1184-1196 Cummings Avenue

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

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April 2023

PN: 2022-168

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1 Screening

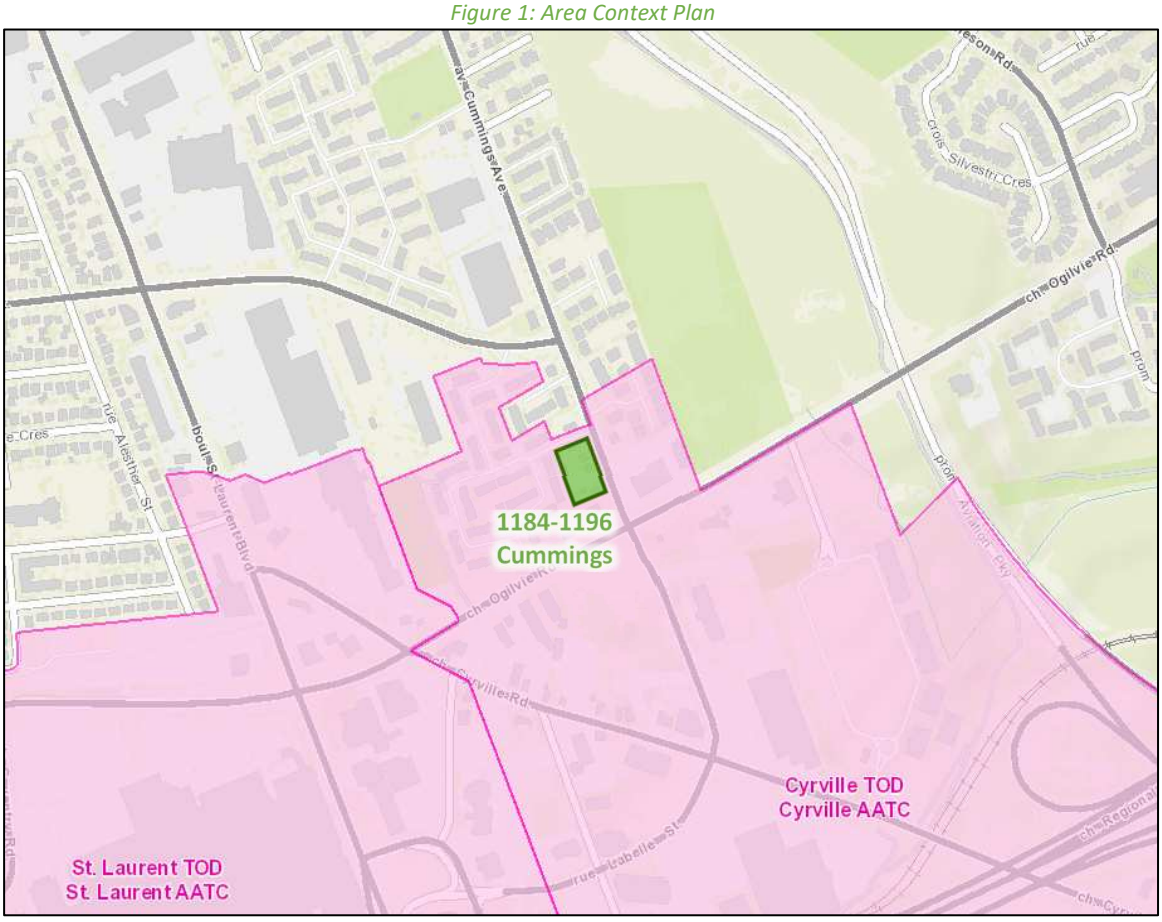
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is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

2 Existing and Planned Conditions

2.1 Proposed Development

The development site is located at 1184, 1186 and 1196 Cummings Avenue, and it is zoned as Residential Third Density Zone (R3Y[708]). The development is proposed to redevelop existing residential units into a mid-rise apartment building totalling 188 units with 37 residential parking spaces, 19 visitor parking spaces, and 184 bicycle parking spaces. The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site. The anticipated full build-out and occupancy horizon is 2026. The development site is within the Cyville TOD area and Inner East Lines 1 and 3 Stations 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: March 3, 2023

Figure 2: Concept Plan

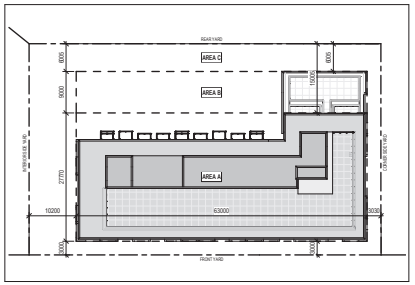
SURVEYOR'S REAL PROPERTY REPORT
PART 1 - PLAN OF SURVEY
PART OF LOT 1
REGISTERED PLAN 217
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA
STANTEC GEOMATICS LTD.

SURVEY INFO
SCALE: 1 : 100

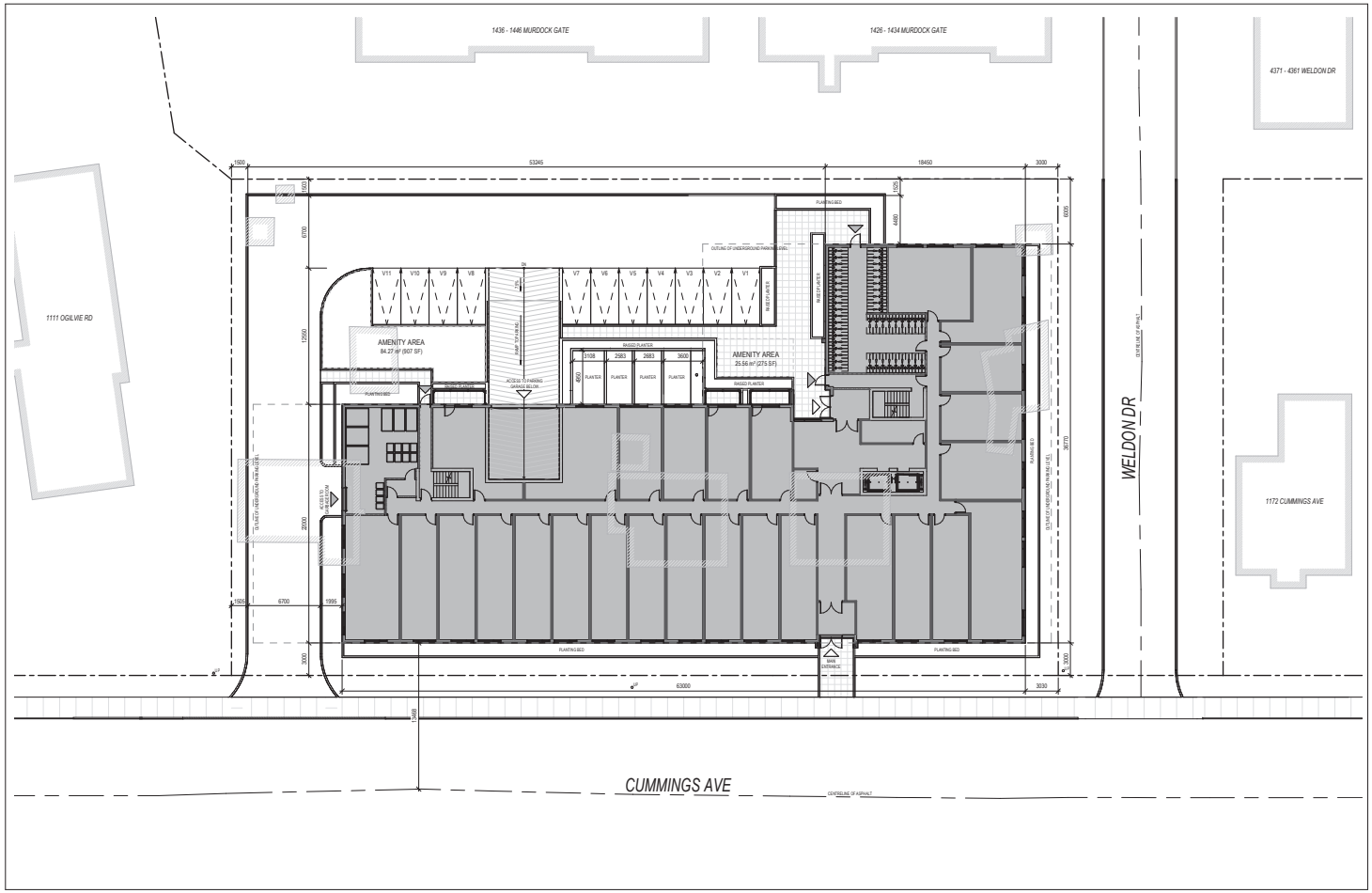
SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- BICYCLE PARKING
- PROPERTY LINE
- SETBACK LINE
- INTERLOCKING STONE PAVERS
- EXISTING UTILITY POLE TO REMAIN
- FDC — FIRE DEPARTMENT CONNECTION

3 SP-01 LOCATION PLAN
SCALE: N.T.S.



2 SP-01 ZONING SETBACK SCHEDULE
SCALE: 1 : 500



1 SP-01 SITE PLAN
SCALE: 1 : 200

Site Statistics	
Current Zoning Designation:	TD1 (Transit Oriented Development Zone)
Lot Width:	76.2m
Total Lot Area:	3487.7m²
Average Existing Grade:	71.27m²
Gross Floor Area:	11484.6m²
Floor Space Index:	3.29
Proposed Unit Count:	188 Residential Units

Proposed Development - 6 Storey Mid-Rise Apartment Building

Zoning Mechanism	Required	Provided
Minimum Lot Width Table 195(b)	No Minimum	76.2m
Minimum Lot Area Table 195(a)	No Minimum	3487.7m²
Min. Front Yard Setback Table 195(c)(i)	3m	3m
Corner Side Yard Setback Table 195(c)(i)	3m	3m
Min. Interior Side Yard Setback Table 195(d)(ii)	No Minimum	1.5m
Min. Rear Yard Setback Table 195(e)(i)	6m	6m
Maximum Building Height Table 195(g)(ii)	20m	18.45m
Min. Residential Units per Hectare Section 198(1)(a)(i)	52 Units / 150 units / hectare	188 Units
Parking Space Rates 101(2)(Area Z)	0 Spaces	37 Resident Spaces (56 total spaces incl. 19 visitor)
Minimum Visitor Parking Rates Table 102(6)(Area Z)	19 Spaces 0.1 spaces / unit for 188 units	19 Spaces
Bicycle Parking Rates 111(1)(Area Z)	94 Spaces 0.5 spaces / unit for 188 units	184 Spaces (94 at grade + 90 underground)
Outdoor Communal Space at Grade Section 193(6)	69.75m² (2% of total lot area)	82.41m²
Total Amenity Area Table 137(4)(f)	1128m² 6m² / unit for 188 units	1305.75m²
Communal Amenity Area Table 137(4)(f)	564m² Min. 50% of Total Amenity Area	1070.32m²

4 SP-01 SITE & PROJECT STATISTICS
SCALE: 1 : 1

UNIT COUNT

NAME	LVL 01	LVL 02	LVL 03	LVL 04	LVL 05	LVL 06	TOTAL COUNT	PERCENTAGE
1-BEDROOM	17	17	17	17	17	17	102	54%
1-BEDROOM + DEN	1	1	1	1	1	1	6	3%
2-BEDROOM	2	5	5	5	3	3	23	12%
STUDIO	7	10	10	10	10	10	57	30%
TOTAL	27	33	33	33	31	31	188	100%

AMENITY AREAS (COMMUNAL)

LEVEL	NAME	AREA	AREA (SF)
LEVEL P1	INDOOR AMENITY	332.91 m²	3584 SF
AVG. GRADE	AMENITY AREA	109.83 m²	1182 SF
LEVEL 05	AMENITY - LEVEL 05 TERRACE	78.68 m²	847 SF
T.O. ROOF	AMENITY - ROOFTOP TERRACE	575.32 m²	6193 SF
TOTAL		1097.74 m²	11816 SF

LEASABLE FLOOR AREA

LEVEL	AREA	AREA (SF)
LEVEL 01	1185.96 m²	12766 SF
LEVEL 02	1486.98 m²	16006 SF
LEVEL 03	1474.52 m²	15870 SF
LEVEL 04	1462.67 m²	15744 SF
LEVEL 05	1295.62 m²	13946 SF
LEVEL 06	1290.21 m²	13900 SF
TOTAL	8196.96 m²	88231 SF

AMENITY AREAS (PRIVATE)

LEVEL	AREA	AREA (SF)
LEVEL 01	15.34 m²	165 SF
LEVEL 02	37.12 m²	400 SF
LEVEL 03	41.71 m²	449 SF
LEVEL 04	40.54 m²	436 SF
LEVEL 05	57.28 m²	617 SF
LEVEL 06	35.61 m²	383 SF
TOTAL	227.60 m²	2450 SF

GROSS FLOOR AREA

LEVEL	AREA	AREA (SF)
LEVEL P1	2094.06 m²	22540 SF
LEVEL 01	1653.70 m²	17800 SF
LEVEL 02	1633.74 m²	17585 SF
LEVEL 03	1621.26 m²	17451 SF
LEVEL 04	1609.42 m²	17324 SF
LEVEL 05	1438.99 m²	15489 SF
LEVEL 06	1433.41 m²	15429 SF
TOTAL	11484.58 m²	123619 SF

PARKING SCH. (BICYCLE)

LEVEL	COUNT
LEVEL P1	90
LEVEL 01	94
TOTAL	184

PARKING SCH. (VEHICLE)

LEVEL	COUNT
LEVEL P1	45
AVG. GRADE	11
TOTAL	56

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjuction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

KEY PLAN

3	ISSUED FOR COORDINATION	2023-03-31
2	ISSUED FOR COORDINATION	2023-03-15
1	ISSUED FOR COORDINATION	2023-03-02

ISSUE RECORD

project1 studio
Project1 Studio Incorporated
| 613.884.3939 | mail@project1studio.ca

1184 CUMMINGS

1184 Cummings Avenue
Gloucester, ON

PROJ	SCALE	DRAWN	REVIEWED
2231	NOTED	BH	RK

SITE PLAN

SP-01

2.2 Existing Conditions

2.2.1 Area Road Network

Cummings Avenue: Cummings Avenue is a major collector road between Ogilvie Road and Donald Street, and north of Donald Street is a collector road, each with a two-lane urban cross-section. South of Ogilvie Road, Cummings Avenue is a City of Ottawa arterial road with a two-lane semi-urban cross section, curbed on its east side. North of Ogilvie Road, sidewalks are present on both sides of the road and south of Ogilvie Road, a sidewalk is present on the east side of the road and a 1.5-metre-wide gravel shoulder is on the west side. The posted speed limit is 50 km/h and the City-protected right of way is 26.0 metres between Ogilvie Road and Donald Street, 24.0 metres north of Donald Street, and 37.5 metres south of Ogilvie Road. Cummings Avenue south of Donald Street is a truck route.

Ogilvie Road: Ogilvie Road is a City of Ottawa arterial road with a four-lane, divided urban cross-section with curbside bike lanes and sidewalks on both sides of the road. The posted speed limit is 60 km/h and the City-protected right of way is 44.5 metres within the study area. Ogilvie Road is a truck route.

Cyrville Road: Cyrville Road is a City of Ottawa two-lane roadway, classified as an arterial south of Cummings Avenue/Labelle Street and a collector road to the north. Between St. Laurent Boulevard and Ogilvie Road, the cross-section includes a curb with a sidewalk on the east side and is uncurbed on the west side. Between Ogilvie Road and Cummings Avenue/Labelle Street, the cross-section is fully urban and includes a sidewalk and curb-side bike lane on each side of the road. South of Cummings Avenue/Labelle Street, the cross-section transitions to an uncurbed condition and includes a paved shoulder and sidewalk on the west side of the road and a mixed-use path on the east side of the road separated by a concrete rumble strip. The posted speed limit is 60 km/h. The City-protected right of way is 37.5 metres south of Cummings Avenue/Labelle Street and the existing right of way varies between 18.0 metres and 23.0 metres within the study area. Cyrville Road is a truck route.

Donald Street: Donald Street is a City of Ottawa major collector road with a two-lane urban cross-section, with sidewalks and curbside bike lanes on both sides of the road between Belgate Way and Alesther Street. The posted speed limit is 50 km/h and the existing right of way is 26.0 metres. Donald Street is a truck route within the study area.

2.2.2 Existing Intersections

The existing signalized area key intersections within 400 metres of the site have been summarized below:

Ogilvie Road at Cummings Avenue	The intersection of Ogilvie Road at Cummings Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a shared through/channelized right-turn lane, and the southbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches each consist of an auxiliary left-turn lane, a through lane, a shared through/right-turn lane, and a bike lane. No turn restrictions were noted.
Donald Street at Cummings Avenue	The intersection of Donald Street at Cummings Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a through lane, and the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, and a right-turn lane. No turn restrictions were noted.

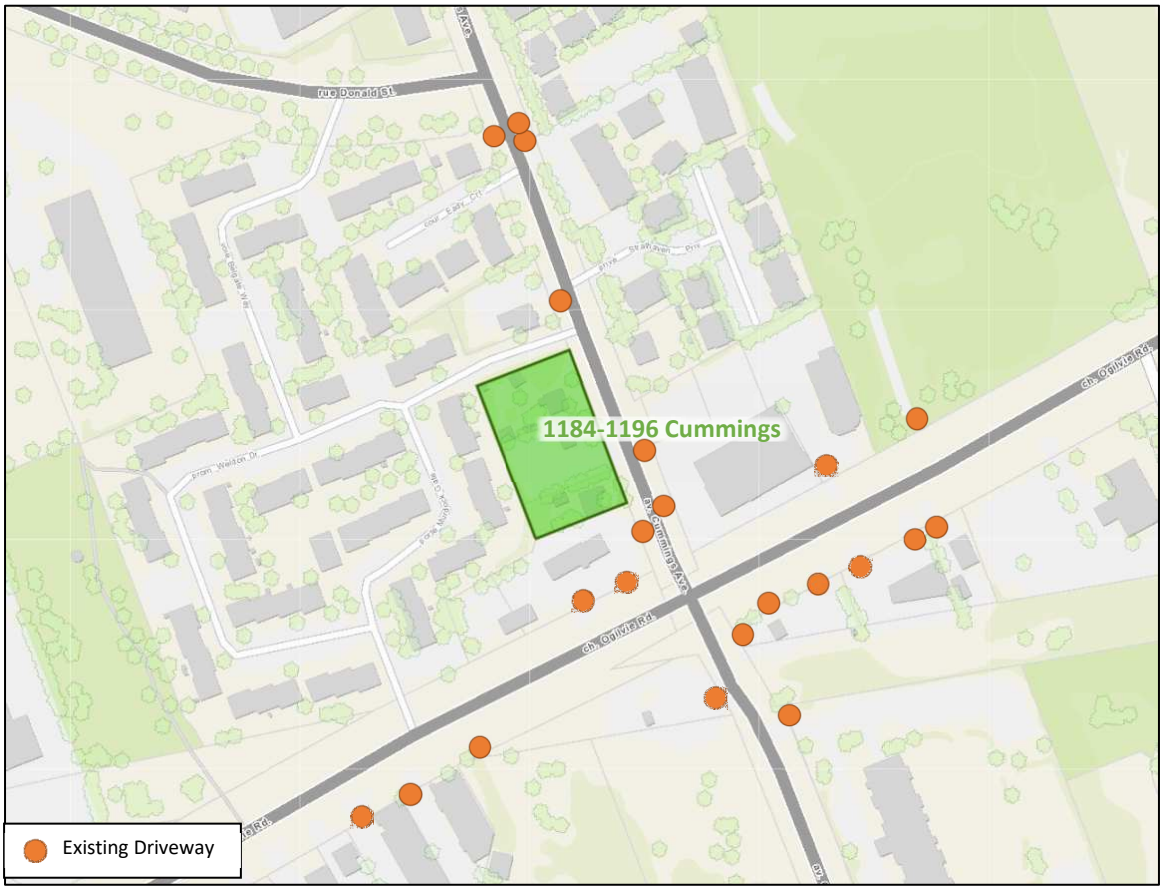
Ogilvie Road at Cyrville Road

The intersection of Ogilvie Road at Cyrville Road is a signalized intersection. The northbound approach of Cyrville Road consists of an auxiliary left-turn lane, a shared through/right-turn lane, and a bike lane and the southbound consists of an auxiliary left-turn lane and a shared through/channelized right-turn lane. The eastbound approach consists of two through lanes, a bike lane, and an auxiliary right-turn lane and the westbound approach consists of an auxiliary left-turn lane, two through lanes, a bike lane, and an auxiliary right-turn lane. Eastbound left turns are restricted at this intersection.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, driveways to gas stations, restaurant land uses, attached and detached residential land uses, a vacant lot, and a mid-rise residential land use exist on Cummings Avenue. Driveways to gas stations, a vacant lot, a community center, retail plazas, restaurant land uses, and a park exist on Ogilvie Road. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 3, 2023

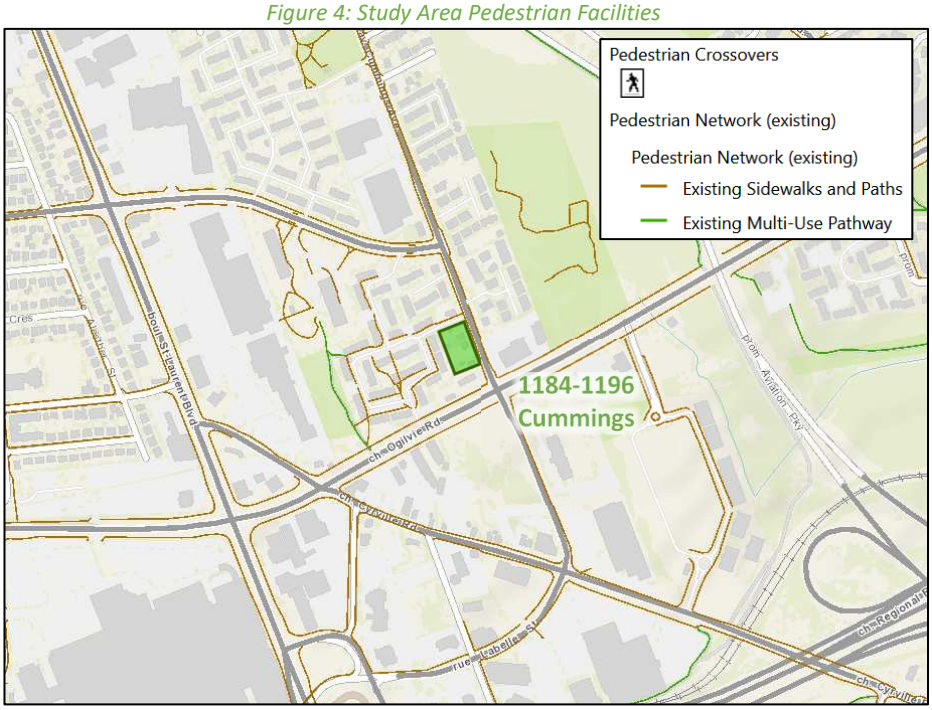
2.2.4 Cycling and Pedestrian Facilities

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

Sidewalks are provided along the east side of Cummings Avenue south of Ogilvie Road and both sides of Cyrville Road, Ogilvie Road, Donald Street, and Cummings Avenue north of Ogilvie Road.

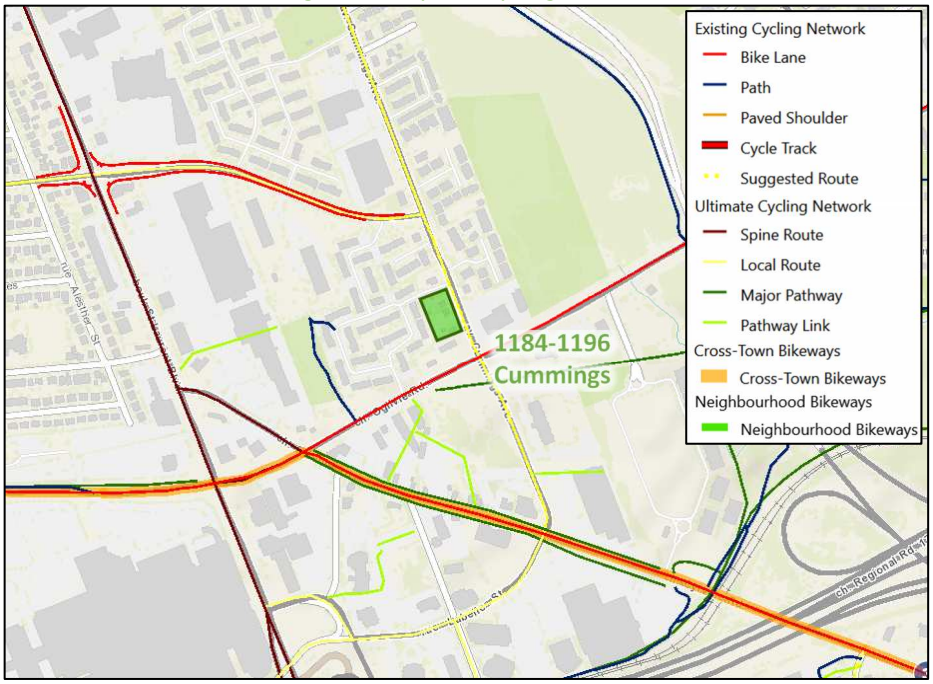
Cycling facilities include bike lanes along Cyrville Road south of Ogilvie Road, Ogilvie Road, and Donald Street. Within the ultimate cycling network, Ogilvie Road and Cyrville Road are spine routes and Donald Street and Cummings Avenue are local routes. Cyrville Road south of Ogilvie Road and Ogilvie Road west of Cyrville Road form part of a crosstown bikeway.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 3, 2023

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 3, 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.

Figure 6: Existing Pedestrian Volumes

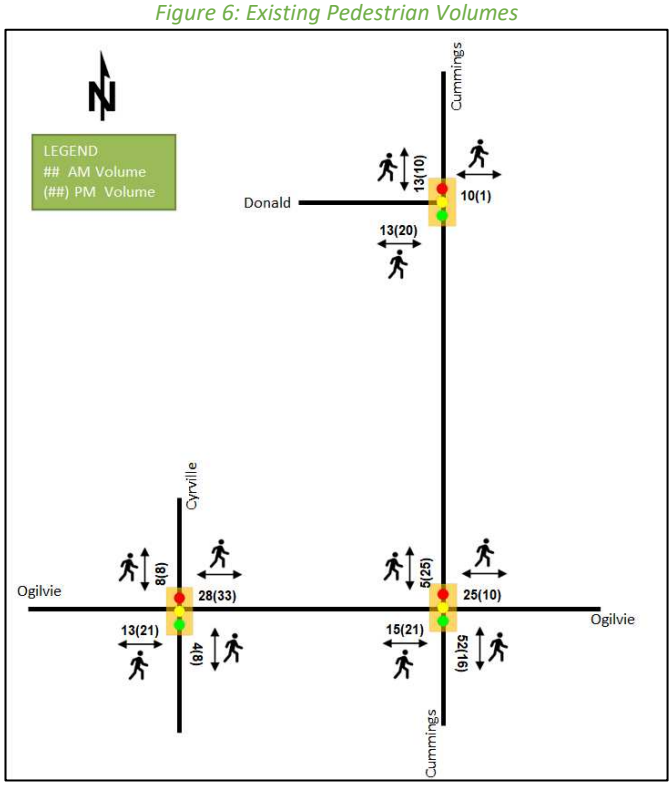
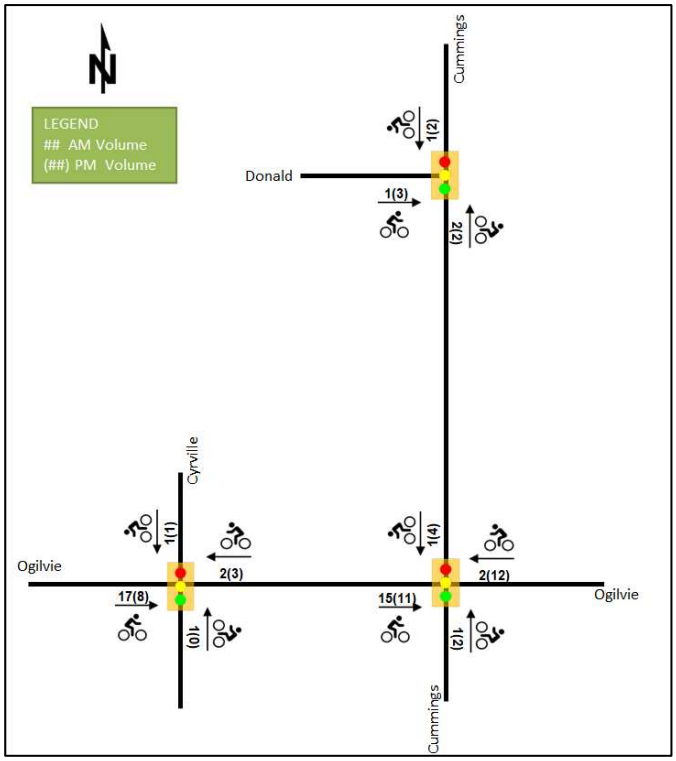


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

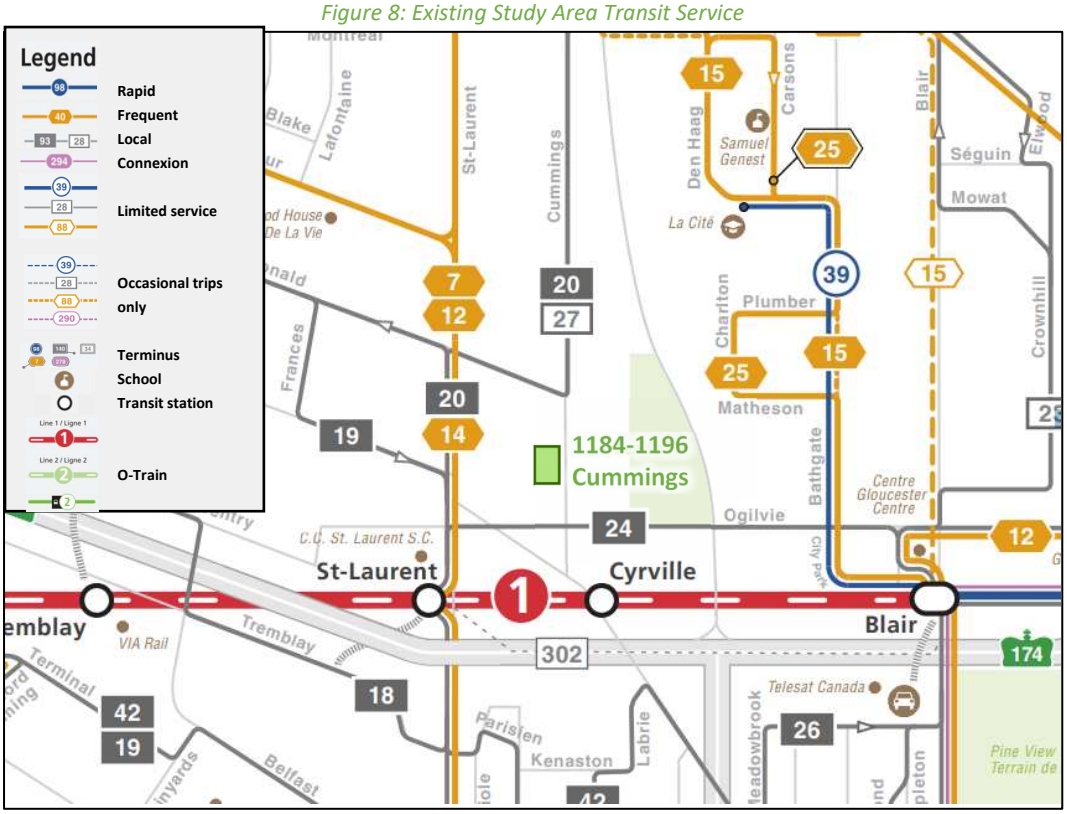
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stations and stops. All transit information is from March 3, 2023 and is included for general information purposes and context to the surrounding area.

