265 Carling Avenue

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report (Rev#1)

Prepared for:

KTS Ontario Properties
265 Carling Avenue, Unit 401
Ottawa, ON K1S 2E1

Prepared by:

CGH TRANSPORTATION

6 Plaza Court
Ottawa, ON K2H 7W1

December 2024

PN: 2023-181

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1 Screening

This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, incorporating the 2023 Revision to Transportation Impact Assessment 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. Based on the Screening Form and low trip generation, through the pre-consultation feedback, the City's Transportation Project Manager requested a scoped TIA for the building conversion, and this study has been prepared to address this request in support of the site plan application.

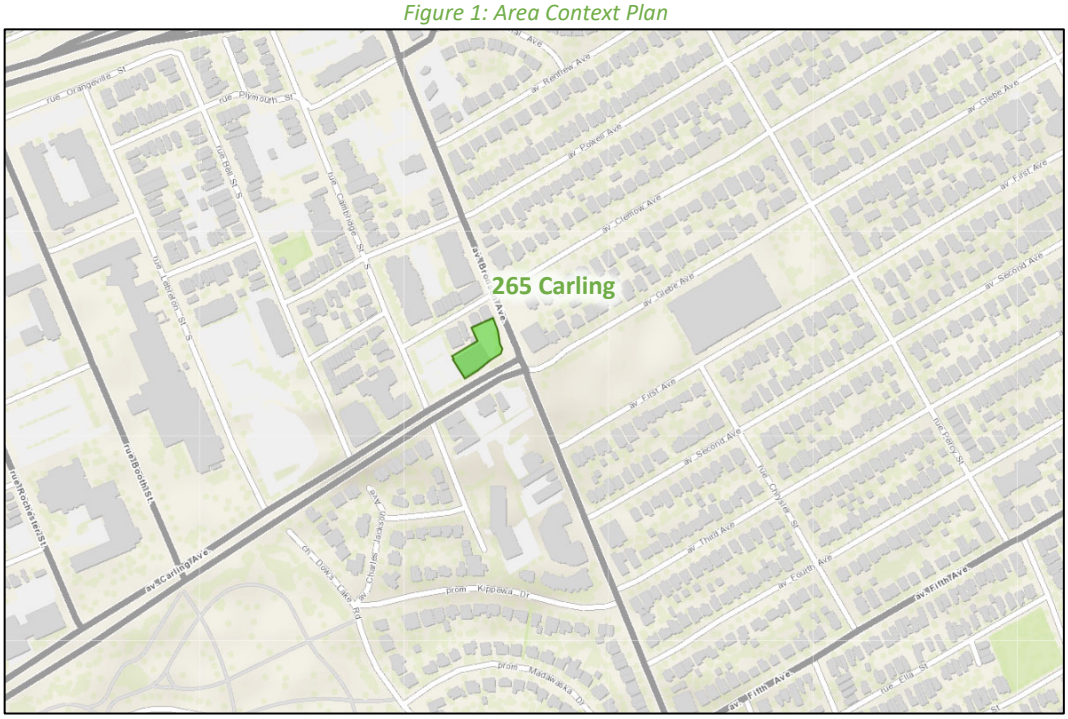
2 Existing and Planned Conditions

2.1 Proposed Development

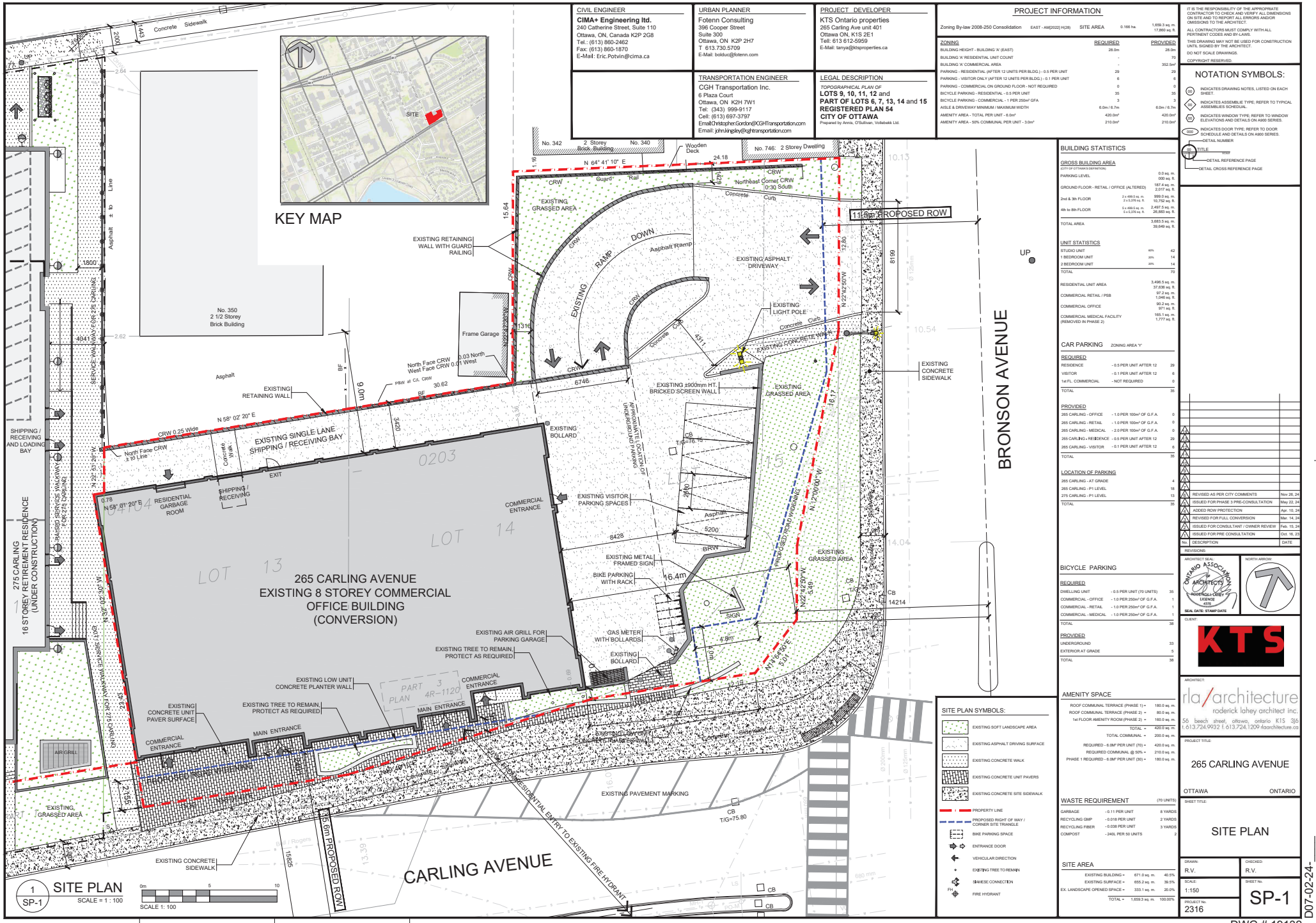
The development site is located 265 Carling Avenue, and it is zoned as Arterial Mainstreet Zone (AM[2022] H(28)). The existing site is an eight-storey mixed-use building, including covered parking and commercial on the ground floor and office space above the ground floor. The redevelopment concept is for the conversion of the covered parking to a 1,046 sq. ft. of commercial space on the ground floor, the conversion of a 1,745 sq.t. dentist office to amenity space, and the conversion of seven storeys of office space to 70 residential dwellings. A total of four existing surface vehicle parking spaces and 18 existing underground vehicle parking spaces will remain, and the use of 13 vehicle parking spaces in the adjacent 275 Carling Avenue building's underground parking levels is proposed. The redevelopment is also proposed to include a total of 38 bicycle parking spaces. No changes to the site frontages, the conditions at the corner of Bronson Avenue at Carling Avenue/Glebe Avenue are being contemplated. The anticipated full build-out and occupancy horizon is 2026 with construction occurring in two phases. The existing full-movement site access on Bronson Avenue is proposed to be retained.

Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 18, 2024



CIVIL ENGINEER	URBAN PLANNER	PROJECT DEVELOPER
CIMA+ Engineering ltd. 240 Catherine Street, Suite 110 Ottawa, ON, Canada K2P 2G8 Tel.: (613) 860-2462 Fax: (613) 860-1870 E-Mail: Eric.Potvin@cima.ca	Fotenn Consulting 396 Cooper Street Suite 300 Ottawa, ON K2P 2H7 T 613.730.5709 E-Mail: bolduc@fotenn.com	KTS Ontario properties 265 Carling Ave unit 401 Ottawa ON, K1S 2E1 Tell: 613 612-5959 E-Mail: tanya@ktsproperties.ca
TRANSPORTATION ENGINEER	**LEGAL DESCRIPTION**	
CGH Transportation Inc. 6 Plaza Court Ottawa, ON K2H 7W1 Tel: (343) 999-9117 Cell: (613) 697-3797 Email:Christopher.Gordon@CGHTransportation.com Email: john.kingsley@cghtransportation.com	*TOPOGRAPHICAL PLAN OF* **LOTS 9, 10, 11, 12** and **PART OF LOTS 6, 7, 13, 14** and **15** **REGISTERED PLAN 54** **CITY OF OTTAWA** Prepared by Annis, O'Sullivan, Vollebekk Ltd.	

PROJECT INFORMATION

Zoning By-law 2008-250 Consolidation EAST - AM[2022] H(28) SITE AREA 0.166 ha. 1,659.3 sq. m. 17,860 sq. ft.

ZONING	REQUIRED	PROVIDED
BUILDING HEIGHT - BUILDING 'A' (EAST)	28.0m	28.0m
BUILDING 'A' RESIDENTIAL UNIT COUNT	-	70
BUILDING 'A' COMMERCIAL AREA	-	352.5m²
PARKING - RESIDENTIAL (AFTER 12 UNITS PER BLDG.) - 0.5 PER UNIT	29	29
PARKING - VISITOR ONLY (AFTER 12 UNITS PER BLDG.) - 0.1 PER UNIT	6	6
PARKING - COMMERCIAL ON GROUND FLOOR - NOT REQUIRED	0	0
BICYCLE PARKING - RESIDENTIAL - 0.5 PER UNIT	35	35
BICYCLE PARKING - COMMERCIAL - 1 PER 250m² GFA	3	3
AISLE & DRIVEWAY MINIMUM / MAXIMUM WIDTH	6.0m / 6.7m	6.0m / 6.7m
AMENITY AREA - TOTAL PER UNIT - 6.0m²	420.0m²	420.0m²
AMENITY AREA - 50% COMMUNAL PER UNIT - 3.0m²	210.0m²	210.0m²

BUILDING STATISTICS

GROSS BUILDING AREA (CITY OF OTTAWA'S DEFINITION)

PARKING LEVEL		0.0 sq. m. 000 sq. ft.
GROUND FLOOR - RETAIL / OFFICE (ALTERED)		187.4 sq. m. 2,017 sq. ft.
2nd & 3th FLOOR	2 x 499.5 sq. m. 2 x 5,376 sq. ft.	999.0 sq. m. 10,752 sq. ft.
4th to 8th FLOOR	5 x 499.5 sq. m. 5 x 5,376 sq. ft.	2,497.5 sq. m. 26,883 sq. ft.
TOTAL AREA		3,683.5 sq. m. 39,649 sq. ft.

