53.0	87.4	
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)				40.0		40.0			65.0	65.0		
Base Capacity (vph)				210		740		2375	1038	581	2399	
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				0.34		0.13		0.22	0.06	0.31	0.34	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 69.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Longfields & Chapman Mills



Appendix D

Collision Data

CGH TRANSPORTATION

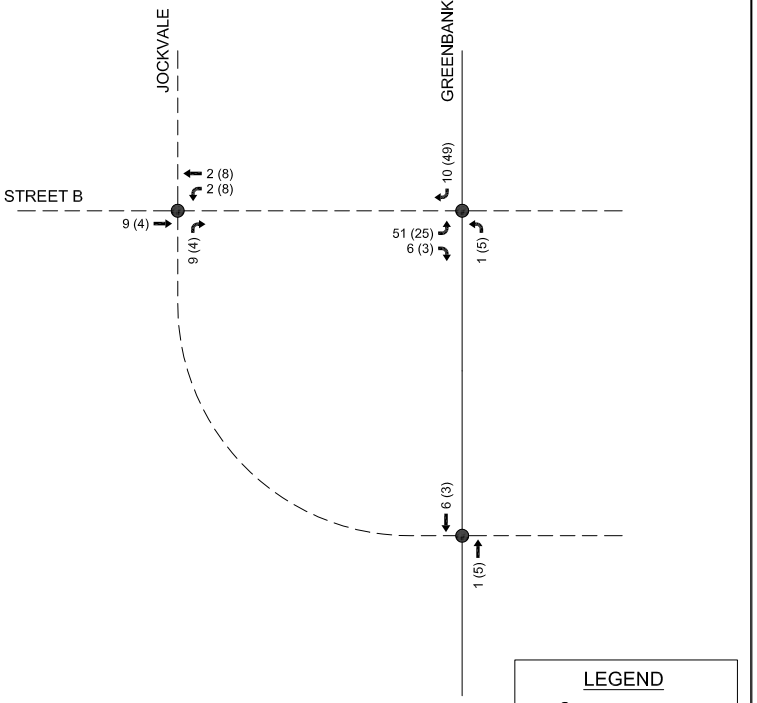
Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
10/20/2016	2016	22:52	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
12/1/2016	2016	17:10	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
12/17/2016	2016	13:12	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
1/30/2016	2016	12:59	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
1/7/2016	2016	20:11	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
4/6/2016	2016	20:10	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	03 - Loose snow	2	0	0	0
4/13/2016	2016	18:06	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
4/15/2016	2016	20:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
4/22/2016	2016	10:26	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	3	0	0	0
6/10/2016	2016	13:11	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
6/29/2016	2016	12:07	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
7/28/2016	2016	18:31	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/18/2016	2016	8:08	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
9/21/2016	2016	15:53	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
10/14/2017	2017	19:56	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/17/2017	2017	16:17	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/30/2017	2017	16:37	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/20/2017	2017	18:06	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/15/2017	2017	12:57	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
2/10/2017	2017	9:10	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2/21/2017	2017	21:27	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
6/1/2017	2017	16:45	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
6/26/2017	2017	20:10	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	5	0	0	0
8/11/2017	2017	11:55	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
8/24/2017	2017	21:21	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/31/2017	2017	0:39	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
11/6/2018	2018	12:17	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	99 - Other	02 - Wet	2	0	0	0
10/29/2018	2018	8:41	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
11/10/2018	2018	13:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/6/2018	2018	15:29	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/30/2018	2018	8:28	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	03 - Loose snow	2	0	0	0
3/14/2018	2018	18:54	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
3/15/2018	2018	15:45	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
3/27/2018	2018	7:44	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
4/7/2018	2018	10:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
4/7/2018	2018	12:50	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/8/2018	2018	14:07	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
4/24/2018	2018	20:10	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/3/2018	2018	18:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/16/2018	2018	14:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/14/2018	2018	10:22	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
7/27/2018	2018	8:38	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
7/28/2018	2018	7:37	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
8/30/2018	2018	19:40	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/16/2018	2018	4:04	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
9/24/2018	2018	14:43	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	3	0	0	0
10/14/2019	2019	20:34	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	00 - Unknown	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
1/21/2019	2019	7:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	03 - Dawn	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
10/31/2019	2019	16:56	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
10/25/2019	2019	14:57	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	0	0
10/28/2019	2019	20:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/10/2019	2019	10:15	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/13/2019	2019	6:52	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	03 - Dawn	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
12/13/2019	2019	8:57	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2/28/2019	2019	18:49	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
5/6/2019	2019	19:20	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
4/16/2019	2019	12:29	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
4/16/2019	2019	20:09	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
5/13/2019	2019	20:50	STRANDHERD DR @ LONGFIELDS DR (0010935)	02 - Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
6/24/2019	2019	11:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
6/26/2019	2019	14:57	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
7/10/2019	2019	18:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/15/2019	2019	8:20	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/3/2019	2019	15:08	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2/11/2020	2020	11:08	STRANDHERD DR @ LONGFIELDS DR (0010935)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2/15/2020	2020	10:33	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
3/7/2020	2020	21:34	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
4/15/2020	2020	11:01	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
4/6/2020	2020	18:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
5/20/2020	2020	12:54	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/3/2020	2020	17:00	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/24/2020	2020	12:48	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
9/3/2020	2020	17:47	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
8/30/2020	2020	11:03	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
10/22/2020	2020	12:26	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
1/20/2020	2020	16:30	STRANDHERD DR @ LONGFIELDS DR (0010935)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	02 - Wet	3	0	0	0
2/17/2016	2016	21:17	STRANDHERD DR btwn MCGARRY TER & LONGFIELDS DR (__4BRV6M)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	99 - Other	06 - Ice	3	0	0	0
8/30/2018	2018	13:29	STRANDHERD DR btwn MCGARRY TER & LONGFIELDS DR (__4BRV6M)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/17/2019	2019	15:12	STRANDHERD DR btwn MCGARRY TER & LONGFIELDS DR (__4BRV6M)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	1	0
10/8/2019	2019	18:15	STRANDHERD DR btwn MCGARRY TER & LONGFIELDS DR (__4BRV6M)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2/3/2017	2017	10:55	MARKETPLACE AVE btwn RIOCAN AVE & Continuation of MARKETPLACE AVE (__4LZBIC)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	3	0	0	0
12/18/2018	2018	20:59	MARKETPLACE AVE btwn RIOCAN AVE & Continuation of MARKETPLACE AVE (__4LZBIC)	01 - Clear	07 - Dark	04 - Ped. crossover	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
4/30/2018	2018	10:18	MARKETPLACE AVE btwn Continuation of MARKETPLACE AVE & LONGFIELDS DR (__5Z2MNR)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
5/25/2019	2019	11:14	MARKETPLACE AVE btwn Continuation of MARKETPLACE AVE & LONGFIELDS DR (__5Z2MNR)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
10/6/2016	2016	16:03	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
1/4/2016	2016	17:04	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/9/2016	2016	8:25	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	06 - Ice	4	0	0	0
3/28/2016	2016	9:30	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
8/10/2016	2016	12:11	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
9/16/2016	2016	8:10	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
2/4/2017	2017	13:54	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2/22/2017	2017	19:00	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
7/28/2017	2017	14:35	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
3/16/2018	2018	10:36	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
3/31/2018	2018	17:10	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
5/4/2018	2018	13:23	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	02 - Wet	1	0	0	1
5/29/2018	2018	19:06	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
8/18/2018	2018	20:35	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
11/5/2019	2019	18:13	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
11/17/2019	2019	17:53	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/8/2019	2019	6:45	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	03 - Loose snow	2	0	0	0
4/15/2019	2019	14:51	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
6/27/2019	2019	14:50	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/18/2019	2019	21:30	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
2/19/2020	2020	10:09	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2/18/2020	2020	9:30	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	03 - Loose snow	2	0	0	0
4/23/2020	2020	8:57	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
5/12/2020	2020	20:34	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	1	0	0

1/18/2020	2020	17:56	CLEARBROOK DR/MARKETPLACE AVE @ LONGFIELDS DR (0011162)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
12/29/2016	2016	11:49	LONGFIELDS DR btwn STRANDHERD DR & MARKETPLACE AVE (__5Z2MQN)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
2/21/2016	2016	3:19	LONGFIELDS DR btwn STRANDHERD DR & MARKETPLACE AVE (__5Z2MQN)	01 - Clear	07 - Dark	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
9/20/2016	2016	16:39	LONGFIELDS DR btwn STRANDHERD DR & MARKETPLACE AVE (__5Z2MQN)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2/6/2018	2018	10:43	LONGFIELDS DR btwn STRANDHERD DR & MARKETPLACE AVE (__5Z2MQN)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	02 - Wet	1	0	0	0

Appendix E

Background Development Volumes

CGH TRANSPORTATION



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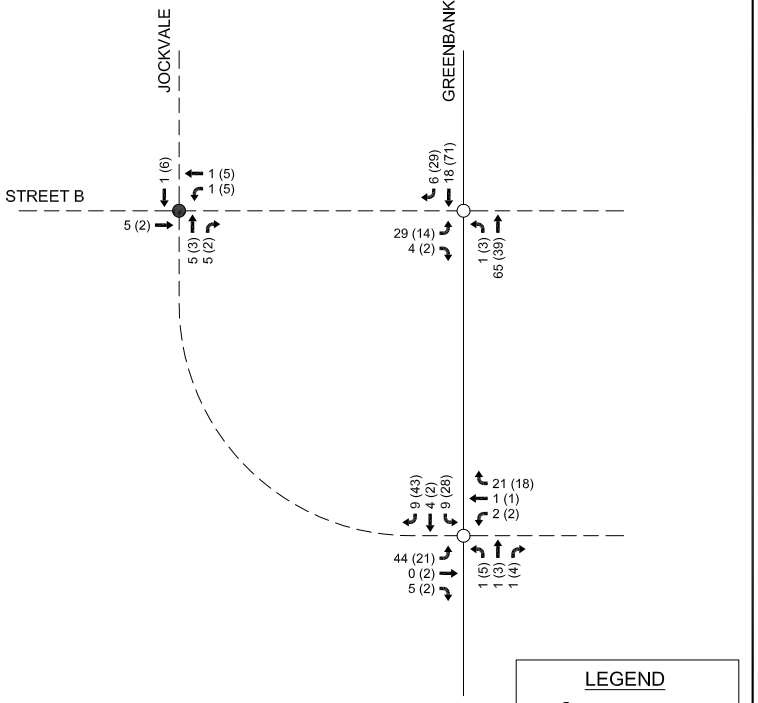
3370 GREENBANK ROAD
BURNETT LANDS

PHASE 1 SITE
GENERATED TRAFFIC

JAN 2018 111117 FIGURE 5

SHT8X11.DWG - 216mmX278mm

M:\2011\111117\CAD\Design\Figures\Traffic\Addendum\111117 - VOLUME FIGURES.dwg, 2022 SITE, Jan 25, 2018 - 3:01pm, bbyvelis



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3370 GREENBANK ROAD
BURNETT LANDS

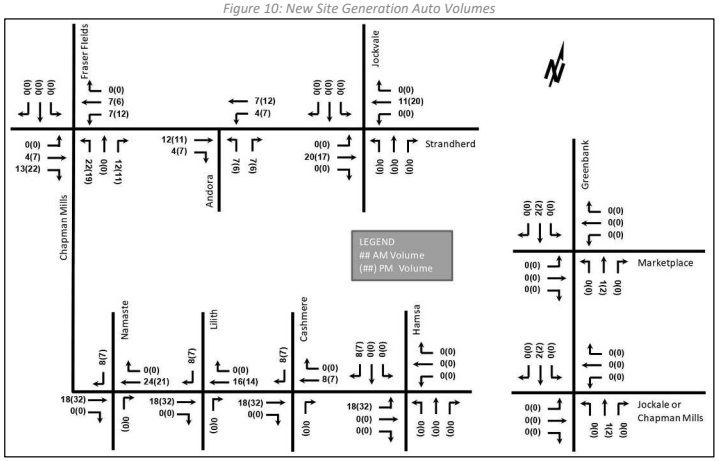
ULTIMATE SITE
GENERATED TRAFFIC

JAN 2018 111117 FIGURE 7

SHT8X11.DWG - 216mmX278mm

M:\2011\111117\CAD\Design\Figures\Traffic\Addendum\111117 - VOLUME FIGURES.dwg, 2027 SITE, Jan 25, 2018 - 3:01pm, bbyvelis

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. The widening of Strandherd Drive has been included within the background network conditions after 2022. The re-alignment of Greenbank Road (south of the study area) is not considered to have any notable impact on the study area traffic volumes and travel patterns. The extension of Chapman Mills Drive to Strandherd Drive is not anticipated to be completed over the Kennedy-Burnett SWM Pond during the forecast horizons.

6.2 Background Growth

The adjacent area transportation studies have used a 2-3% traffic growth in the area. This background growth would be conservative for the short-term horizons, but by the 2031 horizon, would overburden the existing road network. Given the known roadway capacity issues in Barrhaven, a 10% growth total is proposed for the area, between 2018 and 2031. This results in an approximate 0.76% growth annually along the mainline volumes. Supporting this assumption is the explicit consideration of the individual developments in the surrounding area.

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 2.3) include:

- 3195 Greenbank Road
- 3201 Greenbank Road
- 3228 Greenbank Road
- 3311 Greenbank Road
- 3370 Greenbank Road
- 4005/4025 Strandherd Drive

Table 11: OD Survey Existing Mode Share – South Nepean

To/From	Residential % of Trips
North	80%
South	5%
East	10%
West	5%
Total	100%

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 11 illustrates the new site generated volumes.