Within the study area, routes #24 and #N39 travel along Ogilvie Road and routes #20 and #27 travel along Donald Street and Cummings Avenue to the north. The frequency of these routes within proximity of the proposed site based on March 3, 2023 service levels are:

- Route #20 – 30-minute service all day
- Route #24 – 15-minute service during peak hours, 30-minute service all day
- Route #27 – nine buses in each peak direction/period
- Route #N39 – seven-to-eight overnight buses per direction when the O-Train Line 1 does not run overnight

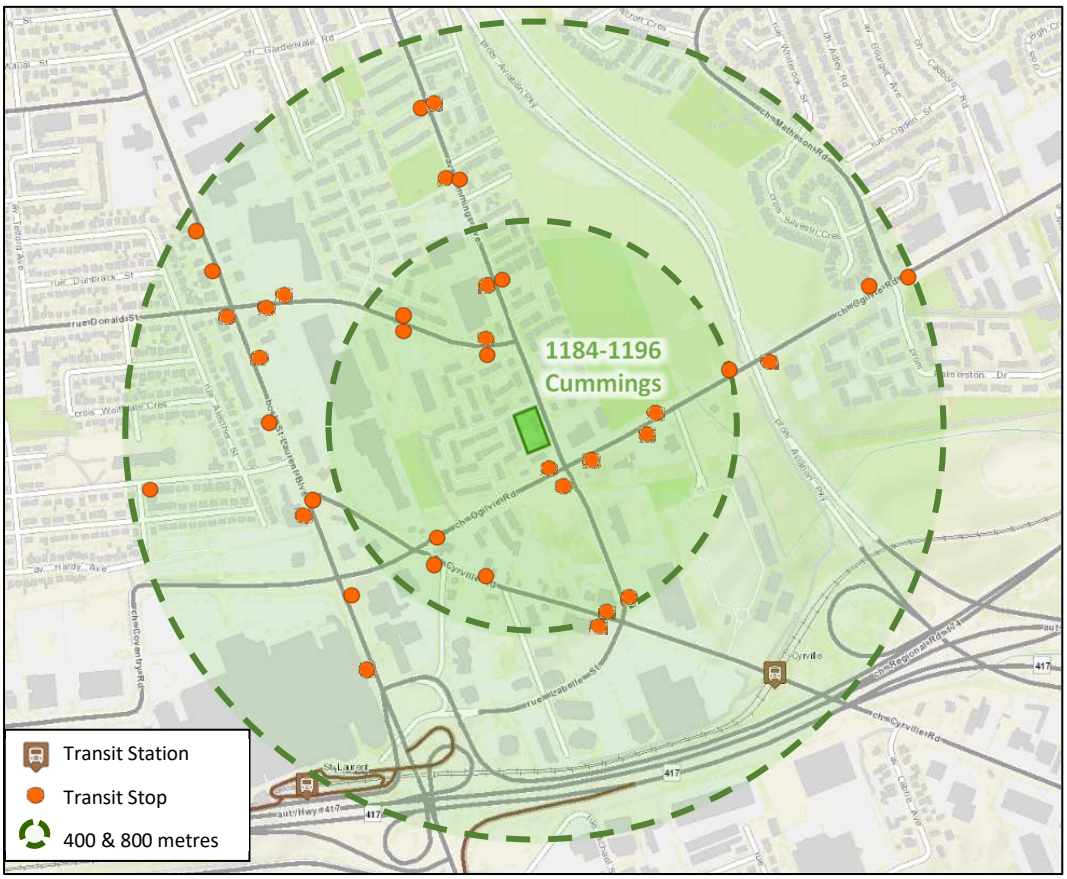
Additionally, the site is less than one kilometre walking distance to Cyrville Station, on the Confederation LRT Line.

Figure 8: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: March 3, 2023

Figure 9: Existing Study Area Transit Stations and stops



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 3, 2023

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing study area key intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Ogilvie Road at Cyrville Road	Wednesday, April 11, 2018
Donald Street at Cummings Avenue	Wednesday, April 11, 2018
Ogilvie Road at Cummings Avenue	Wednesday, April 11, 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. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

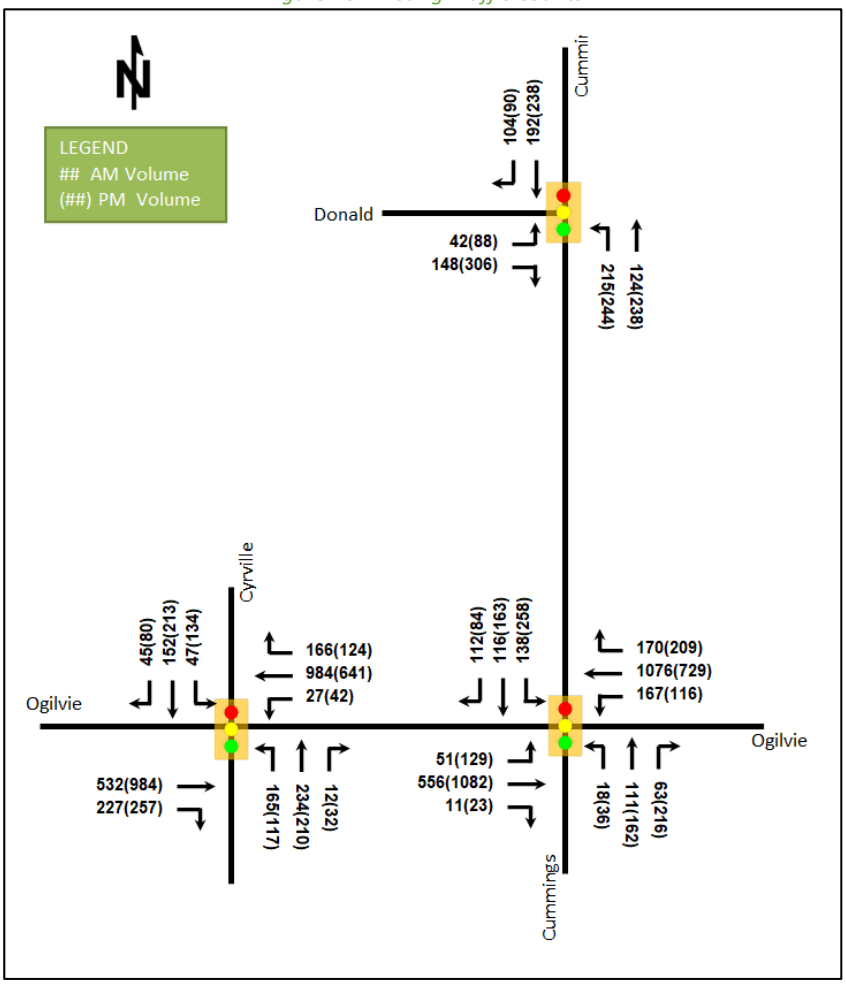


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cyrville Road *Signalized*	EBT	A	0.28	10.7	49.3	A	0.51	13.3	105.7
	EBR	A	0.27	2.2	11.3	A	0.29	2.2	11.7
	WBL	A	0.07	3.3	m0.9	A	0.20	22.6	m8.5
	WBT	A	0.51	3.5	14.7	A	0.33	18.8	m61.7
	WBR	A	0.20	0.3	m0.0	A	0.15	9.7	m11.3
	NBL	E	0.92	**88.3**	**#65.1**	**F**	**1.05**	**138.2**	**#60.9**
	NBT	B	0.65	46.8	75.8	B	0.65	46.0	73.6
	SBL	A	0.31	38.9	19.4	D	0.87	**84.5**	54.2
	SBT	A	0.55	40.9	59.0	C	0.80	54.1	89.9
	Overall	**B**	**0.62**	**17.6**	-	**B**	**0.66**	**29.1**	-
Donald Street at Cummings Avenue *Signalized*	EBL	A	0.12	14.8	11.0	A	0.25	17.3	19.4
	EBR	A	0.35	5.8	12.0	A	0.57	6.9	16.9
	NBL	A	0.57	15.5	31.8	B	0.67	18.8	38.4
	NBT	A	0.19	8.3	14.6	A	0.36	9.4	27.0
	SBT/R	A	0.45	8.9	29.3	A	0.50	10.2	35.9
	Overall	**A**	**0.39**	**10.3**	-	**A**	**0.50**	**11.5**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cummings Avenue *Signalized*	EBL	A	0.37	30.2	20.5	C	0.73	49.5	**#46.2**
	EBT	A	0.39	18.2	50.6	**F**	**1.06**	**76.8**	**#221.4**
	WBL	A	0.48	18.4	33.1	B	0.69	42.3	**#40.4**
	WBT	D	0.84	33.2	**#207.0**	E	0.93	52.2	**#170.7**
	NBL	A	0.09	35.8	10.1	A	0.15	34.7	16.2
	NBT	A	0.56	41.8	57.2	E	0.93	66.1	**#141.1**
	SBL	A	0.52	35.3	41.4	E	0.94	65.4	**#95.6**
	SBT	A	0.48	29.3	60.8	A	0.38	22.2	58.4
	Overall	**C**	**0.75**	**29.3**	-	**F**	**1.01**	**60.4**	-

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

During the PM peak hour, the study area intersections experience capacity issues on the northbound left at the intersections of Ogilvie Road at Cyrville Road and on the eastbound through at Ogilvie Road at Cummings Avenue.

At the intersection of Ogilvie Road and Cyrville Road, the northbound left-turn movement may be subject to high delays and extended queues during both peak hours, where during the PM peak hour this movement is over theoretical capacity and the southbound left-turn movement may be subject to high delays.

The Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on the westbound through movement during the AM peak hour and eastbound left, eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour. The overall intersection and the eastbound through movement are additionally over theoretical capacity where the eastbound through movement may also be subject to high delays during the PM 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		**110**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	23	21%
	Property Damage Only	87	79%
Initial Impact Type	**Angle**	24	22%
	Rear end	34	31%
	Sideswipe	16	15%
	Turning Movement	29	26%
	SMV Other	5	4%
	Other	2	2%
Road Surface Condition	**Dry**	71	65%
	Wet	17	15%
	Loose Snow	6	5%
	Slush	2	2%
	Packed Snow	4	4%

	Number	%
Total Collisions	**110**	**100%**
Ice	10	9%
Pedestrian Involved	2	2%
Cyclists Involved	6	5%

Figure 11: Study Area Collision Records

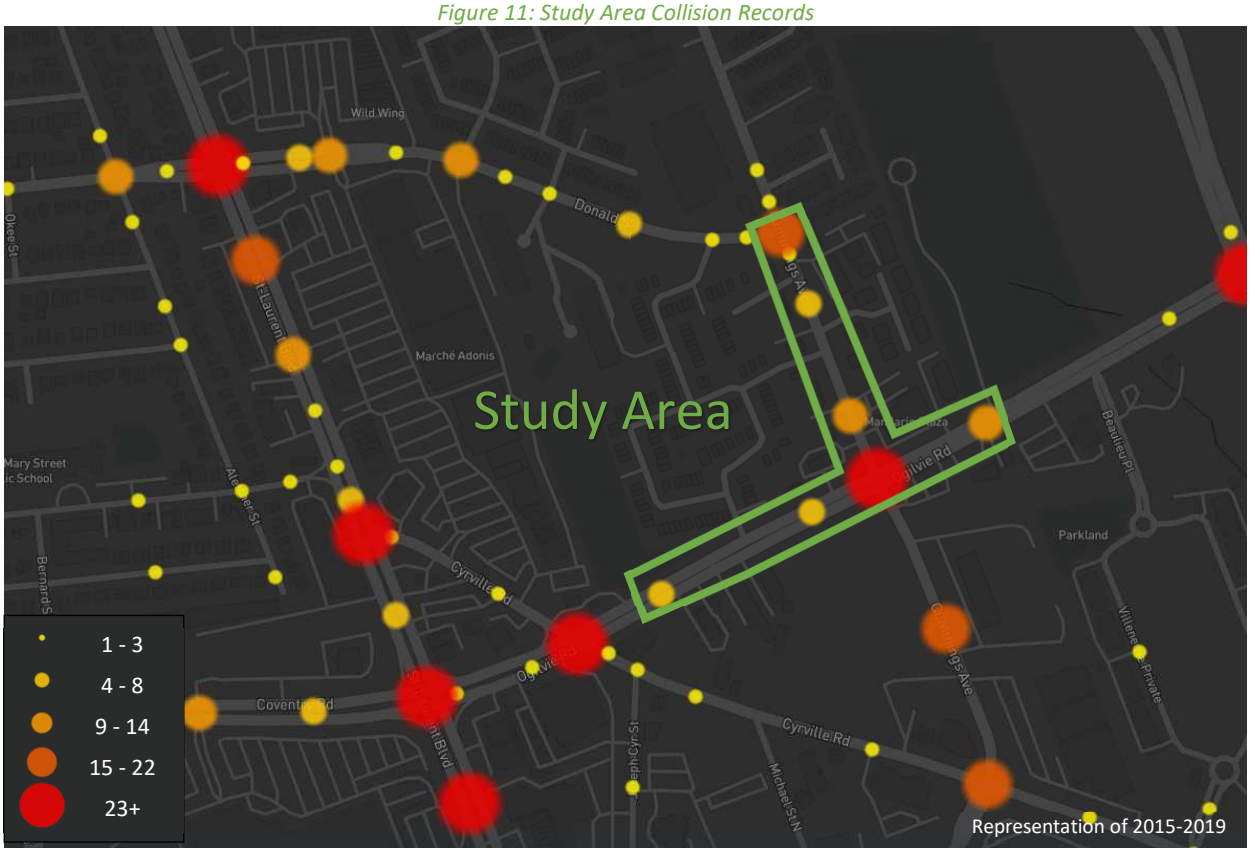


Table 4: Summary of Collision Locations, 2016-2020

	Number	%
Intersections / Segments	**110**	**100%**
Cummings Ave @ Ogilvie Rd	57	52%
Cummings Ave @ Donald St	17	15%
Cummings Ave btwn Weldon Dr & Ogilvie Rd	11	10%
Ogilvie Rd btwn Murdock Gt & Cummings Ave	10	9%
Ogilvie Rd btwn Cummings Ave & Beaulieu Pl	9	8%
Cummings Ave btwn Eady Crt & Strathaven Priv	4	4%
Cummings Ave btwn Donald St & Eady Crt	2	2%

Within the study area, the intersection of Cummings Avenue at Ogilvie Road and Cummings Avenue at Donald Street 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: Cummings Avenue at Ogilvie Road Collision Summary

		Number	%
Total Collisions		**57**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	11	19%
	Property Damage Only	46	81%
Initial Impact Type	**Angle**	5	9%
	Rear end	23	40%
	Sideswipe	8	14%
	Turning Movement	18	32%
	SMV Other	1	2%
	Other	2	4%
Road Surface Condition	**Dry**	36	63%
	Wet	6	11%
	Loose Snow	5	9%
	Packed Snow	3	5%
	Ice	7	12%
Pedestrian Involved		1	2%
Cyclists Involved		4	7%

The Ogilvie Road at Cummings Avenue intersection had a total of 57 collisions during the 2016-2020 time period, with 46 involving property damage only and the remaining eleven having non-fatal injuries. The collision types are most represented by rear end with 23 collisions, followed by turning movement with 18, sideswipe with eight, angle with five, other with two and SMV (other) with one.

The City's Cycling Safety Review of High-Volume Intersections (March 2020) completed a review of this intersection for pedestrian and cycling-related observations and movements. The report suggests improvements such as the removal of the northbound right-turn channel, the addition of a westbound right-turn lane, signal phasing changes, and ultimately a protected intersection configuration, which may help address a variety of collisions noted at this intersection. This report does not recommend any additional changes to those planned by the City. No further examination is required as part of this study.

Table 6: Cummings Avenue at Donald Street Collision Summary

		Number	%
Total Collisions		**17**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	4	24%
	Property Damage Only	13	76%
Initial Impact Type	**Angle**	3	18%
	Rear end	7	41%
	Sideswipe	1	6%
	Turning Movement	4	24%
	SMV Other	2	12%
Road Surface Condition	**Dry**	12	71%
	Wet	1	6%
	Loose Snow	1	6%
	Ice	3	18%
Pedestrian Involved		1	6%
Cyclists Involved		0	0%

The Cummings Avenue at Donald Street intersection had a total of 17 collisions during the 2016-2020 time period, with 13 involving property damage only and the remaining four having non-fatal injuries. The collision types are most represented by rear end with seven collisions, followed by turning movement with four, turning angle with three, SMV other with two, and sideswipe with one. The collision rates have been generally consistent through the years with 2017 and 2018 peaking with five and four collisions respectively. Weather conditions do not affect collisions at this location. No further examination is required as part of this study.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

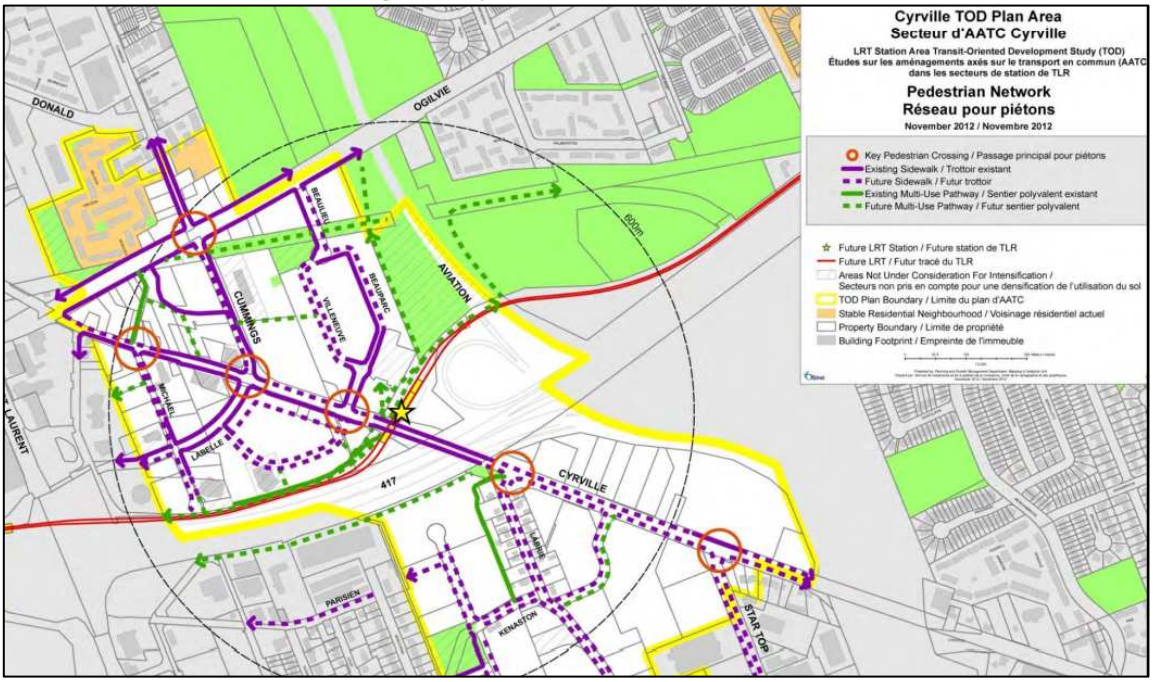
2.3.1.1 New Official Plan (2021)

Within the Transit and Network Ultimate diagram, transit priority corridor is identified along Ogilvie Road.

2.3.1.2 Cyrville TOD Plan area

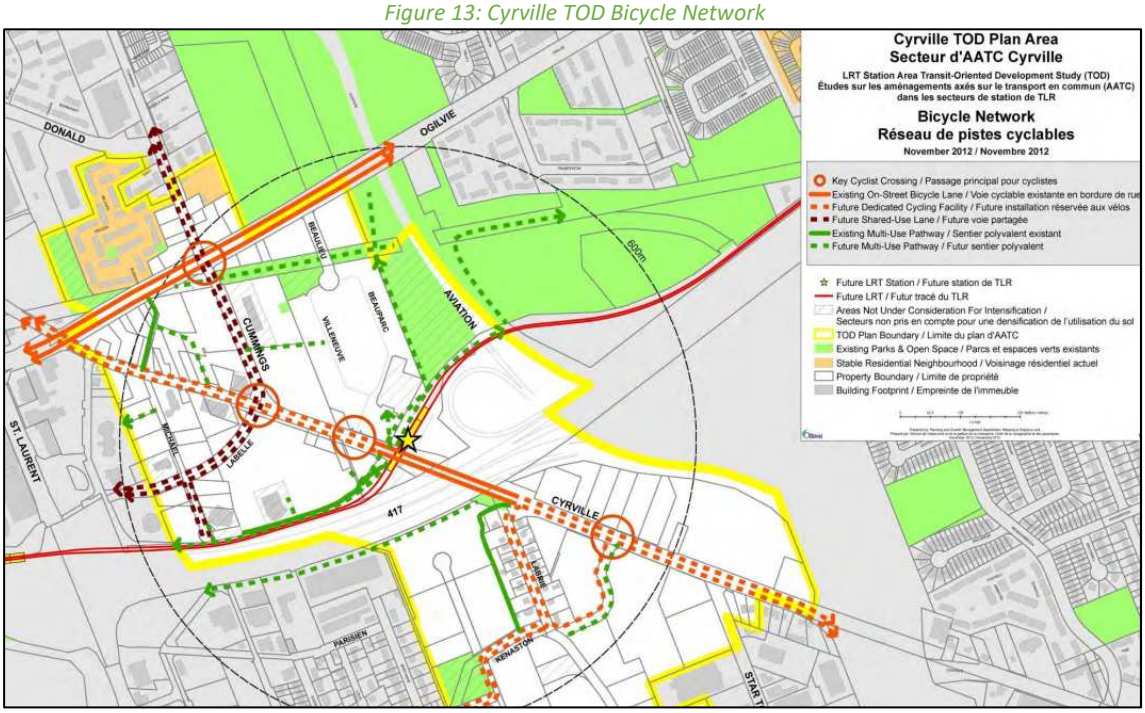
The Cyrville TOD plan outlines a future sidewalk on the west side of Cummings Avenue south of Ogilvie Road and future shared-use lanes along Cummings Avenue. Figure 12 and Figure 13 illustrate the Cyrville pedestrian and cycling TOD plans.

Figure 12: Cyrville TOD Pedestrian Network



Source: https://ottawa.ca/en/transit-oriented-development-tod-plans Accessed: March 3, 2023

Figure 13: Cyrville TOD Bicycle Network

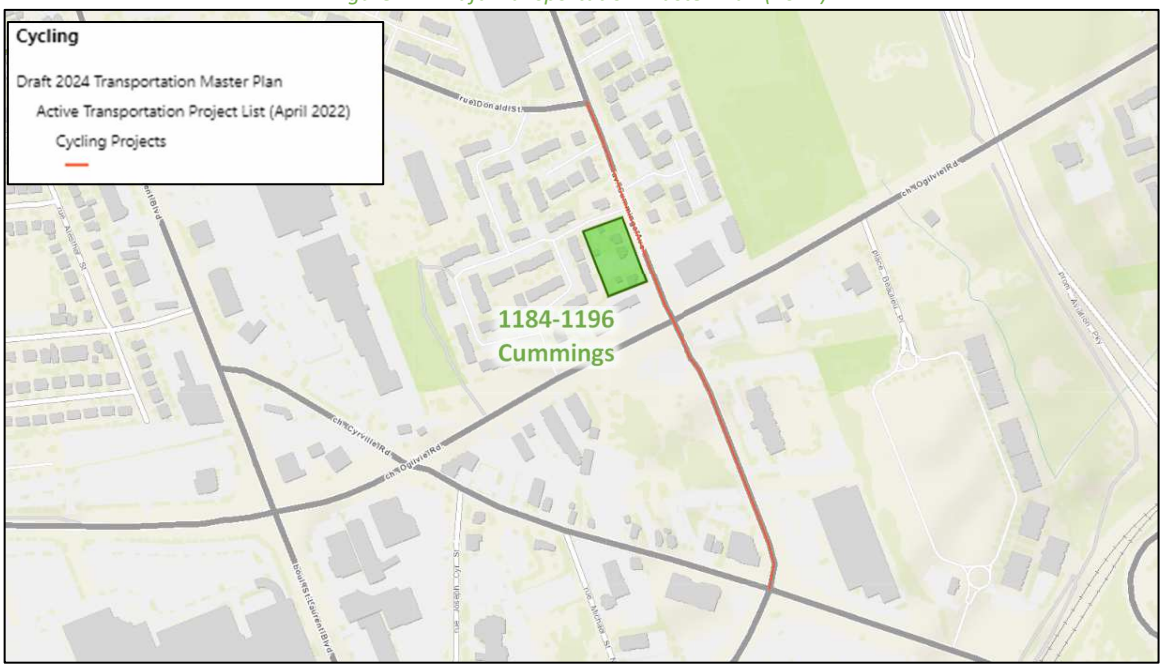


Source: https://ottawa.ca/en/transit-oriented-development-tod-plans Accessed: March 3, 2023

2.3.1.3 Draft Transportation Master Plan (2024)

In the Active Transportation project List (April 2022), cycling facilities are identified along Cummings Avenue between Donald Street and Cyrville Road. Based on the Cyrville TOD Plan area, it is assumed that this cycling facility would be a shared-use lane. Figure 14 illustrates the Draft Transportation Master Plan (2024).

Figure 14: Draft Transportation Master Plan (2024)



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 6, 2023

2.3.2 Other Study Area Developments

1098 Ogilvie Road, 1178 Cummings Avenue

The proposed development application includes a site plan for a two-phase development with occupancy horizons of 2022 and 2024, comprising three residential towers and one hotel for 850 residential dwelling units and 175 hotel rooms. The development is expected to generate 148 new AM peak hour two-way auto trips and 130 new PM peak hour two-way auto trips. (Parsons, 2020)

1298 Ogilvie Road

The proposed development application includes a site plan for seven townhome buildings comprising 78 residential units. The development is expected to generate 39 new AM peak hour two-way auto trips and 40 new PM peak hour two-way auto trips. The build-out horizon is assumed to be 2023 (Parsons, 2018)

1155 Joseph Cyr Street, 1082 Cyrville Road

The proposed development includes a Zoning by-law amendment and site plan application to construct a six-storey mixed-use building with 116 residential dwelling units and a 1425 sq. ft. ground floor commercial component to be built in a single phase by 2023. The development is predicted to generate eight new AM and nine new PM two-way peak-hour auto trips. (CGH Transportation, 2020)

1209 St Laurent Boulevard, 1200 Lemieux Street

The proposed development includes a site plan application to construct two 30-storey residential buildings including 644 units to be built by 2026. The development is expected to generate 35 new AM peak hour two-way auto trips and 38 new PM peak hour two-way auto trips. (CGH Transportation, 2022)

1209 St Laurent Boulevard, 1200 Lemieux Street

The proposed development includes a site plan application to construct two 30-storey residential buildings including 644 units to be built by 2026. The development is expected to generate 35 new AM peak hour two-way auto trips and 38 new PM peak hour two-way auto trips. (CGH Transportation, 2022)

1125 - 1149 Cyrville Road

The proposed development application includes a site plan to construct two residential buildings with a total of 354 units. The development is predicted to generate 22 new AM and 21 new PM two-way peak-hour auto trips. The anticipated build-out horizon is 2023. (Stantec, 2021)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Donald Street at:
  - Cummings Avenue
- Ogilvie Road at:
  - Cyrville Road
  - Cummings Avenue
- Cummings Avenue at Site Access (future conditions)

The boundary roads will be Cummings Avenue and no screenlines are present within proximity to the site.

3.2 Time Periods

As the proposed development is composed entirely 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	Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

4.1 TIA Stepped Process

Being located within the Cyrville TOD area and the site proposed small number of residential units, the expected new auto tips will be minimal to the study area. Given the existing conditions identified no barriers to the development of the proposed site, the remaining TIA stepped process has been included within the submission for a fulsome review by the City.

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 Ottawa East have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Ottawa East

Travel Mode	Multi-Unit (High-Rise)	
	AM	PM
Auto Driver	40%	40%
Auto Passenger	8%	14%
Transit	38%	28%
Cycling	2%	3%
Walking	13%	15%
Total	**100%**	**100%**

Being within 600 metres of the Cyrville LRT station and within one kilometre of the St. Laurent LRT station, a higher transit mode is considered achievable at this location. A 17% shift to transit mode taken from the auto mode is proposed. The proposed modified mode share targets are summarized in Table 9.

Table 9: Proposed Development Mode Shares

Travel Mode	Multi-Unit (High-Rise)	
	AM	PM
Auto Driver	23%	23%
Auto Passenger	7%	14%
Transit	55%	45%
Cycling	2%	3%
Walking	13%	15%
Total	**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). Table 10 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 10: Trip Generation Person Trip Rates

Land Use	Land Use Code	Peak	Peak Period	
			Vehicle Trip Rate	Person Trip Rates
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	-	0.80
		PM	-	0.90

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.

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)	188	47	104	151	98	71	169

Using the above mode share targets for a LRT area, 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 12 summarizes the residential trip generation by mode and peak hour.

Table 12: 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	**23%**	5	12	17	**23%**	10	7	17
	Auto Passenger	**7%**	1	3	4	**14%**	6	4	10
	Transit	**55%**	14	31	45	**45%**	21	15	36
	Cycling	**2%**	1	1	2	**3%**	1	1	2
	Walking	**13%**	3	8	11	**15%**	8	6	14
	Total	**100%**	**24**	**55**	**79**	**100%**	**46**	**33**	**79**

As shown above, a total of 17 AM and 17 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 for the residential component, and these patterns were applied based on the build-out of Ottawa East. Table 13 below summarizes the distributions.

Table 13: OD Survey Distribution – Ottawa East

To/From	Residential % of Trips
North	15%
South	20%
East	15%
West	50%
Total	**100%**

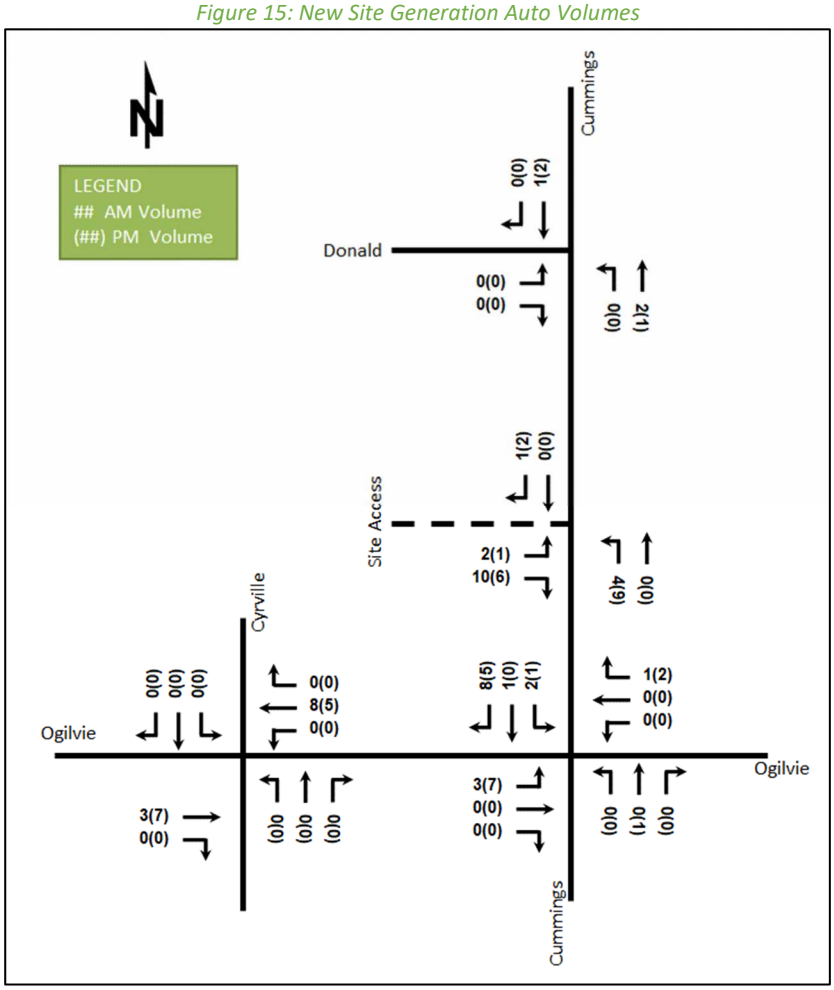
5.4 Trip Assignment

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 14 summarizes the proportional assignment to the study area roadways, and Figure 15 illustrates the new site generated volumes.