UNIT STATISTICS

STUDIO UNIT	60%	42
1 BEDROOM UNIT	20%	14
2 BEDROOM UNIT	20%	14
TOTAL		70

RESIDENTIAL UNIT AREA	3,496.5 sq. m. 37,636 sq. ft.
COMMERCIAL RETAIL / PSB	97.2 sq. m. 1,046 sq. ft.
COMMERCIAL OFFICE	90.2 sq. m. 971 sq. ft.
COMMERCIAL MEDICAL FACILITY (REMOVED IN PHASE 2)	165.1 sq. m. 1,777 sq. ft.

CAR PARKING

ZONING AREA 'Y'

REQUIRED

RESIDENCE	- 0.5 PER UNIT AFTER 12	29
VISITOR	- 0.1 PER UNIT AFTER 12	6
1st FL. COMMERCIAL	- NOT REQUIRED	0
TOTAL		35

PROVIDED

265 CARLING - OFFICE	- 1.0 PER 100m² OF G.F.A.	0
265 CARLING - RETAIL	- 1.0 PER 100m² OF G.F.A.	0
265 CARLING - MEDICAL	- 2.0 PER 100m² OF G.F.A.	0
265 CARLING - RESIDENCE	- 0.5 PER UNIT AFTER 12	29
265 CARLING - VISITOR	- 0.1 PER UNIT AFTER 12	6
TOTAL		35

LOCATION OF PARKING

265 CARLING - AT GRADE	4
265 CARLING - P1 LEVEL	18
275 CARLING - P1 LEVEL	13
TOTAL	35

BICYCLE PARKING

REQUIRED

DWELLING UNIT	- 0.5 PER UNIT (70 UNITS)	35
COMMERCIAL - OFFICE	- 1.0 PER 250m² OF G.F.A.	1
COMMERCIAL - RETAIL	- 1.0 PER 250m² OF G.F.A.	1
COMMERCIAL - MEDICAL	- 1.0 PER 250m² OF G.F.A.	1
TOTAL		38

PROVIDED

UNDERGROUND	33
EXTERIOR AT GRADE	5
TOTAL	38

AMENITY SPACE

ROOF COMMUNAL TERRACE (PHASE 1) =	180.0 sq. m.
ROOF COMMUNAL TERRACE (PHASE 2) =	80.0 sq. m.
1st FLOOR AMENITY ROOM (PHASE 2) =	160.0 sq. m.
TOTAL =	420.0 sq. m.
TOTAL COMMUNAL =	200.0 sq. m.
REQUIRED - 6.0M² PER UNIT (70) =	420.0 sq. m.
REQUIRED COMMUNAL @ 50% =	210.0 sq. m.
PHASE 1 REQUIRED - 6.0M² PER UNIT (30) =	180.0 sq. m.

WASTE REQUIREMENT (70 UNITS)

GARBAGE	- 0.11 PER UNIT	8 YARDS
RECYCLING GMP	- 0.018 PER UNIT	2 YARDS
RECYCLING FIBER	- 0.038 PER UNIT	3 YARDS
COMPOST	- 240L PER 50 UNITS	2

SITE AREA

EXISTING BUILDING =	671.0 sq. m.	40.5%
EXISTING SURFACE =	655.2 sq. m.	39.5%
EX. LANDSCAPE OPENED SPACE =	333.1 sq. m.	20.0%
TOTAL =	1,659.3 sq. m.	100.00%

SITE PLAN SYMBOLS:

- EXISTING SOFT LANDSCAPE AREA
- EXISTING ASPHALT DRIVING SURFACE
- EXISTING CONCRETE WALK
- EXISTING CONCRETE UNIT PAVERS
- EXISTING CONCRETE SITE SIDEWALK
- PROPERTY LINE
- PROPOSED RIGHT OF WAY / CORNER SITE TRIANGLE
- BIKE PARKING SPACE
- ENTRANCE DOOR
- VEHICULAR DIRECTION
- EXISTING TREE TO REMAIN
- SIAMESE CONNECTION
- FIRE HYDRANT

NOTATION SYMBOLS:

- (XX) INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
- XX INDICATES ASSEMBLIE TYPE; REFER TO TYPICAL ASSEMBLIES SCHEDULE.
- XX INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A900 SERIES.
- A900 INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A900 SERIES.
- DETAIL NUMBER
- TITLE / SCALE
- DETAIL REFERENCE PAGE
- DETAIL CROSS REFERENCE PAGE

No.	DESCRIPTION	DATE
13	REVISED AS PER CITY COMMENTS	Nov. 26, 24
12	ISSUED FOR PHASE 3 PRE-CONSULTATION	May 22, 24
11	ADDED ROW PROTECTION	Apr. 10, 24
10	REVISED FOR FULL CONVERSION	Mar. 14, 24
9	ISSUED FOR CONSULTANT / OWNER REVIEW	Feb. 15, 24
8	ISSUED FOR PRE CONSULTATION	Oct. 16, 23

REVISIONS:

ARCHITECT SEAL: ONTARIO ASSOCIATION OF ARCHITECTS — RODERICK LAHEY — LICENCE 4375 — SEAL DATE: STAMP DATE

NORTH ARROW:

CLIENT: KTS

ARCHITECT: rla/architecture — roderick lahey architect inc. — 56 beech street, ottawa, ontario K1S 3J6 — t.613.724.9932 f.613.724.1209 rlaarchitecture.ca

PROJECT TITLE: 265 CARLING AVENUE — OTTAWA ONTARIO

SHEET TITLE: SITE PLAN

DRAWN:	CHECKED:
R.V.	R.V.
SCALE: 1:150	SHEET No. SP-1
PROJECT No. 2316	

D07-02-24-

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DWG # 19132

2.2 Existing Conditions

2.2.1 Area Road Network

Carling Avenue: Carling Avenue is a City of Ottawa arterial road with a divided six-lane urban cross-section including sidewalks on both sides of the road. The outside lanes are shared transit-bike priority lanes and on-street parking is prohibited within the study area on both sides of the road. The transit lane on the south side of Carling Avenue transitions to a right-turn lane approximately 200 metres west of Bronson Avenue. The posted speed limit is 60 km/h, and the Ottawa Official Plan reserves a 44.5 metre right of way within the study area. Carling Avenue is a truck route.

Bronson Avenue: Bronson Avenue is a City of Ottawa arterial road with a four-lane urban cross-section including sidewalks on both sides of the road. Within the study area, stopping regulations alternate between no stopping and stopping prohibited from 7:00 – 9:00am, and 3:30 – 5:30pm during weekdays. The parking regulations during weekdays alternate between no parking and parking prohibited between 9:00am and 3:00 pm. The posted speed limit is 50 km/h, and the Ottawa Official Plan reserves a 23.0 metre right of way within the study area. Bronson Avenue is a truck route.

Glebe Avenue: Glebe Avenue is an eastbound City of Ottawa one-way local road with sidewalks on both sides of the street, eastbound and westbound bike lanes on the south side of the road, and a bike lane on the south side of the road east of Percy Street. On-street parking is permitted on the south side of the road, the posted speed limit is 30 km/h, and the measured right of way width is 18.0 metres within the study area.

Clemow Avenue: Clemow Avenue is a City of Ottawa local road with a two-lane urban cross-section including sidewalks on both sides of the road. West of Bronson Avenue, on-street parking is permitted on the north side of the road between 8:00am and 6:00pm, the posted speed limit is 30 km/h, and the measured right of way is 12.0 metres.

Cambridge Street South: Cambridge Street South is a City of Ottawa local road with a two-lane urban cross-section including sidewalks on both sides of the road. The roadway is separated by the median on Carling Avenue. North of Carling Avenue, two-hour on-street parking is permitted on both sides of the road between 7:00am and 6:00pm, with restrictions on the east side from December 1st to March 31st, the posted speed limit is 30 km/h, and the measured right of way varies between 19.5 and 20.0 metres.

2.2.2 Existing Intersections

The key intersection within 400 metres of the site has been summarized below:

Bronson Avenue at Carling Avenue / Glebe Avenue	The intersection of Bronson Avenue at Carling Avenue/Glebe Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a left-turn lane, and a shared through/right-turn lane and the southbound approach consists of a through lane and a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a shared left-turn/through lane, and a right-turn lane and the east leg is inbound only. Southbound left turns are prohibited at this intersection.

2.2.3 Existing Driveways

Along Bronson Avenue two driveways to a McDonalds restaurant and two driveways to adjacent pizza restaurants are present on the west side of the road between 130 metres and 200 metres north the site access. On the west side of the road between 90 and 200 metres south of the site access, one access to a surface parking lot, one

access to a medical office, a shared access to a pet grooming business and a medical lab, and a further access to the medical lab are present. Across the road on the east side of Bronson Avenue, a driveway to parking for a hydro transformer station is located where its northern extent is in line with the southern extent of the subject site's access. On the east side of Bronson Avenue, a driveway to a mid-rise residential building, a driveway to a barbershop, and a driveway to a custom homebuilder business between 65 and 200 metres north of the site access, and one driveway to a shared rear lane for six to eight single detached dwellings approximately 180 metres south of the site access.

Along Carling Avenue, driveways to a surface parking lot and a retail store are present within 200 metres of the existing site access on the south side of the road. Along Clemow Avenue, driveways to low-to-medium-rise residential land uses are present. Figure 4 illustrates the existing driveways.