Figure 11: New Site Generation Auto Volumes

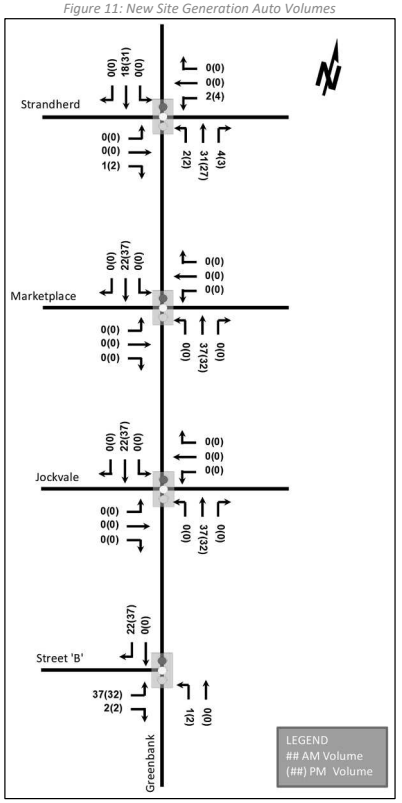


Figure 10: New Site Generation Auto Volumes

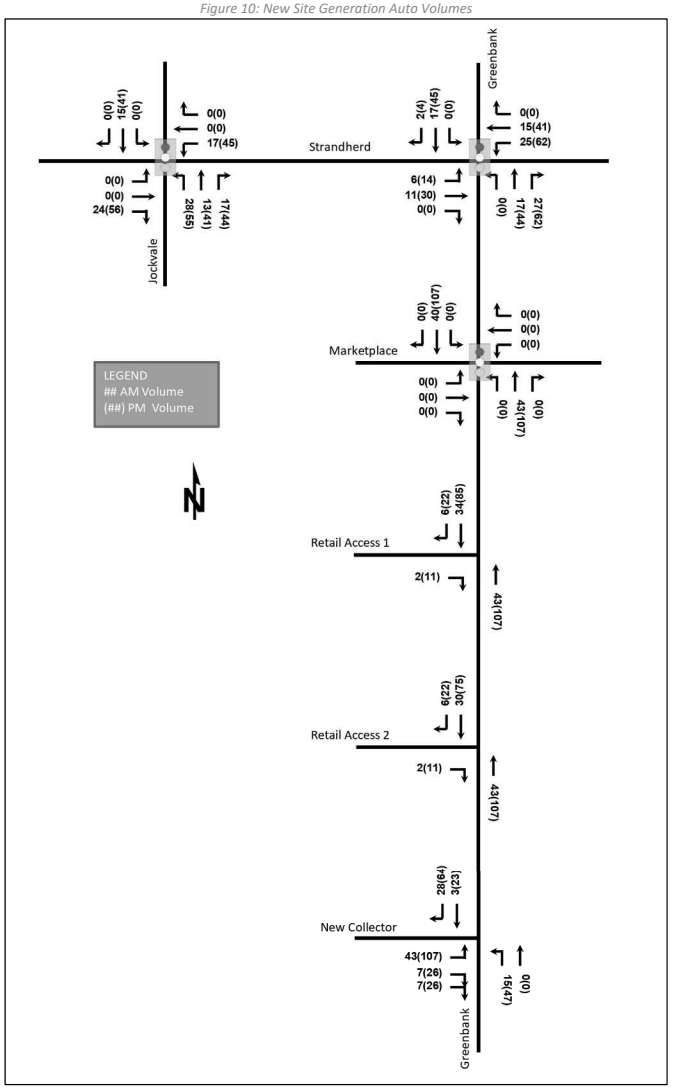


Figure 11: Pass-By Volumes

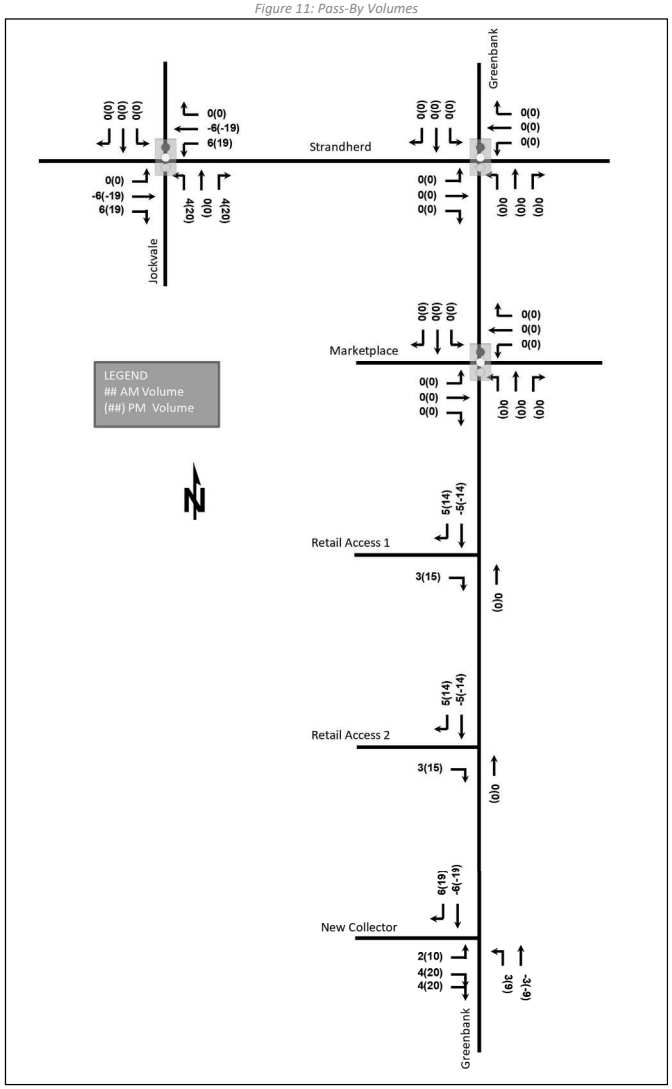
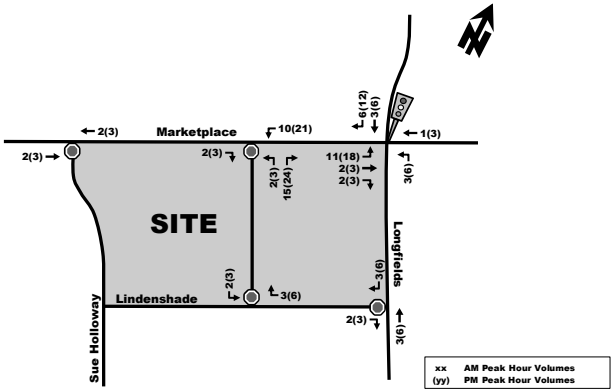


Figure 7: 'New' Site-Generated Traffic Volumes



As shown in Table 4, the proposed site is projected to generate approximately 170 person trips per hour during the weekday commuter peak hours. The increase in two-way transit trips is estimated to be 25 persons per hour, and the increase in bike/walk trips is approximately 15 persons per hour.

3.5. VEHICLE TRAFFIC DISTRIBUTION AND ASSIGNMENT

Traffic distribution was based on the existing volume splits at study area intersections, the right-in/right-out connection, and our knowledge of the surrounding area. The resulting distribution is as follows:

- 70% to/from the north via Greenbank Road, Longfields Drive and Woodroffe Avenue;
- 15% to/from the east via Strandherd Drive;
- 10% to/from the west via Strandherd Drive; and
- 5% to/from the south via Longfields Drive and Greenbank Road.

Based on these distributions, 'new' site-generated trips were assigned to the study area, which are illustrated as Figure 7.

Figure 7: 'New' Site-Generated Traffic Volumes

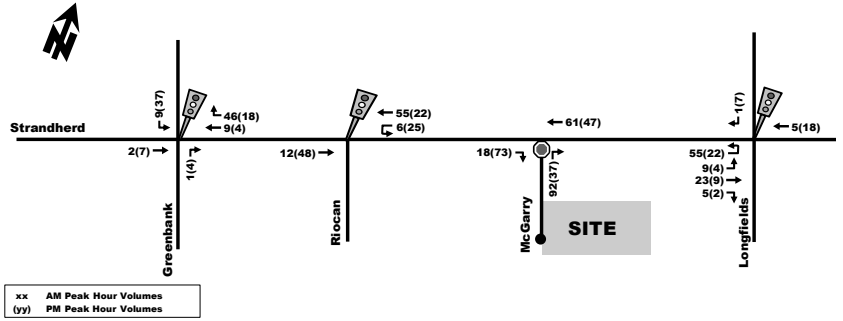


Figure 8: 'New' Site Generated Auto Volumes

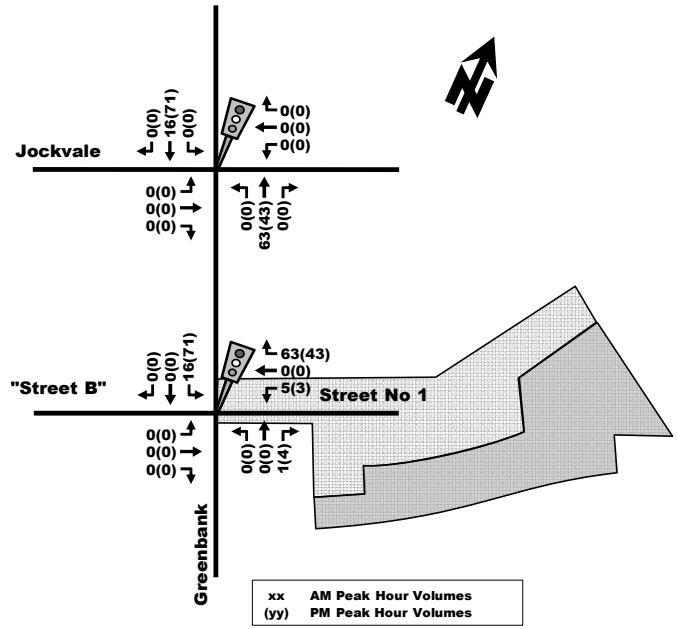


Figure 12: 2026 New Site Generation Auto Volumes

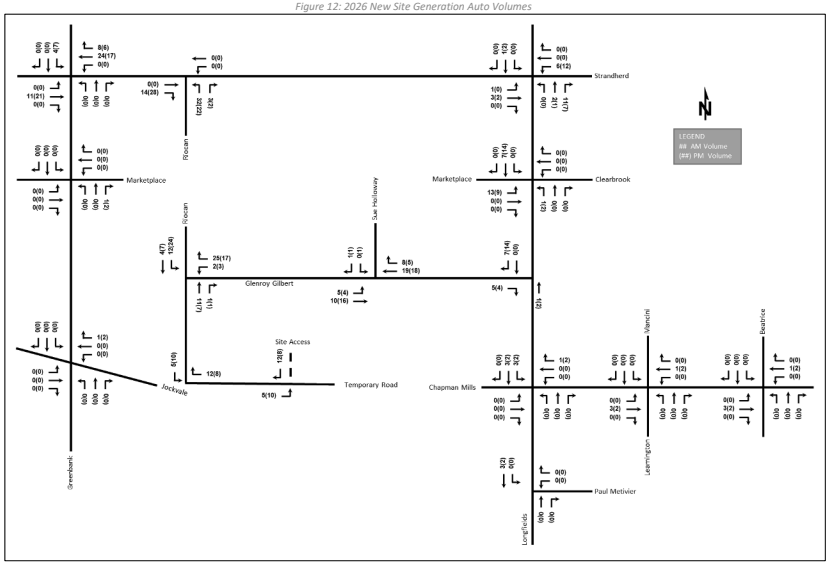


Figure 13: 2031 New Site Generation Auto Volumes

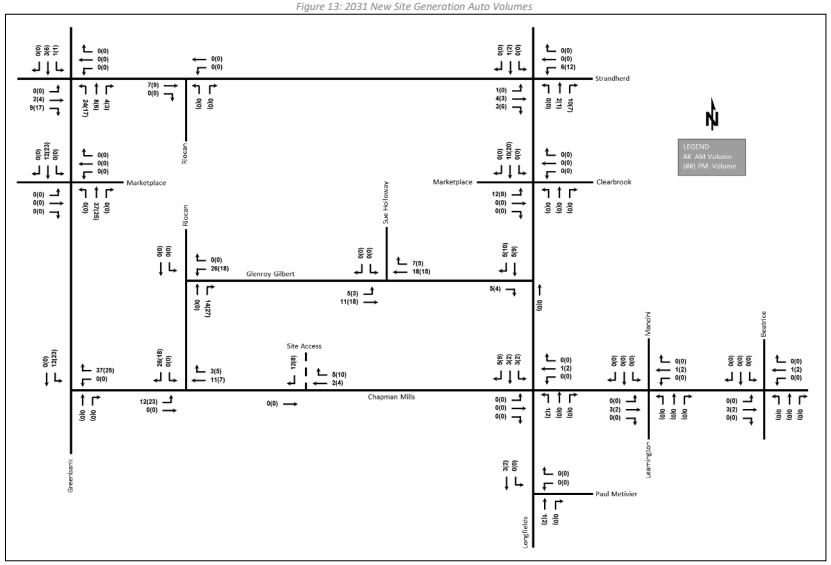


Figure 5: Phase 1 Site-Generated Traffic Assignment

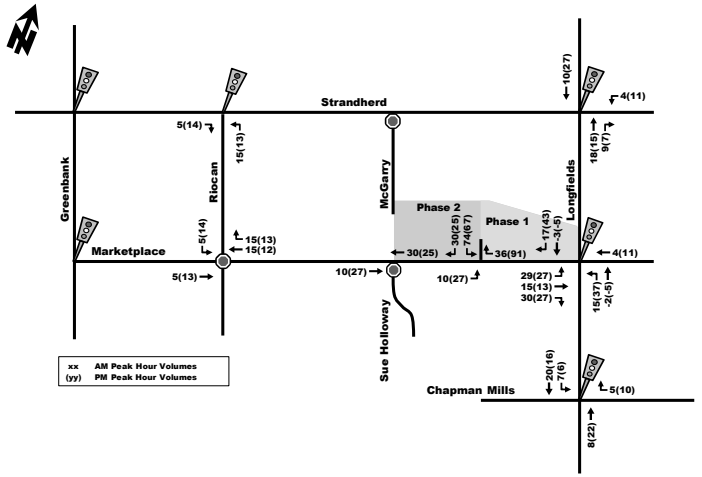
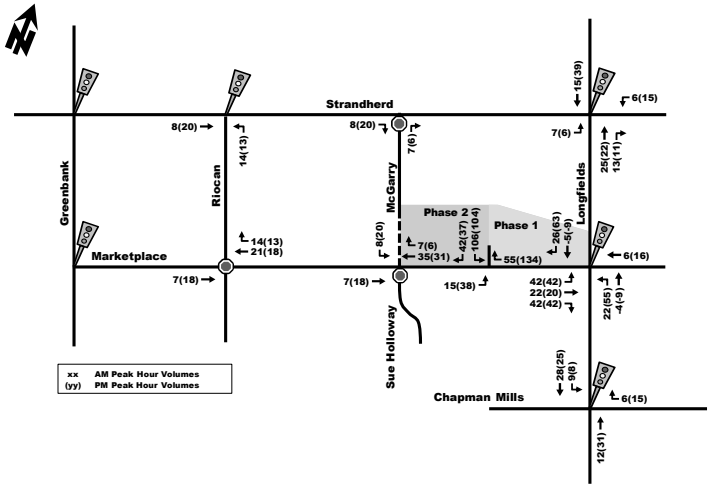


Figure 6: Phase 2 Site-Generated Traffic Assignment



Appendix F

TRANS Model Plots

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

McGarry Terrace Area

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Jan 17, 2023
EMME Scenario: 21713

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

50 100 150 200 250

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

McGarry Terrace Area

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Jan 17, 2023
EMME Scenario: 21715

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

50 100 150 200 250

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 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 G

Synchro Intersection Worksheets – 2026 Future Background Conditions

CGH TRANSPORTATION

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	836	83	104	1310	98	60	
Future Volume (vph)	836	83	104	1310	98	60	
Satd. Flow (prot)	3221	1427	1610	3252	2878	1327	
Flt Permitted			0.273		0.950		
Satd. Flow (perm)	3221	1380	462	3252	2708	1327	
Satd. Flow (RTOR)		83				60	
Lane Group Flow (vph)	836	83	104	1310	98	60	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	48.0	48.0	18.0	66.0	17.0		37.0
Total Split (%)	40.0%	40.0%	15.0%	55.0%	14.2%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	74.2	74.2	88.3	88.0	8.9	21.3	
Actuated g/C Ratio	0.62	0.62	0.74	0.73	0.07	0.18	
v/c Ratio	0.42	0.09	0.25	0.55	0.46	0.21	
Control Delay	13.6	2.7	1.7	1.7	59.9	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.6	2.7	1.7	1.7	59.9	12.0	
LOS	B	A	A	A	E	B	
Approach Delay	12.6			1.7	41.8		
Approach LOS	B			A	D		
Queue Length 50th (m)	53.4	0.0	0.9	6.7	11.5	0.0	
Queue Length 95th (m)	72.3	6.7	m1.3	m8.5	20.1	11.5	
Internal Link Dist (m)	78.8			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1992	885	454	2385	244	515	
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	0.42	0.09	0.23	0.55	0.40	0.12	

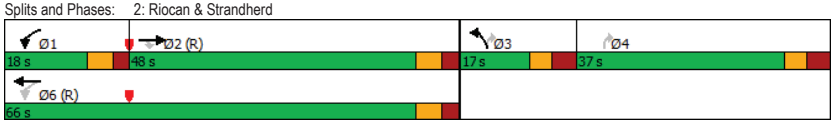
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	57	16	30	81	77	15	91	11	53	91	44
Future Vol, veh/h	29	57	16	30	81	77	15	91	11	53	91	44
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	6	7	7	11	5	2	7	2	4	2	2
Mvmt Flow	29	57	16	30	81	77	15	91	11	53	91	44
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	9	9.5	9.2	9.2
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	89%	0%	78%	0%	51%	0%	67%
Vol Right, %	0%	11%	0%	22%	0%	49%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	102	29	73	30	158	53	135
LT Vol	15	0	29	0	30	0	53	0
Through Vol	0	91	0	57	0	81	0	91
RT Vol	0	11	0	16	0	77	0	44
Lane Flow Rate	15	102	29	73	30	158	53	135
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.025	0.156	0.049	0.111	0.05	0.231	0.088	0.195
Departure Headway (Hd)	6.01	5.516	6.047	5.457	6.036	5.258	5.964	5.197
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	592	646	589	653	591	679	598	686
Service Time	3.78	3.286	3.818	3.228	3.799	3.021	3.728	2.96
HCM Lane V/C Ratio	0.025	0.158	0.049	0.112	0.051	0.233	0.089	0.197
HCM Control Delay	8.9	9.3	9.1	8.9	9.1	9.6	9.3	9.2
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.6	0.2	0.4	0.2	0.9	0.3	0.7

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	887	18	0	1329	0	92
Future Vol, veh/h	887	18	0	1329	0	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	887	18	0	1329	0	92