Table 14: Trip Assignment

To/From	Via
North	15% Cummings Ave (N)
South	5% Cummings Ave (N) 15% Ogilvie Rd (W)
East	15% Ogilvie Rd (E)
West	50% Ogilvie Rd (W)
Total	**100%**

Figure 15: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and will not have any notable impact on the study area traffic volumes and travel patterns.

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 volumes along Donald Street are significantly underestimated when compared to traffic counts and should not be considered for the area. The background TRANS model growth rates are summarized in Table 15 and the TRANS model plots are provided in Appendix E.

Table 15: TRANS Regional Model Projections – Study Area Growth Rates

Street	TRANS Rate		2011 to Existing		Existing to 2031	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Ogilvie Rd	0.29%	0.32%	-1.31%	0.81%	1.17%	0.05%
Donald St	-	-	-	-	-	-
	Northbound	**Southbound**	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Cummings Ave	0.21%	1.02%	3.55%	4.46%	-1.55%	-0.79%
Cyrville Rd	0.36%	1.17%	0.70%	2.17%	-0.26%	0.96%

In general, the growth rates in the study area derived from the two TRANS model horizons are projected to be positive along all roadways. A conservative 1.00% growth will apply to Donald Street. A comparison of the 2011 to Existing volumes and the Existing to 2031 volumes illustrates a situation that development has not progressed linearly along Cummings Avenue. It is unlikely that the growth rates will decrease or become negative as the Existing to 2031 summary outlines, therefore it is expected that they will be lower than the 2011 to Existing rates that have been experienced. Table 16 summarizes the recommended growth rates to be considered within the study area.

Table 16: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Ogilvie Rd	0.25%	0.25%	0.25%	0.25%
Donald St	1.00%	1.00%	1.00%	1.00%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Cummings Ave	0.25%	1.00%	1.00%	0.25%
Cyrville Rd	0.25%	1.00%	1.00%	0.25%

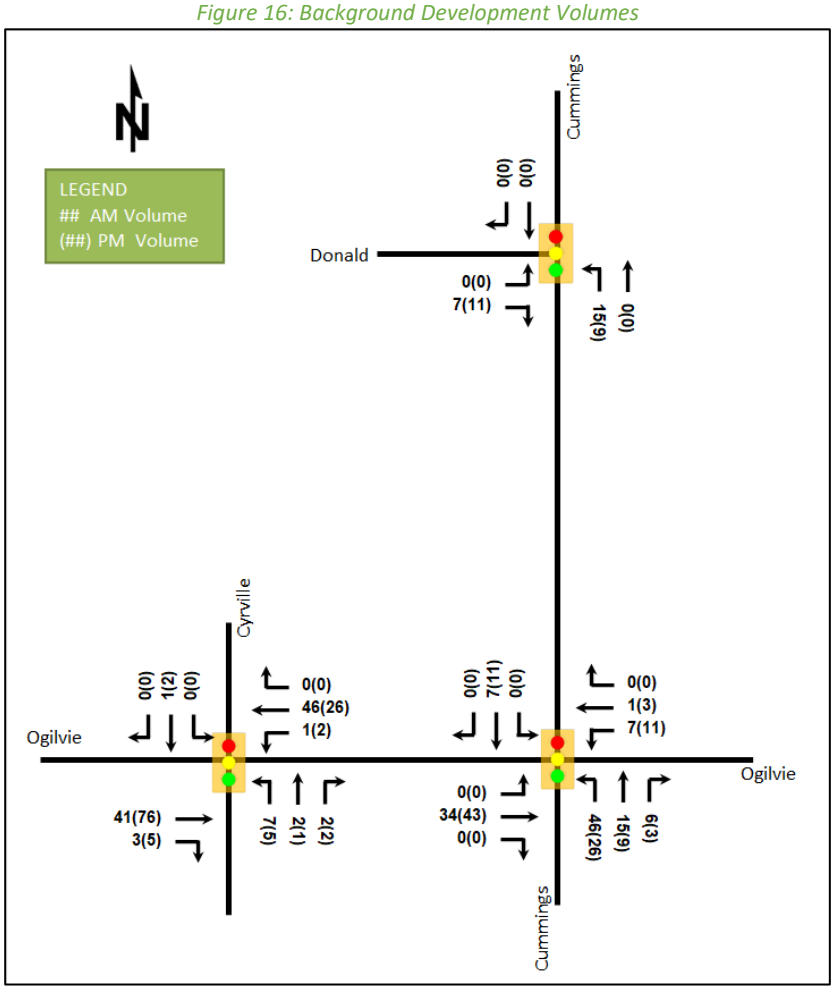
6.3 Other Developments

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

- 1098 Ogilvie Road, 1178 Cummings Avenue
- 1298 Ogilvie Road
- 1155 Joseph Cyr Street, 1082 Cyrville Road
- 1209 St Laurent Boulevard, 1200 Lemieux Street
- 1125 - 1149 Cyrville Road

Figure 16 illustrates the background development volumes, and the background development volumes within the study area have been provided in Appendix F.

Figure 16: Background Development Volumes



7 Demand Rationalization

7.1 2026 Future Background Operations

Figure 17 illustrates the 2026 background volumes and Table 17 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. The synchro worksheets for the 2026 future background horizon are provided in Appendix G.

Figure 17: 2026 Future Background Volumes

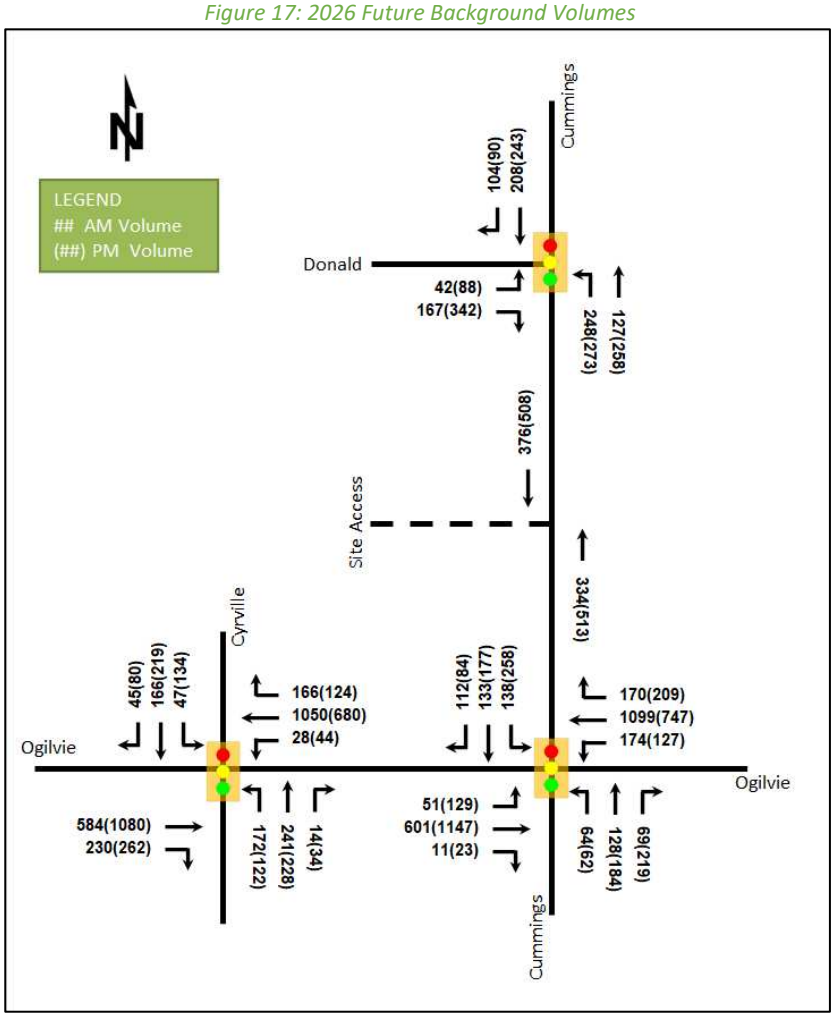


Table 17: 2026 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cyrville Road *Signalized*	EBT	A	0.27	10.1	48.6	A	0.49	12.4	103.7
	EBR	A	0.24	2.2	10.8	A	0.27	2.1	11.4
	WBL	A	0.06	4.3	m1.2	A	0.17	20.6	m9.0
	WBT	A	0.48	4.6	19.3	A	0.31	16.5	m65.9
	WBR	A	0.18	0.3	m0.1	A	0.14	8.7	m11.4
	NBL	D	0.90	**85.9**	59.6	E	0.95	**113.5**	**#52.3**
	NBT	B	0.64	47.1	70.3	B	0.66	48.1	71.5
	SBL	A	0.28	38.6	17.7	D	0.84	**81.1**	48.1
	SBT	A	0.56	42.2	57.1	C	0.77	53.5	81.7
	Overall	**A**	**0.59**	**17.8**	-	**B**	**0.61**	**26.8**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Donald Street at Cummings Avenue *Signalized*	EBL	A	0.11	14.8	10.1	A	0.22	16.7	17.8
	EBR	A	0.35	5.9	12.0	A	0.57	6.8	17.0
	NBL	A	0.58	15.6	33.0	B	0.67	18.5	37.8
	NBT	A	0.17	8.1	13.6	A	0.35	9.4	26.4
	SBT/R	A	0.42	8.6	27.9	A	0.46	9.7	32.3
	Overall	**A**	**0.40**	**10.3**	-	**A**	**0.50**	**11.2**	-
Ogilvie Road at Cummings Avenue *Signalized*	EBL	A	0.28	22.1	17.0	B	0.61	33.5	29.4
	EBT	A	0.38	18.1	48.3	E	0.99	57.5	**#205.4**
	WBL	A	0.45	17.3	31.1	B	0.68	42.0	**#40.2**
	WBT	C	0.77	29.7	166.6	D	0.83	42.6	**#147.8**
	NBL	A	0.28	40.2	24.5	A	0.24	36.8	23.2
	NBT	A	0.56	42.4	58.7	E	0.92	64.7	**#133.2**
	SBL	A	0.47	33.7	37.8	D	0.83	46.1	**#75.3**
	SBT	A	0.46	29.5	59.6	A	0.37	22.3	55.7
	Overall	**B**	**0.69**	**27.5**	-	**E**	**0.92**	**48.6**	-

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

Intersections within the study area will operate similar to existing condition with the incremental improvement to the intersection operations. It is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions. No additional capacity issues are noted.

Similar to the existing condition, the northbound left-turn movement at the intersection of Ogilvie Road and Cyrville Road may be subject to high delays during both peak hours and extended queues during the PM peak hours. The Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on the eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour.

7.2 2031 Future Background Operations

Figure 18 illustrates the 2031 background volumes and Table 18 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. The synchro worksheets for the 2031 future background horizon are provided in Appendix H.

Figure 18: 2031 Future Background Volumes

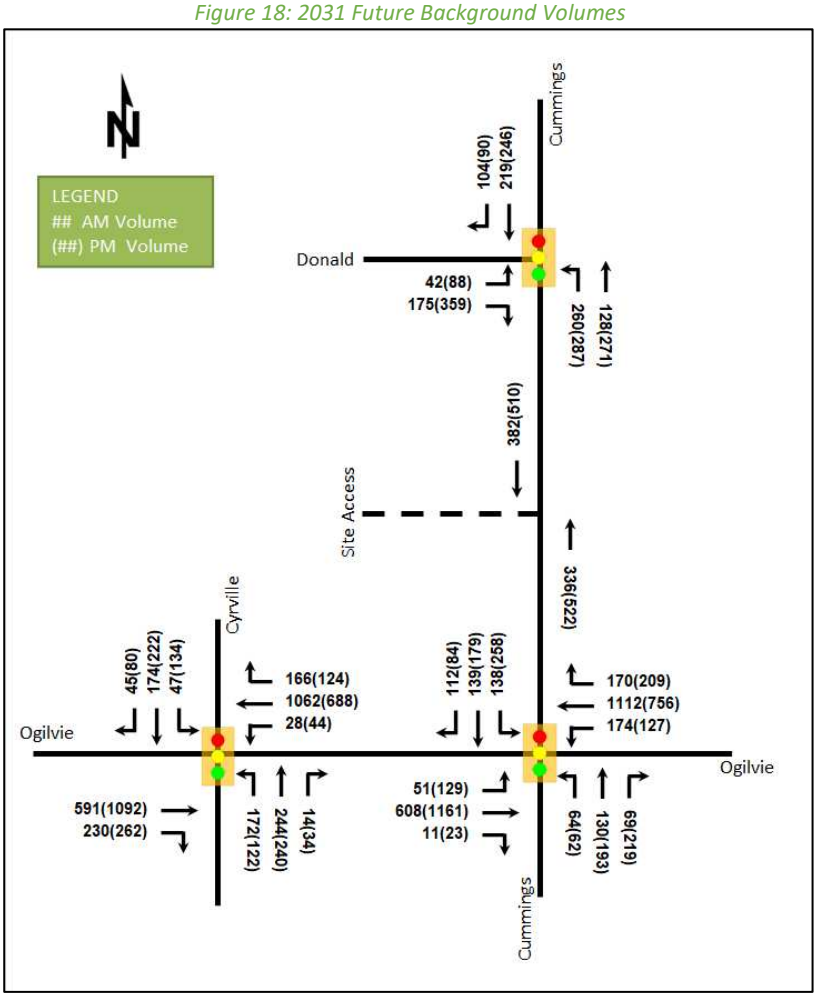


Table 18: 2031 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cyrville Road *Signalized*	EBT	A	0.28	10.3	49.3	A	0.50	12.6	105.5
	EBR	A	0.24	2.2	10.8	A	0.27	2.1	11.4
	WBL	A	0.06	4.3	m1.2	A	0.18	20.9	m8.6
	WBT	A	0.49	4.6	19.5	A	0.31	16.9	m65.2
	WBR	A	0.18	0.3	m0.1	A	0.14	8.9	m11.2
	NBL	E	0.91	**88.8**	60.3	E	0.96	**114.7**	**#52.7**
	NBT	B	0.64	46.9	71.3	B	0.69	49.3	75.1
	SBL	A	0.28	38.3	17.7	D	0.88	**88.9**	49.2
	SBT	A	0.57	42.5	59.2	C	0.78	53.7	82.4
	Overall	**A**	**0.60**	**18.1**	-	**B**	**0.62**	**27.5**	-
Donald Street at Cummings Avenue *Signalized*	EBL	A	0.11	15.0	10.1	A	0.23	17.3	18.1
	EBR	A	0.36	5.9	12.3	A	0.59	7.1	17.9
	NBL	B	0.61	16.5	35.5	B	0.69	19.1	40.6
	NBT	A	0.17	8.1	13.7	A	0.36	9.4	27.5
	SBT/R	A	0.43	8.8	29.2	A	0.46	9.5	32.5
	Overall	**A**	**0.42**	**10.6**	-	**A**	**0.52**	**11.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cummings Avenue *Signalized*	EBL	A	0.29	22.8	17.3	B	0.62	35.8	30.6
	EBT	A	0.39	18.2	49.4	**F**	**1.02**	**63.3**	**#209.4**
	WBL	A	0.45	17.4	31.1	B	0.68	41.3	**#39.6**
	WBT	C	0.78	30.1	169.7	D	0.85	44.0	**#150.2**
	NBL	A	0.28	40.2	24.5	A	0.24	36.6	23.2
	NBT	A	0.57	42.9	59.5	E	0.93	66.1	**#138.7**
	SBL	A	0.47	33.7	37.8	D	0.84	47.0	**#76.8**
	SBT	A	0.47	30.1	61.9	A	0.37	22.2	56.2
	Overall	**B**	**0.70**	**27.8**	**-**	**E**	**0.93**	**51.4**	**-**

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

Intersections within the study area will operate similar to existing condition during peak hours. No additional capacity issues are noted.

Similar to the existing condition, the northbound left-turn movement at the intersection of Ogilvie Road and Cyrville Road may be subject to high delays during both peak hours and extended queues during the PM peak hours.

Similar to the existing condition, the Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on eastbound left, eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour. The eastbound through movement is additionally over theoretical capacity where the eastbound through movement may also be subject to high delays during the PM peak hour.

7.3 2026 Future Total Operations

Figure 19 illustrates the 2026 total volumes and Table 19 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, and average delay for unsignalized intersections. The synchro worksheets for the 2026 total horizon are provided in Appendix I.

Figure 19: 2026 Future Total Volumes

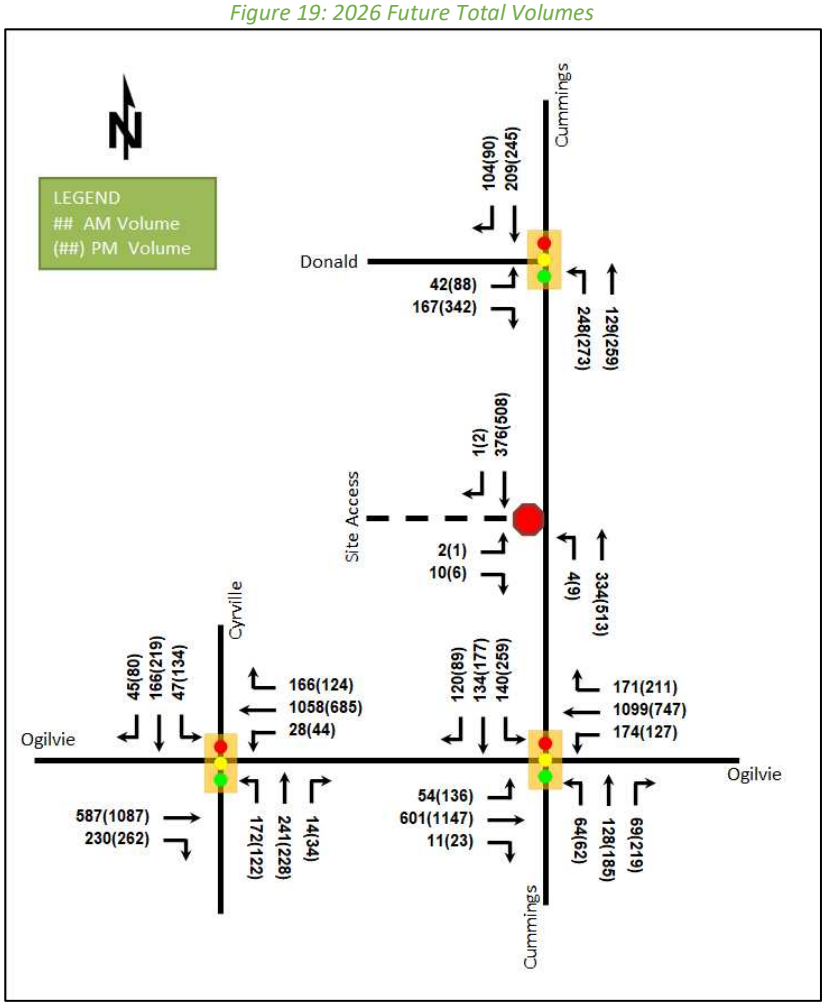


Table 19: 2026 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cyrville Road *Signalized*	EBT	A	0.27	10.1	48.9	A	0.50	12.5	104.8
	EBR	A	0.24	2.2	10.8	A	0.27	2.1	11.4
	WBL	A	0.06	4.5	m1.2	A	0.17	20.6	m8.8
	WBT	A	0.49	4.7	20.2	A	0.31	16.6	m66.1
	WBR	A	0.18	0.4	m0.2	A	0.14	8.7	m11.3
	NBL	D	0.90	**85.9**	59.6	E	0.95	**113.5**	**#52.3**
	NBT	B	0.64	47.1	70.3	B	0.66	48.1	71.5
	SBL	A	0.28	38.6	17.7	D	0.84	**81.1**	48.1
	SBT	A	0.56	42.2	57.1	C	0.77	53.5	81.7
	Overall	**A**	**0.59**	**17.9**	-	**B**	**0.61**	**26.8**	-
Donald Street at Cummings Avenue *Signalized*	EBL	A	0.11	14.8	10.1	A	0.22	16.7	17.8
	EBR	A	0.35	5.9	12.0	A	0.57	6.8	17.0
	NBL	A	0.58	15.7	33.1	B	0.67	18.6	37.9
	NBT	A	0.17	8.2	13.8	A	0.35	9.4	26.4
	SBT/R	A	0.42	8.6	27.9	A	0.47	9.8	32.5
	Overall	**A**	**0.40**	**10.3**	-	**A**	**0.50**	**11.3**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cummings Avenue *Signalized*	EBL	A	0.30	22.9	17.9	B	0.64	36.3	**#32.5**
	EBT	A	0.38	18.1	48.6	E	1.00	57.7	**#205.6**
	WBL	A	0.45	17.3	31.1	B	0.68	41.6	**#39.9**
	WBT	C	0.78	29.7	166.8	D	0.84	43.1	**#148.1**
	NBL	A	0.28	40.2	24.5	A	0.24	36.8	23.2
	NBT	A	0.56	42.4	58.7	E	0.92	64.5	**#133.6**
	SBL	A	0.47	33.9	38.2	D	0.84	46.5	**#75.8**
	SBT	A	0.48	29.8	61.9	A	0.38	22.4	56.8
	Overall	**B**	**0.69**	**27.6**	**-**	**E**	**0.92**	**48.9**	**-**
Site Access at Cummings Avenue *Signalized*	EB	B	0.02	11.1	0.8	B	0.02	12.6	0.0
	NB	A	0.00	8.1	0.0	A	0.01	8.4	0.0
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.1**	**-**

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

During both peak hours, the study area intersection operates operate similar to the 2026 future background condition except for the eastbound left-turn movement during the PM peak hour at the intersection of Ogilvie Road at Cummings Avenue, which may be subject to extended queues, and it is similar to the existing condition.

7.4 2031 Future Total Operations

Figure 20 illustrates the 2031 total volumes and Table 20 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, and average delay for unsignalized intersections. The synchro worksheets for the 2031 future total horizon are provided in Appendix J.

Figure 20: 2031 Future Total Volumes

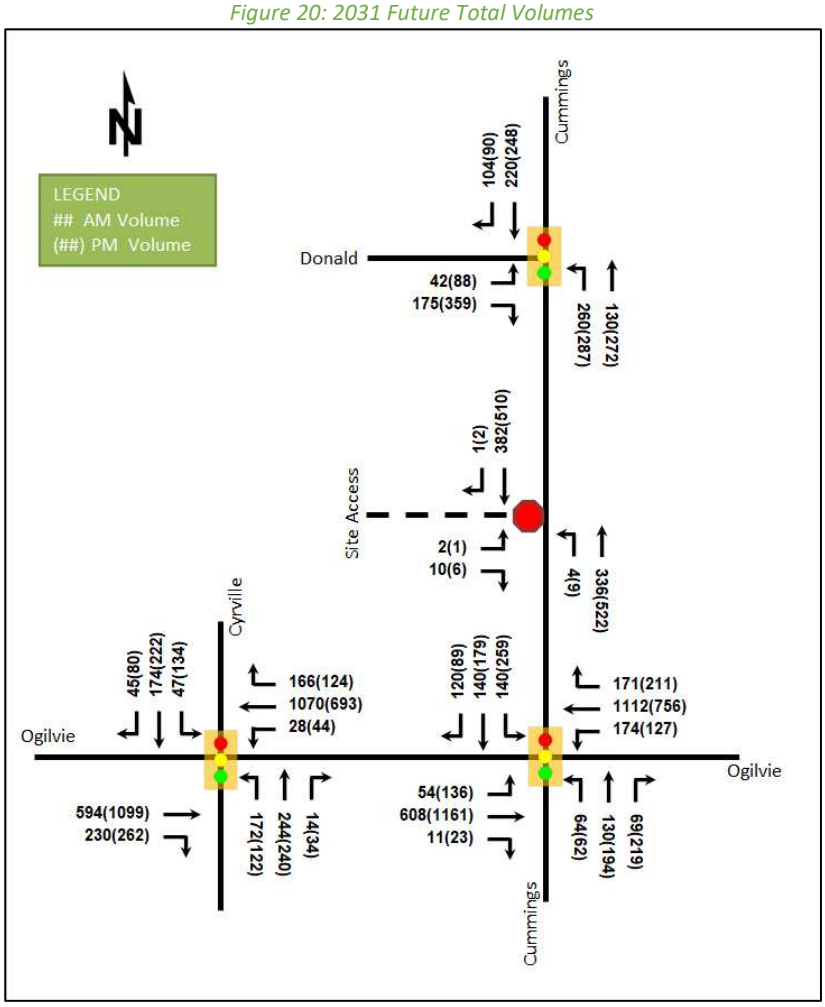


Table 20: 2031 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cyrville Road *Signalized*	EBT	A	0.28	10.3	49.6	A	0.50	12.6	106.5
	EBR	A	0.24	2.2	10.8	A	0.27	2.1	11.4
	WBL	A	0.06	4.5	m1.2	A	0.18	21.0	m8.6
	WBT	A	0.49	4.8	20.3	A	0.32	17.1	m65.6
	WBR	A	0.18	0.4	m0.2	A	0.14	8.9	m11.1
	NBL	E	0.91	**88.8**	60.3	E	0.96	**114.7**	**#52.7**
	NBT	B	0.64	46.9	71.3	B	0.69	49.3	75.1
	SBL	A	0.28	38.3	17.7	D	0.88	**88.9**	49.2
	SBT	A	0.57	42.5	59.2	C	0.78	53.7	82.4
	Overall	**A**	**0.60**	**18.1**	-	**B**	**0.62**	**27.5**	-
Donald Street at Cummings Avenue *Signalized*	EBL	A	0.11	15.0	10.1	A	0.23	17.3	18.1
	EBR	A	0.36	5.9	12.3	A	0.59	7.1	17.9
	NBL	B	0.61	16.5	35.5	B	0.69	19.2	40.6
	NBT	A	0.17	8.1	14.0	A	0.36	9.4	27.7
	SBT/R	A	0.43	8.8	29.4	A	0.46	9.6	32.7
	Overall	**A**	**0.42**	**10.6**	-	**A**	**0.52**	**11.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Ogilvie Road at Cummings Avenue *Signalized*	EBL	A	0.31	23.7	18.2	B	0.65	38.6	**#35.3**
	EBT	A	0.39	18.3	49.5	**F**	**1.02**	**63.7**	**#209.6**
	WBL	A	0.45	17.4	31.1	B	0.68	41.5	**#39.6**
	WBT	C	0.78	30.1	169.7	D	0.86	44.6	**#150.5**
	NBL	A	0.28	40.3	24.5	A	0.24	36.6	23.2
	NBT	A	0.57	42.9	59.5	E	0.93	66.1	**#138.7**
	SBL	A	0.48	34.0	38.2	D	0.84	47.3	**#77.3**
	SBT	A	0.49	30.4	64.0	A	0.38	22.2	57.1
	Overall	**B**	**0.70**	**27.9**	**-**	**E**	**0.93**	**51.8**	**-**
Site Access at Cummings Avenue *Signalized*	EB	B	0.02	11.2	0.8	B	0.02	12.7	0.0
	NB	A	0.00	8.1	0.0	A	0.01	8.4	0.0
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.1**	**-**

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

During both peak hours, the study area intersection operates operate similar to the 2031 future background conditions except for the eastbound left-turn movement during the PM peak hour at the intersection of Ogilvie Road at Cummings Avenue may be subject to extended queues, which is similar to the existing condition. No additional capacity issues are noted.

7.5 Modal Share Sensitivity and Demand Rationalization Conclusions

The study area notes some minor capacity constraints along Ogilvie Road during the existing and forecasted horizons. These constraints are a result of the east-west traffic volumes and signal progression for the peak hours. It is also noted that the continued construction along Highway 417 and onto Highway 174 has likely inflated these volumes as drivers shift to alternate routes bypass delays only the highway system. These constraints should be monitored by the City as the construction activities wrap up and traffic may normalize back to the highway system. No further regional rationalization or trip demand is required.

The development is expected to generate less than 20 two-way vehicle trips, and the impact on the study area intersections is negligible. No site rationalization for adjusted mode shares or demand is required for this TIA.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development includes a mid-rise building with a new two-way access on Cummings Avenue. There are a total of 90 underground bicycle parking spaces and a total of 94 surface bicycle parking spaces. Hard surface connections are provided between building entrances and the surrounding pedestrian facilities on Cummings Avenue. The closest bus stop is located less than 100 metres walking distance from the site, Cyrville LRT Station is located approximately 1.0-kilometre walking distance from the site access, and St-Laurent LRT Station is located approximately 1.3-kilometre walking distance from the site access.

8.2 Circulation and Access

The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site. The site access is 6.7 metres wide, and the vehicle parking is proposed as accessing

the parking garage ramp with a 7.5% slope. The garbage collection vehicles were reviewed to confirm movements will be permitted on site, and the emergency services can access the site via the Cummings Avenue frontage.

9 Parking

9.1 Parking Supply

The site provides 37 residential parking spaces, 19 surface visitor parking spaces, 90 underground bicycle spaces, and 94 surface bicycle spaces. Within 600 metres of a rapid transit station, the maximum parking provision is 329 spaces, the minimum visitor parking provision is 19 spaces, and the minimum bicycle parking provision is 94 spaces. The vehicle and bicycle parking requirements are satisfied.

10 Boundary Street Design

Table 21 summarizes the MMLOS analysis for the boundary street of Cummings Avenue. The MMLOS for Cummings Avenue are only assessed for the existing conditions, as the future conditions will be subject to the City's improvements to the cycling infrastructure . The boundary street analysis is based on the policy area of "Within 600 m of a rapid transit station" and the land-use designation of "Mixed Use Centre". The MMLOS worksheets has been provided in Appendix K.

Table 21: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Cummings Avenue	E	A	D	B	N/A	N/A	C	D

The pedestrian LOS will not be met along the segment of Cummings Avenue. To meet the theoretical pedestrian LOS targets, the boulevards would need to be at least 0.5 metres along boundary streets and the operating speed would need to be lower than 30 km/h.

The bicycle LOS will not be met along the segment of Cummings Avenue. To meet the theoretical bicycle LOS targets, operating speeds would need to be decreased to less than 50 km/h. The City may look at reducing the speed limit to help improve the BLOS results (e.g. 40 km/h would become PLOS B).

No mitigation for the boundary street design is required as part of this application and require higher level City adjustments to the road operations, such as speed limits.

11 Access Intersections Design

11.1 Location and Design of Access

The proposed access width is approximately 6.7 metres, meeting the private approach width requirements, and the throat length meets the 15.0 metre minimum requirement. Access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1.

The access is located within the southbound auxiliary left-turn lane for the Ogilvie Road at Cummins Avenue intersection. While this is not an ideal location for an access, given the entire length of Cummings Avenue has back-to-back left-turn lanes for northbound left-turns at Donald Street and southbound left-turns at Ogilvie Road, this cannot be avoided. Access should still be permitted within this section of roadway.

The site access is 1.5 metres from the adjacent property line, which is closer to the required 3.0-metre offset from the private approach by-law, and the adjacent gas station access is approximately 8.5 metres from the property

line, therefore meeting the 9.0 metres offset between accesses. The access location is considered acceptable, and the City can approve through an exemption to the private approach bylaw.

11.2 Intersection Control

Based upon the projected volumes, the site access will have stop-control on the minor approaches.

11.3 Access Intersection Design

11.3.1 Future Access Intersection Operations

The operations are noted in Section 7.4 and no mitigation is required for the development.

11.3.2 Access Intersection MMLOS

Based upon the projected volumes, the site access will have stop-control on the minor approaches and don't require MMLOS.