Figure 3: Existing Driveways

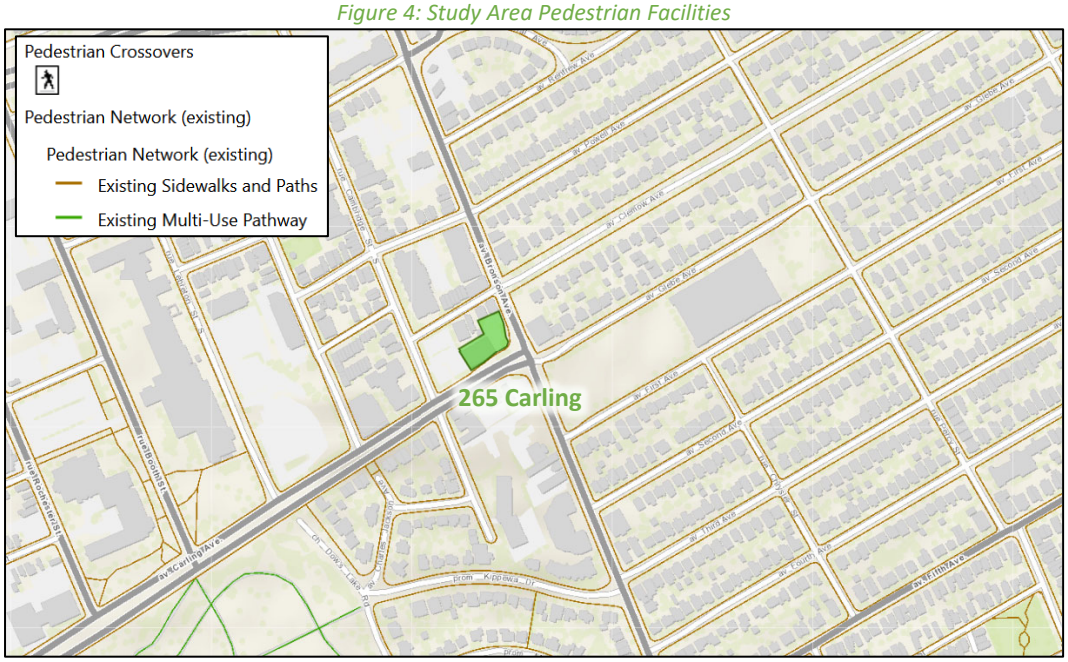
Source: http://maps.ottawa.ca/geoOttawa/ Accessed: July 15, 2024

2.2.4 Cycling and Pedestrian Facilities

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

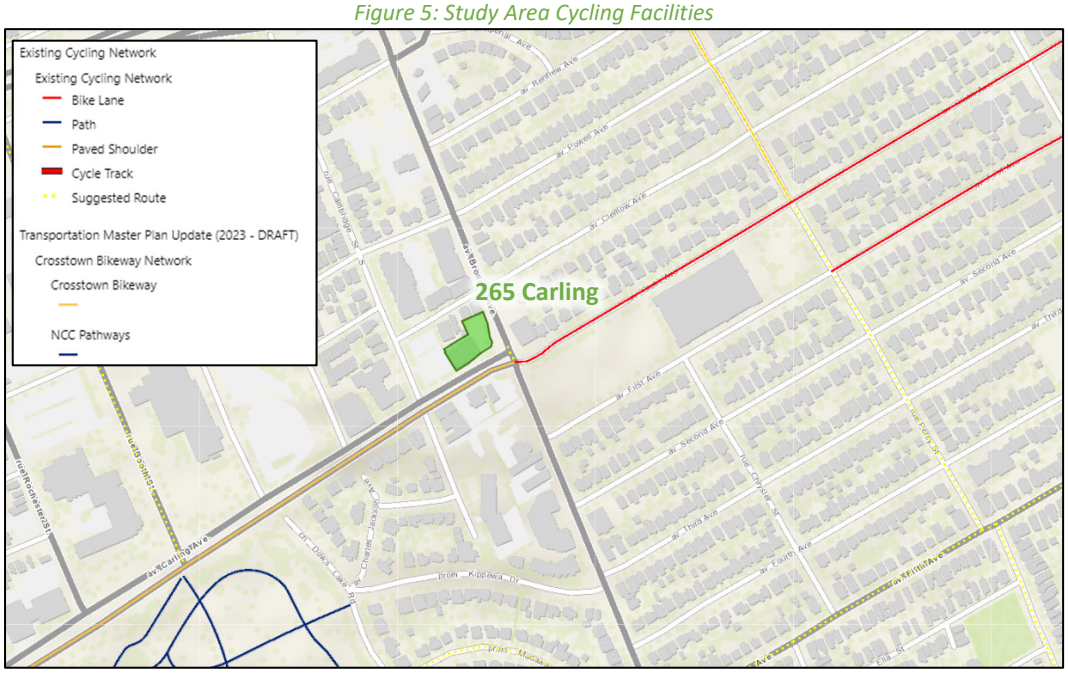
Sidewalks are provided along both sides of all study area roads. Cycling facilities include separated two-way bike lanes the south side of Glebe Avenue west of Percy Street and a bike lane on the south side of a Glebe Avenue east of Percy Street. Cycling paths are present in the Commissioners Park. Carling Avenue and Glebe Avenue are crosstown bikeways in the 2023 Transportation Master Plan – Part 1.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 18, 2024

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 18, 2024

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

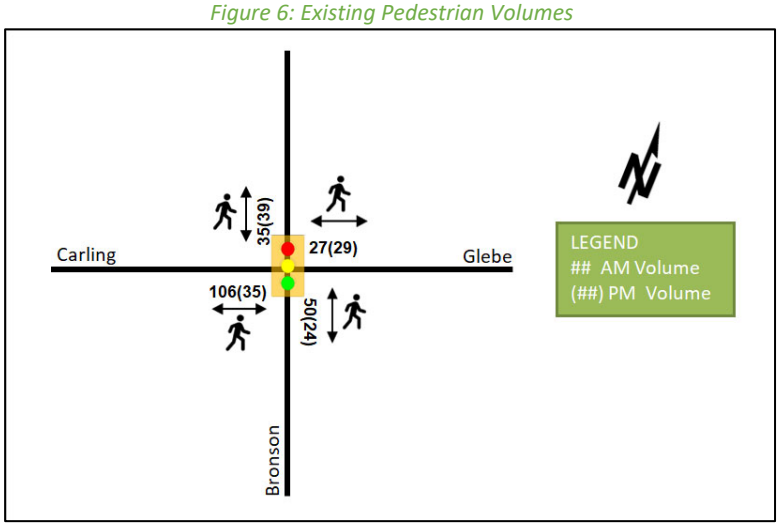
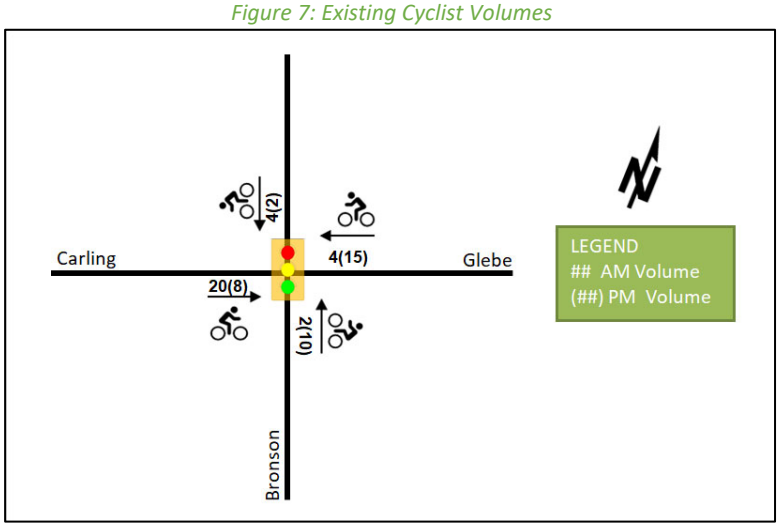


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

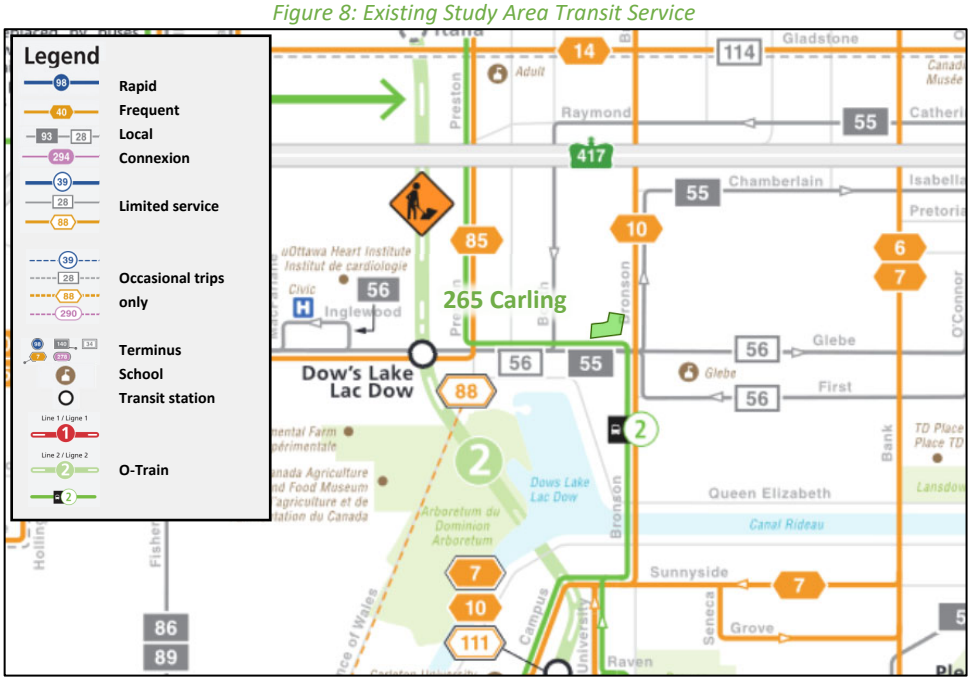
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from December 13, 2023, and is included for general information purposes and context to the surrounding area.

Within the study area, routes #2, #55, and #56 run along Carling Avenue. Route #55 also runs along Booth Street. At Bronson Avenue and Carling Avenue intersection, route #2 turns south and runs along Bronson Avenue, while route #56 continues running east along Glebe Avenue. Route #10 also runs along Bronson Avenue. Dow's Lake Station on the O-Train Trillium line is located approximately 850 metres west of the site. At the time of this report, due to construction, LRT service had been substituted with bus service. The frequency of these routes within proximity of the proposed site based on December 13, 2023 service levels are:

- Route #2 – 7–10-minute service during peak hours, 10-12-minute service all day on weekdays and Saturdays and every 15 minutes on Sundays
- Route #10 – 15-minute service all day, 30-minute service after 7:00pm
- Route #55 – 15-minute service all day and 30-minute service after 7:00pm