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	896
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	338
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	338
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	338	-	-	-
HCM Lane V/C Ratio	0.272	-	-	-
HCM Control Delay (s)	19.6	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	96	23	6	203	0	21	0	23	0	0	0
Future Vol, veh/h	0	96	23	6	203	0	21	0	23	0	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	13	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	11	2	17	7	2	2	2	20	2	2	2
Mvmt Flow	0	96	23	6	203	0	21	0	23	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	203	0	0	120	0	0	337	324	110	335	335	216
Stage 1	-	-	-	-	-	-	109	109	-	215	215	-
Stage 2	-	-	-	-	-	-	228	215	-	120	120	-
Critical Hdwy	4.12	-	-	4.27	-	-	7.12	6.52	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.353	-	-	3.518	4.018	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	1369	-	-	1380	-	-	617	594	897	619	585	824
Stage 1	-	-	-	-	-	-	896	805	-	787	725	-
Stage 2	-	-	-	-	-	-	775	725	-	884	796	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1369	-	-	1379	-	-	608	590	896	600	581	816
Mov Cap-2 Maneuver	-	-	-	-	-	-	608	590	-	600	581	-
Stage 1	-	-	-	-	-	-	895	804	-	787	721	-
Stage 2	-	-	-	-	-	-	763	721	-	861	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	10.2	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	731	1369	-	-	1379	-	-	-
HCM Lane V/C Ratio	0.06	-	-	-	0.004	-	-	-
HCM Control Delay (s)	10.2	0	-	-	7.6	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	647	149	153	834	128	385	546	341	100	209	130
Future Volume (vph)	161	647	149	153	834	128	385	546	341	100	209	130
Satd. Flow (prot)	3066	3191	1401	3038	3252	1469	3185	1745	1469	1658	1712	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3036	3191	1355	2999	3252	1421	3136	1745	1384	1624	1712	1444
Satd. Flow (RTOR)			155			155			318			152
Lane Group Flow (vph)	161	647	149	153	834	128	385	546	341	100	209	130
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	22.0	37.0	37.0	22.0	37.0	37.0	25.0	36.0	36.0	25.0	36.0	36.0
Total Split (%)	18.3%	30.8%	30.8%	18.3%	30.8%	30.8%	20.8%	30.0%	30.0%	20.8%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	11.6	34.6	34.6	11.4	34.4	34.4	17.5	35.1	35.1	12.5	30.1	30.1
Actuated g/C Ratio	0.10	0.29	0.29	0.10	0.29	0.29	0.15	0.29	0.29	0.10	0.25	0.25
v/c Ratio	0.54	0.70	0.30	0.53	0.89	0.25	0.83	1.07	0.54	0.58	0.49	0.27
Control Delay	47.2	58.1	23.3	58.3	54.8	4.2	65.4	101.8	8.8	63.8	43.3	5.2
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	47.2	58.1	23.3	58.3	54.8	4.2	65.4	101.8	8.8	63.8	43.3	5.2
LOS	D	E	C	E	D	A	E	F	A	E	D	A
Approach Delay		50.8			49.4			65.9			36.7	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	19.0	84.3	11.0	17.9	99.3	0.0	45.6	~142.5	3.9	22.8	42.6	0.0
Queue Length 95th (m)	29.4	103.9	31.9	27.8	#145.6	9.5	#66.4	#226.4	30.5	38.8	66.4	10.8
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	393	921	501	389	932	517	485	509	629	252	429	475
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	0.41	0.70	0.30	0.39	0.89	0.25	0.79	1.07	0.54	0.40	0.49	0.27

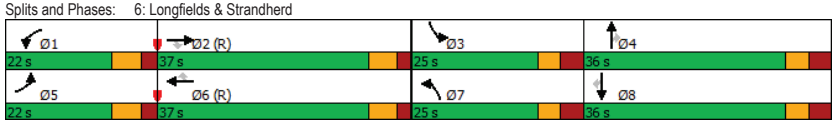
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 53.8	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
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.

Splits and Phases: 6: Longfields & Strandherd



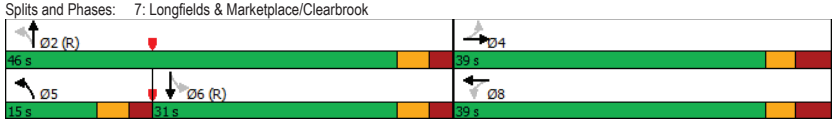
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	40	104	21	43	136	127	1007	19	31	282	55
Future Volume (vph)	95	40	104	21	43	136	127	1007	19	31	282	55
Satd. Flow (prot)	1537	1387	0	0	1439	0	1523	3277	0	1626	3157	0
Flt Permitted	0.573				0.955		0.480			0.279		
Satd. Flow (perm)	917	1387	0	0	1381	0	765	3277	0	471	3157	0
Satd. Flow (RTOR)		104			55			3			27	
Lane Group Flow (vph)	95	144	0	0	200	0	127	1026	0	31	337	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.0	20.0			20.0		52.6	52.4		38.8	38.8	
Actuated g/C Ratio	0.24	0.24			0.24		0.62	0.62		0.46	0.46	
v/c Ratio	0.44	0.35			0.54		0.23	0.51		0.14	0.23	
Control Delay	31.1	9.7			23.8		10.7	12.4		22.2	16.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	31.1	9.7			23.8		10.7	12.4		22.2	16.3	
LOS	C	A			C		B	B		C	B	
Approach Delay		18.2			23.8			12.2			16.8	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	14.4	5.6			22.2		6.2	35.1		2.4	13.2	
Queue Length 95th (m)	22.1	15.6			32.7		21.2	84.5		11.3	31.7	
Internal Link Dist (m)		64.3			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	347	590			557		557	2020		215	1455	
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	0.27	0.24			0.36		0.23	0.51		0.14	0.23	

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	8	44	2	151	3	986	54	104	325	11
Future Volume (vph)	5	5	8	44	2	151	3	986	54	104	325	11
Satd. Flow (prot)	1658	1271	1483	1551	1187	1401	1658	3316	1455	1496	3131	1043
Flt Permitted	0.950			0.950			0.555			0.246		
Satd. Flow (perm)	1649	1271	1483	1551	1187	1377	960	3316	1360	385	3131	1008
Satd. Flow (RTOR)			127			151						129
Lane Group Flow (vph)	5	5	8	44	2	151	3	986	54	104	325	11
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	22.0	35.7	35.7	22.0	35.7	35.7	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (%)	22.0%	35.7%	35.7%	22.0%	35.7%	35.7%	42.3%	42.3%	42.3%	42.3%	42.3%	42.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	5.9	12.7	12.7	8.7	17.0	17.0	65.4	65.4	65.4	65.4	65.4	65.4
Actuated g/C Ratio	0.06	0.13	0.13	0.09	0.17	0.17	0.65	0.65	0.65	0.65	0.65	0.65
v/c Ratio	0.05	0.03	0.03	0.33	0.01	0.42	0.00	0.45	0.06	0.41	0.16	0.02
Control Delay	45.2	35.0	0.1	48.6	28.0	8.6	12.7	12.1	10.8	20.9	9.5	0.0
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	45.2	35.0	0.1	48.6	28.0	8.6	12.7	12.1	10.8	20.9	9.5	0.0
LOS	D	C	A	D	C	A	B	B	B	C	A	A
Approach Delay		22.3			17.7			12.1			11.9	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	1.0	0.9	0.0	8.0	0.4	0.0	0.2	29.3	2.2	5.7	7.5	0.0
Queue Length 95th (m)	4.5	3.7	0.0	18.2	2.0	14.1	2.0	101.6	13.4	#41.3	29.9	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	243	358	509	227	334	496	627	2169	889	251	2048	704
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	0.02	0.01	0.02	0.19	0.01	0.30	0.00	0.45	0.06	0.41	0.16	0.02

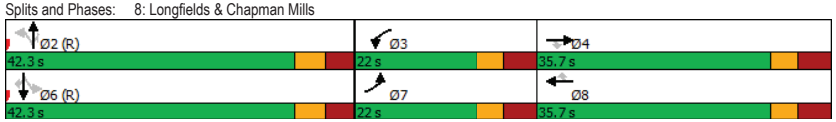
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	150	176	72	60	148
Future Vol, veh/h	20	150	176	72	60	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	150	176	72	60	148

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	248	0	-	0	402	212
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	190	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1318	-	-	-	604	828
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	842	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	594	828
Mov Cap-2 Maneuver	-	-	-	-	594	-
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	842	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1318	-	-	-	744
HCM Lane V/C Ratio	0.015	-	-	-	0.28
HCM Control Delay (s)	7.8	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	1113	194	272	1153	221	136	
Future Volume (vph)	1113	194	272	1153	221	136	
Satd. Flow (prot)	3316	1483	1658	3316	3216	1483	
Flt Permitted			0.081		0.950		
Satd. Flow (perm)	3316	1435	141	3316	3058	1436	
Satd. Flow (RTOR)		178				136	
Lane Group Flow (vph)	1113	194	272	1153	221	136	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	49.0	49.0	15.0	64.0	19.0		37.0
Total Split (%)	40.8%	40.8%	12.5%	53.3%	15.8%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	45.7	45.7	78.5	78.2	11.6	28.7	
Actuated g/C Ratio	0.38	0.38	0.65	0.65	0.10	0.24	
v/c Ratio	0.88	0.30	0.64	0.53	0.71	0.30	
Control Delay	44.0	5.9	28.2	6.0	65.6	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.0	5.9	28.2	6.0	65.6	6.5	
LOS	D	A	C	A	E	A	
Approach Delay	38.3			10.2	43.1		
Approach LOS	D			B	D		
Queue Length 50th (m)	121.6	2.2	15.2	6.1	26.2	0.0	
Queue Length 95th (m)	#176.1	17.8	m#99.5	166.4	39.3	12.0	
Internal Link Dist (m)	83.7			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1263	657	427	2162	326	639	
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	0.88	0.30	0.64	0.53	0.68	0.21	

Intersection Summary

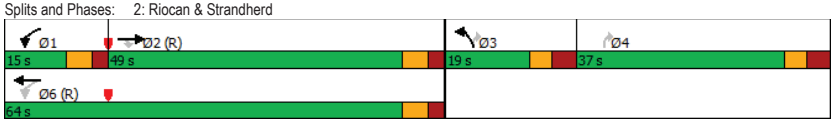
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	17.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	151	82	90	142	102	73	233	78	117	181	77
Future Vol, veh/h	44	151	82	90	142	102	73	233	78	117	181	77
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	6	2	2	2	2	2	2	2
Mvmt Flow	44	151	82	90	142	102	73	233	78	117	181	77
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	16.8	16.6	20.3	16.7
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	75%	0%	65%	0%	58%	0%	70%
Vol Right, %	0%	25%	0%	35%	0%	42%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	311	44	233	90	244	117	258
LT Vol	73	0	44	0	90	0	117	0
Through Vol	0	233	0	151	0	142	0	181
RT Vol	0	78	0	82	0	102	0	77
Lane Flow Rate	73	311	44	233	90	244	117	258
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.163	0.635	0.102	0.494	0.206	0.509	0.263	0.527
Departure Headway (Hd)	8.044	7.349	8.369	7.635	8.252	7.506	8.086	7.357
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	445	491	427	471	434	478	442	488
Service Time	5.815	5.12	6.147	5.412	6.028	5.281	5.862	5.132
HCM Lane V/C Ratio	0.164	0.633	0.103	0.495	0.207	0.51	0.265	0.529
HCM Control Delay	12.4	22.1	12.1	17.7	13.2	17.9	13.7	18.1
HCM Lane LOS	B	C	B	C	B	C	B	C
HCM 95th-tile Q	0.6	4.4	0.3	2.7	0.8	2.8	1	3

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1283	73	0	1402	0	37
Future Vol, veh/h	1283	73	0	1402	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1283	73	0	1402	0	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1320
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	191
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	191
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	28.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	191	-	-	-
HCM Lane V/C Ratio	0.194	-	-	-
HCM Control Delay (s)	28.3	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	314	36	8	394	0	23	0	19	0	0	0
Future Vol, veh/h	0	314	36	8	394	0	23	0	19	0	0	0
Conflicting Peds, #/hr	0	0	2	2	0	0	3	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	13	3	2	2	2	2	2	2	2
Mvmt Flow	0	314	36	8	394	0	23	0	19	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	394	0	0	352	0	0	747	744	335	753	762	397
Stage 1	-	-	-	-	-	-	334	334	-	410	410	-
Stage 2	-	-	-	-	-	-	413	410	-	343	352	-
Critical Hdwy	4.12	-	-	4.23	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.317	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1165	-	-	1148	-	-	329	343	707	326	335	652
Stage 1	-	-	-	-	-	-	680	643	-	619	595	-
Stage 2	-	-	-	-	-	-	616	595	-	672	632	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1165	-	-	1146	-	-	325	339	705	315	331	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	325	339	-	315	331	-
Stage 1	-	-	-	-	-	-	679	642	-	619	590	-
Stage 2	-	-	-	-	-	-	609	590	-	653	631	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.3	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	430	1165	-	-	1146	-	-	-
HCM Lane V/C Ratio	0.098	-	-	-	0.007	-	-	-
HCM Control Delay (s)	14.3	0	-	-	8.2	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	912	194	315	1100	127	119	243	196	116	402	173
Future Volume (vph)	214	912	194	315	1100	127	119	243	196	116	402	173
Satd. Flow (prot)	3154	3316	1483	3216	3316	1483	3185	1745	1483	1658	1745	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3147	3316	1444	3197	3316	1454	3128	1745	1435	1636	1745	1407
Satd. Flow (RTOR)			215			155			212			212
Lane Group Flow (vph)	214	912	194	315	1100	127	119	243	196	116	402	173
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	12.6	42.0	42.0	24.0	53.4	53.4	18.0	36.0	36.0	18.0	36.0	36.0
Total Split (%)	10.5%	35.0%	35.0%	20.0%	44.5%	44.5%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	6.0	37.2	37.2	15.8	47.0	47.0	9.6	29.8	29.8	10.8	31.0	31.0
Actuated g/C Ratio	0.05	0.31	0.31	0.13	0.39	0.39	0.08	0.25	0.25	0.09	0.26	0.26
v/c Ratio	1.36	0.89	0.33	0.74	0.85	0.19	0.47	0.56	0.38	0.78	0.89	0.33
Control Delay	225.3	47.8	14.9	61.2	40.7	2.6	58.7	45.5	6.1	85.8	66.4	3.9
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	225.3	47.8	14.9	61.2	40.7	2.6	58.7	45.5	6.1	85.8	66.4	3.9
LOS	F	D	B	E	D	A	E	D	A	F	E	A
Approach Delay		71.8			41.8			34.5			54.0	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	~32.8	119.6	22.3	36.9	122.5	0.0	14.0	50.5	0.0	27.1	91.7	0.0
Queue Length 95th (m)	m#44.0	m#146.0	m32.3	51.9	151.1	7.5	23.1	76.9	14.8	#55.8	#152.9	9.5
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	157	1026	595	466	1298	663	299	433	515	156	451	520
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	1.36	0.89	0.33	0.68	0.85	0.19	0.40	0.56	0.38	0.74	0.89	0.33

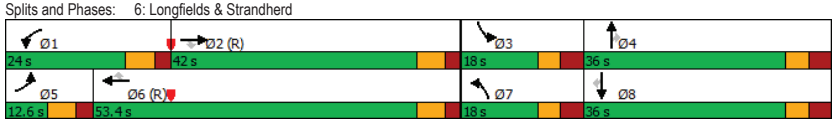
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 52.5	Intersection LOS: D
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Longfields & Strandherd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	84	282	17	63	54	193	397	15	100	634	219
Future Volume (vph)	161	84	282	17	63	54	193	397	15	100	634	219
Satd. Flow (prot)	1642	1522	0	0	1627	0	1610	3294	0	1658	3158	0
Flt Permitted	0.694				0.636		0.218			0.510		
Satd. Flow (perm)	1191	1522	0	0	1041	0	369	3294	0	879	3158	0
Satd. Flow (RTOR)		229			46			6			57	
Lane Group Flow (vph)	161	366	0	0	134	0	193	412	0	100	853	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	18.3	18.3			18.3		54.3	54.1		38.8	38.8	
Actuated g/C Ratio	0.22	0.22			0.22		0.64	0.64		0.46	0.46	
v/c Ratio	0.63	0.72			0.52		0.51	0.20		0.25	0.58	
Control Delay	39.6	19.0			24.5		13.4	8.0		20.2	20.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	39.6	19.0			24.5		13.4	8.0		20.2	20.3	
LOS	D	B			C		B	A		C	C	
Approach Delay		25.3			24.5			9.7			20.3	
Approach LOS		C			C			A			C	
Queue Length 50th (m)	24.6	20.0			12.7		10.6	11.8		9.3	46.6	
Queue Length 95th (m)	34.2	38.4			23.0		30.9	29.0		26.8	#97.5	
Internal Link Dist (m)		60.7			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	451	718			422		384	2098		401	1473	
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	0.36	0.51			0.32		0.50	0.20		0.25	0.58	