11.3.3 Recommended Design Elements

The proposed access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1.

12 Transportation Demand Management

12.1 Context for TDM

The subject site is within the Cyville TOD area, the mode shares used within the TIA represent a shift from auto mode to transit mode. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided.

Total bedrooms within the development are 211 bedrooms across both buildings with 165 studio/one-bedroom units and 23 two-bedroom units.

12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on transit due to the proximity to the Cyville LRT Station. The convenience of the transit station should provide the opportunity to reach the forecast transit mode share.

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 and cycling routes, and transit route information and schedules at major entrances
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-year Presto card for first time 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 rental costs

13 Transit

13.1 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 22 summarizes the transit trip generation.

Table 22: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	55% (45%)	14	31	45	21	15	36

The proposed development is anticipated to generate an additional 45 AM and 36 PM peak hour two-way transit trips. From the trip distribution found in section 5.3, these values can be further broken down. Table 23 summarizes forecasted site-generated transit ridership trips by direction and the equivalent bus loads.

Table 23: Forecasted Site-Generated Transit Ridership

Direction	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Direction Bus Loads
	In	Out	In	Out		
North	2	5	3	2	Bus	Negligible
South	3	6	4	3	Bus	Negligible
East	2	5	3	2	Bus, LRT	Negligible
West	7	15	11	8	Bus, LRT	One-thirds of a standard bus

13.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements and no decrease in transit LOS at the study area intersections are noted as a result of forecasted site-generated traffic.

14 Network Intersection Design

14.1 Network Intersection Control

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

14.2 Network Intersection Design

14.2.1 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.

14.2.2 Network Intersection MMLOS

Table 24 summarizes the MMLOS analysis for the network intersections of Ogilvie Road at Cyrville Road, Donald Street at Cummings Avenue, and Ogilvie Road at Cummings Avenue. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection analysis is based on the policy area of “Within 600 m of a rapid transit station” and the land-use designation of “Mixed Use Centre”. The MMLOS worksheets has been provided in Appendix K.

Table 24: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Ogilvie Road at Cyrville Road	F	A	F	B	C	C	C	D	B	D
Donald Street at Cummings Avenue	F	A	E	B	N/A	N/A	C	D	A	D
Ogilvie Road at Cummings Avenue	F	A	F	B	F	C	C	D	E	D

The pedestrian LOS targets will not be met at the study area intersections. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance on all pedestrian crossings would need to be reduced to two lane-widths.

Pedestrian delay LOS is not considered in the PLOS calculation as it is not a suitable metric for the assessment of pedestrian LOS as formulated. This exclusion is consistent with City direction since 2015, and no alternative methodology has been provided for its assessment.

The bicycle LOS targets will not be met at the study area intersections. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or include turn boxes.

The transit LOS will not be met at Ogilvie Road at Cummings Avenue intersection and the delay would need to be zero to meet the target of LOS A.

The development is expected to have negligible impact to the study area intersections, and the City will be responsible for exploring options to address the area PLOS, BLOS, TLOS, and ALOS deficiencies. An additional MMLOS analysis is suggested during the City's redesign and upgrades at the Ogilvie Road at Cummings Road intersection.

14.2.3 Recommended Design Elements

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

15 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 an apartment building totalling 188 units with 37 residential parking spaces, 19 visitor parking spaces, and 184 bicycle parking spaces
- The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site
- The development is proposed to be completed as a single phase by 2026
- The development site is within the Cyville TOD area and Inner East Lines 1 and 3 Stations secondary plan area
- The trip generation and safety triggers were met for the TIA Screening

Existing Conditions

- Cummings Avenue south of Ogilvie Road, Ogilvie Road, Cyrville Road south of Cummings Avenue/Labelle Street are arterial roads
- Cummings Avenue between Ogilvie Road and Donald Street, and Donald Street are major collector roads, and Cummings Avenue north of Donald Street, Cyrville Road north of Cummings Avenue/Labelle Street are collector roads in the study area
- Sidewalks are provided along the east side of Cummings Avenue south of Ogilvie Road and both sides of Cyrville Road, Ogilvie Road, Donald Street, and Cummings Avenue north of Ogilvie Road
- Bike lanes are provided along Cyrville Road south of Ogilvie Road, Ogilvie Road, and Donald Street
- Ogilvie Road and Cyrville Road are spine routes and Donald Street and Cummings Avenue are local routes. Cyrville Road south of Ogilvie Road and Ogilvie Road west of Cyrville Road form part of a crosstown bikeway
- During the PM peak hour, the study area intersections experience capacity issues on the northbound left at the intersections of Ogilvie Road at Cyrville Road and on the eastbound through at Ogilvie Road at Cummings Avenue

- Within the study area, the intersection of Cummings Avenue at Ogilvie Road is noted to have experienced higher collisions than other locations
- The Ogilvie Road at Cummings Avenue intersection had a total of 57 collisions during the 2016-2020 time period, and collision types are most represented by rear end with 23 collisions
- The City's Cycling Safety Review of High-Volume Intersections (March 2020) completed a review of Ogilvie Road at Cummings Avenue intersection, and the report suggests improvements that help address a variety of collisions noted at this intersection
- This report does not recommend any changes to those planned for implementation by the City based upon the Cycling Safety Review, and no further examination is required as part of this study

Development Generated Travel Demand

- The proposed development is forecasted produce 79 two-way people trips during the AM and PM peak hours
- Of the forecasted people trips, 17 two-way trips will be vehicle trips during the AM and PM peak hours based on a 23% modal share target
- Of the forecasted trips, 15% are anticipated to travel north and east, 20% to the south, and 50% to the west

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growths along the mainline volumes along Ogilvie Road, Donald Street, Cummings Avenue, and Cyrville Road
- The study area intersections at future background conditions will operate similar to the existing conditions
- No additional capacity issues are noted in the future conditions

Development Design

- There are a total of 90 underground bicycle parking spaces and a total of 94 surface bicycle parking spaces
- Hard surface connections are provided between building entrances and the surrounding pedestrian facilities on Cummings Avenue
- The closest bus stop is located less than 100 metres walking distance from the site, Cyrville LRT Station is located approximately 1.0-kilometre walking distance from the site access, and St-Laurent LRT Station is located approximately 1.3-kilometre walking distance from the site access
- The site access is 6.7 metres wide, and the vehicle parking is proposed as accessing the parking garage ramp with a 7.5% slope
- The garbage collection vehicles were reviewed to confirm movements will be permitted on site, and the emergency services can access the site via the Cummings Avenue frontage

Parking

- The site provides 37 residential parking spaces, 19 surface visitor parking spaces, 90 underground bicycle spaces, and 94 surface bicycle spaces
- The vehicle and bicycle parking requirements are satisfied

Boundary Street Design

- Cummings Avenue does not meet the pedestrian MMLOS targets, and at least 0.5 metres boulevards and lower than 30 km/h operating speed would need to meet the targets

- The bicycle LOS will not be met along the segment of Cummings Avenue, and lower than 50 km/h operating speed would need to meet the targets
- No mitigation for the boundary street design is required as part of this application and require higher level City adjustments to the road operations, such as speed limits

Access Intersections Design

- The proposed access width is approximately 6.7 metres, meeting the private approach width requirements, and the throat length meets the 15.0 metre minimum requirement
- Access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1
- The site access is 1.5 metres from the adjacent property line, which is closer to the required 3.0-metre offset from the private approach by-law, and the adjacent gas station access is approximately 8.5 metres from the property line, therefore meeting the 9.0 metres offset between accesses
- The access location is considered acceptable and the City can approve through an exemption to the private approach bylaw

TDM

- Supportive TDM measures to be included within the proposed development should include:
    - Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
    - Provide a multimodal travel option information package to new residents
    - Inclusion of a 1-year Presto card for first time 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 rental costs

Transit

- The proposed development is anticipated to generate an additional 45 AM and 36 PM peak hour two-way transit trips
- Peak hour increases in transit ridership resulting from the site equate to one-thirds of a standard bus load westerly of the site, and negligible impact northerly, southerly, and easterly of the site
- Negligible impacts are noted on the transit movements

Network Intersection Design

- No change to the existing signalized control is recommended for the network intersections
- Generally, the network intersections will operate similarly to the existing condition, and no mitigation of conditions is required for the subject site traffic
- The pedestrian LOS targets will not be met at the study area intersections, and two lane-widths crossing distance on all pedestrian crossings would need
- Pedestrian delay LOS is not considered in the PLOS calculation
- The bicycle LOS targets will not be met at the study area intersections, and left-turn configurations would need to be two-stage or include turn boxes on all approaches
- The transit LOS will not be met at Ogilvie Road at Cummings Avenue intersection and the delay would need to be zero to meet the target of LOS A
- The development is expected to have negligible impact to the study area intersections, and the City of Ottawa will be responsible for exploring options to address the area PLOS, BLOS, TLOS, and ALOS deficiencies

- An additional MMLOS analysis is suggested during the City's redesign and upgrades at the Ogilvie Road at Cummings Road intersection

16 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

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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: 21-Dec-22
Project Number: 2022-168
Project Reference: TCU 1184-96 Cummings

1.1 Description of Proposed Development	
Municipal Address	1184, 1188, 1196 Cummings Avenue
Description of Location	Three existing residential lots north of the Ogilvie-Cummings intersection
Land Use Classification	Residential Third Density (R3Y [708])
Development Size	188 residential units, approximately 56 parking stalls
Accesses	Single access
Phase of Development	Single
Buildout Year	2025
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	188	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)?	Yes	Site frontage is 32m north of Ogilvie to 108m north of Ogilvie
Is the proposed driveway within auxiliary lanes of an intersection?	Yes	Southbound left-turn on Cummings extends Donald, all accesses along Cummings are within an auxiliary lane
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 Ogilvie and Cyrville
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.**

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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)
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Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

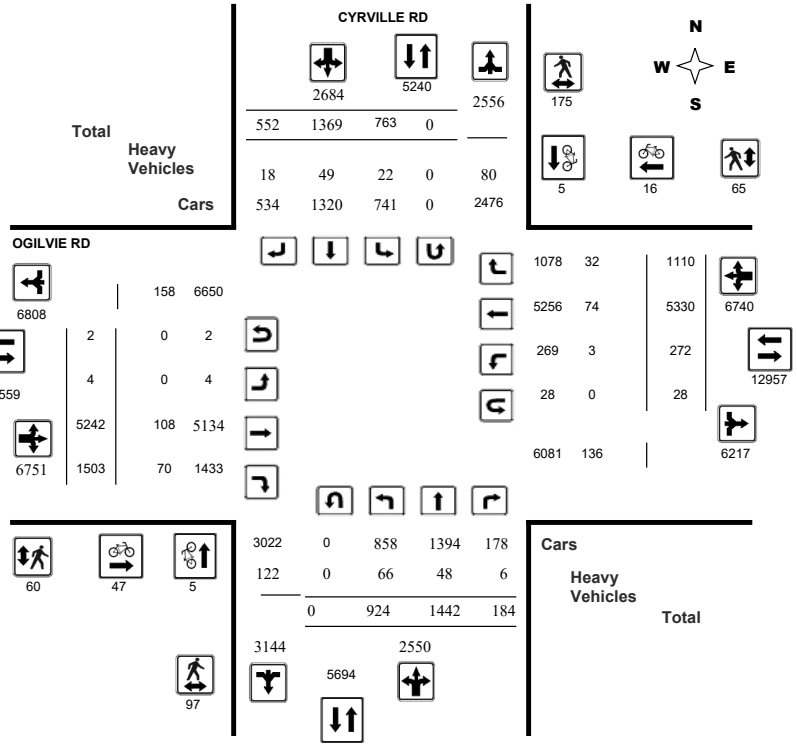
Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Diagram



Transportation Services - Traffic Services

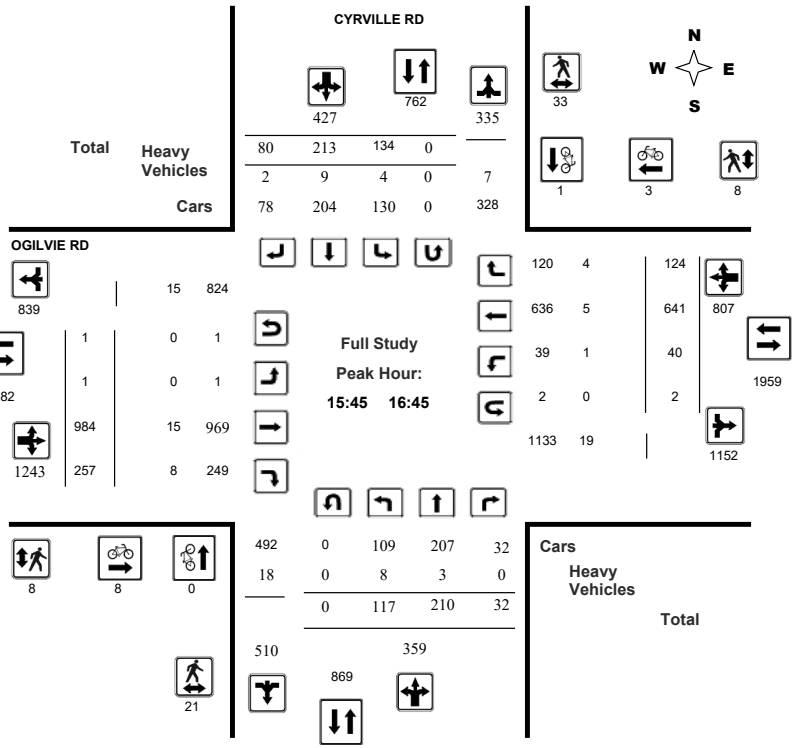
Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Peak Hour Diagram



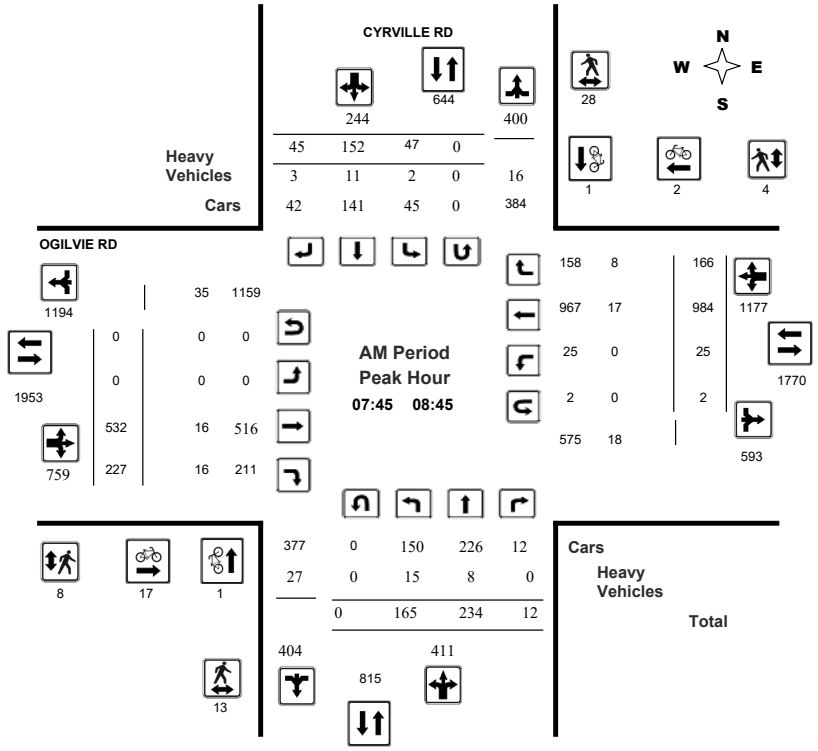
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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



Comments

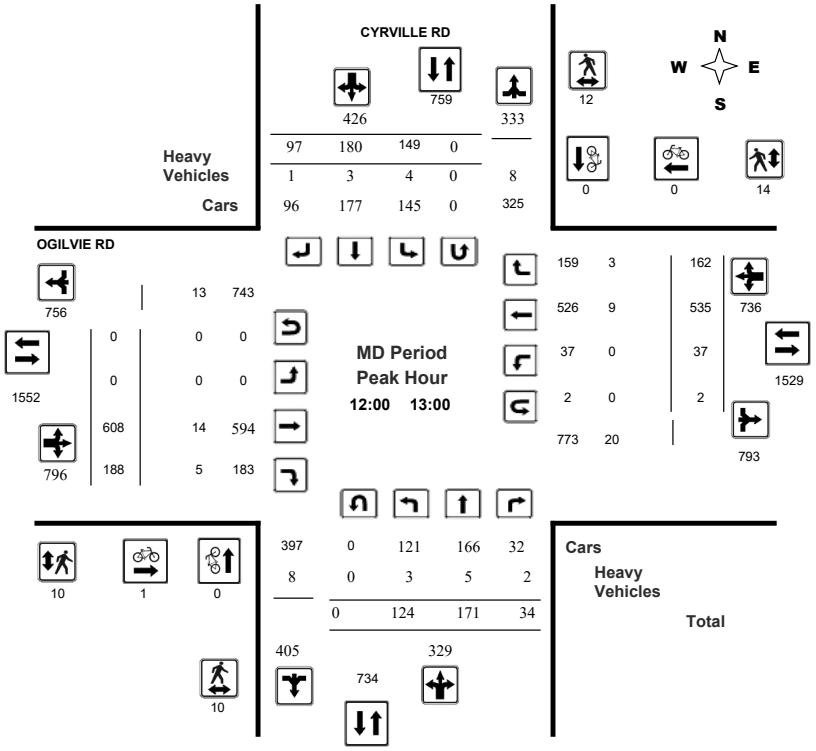
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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



Comments

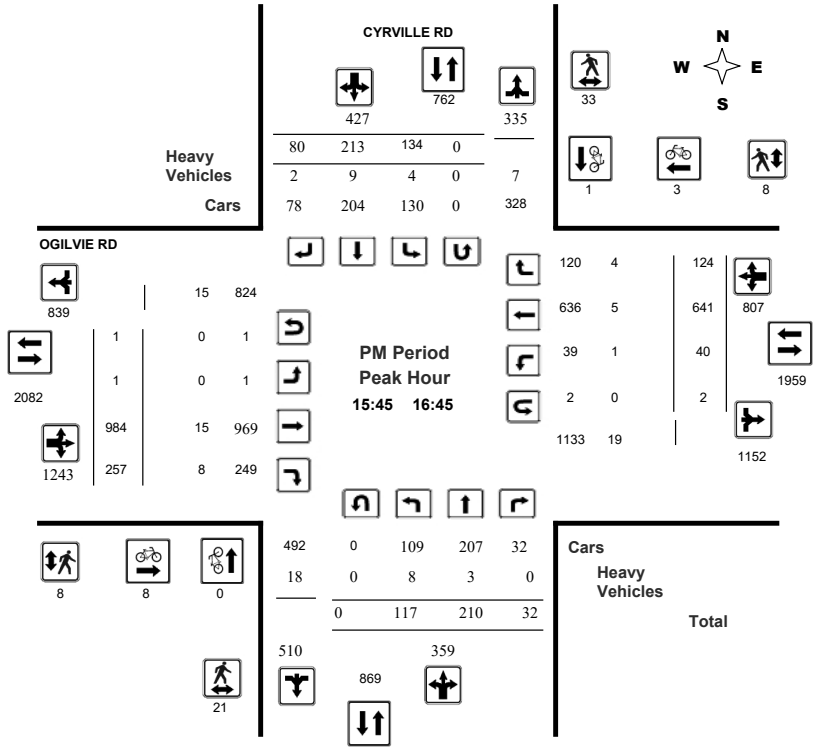
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 2 Westbound: 28

AADT Factor .90

	CYRVILLE RD									OGILVIE RD									
	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	144	156	10	**310**	27	172	35	**234**	**544**	0	556	185	**741**	24	838	146	**1008**	**1749**	**2293**
08:00 09:00	157	230	13	**400**	64	144	49	**257**	**657**	0	545	201	**746**	31	921	172	**1124**	**1870**	**2527**
09:00 10:00	86	133	12	**231**	74	144	52	**270**	**501**	1	475	145	**621**	38	576	126	**740**	**1361**	**1862**
11:30 12:30	113	173	36	**322**	92	156	105	**353**	**675**	0	654	174	**828**	27	523	152	**702**	**1530**	**2205**
12:30 13:30	113	151	35	**299**	146	179	90	**415**	**714**	0	563	188	**751**	44	535	138	**717**	**1468**	**2182**
15:00 16:00	109	178	29	**316**	122	227	64	**413**	**729**	2	828	205	**1035**	33	632	143	**808**	**1843**	**2572**
16:00 17:00	124	215	16	**355**	129	189	86	**404**	**759**	1	736	256	**993**	34	656	117	**807**	**1800**	**2559**
17:00 18:00	78	206	33	**317**	109	158	71	**338**	**655**	0	885	149	**1034**	41	649	116	**806**	**1840**	**2495**
Sub Total	924	1442	184	**2550**	763	1369	552	**2684**	**5234**	4	5242	1503	**6749**	272	5330	1110	**6712**	**13461**	**18695**
U Turns				**0**				**0**	**0**				**2**				**28**	**30**	**30**
Total	924	1442	184	**2550**	763	1369	552	**2684**	**5234**	4	5242	1503	**6751**	272	5330	1110	**6740**	**13491**	**18725**
EQ 12Hr	1284	2004	256	**3544**	1061	1903	767	**3731**	**7275**	6	7286	2089	**9384**	378	7409	1543	**9369**	**18752**	**26028**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1089	1700	217	**3006**	900	1614	651	**3164**	**6548**	5	6180	1772	**7959**	321	6284	1309	**7946**	**16877**	**23425**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	1427	2227	284	**3938**	1178	2114	853	**4145**	**8083**	6	8096	2321	**10427**	420	8232	1714	**10410**	**20837**	**28920**
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

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study 15 Minute Increments

		CYRVILLE RD									OGILVIE RD									
		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	26	39	1	66	4	36	9	49	5	0	128	42	170	6	162	37	206	5	491
07:15	07:30	44	28	3	75	6	36	10	52	8	0	146	40	186	3	188	39	230	8	543
07:30	07:45	31	37	3	71	7	53	6	66	9	0	148	39	187	12	236	31	279	9	603
07:45	08:00	43	52	3	98	10	47	10	67	10	0	134	64	198	3	252	39	294	10	657
08:00	08:15	32	50	3	85	12	28	7	47	10	0	131	52	183	6	270	38	314	10	629
08:15	08:30	44	73	3	120	10	31	13	54	8	0	140	58	198	8	252	33	295	8	667
08:30	08:45	46	59	3	108	15	46	15	76	11	0	127	53	180	8	210	56	274	11	638
08:45	09:00	35	48	4	87	27	39	14	80	11	0	147	38	185	9	189	45	243	11	595
09:00	09:15	21	31	3	55	16	48	10	74	7	0	126	40	166	12	163	52	227	7	522
09:15	09:30	26	35	1	62	15	27	15	57	4	0	130	32	162	9	140	26	175	4	456
09:30	09:45	16	35	5	56	27	46	19	92	10	1	126	39	166	14	150	24	188	10	502
09:45	10:00	23	32	3	58	16	23	8	47	9	0	93	34	127	3	123	24	153	9	385
11:30	11:45	30	40	9	79	31	33	25	89	3	0	166	41	207	7	128	28	163	3	538
11:45	12:00	23	45	8	76	16	37	22	75	12	0	160	44	204	7	126	35	179	12	534
12:00	12:15	32	46	11	89	24	38	30	92	2	0	150	33	183	7	144	37	189	2	553
12:15	12:30	28	42	8	78	21	48	28	97	3	0	178	56	234	6	125	52	184	3	593
12:30	12:45	30	40	7	77	73	36	15	124	8	0	130	44	174	11	143	34	188	8	563
12:45	13:00	34	43	8	85	31	58	24	113	5	0	150	55	205	13	123	39	175	5	578
13:00	13:15	29	39	12	80	27	42	28	97	10	0	139	49	188	10	126	29	165	10	530
13:15	13:30	20	29	8	57	15	43	23	81	5	0	144	40	184	10	143	36	190	5	512
15:00	15:15	34	40	5	79	35	55	23	113	5	0	195	47	243	12	158	28	198	5	633
15:15	15:30	23	49	3	75	30	53	14	97	4	2	206	36	244	6	143	38	187	4	603
15:30	15:45	25	48	5	78	26	46	16	88	3	0	179	46	225	9	184	38	232	3	623
15:45	16:00	27	41	16	84	31	73	11	115	9	0	248	76	324	6	147	39	192	9	715
16:00	16:15	31	70	3	104	40	45	15	100	6	0	259	55	315	13	171	23	207	6	726
16:15	16:30	22	48	4	74	30	47	28	105	5	0	233	78	311	14	154	32	201	5	691
16:30	16:45	37	51	9	97	33	48	26	107	6	1	244	48	293	7	169	30	207	6	704
16:45	17:00	34	46	0	80	26	49	17	92	5	0	0	75	75	0	162	32	194	5	441
17:00	17:15	17	63	9	89	28	49	12	89	5	0	283	44	327	11	167	26	205	5	710
17:15	17:30	19	47	7	73	34	43	17	94	4	0	245	38	283	16	182	31	231	4	681
17:30	17:45	22	55	8	85	31	38	20	89	2	0	197	29	226	5	145	27	177	2	577
17:45	18:00	20	41	9	70	16	28	22	66	5	0	160	38	198	9	155	32	198	5	532
Total:		924	1442	184	2550	763	1369	552	2684	209	4	5242	1503	6751	272	5330	1110	6740	209	18,725

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Cyclist Volume

		CYRVILLE RD			OGILVIE RD			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	1	0	1	1
07:15	07:30	1	0	1	1	1	2	3
07:30	07:45	0	1	1	1	2	3	4
07:45	08:00	1	0	1	3	1	4	5
08:00	08:15	0	0	0	8	0	8	8
08:15	08:30	0	1	1	4	1	5	6
08:30	08:45	0	0	0	2	0	2	2
08:45	09:00	0	1	1	3	0	3	4
09:00	09:15	1	0	1	1	0	1	2
09:15	09:30	0	0	0	2	0	2	2
09:30	09:45	0	0	0	1	1	2	2
09:45	10:00	0	0	0	1	0	1	1
11:30	11:45	1	0	1	0	0	0	1
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	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	1	1	2	2
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	2	0	2	2
15:45	16:00	0	0	0	2	0	2	2
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	1	1	2	1	3	4
16:30	16:45	0	0	0	4	2	6	6
16:45	17:00	0	0	0	0	1	1	1
17:00	17:15	0	0	0	4	2	6	6
17:15	17:30	0	1	1	1	1	2	3
17:30	17:45	1	0	1	1	2	3	4
17:45	18:00	0	0	0	1	0	1	1
Total		5	5	**10**	47	16	63	73

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Pedestrian Volume

		CYRVILLE RD			OGILVIE RD			
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	2	3	**5**	1	2	**3**	**8**
07:15	07:30	2	6	**8**	2	1	**3**	**11**
07:30	07:45	1	5	**6**	2	2	**4**	**10**
07:45	08:00	5	8	**13**	0	1	**1**	**14**
08:00	08:15	3	5	**8**	3	1	**4**	**12**
08:15	08:30	3	7	**10**	2	0	**2**	**12**
08:30	08:45	2	8	**10**	3	2	**5**	**15**
08:45	09:00	6	7	**13**	4	1	**5**	**18**
09:00	09:15	4	7	**11**	3	2	**5**	**16**
09:15	09:30	3	3	**6**	0	2	**2**	**8**
09:30	09:45	0	2	**2**	0	2	**2**	**4**
09:45	10:00	0	2	**2**	0	0	**0**	**2**
11:30	11:45	7	3	**10**	0	2	**2**	**12**
11:45	12:00	4	4	**8**	1	2	**3**	**11**
12:00	12:15	7	1	**8**	3	4	**7**	**15**
12:15	12:30	1	4	**5**	6	2	**8**	**13**
12:30	12:45	1	4	**5**	0	3	**3**	**8**
12:45	13:00	1	3	**4**	1	5	**6**	**10**
13:00	13:15	2	6	**8**	1	1	**2**	**10**
13:15	13:30	1	7	**8**	3	2	**5**	**13**
15:00	15:15	6	4	**10**	1	1	**2**	**12**
15:15	15:30	6	5	**11**	7	3	**10**	**21**
15:30	15:45	0	4	**4**	1	2	**3**	**7**
15:45	16:00	2	6	**8**	4	1	**5**	**13**
16:00	16:15	8	16	**24**	2	5	**7**	**31**
16:15	16:30	5	3	**8**	2	2	**4**	**12**
16:30	16:45	6	8	**14**	0	0	**0**	**14**
16:45	17:00	0	8	**8**	4	6	**10**	**18**
17:00	17:15	2	7	**9**	1	1	**2**	**11**
17:15	17:30	5	7	**12**	1	3	**4**	**16**
17:30	17:45	1	7	**8**	0	1	**1**	**9**
17:45	18:00	1	5	**6**	2	3	**5**	**11**
Total	.....	97	175	**272**	60	65	**125**	**397**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study Heavy Vehicles

		CYRVILLE RD									OGILVIE RD									
		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	2	0	**3**	1	1	0	**2**	**5**	0	7	2	**9**	0	3	1	**4**	**13**	**18**
07:15	07:30	4	1	0	**5**	1	1	1	**3**	**8**	0	4	1	**5**	0	1	1	**2**	**7**	**15**
07:30	07:45	4	4	1	**9**	0	0	0	**0**	**9**	0	5	2	**7**	0	3	0	**3**	**10**	**19**
07:45	08:00	6	3	0	**9**	0	0	1	**1**	**10**	0	6	3	**9**	0	7	2	**9**	**18**	**28**
08:00	08:15	1	3	0	**4**	1	4	1	**6**	**10**	0	5	3	**8**	0	4	0	**4**	**12**	**22**
08:15	08:30	3	0	0	**3**	1	4	0	**5**	**8**	0	4	4	**8**	0	1	1	**2**	**10**	**18**
08:30	08:45	5	2	0	**7**	0	3	1	**4**	**11**	0	1	6	**7**	0	5	5	**10**	**17**	**28**
08:45	09:00	3	0	1	**4**	1	5	1	**7**	**11**	0	3	1	**4**	0	2	1	**3**	**7**	**18**
09:00	09:15	3	1	1	**5**	0	2	0	**2**	**7**	0	5	3	**8**	0	3	1	**4**	**12**	**19**
09:15	09:30	1	2	0	**3**	0	0	1	**1**	**4**	0	4	4	**8**	0	2	0	**2**	**10**	**14**
09:30	09:45	3	4	0	**7**	1	2	0	**3**	**10**	0	3	3	**6**	0	4	1	**5**	**11**	**21**
09:45	10:00	4	5	0	**9**	0	0	0	**0**	**9**	0	3	2	**5**	0	5	2	**7**	**12**	**21**
11:30	11:45	1	1	0	**2**	1	0	0	**1**	**3**	0	7	2	**9**	0	1	1	**2**	**11**	**14**
11:45	12:00	2	5	0	**7**	0	1	4	**5**	**12**	0	1	1	**2**	0	3	2	**5**	**7**	**19**
12:00	12:15	1	0	0	**1**	1	0	0	**1**	**2**	0	3	0	**3**	0	2	1	**3**	**6**	**8**
12:15	12:30	1	2	0	**3**	0	0	0	**0**	**3**	0	3	2	**5**	0	2	0	**2**	**7**	**10**
12:30	12:45	0	2	2	**4**	2	2	0	**4**	**8**	0	6	3	**9**	0	4	1	**5**	**14**	**22**
12:45	13:00	1	1	0	**2**	1	1	1	**3**	**5**	0	2	0	**2**	0	1	1	**2**	**4**	**9**
13:00	13:15	2	4	0	**6**	1	1	2	**4**	**10**	0	2	3	**5**	1	6	1	**8**	**13**	**23**
13:15	13:30	3	0	0	**3**	1	1	0	**2**	**5**	0	0	1	**1**	0	1	2	**3**	**4**	**9**
15:00	15:15	1	0	1	**2**	0	2	1	**3**	**5**	0	10	2	**12**	0	4	2	**6**	**18**	**23**
15:15	15:30	2	0	0	**2**	0	2	0	**2**	**4**	0	5	3	**8**	0	1	1	**2**	**10**	**14**
15:30	15:45	1	0	0	**1**	1	1	0	**2**	**3**	0	1	1	**2**	1	0	0	**1**	**3**	**6**
15:45	16:00	5	0	0	**5**	0	4	0	**4**	**9**	0	2	2	**4**	0	1	3	**4**	**8**	**17**
16:00	16:15	1	3	0	**4**	1	1	0	**2**	**6**	0	8	1	**9**	0	3	1	**4**	**13**	**19**
16:15	16:30	0	0	0	**0**	1	3	1	**5**	**5**	0	3	2	**5**	1	0	0	**1**	**6**	**11**
16:30	16:45	2	0	0	**2**	2	1	1	**4**	**6**	0	2	3	**5**	0	1	0	**1**	**6**	**12**
16:45	17:00	1	0	0	**1**	0	4	0	**4**	**5**	0	0	4	**4**	0	1	0	**1**	**5**	**10**
17:00	17:15	1	1	0	**2**	1	2	0	**3**	**5**	0	1	2	**3**	0	1	0	**1**	**4**	**9**
17:15	17:30	1	1	0	**2**	1	0	1	**2**	**4**	0	1	1	**2**	0	0	1	**1**	**3**	**7**
17:30	17:45	1	1	0	**2**	0	0	0	**0**	**2**	0	1	2	**3**	0	2	0	**2**	**5**	**7**
17:45	18:00	1	0	0	**1**	2	1	1	**4**	**5**	0	0	1	**1**	0	0	0	**0**	**1**	**6**
Total:	None	66	48	6	**120**	22	49	18	**89**	**209**	0	108	70	**178**	3	74	32	**109**	**287**	**496**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37723