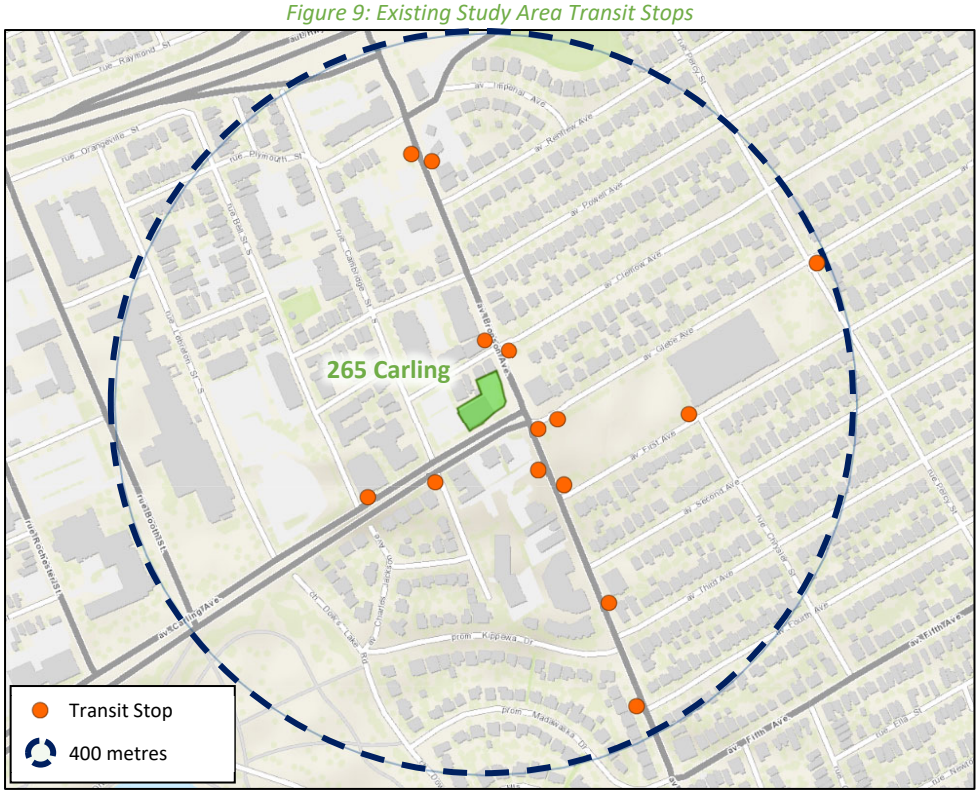
- Route #56 – Operating during peak hours only, 20-minute service in peak direction, 30-minute service in off-peak direction

Figure 8: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: December 13, 2023

Figure 9: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: December 13, 2023

2.2.6 Existing Area Traffic Management Measures

On-street parking is prevalent on local roads throughout the study area, bulb-outs are notably found on Cambridge Street at Carling Avenue, mid-block narrowing with alternating parking is found on Powell Avenue, direction control prevents inbound access to Clemow Avenue from Bronson Avenue, an extensive high-visibility gateway surface treatment is found on Glebe Avenue at Bronson Avenue, and a radar speed driver feedback sign on Bronson Avenue southbound.

2.2.7 Existing Peak Hour Travel Demand

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

Table 1: Intersection Count Date

Intersection	Count Date
Bronson Avenue at Carling Avenue/Glebe Avenue	Wednesday, September 28, 2022

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

Figure 10: Existing Traffic Counts

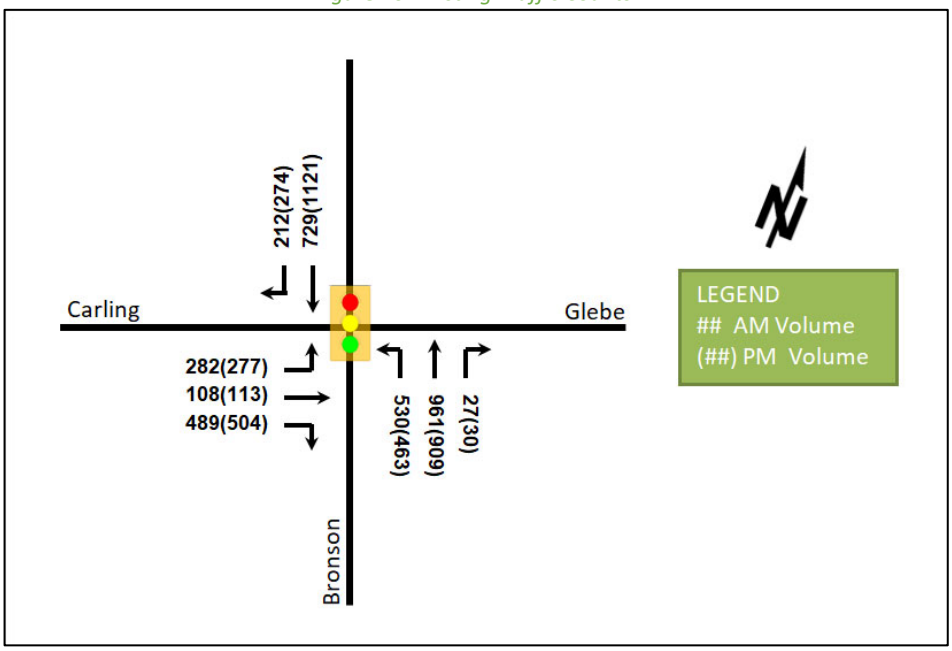


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Bronson Avenue at Carling Avenue Street *Signalized*	EBL	B	0.64	47.6	70.1	C	0.76	67.7	**#92.1**
	EBL/T	A	0.60	45.5	70.9	C	0.74	65.3	**#92.7**
	EBR	C	0.79	23.7	109.3	E	0.92	52.3	**#190.9**
	NBL	C	0.79	47.5	77.2	D	0.90	73.0	**#97.2**
	NBT/R	E	0.97	39.5	**#316.0**	D	0.84	21.4	250.3
	SBT/R	D	0.90	44.6	**#161.0**	E	0.98	50.5	**#253.6**
	Overall	**F**	**1.03**	**40.7**	-	**F**	**1.03**	**47.9**	-

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

At the intersection of Bronson Avenue and Carling Avenue, during the AM peak hour, the northbound through/right and the southbound through/right movements may exhibit extended queuing. During the PM peak hour, the eastbound left, eastbound left/through, eastbound right, northbound left, and southbound through/right are exhibited extended queuing. During both peak hours, the overall intersection is over theoretical capacity based on the HCM 2000 methodology. No individual movements are noted as being over theoretical capacity based on the Synchro calculation method, however.

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, which, given the redevelopment is a conversion of the existing building with no change to access and is anticipated to be associated with a reduction in traffic, is limited to the site frontage on Bronson Avenue and adjacent arterial-arterial intersection. Figure 11 illustrates the area collisions, and Table 4 summarizes the total collisions for each of the locations analyzed. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2018-2022

		Number	%
Total Collisions		**67**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	12	18%
	Property Damage Only	55	82%
Initial Impact Type	**Angle**	3	4%
	Rear end	25	37%
	Sideswipe	30	45%
	Turning Movement	4	6%
	SMV Other	4	6%
	Other	1	1%
Road Surface Condition	**Dry**	48	72%
	Wet	13	19%
	Loose Snow	2	3%
	Slush	1	1%
	Packed Snow	1	1%
	Ice	2	3%
Pedestrian Involved		1	1%
Cyclists Involved		1	1%

Figure 11: Study Area Collision Records 2017-2022

Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	**67**	**100%**
Bronson Ave at Carling Ave/Glebe Ave	60	90%
Bronson Ave between Carling Ave & Clemow Ave	7	10%

Within the study area, the intersection of Bronson Avenue at Carling Avenue/Glebe Avenue is noted to have experienced a high incidence of collisions. All collisions on the segment of Bronson Avenue between Carling Avenue and Clemow Avenue involved property damage only and were split between rear end and sideswipe collisions outside of one angle collision. Rear end and sideswipe collisions are typical of congested conditions, and the single angle collision involved a vehicle making an eastbound left-turn colliding with a vehicle making the southbound through movement. It is assumed that this collision occurred at the subject site access, however no patterns or statistical significance can be established on its basis. The angle collision occurred at 8:46 AM on a Wednesday in October 2020 and was limited to property damage only. During peak hours, gaps in the traffic stream along Bronson Avenue are anticipated to be limited to "courtesy gaps" given the extended queues on the southbound approach at the intersection with Carling Avenue/Glebe Avenue. The building conversion is anticipated to be associated with a reduction in trips, and proposes a reduction in vehicle parking accessed by this driveway. Therefore, no safety implications are anticipated from the site access.

Table 5 summarizes the collision types and conditions for the Bronson Avenue at Carling Avenue/Glebe Avenue intersection.

Table 5: Bronson Avenue at Carling Avenue/Glebe Avenue Collision Summary

		Number	%
Total Collisions		**60**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	12	20%
	Property Damage Only	48	80%

		Number	%
Total Collisions		**60**	**100%**
Initial Impact Type	**Angle**	2	3%
	Rear end	23	38%
	Sideswipe	26	43%
	Turning Movement	4	7%
	SMV Other	4	7%
	Other	1	2%
Road Surface Condition	**Dry**	42	70%
	Wet	12	20%
	Loose Snow	2	3%
	Slush	1	2%
	Packed Snow	1	2%
	Ice	2	3%
Pedestrian Involved		1	2%
Cyclists Involved		1	2%

The Bronson Avenue at Carling Avenue/Glebe Avenue intersection had a total of 60 collisions during the 2018-2022 time period, with 48 involving property damage only and the remaining 12 having non-fatal injuries. The collision types are most represented by sideswipe with 26 collisions, followed by rear end with 23, four each as turning movement and SMV (other), two as angle, and one as the "other" collision type.

The latest detailed collision records for this intersection were received from the City for the data range of 2017-2021. From these data, 53% of the sideswipe collisions occurred on the northbound approach, and these may be influenced by the left-turn trap. Under 13% of the sideswipe collisions occurred on the southbound approach. Fifty-six percent of the rear end collisions occurred on the northbound approach, and 20% occurred on the southbound approach, and this type of collisions is typical of congested conditions.

The pedestrian collision occurred at 11:42 AM on March 6, 2019, in clear, daylit, and dry conditions involving a vehicle making the southbound through movement. The cyclist collision occurred at 9:49 PM on May 30, 2019 in dark and rainy conditions, where a cyclist making the westbound through movement collided with a vehicle making the eastbound left movement. No patterns are present for the collisions involve active modes.

Weather conditions generally do not influence collisions at this location. No further collision analysis is required as part of this study.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 Official Plan (2022)

Within the Ultimate Transit Network, an at-grade BRT corridor is shown along Carling Avenue between Dow's Lake Station and Bronson Avenue. Bronson Avenue is shown as a Transit Priority Corridor.

The proposed development is also located in the Bronson Avenue Mainstreet Corridor and Carling Avenue Mainstreet within Design Priority Area.

2.3.1.2 Transportation Master Plan (2013)

Within the Transportation Master Plan (2013), the Rapid Transit and Transit Priority Network's Affordable Network diagram shows isolated transit priority measures on Carling Avenue, east of the O-Train Line 2, and Bronson Avenue, south of Carling Street. Continuous transit-priority measures are depicted on Carling Avenue, west of the O-Train Line 2 within this diagram.

2.3.1.3 Transportation Master Plan Part 1 (2023)

Within the study area, Carling Avenue and Glebe Avenue west of Percy Street are cross-town bikeways within the Transportation Master Plan Part 1.

2.3.1.4 The Carling Avenue Transit Priority Measures project

The Carling Avenue Transit Priority Measures project includes detailed plans outlining the transit infrastructure proposed along the route. Within the study area, changes to lane configuration at Carling Avenue and Bronson Avenue intersection as well as modifications to Carling Avenue cross-section are included. The implementation timeline within the study area is unknown, as these measures are currently on hold pending a Road Safety Audit. A draft preliminary design of the Transit Priority Measures provided by the City is included in Appendix E.