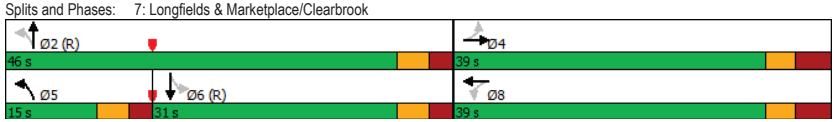
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 76.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



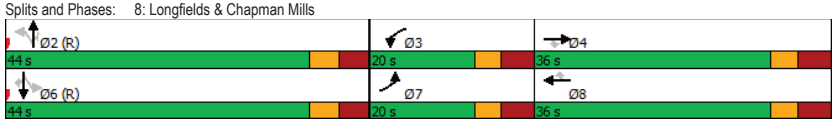
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	85	0	86	0	553	54	179	834	0
Future Volume (vph)	0	0	0	85	0	86	0	553	54	179	834	0
Satd. Flow (prot)	1745	1745	1745	1658	1745	1469	1745	3283	1483	1658	3316	1745
Flt Permitted				0.950						0.445		
Satd. Flow (perm)	1745	1745	1745	1640	1745	1436	1745	3283	1428	772	3316	1745
Satd. Flow (RTOR)						384						
Lane Group Flow (vph)	0	0	0	85	0	86	0	553	54	179	834	0
Turn Type	Prot		Perm	Prot		Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	20.0	36.0	36.0	20.0	36.0	36.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	20.0%	36.0%	36.0%	20.0%	36.0%	36.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)				10.3		18.0		72.1	72.1	72.1	72.1	
Actuated g/C Ratio				0.10		0.18		0.72	0.72	0.72	0.72	
v/c Ratio				0.50		0.15		0.23	0.05	0.32	0.35	
Control Delay				51.9		0.6		9.3	10.8	13.9	10.4	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				51.9		0.6		9.3	10.8	13.9	10.4	
LOS				D		A		A	B	B	B	
Approach Delay					26.1			9.5			11.0	
Approach LOS					C			A			B	
Queue Length 50th (m)				15.8		0.0		14.0	2.3	9.4	23.5	
Queue Length 95th (m)				30.0		0.0		56.9	14.9	52.7	91.2	
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)				40.0		40.0			65.0	65.0		
Base Capacity (vph)				210		724		2368	1030	557	2392	
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				0.40		0.12		0.23	0.05	0.32	0.35	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 73.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	437	363	182	50	134
Future Vol, veh/h	54	437	363	182	50	134
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	437	363	182	50	134

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	545	0	-	0	999	454
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	545	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1024	-	-	-	270	606
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	581	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1024	-	-	-	251	606
Mov Cap-2 Maneuver	-	-	-	-	251	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	581	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1024	-	-	-	438
HCM Lane V/C Ratio	0.053	-	-	-	0.42
HCM Control Delay (s)	8.7	0	-	-	19
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	2

Appendix H

Synchro Intersection Worksheets – 2031 Future Background Conditions

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	885	83	104	1297	66	57	
Future Volume (vph)	885	83	104	1297	66	57	
Satd. Flow (prot)	3221	1427	1610	3252	2878	1327	
Flt Permitted			0.260		0.950		
Satd. Flow (perm)	3221	1380	440	3252	2708	1327	
Satd. Flow (RTOR)		83				57	
Lane Group Flow (vph)	885	83	104	1297	66	57	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	48.0	48.0	18.0	66.0	17.0		37.0
Total Split (%)	40.0%	40.0%	15.0%	55.0%	14.2%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	77.7	77.7	91.7	92.7	8.1	18.0	
Actuated g/C Ratio	0.65	0.65	0.76	0.77	0.07	0.15	
v/c Ratio	0.42	0.09	0.25	0.52	0.34	0.23	
Control Delay	12.8	2.6	1.7	1.5	57.7	13.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.8	2.6	1.7	1.5	57.7	13.0	
LOS	B	A	A	A	E	B	
Approach Delay	12.0			1.6	37.0		
Approach LOS	B			A	D		
Queue Length 50th (m)	55.8	0.0	0.9	6.4	7.7	0.0	
Queue Length 95th (m)	77.6	6.7	m1.3	8.5	14.7	11.3	
Internal Link Dist (m)	78.8			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	2086	923	453	2512	244	477	
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	0.42	0.09	0.23	0.52	0.27	0.12	

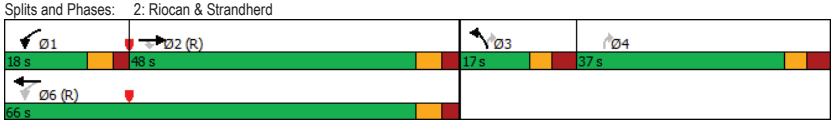
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	54	18	32	73	77	15	67	0	51	82	41
Future Vol, veh/h	29	54	18	32	73	77	15	67	0	51	82	41
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	6	7	7	11	5	2	7	2	4	2	2
Mvmt Flow	29	54	18	32	73	77	15	67	0	51	82	41
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	8.8	9.2	8.9	9.1
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	75%	0%	49%	0%	67%
Vol Right, %	0%	0%	0%	25%	0%	51%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	67	29	72	32	150	51	123
LT Vol	15	0	29	0	32	0	51	0
Through Vol	0	67	0	54	0	73	0	82
RT Vol	0	0	0	18	0	77	0	41
Lane Flow Rate	15	67	29	72	32	150	51	123
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.025	0.103	0.048	0.106	0.052	0.213	0.083	0.175
Departure Headway (Hd)	5.959	5.541	5.902	5.291	5.902	5.107	5.891	5.12
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	599	644	605	675	605	701	606	699
Service Time	3.716	3.298	3.655	3.044	3.651	2.855	3.642	2.87
HCM Lane V/C Ratio	0.025	0.104	0.048	0.107	0.053	0.214	0.084	0.176
HCM Control Delay	8.9	8.9	9	8.7	9	9.2	9.2	9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.2	0.4	0.2	0.8	0.3	0.6

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	937	18	0	1316	0	92
Future Vol, veh/h	937	18	0	1316	0	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	937	18	0	1316	0	92

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	946
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	316
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	316
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	316	-	-	-
HCM Lane V/C Ratio	0.291	-	-	-
HCM Control Delay (s)	21	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.2	-	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	85	23	6	191	0	21	0	22	0	0	0
Future Vol, veh/h	0	85	23	6	191	0	21	0	22	0	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	13	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	11	2	17	7	2	2	2	20	2	2	2
Mvmt Flow	0	85	23	6	191	0	21	0	22	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	191	0	0	109	0	0	314	301	99	312	312	204
Stage 1	-	-	-	-	-	-	98	98	-	203	203	-
Stage 2	-	-	-	-	-	-	216	203	-	109	109	-
Critical Hdwy	4.12	-	-	4.27	-	-	7.12	6.52	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.353	-	-	3.518	4.018	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	1383	-	-	1393	-	-	639	612	910	641	603	837
Stage 1	-	-	-	-	-	-	908	814	-	799	733	-
Stage 2	-	-	-	-	-	-	786	733	-	896	805	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	1392	-	-	629	608	909	622	599	829
Mov Cap-2 Maneuver	-	-	-	-	-	-	629	608	-	622	599	-
Stage 1	-	-	-	-	-	-	907	813	-	799	729	-
Stage 2	-	-	-	-	-	-	774	729	-	874	804	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	10.1	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	747	1383	-	-	1392	-	-	-
HCM Lane V/C Ratio	0.058	-	-	-	0.004	-	-	-
HCM Control Delay (s)	10.1	0	-	-	7.6	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	676	152	168	821	128	385	615	360	100	235	130
Future Volume (vph)	160	676	152	168	821	128	385	615	360	100	235	130
Satd. Flow (prot)	3066	3191	1401	3038	3252	1469	3185	1745	1469	1658	1712	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3036	3191	1355	3001	3252	1421	3137	1745	1384	1627	1712	1444
Satd. Flow (RTOR)			155			155			298			152
Lane Group Flow (vph)	160	676	152	168	821	128	385	615	360	100	235	130
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	22.0	37.0	37.0	22.0	37.0	37.0	25.0	36.0	36.0	25.0	36.0	36.0
Total Split (%)	18.3%	30.8%	30.8%	18.3%	30.8%	30.8%	20.8%	30.0%	30.0%	20.8%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	11.6	34.1	34.1	11.9	34.4	34.4	17.5	35.1	35.1	12.5	30.1	30.1
Actuated g/C Ratio	0.10	0.28	0.28	0.10	0.29	0.29	0.15	0.29	0.29	0.10	0.25	0.25
v/c Ratio	0.54	0.75	0.31	0.56	0.88	0.25	0.83	1.21	0.59	0.58	0.55	0.27
Control Delay	47.3	57.6	23.8	58.3	53.3	4.2	65.4	148.6	12.0	63.8	45.1	5.2
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	47.3	57.6	23.8	58.3	53.3	4.2	65.4	148.6	12.0	63.8	45.1	5.2
LOS	D	E	C	E	D	A	E	F	B	E	D	A
Approach Delay		50.7			48.4			88.9			37.9	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	18.8	88.4	11.1	19.7	97.2	0.0	45.6	~176.3	10.8	22.8	48.8	0.0
Queue Length 95th (m)	28.9	#109.1	33.1	30.1	#142.1	9.5	#66.4	#262.2	43.0	38.8	74.7	10.8
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	393	906	496	389	933	518	485	509	615	252	429	475
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	0.41	0.75	0.31	0.43	0.88	0.25	0.79	1.21	0.59	0.40	0.55	0.27

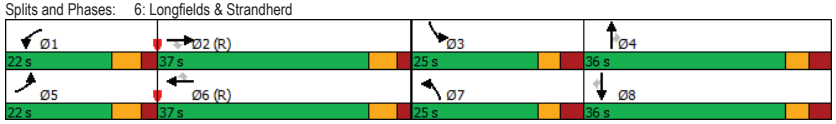
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 61.8	Intersection LOS: E
Intersection Capacity Utilization 91.2%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Longfields & Strandherd



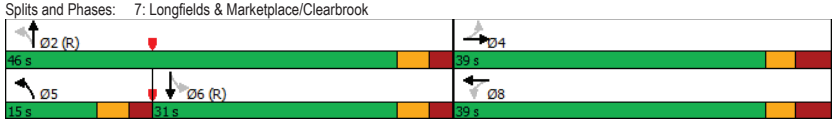
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	40	93	21	43	136	115	1159	19	31	336	55
Future Volume (vph)	94	40	93	21	43	136	115	1159	19	31	336	55
Satd. Flow (prot)	1537	1392	0	0	1439	0	1523	3284	0	1626	3178	0
Flt Permitted	0.577				0.956		0.456			0.240		
Satd. Flow (perm)	923	1392	0	0	1382	0	728	3284	0	407	3178	0
Satd. Flow (RTOR)		93			35			3			22	
Lane Group Flow (vph)	94	133	0	0	200	0	115	1178	0	31	391	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.5	20.5			20.5		52.1	51.9		40.7	40.7	
Actuated g/C Ratio	0.24	0.24			0.24		0.61	0.61		0.48	0.48	
v/c Ratio	0.42	0.33			0.56		0.22	0.59		0.16	0.26	
Control Delay	30.1	9.8			27.1		10.8	13.8		23.2	16.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	30.1	9.8			27.1		10.8	13.8		23.2	16.7	
LOS	C	A			C		B	B		C	B	
Approach Delay		18.2			27.1			13.5			17.2	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	14.0	5.5			25.3		5.8	45.4		2.5	16.5	
Queue Length 95th (m)	21.9	15.1			35.6		19.4	103.3		11.7	37.4	
Internal Link Dist (m)		64.3			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	349	585			545		535	2007		194	1533	
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	0.27	0.23			0.37		0.21	0.59		0.16	0.26	

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 91.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	7	74	44	4	149	328	1103	54	102	352	31
Future Volume (vph)	99	7	74	44	4	149	328	1103	54	102	352	31
Satd. Flow (prot)	1658	1271	1483	1551	1187	1401	1658	3316	1455	1496	3131	1043
Flt Permitted	0.950			0.950			0.541			0.186		
Satd. Flow (perm)	1649	1271	1458	1543	1187	1377	936	3316	1360	292	3131	1008
Satd. Flow (RTOR)			127			140						129
Lane Group Flow (vph)	99	7	74	44	4	149	328	1103	54	102	352	31
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	21.7	36.0	36.0	21.7	36.0	36.0	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (%)	21.7%	36.0%	36.0%	21.7%	36.0%	36.0%	42.3%	42.3%	42.3%	42.3%	42.3%	42.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.0	18.9	18.9	8.3	13.6	13.6	56.1	56.1	56.1	56.1	56.1	56.1
Actuated g/C Ratio	0.11	0.19	0.19	0.08	0.14	0.14	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio	0.54	0.03	0.20	0.34	0.02	0.48	0.62	0.59	0.07	0.63	0.20	0.05
Control Delay	52.8	30.6	2.0	49.7	32.8	12.4	26.4	19.4	15.4	41.8	14.0	0.2
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	52.8	30.6	2.0	49.7	32.8	12.4	26.4	19.4	15.4	41.8	14.0	0.2
LOS	D	C	A	D	C	B	C	B	B	D	B	A
Approach Delay		31.0			21.2			20.8			19.0	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	18.4	1.2	0.0	8.2	0.7	1.6	39.9	68.6	4.4	12.4	16.4	0.0
Queue Length 95th (m)	33.3	4.1	2.2	18.2	3.1	15.4	#117.6	#149.3	15.4	#52.8	37.1	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	238	368	513	223	338	492	525	1860	763	163	1757	622
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	0.42	0.02	0.14	0.20	0.01	0.30	0.62	0.59	0.07	0.63	0.20	0.05

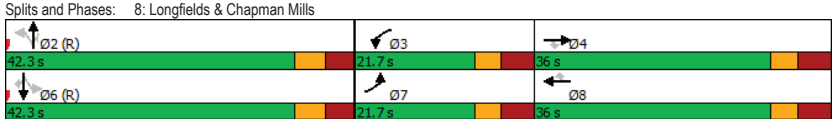
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 80.9%	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.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	138	164	72	60	148
Future Vol, veh/h	20	138	164	72	60	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	138	164	72	60	148

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	378	200
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	178	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1331	-	-	-	624	841
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1331	-	-	-	614	841
Mov Cap-2 Maneuver	-	-	-	-	614	-
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1331	-	-	-	760
HCM Lane V/C Ratio	0.015	-	-	-	0.274
HCM Control Delay (s)	7.7	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	1113	194	272	1134	199	134	
Future Volume (vph)	1113	194	272	1134	199	134	
Satd. Flow (prot)	3316	1483	1658	3316	3216	1483	
Flt Permitted			0.081		0.950		
Satd. Flow (perm)	3316	1435	141	3316	3058	1436	
Satd. Flow (RTOR)		178				134	
Lane Group Flow (vph)	1113	194	272	1134	199	134	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	49.0	49.0	15.0	64.0	19.0		37.0
Total Split (%)	40.8%	40.8%	12.5%	53.3%	15.8%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	45.9	45.9	78.8	78.5	11.4	28.4	
Actuated g/C Ratio	0.38	0.38	0.66	0.65	0.10	0.24	
v/c Ratio	0.88	0.29	0.63	0.52	0.65	0.30	
Control Delay	43.6	5.9	28.0	5.9	62.9	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	43.6	5.9	28.0	5.9	62.9	6.5	
LOS	D	A	C	A	E	A	
Approach Delay	38.0			10.2	40.2		
Approach LOS	D			B	D		
Queue Length 50th (m)	121.6	2.2	14.8	6.1	23.5	0.0	
Queue Length 95th (m)	#176.1	17.8	m#100.8	159.5	35.7	11.8	
Internal Link Dist (m)	83.7			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1268	658	429	2169	326	638	
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	0.88	0.29	0.63	0.52	0.61	0.21	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88
Intersection Signal Delay: 25.4 — Intersection LOS: C
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	142	89	96	128	102	73	247	40	110	165	72
Future Vol, veh/h	44	142	89	96	128	102	73	247	40	110	165	72
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	6	2	2	2	2	2	2	2
Mvmt Flow	44	142	89	96	128	102	73	247	40	110	165	72
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	15.8	15.3	18.1	15.3
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	86%	0%	61%	0%	56%	0%	70%
Vol Right, %	0%	14%	0%	39%	0%	44%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	287	44	231	96	230	110	237
LT Vol	73	0	44	0	96	0	110	0
Through Vol	0	247	0	142	0	128	0	165
RT Vol	0	40	0	89	0	102	0	72
Lane Flow Rate	73	287	44	231	96	230	110	237
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.159	0.578	0.099	0.473	0.214	0.464	0.242	0.473
Departure Headway (Hd)	7.864	7.251	8.127	7.371	8.028	7.265	7.915	7.183
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	456	497	440	487	446	495	453	500
Service Time	5.626	5.013	5.89	5.133	5.791	5.028	5.677	4.945
HCM Lane V/C Ratio	0.16	0.577	0.1	0.474	0.215	0.465	0.243	0.474
HCM Control Delay	12.1	19.6	11.8	16.6	13	16.2	13.2	16.3
HCM Lane LOS	B	C	B	C	B	C	B	C
HCM 95th-tile Q	0.6	3.6	0.3	2.5	0.8	2.4	0.9	2.5