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

Full Study 15 Minute U-Turn Total

Time Period		CYRVILLE RD Northbound U-Turn Total	CYRVILLE RD Southbound U-Turn Total	OGILVIE RD Eastbound U-Turn Total	OGILVIE RD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	1	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	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	2	2
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	3	3
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	11	11
12:00	12:15	0	0	0	1	1
12:15	12:30	0	0	0	1	1
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	1	1
15:00	15:15	0	0	1	0	1
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	1	0	1
16:15	16:30	0	0	0	1	1
16:30	16:45	0	0	0	1	1
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	1	1
17:15	17:30	0	0	0	2	2
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	2	2
Total		0	0	2	28	30

Transportation Services - Traffic Services W.O. 37738

Turning Movement Count - 15 Minute Summary Report

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 2 Southbound: 0

Eastbound: 76 Westbound: 20

		CUMMINGS AVE Northbound				CUMMINGS AVE Southbound					OGILVIE RD Eastbound					OGILVIE RD 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	24	9	**34**	19	23	22	**64**	**98**	7	105	3	**115**	22	165	30	**217**	**332**	**430**		
07:15	07:30	5	21	17	**43**	25	23	23	**71**	**114**	11	138	1	**151**	45	194	26	**265**	**416**	**530**		
07:30	07:45	4	23	16	**43**	43	30	36	**109**	**152**	14	142	0	**158**	25	226	30	**281**	**439**	**591**		
07:45	08:00	2	25	13	**40**	32	33	23	**88**	**128**	14	145	2	**161**	42	280	40	**363**	**524**	**652**		
08:00	08:15	4	33	11	**48**	41	33	35	**109**	**157**	15	122	2	**139**	38	289	35	**363**	**502**	**659**		
08:15	08:30	6	25	21	**52**	34	23	29	**86**	**138**	11	142	3	**156**	47	256	54	**358**	**514**	**652**		
08:30	08:45	6	28	18	**52**	31	27	25	**83**	**135**	8	147	4	**162**	36	251	41	**329**	**491**	**626**		
08:45	09:00	6	20	17	**43**	41	24	23	**88**	**131**	9	161	5	**177**	37	225	41	**303**	**480**	**611**		
09:00	09:15	4	40	14	**58**	57	31	18	**106**	**164**	9	119	5	**133**	21	182	27	**230**	**363**	**527**		
09:15	09:30	6	27	21	**54**	38	26	22	**86**	**140**	13	147	7	**168**	24	168	42	**235**	**403**	**543**		
09:30	09:45	5	32	29	**66**	36	28	22	**86**	**152**	9	132	3	**144**	24	161	26	**211**	**355**	**507**		
09:45	10:00	2	32	26	**60**	25	33	33	**91**	**151**	14	117	2	**135**	27	115	35	**177**	**312**	**463**		
11:30	11:45	5	28	33	**66**	40	40	21	**101**	**167**	17	158	8	**184**	31	152	37	**220**	**404**	**571**		
11:45	12:00	7	41	42	**90**	44	36	18	**98**	**188**	21	156	10	**190**	35	164	37	**236**	**426**	**614**		
12:00	12:15	5	38	46	**89**	56	37	17	**110**	**199**	15	157	5	**180**	32	173	51	**258**	**438**	**637**		
12:15	12:30	10	33	50	**93**	54	42	16	**112**	**205**	22	168	9	**201**	31	168	47	**246**	**447**	**652**		
12:30	12:45	7	42	31	**80**	48	46	26	**120**	**200**	13	185	8	**209**	26	157	25	**208**	**417**	**617**		
12:45	13:00	9	39	36	**84**	55	45	16	**116**	**200**	17	177	8	**206**	30	152	36	**219**	**425**	**625**		
13:00	13:15	10	32	32	**74**	48	59	11	**118**	**192**	22	163	5	**193**	35	146	37	**218**	**411**	**603**		
13:15	13:30	7	35	39	**81**	60	22	21	**103**	**184**	14	135	10	**168**	37	148	45	**230**	**398**	**582**		
15:00	15:15	7	35	53	**95**	52	30	13	**95**	**190**	24	173	6	**208**	24	163	54	**242**	**450**	**640**		
15:15	15:30	10	43	46	**99**	48	43	17	**108**	**207**	25	199	7	**233**	23	144	46	**213**	**446**	**653**		
15:30	15:45	5	40	49	**94**	77	51	27	**155**	**249**	21	207	5	**235**	28	199	68	**296**	**531**	**780**		
15:45	16:00	5	45	48	**98**	63	44	24	**131**	**229**	25	193	3	**223**	32	160	53	**246**	**469**	**698**		
16:00	16:15	3	47	59	**110**	62	40	29	**131**	**241**	23	292	9	**327**	21	173	50	**244**	**571**	**812**		
16:15	16:30	6	45	40	**92**	76	44	17	**137**	**229**	21	267	0	**289**	20	163	39	**224**	**513**	**742**		
16:30	16:45	8	35	73	**116**	61	39	22	**122**	**238**	21	283	5	**313**	24	196	43	**264**	**577**	**815**		
16:45	17:00	4	49	45	**98**	71	44	20	**135**	**233**	28	246	4	**279**	27	161	42	**233**	**512**	**745**		
17:00	17:15	13	36	48	**97**	61	28	23	**112**	**209**	33	300	6	**343**	32	182	69	**283**	**626**	**835**		
17:15	17:30	11	42	50	**103**	65	52	19	**136**	**239**	28	253	8	**299**	26	190	55	**274**	**573**	**812**		
17:30	17:45	9	37	31	**77**	58	27	15	**100**	**177**	25	220	7	**254**	18	174	33	**225**	**479**	**656**		
17:45	18:00	6	30	35	**71**	56	23	29	**108**	**179**	25	168	4	**198**	18	154	39	**211**	**409**	**588**		
TOTAL:		198	1102	1098	**2400**	1577	1126	712	**3415**	**5815**	574	5717	164	**6531**	938	5831	1333	**8122**	**14653**	**20468**		

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
37738

CUMMINGS AVE @ OGILVIE RD

Count Date: Wednesday, April 11, 2018 **Start Time:** 07:00

	CUMMINGS AVE			OGILVIE RD			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	0	1	**1**	8	6	**14**	**15**
08:00 09:00	3	1	**4**	13	1	**14**	**18**
09:00 10:00	0	0	**0**	5	1	**6**	**6**
11:30 12:30	0	1	**1**	0	2	**2**	**3**
12:30 13:30	0	0	**0**	1	2	**3**	**3**
15:00 16:00	3	4	**7**	5	8	**13**	**20**
16:00 17:00	1	5	**6**	6	7	**13**	**19**
17:00 18:00	3	2	**5**	7	8	**15**	**20**
Total	10	14	**24**	45	35	**80**	**104**

Comment:

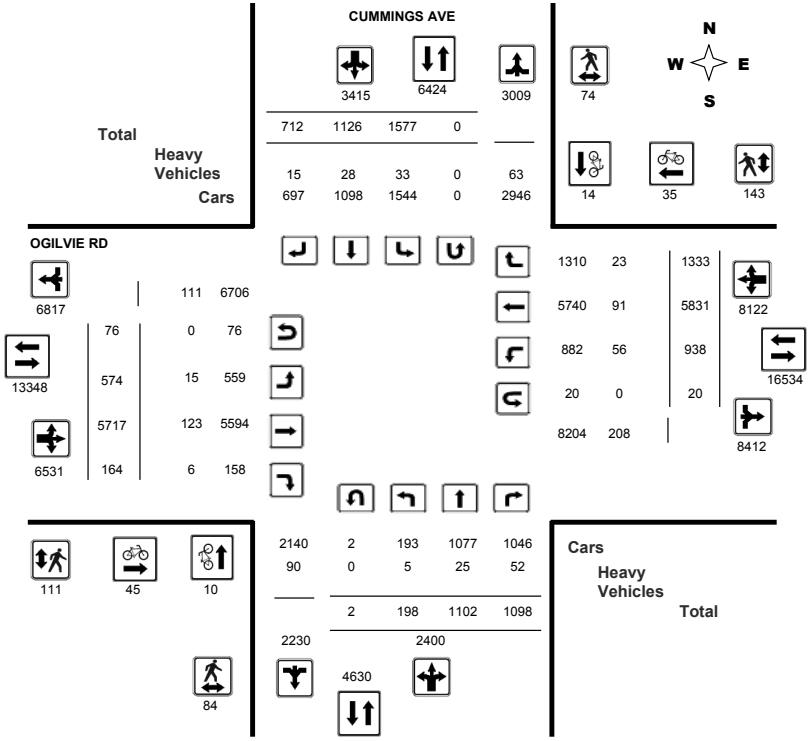
Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO#:** 37738
Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 37738

Turning Movement Count - Heavy Vehicle Report

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

Time Period	CUMMINGS AVE Northbound LT	ST	RT	N TOT	CUMMINGS AVE Southbound LT	ST	RT	S TOT	STR TOT	OGILVIE RD Eastbound LT	ST	RT	E TOT	OGILVIE RD Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 08:00	2	7	6	**15**	5	2	0	**7**	**22**	1	25	0	**26**	5	14	4	**23**	**49**	**71**
08:00 09:00	0	5	12	**17**	9	1	0	**10**	**27**	3	11	1	**15**	9	26	5	**40**	**55**	**82**
09:00 10:00	0	6	6	**12**	7	7	3	**17**	**29**	2	14	1	**17**	10	12	1	**23**	**40**	**69**
11:30 12:30	0	2	8	**10**	1	1	3	**5**	**15**	5	11	1	**17**	8	9	0	**17**	**34**	**49**
12:30 13:30	1	1	5	**7**	3	3	3	**9**	**16**	1	17	0	**18**	4	15	3	**22**	**40**	**56**
15:00 16:00	0	2	8	**10**	5	8	4	**17**	**27**	0	25	0	**25**	10	8	6	**24**	**49**	**76**
16:00 17:00	1	2	3	**6**	3	5	1	**9**	**15**	2	13	3	**18**	6	4	3	**13**	**31**	**46**
17:00 18:00	1	0	4	**5**	0	1	1	**2**	**7**	1	7	0	**8**	4	3	1	**8**	**16**	**23**
Sub Total	5	25	52	**82**	33	28	15	**76**	**158**	15	123	6	**144**	56	91	23	**170**	**314**	**472**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	5	25	52	**0**	33	28	15	**76**	**158**	15	123	6	**144**	56	91	23	**170**	**314**	**472**

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 37738

Turning Movement Count - Pedestrian Volume Report

CUMMINGS AVE @ OGILVIE RD

Count Date: Wednesday, April 11, 2018 **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	1	0	**1**	2	1	**3**	**4**
07:15 07:30	3	4	**7**	0	7	**7**	**14**
07:30 07:45	2	3	**5**	3	2	**5**	**10**
07:45 08:00	2	3	**5**	0	9	**9**	**14**
07:00 08:00	8	10	**18**	5	19	**24**	**42**
08:00 08:15	4	6	**10**	2	12	**14**	**24**
08:15 08:30	4	5	**9**	1	17	**18**	**27**
08:30 08:45	5	11	**16**	2	14	**16**	**32**
08:45 09:00	5	2	**7**	4	17	**21**	**28**
08:00 09:00	18	24	**42**	9	60	**69**	**111**
09:00 09:15	4	1	**5**	0	5	**5**	**10**
09:15 09:30	1	1	**2**	0	0	**0**	**2**
09:30 09:45	0	2	**2**	0	1	**1**	**3**
09:45 10:00	0	1	**1**	0	4	**4**	**5**
09:00 10:00	5	5	**10**	0	10	**10**	**20**
11:30 11:45	4	1	**5**	1	2	**3**	**8**
11:45 12:00	1	1	**2**	1	0	**1**	**3**
12:00 12:15	3	3	**6**	1	6	**7**	**13**
12:15 12:30	0	1	**1**	2	5	**7**	**8**
11:30 12:30	8	6	**14**	5	13	**18**	**32**
12:30 12:45	1	1	**2**	2	1	**3**	**5**
12:45 13:00	2	1	**3**	2	3	**5**	**8**
13:00 13:15	3	4	**7**	1	7	**8**	**15**
13:15 13:30	0	2	**2**	1	0	**1**	**3**
12:30 13:30	6	8	**14**	6	11	**17**	**31**
15:00 15:15	3	1	**4**	0	6	**6**	**10**
15:15 15:30	5	1	**6**	20	2	**22**	**28**
15:30 15:45	0	2	**2**	5	2	**7**	**9**
15:45 16:00	1	2	**3**	28	0	**28**	**31**
15:00 16:00	9	6	**15**	53	10	**63**	**78**
16:00 16:15	5	2	**7**	5	1	**6**	**13**
16:15 16:30	1	1	**2**	1	0	**1**	**3**
16:30 16:45	7	1	**8**	5	4	**9**	**17**
16:45 17:00	3	5	**8**	8	2	**10**	**18**
16:00 17:00	16	9	**25**	19	7	**26**	**51**
17:00 17:15	8	3	**11**	7	1	**8**	**19**
17:15 17:30	3	1	**4**	5	9	**14**	**18**
17:30 17:45	2	0	**2**	0	0	**0**	**2**
17:45 18:00	1	2	**3**	2	3	**5**	**8**
17:00 18:00	14	6	**20**	14	13	**27**	**47**
Total	84	74	**158**	111	143	**254**	**412**

Comment:

Transportation Services - Traffic Services

Work Order 37738

Turning Movement Count - Full Study Summary Report

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 2 Southbound: 0 Eastbound: 76 Westbound: 20

AADT Factor .90

Full Study

	CUMMINGS AVE									OGILVIE RD									
	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	12	93	55	**160**	119	109	104	**332**	**492**	46	530	6	**582**	134	865	126	**1125**	**1707**	**2199**
08:00 09:00	22	106	67	**195**	147	107	112	**366**	**561**	43	572	14	**629**	158	1021	171	**1350**	**1979**	**2540**
09:00 10:00	17	131	90	**238**	156	118	95	**369**	**607**	45	515	17	**577**	96	626	130	**852**	**1429**	**2036**
11:30 12:30	27	140	171	**338**	194	155	72	**421**	**759**	75	639	32	**746**	129	657	172	**958**	**1704**	**2463**
12:30 13:30	33	148	138	**319**	211	172	74	**457**	**776**	66	660	31	**757**	128	603	143	**874**	**1631**	**2407**
15:00 16:00	27	163	196	**386**	240	168	81	**489**	**875**	95	772	21	**888**	107	666	221	**994**	**1882**	**2757**
16:00 17:00	21	176	217	**414**	270	167	88	**525**	**939**	93	1088	18	**1199**	92	693	174	**959**	**2158**	**3097**
17:00 18:00	39	145	164	**348**	240	130	86	**456**	**804**	111	941	25	**1077**	94	700	196	**990**	**2067**	**2871**
Sub Total	198	1102	1098	**2398**	1577	1126	712	**3415**	**5813**	574	5717	164	**6455**	938	5831	1333	**8102**	**14557**	**20370**
U Turns				**2**				**0**	**2**				**76**				**20**	**96**	**98**
Total	198	1102	1098	**2400**	1577	1126	712	**3415**	**5815**	574	5717	164	**6531**	938	5831	1333	**8122**	**14653**	**20468**
EQ 12Hr	275	1532	1526	**3336**	2192	1565	990	**4747**	**8083**	798	7947	228	**9078**	1304	8105	1853	**11290**	**20368**	**28451**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	248	1379	1374	**3002**	1973	1409	891	**4272**	**7274**	718	7152	205	**8170**	1173	7295	1668	**10161**	**18331**	**25605**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	324	1806	1799	**3933**	2584	1845	1167	**5597**	**9530**	941	9369	269	**10703**	1537	9556	2185	**13310**	**24013**	**33543**
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.

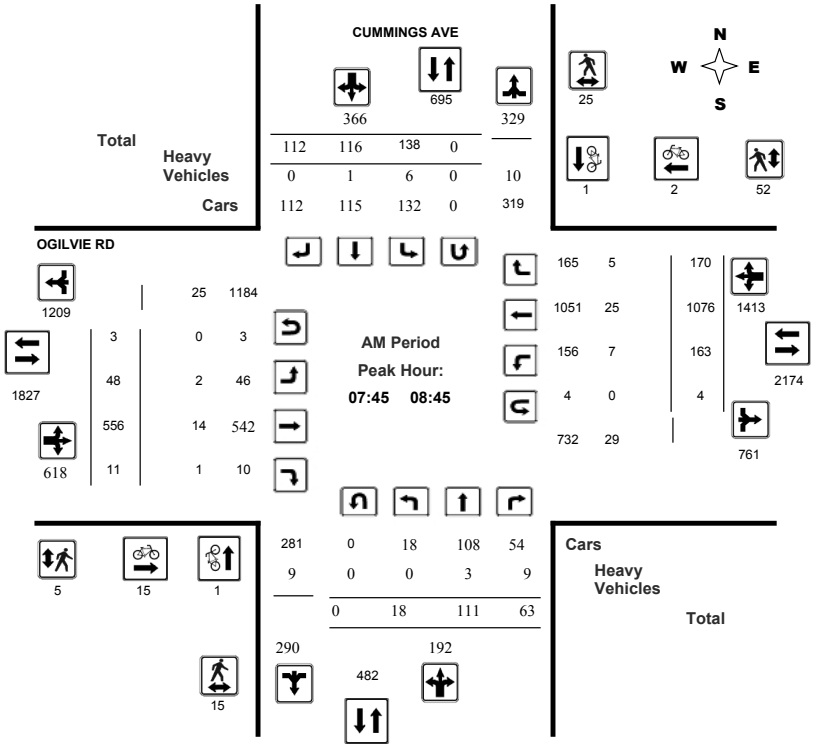
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37738

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



Comments

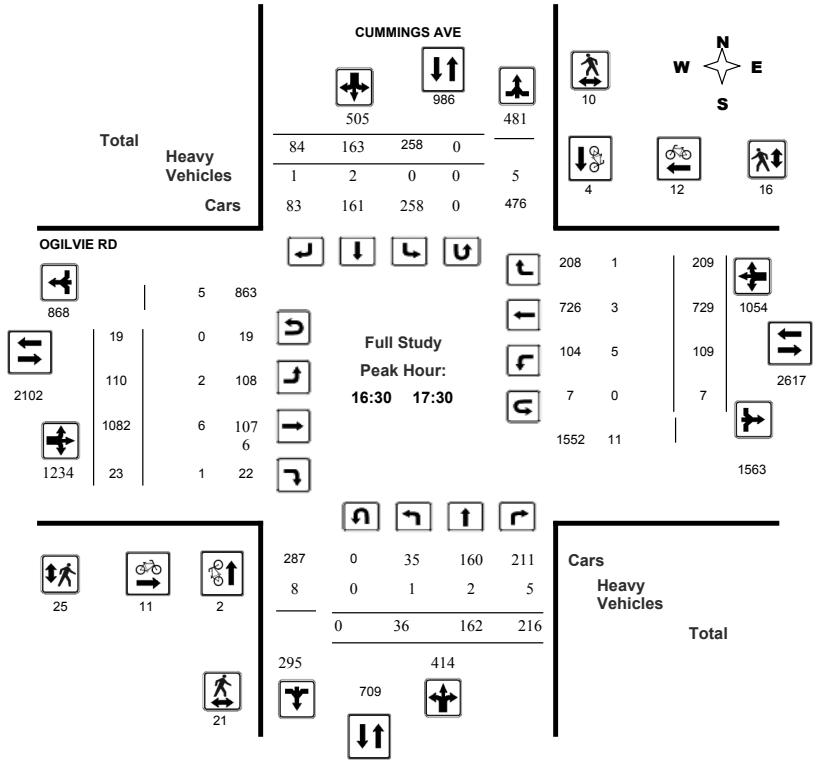
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37738

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



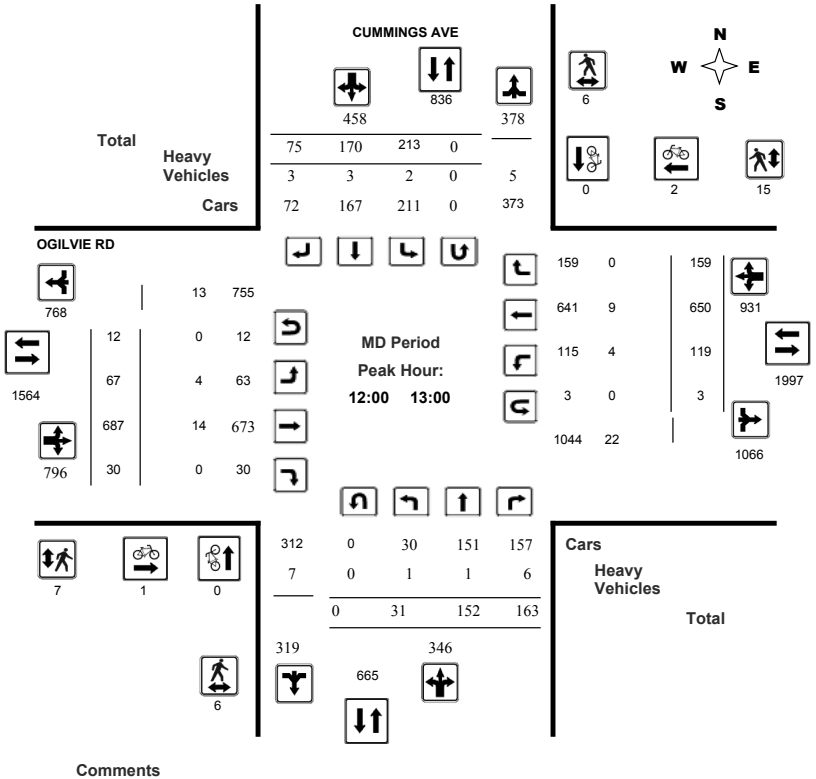
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37738

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



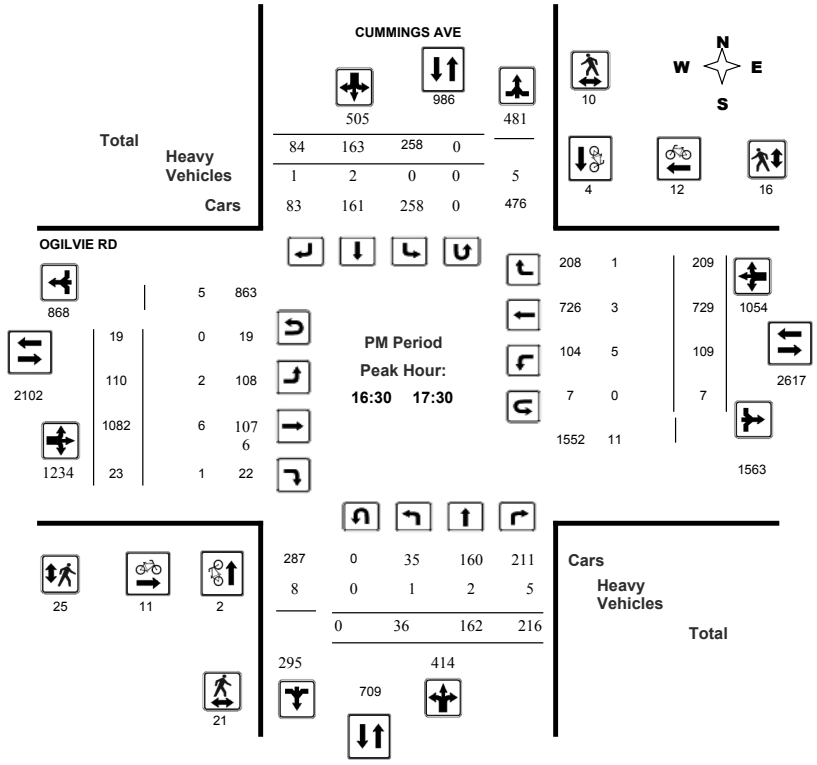
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018 **WO No:** 37738

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



Comments

Transportation Services - Traffic Services

Work Order 37738

Turning Movement Count - 15 Min U-Turn Total Report

CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

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	1	0	1
07:30	07:45	0	0	2	0	2
07:45	08:00	0	0	0	1	1
08:00	08:15	0	0	0	1	1
08:15	08:30	0	0	0	1	1
08:30	08:45	0	0	3	1	4
08:45	09:00	0	0	2	0	2
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	1	1	2
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	2	0	2
11:30	11:45	0	0	1	0	1
11:45	12:00	0	0	3	0	3
12:00	12:15	0	0	3	2	5
12:15	12:30	0	0	2	0	2
12:30	12:45	0	0	3	0	3
12:45	13:00	0	0	4	1	5
13:00	13:15	0	0	3	0	3
13:15	13:30	0	0	9	0	9
15:00	15:15	0	0	5	1	6
15:15	15:30	0	0	2	0	2
15:30	15:45	0	0	2	1	3
15:45	16:00	0	0	2	1	3
16:00	16:15	1	0	3	0	4
16:15	16:30	1	0	1	2	4
16:30	16:45	0	0	4	1	5
16:45	17:00	0	0	1	3	4
17:00	17:15	0	0	4	0	4
17:15	17:30	0	0	10	3	13
17:30	17:45	0	0	2	0	2
17:45	18:00	0	0	1	0	1
Total		2	0	76	20	98

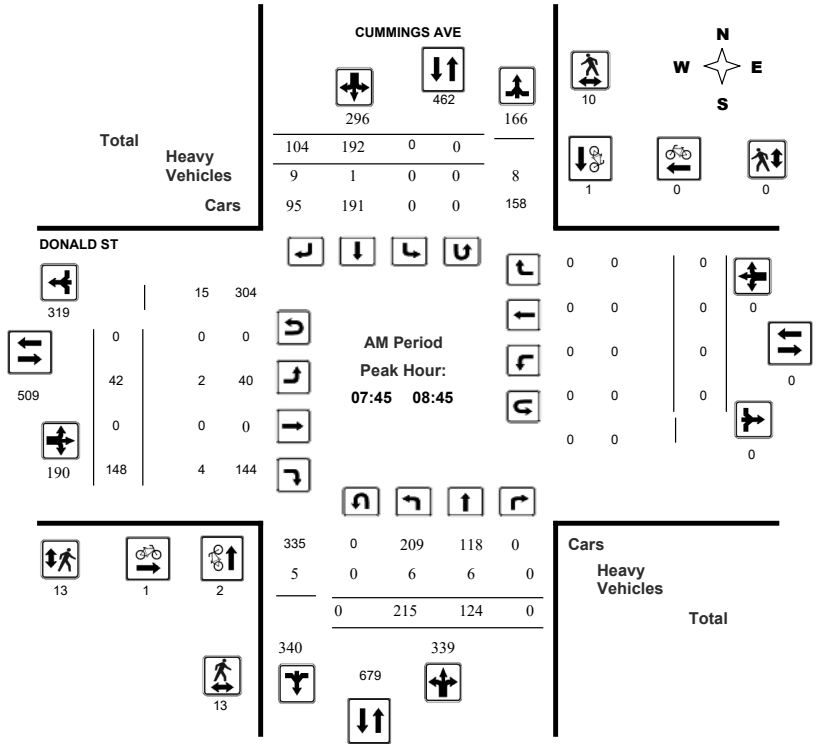
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018 **WO No:** 37720

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



Comments

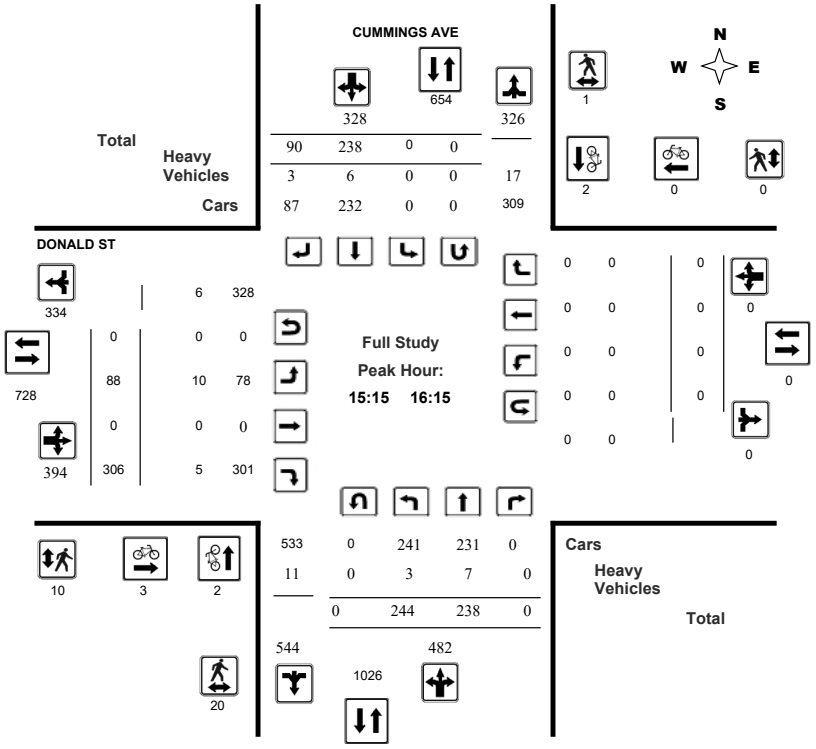
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018 **WO No:** 37720