2.3.1.5 Planned Construction Projects Portal

Ottawa's Planned Construction Projects portal lists road, sewer, and water infrastructure upgrades on Bronson Avenue. This integrated renewal for the section between Chamberlain Avenue and Carling is planned for implementation in 2-3 years and the section between Carling Avenue and Queen Elizabeth Driveway is planned for implementation in 3-5 years.

2.3.2 Other Study Area Developments

265 Carling Avenue

The proposed development application includes a 20-storey mixed-use building. As part of this development, 168 retirement units, a 1,160 square foot pharmacy and 1,206 square foot hair salon. This development is under construction and is anticipated to be completed by 2024. The development is anticipated to generate 24 new two-way AM peak hour and 36 new two-way PM peak hour auto trips (Parsons 2019).

289 Carling Avenue

The proposed development application includes a site plan for 40 residential units with office support spaces totalling in 1000 square metres of gross floor area. This development was completed in 2022 and has a minimal impact on network intersections (CGH 2019).

7 McLean Street

The proposed development application includes a site plan for a three-storey apartment building, with 7 units and a gross floor area of 600 square metres. The TIA is not required as part of this application.

536 Rochester Street

The proposed development application includes a zoning by-law amendment permitting the conversion of existing dwelling use into a restaurant use with seating for approximately 20 customers. No new parking spaces are proposed as part of this zoning by-law amendment. The projected trip generation for this development is 6 PM peak hour vehicle trips (Novatech 2018).

552 Booth Street

The proposed development application includes a zoning by-law amendment permitting the construction of five buildings with approximately 1000 residential units. The proposed development also includes five existing heritage buildings which will consist of retail and office uses and add up to approximately 142,000 square feet (Parsons 2018). The forecasting report for this development is not yet available on the City's online development application search tool and thus, the projected trip generation of this development is unknown at this point in time.

450 Rochester Road

The proposed development application includes an official plan amendment permitting the construction of mixed-use development. Phase 1 consists of a 9-storey and a 15-storey residential building with approximately 295 units, a 21,550 ft^2 grocery store, a 12,210 ft^2 liquor store, 4,817 ft^2 retail on ground floor and a 10,360 ft^2 retail/commercial on second and third floors for a total of approximately 48,937 ft^2 of commercial/retail. Phase 2 consists of a 26-storey residential building with approximately 245 units and a 10,245 ft^2 retail store on the ground floor. The buildout years are assumed to be 2024 for Phase 1 and 2026 for Phase 2. The development is anticipated to generate 80 new two-way AM peak hour and 75 new two-way PM peak hour auto trips. (Parsons 2019).

770-774 Bronson Avenue

The proposed development application includes a zoning by-law amendment/site plan application permitting the construction of a 22-storey mixed-use building and a 9-storey residential building. This development will include a 22-storey residential building on the east side of the property comprising 117 apartment dwelling units, 71 student housing dwelling units, and 4,742 sq. ft commercial space to be built-out by 2024, connecting to a nine-storey residential building on the west side, comprising 90 apartment units to be built-out by 2025. The development is anticipated to generate 33 new two-way AM peak hour and 39 new two-way PM peak hour auto trips (CGH 2023).

829 Carling Avenue

The proposed development application includes a zoning by-law amendment/site plan application permitting the construction of a single 40-storey high-rise residential building with 396 dwellings and approximately 3,628 ft^2 GFA of ground-floor retail. The anticipated build-out horizon is 2028. The development is anticipated to generate 19 new two-way AM peak hour and 13 new two-way PM peak hour auto trips (Novatech 2021).

870-930 Carling Avenue, 520 Preston Street (New Civic Campus for The Ottawa Hospital)

The proposed development application includes a site plan application to replace an existing 1.8 million ft^2 of the existing Civic Campus at 1053 Carling Avenue with approximately 3.8 million ft^2 of hospital use in the new location at 870-930 Carling Avenue, 520 Preston Street by 2048 with an opening year of 2028. In 2028, the development is anticipated include 6,600 full-time equivalent employees and 765 beds, and to generate 985 to 1,125 vehicle trips during peak hours. By full buildout in 2048, which includes the full hospital expansion and all ancillary facilities are anticipated to include 10,500 full-time equivalent employees and 1,250 beds, and to generate approximately 1,175 to 1,325 vehicle trips during peak hours (Parsons 2021).

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersection of Bronson Avenue at Carling Avenue. The boundary roads are Bronson Avenue and Carling Avenue and TRANS Screenline 28, while not considered within this TIA, intersects Carling Avenue at the Trillium Pathway.

3.2 Time Periods

As the proposed redevelopment is primarily for residential units the AM and PM peak hours have been examined.

3.3 Horizon Years

The anticipated build-out year is 2026, and no build-out plus five years horizon will be discussed as part of this scoped study.

4 Development-Generated Travel Demand

4.1 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 Inner Area have been summarized in Table 6.

Table 6: TRANS Trip Generation Manual Recommended Mode Shares – Ottawa Inner Area

Travel Mode	Multi-Unit (High-Rise)		Commercial Generator	
	AM	PM	PM	PM
Auto Driver	26%	25%	39%	22%
Auto Passenger	6%	8%	2%	4%
Transit	28%	21%	16%	12%
Cycling	5%	6%	3%	4%
Walking	34%	39%	40%	58%
Total	**100%**	**100%**	**100%**	**100%**

4.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020) and the vehicle trip rates and derived person trip rates for commercial component from the ITE Trip Generation Manual 10th Edition (2017) using the City-prescribed conversion factor of 1.28. Table 7 summarizes the person trip rates for the proposed residential land uses for each peak period and the person trip rates for the non-residential land uses by peak hour.

Table 7: Trip Generation Person Trip Rates by Peak

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

Using the above person trip rates, and the residential person trip peak period adjustment factors of 0.50 for the AM and 0.44 for the PM from the TRANS Trip Generation Manual (2020), the total person trip generation has been estimated. Table 8 summarizes the total person trip generation by peak hour.

Table 8: Person Trip Generation by Peak Hour

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	70	9	20	28	16	11	28
Retail <40k sq. ft.	1,046 sq. ft	2	0	2	5	5	9
Total	-	11	20	30	21	16	36

4.3 Trip Reductions

To account for the removal of the existing office trip, an approximation of the existing land uses was derived from the ITE Trip Generation Manual 11th Edition (2021) using the City-prescribed conversion factor of 1.28. Table 9 summarizes the trip generation land use and floor area.

Table 9: Trip Generation Person Trip Rates by Peak Hour

Land Use	Land Use Code	GFA (sq. ft.)
General Office	710	37,632
Medical-Dental Office	720	1,777

The land uses that are proposed to be removed are estimated to produce 62 two-way person trips in the AM peak hour and 63 two-way person trips in the PM peak hour. Table 10 compares the estimated existing person trips and forecasted site-generated person trips.

Table 10: Estimated Existing Person Trip Volumes vs Forecasted Person Trip Volumes

Scenario	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Existing	88	13	101	18	82	99
Proposed	11	20	30	21	16	36
Difference	**-77**	**7**	**-71**	**3**	**-66**	**-63**

Based on the changes in land uses, the redevelopment is forecast to be associated with reduction of 71 two-way person trips during the AM peak hour and 63 two-way person trips during the PM peak hour.

5 Exemption Review

Table 11 summarizes the exemptions for this TIA.

Table 11: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
Development Design	4.1.2 Circulation and Access	Only required for site plan and zoning by-law applications	Exempt per TIA scope defined by pre-consultation
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Required
Boundary Street Design		All applications	Required
Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required per TIA scope defined by pre-consultation
Network Impact			
Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered when the development generates more than 75 auto or transit trips	Exempt
Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	Exempt
Neighbourhood Traffic Calming	4.6.1 Adjacent Neighbourhoods	If the development meets all of the following criteria along the route(s) site generated traffic is expected to utilize between an arterial road and the site's access:	Exempt

Module	Element	Explanation	Exempt/Required
		1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: • School (within 250m walking distance); • Park; • Retirement / Older Adult Facility (i.e. long-term care and retirement homes); • Licenced Child Care Centre; • Community Centre; or • 50%, or greater, of adjacent property along the route(s) is occupied by residential lands and a minimum of 10 occupied residential units are present on the route. 3. Application is for Zoning By-Law Amendment or Draft Plan of Subdivision; 4. At least 75 site-generated auto trips; 5. Site Trip Infiltration is expected. Site traffic will increase peak hour vehicle volumes along the route by 50% or more.	
Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Exempt
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Exempt
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
Intersection Design	4.4.1-2/4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Exempt
	4.4.3/4.9.2 Intersection Design	Only required when the development generates more than 75 auto trips	Exempt

6 Parking

6.1 Parking Supply

A total of 35 vehicle parking spaces are provided between the retained existing spaces within the subject parcel and newly proposed spaces within the adjacent 275 Carling Avenue building's underground parking levels through a door providing access between the two building's parking levels. A total of four existing at-grade parking spaces and 18 existing underground parking spaces in the proposed building will remain. The use of 13 of the surplus

parking spaces beyond the zoning by-law requirement of the adjacent retirement residence's (275 Carling Avenue) underground parking is proposed, where that building was constructed over the former surface parking lot for the subject building. The zoning by-law requires a minimum of 35 vehicle parking spaces for the subject development, including 29 spaces for residents, six spaces for visitors, and no spaces for the commercial components. The minimum zoning by-law vehicle parking requirements are satisfied.

A total of 38 bicycle parking spaces are proposed to be located on the property, including 33 within the parking level below grade and five new external surface spaces. The zoning bylaw requires a minimum of 38 bicycle spaces, and this minimum provision is satisfied.

7 Boundary Street Design

Table 12 summarizes the Multi-Modal Level of Service (MMLOS) analysis for the boundary streets of Carling Avenue and Bronson Avenue. Where the existing and future conditions will be the same, they are presented in one row. The boundary streets analysis is based on the policy area of "Within 300 metres of a school". The MMLOS worksheets has been provided in Appendix F.

Table 12: Boundary Street MMLOS Analysis

Segment		Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Carling Avenue	Ex.	C	A	E	A	B	C	D	D
	Fut.	E		E		D		B	
Bronson Avenue		E	A	E	D	N/A	N/A	A	D

The pedestrian LOS targets will not be met along Carling Avenue and Bronson Avenue. Traffic volumes and speed are the primary influence on the PLOS E result for Carling Avenue in the future conditions and for Bronson Avenue and no configuration can meet the target of A. To meet the theoretical PLOS targets on Carling Avenue in the future, either the operating speed would need to be 30 km/h or less or the curb lane vehicle volumes would need to be reduced to below 3000 AADT and the boulevard would need to be wider than 0.5 metres. To meet the theoretical PLOS targets on Bronson Avenue, either the operating speed would need to be less than 30 km/h or the curb lane vehicle volumes would need to be reduced to below 3000 AADT, and a 2.0-metre-wide sidewalk with a 0.5-metre-wide boulevard would be required.