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1281	73	0	1386	0	37
Future Vol, veh/h	1281	73	0	1386	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1281	73	0	1386	0	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1318
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	192
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	192
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	28.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	192	-	-	-
HCM Lane V/C Ratio	0.193	-	-	-
HCM Control Delay (s)	28.2	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	276	36	8	377	0	23	0	18	0	0	0
Future Vol, veh/h	0	276	36	8	377	0	23	0	18	0	0	0
Conflicting Peds, #/hr	0	0	2	2	0	0	3	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	13	3	2	2	2	2	2	2	2
Mvmt Flow	0	276	36	8	377	0	23	0	18	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	377	0	0	314	0	0	692	689	297	697	707	380
Stage 1	-	-	-	-	-	-	296	296	-	393	393	-
Stage 2	-	-	-	-	-	-	396	393	-	304	314	-
Critical Hdwy	4.12	-	-	4.23	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.317	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1181	-	-	1187	-	-	358	369	742	356	360	667
Stage 1	-	-	-	-	-	-	712	668	-	632	606	-
Stage 2	-	-	-	-	-	-	629	606	-	705	656	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1181	-	-	1185	-	-	354	365	740	345	356	665
Mov Cap-2 Maneuver	-	-	-	-	-	-	354	365	-	345	356	-
Stage 1	-	-	-	-	-	-	711	667	-	632	601	-
Stage 2	-	-	-	-	-	-	622	601	-	687	655	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.6	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	459	1181	-	-	1185	-	-	-
HCM Lane V/C Ratio	0.089	-	-	-	0.007	-	-	-
HCM Control Delay (s)	13.6	0	-	-	8.1	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	904	200	351	1080	127	119	272	208	116	451	173
Future Volume (vph)	214	904	200	351	1080	127	119	272	208	116	451	173
Satd. Flow (prot)	3154	3316	1483	3216	3316	1483	3185	1745	1483	1658	1745	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3147	3316	1444	3197	3316	1454	3132	1745	1435	1637	1745	1407
Satd. Flow (RTOR)			215			155			212			212
Lane Group Flow (vph)	214	904	200	351	1080	127	119	272	208	116	451	173
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	12.6	42.0	42.0	24.0	53.4	53.4	18.0	36.0	36.0	18.0	36.0	36.0
Total Split (%)	10.5%	35.0%	35.0%	20.0%	44.5%	44.5%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	6.0	36.6	36.6	16.4	47.0	47.0	9.6	29.8	29.8	10.8	31.0	31.0
Actuated g/C Ratio	0.05	0.30	0.30	0.14	0.39	0.39	0.08	0.25	0.25	0.09	0.26	0.26
v/c Ratio	1.36	0.90	0.34	0.80	0.83	0.19	0.47	0.63	0.40	0.78	1.00	0.33
Control Delay	225.2	48.9	15.6	64.2	39.8	2.6	58.7	47.9	7.1	85.8	87.6	3.9
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	225.2	48.9	15.6	64.2	39.8	2.6	58.7	47.9	7.1	85.8	87.6	3.9
LOS	F	D	B	E	D	A	E	D	A	F	F	A
Approach Delay		72.5			42.2			35.9			67.8	
Approach LOS		E			D			D			E	
Queue Length 50th (m)	~32.9	118.7	23.6	41.4	119.2	0.0	14.0	57.6	0.0	27.1	~107.9	0.0
Queue Length 95th (m)	m#44.2	m#144.4	m34.0	#57.8	147.0	7.5	23.1	86.6	17.6	#55.8	#178.8	9.5
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	157	1010	589	466	1298	663	299	433	515	156	451	520
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	1.36	0.90	0.34	0.75	0.83	0.19	0.40	0.63	0.40	0.74	1.00	0.33

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 55.3	Intersection LOS: E
Intersection Capacity Utilization 90.9%	ICU Level of Service E
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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Longfields & Strandherd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	84	244	17	63	54	176	462	15	100	757	219
Future Volume (vph)	160	84	244	17	63	54	176	462	15	100	757	219
Satd. Flow (prot)	1642	1529	0	0	1627	0	1610	3295	0	1658	3178	0
Flt Permitted	0.694				0.739		0.177			0.479		
Satd. Flow (perm)	1191	1529	0	0	1209	0	300	3295	0	827	3178	0
Satd. Flow (RTOR)		198			46			5			45	
Lane Group Flow (vph)	160	328	0	0	134	0	176	477	0	100	976	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	18.2	18.2			18.2		54.4	54.2		39.6	39.6	
Actuated g/C Ratio	0.21	0.21			0.21		0.64	0.64		0.47	0.47	
v/c Ratio	0.63	0.68			0.45		0.53	0.23		0.26	0.65	
Control Delay	39.6	18.3			22.0		14.3	8.2		20.1	22.0	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	39.6	18.3			22.0		14.3	8.2		20.1	22.0	
LOS	D	B			C		B	A		C	C	
Approach Delay		25.3			22.0			9.9			21.8	
Approach LOS		C			C			A			C	
Queue Length 50th (m)	24.5	18.8			12.6		9.5	14.1		9.1	56.4	
Queue Length 95th (m)	34.0	35.5			22.1		28.2	33.7		27.3	#122.5	
Internal Link Dist (m)		60.7			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	451	702			486		342	2101		384	1503	
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	0.35	0.47			0.28		0.51	0.23		0.26	0.65	

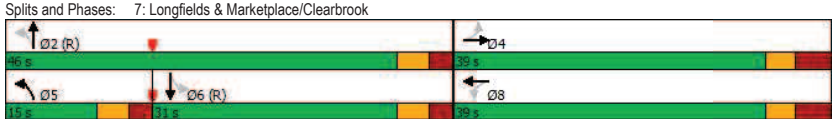
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 19.2	Intersection LOS: B
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.

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	6	367	85	4	82	230	606	54	173	906	45
Future Volume (vph)	12	6	367	85	4	82	230	606	54	173	906	45
Satd. Flow (prot)	1658	1745	1483	1658	1745	1469	1658	3283	1483	1658	3316	1483
Flt Permitted	0.950			0.950			0.220			0.375		
Satd. Flow (perm)	1640	1745	1449	1640	1745	1436	381	3283	1428	651	3316	1398
Satd. Flow (RTOR)			143			127						129
Lane Group Flow (vph)	12	6	367	85	4	82	230	606	54	173	906	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	20.0	36.0	36.0	20.0	36.0	36.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	20.0%	36.0%	36.0%	20.0%	36.0%	36.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	6.3	21.3	21.3	10.0	33.0	33.0	49.2	49.2	49.2	49.2	49.2	49.2
Actuated g/C Ratio	0.06	0.21	0.21	0.10	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.11	0.02	0.87	0.51	0.01	0.15	1.23	0.38	0.08	0.54	0.56	0.06
Control Delay	46.1	27.0	43.3	53.0	19.5	1.9	171.4	19.6	19.0	31.1	22.5	0.2
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	46.1	27.0	43.3	53.0	19.5	1.9	171.4	19.6	19.0	31.1	22.5	0.2
LOS	D	C	D	D	B	A	F	B	B	C	C	A
Approach Delay		43.2			27.7			58.8			22.9	
Approach LOS		D			C			E			C	
Queue Length 50th (m)	2.2	0.9	42.9	15.8	0.5	0.0	~58.4	40.4	5.8	24.3	67.7	0.0
Queue Length 95th (m)	7.7	3.8	72.6	30.0	2.8	3.5	#110.4	63.3	15.0	#62.3	102.3	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	210	497	515	210	635	603	187	1616	703	320	1632	753
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	0.06	0.01	0.71	0.40	0.01	0.14	1.23	0.38	0.08	0.54	0.56	0.06

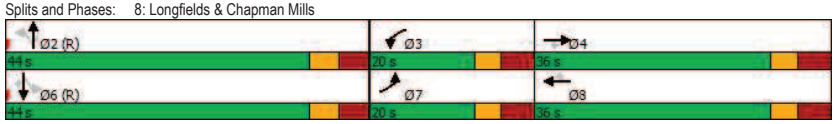
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 38.7	Intersection LOS: D
Intersection Capacity Utilization 77.6%	ICU Level of Service D
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.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	398	346	182	50	134
Future Vol, veh/h	54	398	346	182	50	134
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	398	346	182	50	134

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	528	0	-	0	943	437
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	506	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1039	-	-	-	291	620
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	606	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1039	-	-	-	272	620
Mov Cap-2 Maneuver	-	-	-	-	272	-
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	606	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1039	-	-	-	460
HCM Lane V/C Ratio	0.052	-	-	-	0.4
HCM Control Delay (s)	8.7	0	-	-	17.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.9

Appendix I

Synchro Intersection Worksheets – 2026 Future Total Conditions

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	844	83	104	1307	116	60	
Future Volume (vph)	844	83	104	1307	116	60	
Satd. Flow (prot)	3221	1427	1610	3252	2878	1327	
Flt Permitted			0.269		0.950		
Satd. Flow (perm)	3221	1366	454	3252	2708	1327	
Satd. Flow (RTOR)		83				60	
Lane Group Flow (vph)	844	83	104	1307	116	60	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	48.0	48.0	18.0	66.0	17.0		37.0
Total Split (%)	40.0%	40.0%	15.0%	55.0%	14.2%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	73.8	73.8	88.0	87.7	9.3	21.7	
Actuated g/C Ratio	0.62	0.62	0.73	0.73	0.08	0.18	
v/c Ratio	0.43	0.10	0.25	0.55	0.52	0.21	
Control Delay	13.8	2.7	1.8	1.8	61.6	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.8	2.7	1.8	1.8	61.6	12.0	
LOS	B	A	A	A	E	B	
Approach Delay	12.8			1.8	44.7		
Approach LOS	B			A	D		
Queue Length 50th (m)	55.2	0.0	0.9	6.9	13.6	0.0	
Queue Length 95th (m)	73.1	6.7	m1.4	m8.8	23.2	11.5	
Internal Link Dist (m)	78.8			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1980	872	448	2375	244	529	
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	0.43	0.10	0.23	0.55	0.48	0.11	

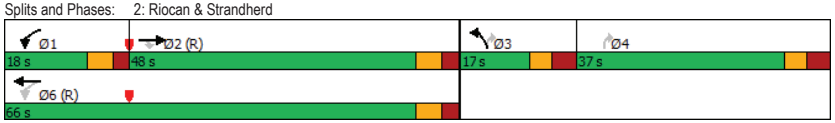
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 53.2%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	57	16	30	81	95	15	91	11	53	91	44
Future Vol, veh/h	29	57	16	30	81	95	15	91	11	53	91	44
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	6	7	7	11	5	2	7	2	4	2	2
Mvmt Flow	29	57	16	30	81	95	15	91	11	53	91	44
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	9	9.7	9.3	9.3
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	89%	0%	78%	0%	46%	0%	67%
Vol Right, %	0%	11%	0%	22%	0%	54%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	102	29	73	30	176	53	135
LT Vol	15	0	29	0	30	0	53	0
Through Vol	0	91	0	57	0	81	0	91
RT Vol	0	11	0	16	0	95	0	44
Lane Flow Rate	15	102	29	73	30	176	53	135
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.025	0.158	0.049	0.111	0.05	0.255	0.088	0.196
Departure Headway (Hd)	6.054	5.56	6.071	5.481	6.041	5.226	6.008	5.24
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	588	641	586	649	590	683	593	680
Service Time	3.828	3.334	3.845	3.254	3.805	2.989	3.776	3.008
HCM Lane V/C Ratio	0.026	0.159	0.049	0.112	0.051	0.258	0.089	0.199
HCM Control Delay	9	9.4	9.2	8.9	9.1	9.8	9.4	9.3
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.6	0.2	0.4	0.2	1	0.3	0.7

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	885	28	0	1326	0	95
Future Vol, veh/h	885	28	0	1326	0	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	885	28	0	1326	0	95

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	899
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	337
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	337
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	337	-	-	-
HCM Lane V/C Ratio	0.282	-	-	-
HCM Control Delay (s)	19.8	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	96	23	6	221	3	21	0	23	10	0	0
Future Vol, veh/h	0	96	23	6	221	3	21	0	23	10	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	15	0	5	5	0	15
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	11	2	17	7	2	2	2	20	2	2	2
Mvmt Flow	0	96	23	6	221	3	21	0	23	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	224	0	0	124	0	0	363	349	118	359	359	238
Stage 1	-	-	-	-	-	-	113	113	-	235	235	-
Stage 2	-	-	-	-	-	-	250	236	-	124	124	-
Critical Hdwy	4.12	-	-	4.27	-	-	7.12	6.52	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.353	-	-	3.518	4.018	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	1345	-	-	1375	-	-	593	575	887	596	568	801
Stage 1	-	-	-	-	-	-	892	802	-	768	710	-
Stage 2	-	-	-	-	-	-	754	710	-	880	793	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1345	-	-	1370	-	-	582	570	880	576	563	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	582	570	-	576	563	-
Stage 1	-	-	-	-	-	-	888	799	-	768	706	-
Stage 2	-	-	-	-	-	-	741	706	-	854	790	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	10.4	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	707	1345	-	-	1370	-	-	576
HCM Lane V/C Ratio	0.062	-	-	-	0.004	-	-	0.017
HCM Control Delay (s)	10.4	0	-	-	7.6	0	-	11.4
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	648	149	161	831	128	385	549	350	100	211	130
Future Volume (vph)	161	648	149	161	831	128	385	549	350	100	211	130
Satd. Flow (prot)	3066	3191	1401	3038	3252	1469	3185	1745	1469	1658	1712	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3026	3191	1313	2935	3252	1412	2816	1745	1384	1624	1712	1327
Satd. Flow (RTOR)			155			155			325			152
Lane Group Flow (vph)	161	648	149	161	831	128	385	549	350	100	211	130
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	22.0	37.0	37.0	22.0	37.0	37.0	25.0	36.0	36.0	25.0	36.0	36.0
Total Split (%)	18.3%	30.8%	30.8%	18.3%	30.8%	30.8%	20.8%	30.0%	30.0%	20.8%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	11.6	34.3	34.3	11.7	34.4	34.4	17.5	35.1	35.1	12.5	30.1	30.1
Actuated g/C Ratio	0.10	0.29	0.29	0.10	0.29	0.29	0.15	0.29	0.29	0.10	0.25	0.25
v/c Ratio	0.54	0.71	0.31	0.55	0.89	0.25	0.83	1.08	0.55	0.58	0.49	0.29
Control Delay	47.0	58.6	23.5	58.3	54.4	4.2	65.4	103.6	8.9	63.8	43.4	5.5
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	47.0	58.6	23.5	58.3	54.4	4.2	65.4	103.6	8.9	63.8	43.4	5.5
LOS	D	E	C	E	D	A	E	F	A	E	D	A
Approach Delay		51.2			49.2			66.4			36.8	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	19.0	84.4	11.4	18.9	98.7	0.0	45.6	~144.0	4.2	22.8	43.1	0.0
Queue Length 95th (m)	29.1	104.2	32.2	29.0	#144.9	9.5	#66.4	#227.9	31.8	38.8	67.1	10.9
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	393	913	486	389	932	515	485	509	634	252	429	446
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	0.41	0.71	0.31	0.41	0.89	0.25	0.79	1.08	0.55	0.40	0.49	0.29

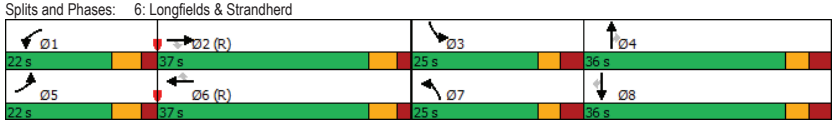
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 54.1	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
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.