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



Comments

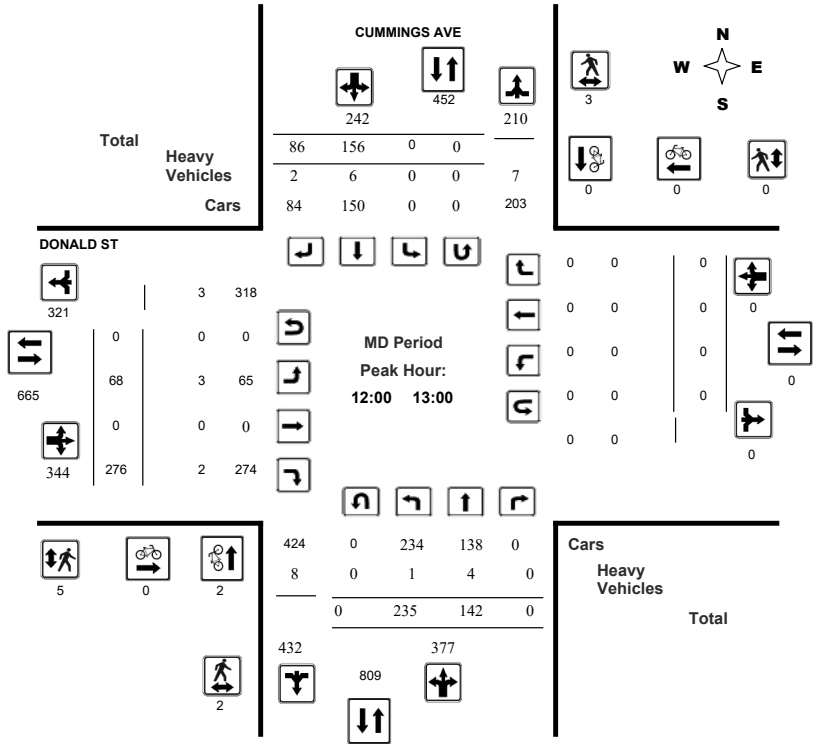
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018 **WO No:** 37720

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



Comments

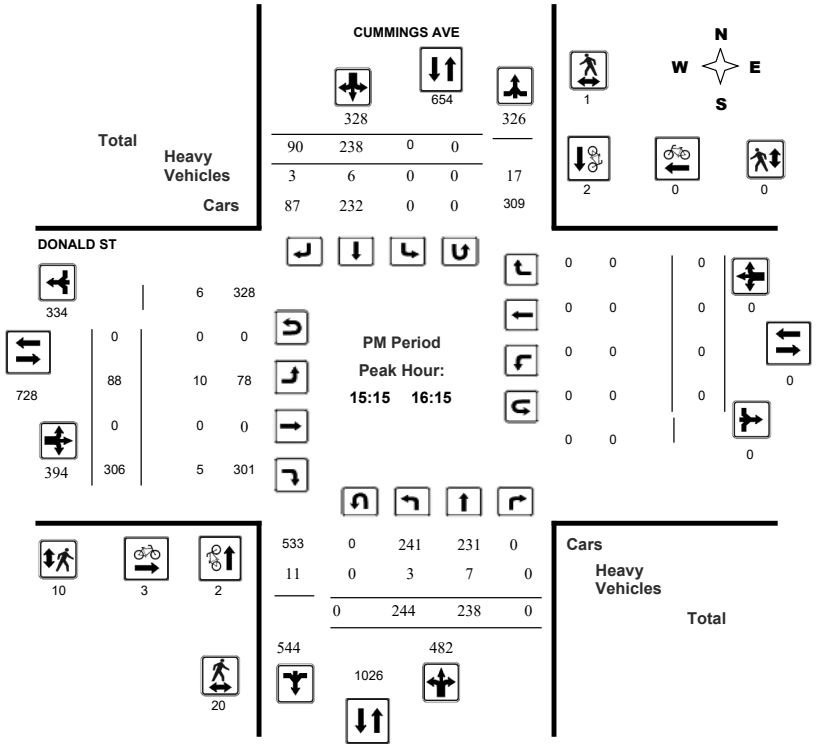
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018 **WO No:** 37720

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



Comments

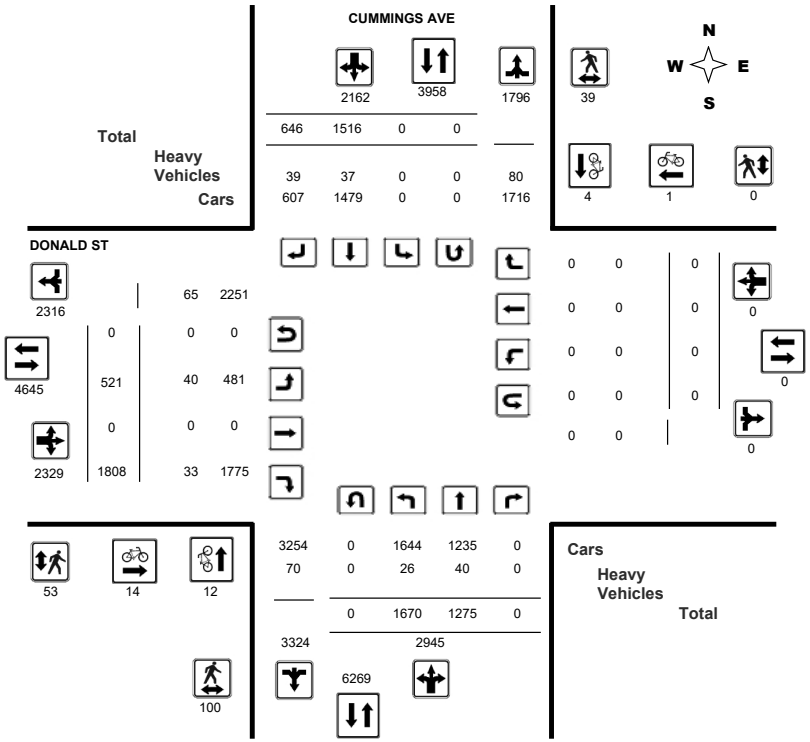
Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018 **WO#:** 37720

Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order 37720

Turning Movement Count - Full Study Summary Report

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	CUMMINGS AVE								DONALD ST									
	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	156	106	0	**262**	0	189	56	**245**	**507**	39	0	128	**167**	0	0	0	**0**	**167**	**674**
08:00 09:00	204	126	0	**330**	0	189	101	**290**	**620**	38	0	150	**188**	0	0	0	**0**	**188**	**808**
09:00 10:00	185	121	0	**306**	0	177	74	**251**	**557**	45	0	182	**227**	0	0	0	**0**	**227**	**784**
11:30 12:30	226	129	0	**355**	0	171	75	**246**	**601**	61	0	244	**305**	0	0	0	**0**	**305**	**906**
12:30 13:30	218	142	0	**360**	0	151	75	**226**	**586**	67	0	272	**339**	0	0	0	**0**	**339**	**925**
15:00 16:00	243	229	0	**472**	0	207	95	**302**	**774**	81	0	286	**367**	0	0	0	**0**	**367**	**1141**
16:00 17:00	222	205	0	**427**	0	231	94	**325**	**752**	95	0	289	**384**	0	0	0	**0**	**384**	**1136**
17:00 18:00	216	217	0	**433**	0	201	76	**277**	**710**	95	0	257	**352**	0	0	0	**0**	**352**	**1062**
Sub Total	1670	1275	0	**2945**	0	1516	646	**2162**	**5107**	521	0	1808	**2329**	0	0	0	**0**	**2329**	**7436**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	1670	1275	0	**2945**	0	1516	646	**2162**	**5107**	521	0	1808	**2329**	0	0	0	**0**	**2329**	**7436**
EQ 12Hr	2321	1772	0	**4094**	0	2107	898	**3005**	**7099**	724	0	2513	**3237**	0	0	0	**0**	**3237**	**10336**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**																			
AVG 12Hr	2089	1595	0	**3684**	0	1897	808	**2705**	**6389**	652	0	2262	**2914**	0	0	0	**0**	**2914**	**9303**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**																			
AVG 24Hr	2737	2089	0	**4826**	0	2484	1059	**3543**	**8369**	854	0	2963	**3817**	0	0	0	**0**	**3817**	**12186**
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

W.O. 37720

Turning Movement Count - 15 Minute Summary Report

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

		CUMMINGS AVE									DONALD ST									
		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	37	21	0	**58**	0	36	11	**47**	**105**	7	0	25	**32**	0	0	0	**0**	**32**	**137**
07:15	07:30	35	30	0	**65**	0	41	11	**52**	**117**	12	0	36	**48**	0	0	0	**0**	**48**	**165**
07:30	07:45	38	26	0	**64**	0	65	10	**75**	**139**	10	0	32	**42**	0	0	0	**0**	**42**	**181**
07:45	08:00	46	29	0	**75**	0	47	24	**71**	**146**	10	0	35	**45**	0	0	0	**0**	**45**	**191**
08:00	08:15	49	38	0	**87**	0	53	32	**85**	**172**	7	0	41	**48**	0	0	0	**0**	**48**	**220**
08:15	08:30	60	33	0	**93**	0	48	25	**73**	**166**	11	0	32	**43**	0	0	0	**0**	**43**	**209**
08:30	08:45	60	24	0	**84**	0	44	23	**67**	**151**	14	0	40	**54**	0	0	0	**0**	**54**	**205**
08:45	09:00	35	31	0	**66**	0	44	21	**65**	**131**	6	0	37	**43**	0	0	0	**0**	**43**	**174**
09:00	09:15	44	31	0	**75**	0	43	15	**58**	**133**	16	0	54	**70**	0	0	0	**0**	**70**	**203**
09:15	09:30	58	27	0	**85**	0	44	25	**69**	**154**	9	0	40	**49**	0	0	0	**0**	**49**	**203**
09:30	09:45	44	29	0	**73**	0	43	19	**62**	**135**	7	0	40	**47**	0	0	0	**0**	**47**	**182**
09:45	10:00	39	34	0	**73**	0	47	15	**62**	**135**	13	0	48	**61**	0	0	0	**0**	**61**	**196**
11:30	11:45	44	30	0	**74**	0	44	15	**59**	**133**	8	0	63	**71**	0	0	0	**0**	**71**	**204**
11:45	12:00	57	28	0	**85**	0	47	14	**61**	**146**	17	0	45	**62**	0	0	0	**0**	**62**	**208**
12:00	12:15	68	34	0	**102**	0	42	22	**64**	**166**	24	0	66	**90**	0	0	0	**0**	**90**	**256**
12:15	12:30	57	37	0	**94**	0	38	24	**62**	**156**	12	0	70	**82**	0	0	0	**0**	**82**	**238**
12:30	12:45	54	36	0	**90**	0	36	22	**58**	**148**	16	0	74	**90**	0	0	0	**0**	**90**	**238**
12:45	13:00	56	35	0	**91**	0	40	18	**58**	**149**	16	0	66	**82**	0	0	0	**0**	**82**	**231**
13:00	13:15	42	41	0	**83**	0	47	16	**63**	**146**	23	0	72	**95**	0	0	0	**0**	**95**	**241**
13:15	13:30	66	30	0	**96**	0	28	19	**47**	**143**	12	0	60	**72**	0	0	0	**0**	**72**	**215**
15:00	15:15	57	48	0	**105**	0	47	27	**74**	**179**	15	0	56	**71**	0	0	0	**0**	**71**	**250**
15:15	15:30	59	52	0	**111**	0	45	24	**69**	**180**	20	0	69	**89**	0	0	0	**0**	**89**	**269**
15:30	15:45	72	57	0	**129**	0	58	21	**79**	**208**	27	0	101	**128**	0	0	0	**0**	**128**	**336**
15:45	16:00	55	72	0	**127**	0	57	23	**80**	**207**	19	0	60	**79**	0	0	0	**0**	**79**	**286**
16:00	16:15	58	57	0	**115**	0	78	22	**100**	**215**	22	0	76	**98**	0	0	0	**0**	**98**	**313**
16:15	16:30	55	50	0	**105**	0	56	19	**75**	**180**	22	0	57	**79**	0	0	0	**0**	**79**	**259**
16:30	16:45	56	48	0	**104**	0	51	29	**80**	**184**	28	0	86	**114**	0	0	0	**0**	**114**	**298**
16:45	17:00	53	50	0	**103**	0	46	24	**70**	**173**	23	0	70	**93**	0	0	0	**0**	**93**	**266**
17:00	17:15	80	54	0	**134**	0	54	14	**68**	**202**	30	0	66	**96**	0	0	0	**0**	**96**	**298**
17:15	17:30	45	69	0	**114**	0	58	17	**75**	**189**	25	0	71	**96**	0	0	0	**0**	**96**	**285**
17:30	17:45	44	51	0	**95**	0	44	23	**67**	**162**	20	0	64	**84**	0	0	0	**0**	**84**	**246**
17:45	18:00	47	43	0	**90**	0	45	22	**67**	**157**	20	0	56	**76**	0	0	0	**0**	**76**	**233**
TOTAL:		1670	1275	0	**2945**	0	1516	646	**2162**	**5107**	521	0	1808	**2329**	0	0	0	**0**	**2329**	**7436**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 37720

CUMMINGS AVE @ DONALD ST

Count Date: Wednesday, April 11, 2018 **Start Time:** 07:00

	CUMMINGS AVE			DONALD ST			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	0	0	**0**	4	1	**5**	**5**
08:00 09:00	2	1	**3**	0	0	**0**	**3**
09:00 10:00	0	0	**0**	0	0	**0**	**0**
11:30 12:30	2	1	**3**	0	0	**0**	**3**
12:30 13:30	3	0	**3**	0	0	**0**	**3**
15:00 16:00	1	1	**2**	3	0	**3**	**5**
16:00 17:00	3	1	**4**	5	0	**5**	**9**
17:00 18:00	1	0	**1**	2	0	**2**	**3**
Total	12	4	**16**	14	1	**15**	**31**

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 - Cyclist Volume Report

Work Order 37720

CUMMINGS AVE @ DONALD ST

Count Date: Wednesday, April 11, 2018 **Start Time:** 07:00

Time Period	CUMMINGS AVE Northbound	CUMMINGS AVE Southbound	CUMMINGS AVE **Street Total**	DONALD ST Eastbound	DONALD ST Westbound	DONALD ST **Street Total**	**Grand Total**
07:00 08:00	0	0	**0**	4	1	**5**	**5**
08:00 09:00	2	1	**3**	0	0	**0**	**3**
09:00 10:00	0	0	**0**	0	0	**0**	**0**
11:30 12:30	2	1	**3**	0	0	**0**	**3**
12:30 13:30	3	0	**3**	0	0	**0**	**3**
15:00 16:00	1	1	**2**	3	0	**3**	**5**
16:00 17:00	3	1	**4**	5	0	**5**	**9**
17:00 18:00	1	0	**1**	2	0	**2**	**3**
Total	12	4	**16**	14	1	**15**	**31**

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

Work Order 37720

Turning Movement Count - Pedestrian Volume Report

CUMMINGS AVE @ DONALD ST

Count Date: Wednesday, April 11, 2018 **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	1	0	**1**	1	0	**1**	**2**
07:15 07:30	4	4	**8**	0	0	**0**	**8**
07:30 07:45	2	2	**4**	1	0	**1**	**5**
07:45 08:00	4	1	**5**	2	0	**2**	**7**
07:00 08:00	11	7	**18**	4	0	**4**	**22**
08:00 08:15	5	2	**7**	6	0	**6**	**13**
08:15 08:30	1	2	**3**	3	0	**3**	**6**
08:30 08:45	3	5	**8**	2	0	**2**	**10**
08:45 09:00	12	1	**13**	3	0	**3**	**16**
08:00 09:00	21	10	**31**	14	0	**14**	**45**
09:00 09:15	7	0	**7**	1	0	**1**	**8**
09:15 09:30	1	3	**4**	1	0	**1**	**5**
09:30 09:45	3	0	**3**	1	0	**1**	**4**
09:45 10:00	1	1	**2**	1	0	**1**	**3**
09:00 10:00	12	4	**16**	4	0	**4**	**20**
11:30 11:45	2	1	**3**	1	0	**1**	**4**
11:45 12:00	2	0	**2**	1	0	**1**	**3**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:15 12:30	0	1	**1**	0	0	**0**	**1**
11:30 12:30	4	2	**6**	2	0	**2**	**8**
12:30 12:45	1	0	**1**	1	0	**1**	**2**
12:45 13:00	1	2	**3**	4	0	**4**	**7**
13:00 13:15	2	0	**2**	1	0	**1**	**3**
13:15 13:30	0	1	**1**	0	0	**0**	**1**
12:30 13:30	4	3	**7**	6	0	**6**	**13**
15:00 15:15	1	1	**2**	0	0	**0**	**2**
15:15 15:30	2	0	**2**	0	0	**0**	**2**
15:30 15:45	5	0	**5**	1	0	**1**	**6**
15:45 16:00	11	0	**11**	7	0	**7**	**18**
15:00 16:00	19	1	**20**	8	0	**8**	**28**
16:00 16:15	2	1	**3**	2	0	**2**	**5**
16:15 16:30	0	3	**3**	2	0	**2**	**5**
16:30 16:45	6	1	**7**	2	0	**2**	**9**
16:45 17:00	6	0	**6**	3	0	**3**	**9**
16:00 17:00	14	5	**19**	9	0	**9**	**28**
17:00 17:15	6	0	**6**	1	0	**1**	**7**
17:15 17:30	1	1	**2**	2	0	**2**	**4**
17:30 17:45	2	4	**6**	2	0	**2**	**8**
17:45 18:00	6	2	**8**	1	0	**1**	**9**
17:00 18:00	15	7	**22**	6	0	**6**	**28**
Total	100	39	**139**	53	0	**53**	**192**

Comment:

Transportation Services - Traffic Services

Work Order
37720

Turning Movement Count - 15 Min U-Turn Total Report

CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018

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	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Appendix C

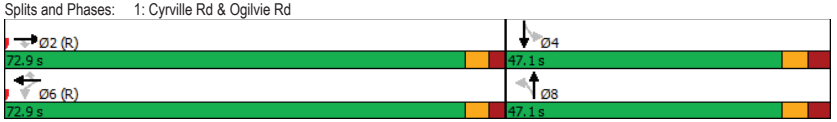
Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	532	227	27	984	166	165	234	12	47	152	45
Future Volume (vph)	0	532	227	27	984	166	165	234	12	47	152	45
Satd. Flow (prot)	0	3283	1414	1658	3316	1441	1551	1716	0	1626	1600	0
Flt Permitted				0.414			0.505			0.406		
Satd. Flow (perm)	0	3283	1329	714	3316	1319	821	1716	0	693	1600	0
Satd. Flow (RTOR)			252			184		2			13	
Lane Group Flow (vph)	0	591	252	30	1093	184	183	273	0	52	219	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		72.9	72.9	72.9	72.9	72.9	47.1	47.1		47.1	47.1	
Total Split (%)		60.8%	60.8%	60.8%	60.8%	60.8%	39.3%	39.3%		39.3%	39.3%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		77.5	77.5	77.5	77.5	77.5	29.2	29.2		29.2	29.2	
Actuated g/C Ratio		0.65	0.65	0.65	0.65	0.65	0.24	0.24		0.24	0.24	
v/c Ratio		0.28	0.27	0.07	0.51	0.20	0.92	0.65		0.31	0.55	
Control Delay		10.7	2.2	3.3	3.5	0.3	88.3	46.8		38.9	40.9	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.7	2.2	3.3	3.5	0.3	88.3	46.8		38.9	40.9	
LOS		B	A	A	A	A	F	D		D	D	
Approach Delay		8.2			3.0			63.4			40.5	
Approach LOS		A			A			E			D	
Queue Length 50th (m)		29.6	0.0	0.5	11.0	0.1	41.9	57.3		10.0	42.3	
Queue Length 95th (m)		49.3	11.3	m0.9	14.7	m0.0	#65.1	75.8		19.4	59.0	
Internal Link Dist (m)		113.5			313.9			191.2			190.6	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2119	947	461	2140	916	273	573		231	542	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.28	0.27	0.07	0.51	0.20	0.67	0.48		0.23	0.40	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92
Intersection Signal Delay: 17.6 Intersection LOS: B
Intersection Capacity Utilization 72.0% 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: 1: Cyrville Rd & Ogilvie Rd

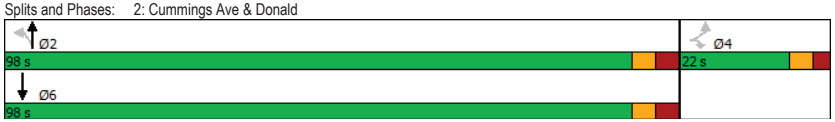


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	148	215	124	192	104
Future Volume (vph)	42	148	215	124	192	104
Satd. Flow (prot)	1610	1469	1642	1695	1597	0
Flt Permitted	0.950		0.562			
Satd. Flow (perm)	1532	1382	957	1695	1597	0
Satd. Flow (RTOR)		164			68	
Lane Group Flow (vph)	47	164	239	138	329	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	22.0	22.0	98.0	98.0	98.0	
Total Split (%)	18.3%	18.3%	81.7%	81.7%	81.7%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.3	19.3	19.3	
Actuated g/C Ratio	0.26	0.26	0.44	0.44	0.44	
v/c Ratio	0.12	0.35	0.57	0.19	0.45	
Control Delay	14.8	5.8	15.5	8.3	8.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.8	5.8	15.5	8.3	8.9	
LOS	B	A	B	A	A	
Approach Delay	7.8			12.9	8.9	
Approach LOS	A			B	A	
Queue Length 50th (m)	2.1	0.0	11.4	5.4	11.2	
Queue Length 95th (m)	11.0	12.0	31.8	14.6	29.3	
Internal Link Dist (m)	296.9			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	580	625	957	1695	1597	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.26	0.25	0.08	0.21	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 44.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.3 — Intersection LOS: B
Intersection Capacity Utilization 60.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	556	11	167	1076	170	18	111	63	138	116	112
Future Volume (vph)	51	556	11	167	1076	170	18	111	63	138	116	112
Satd. Flow (prot)	1626	3265	0	1626	3194	0	1658	1508	0	1626	1599	0
Flt Permitted	0.084			0.347			0.602			0.449		
Satd. Flow (perm)	144	3265	0	585	3194	0	1046	1508	0	737	1599	0
Satd. Flow (RTOR)		2			19			23			44	
Lane Group Flow (vph)	57	630	0	186	1385	0	20	193	0	153	253	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	11.0	61.0		11.0	61.0		36.6	36.6		11.4	48.0	
Total Split (%)	9.2%	50.8%		9.2%	50.8%		30.5%	30.5%		9.5%	40.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	66.0	58.8		67.3	61.3		26.2	26.2		39.9	37.6	
Actuated g/C Ratio	0.55	0.49		0.56	0.51		0.22	0.22		0.33	0.31	
v/c Ratio	0.37	0.39		0.48	0.84		0.09	0.56		0.52	0.48	
Control Delay	30.2	18.2		18.4	33.2		35.8	41.8		35.3	29.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.2	18.2		18.4	33.2		35.8	41.8		35.3	29.3	
LOS	C	B		B	C		D	D		D	C	
Approach Delay		19.2			31.5			41.3			31.6	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	5.3	39.6		20.7	157.0		3.6	34.2		25.1	37.4	
Queue Length 95th (m)	20.5	50.6		33.1	#207.0		10.1	57.2		41.4	60.8	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	156	1601		384	1640		261	394		297	580	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.37	0.39		0.48	0.84		0.08	0.49		0.52	0.44	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84
Intersection Signal Delay: 29.3 — Intersection LOS: C
Intersection Capacity Utilization 90.1% — ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Cummings Ave & Ogilvie Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	984	257	42	641	124	117	210	32	134	213	80
Future Volume (vph)	0	984	257	42	641	124	117	210	32	134	213	80
Satd. Flow (prot)	0	3316	1469	1658	3316	1469	1580	1705	0	1642	1635	0
Flt Permitted				0.215			0.310			0.412		
Satd. Flow (perm)	0	3316	1353	373	3316	1303	514	1705	0	709	1635	0
Satd. Flow (RTOR)			286			138		7			18	
Lane Group Flow (vph)	0	1093	286	47	712	138	130	269	0	149	326	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		70.0	70.0	70.0	70.0	70.0	50.0	50.0		50.0	50.0	
Total Split (%)		58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		77.7	77.7	77.7	77.7	77.7	29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.65	0.65	0.65	0.65	0.65	0.24	0.24		0.24	0.24	
v/c Ratio		0.51	0.29	0.20	0.33	0.15	1.05	0.65		0.87	0.80	
Control Delay		13.3	2.2	22.6	18.8	9.7	138.2	46.0		84.5	54.1	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		13.3	2.2	22.6	18.8	9.7	138.2	46.0		84.5	54.1	
LOS		B	A	C	B	A	F	D		F	D	
Approach Delay		11.0			17.6			76.0			63.6	
Approach LOS		B			B			E			E	
Queue Length 50th (m)		65.1	0.0	6.3	53.5	8.5	~33.7	56.0		34.0	69.1	
Queue Length 95th (m)		105.7	11.7	m8.5	m61.7	m11.3	#60.9	73.6		54.2	89.9	
Internal Link Dist (m)		113.8			313.9			191.2			190.4	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2146	976	241	2146	892	183	614		253	596	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.51	0.29	0.20	0.33	0.15	0.71	0.44		0.59	0.55	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05
Intersection Signal Delay: 29.1 — Intersection LOS: C
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.
m Volume for 95th percentile queue is metered by upstream signal.

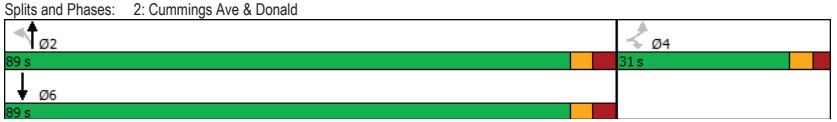
Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	306	244	238	238	90
Future Volume (vph)	88	306	244	238	238	90
Satd. Flow (prot)	1523	1483	1658	1728	1647	0
Flt Permitted	0.950		0.544			
Satd. Flow (perm)	1518	1345	939	1728	1647	0
Satd. Flow (RTOR)		340			36	
Lane Group Flow (vph)	98	340	271	264	364	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	31.0	31.0	89.0	89.0	89.0	
Total Split (%)	25.8%	25.8%	74.2%	74.2%	74.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	18.7	18.7	18.7	
Actuated g/C Ratio	0.26	0.26	0.43	0.43	0.43	
v/c Ratio	0.25	0.57	0.67	0.36	0.50	
Control Delay	17.3	6.9	18.8	9.4	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.3	6.9	18.8	9.4	10.2	
LOS	B	A	B	A	B	
Approach Delay	9.2			14.1	10.2	
Approach LOS	A			B	B	
Queue Length 50th (m)	5.3	0.0	13.6	11.1	14.7	
Queue Length 95th (m)	19.4	16.9	38.4	27.0	35.9	
Internal Link Dist (m)	296.3			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	912	943	939	1728	1647	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.36	0.29	0.15	0.22	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 43.5
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.5 — Intersection LOS: B
Intersection Capacity Utilization 63.2% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



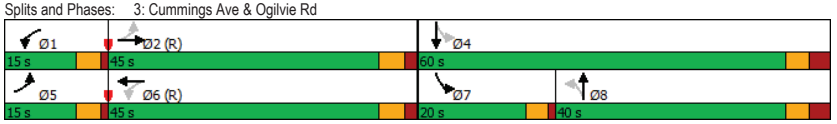
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	1082	23	116	729	209	36	162	216	258	163	84
Future Volume (vph)	129	1082	23	116	729	209	36	162	216	258	163	84
Satd. Flow (prot)	1658	3298	0	1626	3161	0	1642	1566	0	1658	1632	0
Flt Permitted	0.095			0.096			0.591			0.160		
Satd. Flow (perm)	166	3298	0	164	3161	0	1000	1566	0	277	1632	0
Satd. Flow (RTOR)		2			33			55			28	
Lane Group Flow (vph)	143	1228	0	129	1042	0	40	420	0	287	274	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	15.0	45.0		15.0	45.0		40.0	40.0		20.0	60.0	
Total Split (%)	12.5%	37.5%		12.5%	37.5%		33.3%	33.3%		16.7%	50.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	52.8	42.0		52.3	41.7		31.4	31.4		53.7	51.4	
Actuated g/C Ratio	0.44	0.35		0.44	0.35		0.26	0.26		0.45	0.43	
v/c Ratio	0.73	1.06		0.69	0.93		0.15	0.93		0.94	0.38	
Control Delay	49.5	76.8		42.3	52.2		34.7	66.1		65.4	22.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.5	76.8		42.3	52.2		34.7	66.1		65.4	22.2	
LOS	D	E		D	D		C	E		E	C	
Approach Delay		73.9			51.1			63.4			44.3	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	12.7	~178.8		17.4	124.6		7.1	83.9		43.8	37.4	
Queue Length 95th (m)	#46.2	#221.4		#40.4	#170.7		16.2	#141.1		#95.6	58.4	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	202	1155		197	1120		278	475		304	741	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.71	1.06		0.65	0.93		0.14	0.88		0.94	0.37	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06
Intersection Signal Delay: 60.4 — Intersection LOS: E
Intersection Capacity Utilization 96.3% — 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: 3: Cummings Ave & Ogilvie Rd



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
3/24/2016	2016	11:12	CUMMINGS AVE @ DONALD ST (0009936)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
5/24/2016	2016	8:39	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
7/28/2016	2016	16:20	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/26/2017	2017	21:00	CUMMINGS AVE @ DONALD ST (0009936)	05 - Drifting Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	06 - Ice	2	0	0	0
1/9/2017	2017	19:20	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
4/20/2017	2017	13:05	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
8/7/2017	2017	16:06	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
8/8/2017	2017	13:20	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	00 - Unknown	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/25/2018	2018	2:45	CUMMINGS AVE @ DONALD ST (0009936)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	06 - Ice	1	0	0	0
2/25/2018	2018	10:00	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	06 - Ice	2	0	0	0
4/30/2018	2018	14:37	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/17/2018	2018	10:12	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
7/13/2019	2019	10:30	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/22/2019	2019	15:16	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
1/10/2020	2020	20:54	CUMMINGS AVE @ DONALD ST (0009936)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	02 - Wet	1	0	0	1
1/11/2020	2020	14:44	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
6/12/2020	2020	21:14	CUMMINGS AVE @ DONALD ST (0009936)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	3	0	0	0
2/9/2016	2016	16:07	CUMMINGS AVE btwn DONALD ST & EADY CRT (__3ZBO9T)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
9/16/2018	2018	17:44	CUMMINGS AVE btwn DONALD ST & EADY CRT (__3ZBO9T)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
5/24/2016	2016	10:00	CUMMINGS AVE btwn EADY CRT & STRATHAVEN PRIV (__5J9TPH)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2/9/2018	2018	10:14	CUMMINGS AVE btwn EADY CRT & STRATHAVEN PRIV (__5J9TPH)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	05 - Turning movement	04 - Slush	2	0	0	0
3/1/2019	2019	19:30	CUMMINGS AVE btwn EADY CRT & STRATHAVEN PRIV (__5J9TPH)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
8/17/2019	2019	15:42	CUMMINGS AVE btwn EADY CRT & STRATHAVEN PRIV (__5J9TPH)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
5/11/2016	2016	15:30	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
5/22/2016	2016	10:36	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
9/15/2016	2016	12:37	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
3/8/2017	2017	9:19	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	02 - Wet	3	0	0	0
2/21/2018	2018	16:40	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	05 - Packed snow	2	0	0	0
6/16/2018	2018	14:44	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
11/5/2019	2019	18:55	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
10/25/2019	2019	21:38	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
11/27/2019	2019	17:40	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	02 - Rain	07 - Dark	10 - No control	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
2/24/2020	2020	16:11	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	02 - Wet	3	0	0	0
7/7/2020	2020	15:00	CUMMINGS AVE btwn WELDON DR & OGILVIE RD (__3ZA7UQ)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
1/7/2016	2016	11:45	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	99 - Other	01 - Dry	2	0	0	0
2/17/2016	2016	22:17	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	06 - Ice	2	0	0	0
2/17/2016	2016	20:50	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	06 - Ice	2	0	0	0
2/17/2016	2016	21:02	CUMMINGS AVE @ OGILVIE RD (0009923)	05 - Drifting Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
2/18/2016	2016	7:55	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
3/5/2016	2016	16:30	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
7/15/2016	2016	16:14	CUMMINGS AVE @ OGILVIE RD (0009923)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	02 - Wet	3	0	0	0
9/21/2016	2016	12:18	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
9/19/2016	2016	17:50	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
9/6/2016	2016	11:08	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
10/27/2017	2017	11:30	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
1/30/2017	2017	19:00	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2/8/2017	2017	16:20	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	03 - Loose snow	3	0	0	0
2/15/2017	2017	8:17	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	03 - Loose snow	2	0	0	0
3/8/2017	2017	10:45	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
3/2/2017	2017	15:28	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/2/2017	2017	12:40	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
8/3/2017	2017	7:50	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
8/27/2017	2017	0:11	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
9/12/2017	2017	12:30	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/8/2017	2017	8:37	CUMMINGS AVE @ OGILVIE RD (0009923)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
9/20/2017	2017	14:47	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	00 - Unknown	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	1	0	0
10/10/2018	2018	15:15	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
11/21/2018	2018	16:10	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	05 - Packed snow	2	0	0	0
12/8/2018	2018	18:00	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
3/24/2018	2018	18:25	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
5/5/2018	2018	18:14	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	3	0	0	0
4/12/2018	2018	11:01	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
5/25/2018	2018	15:00	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
6/11/2018	2018	18:00	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
7/23/2018	2018	9:30	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/20/2018	2018	17:00	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
9/19/2018	2018	17:07	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	1	0
1/23/2019	2019	12:30	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	05 - Packed snow	2	0	0	0
11/16/2019	2019	21:55	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	3	0	0	0
11/25/2019	2019	9:53	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/28/2019	2019	9:30	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	99 - Other	02 - Wet	2	0	0	0
2/9/2019	2019	16:15	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
3/13/2019	2019	18:40	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	05 - Packed snow	2	0	0	0
3/6/2019	2019	9:59	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	02 - Wet	2	0	0	0
1/11/2019	2019	16:08	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
3/25/2019	2019	11:00	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
5/12/2019	2019	13:19	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
6/27/2019	2019	12:51	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
7/20/2019	2019	13:47	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/1/2019	2019	18:04	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
7/30/2019	2019	12:30	CUMMINGS AVE @ OGILVIE RD (0009923)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
8/11/2019	2019	15:12	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2/7/2020	2020	17:45	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
1/6/2020	2020	7:45	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	03 - Dawn	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	06 - Ice	2	0	0	0
3/6/2020	2020	7:38	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
1/10/2020	2020	12:23	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/11/2020	2020	14:55	CUMMINGS AVE @ OGILVIE RD (0009923)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	03 - Loose snow	2	0	0	0
8/1/2020	2020	15:22	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
7/13/2020	2020	18:04	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
10/11/2020	2020	15:40	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/11/2020	2020	18:16	CUMMINGS AVE @ OGILVIE RD (0009923)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
1/7/2016	2016	11:34	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	02 - Wet	2	0	0	0
5/3/2016	2016	15:35	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
8/26/2016	2016	13:42	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	1	0
12/1/2017	2017	13:26	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
12/15/2017	2017	13:14	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
1/5/2017	2017	13:48	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
6/15/2017	2017	15:45	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
10/25/2018	2018	6:50	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	01 - Clear	07 - Dark	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
4/9/2019	2019	14:14	OGILVIE RD btwn CUMMINGS AVE & BEAULIEU PL (__54P0OD)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	04 - Slush	2	0	0	0
3/14/2016	2016	8:30	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
11/20/2017	2017	15:38	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2/14/2017	2017	12:09	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
1/10/2020	2020	18:00	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
8/6/2020	2020	17:14	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
3/14/2016	2016	8:30	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
11/20/2017	2017	15:38	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2/14/2017	2017	12:09	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0

1/10/2020	2020	18:00	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
8/6/2020	2020	17:14	OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE (__3ZBN9A)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0

Appendix E

TRANS Plot

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Cyrville - St. Laurent Area Growth

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: August 10, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

100 200 300 400 500

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.