The bicycle LOS targets will not be met along Carling Avenue and Bronson Avenue. To meet theoretical targets along Carling Avenue, segregated facilities would need to be provided. To meet theoretical targets along Bronson Avenue, the operating speed would need to be 40 km/h or less, or segregated facilities would need to be provided.

The transit LOS is noted to be reduced in the future on Carling Avenue with the removal of the westbound bus lane for the provision of the eastbound median bus lane.

The planned changes to Carling Avenue along the frontage of the site will remove the curb side bus lane, which result in a decrease in level of service for pedestrians and transit.

The City is reconstructing the intersection of Bronson Avenue at Carling Avenue/Glebe Avenue as part of the Carling Avenue Transit Priority project and it is assumed that the frontage design meets the City's desired balance of MMLOS trade-offs. The future conditions on Bronson Avenue will be subject to the implementation of the pending integrated renewal, and the City will need to investigate opportunities to achieve the MMLOS targets/goals. No changes are recommended to be included as part of the subject building conversion.

8 Transportation Demand Management

8.1 Context for TDM

The site redevelopment represents a forecasted reduction in trip generation from the existing land uses. The subject site is located along the Bronson Avenue Mainstreet and Carling Avenue Mainstreet Design Priority Area corridors. The total bedroom count is 84 including 14 two-bedroom units and 56 one-bedroom or studio units. No age restrictions are noted.

8.2 Need and Opportunity

As the proposed site is anticipated to generate a low number of trips, risks to other network users from failing to meet general area mode share targets are low.

8.3 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 G. 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
- Unbundle parking cost from purchase or rental costs

9 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The redevelopment concept is for the conversion of ground floor parking into commercial space, a ground floor dental clinic into amenity space, and the conversion of seven storeys of office space into 70 residential dwelling units
- A total of four existing surface vehicle parking spaces and 18 existing underground vehicle parking spaces will remain, and the use of 13 vehicle parking spaces located within the adjacent building is proposed, and 38 bicycle parking spaces will be located on site
- No changes to the site frontages, the conditions at the corner of Bronson Avenue at Carling Avenue/Glebe Avenue are being contemplated as part of development
- The anticipated full build-out and occupancy horizon is 2026 with construction occurring in two phases
- The existing site access on Bronson Avenue connects to the underground parking via an existing ramp

Existing Conditions

- Carling Avenue and Bronson Avenue are arterial roads, and Glebe Avenue, Clemow Avenue, and Cambridge Street are local roads in the study area
- Sidewalks are provided along both sides of all study area roads
- Separated two-way bike lanes are present on the south side of Glebe Avenue west of Percy Street, and Carling Avenue is a crosstown bikeway in the 2023 Transportation Master Plan – Part 1
- Dow's Lake Station on the O-Train Trillium line is located 850 metres west of the site along Carling Avenue
- The intersection of Bronson Avenue at Carling Avenue/Glebe Avenue operates satisfactorily during both peak hours with queues noted on various movements

- The intersection of Bronson Avenue at Carling Avenue/Glebe Avenue is noted to have experienced a high incidence of collisions, which were mostly rear end and sideswipe collisions, which are typical of congested conditions
- One pedestrian and one cyclist collision have been noted at Bronson Avenue at Carling Avenue/Glebe Avenue intersection
- One collision within the five most recent years of data may be associated with the subject site access, involving property damage only, the queueing on the southbound approach of the intersection of Bronson Avenue at Carling Avenue/Glebe Avenue is anticipated to limit the available gaps at the access to "courtesy gaps" during the peak hours

Planned Conditions

- Within the Ultimate Transit Network, an at-grade BRT corridor is shown on Carling Avenue between Dow's Lake Station, and Bronson Avenue is a Transit Priority Corridor
- The Carling Avenue Transit Priority Measures project includes proposed transit lanes, eastbound stations within the median, and intersection measures and the timeline of the Transit Priority implementation within the study area is unknown
- Integrated renewal on Bronson Avenue between Chamberlain Avenue and Carling Avenue is planned for construction in the next 2-3 years; integrated renewal is planned for Bronson Avenue between Carling Avenue and Queen Elizabeth Driveway in 3-5 years

Development Generated Travel Demand

- The proposed development is forecasted produce 71 fewer two-way person trips during the AM peak hour and 63 fewer two-way person trips during the PM peak hour than the existing site

Parking

- A total of 35 vehicle parking spaces are proposed between the subject and adjacent developments including four existing at-grade parking spaces, 18 existing underground parking spaces in the proposed building will remain, and the use of up to 13 surplus parking spaces in the adjacent building's underground parking levels
- The minimum vehicle parking requirements from the zoning by-law are satisfied
- A total of 38 bicycle parking spaces are proposed, with five external spaces and 33 spaces within the underground parking level
- The minimum bicycle parking requirements from the zoning by-law are satisfied

Boundary Street Design

- The pedestrian LOS targets cannot be met along Carling Avenue in the future and Bronson Avenue in the existing and future conditions due to traffic volumes and operating speeds
- The bicycle LOS targets will not be met along Carling Avenue and Bronson Avenue, where segregated facilities would need to be provided to meet targets
- Transit LOS targets will not be met on Carling Avenue in the future given the removal of the transit lane along the site frontage
- The planned changes to Carling Avenue along the frontage of the site result in a decrease in level of service for pedestrians and transit

- The City is reconstructing the intersection of Bronson Avenue at Carling Avenue/Glebe Avenue as part of the Carling Avenue Transit Priority project and it is assumed that the frontage design meets the City's desired balance of MMLOS trade-offs, and the frontage on Bronson Avenue will be subject to the pending road, sewer, and water infrastructure improvements

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
    - Unbundle parking cost from purchase or rental costs

10 Conclusion

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

Prepared By:

John Kingsley
Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

6 Plaza Court
Ottawa, ON K2H 7W1

City of Ottawa 2023 Revisions to 2017 TIA Guidelines
Step 1 - Screening Form

Date: 27-Mar-24
Project Number: 2023-181
Project Reference: 265 Carling

1.1 Description of Proposed Development	
Municipal Address	265 Carling Avenue
Description of Location	0.17 ha parcel on the northwest corner of the intersection of Carling Ave at Bronson Ave
Land Use Classification	Arterial Mainstreet (AM[2022] H(28))
Development Size	Conversion of office space into residential dwellings, addition of a commercial unit, removal of a commercial unit
Accesses	One existing on Bronson Ave
Phase of Development	Single
Buildout Year	2026
TIA Requirement	Design Review Component

1.2 Trip Generation Trigger		
Land Use Type	Multi-Family (High-Rise)	
Development Size	70	Units
Trip Generation Trigger	No	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	No	Existing Driveway
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	Yes	Bronson Ave and Carling Ave Mainstreet Corridors within Design Priority Area
Location Trigger	Yes	

1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	No	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No	Existing driveway with a reduction in traffic proposed
Is the proposed driveway within auxiliary lanes of an intersection?	No	
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No	Bronson Ave at Carling Ave: of 60 collisions in 2018-2022, 49 were sideswipe and rear end
Does the development include a drive-thru facility?	No	
Safety Trigger	No	

Certification Form for TIA Study PM

TIA Plan Reports

On April 14, 2022, the Province's Bill 109 received Royal Assent providing legislative direction to implement the More Homes for Everyone Act, 2022 aiming to increase the supply of a range of housing options to make housing more affordable. Revisions have been made to the TIA guidelines to comply with Bill 109 and streamline the process for applicants and staff.

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 they meet the four criteria listed below.

CERTIFICATION

- ☑ 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; (Update effective July 2023)
- ☑ 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;
- ☑ 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
- ☑ I am either a licensed or registered[1] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☐ or transportation planning.

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

City Of Ottawa
Planning, Real Estate and Economic Development
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Fax: 613-560-6006

Revision Date: June 2023

Dated at Ottawa (City) this 17 day of August , 20 23 .

Name : Andrew Harte

Professional title: Senior Transportation Engineer / Vice-President Ottawa

Signature of individual certifier that s/he/they meet the above criteria

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa, K2H 7W1
Telephone / Extension: 613-697-3797
Email Address: andrew.harte@cghtransportation.com

Stamp

Revision Date: June 2023

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

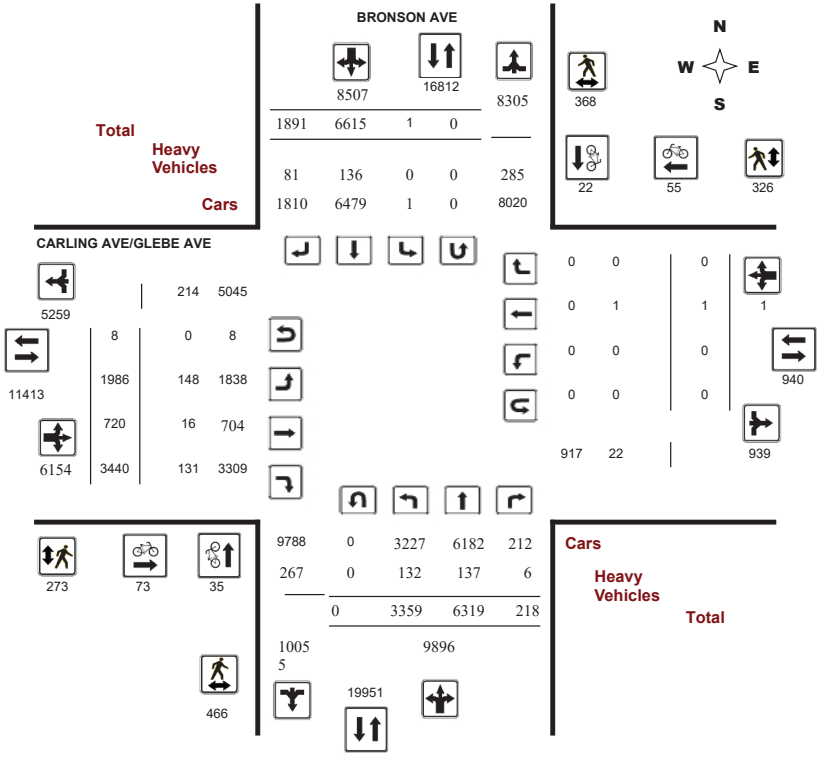
Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Diagram