Splits and Phases: 6: Longfields & Strandherd



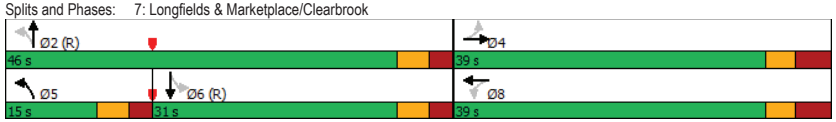
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	40	110	21	43	136	132	1005	19	31	281	66
Future Volume (vph)	111	40	110	21	43	136	132	1005	19	31	281	66
Satd. Flow (prot)	1537	1379	0	0	1435	0	1523	3277	0	1626	3091	0
Flt Permitted	0.574				0.954		0.475			0.280		
Satd. Flow (perm)	915	1379	0	0	1375	0	733	3277	0	472	3091	0
Satd. Flow (RTOR)		110			53			3			34	
Lane Group Flow (vph)	111	150	0	0	200	0	132	1024	0	31	347	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.1	20.1			20.1		52.5	52.3		38.7	38.7	
Actuated g/C Ratio	0.24	0.24			0.24		0.62	0.62		0.46	0.46	
v/c Ratio	0.51	0.37			0.55		0.25	0.51		0.14	0.24	
Control Delay	33.9	9.6			24.2		10.9	12.4		22.2	16.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	33.9	9.6			24.2		10.9	12.4		22.2	16.2	
LOS	C	A			C		B	B		C	B	
Approach Delay		19.9			24.2			12.2			16.7	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	17.1	5.6			22.5		6.5	35.3		2.5	13.5	
Queue Length 95th (m)	25.7	15.8			33.0		22.0	84.2		11.3	32.2	
Internal Link Dist (m)		64.3			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	346	590			553		540	2017		214	1424	
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	0.32	0.25			0.36		0.24	0.51		0.14	0.24	

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	8	44	2	152	3	988	54	106	328	11
Future Volume (vph)	5	5	8	44	2	152	3	988	54	106	328	11
Satd. Flow (prot)	1658	1271	1483	1551	1187	1401	1658	3316	1455	1496	3131	1043
Flt Permitted	0.950			0.950			0.554			0.246		
Satd. Flow (perm)	1653	1271	1483	1551	1187	1380	962	3316	1368	386	3131	1015
Satd. Flow (RTOR)			127			152						129
Lane Group Flow (vph)	5	5	8	44	2	152	3	988	54	106	328	11
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	22.0	35.7	35.7	22.0	35.7	35.7	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (%)	22.0%	35.7%	35.7%	22.0%	35.7%	35.7%	42.3%	42.3%	42.3%	42.3%	42.3%	42.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	5.9	12.7	12.7	8.7	17.0	17.0	65.4	65.4	65.4	65.4	65.4	65.4
Actuated g/C Ratio	0.06	0.13	0.13	0.09	0.17	0.17	0.65	0.65	0.65	0.65	0.65	0.65
v/c Ratio	0.05	0.03	0.03	0.33	0.01	0.42	0.00	0.46	0.06	0.42	0.16	0.02
Control Delay	45.2	35.0	0.1	48.6	28.0	8.5	12.7	12.1	10.8	21.1	9.5	0.0
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	45.2	35.0	0.1	48.6	28.0	8.5	12.7	12.1	10.8	21.1	9.5	0.0
LOS	D	C	A	D	C	A	B	B	B	C	A	A
Approach Delay		22.3			17.6			12.1			12.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	1.0	0.9	0.0	8.0	0.4	0.0	0.2	29.4	2.2	5.8	7.6	0.0
Queue Length 95th (m)	4.5	3.7	0.0	18.2	2.0	14.2	2.0	101.6	13.4	#42.0	30.1	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	243	358	509	227	334	498	629	2169	894	252	2048	708
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	0.02	0.01	0.02	0.19	0.01	0.31	0.00	0.46	0.06	0.42	0.16	0.02

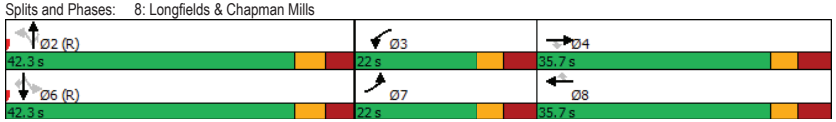
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 66.5%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	150	176	87	80	169
Future Vol, veh/h	30	150	176	87	80	169
Conflicting Peds, #/hr	60	0	0	60	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	150	176	87	80	169

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	323	0	-	0	490	280
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	210	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1237	-	-	-	537	759
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1179	-	-	-	474	724
Mov Cap-2 Maneuver	-	-	-	-	474	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	786	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.7
HCM LOS			B

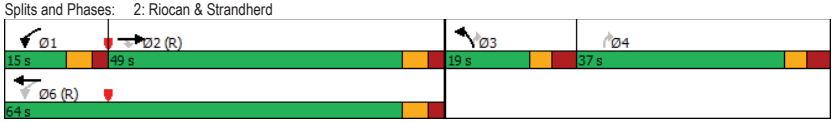
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1179	-	-	-	619
HCM Lane V/C Ratio	0.025	-	-	-	0.402
HCM Control Delay (s)	8.1	0	-	-	14.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	1128	194	272	1141	244	136	
Future Volume (vph)	1128	194	272	1141	244	136	
Satd. Flow (prot)	3316	1483	1658	3316	3216	1483	
Flt Permitted			0.077		0.950		
Satd. Flow (perm)	3316	1420	134	3316	3058	1436	
Satd. Flow (RTOR)		175				136	
Lane Group Flow (vph)	1128	194	272	1141	244	136	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	49.0	49.0	15.0	64.0	19.0		37.0
Total Split (%)	40.8%	40.8%	12.5%	53.3%	15.8%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	45.7	45.7	78.3	78.0	11.9	28.9	
Actuated g/C Ratio	0.38	0.38	0.65	0.65	0.10	0.24	
v/c Ratio	0.89	0.30	0.65	0.53	0.77	0.30	
Control Delay	45.2	6.2	28.9	5.9	69.2	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.2	6.2	28.9	5.9	69.2	6.5	
LOS	D	A	C	A	E	A	
Approach Delay	39.5			10.4	46.8		
Approach LOS	D			B	D		
Queue Length 50th (m)	124.0	2.7	15.7	6.1	29.2	0.0	
Queue Length 95th (m)	#180.0	18.4	m#101.6	162.8	#46.3	12.0	
Internal Link Dist (m)	83.7			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1261	648	421	2155	326	654	
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	0.89	0.30	0.65	0.53	0.75	0.21	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89
Intersection Signal Delay: 27.2 Intersection LOS: C
Intersection Capacity Utilization 72.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	151	82	90	142	125	73	233	78	117	181	77
Future Vol, veh/h	44	151	82	90	142	125	73	233	78	117	181	77
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	6	2	2	2	2	2	2	2
Mvmt Flow	44	151	82	90	142	125	73	233	78	117	181	77
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.2	17.8	20.8	17.1
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	75%	0%	65%	0%	53%	0%	70%
Vol Right, %	0%	25%	0%	35%	0%	47%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	311	44	233	90	267	117	258
LT Vol	73	0	44	0	90	0	117	0
Through Vol	0	233	0	151	0	142	0	181
RT Vol	0	78	0	82	0	125	0	77
Lane Flow Rate	73	311	44	233	90	267	117	258
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.165	0.643	0.103	0.5	0.207	0.557	0.266	0.535
Departure Headway (Hd)	8.142	7.447	8.457	7.722	8.288	7.505	8.189	7.459
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	439	482	422	464	432	478	438	482
Service Time	5.922	5.226	6.242	5.506	6.068	5.284	5.97	5.24
HCM Lane V/C Ratio	0.166	0.645	0.104	0.502	0.208	0.559	0.267	0.535
HCM Control Delay	12.5	22.8	12.2	18.1	13.2	19.4	13.9	18.6
HCM Lane LOS	B	C	B	C	B	C	B	C
HCM 95th-tile Q	0.6	4.5	0.3	2.7	0.8	3.3	1.1	3.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1277	94	0	1390	0	39
Future Vol, veh/h	1277	94	0	1390	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1277	94	0	1390	0	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1324
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	190
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	190
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	28.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	190	-	-	-
HCM Lane V/C Ratio	0.205	-	-	-
HCM Control Delay (s)	28.8	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	314	36	8	417	2	23	0	19	21	0	0
Future Vol, veh/h	0	314	36	8	417	2	23	0	19	21	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	13	3	2	2	2	2	2	2	2
Mvmt Flow	0	314	36	8	417	2	23	0	19	21	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	419	0	0	355	0	0	776	772	342	781	789	423
Stage 1	-	-	-	-	-	-	337	337	-	434	434	-
Stage 2	-	-	-	-	-	-	439	435	-	347	355	-
Critical Hdwy	4.12	-	-	4.23	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.317	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1140	-	-	1145	-	-	315	330	701	312	323	631
Stage 1	-	-	-	-	-	-	677	641	-	600	581	-
Stage 2	-	-	-	-	-	-	597	580	-	669	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1140	-	-	1141	-	-	310	326	696	300	319	629
Mov Cap-2 Maneuver	-	-	-	-	-	-	310	326	-	300	319	-
Stage 1	-	-	-	-	-	-	674	638	-	600	576	-
Stage 2	-	-	-	-	-	-	589	575	-	648	627	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.7	17.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	414	1140	-	-	1141	-	-	300
HCM Lane V/C Ratio	0.101	-	-	-	0.007	-	-	0.07
HCM Control Delay (s)	14.7	0	-	-	8.2	0	-	17.9
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	908	194	337	1088	127	119	245	207	116	405	173
Future Volume (vph)	214	908	194	337	1088	127	119	245	207	116	405	173
Satd. Flow (prot)	3154	3316	1483	3216	3316	1483	3185	1745	1483	1658	1745	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3140	3316	1399	3150	3316	1445	3110	1745	1435	1636	1745	1398
Satd. Flow (RTOR)			215			155			212			212
Lane Group Flow (vph)	214	908	194	337	1088	127	119	245	207	116	405	173
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	12.6	42.0	42.0	24.0	53.4	53.4	18.0	36.0	36.0	18.0	36.0	36.0
Total Split (%)	10.5%	35.0%	35.0%	20.0%	44.5%	44.5%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	6.0	36.8	36.8	16.2	47.0	47.0	9.6	29.8	29.8	10.8	31.0	31.0
Actuated g/C Ratio	0.05	0.31	0.31	0.14	0.39	0.39	0.08	0.25	0.25	0.09	0.26	0.26
v/c Ratio	1.36	0.89	0.34	0.78	0.84	0.19	0.47	0.57	0.40	0.78	0.90	0.33
Control Delay	225.3	48.2	15.1	63.0	40.1	2.6	58.7	45.6	7.0	85.8	67.3	3.9
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	225.3	48.2	15.1	63.0	40.1	2.6	58.7	45.6	7.0	85.8	67.3	3.9
LOS	F	D	B	E	D	A	E	D	A	F	E	A
Approach Delay		72.1			42.0			34.4			54.6	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	~33.1	119.2	22.4	39.5	120.5	0.0	14.0	51.0	0.0	27.1	92.7	0.0
Queue Length 95th (m)	m#43.1	m#141.5	m31.8	55.2	148.7	7.5	23.1	77.5	17.4	#55.8	#153.8	9.5
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	157	1016	578	466	1298	660	299	433	515	156	451	518
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	1.36	0.89	0.34	0.72	0.84	0.19	0.40	0.57	0.40	0.74	0.90	0.33

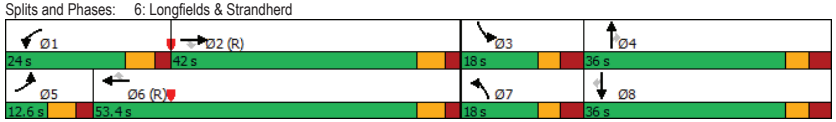
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 52.6	Intersection LOS: D
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Longfields & Strandherd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	178	84	290	17	63	54	201	394	15	100	630	248
Future Volume (vph)	178	84	290	17	63	54	201	394	15	100	630	248
Satd. Flow (prot)	1642	1522	0	0	1624	0	1610	3291	0	1658	3090	0
Flt Permitted	0.697				0.654		0.203			0.512		
Satd. Flow (perm)	1193	1522	0	0	1068	0	344	3291	0	883	3090	0
Satd. Flow (RTOR)		235			46			6			70	
Lane Group Flow (vph)	178	374	0	0	134	0	201	409	0	100	878	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	19.0	19.0			19.0		53.6	53.4		37.7	37.7	
Actuated g/C Ratio	0.22	0.22			0.22		0.63	0.63		0.44	0.44	
v/c Ratio	0.67	0.72			0.49		0.55	0.20		0.26	0.62	
Control Delay	40.9	18.2			23.0		15.1	8.3		21.0	21.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	40.9	18.2			23.0		15.1	8.3		21.0	21.7	
LOS	D	B			C		B	A		C	C	
Approach Delay		25.5			23.0			10.6			21.7	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	27.1	20.0			12.4		11.7	12.4		9.7	50.4	
Queue Length 95th (m)	37.9	39.0			22.8		#33.8	28.8		26.8	#102.6	
Internal Link Dist (m)		60.7			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	451	722			433		373	2068		391	1408	
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	0.39	0.52			0.31		0.54	0.20		0.26	0.62	

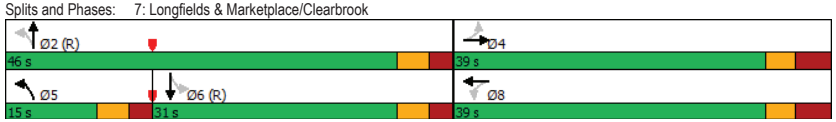
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.7	Intersection LOS: B
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.

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



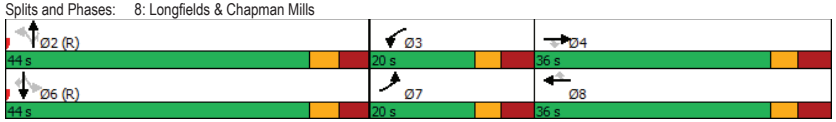
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	85	0	88	0	556	54	180	836	0
Future Volume (vph)	0	0	0	85	0	88	0	556	54	180	836	0
Satd. Flow (prot)	1745	1745	1745	1658	1745	1469	1745	3283	1483	1658	3316	1745
Flt Permitted				0.950						0.444		
Satd. Flow (perm)	1745	1745	1745	1640	1745	1436	1745	3283	1428	770	3316	1745
Satd. Flow (RTOR)						383						
Lane Group Flow (vph)	0	0	0	85	0	88	0	556	54	180	836	0
Turn Type	Prot		Perm	Prot		Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	20.0	36.0	36.0	20.0	36.0	36.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	20.0%	36.0%	36.0%	20.0%	36.0%	36.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)				10.3		18.0		72.1	72.1	72.1	72.1	
Actuated g/C Ratio				0.10		0.18		0.72	0.72	0.72	0.72	
v/c Ratio				0.50		0.15		0.23	0.05	0.32	0.35	
Control Delay				51.9		0.6		9.3	10.8	14.0	10.4	
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay				51.9		0.6		9.3	10.8	14.0	10.4	
LOS				D		A		A	B	B	B	
Approach Delay					25.8			9.5			11.0	
Approach LOS					C			A			B	
Queue Length 50th (m)				15.8		0.0		14.1	2.3	9.5	23.6	
Queue Length 95th (m)				30.0		0.0		57.2	14.9	53.1	91.5	
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)				40.0		40.0			65.0	65.0		
Base Capacity (vph)				210		724		2368	1030	555	2392	
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				0.40		0.12		0.23	0.05	0.32	0.35	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 73.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	437	363	219	74	159
Future Vol, veh/h	75	437	363	219	74	159
Conflicting Peds, #/hr	55	0	0	55	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	437	363	219	74	159

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	637	0	-	0	1115	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	947	-	-	-	230	550
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	907	-	-	-	188	527
Mov Cap-2 Maneuver	-	-	-	-	188	-
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	532	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	37
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	907	-	-	-	335
HCM Lane V/C Ratio	0.083	-	-	-	0.696
HCM Control Delay (s)	9.3	0	-	-	37
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.3	-	-	-	4.9