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Cyrville - St. Laurent Area Growth

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: August 10, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

100 200 300 400 500

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 F

Background Volumes

CGH TRANSPORTATION

PARSONS

Figure 7: Total Phase 1 and 2 Site Generated Traffic

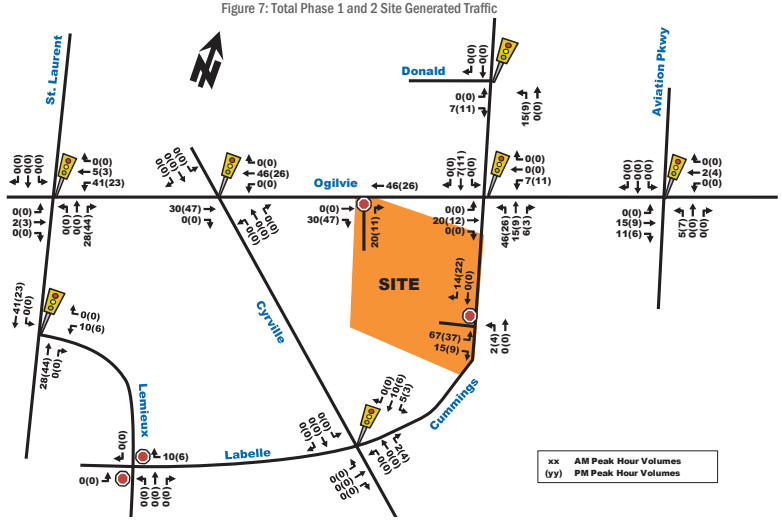


Figure 10 - Site Traffic Assignment

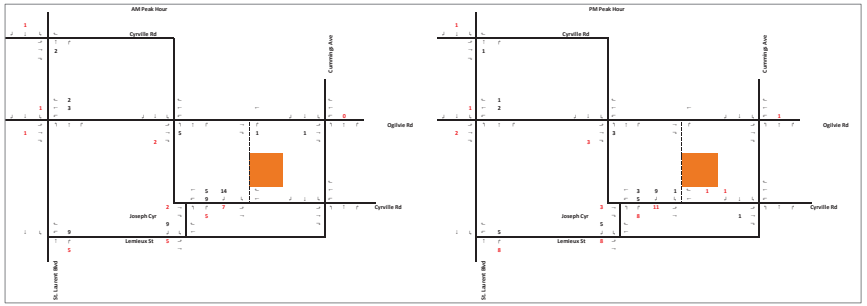


Figure 9: New Site Generation Auto Volumes

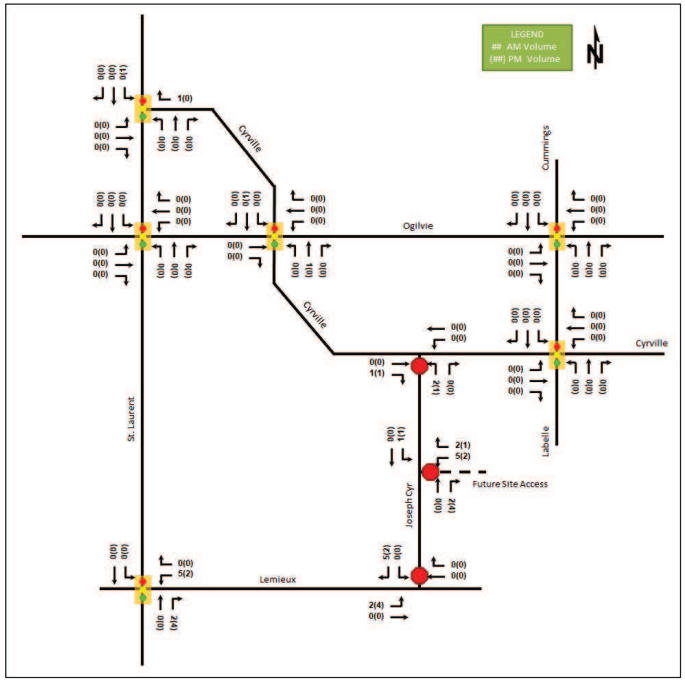
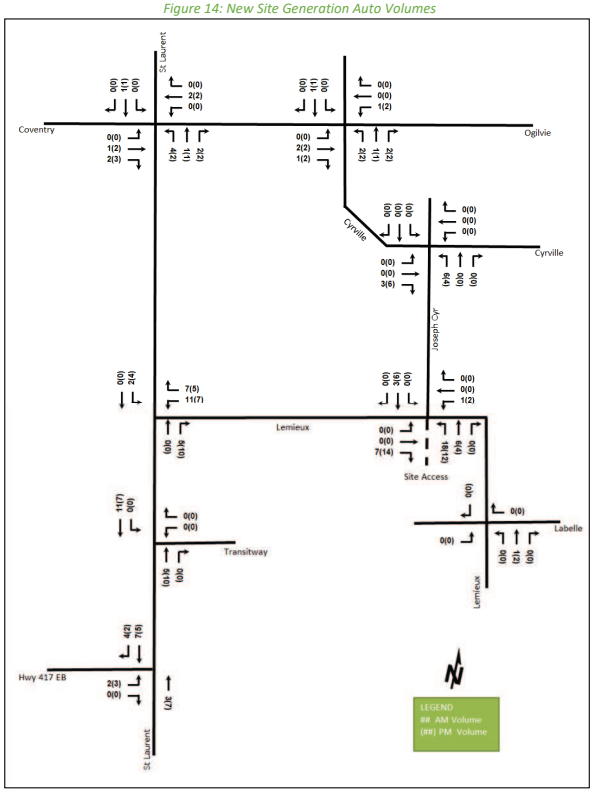


Figure 14: New Site Generation Auto Volumes



As shown in Table 5, a total of 39 and 40 veh/h are projected to travel to/from the proposed development during the weekday morning and afternoon peak hours.

9.1.2. MODE SHARES

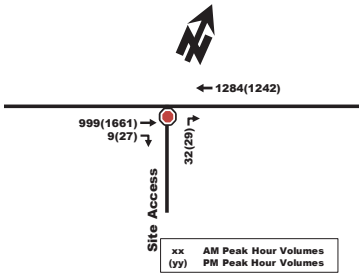
Using the TRANS Auto Trips projected in Table 5 and the modal share percentages from the 2011 NCR Household Origin – Destination Survey and Table 3.13 of the TRANS Trip Generation Study, the modal share for the proposed development are summarized in Table 6.

Table 6: Total Site Trip Generation

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Mode Share	PM Peak (persons/h)		
		In	Out	Total		In	Out	Total
Auto Driver	50%	8	31	39	50%	24	16	40
Auto Passenger	10%	2	6	8	15%	8	4	12
Transit	25%	4	16	20	20%	9	7	16
Non-motorized	15%	2	10	12	15%	7	5	12
Total People Trips	100%	16	63	78	100%	48	32	80
Total 'New' Auto Trips		**8**	**31**	**39**		**24**	**16**	**40**

As shown in Table 6, based on the TRANS Trip Generation method, the proposed site is projected to generate approximately 78 to 80 two-way person-trips per hour during the weekday peak hours. The increase in two-way transit trips is estimated to be 16 to 20 persons per hour, and the increase in bike/walk trips is approximately 12 persons per hour.

Figure 6: Projected Site Access Volumes (2018)



Appendix G

Synchro Intersection Worksheets – 2026 Future Background Conditions

CGH TRANSPORTATION

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	584	230	28	1050	166	172	241	14	47	166	45
Future Volume (vph)	0	584	230	28	1050	166	172	241	14	47	166	45
Satd. Flow (prot)	0	3283	1414	1658	3316	1441	1551	1714	0	1626	1604	0
Flt Permitted				0.419			0.510			0.426		
Satd. Flow (perm)	0	3283	1329	722	3316	1319	829	1714	0	727	1604	0
Satd. Flow (RTOR)			230			166		3			12	
Lane Group Flow (vph)	0	584	230	28	1050	166	172	255	0	47	211	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		72.9	72.9	72.9	72.9	72.9	47.1	47.1		47.1	47.1	
Total Split (%)		60.8%	60.8%	60.8%	60.8%	60.8%	39.3%	39.3%		39.3%	39.3%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		78.9	78.9	78.9	78.9	78.9	27.8	27.8		27.8	27.8	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.27	0.24	0.06	0.48	0.18	0.90	0.64		0.28	0.56	
Control Delay		10.1	2.2	4.3	4.6	0.3	85.9	47.1		38.6	42.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.1	2.2	4.3	4.6	0.3	85.9	47.1		38.6	42.2	
LOS		B	A	A	A	A	F	D		D	D	
Approach Delay		7.9			4.0			62.7			41.6	
Approach LOS		A			A			E			D	
Queue Length 50th (m)		27.6	0.0	0.7	15.2	0.1	39.5	53.9		9.2	41.5	
Queue Length 95th (m)		48.6	10.8	m1.2	19.3	m0.1	59.6	70.3		17.7	57.1	
Internal Link Dist (m)		113.5			313.9			191.2			190.6	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2158	952	474	2180	924	276	573		242	542	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.27	0.24	0.06	0.48	0.18	0.62	0.45		0.19	0.39	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

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

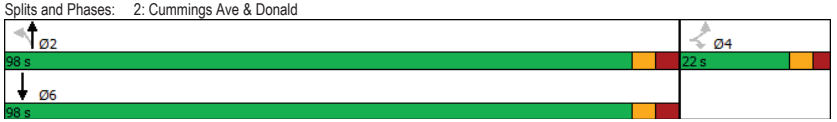
Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	167	248	127	208	104
Future Volume (vph)	42	167	248	127	208	104
Satd. Flow (prot)	1610	1469	1642	1695	1606	0
Flt Permitted	0.950		0.571			
Satd. Flow (perm)	1532	1382	972	1695	1606	0
Satd. Flow (RTOR)		167			62	
Lane Group Flow (vph)	42	167	248	127	312	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	22.0	22.0	98.0	98.0	98.0	
Total Split (%)	18.3%	18.3%	81.7%	81.7%	81.7%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.5	19.5	19.5	
Actuated g/C Ratio	0.26	0.26	0.44	0.44	0.44	
v/c Ratio	0.11	0.35	0.58	0.17	0.42	
Control Delay	14.8	5.9	15.6	8.1	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.8	5.9	15.6	8.1	8.6	
LOS	B	A	B	A	A	
Approach Delay	7.6			13.1	8.6	
Approach LOS	A			B	A	
Queue Length 50th (m)	1.9	0.0	11.9	4.9	10.6	
Queue Length 95th (m)	10.1	12.0	33.0	13.6	27.9	
Internal Link Dist (m)	296.9			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	577	625	972	1695	1606	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.27	0.26	0.07	0.19	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 44.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58

Intersection Signal Delay: 10.3 — Intersection LOS: B
Intersection Capacity Utilization 62.5% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



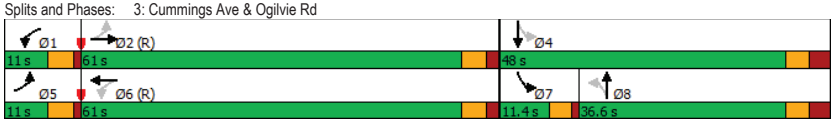
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	601	11	174	1099	170	64	128	69	138	133	112
Future Volume (vph)	51	601	11	174	1099	170	64	128	69	138	133	112
Satd. Flow (prot)	1626	3266	0	1626	3195	0	1658	1514	0	1626	1609	0
Flt Permitted	0.115			0.356			0.607			0.443		
Satd. Flow (perm)	197	3266	0	600	3195	0	1055	1514	0	727	1609	0
Satd. Flow (RTOR)		2			19			22			39	
Lane Group Flow (vph)	51	612	0	174	1269	0	64	197	0	138	245	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	11.0	61.0		11.0	61.0		36.6	36.6		11.4	48.0	
Total Split (%)	9.2%	50.8%		9.2%	50.8%		30.5%	30.5%		9.5%	40.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	66.0	58.8		67.2	61.2		26.3	26.3		40.0	37.7	
Actuated g/C Ratio	0.55	0.49		0.56	0.51		0.22	0.22		0.33	0.31	
v/c Ratio	0.28	0.38		0.45	0.77		0.28	0.56		0.47	0.46	
Control Delay	22.1	18.1		17.3	29.7		40.2	42.4		33.7	29.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.1	18.1		17.3	29.7		40.2	42.4		33.7	29.5	
LOS	C	B		B	C		D	D		C	C	
Approach Delay		18.4			28.2			41.9			31.0	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	4.7	38.4		19.2	135.0		12.1	35.4		22.4	36.7	
Queue Length 95th (m)	17.0	48.3		31.1	166.6		24.5	58.7		37.8	59.6	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	183	1602		391	1638		263	395		295	580	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.38		0.45	0.77		0.24	0.50		0.47	0.42	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 91.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1080	262	44	680	124	122	228	34	134	219	80
Future Volume (vph)	0	1080	262	44	680	124	122	228	34	134	219	80
Satd. Flow (prot)	0	3316	1469	1658	3316	1469	1580	1707	0	1642	1637	0
Flt Permitted				0.223			0.338			0.408		
Satd. Flow (perm)	0	3316	1353	387	3316	1303	560	1707	0	702	1637	0
Satd. Flow (RTOR)			262			124		7			17	
Lane Group Flow (vph)	0	1080	262	44	680	124	122	262	0	134	299	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		70.0	70.0	70.0	70.0	70.0	50.0	50.0		50.0	50.0	
Total Split (%)		58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		79.3	79.3	79.3	79.3	79.3	27.4	27.4		27.4	27.4	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.49	0.27	0.17	0.31	0.14	0.95	0.66		0.84	0.77	
Control Delay		12.4	2.1	20.6	16.5	8.7	113.5	48.1		81.1	53.5	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.4	2.1	20.6	16.5	8.7	113.5	48.1		81.1	53.5	
LOS		B	A	C	B	A	F	D		F	D	
Approach Delay		10.4			15.6			68.8			62.1	
Approach LOS		B			B			E			E	
Queue Length 50th (m)		60.3	0.0	5.3	43.8	5.7	28.8	55.5		30.6	63.4	
Queue Length 95th (m)		103.7	11.4	m9.0	m65.9	m11.4	#52.3	71.5		48.1	81.7	
Internal Link Dist (m)		113.8			313.9			191.2			190.4	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2190	982	255	2190	902	200	614		250	596	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.49	0.27	0.17	0.31	0.14	0.61	0.43		0.54	0.50	

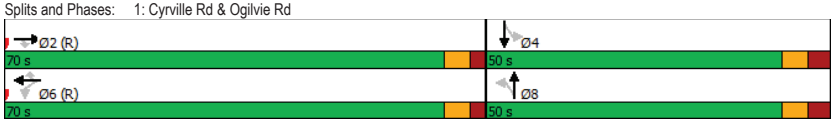
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

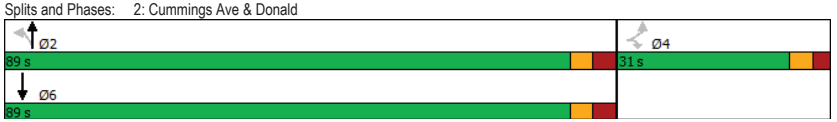


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	342	273	258	243	90
Future Volume (vph)	88	342	273	258	243	90
Satd. Flow (prot)	1523	1483	1658	1728	1649	0
Flt Permitted	0.950		0.560			
Satd. Flow (perm)	1518	1345	966	1728	1649	0
Satd. Flow (RTOR)		342			35	
Lane Group Flow (vph)	88	342	273	258	333	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	31.0	31.0	89.0	89.0	89.0	
Total Split (%)	25.8%	25.8%	74.2%	74.2%	74.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	18.3	18.3	18.3	
Actuated g/C Ratio	0.26	0.26	0.42	0.42	0.42	
v/c Ratio	0.22	0.57	0.67	0.35	0.46	
Control Delay	16.7	6.8	18.5	9.4	9.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.7	6.8	18.5	9.4	9.7	
LOS	B	A	B	A	A	
Approach Delay	8.9			14.1	9.7	
Approach LOS	A			B	A	
Queue Length 50th (m)	4.6	0.0	13.6	10.9	13.0	
Queue Length 95th (m)	17.8	17.0	37.8	26.4	32.3	
Internal Link Dist (m)	296.3			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	922	951	966	1728	1649	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.36	0.28	0.15	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 43.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.2 — Intersection LOS: B
Intersection Capacity Utilization 65.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



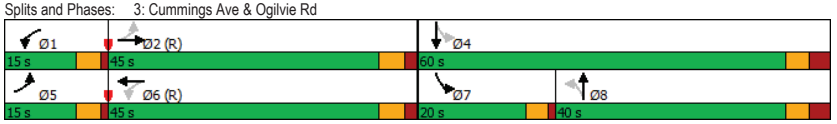
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	1147	23	127	747	209	62	184	219	258	177	84
Future Volume (vph)	129	1147	23	127	747	209	62	184	219	258	177	84
Satd. Flow (prot)	1658	3298	0	1626	3161	0	1642	1574	0	1658	1638	0
Flt Permitted	0.130			0.093			0.598			0.173		
Satd. Flow (perm)	227	3298	0	159	3161	0	1012	1574	0	300	1638	0
Satd. Flow (RTOR)		2			32			49			26	
Lane Group Flow (vph)	129	1170	0	127	956	0	62	403	0	258	261	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	15.0	45.0		15.0	45.0		40.0	40.0		20.0	60.0	
Total Split (%)	12.5%	37.5%		12.5%	37.5%		33.3%	33.3%		16.7%	50.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	53.2	42.7		53.3	42.8		30.7	30.7		53.0	50.7	
Actuated g/C Ratio	0.44	0.36		0.44	0.36		0.26	0.26		0.44	0.42	
v/c Ratio	0.61	0.99		0.68	0.83		0.24	0.92		0.83	0.37	
Control Delay	33.5	57.5		42.0	42.6		36.8	64.7		46.1	22.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.5	57.5		42.0	42.6		36.8	64.7		46.1	22.3	
LOS	C	E		D	D		D	E		D	C	
Approach Delay		55.1			42.6			61.0			34.1	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	12.0	~163.6		17.1	109.6		11.2	80.2		37.6	35.4	
Queue Length 95th (m)	29.4	#205.4		#40.2	#147.8		23.2	#133.2		#75.3	55.7	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	224	1176		197	1147		281	473		310	743	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.58	0.99		0.64	0.83		0.22	0.85		0.83	0.35	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.99
Intersection Signal Delay: 48.6 — Intersection LOS: D
Intersection Capacity Utilization 99.8% — 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: 3: Cummings Ave & Ogilvie Rd



Appendix H

Synchro Intersection Worksheets – 2031 Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	591	230	28	1062	166	172	244	14	47	174	45
Future Volume (vph)	0	591	230	28	1062	166	172	244	14	47	174	45
Satd. Flow (prot)	0	3283	1414	1658	3316	1441	1551	1714	0	1626	1605	0
Flt Permitted				0.416			0.497			0.423		
Satd. Flow (perm)	0	3283	1329	717	3316	1319	808	1714	0	722	1605	0
Satd. Flow (RTOR)			230			166		3			12	
Lane Group Flow (vph)	0	591	230	28	1062	166	172	258	0	47	219	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		72.9	72.9	72.9	72.9	72.9	47.1	47.1		47.1	47.1	
Total Split (%)		60.8%	60.8%	60.8%	60.8%	60.8%	39.3%	39.3%		39.3%	39.3%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		78.6	78.6	78.6	78.6	78.6	28.1	28.1		28.1	28.1	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.28	0.24	0.06	0.49	0.18	0.91	0.64		0.28	0.57	
Control Delay		10.3	2.2	4.3	4.6	0.3	88.8	46.9		38.3	42.5	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.3	2.2	4.3	4.6	0.3	88.8	46.9		38.3	42.5	
LOS		B	A	A	A	A	F	D		D	D	
Approach Delay		8.0			4.1			63.6			41.8	
Approach LOS		A			A			E			D	
Queue Length 50th (m)		28.5	0.0	0.7	15.3	0.1	39.5	54.3		9.1	43.2	
Queue Length 95th (m)		49.3	10.8	m1.2	19.5	m0.1	60.3	71.3		17.7	59.2	
Internal Link Dist (m)		113.5			313.9			191.2			190.6	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2149	949	469	2171	920	269	573		240	543	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.28	0.24	0.06	0.49	0.18	0.64	0.45		0.20	0.40	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

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

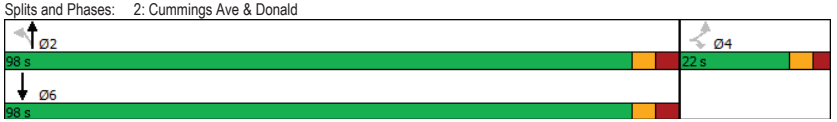
Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	175	260	128	219	104
Future Volume (vph)	42	175	260	128	219	104
Satd. Flow (prot)	1610	1469	1642	1695	1611	0
Flt Permitted	0.950		0.565			
Satd. Flow (perm)	1532	1382	962	1695	1611	0
Satd. Flow (RTOR)		175			59	
Lane Group Flow (vph)	42	175	260	128	323	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	22.0	22.0	98.0	98.0	98.0	
Total Split (%)	18.3%	18.3%	81.7%	81.7%	81.7%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.8	19.8	19.8	
Actuated g/C Ratio	0.25	0.25	0.44	0.44	0.44	
v/c Ratio	0.11	0.36	0.61	0.17	0.43	
Control Delay	15.0	5.9	16.5	8.1	8.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	5.9	16.5	8.1	8.8	
LOS	B	A	B	A	A	
Approach Delay	7.7			13.7	8.8	
Approach LOS	A			B	A	
Queue Length 50th (m)	2.0	0.0	12.7	4.9	11.3	
Queue Length 95th (m)	10.1	12.3	35.5	13.7	29.2	
Internal Link Dist (m)	296.9			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	572	626	962	1695	1611	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.28	0.27	0.08	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 44.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61

Intersection Signal Delay: 10.6 — Intersection LOS: B
Intersection Capacity Utilization 63.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



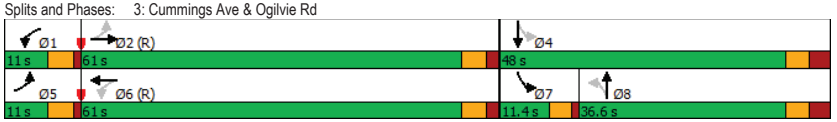
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	608	11	174	1112	170	64	130	69	138	139	112
Future Volume (vph)	51	608	11	174	1112	170	64	130	69	138	139	112
Satd. Flow (prot)	1626	3266	0	1626	3195	0	1658	1517	0	1626	1613	0
Flt Permitted	0.111			0.353			0.603			0.439		
Satd. Flow (perm)	190	3266	0	595	3195	0	1048	1517	0	721	1613	0
Satd. Flow (RTOR)		2			19			21			37	
Lane Group Flow (vph)	51	619	0	174	1282	0	64	199	0	138	251	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	11.0	61.0		11.0	61.0		36.6	36.6		11.4	48.0	
Total Split (%)	9.2%	50.8%		9.2%	50.8%		30.5%	30.5%		9.5%	40.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	65.9	58.8		67.2	61.2		26.3	26.3		40.0	37.7	
Actuated g/C Ratio	0.55	0.49		0.56	0.51		0.22	0.22		0.33	0.31	
v/c Ratio	0.29	0.39		0.45	0.78		0.28	0.57		0.47	0.47	
Control Delay	22.8	18.2		17.4	30.1		40.2	42.9		33.7	30.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.8	18.2		17.4	30.1		40.2	42.9		33.7	30.1	
LOS	C	B		B	C		D	D		C	C	
Approach Delay		18.6			28.6			42.2			31.4	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	4.7	38.7		19.2	137.4		12.1	36.0		22.4	38.3	
Queue Length 95th (m)	17.3	49.4		31.1	169.7		24.5	59.5		37.8	61.9	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	179	1600		389	1637		262	395		294	580	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.39		0.45	0.78		0.24	0.50		0.47	0.43	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 91.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



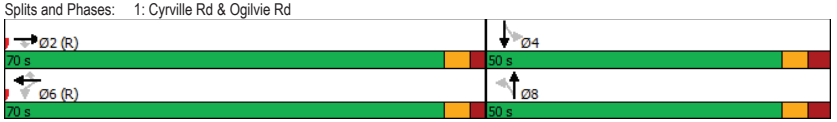
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1092	262	44	688	124	122	240	34	134	222	80
Future Volume (vph)	0	1092	262	44	688	124	122	240	34	134	222	80
Satd. Flow (prot)	0	3316	1469	1658	3316	1469	1580	1707	0	1642	1637	0
Flt Permitted				0.219			0.335			0.388		
Satd. Flow (perm)	0	3316	1353	380	3316	1303	555	1707	0	668	1637	0
Satd. Flow (RTOR)			262			124		7			17	
Lane Group Flow (vph)	0	1092	262	44	688	124	122	274	0	134	302	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		70.0	70.0	70.0	70.0	70.0	50.0	50.0		50.0	50.0	
Total Split (%)		58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		79.1	79.1	79.1	79.1	79.1	27.6	27.6		27.6	27.6	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.50	0.27	0.18	0.31	0.14	0.96	0.69		0.88	0.78	
Control Delay		12.6	2.1	20.9	16.9	8.9	114.7	49.3		88.9	53.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.6	2.1	20.9	16.9	8.9	114.7	49.3		88.9	53.7	
LOS		B	A	C	B	A	F	D		F	D	
Approach Delay		10.6			16.0			69.5			64.5	
Approach LOS		B			B			E			E	
Queue Length 50th (m)		61.6	0.0	5.4	44.7	6.0	28.8	58.5		30.9	64.1	
Queue Length 95th (m)		105.5	11.4	m8.6	m65.2	m11.2	#52.7	75.1		49.2	82.4	
Internal Link Dist (m)		113.8			313.9			191.2			190.4	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2186	981	250	2186	901	198	614		238	596	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.50	0.27	0.18	0.31	0.14	0.62	0.45		0.56	0.51	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96
Intersection Signal Delay: 27.5 — Intersection LOS: C
Intersection Capacity Utilization 85.3% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

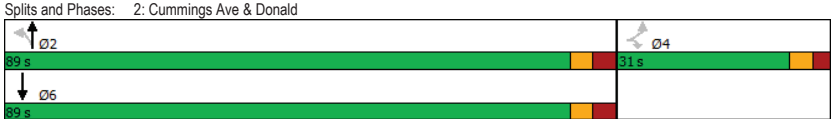


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	359	287	271	246	90
Future Volume (vph)	88	359	287	271	246	90
Satd. Flow (prot)	1523	1483	1658	1728	1649	0
Flt Permitted	0.950		0.558			
Satd. Flow (perm)	1518	1345	963	1728	1649	0
Satd. Flow (RTOR)		359			35	
Lane Group Flow (vph)	88	359	287	271	336	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	31.0	31.0	89.0	89.0	89.0	
Total Split (%)	25.8%	25.8%	74.2%	74.2%	74.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.1	19.1	19.1	
Actuated g/C Ratio	0.26	0.26	0.44	0.44	0.44	
v/c Ratio	0.23	0.59	0.69	0.36	0.46	
Control Delay	17.3	7.1	19.1	9.4	9.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.3	7.1	19.1	9.4	9.5	
LOS	B	A	B	A	A	
Approach Delay	9.1			14.4	9.5	
Approach LOS	A			B	A	
Queue Length 50th (m)	4.8	0.0	14.6	11.5	13.2	
Queue Length 95th (m)	18.1	17.9	40.6	27.5	32.5	
Internal Link Dist (m)	296.3			237.9	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	905	947	963	1728	1649	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.38	0.30	0.16	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 43.9
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.69

Intersection Signal Delay: 11.4 — Intersection LOS: B
Intersection Capacity Utilization 66.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