Transportation Services - Traffic Services

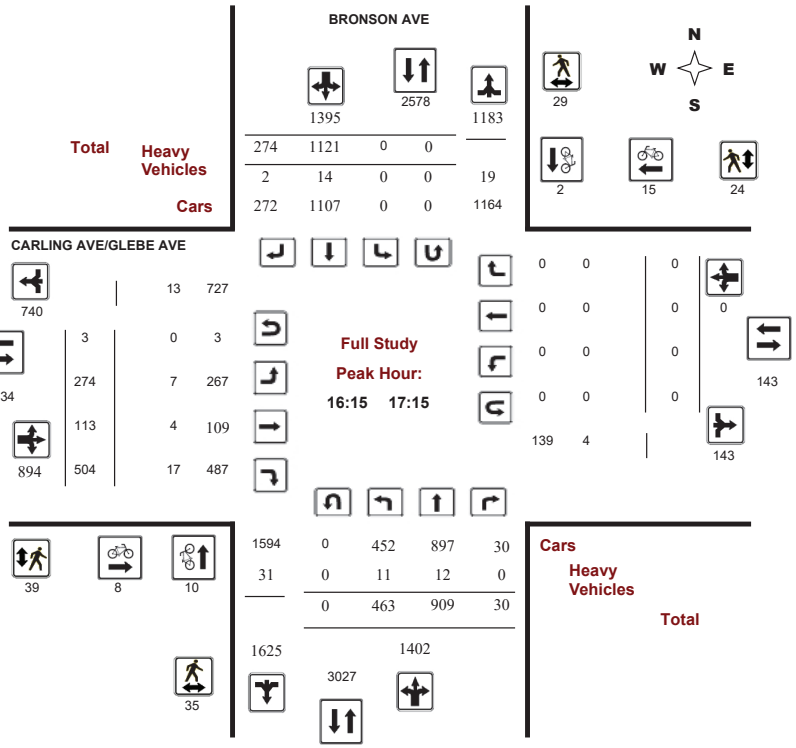
Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Peak Hour Diagram



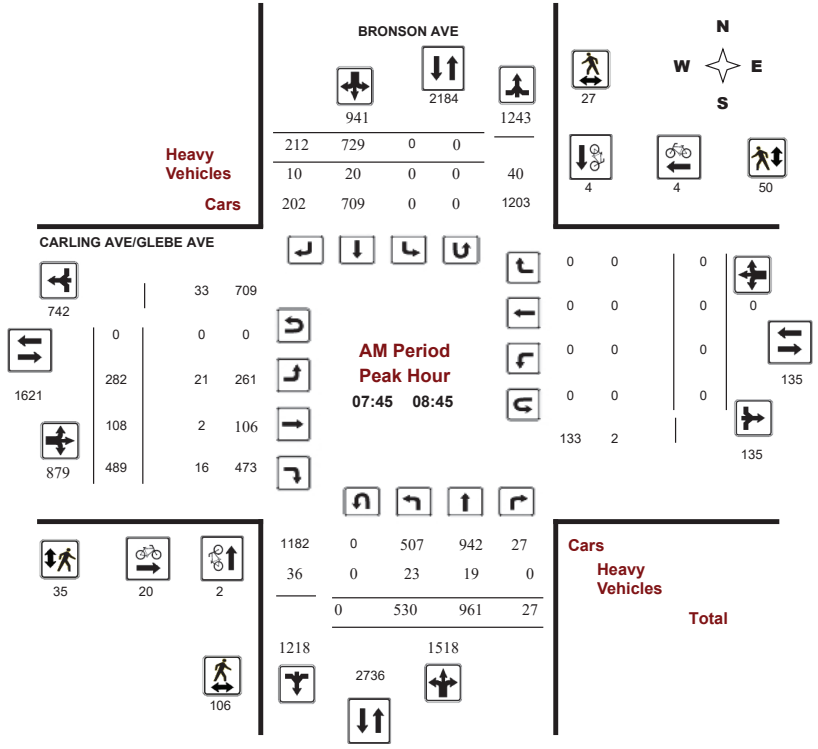
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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



Comments

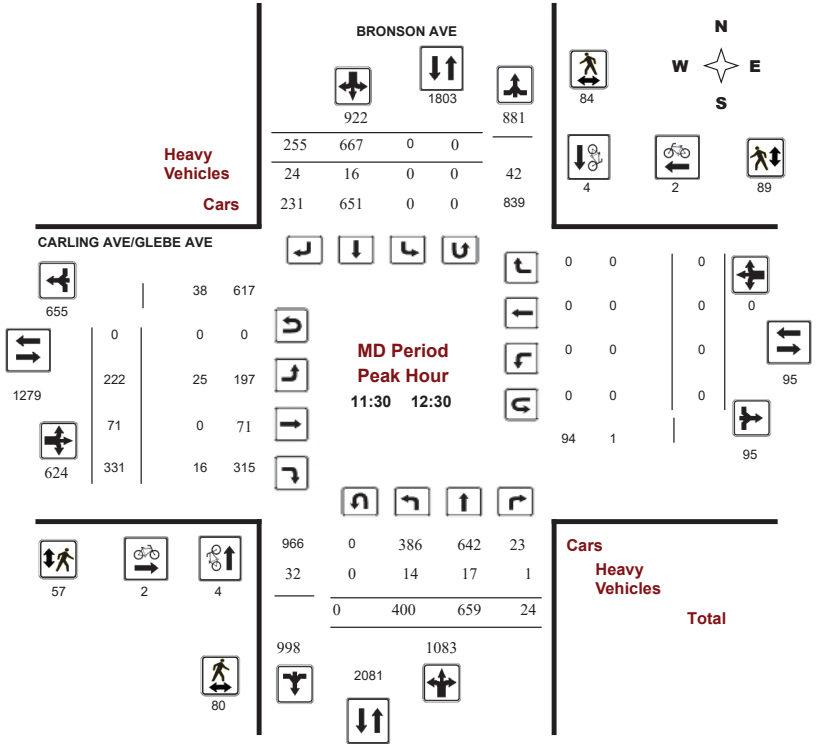
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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



Comments

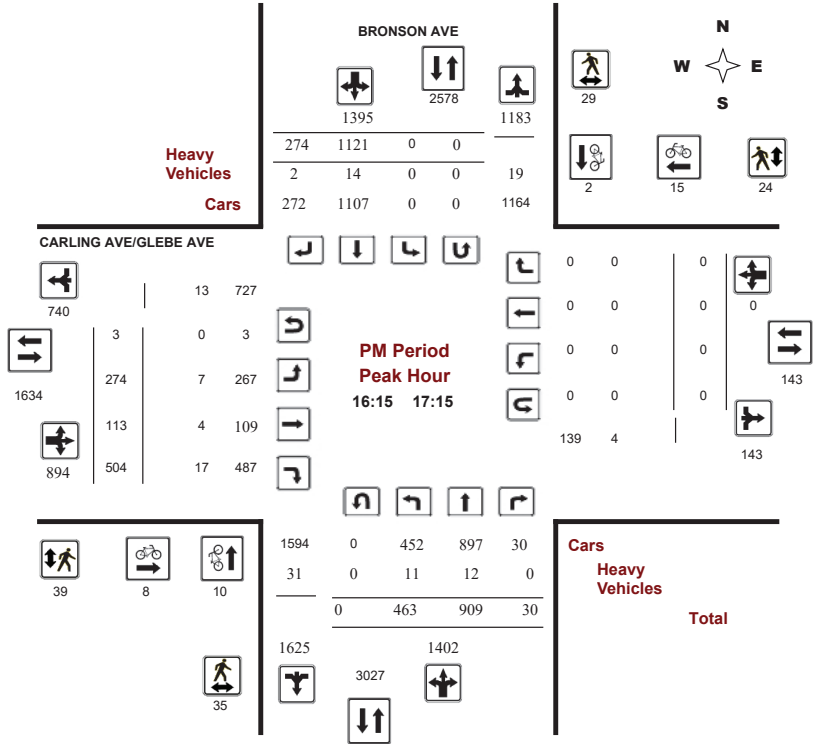
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, September 28, 2022

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 8 Westbound: 0

AADT Factor 1.00

	BRONSON AVE								CARLING AVE/GLEBE AVE								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	363	693	13	**1069**	1	677	214	**892**	**1961**	218	46	462	**726**	0	0	0	**0**	**726**	**2687**
08:00 09:00	532	965	39	**1536**	0	707	211	**918**	**2454**	278	127	424	**829**	0	0	0	**0**	**829**	**3283**
09:00 10:00	393	754	27	**1174**	0	709	208	**917**	**2091**	248	75	414	**737**	0	0	0	**0**	**737**	**2828**
11:30 12:30	400	659	24	**1083**	0	667	255	**922**	**2005**	222	71	331	**624**	0	0	0	**0**	**624**	**2629**
12:30 13:30	357	638	26	**1021**	0	725	215	**940**	**1961**	213	72	377	**662**	0	1	0	**1**	**663**	**2624**
15:00 16:00	423	808	27	**1258**	0	958	257	**1215**	**2473**	271	83	444	**798**	0	0	0	**0**	**798**	**3271**
16:00 17:00	472	891	22	**1385**	0	1052	272	**1324**	**2709**	286	109	513	**908**	0	0	0	**0**	**908**	**3617**
17:00 18:00	419	911	40	**1370**	0	1120	259	**1379**	**2749**	250	137	475	**862**	0	0	0	**0**	**862**	**3611**
Sub Total	3359	6319	218	**9896**	1	6615	1891	**8507**	**18403**	1986	720	3440	**6146**	0	1	0	**1**	**6147**	**24550**
U Turns				**0**				**0**	**0**				**8**				**0**	**8**	**8**
Total	3359	6319	218	**9896**	1	6615	1891	**8507**	**18403**	1986	720	3440	**6154**	0	1	0	**1**	**6155**	**24558**
EQ 12Hr	4669	8783	303	**13755**	1	9195	2628	**11825**	**25580**	2761	1001	4782	**8554**	0	1	0	**1**	**8555**	**34136**

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

AVG 12Hr	4669	8783	303	**13755**	1	12045	3443	**11825**	**25580**	2761	1001	4782	**8554**	0	1	0	**1**	**8555**	**34136**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **1.00**

AVG 24Hr	6116	11506	397	**18019**	1	15779	4510	**15491**	**33510**	3617	1311	6264	**11206**	0	1	0	**1**	**11207**	**44718**