Appendix J

Synchro Intersection Worksheets – 2031 Future Total Conditions

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	911	83	104	1304	84	57	
Future Volume (vph)	911	83	104	1304	84	57	
Satd. Flow (prot)	3221	1427	1610	3252	2878	1327	
Flt Permitted			0.247		0.950		
Satd. Flow (perm)	3221	1366	417	3252	2708	1327	
Satd. Flow (RTOR)		83				57	
Lane Group Flow (vph)	911	83	104	1304	84	57	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	48.0	48.0	18.0	66.0	17.0		37.0
Total Split (%)	40.0%	40.0%	15.0%	55.0%	14.2%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	74.5	74.5	88.7	88.4	8.6	21.0	
Actuated g/C Ratio	0.62	0.62	0.74	0.74	0.07	0.18	
v/c Ratio	0.46	0.09	0.27	0.54	0.41	0.20	
Control Delay	14.0	2.7	1.9	1.7	58.8	12.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.0	2.7	1.9	1.7	58.8	12.4	
LOS	B	A	A	A	E	B	
Approach Delay	13.0			1.7	40.1		
Approach LOS	B			A	D		
Queue Length 50th (m)	59.3	0.0	0.9	6.6	9.8	0.0	
Queue Length 95th (m)	81.3	6.8	m1.4	8.9	17.8	11.3	
Internal Link Dist (m)	78.8			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1999	879	427	2395	244	498	
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	0.46	0.09	0.24	0.54	0.34	0.11	

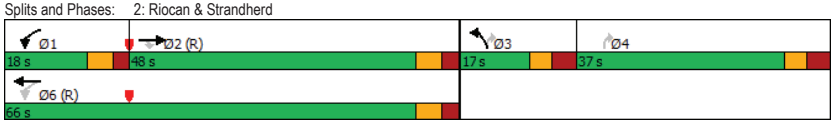
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 53.1%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	54	18	32	73	95	15	67	0	51	82	41
Future Vol, veh/h	29	54	18	32	73	95	15	67	0	51	82	41
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	6	7	7	11	5	2	7	2	4	2	2
Mvmt Flow	29	54	18	32	73	95	15	67	0	51	82	41
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	8.8	9.3	9	9.1
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	75%	0%	43%	0%	67%
Vol Right, %	0%	0%	0%	25%	0%	57%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	67	29	72	32	168	51	123
LT Vol	15	0	29	0	32	0	51	0
Through Vol	0	67	0	54	0	73	0	82
RT Vol	0	0	0	18	0	95	0	41
Lane Flow Rate	15	67	29	72	32	168	51	123
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.025	0.104	0.048	0.106	0.053	0.237	0.084	0.176
Departure Headway (Hd)	6.004	5.586	5.925	5.314	5.908	5.075	5.933	5.161
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	639	602	672	605	706	602	692
Service Time	3.766	3.348	3.681	3.07	3.656	2.823	3.689	2.917
HCM Lane V/C Ratio	0.025	0.105	0.048	0.107	0.053	0.238	0.085	0.178
HCM Control Delay	8.9	9	9	8.7	9	9.4	9.2	9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.2	0.4	0.2	0.9	0.3	0.6

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	953	28	0	1323	0	95
Future Vol, veh/h	953	28	0	1323	0	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	953	28	0	1323	0	95

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	967
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	307
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	307
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	307	-	-	-
HCM Lane V/C Ratio	0.309	-	-	-
HCM Control Delay (s)	21.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.3	-	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	85	23	6	209	3	21	0	22	10	0	0
Future Vol, veh/h	0	85	23	6	209	3	21	0	22	10	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	15	0	5	5	0	15
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	11	2	17	7	2	2	2	20	2	2	2
Mvmt Flow	0	85	23	6	209	3	21	0	22	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	212	0	0	113	0	0	340	326	107	336	336	226
Stage 1	-	-	-	-	-	-	102	102	-	223	223	-
Stage 2	-	-	-	-	-	-	238	224	-	113	113	-
Critical Hdwy	4.12	-	-	4.27	-	-	7.12	6.52	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.353	-	-	3.518	4.018	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	1358	-	-	1388	-	-	614	592	900	618	585	813
Stage 1	-	-	-	-	-	-	904	811	-	780	719	-
Stage 2	-	-	-	-	-	-	765	718	-	892	802	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1358	-	-	1383	-	-	602	587	893	598	580	804
Mov Cap-2 Maneuver	-	-	-	-	-	-	602	587	-	598	580	-
Stage 1	-	-	-	-	-	-	900	808	-	780	715	-
Stage 2	-	-	-	-	-	-	752	714	-	867	799	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	10.3	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	722	1358	-	-	1383	-	-	598
HCM Lane V/C Ratio	0.06	-	-	-	0.004	-	-	0.017
HCM Control Delay (s)	10.3	0	-	-	7.6	0	-	11.1
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	695	152	176	828	128	385	618	369	100	237	130
Future Volume (vph)	160	695	152	176	828	128	385	618	369	100	237	130
Satd. Flow (prot)	3066	3191	1401	3038	3252	1469	3185	1745	1469	1658	1712	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3026	3191	1313	2942	3252	1412	2829	1745	1384	1627	1712	1327
Satd. Flow (RTOR)			155			155			304			152
Lane Group Flow (vph)	160	695	152	176	828	128	385	618	369	100	237	130
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	22.0	37.0	37.0	22.0	37.0	37.0	25.0	36.0	36.0	25.0	36.0	36.0
Total Split (%)	18.3%	30.8%	30.8%	18.3%	30.8%	30.8%	20.8%	30.0%	30.0%	20.8%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	11.6	33.8	33.8	12.2	34.4	34.4	17.5	35.1	35.1	12.5	30.1	30.1
Actuated g/C Ratio	0.10	0.28	0.28	0.10	0.29	0.29	0.15	0.29	0.29	0.10	0.25	0.25
v/c Ratio	0.54	0.77	0.32	0.57	0.89	0.25	0.83	1.21	0.60	0.58	0.55	0.29
Control Delay	46.5	61.0	24.0	58.6	54.0	4.2	65.4	150.8	12.3	63.8	45.2	5.5
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	46.5	61.0	24.0	58.6	54.0	4.2	65.4	150.8	12.3	63.8	45.2	5.5
LOS	D	E	C	E	D	A	E	F	B	E	D	A
Approach Delay		53.1			49.1			89.6			38.1	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	18.7	91.0	11.7	20.7	98.3	0.0	45.6	~177.8	11.4	22.8	49.2	0.0
Queue Length 95th (m)	29.0	#114.7	33.3	31.2	#143.8	9.5	#66.4	#264.2	44.5	38.8	75.3	10.9
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	393	899	481	389	933	515	485	509	619	252	429	446
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	0.41	0.77	0.32	0.45	0.89	0.25	0.79	1.21	0.60	0.40	0.55	0.29

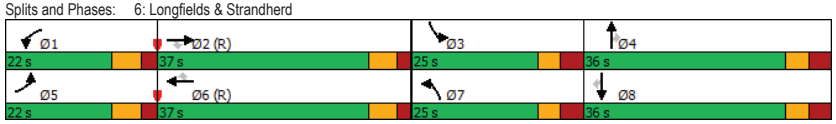
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 62.8	Intersection LOS: E
Intersection Capacity Utilization 91.6%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Longfields & Strandherd



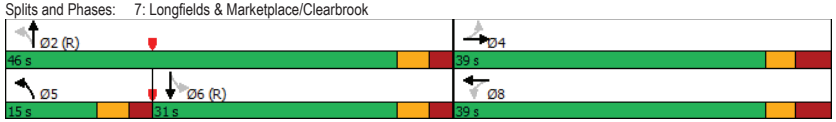
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	40	99	21	43	136	120	1157	19	31	335	66
Future Volume (vph)	110	40	99	21	43	136	120	1157	19	31	335	66
Satd. Flow (prot)	1537	1385	0	0	1435	0	1523	3284	0	1626	3121	0
Flt Permitted	0.577				0.956		0.449			0.240		
Satd. Flow (perm)	920	1385	0	0	1378	0	695	3284	0	406	3121	0
Satd. Flow (RTOR)		99			34			3			27	
Lane Group Flow (vph)	110	139	0	0	200	0	120	1176	0	31	401	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.5	20.5			20.5		52.1	51.9		40.6	40.6	
Actuated g/C Ratio	0.24	0.24			0.24		0.61	0.61		0.48	0.48	
v/c Ratio	0.50	0.34			0.56		0.24	0.59		0.16	0.27	
Control Delay	32.7	9.6			27.3		10.9	13.8		23.2	16.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	32.7	9.6			27.3		10.9	13.8		23.2	16.7	
LOS	C	A			C		B	B		C	B	
Approach Delay		19.8			27.3			13.5			17.1	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	16.7	5.5			25.4		6.1	45.5		2.6	16.9	
Queue Length 95th (m)	25.4	15.5			35.8		20.1	103.2		11.7	38.0	
Internal Link Dist (m)		64.3			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	348	586			543		518	2005		193	1504	
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	0.32	0.24			0.37		0.23	0.59		0.16	0.27	

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 16.2	Intersection LOS: B
Intersection Capacity Utilization 95.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	7	74	44	4	150	328	1105	54	104	355	31
Future Volume (vph)	99	7	74	44	4	150	328	1105	54	104	355	31
Satd. Flow (prot)	1658	1271	1483	1551	1187	1401	1658	3316	1455	1496	3131	1043
Flt Permitted	0.950			0.950			0.539			0.185		
Satd. Flow (perm)	1640	1271	1483	1551	1187	1369	932	3316	1360	290	3131	1008
Satd. Flow (RTOR)			127			144						129
Lane Group Flow (vph)	99	7	74	44	4	150	328	1105	54	104	355	31
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	22.0	35.7	35.7	22.0	35.7	35.7	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (%)	22.0%	35.7%	35.7%	22.0%	35.7%	35.7%	42.3%	42.3%	42.3%	42.3%	42.3%	42.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.0	18.9	18.9	8.3	13.6	13.6	56.1	56.1	56.1	56.1	56.1	56.1
Actuated g/C Ratio	0.11	0.19	0.19	0.08	0.14	0.14	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio	0.54	0.03	0.19	0.34	0.02	0.48	0.63	0.59	0.07	0.64	0.20	0.05
Control Delay	52.5	30.4	2.0	49.7	32.8	11.9	26.6	19.6	15.5	43.2	14.1	0.2
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	52.5	30.4	2.0	49.7	32.8	11.9	26.6	19.6	15.5	43.2	14.1	0.2
LOS	D	C	A	D	C	B	C	B	B	D	B	A
Approach Delay		30.9			20.7			21.0			19.4	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	18.4	1.2	0.0	8.2	0.7	1.1	40.0	68.9	4.4	12.8	16.6	0.0
Queue Length 95th (m)	33.2	4.1	2.2	18.2	3.1	15.1	#118.4	#150.7	15.5	#54.3	37.6	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	243	366	517	227	334	489	522	1858	762	162	1755	621
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	0.41	0.02	0.14	0.19	0.01	0.31	0.63	0.59	0.07	0.64	0.20	0.05

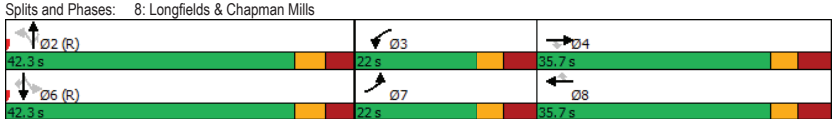
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	138	164	87	80	169
Future Vol, veh/h	30	138	164	87	80	169
Conflicting Peds, #/hr	60	0	0	60	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	138	164	87	80	169

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	311	0	-	0	466	268
Stage 1	-	-	-	-	268	-
Stage 2	-	-	-	-	198	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1249	-	-	-	555	771
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1191	-	-	-	491	735
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1191	-	-	-	634
HCM Lane V/C Ratio	0.025	-	-	-	0.393
HCM Control Delay (s)	8.1	0	-	-	14.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

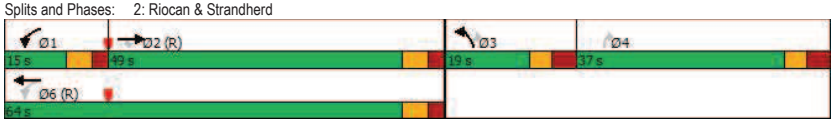
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	1143	194	272	1140	222	134	
Future Volume (vph)	1143	194	272	1140	222	134	
Satd. Flow (prot)	3316	1483	1658	3316	3216	1483	
Flt Permitted			0.077		0.950		
Satd. Flow (perm)	3316	1420	134	3316	3058	1436	
Satd. Flow (RTOR)		173				134	
Lane Group Flow (vph)	1143	194	272	1140	222	134	
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm	
Protected Phases	2		1	6	3		4
Permitted Phases		2	6			3 4	
Detector Phase	2	2	1	6	3	3 4	
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0		5.0
Minimum Split (s)	36.3	36.3	11.0	35.3	11.8		35.8
Total Split (s)	49.0	49.0	15.0	64.0	19.0		37.0
Total Split (%)	40.8%	40.8%	12.5%	53.3%	15.8%		31%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3		3.3
All-Red Time (s)	2.6	2.6	2.3	2.6	3.5		3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.3	6.3	6.0	6.3	6.8		
Lead/Lag	Lag	Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes
Recall Mode	C-Max	C-Max	None	C-Max	None		None
Act Effct Green (s)	45.7	45.7	78.5	78.2	11.7	28.7	
Actuated g/C Ratio	0.38	0.38	0.65	0.65	0.10	0.24	
v/c Ratio	0.91	0.30	0.64	0.53	0.71	0.30	
Control Delay	46.3	6.4	28.8	5.9	65.7	6.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.3	6.4	28.8	5.9	65.7	6.4	
LOS	D	A	C	A	E	A	
Approach Delay	40.5			10.3	43.4		
Approach LOS	D			B	D		
Queue Length 50th (m)	126.6	3.0	15.8	6.1	26.4	0.0	
Queue Length 95th (m)	#183.8	18.8	m#101.4	162.2	39.3	11.8	
Internal Link Dist (m)	83.7			195.3	182.9		
Turn Bay Length (m)		80.0	150.0		40.0		
Base Capacity (vph)	1262	647	424	2161	326	638	
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	0.91	0.30	0.64	0.53	0.68	0.21	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91
Intersection Signal Delay: 27.1 — Intersection LOS: C
Intersection Capacity Utilization 71.9% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Riocan & Strandherd



Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	142	89	96	128	125	73	247	40	110	165	72
Future Vol, veh/h	44	142	89	96	128	125	73	247	40	110	165	72
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	6	2	2	2	2	2	2	2
Mvmt Flow	44	142	89	96	128	125	73	247	40	110	165	72
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	16.1	16.2	18.4	15.6
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	86%	0%	61%	0%	51%	0%	70%
Vol Right, %	0%	14%	0%	39%	0%	49%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	287	44	231	96	253	110	237
LT Vol	73	0	44	0	96	0	110	0
Through Vol	0	247	0	142	0	128	0	165
RT Vol	0	40	0	89	0	125	0	72
Lane Flow Rate	73	287	44	231	96	253	110	237
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.161	0.585	0.1	0.478	0.215	0.51	0.245	0.479
Departure Headway (Hd)	7.957	7.344	8.206	7.449	8.059	7.26	8.01	7.278
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	450	491	436	483	444	496	448	493
Service Time	5.724	5.11	5.975	5.218	5.825	5.025	5.778	5.045
HCM Lane V/C Ratio	0.162	0.585	0.101	0.478	0.216	0.51	0.246	0.481
HCM Control Delay	12.3	20	11.9	16.9	13	17.4	13.4	16.6
HCM Lane LOS	B	C	B	C	B	C	B	C
HCM 95th-tile Q	0.6	3.7	0.3	2.5	0.8	2.9	1	2.6