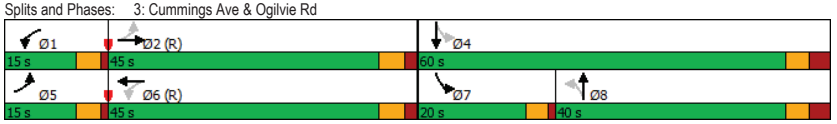
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	1161	23	127	756	209	62	193	219	258	179	84
Future Volume (vph)	129	1161	23	127	756	209	62	193	219	258	179	84
Satd. Flow (prot)	1658	3298	0	1626	3165	0	1642	1578	0	1658	1638	0
Flt Permitted	0.122			0.095			0.597			0.168		
Satd. Flow (perm)	213	3298	0	163	3165	0	1010	1578	0	291	1638	0
Satd. Flow (RTOR)		2			31			47			25	
Lane Group Flow (vph)	129	1184	0	127	965	0	62	412	0	258	263	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	15.0	45.0		15.0	45.0		40.0	40.0		20.0	60.0	
Total Split (%)	12.5%	37.5%		12.5%	37.5%		33.3%	33.3%		16.7%	50.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	52.8	42.3		52.8	42.3		31.2	31.2		53.5	51.2	
Actuated g/C Ratio	0.44	0.35		0.44	0.35		0.26	0.26		0.45	0.43	
v/c Ratio	0.62	1.02		0.68	0.85		0.24	0.93		0.84	0.37	
Control Delay	35.8	63.3		41.3	44.0		36.6	66.1		47.0	22.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.8	63.3		41.3	44.0		36.6	66.1		47.0	22.2	
LOS	D	E		D	D		D	E		D	C	
Approach Delay		60.6			43.7			62.2			34.5	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	11.7	~167.2		17.1	111.2		11.2	83.3		37.6	35.9	
Queue Length 95th (m)	30.6	#209.4		#39.6	#150.2		23.2	#138.7		#76.8	56.2	
Internal Link Dist (m)		313.9			184.8			136.9			237.9	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	218	1162		198	1135		281	473		308	742	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.59	1.02		0.64	0.85		0.22	0.87		0.84	0.35	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02
Intersection Signal Delay: 51.4 — Intersection LOS: D
Intersection Capacity Utilization 100.7% — ICU Level of Service G
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: 3: Cummings Ave & Ogilvie Rd



Appendix I

Synchro Intersection Worksheets – 2026 Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	587	230	28	1058	166	172	241	14	47	166	45
Future Volume (vph)	0	587	230	28	1058	166	172	241	14	47	166	45
Satd. Flow (prot)	0	3283	1414	1658	3316	1441	1551	1714	0	1626	1604	0
Flt Permitted				0.418			0.510			0.426		
Satd. Flow (perm)	0	3283	1329	721	3316	1319	829	1714	0	727	1604	0
Satd. Flow (RTOR)			230			166		3			12	
Lane Group Flow (vph)	0	587	230	28	1058	166	172	255	0	47	211	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		72.9	72.9	72.9	72.9	72.9	47.1	47.1		47.1	47.1	
Total Split (%)		60.8%	60.8%	60.8%	60.8%	60.8%	39.3%	39.3%		39.3%	39.3%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		78.9	78.9	78.9	78.9	78.9	27.8	27.8		27.8	27.8	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.27	0.24	0.06	0.49	0.18	0.90	0.64		0.28	0.56	
Control Delay		10.1	2.2	4.5	4.7	0.4	85.9	47.1		38.6	42.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.1	2.2	4.5	4.7	0.4	85.9	47.1		38.6	42.2	
LOS		B	A	A	A	A	F	D		D	D	
Approach Delay		7.9			4.2			62.7			41.6	
Approach LOS		A			A			E			D	
Queue Length 50th (m)		27.8	0.0	0.8	15.8	0.1	39.5	53.9		9.2	41.5	
Queue Length 95th (m)		48.9	10.8	m1.2	20.2	m0.2	59.6	70.3		17.7	57.1	
Internal Link Dist (m)		113.5			313.9			191.2			190.6	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2158	952	474	2180	924	276	573		242	542	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.27	0.24	0.06	0.49	0.18	0.62	0.45		0.19	0.39	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

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

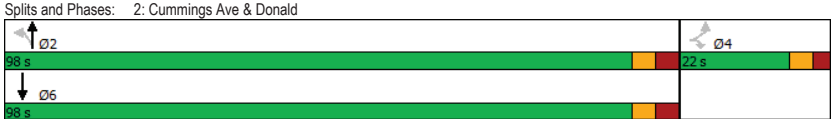
Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	167	248	129	209	104
Future Volume (vph)	42	167	248	129	209	104
Satd. Flow (prot)	1610	1469	1642	1695	1606	0
Flt Permitted	0.950		0.570			
Satd. Flow (perm)	1532	1382	970	1695	1606	0
Satd. Flow (RTOR)		167			62	
Lane Group Flow (vph)	42	167	248	129	313	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	22.0	22.0	98.0	98.0	98.0	
Total Split (%)	18.3%	18.3%	81.7%	81.7%	81.7%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.5	19.5	19.5	
Actuated g/C Ratio	0.26	0.26	0.44	0.44	0.44	
v/c Ratio	0.11	0.35	0.58	0.17	0.42	
Control Delay	14.8	5.9	15.7	8.2	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.8	5.9	15.7	8.2	8.6	
LOS	B	A	B	A	A	
Approach Delay	7.6			13.1	8.6	
Approach LOS	A			B	A	
Queue Length 50th (m)	1.9	0.0	11.9	5.0	10.6	
Queue Length 95th (m)	10.1	12.0	33.1	13.8	27.9	
Internal Link Dist (m)	296.9			132.3	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	577	625	970	1695	1606	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.27	0.26	0.08	0.19	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 44.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58

Intersection Signal Delay: 10.3 — Intersection LOS: B
Intersection Capacity Utilization 62.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald

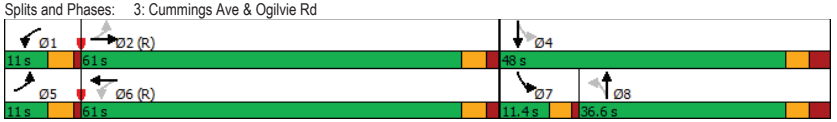


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	601	11	174	1099	171	64	128	69	140	134	120
Future Volume (vph)	54	601	11	174	1099	171	64	128	69	140	134	120
Satd. Flow (prot)	1626	3266	0	1626	3194	0	1658	1514	0	1626	1605	0
Flt Permitted	0.114			0.356			0.602			0.443		
Satd. Flow (perm)	195	3266	0	600	3194	0	1046	1514	0	727	1605	0
Satd. Flow (RTOR)		2			19			22			41	
Lane Group Flow (vph)	54	612	0	174	1270	0	64	197	0	140	254	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	11.0	61.0		11.0	61.0		36.6	36.6		11.4	48.0	
Total Split (%)	9.2%	50.8%		9.2%	50.8%		30.5%	30.5%		9.5%	40.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	66.0	58.8		67.2	61.2		26.3	26.3		40.0	37.7	
Actuated g/C Ratio	0.55	0.49		0.56	0.51		0.22	0.22		0.33	0.31	
v/c Ratio	0.30	0.38		0.45	0.78		0.28	0.56		0.47	0.48	
Control Delay	22.9	18.1		17.3	29.7		40.2	42.4		33.9	29.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.9	18.1		17.3	29.7		40.2	42.4		33.9	29.8	
LOS	C	B		B	C		D	D		C	C	
Approach Delay		18.5			28.2			41.9			31.3	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	5.0	38.3		19.2	135.3		12.1	35.4		22.7	38.2	
Queue Length 95th (m)	17.9	48.6		31.1	166.8		24.5	58.7		38.2	61.9	
Internal Link Dist (m)		313.9			184.8			136.9			81.8	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	182	1602		391	1638		261	395		295	580	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.38		0.45	0.78		0.25	0.50		0.47	0.44	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78
Intersection Signal Delay: 27.6 — Intersection LOS: C
Intersection Capacity Utilization 91.1% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	10	4	334	376	1
Future Vol, veh/h	2	10	4	334	376	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	10	4	334	376	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	719	377	377	0	-	0
Stage 1	377	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	395	670	1181	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	393	670	1181	-	-	-
Mov Cap-2 Maneuver	393	-	-	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	719	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1181	-	600	-	-
HCM Lane V/C Ratio	0.003	-	0.02	-	-
HCM Control Delay (s)	8.1	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1087	262	44	685	124	122	228	34	134	219	80
Future Volume (vph)	0	1087	262	44	685	124	122	228	34	134	219	80
Satd. Flow (prot)	0	3316	1469	1658	3316	1469	1580	1707	0	1642	1637	0
Flt Permitted				0.221			0.338			0.408		
Satd. Flow (perm)	0	3316	1353	383	3316	1303	560	1707	0	702	1637	0
Satd. Flow (RTOR)			262			124		7			17	
Lane Group Flow (vph)	0	1087	262	44	685	124	122	262	0	134	299	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		70.0	70.0	70.0	70.0	70.0	50.0	50.0		50.0	50.0	
Total Split (%)		58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		79.3	79.3	79.3	79.3	79.3	27.4	27.4		27.4	27.4	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.50	0.27	0.17	0.31	0.14	0.95	0.66		0.84	0.77	
Control Delay		12.5	2.1	20.6	16.6	8.7	113.5	48.1		81.1	53.5	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.5	2.1	20.6	16.6	8.7	113.5	48.1		81.1	53.5	
LOS		B	A	C	B	A	F	D		F	D	
Approach Delay		10.5			15.7			68.8			62.1	
Approach LOS		B			B			E			E	
Queue Length 50th (m)		60.9	0.0	5.3	44.3	5.7	28.8	55.5		30.6	63.4	
Queue Length 95th (m)		104.8	11.4	m8.8	m66.1	m11.3	#52.3	71.5		48.1	81.7	
Internal Link Dist (m)		113.8			313.9			191.2			190.4	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2190	982	252	2190	902	200	614		250	596	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.50	0.27	0.17	0.31	0.14	0.61	0.43		0.54	0.50	

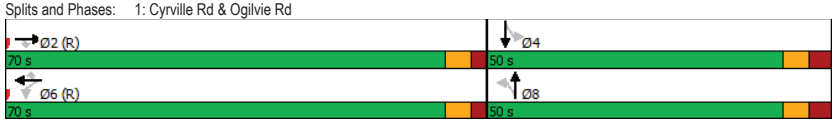
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

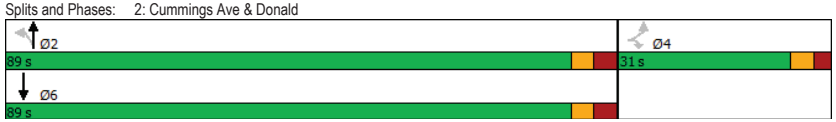


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	342	273	259	245	90
Future Volume (vph)	88	342	273	259	245	90
Satd. Flow (prot)	1523	1483	1658	1728	1649	0
Flt Permitted	0.950		0.559			
Satd. Flow (perm)	1518	1345	965	1728	1649	0
Satd. Flow (RTOR)		342			35	
Lane Group Flow (vph)	88	342	273	259	335	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	31.0	31.0	89.0	89.0	89.0	
Total Split (%)	25.8%	25.8%	74.2%	74.2%	74.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	18.3	18.3	18.3	
Actuated g/C Ratio	0.26	0.26	0.42	0.42	0.42	
v/c Ratio	0.22	0.57	0.67	0.35	0.47	
Control Delay	16.7	6.8	18.6	9.4	9.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.7	6.8	18.6	9.4	9.8	
LOS	B	A	B	A	A	
Approach Delay	8.9			14.1	9.8	
Approach LOS	A			B	A	
Queue Length 50th (m)	4.6	0.0	13.6	10.9	13.2	
Queue Length 95th (m)	17.8	17.0	37.9	26.4	32.5	
Internal Link Dist (m)	296.3			141.5	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	922	951	965	1728	1649	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.36	0.28	0.15	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 43.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.3 | Intersection LOS: B
Intersection Capacity Utilization 65.1% | ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	1147	23	127	747	211	62	185	219	259	177	89
Future Volume (vph)	136	1147	23	127	747	211	62	185	219	259	177	89
Satd. Flow (prot)	1658	3298	0	1626	3161	0	1642	1576	0	1658	1634	0
Flt Permitted	0.126			0.094			0.595			0.173		
Satd. Flow (perm)	220	3298	0	161	3161	0	1007	1576	0	300	1634	0
Satd. Flow (RTOR)		2			32			49			27	
Lane Group Flow (vph)	136	1170	0	127	958	0	62	404	0	259	266	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	15.0	45.0		15.0	45.0		40.0	40.0		20.0	60.0	
Total Split (%)	12.5%	37.5%		12.5%	37.5%		33.3%	33.3%		16.7%	50.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	53.4	42.7		53.1	42.6		30.8	30.8		53.1	50.8	
Actuated g/C Ratio	0.44	0.36		0.44	0.36		0.26	0.26		0.44	0.42	
v/c Ratio	0.64	1.00		0.68	0.84		0.24	0.92		0.84	0.38	
Control Delay	36.3	57.7		41.6	43.1		36.8	64.5		46.5	22.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.3	57.7		41.6	43.1		36.8	64.5		46.5	22.4	
LOS	D	E		D	D		D	E		D	C	
Approach Delay		55.5			42.9			60.8			34.3	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	12.8	~163.7		17.1	110.0		11.2	80.4		37.8	36.1	
Queue Length 95th (m)	#32.5	#205.6		#39.9	#148.1		23.2	#133.6		#75.8	56.8	
Internal Link Dist (m)		313.9			184.8			136.9			72.5	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	222	1174		197	1141		280	474		310	742	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.61	1.00		0.64	0.84		0.22	0.85		0.84	0.36	

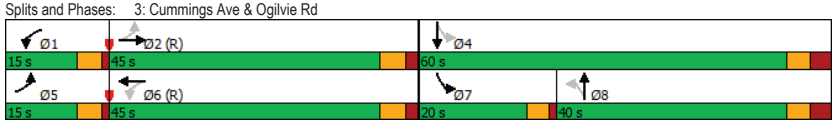
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 48.9	Intersection LOS: D
Intersection Capacity Utilization 99.9%	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: 3: Cummings Ave & Ogilvie Rd



Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	6	9	513	508	2
Future Vol, veh/h	1	6	9	513	508	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	6	9	513	508	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1040	509	510	0	-	0
Stage 1	509	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	255	564	1055	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	252	564	1055	-	-	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1055	-	479	-	-
HCM Lane V/C Ratio	0.009	-	0.015	-	-
HCM Control Delay (s)	8.4	0	12.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Appendix J

Synchro Intersection Worksheets – 2031 Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	594	230	28	1070	166	172	244	14	47	174	45
Future Volume (vph)	0	594	230	28	1070	166	172	244	14	47	174	45
Satd. Flow (prot)	0	3283	1414	1658	3316	1441	1551	1714	0	1626	1605	0
Flt Permitted				0.414			0.497			0.423		
Satd. Flow (perm)	0	3283	1329	714	3316	1319	808	1714	0	722	1605	0
Satd. Flow (RTOR)			230			166		3			12	
Lane Group Flow (vph)	0	594	230	28	1070	166	172	258	0	47	219	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		72.9	72.9	72.9	72.9	72.9	47.1	47.1		47.1	47.1	
Total Split (%)		60.8%	60.8%	60.8%	60.8%	60.8%	39.3%	39.3%		39.3%	39.3%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		78.6	78.6	78.6	78.6	78.6	28.1	28.1		28.1	28.1	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.28	0.24	0.06	0.49	0.18	0.91	0.64		0.28	0.57	
Control Delay		10.3	2.2	4.5	4.8	0.4	88.8	46.9		38.3	42.5	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		10.3	2.2	4.5	4.8	0.4	88.8	46.9		38.3	42.5	
LOS		B	A	A	A	A	F	D		D	D	
Approach Delay		8.0			4.2			63.6			41.8	
Approach LOS		A			A			E			D	
Queue Length 50th (m)		28.6	0.0	0.8	16.0	0.2	39.5	54.3		9.1	43.2	
Queue Length 95th (m)		49.6	10.8	m1.2	20.3	m0.2	60.3	71.3		17.7	59.2	
Internal Link Dist (m)		113.5			313.9			191.2			190.6	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2149	949	467	2171	920	269	573		240	543	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.28	0.24	0.06	0.49	0.18	0.64	0.45		0.20	0.40	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

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

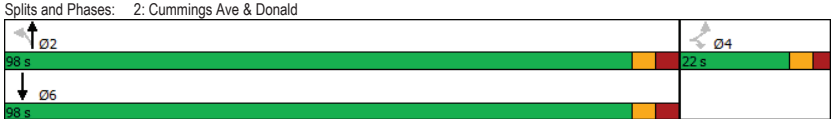
Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	175	260	130	220	104
Future Volume (vph)	42	175	260	130	220	104
Satd. Flow (prot)	1610	1469	1642	1695	1611	0
Flt Permitted	0.950		0.564			
Satd. Flow (perm)	1532	1382	960	1695	1611	0
Satd. Flow (RTOR)		175			59	
Lane Group Flow (vph)	42	175	260	130	324	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	22.0	22.0	98.0	98.0	98.0	
Total Split (%)	18.3%	18.3%	81.7%	81.7%	81.7%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.8	19.8	19.8	
Actuated g/C Ratio	0.25	0.25	0.44	0.44	0.44	
v/c Ratio	0.11	0.36	0.61	0.17	0.43	
Control Delay	15.0	5.9	16.5	8.1	8.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	5.9	16.5	8.1	8.8	
LOS	B	A	B	A	A	
Approach Delay	7.7			13.7	8.8	
Approach LOS	A			B	A	
Queue Length 50th (m)	2.0	0.0	12.8	5.1	11.3	
Queue Length 95th (m)	10.1	12.3	35.5	14.0	29.4	
Internal Link Dist (m)	296.9			132.3	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	572	626	960	1695	1611	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.28	0.27	0.08	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 44.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61

Intersection Signal Delay: 10.6 — Intersection LOS: B
Intersection Capacity Utilization 63.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



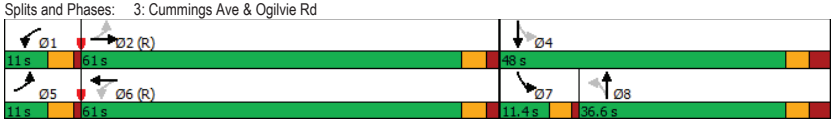
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	608	11	174	1112	171	64	130	69	140	140	120
Future Volume (vph)	54	608	11	174	1112	171	64	130	69	140	140	120
Satd. Flow (prot)	1626	3266	0	1626	3195	0	1658	1517	0	1626	1609	0
Flt Permitted	0.111			0.353			0.599			0.439		
Satd. Flow (perm)	190	3266	0	595	3195	0	1041	1517	0	721	1609	0
Satd. Flow (RTOR)		2			19			21			39	
Lane Group Flow (vph)	54	619	0	174	1283	0	64	199	0	140	260	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	11.0	61.0		11.0	61.0		36.6	36.6		11.4	48.0	
Total Split (%)	9.2%	50.8%		9.2%	50.8%		30.5%	30.5%		9.5%	40.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	65.9	58.8		67.2	61.2		26.3	26.3		40.0	37.7	
Actuated g/C Ratio	0.55	0.49		0.56	0.51		0.22	0.22		0.33	0.31	
v/c Ratio	0.31	0.39		0.45	0.78		0.28	0.57		0.48	0.49	
Control Delay	23.7	18.3		17.4	30.1		40.3	42.9		34.0	30.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.7	18.3		17.4	30.1		40.3	42.9		34.0	30.4	
LOS	C	B		B	C		D	D		C	C	
Approach Delay		18.7			28.6			42.2			31.7	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	5.0	38.8		19.2	137.5		12.1	36.0		22.7	39.8	
Queue Length 95th (m)	18.2	49.5		31.1	169.7		24.5	59.5		38.2	64.0	
Internal Link Dist (m)		313.9			184.8			136.9			81.8	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	179	1600		389	1637		260	395		294	580	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.39		0.45	0.78		0.25	0.50		0.48	0.45	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 27.9	Intersection LOS: C
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	10	4	336	382	1
Future Vol, veh/h	2	10	4	336	382	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	10	4	336	382	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	727	383	383	0	-	0
Stage 1	383	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	391	664	1175	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	718	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	389	664	1175	-	-	-
Mov Cap-2 Maneuver	389	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	718	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1175	-	594	-	-
HCM Lane V/C Ratio	0.003	-	0.02	-	-
HCM Control Delay (s)	8.1	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1099	262	44	693	124	122	240	34	134	222	80
Future Volume (vph)	0	1099	262	44	693	124	122	240	34	134	222	80
Satd. Flow (prot)	0	3316	1469	1658	3316	1469	1580	1707	0	1642	1637	0
Flt Permitted				0.216			0.335			0.388		
Satd. Flow (perm)	0	3316	1353	375	3316	1303	555	1707	0	668	1637	0
Satd. Flow (RTOR)			262			124		7			17	
Lane Group Flow (vph)	0	1099	262	44	693	124	122	274	0	134	302	0
Turn Type		NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases			2	6		6	8			4		
Detector Phase		2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)		32.2	32.2	32.2	32.2	32.2	47.1	47.1		47.1	47.1	
Total Split (s)		70.0	70.0	70.0	70.0	70.0	50.0	50.0		50.0	50.0	
Total Split (%)		58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)		2.5	2.5	2.5	2.5	2.5	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	
Total Lost Time (s)		6.2	6.2	6.2	6.2	6.2	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		79.1	79.1	79.1	79.1	79.1	27.6	27.6		27.6	27.6	
Actuated g/C Ratio		0.66	0.66	0.66	0.66	0.66	0.23	0.23		0.23	0.23	
v/c Ratio		0.50	0.27	0.18	0.32	0.14	0.96	0.69		0.88	0.78	
Control Delay		12.6	2.1	21.0	17.1	8.9	114.7	49.3		88.9	53.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.6	2.1	21.0	17.1	8.9	114.7	49.3		88.9	53.7	
LOS		B	A	C	B	A	F	D		F	D	
Approach Delay		10.6			16.1			69.5			64.5	
Approach LOS		B			B			E			E	
Queue Length 50th (m)		62.3	0.0	5.4	45.2	5.9	28.8	58.5		30.9	64.1	
Queue Length 95th (m)		106.5	11.4	m8.6	m65.6	m11.1	#52.7	75.1		49.2	82.4	
Internal Link Dist (m)		113.8			313.9			191.2			190.4	
Turn Bay Length (m)				62.0		71.0	33.5			82.0		
Base Capacity (vph)		2186	981	247	2186	901	198	614		238	596	
Starvation Cap Reductn		0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0		0	0	
Storage Cap Reductn		0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio		0.50	0.27	0.18	0.32	0.14	0.62	0.45		0.56	0.51	

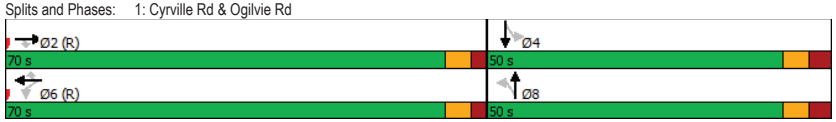
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd

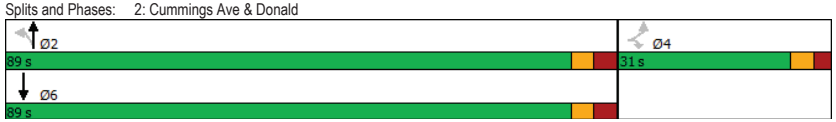


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	359	287	272	248	90
Future Volume (vph)	88	359	287	272	248	90
Satd. Flow (prot)	1523	1483	1658	1728	1649	0
Flt Permitted	0.950		0.557			
Satd. Flow (perm)	1518	1345	961	1728	1649	0
Satd. Flow (RTOR)		359			34	
Lane Group Flow (vph)	88	359	287	272	338	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.0	22.0	39.9	39.9	39.9	
Total Split (s)	31.0	31.0	89.0	89.0	89.0	
Total Split (%)	25.8%	25.8%	74.2%	74.2%	74.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.7	2.7	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.9	6.9	6.9	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
Act Effct Green (s)	11.3	11.3	19.1	19.1	19.1	
Actuated g/C Ratio	0.26	0.26	0.44	0.44	0.44	
v/c Ratio	0.23	0.59	0.69	0.36	0.46	
Control Delay	17.3	7.1	19.2	9.4	9.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.3	7.1	19.2	9.4	9.6	
LOS	B	A	B	A	A	
Approach Delay	9.1			14.4	9.6	
Approach LOS	A			B	A	
Queue Length 50th (m)	4.8	0.0	14.6	11.5	13.3	
Queue Length 95th (m)	18.1	17.9	40.6	27.7	32.7	
Internal Link Dist (m)	296.3			141.5	259.3	
Turn Bay Length (m)	60.0		60.0			
Base Capacity (vph)	905	947	961	1728	1649	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.38	0.30	0.16	0.20	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 43.9
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.69

Intersection Signal Delay: 11.4 | Intersection LOS: B
Intersection Capacity Utilization 66.1% | ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Cummings Ave & Donald



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	1161	23	127	756	211	62	194	219	259	179	89
Future Volume (vph)	136	1161	23	127	756	211	62	194	219	259	179	89
Satd. Flow (prot)	1658	3298	0	1626	3161	0	1642	1578	0	1658	1634	0
Flt Permitted	0.119			0.095			0.594			0.168		
Satd. Flow (perm)	208	3298	0	163	3161	0	1005	1578	0	291	1634	0
Satd. Flow (RTOR)		2			32			47			27	
Lane Group Flow (vph)	136	1184	0	127	967	0	62	413	0	259	268	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	9.7	24.7		9.7	24.7		36.6	36.6		9.3	36.6	
Total Split (s)	15.0	45.0		15.0	45.0		40.0	40.0		20.0	60.0	
Total Split (%)	12.5%	37.5%		12.5%	37.5%		33.3%	33.3%		16.7%	50.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	2.0		1.0	2.0		3.3	3.3		1.0	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.7	5.7		4.7	5.7		6.6	6.6		4.3	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	52.9	42.2		52.6	42.0		31.3	31.3		53.6	51.3	
Actuated g/C Ratio	0.44	0.35		0.44	0.35		0.26	0.26		0.45	0.43	
v/c Ratio	0.65	1.02		0.68	0.86		0.24	0.93		0.84	0.38	
Control Delay	38.6	63.7		41.5	44.6		36.6	66.1		47.3	22.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.6	63.7		41.5	44.6		36.6	66.1		47.3	22.2	
LOS	D	E		D	D		D	E		D	C	
Approach Delay		61.1			44.3			62.2			34.5	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	12.4	~167.2		17.1	111.5		11.2	83.6		37.8	36.5	
Queue Length 95th (m)	#35.3	#209.6		#39.6	#150.5		23.2	#138.7		#77.3	57.1	
Internal Link Dist (m)		313.9			184.8			136.9			72.5	
Turn Bay Length (m)	80.0			100.0			34.0			153.0		
Base Capacity (vph)	217	1160		198	1127		279	473		308	742	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	1.02		0.64	0.86		0.22	0.87		0.84	0.36	

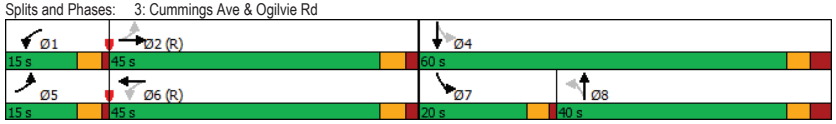
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 51.8	Intersection LOS: D
Intersection Capacity Utilization 100.8%	ICU Level of Service G
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: 3: Cummings Ave & Ogilvie Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	6	9	522	510	2
Future Volume (vph)	1	6	9	522	510	2
Satd. Flow (prot)	1532	0	0	1743	1743	0
Flt Permitted	0.993			0.999		
Satd. Flow (perm)	1532	0	0	1743	1743	0
Lane Group Flow (vph)	7	0	0	531	512	0
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 46.6%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	6	9	522	510	2
Future Vol, veh/h	1	6	9	522	510	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	6	9	522	510	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1051	511	512	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	251	563	1053	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	563	1053	-	-	-
Mov Cap-2 Maneuver	248	-	-	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	584	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1053	-	477	-	-
HCM Lane V/C Ratio	0.009	-	0.015	-	-
HCM Control Delay (s)	8.4	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Appendix K

MMLOS Analysis

CGH TRANSPORTATION

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc**	**Project**	**2022-168**
Scenario	**Existing/Future**	**Date**	**4/5/2023**
Comments			

	INTERSECTIONS	Ogilvie Road at Cyrville Road				Donald Street at Cummings Avenue				Ogilvie Road at Cummings Avenue			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	6	10+	9	4	4		6	5	7	6	8
	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
	Conflicting Left Turns	No left turn / Prohib.	Permissive	Permissive	Permissive	Permissive	No left turn / Prohib.		Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive
	Conflicting Right Turns	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
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No		No	No	No	No	No
	Right Turn Channel	Conventional with Receiving Lane	No Channel	No Channel	No Channel	No Channel	No Right Turn		No Channel	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel
	Corner Radius	5-10m	5-10m	15-25m	15-25m	10-15m	No Right Turn		10-15m	10-15m	15-25m	5-10m	5-10m
	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
	PETSI Score	**-19**	**21**	**-47**	**-31**	**58**	**71**		**20**	**37**	**6**	**21**	**-11**
	Ped. Exposure to Traffic LoS	**F**	**F**	**F**	**F**	**D**	**C**	**-**	**F**	**E**	**F**	**F**	**F**
	Cycle Length	120	120	120	120	120	120		120	120	120	120	120
	Effective Walk Time	7	7	47	47	63	82		7	18	6	27	27
	Average Pedestrian Delay	**53**	**53**	**22**	**22**	**14**	**6**		**53**	**43**	**54**	**36**	**36**
	Pedestrian Delay LoS	**E**	**E**	**C**	**C**	**B**	**A**	**-**	**E**	**E**	**E**	**D**	**D**
	Level of Service	**F**	**F**	**F**	**F**	**D**	**C**	**-**	**F**	**E**	**F**	**F**	**F**
		F				**F**				**F**			
	Approach From	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			Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration												
	Right Turning Speed												
	Cyclist relative to RT motorists	**#N/A**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**#N/A**	**-**	**-**	**#N/A**	**#N/A**	**#N/A**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**-**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	One lane crossed	1 lane crossed		≥ 2 lanes crossed		One lane crossed		One lane crossed	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed
	Operating Speed	≥ 60 km/h	≥ 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	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**F**	**E**	**-**	**F**	**-**	**E**	**-**	**E**	**E**	**E**	**F**	**F**
	Level of Service	**#N/A**	**E**	**-**	**F**	**#N/A**	**-**	**-**	**#N/A**	**#N/A**	**#N/A**	**F**	**F**
		F				**E**				**F**			
Transit	Average Signal Delay			≤ 20 sec	≤ 20 sec							> 40 sec	> 40 sec
	Level of Service	**-**	**-**	**C**	**C**	**-**	**-**	**-**	**-**	**-**	**-**	**F**	**F**
		C				**-**				**F**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m			> 15 m	> 15 m	> 15 m	> 15 m	> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	1			1	≥ 2	≥ 2	1	1
	Level of Service	**A**	**A**	**C**	**C**	**C**	**-**	**-**	**C**	**A**	**A**	**C**	**C**
		C				**C**				**C**			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60				0.91 - 1.00			
	Level of Service	**B**				**A**				**E**			

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc**	**Project**	**2022-168**
Scenario	**Existing**	**Date**	**4/5/2024**
Comments			

SEGMENTS			Cummings Ave	Section	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	-	≥ 2 m < 0.5		
	Avg Daily Curb Lane Traffic Volume		> 3000		
	Operating Speed On-Street Parking		> 50 to 60 km/h no		
	Exposure to Traffic PLoS		**E**	-	-
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service		**-**	**-**	**-**
Bicycle	Type of Cycling Facility	**D**	Mixed Traffic		
	Number of Travel Lanes		≤ 2 (no centreline)		
	Operating Speed		≥ 50 to 60 km/h		
	# of Lanes & Operating Speed LoS		**D**	-	-
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge		
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes		
	Sidestreet Operating Speed		>50 to 60 km/h		
	Unsignalized Crossing - Lowest LoS		**C**	-	-
	Level of Service		**D**	**-**	**-**
Transit	Facility Type	**D**	Mixed Traffic		
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8		
	Level of Service		**D**	**-**	**-**
Truck	Truck Lane Width	**C**	≤ 3.5 m		
	Travel Lanes per Direction		1		
	Level of Service		**C**	**-**	**-**

Appendix L

TDM Checklist

CGH TRANSPORTATION

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: *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:
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 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)	☐