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1290	94	0	1392	0	39
Future Vol, veh/h	1290	94	0	1392	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1290	94	0	1392	0	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1337
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	187
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	187
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	29.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	187	-	-	-
HCM Lane V/C Ratio	0.209	-	-	-
HCM Control Delay (s)	29.3	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.8	-	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	276	36	8	400	2	23	0	18	21	0	0
Future Vol, veh/h	0	276	36	8	400	2	23	0	18	21	0	0
Conflicting Peds, #/hr	0	0	5	5	0	0	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	13	3	2	2	2	2	2	2	2
Mvmt Flow	0	276	36	8	400	2	23	0	18	21	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	317	0	0	721	717	304	725	734	406
Stage 1	-	-	-	-	-	-	299	299	-	417	417	-
Stage 2	-	-	-	-	-	-	422	418	-	308	317	-
Critical Hdwy	4.12	-	-	4.23	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.317	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	1183	-	-	343	355	736	340	347	645
Stage 1	-	-	-	-	-	-	710	666	-	613	591	-
Stage 2	-	-	-	-	-	-	609	591	-	702	654	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1157	-	-	1178	-	-	338	350	730	328	342	642
Mov Cap-2 Maneuver	-	-	-	-	-	-	338	350	-	328	342	-
Stage 1	-	-	-	-	-	-	707	663	-	613	586	-
Stage 2	-	-	-	-	-	-	601	586	-	682	651	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14	16.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	442	1157	-	-	1178	-	-	328
HCM Lane V/C Ratio	0.093	-	-	-	0.007	-	-	0.064
HCM Control Delay (s)	14	0	-	-	8.1	0	-	16.7
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	915	200	373	1086	127	119	274	219	116	454	173
Future Volume (vph)	214	915	200	373	1086	127	119	274	219	116	454	173
Satd. Flow (prot)	3154	3316	1483	3216	3316	1483	3185	1745	1483	1658	1745	1455
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3140	3316	1399	3151	3316	1445	3115	1745	1435	1637	1745	1398
Satd. Flow (RTOR)			215			155			219			212
Lane Group Flow (vph)	214	915	200	373	1086	127	119	274	219	116	454	173
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	35.4	35.4	11.6	35.4	35.4	11.7	35.7	35.7	11.7	35.7	35.7
Total Split (s)	12.6	42.0	42.0	24.0	53.4	53.4	18.0	36.0	36.0	18.0	36.0	36.0
Total Split (%)	10.5%	35.0%	35.0%	20.0%	44.5%	44.5%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.4	2.2	2.2	2.4	2.2	2.2	3.4	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)	6.6	6.4	6.4	6.6	6.4	6.4	6.7	6.7	6.7	6.7	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	6.0	36.2	36.2	16.8	47.0	47.0	9.6	29.8	29.8	10.8	31.0	31.0
Actuated g/C Ratio	0.05	0.30	0.30	0.14	0.39	0.39	0.08	0.25	0.25	0.09	0.26	0.26
v/c Ratio	1.36	0.92	0.35	0.83	0.84	0.19	0.47	0.63	0.42	0.78	1.01	0.33
Control Delay	225.0	50.3	15.6	66.3	40.0	2.6	58.7	48.1	7.4	85.8	89.1	3.9
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	225.0	50.3	15.6	66.3	40.0	2.6	58.7	48.1	7.4	85.8	89.1	3.9
LOS	F	D	B	E	D	A	E	D	A	F	F	A
Approach Delay		73.2			43.2			35.6			68.7	
Approach LOS		E			D			D			E	
Queue Length 50th (m)	~32.8	120.2	23.9	44.3	120.2	0.0	14.0	58.1	0.0	27.1	~109.8	0.0
Queue Length 95th (m)	m#42.4	m#140.7	m33.0	#65.3	148.3	7.5	23.1	87.2	18.9	#55.8	#180.3	9.5
Internal Link Dist (m)		187.7			421.8			202.6			113.0	
Turn Bay Length (m)	90.0		55.0	80.0		195.0	50.0		90.0	50.0		50.0
Base Capacity (vph)	157	999	572	466	1298	660	299	433	520	156	451	518
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	1.36	0.92	0.35	0.80	0.84	0.19	0.40	0.63	0.42	0.74	1.01	0.33

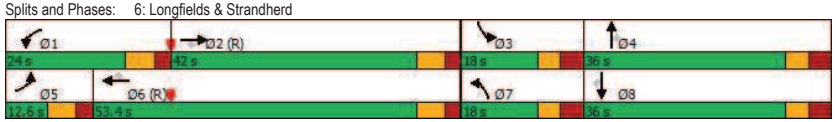
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 55.9	Intersection LOS: E
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Longfields & Strandherd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	84	252	17	63	54	184	459	15	100	753	248
Future Volume (vph)	177	84	252	17	63	54	184	459	15	100	753	248
Satd. Flow (prot)	1642	1527	0	0	1624	0	1610	3295	0	1658	3117	0
Flt Permitted	0.697				0.758		0.162			0.481		
Satd. Flow (perm)	1193	1527	0	0	1238	0	275	3295	0	830	3117	0
Satd. Flow (RTOR)		205			46			5			54	
Lane Group Flow (vph)	177	336	0	0	134	0	184	474	0	100	1001	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	38.8	38.8		38.8	38.8		10.6	25.8		25.8	25.8	
Total Split (s)	39.0	39.0		39.0	39.0		15.0	46.0		31.0	31.0	
Total Split (%)	45.9%	45.9%		45.9%	45.9%		17.6%	54.1%		36.5%	36.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8		3.8	3.8		2.3	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8			6.8		5.6	5.8		5.8	5.8	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	19.0	19.0			19.0		53.6	53.4		38.4	38.4	
Actuated g/C Ratio	0.22	0.22			0.22		0.63	0.63		0.45	0.45	
v/c Ratio	0.67	0.67			0.43		0.57	0.23		0.27	0.70	
Control Delay	40.8	17.5			20.8		16.8	8.5		20.9	23.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	40.8	17.5			20.8		16.8	8.5		20.9	23.7	
LOS	D	B			C		B	A		C	C	
Approach Delay		25.5			20.8			10.8			23.4	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	27.0	18.6			12.3		10.5	14.7		9.5	61.0	
Queue Length 95th (m)	37.5	35.9			22.0		#35.2	33.4		27.2	#128.0	
Internal Link Dist (m)		60.7			273.5			401.5			202.6	
Turn Bay Length (m)	30.0						75.0			100.0		
Base Capacity (vph)	451	705			497		331	2072		375	1439	
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	0.39	0.48			0.27		0.56	0.23		0.27	0.70	

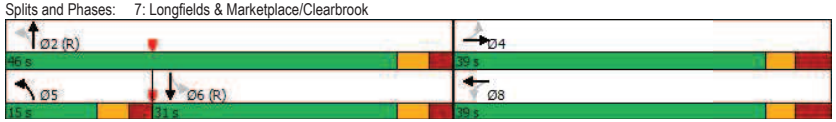
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Longfields & Marketplace/Clearbrook



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	6	367	85	4	84	230	609	54	174	908	45
Future Volume (vph)	12	6	367	85	4	84	230	609	54	174	908	45
Satd. Flow (prot)	1658	1745	1483	1658	1745	1469	1658	3283	1483	1658	3316	1483
Flt Permitted	0.950			0.950			0.219			0.373		
Satd. Flow (perm)	1640	1745	1449	1640	1745	1436	379	3283	1428	647	3316	1387
Satd. Flow (RTOR)			142			127						129
Lane Group Flow (vph)	12	6	367	85	4	84	230	609	54	174	908	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	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)	12.3	35.5	35.5	12.5	35.5	35.5	42.3	42.3	42.3	42.3	42.3	42.3
Total Split (s)	20.0	36.0	36.0	20.0	36.0	36.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	20.0%	36.0%	36.0%	20.0%	36.0%	36.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.0	4.2	4.2	4.0	4.2	4.2	3.6	3.6	3.6	3.6	3.6	3.6
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)	7.3	7.5	7.5	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	6.3	21.4	21.4	10.0	33.0	33.0	49.2	49.2	49.2	49.2	49.2	49.2
Actuated g/C Ratio	0.06	0.21	0.21	0.10	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.11	0.02	0.87	0.51	0.01	0.15	1.24	0.38	0.08	0.55	0.56	0.06
Control Delay	46.1	26.8	43.6	53.0	19.5	2.0	173.5	19.6	19.1	31.5	22.5	0.2
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	46.1	26.8	43.6	53.0	19.5	2.0	173.5	19.6	19.1	31.5	22.5	0.2
LOS	D	C	D	D	B	A	F	B	B	C	C	A
Approach Delay		43.4			27.5			59.2			23.0	
Approach LOS		D			C			E			C	
Queue Length 50th (m)	2.2	0.9	43.2	15.8	0.5	0.0	~58.6	40.6	5.8	24.6	68.0	0.0
Queue Length 95th (m)	7.7	3.8	72.9	30.0	2.8	3.9	#110.5	63.8	15.0	#63.0	102.6	0.0
Internal Link Dist (m)		76.0			220.5			250.0			401.5	
Turn Bay Length (m)	50.0		50.0	40.0		40.0	90.0		65.0	65.0		75.0
Base Capacity (vph)	210	497	514	210	635	603	186	1615	702	318	1631	747
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	0.06	0.01	0.71	0.40	0.01	0.14	1.24	0.38	0.08	0.55	0.56	0.06

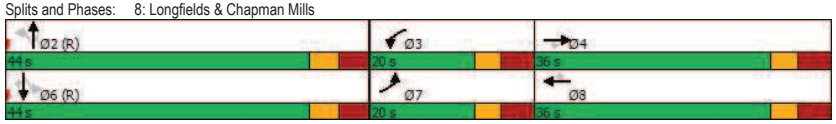
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.24

Intersection Signal Delay: 38.9	Intersection LOS: D
Intersection Capacity Utilization 77.6%	ICU Level of Service D
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.

Splits and Phases: 8: Longfields & Chapman Mills



Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	398	346	219	74	159
Future Vol, veh/h	75	398	346	219	74	159
Conflicting Peds, #/hr	55	0	0	55	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	398	346	219	74	159

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	620	0	-	0	1059	511
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	548	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	960	-	-	-	249	563
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	579	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	919	-	-	-	204	539
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	554	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	32.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	919	-	-	-	354
HCM Lane V/C Ratio	0.082	-	-	-	0.658
HCM Control Delay (s)	9.3	0	-	-	32.7
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.3	-	-	-	4.5

Appendix K

MMLOS Analysis

CGH TRANSPORTATION

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation**	**Project**	**2022-160**
Scenario	**Existing/Future**	**Date**	**5/31/2023**
Comments			

	INTERSECTIONS	Strandherd Drive at Longfields Drive				Strandherd Drive at Riocan Avenue				Marketplace Avenue/ Clearbrook Drive at Longfields Drive				Chapman Mills Drive at Longfields Drive			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	10+	10+	10+	10+		8	7	8	8	8	4	4	7	7	9	9
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m
	Conflicting Left Turns	Protected	Protected	Protected	Protected		Protected/ Permissive	Permissive	Protected	Permissive	Permissive	Permissive	Protected/ Permissive	Permissive	Permissive	Protected	Protected
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No		No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	Smart Channel	Smart Channel	Smart Channel	No Channel		No Channel	No Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	15-25m	10-15m		10-15m	10-15m	No Right Turn	5-10m	5-10m	5-10m	5-10m	10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**-31**	**-31**	**-33**	**-37**		**-12**	**7**	**11**	**-11**	**-11**	**54**	**54**	**7**	**7**	**-6**	**-9**
	Ped. Exposure to Traffic LoS	**F**	**F**	**F**	**F**	-	**F**	**F**	**F**	**F**	**F**	**D**	**D**	**F**	**F**	**F**	**F**
	Cycle Length	120	120	120	120		120	120	120	85	85	85	85	100	100	100	100
	Effective Walk Time	7	7	9	9		25	35	19	12	27	7	7	7	7	8	8
	Average Pedestrian Delay	**53**	**53**	**51**	**51**		**38**	**30**	**43**	**31**	**20**	**36**	**36**	**43**	**43**	**42**	**42**
	Pedestrian Delay LoS	**E**	**E**	**E**	**E**	-	**D**	**D**	**E**	**D**	**C**	**D**	**D**	**E**	**E**	**E**	**E**
	Level of Service	**F**	**F**	**F**	**F**	**-**	**F**	**F**	**F**	**F**	**F**	**D**	**D**	**F**	**F**	**F**	**F**
		F				**F**				**F**				**F**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	≤ 50 m	Not Applicable	Not Applicable	Not Applicable			Not Applicable	Not Applicable					Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Right Turning Speed	≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable			Not Applicable	Not Applicable					Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**D**	**Not Applicable**	**Not Applicable**	**Not Applicable**	-	**#N/A**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**#N/A**	**#N/A**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	-	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**
	Left Turn Approach	≥ 2 lanes crossed	1 lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		No lane crossed	≥ 2 lanes crossed		≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	One lane crossed	2-stage, LT box	2-stage, LT box	2-stage, LT box	2-stage, LT box
	Operating Speed	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	≥ 60 km/h	≥ 60 km/h		> 50 to < 60 km/h	≥ 60 km/h		> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**E**	**D**	**F**	**F**	-	**C**	**F**	-	**F**	**F**	**C**	**E**	**A**	**A**	**A**	**A**
	Level of Service	**E**	**D**	**F**	**F**	**-**	**#N/A**	**F**	**-**	**F**	**F**	**#N/A**	**#N/A**	**A**	**A**	**A**	**A**
		F				**#N/A**				**F**				**A**			
Transit	Average Signal Delay													≤ 30 sec	≤ 20 sec	≤ 10 sec	
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**D**	**C**	**B**	**-**
		-				**-**				**-**				**D**			
Truck	Effective Corner Radius		10 - 15 m		10 - 15 m												
	Number of Receiving Lanes on Departure from Intersection		≥ 2		≥ 2												
	Level of Service	**-**	**B**	**-**	**B**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		B				**-**				**-**				**-**			
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.61 - 0.70				0.61 - 0.70				0.0 - 0.60			
	Level of Service	**E**				**B**				**B**				**A**			

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation**	**Project**	**2022-160**
Scenario	**Existing/Future**	**Date**	**5/31/2023**
Comments			

SEGMENTS			Marketplace Avenue	McGarry Terrace	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width		≥ 2 m < 0.5	≥ 2 m < 0.5	
	Avg Daily Curb Lane Traffic Volume		> 3000	≤ 3000	
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 50 to 60 km/h yes	
	Exposure to Traffic PLoS	**-**	**D**	**C**	**-**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**-**	**-**	**-**
	Level of Service		**-**	**-**	**-**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		**D**	**D**	**-**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS	**D**	**-**	**-**	**-**
	Bike Lane Blockages				
	Blockage LoS		**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		>50 to 60 km/h	>50 to 60 km/h	
	Unsignalized Crossing - Lowest LoS		**C**	**B**	**-**
	Level of Service		**D**	**D**	**-**
Transit	Facility Type				
	Friction or Ratio Transit:Posted Speed	**-**			
	Level of Service		**-**	**-**	**-**
Truck	Truck Lane Width				
	Travel Lanes per Direction	**-**			
	Level of Service		**-**	**-**	**-**

Appendix L

TDM Checklist

CGH TRANSPORTATION

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☐
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	☐
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		2.3 Valet bike parking	
		Visitor travel	
BETTER		2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances	☐
BASIC		3.1.2 Provide online links to OC Transpo and STO information	☐
BETTER		3.1.3 Provide real-time arrival information display at entrances	☐
		3.2 Transit fare incentives	
		Commuter travel	
BETTER		3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER	★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	☐
		Visitor travel	
BETTER		3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER		3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4 Private transit service	
		Commuter travel	
BETTER		3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		4.	**RIDESHARING**	
		4.1	**Ridematching service**	
			Commuter travel	
BASIC	★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
		4.2	**Carpool parking price incentives**	
			Commuter travel	
BETTER		4.2.1	Provide discounts on parking costs for registered carpools	☐
		4.3	**Vanpool service**	
			Commuter travel	
BETTER		4.3.1	Provide a vanpooling service for long-distance commuters	☐
		5.	**CARSHARING & BIKESHARING**	
		5.1	**Bikeshare stations & memberships**	
BETTER		5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
			Commuter travel	
BETTER		5.1.2	Provide employees with bikeshare memberships for local business travel	☐
		5.2	**Carshare vehicles & memberships**	
			Commuter travel	
BETTER		5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER		5.2.2	Provide employees with carshare memberships for local business travel	☐
		6.	**PARKING**	
		6.1	**Priced parking**	
			Commuter travel	
BASIC	★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☐
BASIC		6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☐
			Visitor travel	
BETTER		6.1.3	Charge for short-term parking (hourly)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		7.	**TDM MARKETING & COMMUNICATIONS**	
		7.1	**Multimodal travel information**	
			Commuter travel	
BASIC	★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☑
			Visitor travel	
BETTER	★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
		7.2	**Personalized trip planning**	
			Commuter travel	
BETTER	★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
		7.3	**Promotions**	
			Commuter travel	
BETTER		7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8.	**OTHER INCENTIVES & AMENITIES**	
		8.1	**Emergency ride home**	
			Commuter travel	
BETTER	★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☐
BETTER		8.2.2	Encourage compressed workweeks	☐
BETTER	★	8.2.3	Encourage telework	☐
		8.3	**Local business travel options**	
			Commuter travel	
BASIC	★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
		8.4	**Commuter incentives**	
			Commuter travel	
BETTER		8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5	**On-site amenities**	
			Commuter travel	
BETTER		8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☑
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

TDM Measures Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station *(multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☑
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☐
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

TDM-Supportive Development Design and Infrastructure Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