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

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study 15 Minute Increments

		BRONSON AVE									CARLING AVE/GLEBE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	56	112	3	171	1	151	47	199	370	28	8	75	112	0	0	0	0	112	482
07:15	07:30	92	175	2	269	0	147	48	195	464	44	7	115	166	0	0	0	0	166	630
07:30	07:45	89	175	5	269	0	201	61	262	531	70	12	114	196	0	0	0	0	196	727
07:45	08:00	126	231	3	360	0	178	58	236	596	76	19	158	253	0	0	0	0	253	849
08:00	08:15	146	249	8	403	0	190	58	248	651	65	24	149	238	0	0	0	0	238	889
08:15	08:30	122	231	7	360	0	208	49	257	617	69	29	107	205	0	0	0	0	205	822
08:30	08:45	136	250	9	395	0	153	47	200	595	72	36	75	183	0	0	0	0	183	778
08:45	09:00	128	235	15	378	0	156	57	213	591	72	38	93	203	0	0	0	0	203	794
09:00	09:15	121	210	5	336	0	180	48	228	564	64	23	85	172	0	0	0	0	172	736
09:15	09:30	101	199	5	305	0	155	55	210	515	51	23	134	209	0	0	0	0	209	724
09:30	09:45	90	175	8	273	0	182	56	238	511	66	12	93	171	0	0	0	0	171	682
09:45	10:00	81	170	9	260	0	192	49	241	501	67	17	102	186	0	0	0	0	186	687
11:30	11:45	104	186	6	296	0	173	57	230	526	56	18	90	164	0	0	0	0	164	690
11:45	12:00	107	184	6	297	0	171	83	254	551	50	14	81	145	0	0	0	0	145	696
12:00	12:15	96	141	8	245	0	155	60	215	460	55	19	73	147	0	0	0	0	147	607
12:15	12:30	93	148	4	245	0	168	55	223	468	61	20	87	168	0	0	0	0	168	636
12:30	12:45	75	152	8	235	0	189	52	241	476	58	9	73	140	0	1	0	1	141	617
12:45	13:00	98	161	5	264	0	180	68	248	512	51	24	104	179	0	0	0	0	179	691
13:00	13:15	92	153	4	249	0	182	45	227	476	52	15	101	168	0	0	0	0	168	644
13:15	13:30	92	172	9	273	0	174	50	224	497	52	24	99	176	0	0	0	0	176	673
15:00	15:15	106	194	4	304	0	218	57	275	579	36	20	72	128	0	0	0	0	128	707
15:15	15:30	113	196	6	315	0	225	59	284	599	68	19	123	210	0	0	0	0	210	809
15:30	15:45	111	214	9	334	0	267	57	324	658	80	23	117	220	0	0	0	0	220	878
15:45	16:00	93	204	8	305	0	248	84	332	637	87	21	132	240	0	0	0	0	240	877
16:00	16:15	118	206	3	327	0	224	62	286	613	75	26	125	227	0	0	0	0	227	840
16:15	16:30	123	223	4	350	0	274	66	340	690	73	27	140	240	0	0	0	0	240	930
16:30	16:45	122	234	5	361	0	302	57	359	720	78	29	118	225	0	0	0	0	225	945
16:45	17:00	109	228	10	347	0	252	87	339	686	60	27	130	219	0	0	0	0	219	905
17:00	17:15	109	224	11	344	0	293	64	357	701	63	30	116	210	0	0	0	0	210	911
17:15	17:30	92	224	11	327	0	280	65	345	672	63	45	120	228	0	0	0	0	228	900
17:30	17:45	117	234	11	362	0	288	69	357	719	61	41	143	245	0	0	0	0	245	964
17:45	18:00	101	229	7	337	0	259	61	320	657	63	21	96	181	0	0	0	0	181	838
Total:		3359	6319	218	9896	1	6615	1891	8507	18403	1986	720	3440	6154	0	1	0	1	6155	24,558

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Cyclist Volume

		BRONSON AVE			CARLING AVE/GLEBE AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	3	0	3	3
07:15	07:30	1	0	1	0	0	0	1
07:30	07:45	0	1	1	0	0	0	1
07:45	08:00	2	1	3	3	0	3	6
08:00	08:15	0	1	1	0	1	1	2
08:15	08:30	0	0	0	2	1	3	3
08:30	08:45	0	2	2	15	2	17	19
08:45	09:00	0	0	0	20	0	20	20
09:00	09:15	0	0	0	3	0	3	3
09:15	09:30	1	0	1	3	0	3	4
09:30	09:45	4	1	5	0	5	5	10
09:45	10:00	0	0	0	1	0	1	1
11:30	11:45	0	1	1	1	0	1	2
11:45	12:00	1	1	2	1	0	1	3
12:00	12:15	0	2	2	0	1	1	3
12:15	12:30	3	0	3	0	1	1	4
12:30	12:45	0	1	1	0	0	0	1
12:45	13:00	2	1	3	0	1	1	4
13:00	13:15	1	1	2	0	0	0	2
13:15	13:30	1	1	2	0	1	1	3
15:00	15:15	2	0	2	0	14	14	16
15:15	15:30	0	0	0	3	4	7	7
15:30	15:45	1	1	2	3	1	4	6
15:45	16:00	0	0	0	2	3	5	5
16:00	16:15	2	2	4	0	0	0	4
16:15	16:30	1	0	1	1	1	2	3
16:30	16:45	0	0	0	1	4	5	5
16:45	17:00	6	0	6	1	6	7	13
17:00	17:15	3	2	5	5	4	9	14
17:15	17:30	0	1	1	2	4	6	7
17:30	17:45	2	1	3	1	1	2	5
17:45	18:00	2	1	3	2	0	2	5
Total		35	22	**57**	73	55	128	185

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Pedestrian Volume

		BRONSON AVE			CARLING AVE/GLEBE AVE			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	5	1	**6**	4	1	**5**	**11**
07:15	07:30	3	1	**4**	3	3	**6**	**10**
07:30	07:45	3	2	**5**	5	2	**7**	**12**
07:45	08:00	7	2	**9**	3	5	**8**	**17**
08:00	08:15	8	1	**9**	6	12	**18**	**27**
08:15	08:30	20	9	**29**	9	12	**21**	**50**
08:30	08:45	71	15	**86**	17	21	**38**	**124**
08:45	09:00	47	21	**68**	21	8	**29**	**97**
09:00	09:15	9	2	**11**	3	7	**10**	**21**
09:15	09:30	8	4	**12**	7	8	**15**	**27**
09:30	09:45	1	1	**2**	9	2	**11**	**13**
09:45	10:00	5	4	**9**	4	4	**8**	**17**
11:30	11:45	22	30	**52**	10	17	**27**	**79**
11:45	12:00	8	13	**21**	9	16	**25**	**46**
12:00	12:15	28	20	**48**	24	20	**44**	**92**
12:15	12:30	22	21	**43**	14	36	**50**	**93**
12:30	12:45	6	4	**10**	8	13	**21**	**31**
12:45	13:00	3	8	**11**	1	3	**4**	**15**
13:00	13:15	9	28	**37**	4	18	**22**	**59**
13:15	13:30	5	5	**10**	6	6	**12**	**22**
15:00	15:15	53	80	**133**	4	34	**38**	**171**
15:15	15:30	9	21	**30**	6	21	**27**	**57**
15:30	15:45	5	5	**10**	9	7	**16**	**26**
15:45	16:00	10	5	**15**	3	7	**10**	**25**
16:00	16:15	6	8	**14**	5	5	**10**	**24**
16:15	16:30	2	3	**5**	8	7	**15**	**20**
16:30	16:45	5	10	**15**	8	4	**12**	**27**
16:45	17:00	12	8	**20**	7	8	**15**	**35**
17:00	17:15	16	8	**24**	16	5	**21**	**45**
17:15	17:30	30	15	**45**	21	7	**28**	**73**
17:30	17:45	11	5	**16**	6	2	**8**	**24**
17:45	18:00	17	8	**25**	13	5	**18**	**43**
Total	.....	466	368	**834**	273	326	**599**	**1433**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study Heavy Vehicles

		BRONSON AVE								CARLING AVE/GLEBE AVE									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	6	4	0	**17**	0	5	0	**12**	**29**	3	0	2	**11**	0	0	0	**0**	**11**	**20**
07:15	07:30	2	5	0	**16**	0	7	2	**24**	**40**	10	0	2	**16**	0	0	0	**0**	**16**	**28**
07:30	07:45	4	6	0	**17**	0	4	3	**20**	**37**	7	0	3	**17**	0	0	0	**0**	**17**	**27**
07:45	08:00	7	5	0	**18**	0	4	3	**16**	**34**	4	2	2	**18**	0	0	0	**2**	**20**	**27**
08:00	08:15	9	5	0	**23**	0	3	2	**15**	**38**	5	0	6	**22**	0	0	0	**0**	**22**	**30**
08:15	08:30	3	4	0	**17**	0	5	3	**20**	**37**	8	0	5	**19**	0	0	0	**0**	**19**	**28**
08:30	08:45	4	5	0	**20**	0	8	2	**19**	**39**	4	0	3	**13**	0	0	0	**0**	**13**	**26**
08:45	09:00	6	7	0	**22**	0	6	2	**23**	**45**	8	1	3	**20**	0	0	0	**1**	**21**	**33**
09:00	09:15	7	10	1	**29**	0	5	9	**33**	**62**	9	3	6	**34**	0	0	0	**4**	**38**	**50**
09:15	09:30	3	7	0	**26**	0	5	8	**25**	**51**	5	1	11	**28**	0	0	0	**1**	**29**	**40**
09:30	09:45	8	7	0	**27**	0	9	3	**27**	**54**	8	0	3	**22**	0	0	0	**0**	**22**	**38**
09:45	10:00	4	7	2	**21**	0	4	3	**19**	**40**	5	1	4	**17**	0	0	0	**3**	**20**	**30**
11:30	11:45	4	3	0	**16**	0	4	7	**19**	**35**	5	0	5	**21**	0	0	0	**0**	**21**	**28**
11:45	12:00	5	6	1	**18**	0	3	10	**25**	**43**	6	0	3	**24**	0	0	0	**1**	**25**	**34**
12:00	12:15	0	3	0	**12**	0	7	2	**22**	**34**	10	0	2	**14**	0	0	0	**0**	**14**	**24**
12:15	12:30	5	5	0	**18**	0	2	5	**16**	**34**	4	0	6	**20**	0	0	0	**0**	**20**	**27**
12:30	12:45	2	3	2	**14**	0	6	5	**19**	**33**	5	1	1	**15**	0	1	0	**4**	**19**	**26**
12:45	13:00	6	5	0	**18**	0	2	2	**13**	**31**	4	0	5	**17**	0	0	0	**0**	**17**	**24**
13:00	13:15	4	1	0	**18**	0	6	3	**16**	**34**	6	0	7	**20**	0	0	0	**0**	**20**	**27**
13:15	13:30	3	6	0	**17**	0	4	2	**17**	**34**	5	0	4	**14**	0	0	0	**0**	**14**	**24**
15:00	15:15	2	3	0	**9**	0	1	0	**7**	**16**	3	1	3	**9**	0	0	0	**1**	**10**	**13**
15:15	15:30	2	3	0	**14**	0	2	0	**9**	**23**	4	0	7	**13**	0	0	0	**0**	**13**	**18**
15:30	15:45	5	3	0	**18**	0	8	2	**16**	**34**	3	0	2	**12**	0	0	0	**0**	**12**	**23**
15:45	16:00	3	2	0	**16**	0	5	1	**13**	**29**	5	0	6	**15**	0	0	0	**0**	**15**	**22**
16:00	16:15	5	6	0	**16**	0	1	0	**10**	**26**	3	1	4	**13**	0	0	0	**1**	**14**	**20**
16:15	16:30	2	4	0	**10**	0	1	0	**9**	**19**	4	1	3	**10**	0	0	0	**1**	**11**	**15**
16:30	16:45	4	3	0	**15**	0	3	0	**8**	**23**	2	0	5	**11**	0	0	0	**0**	**11**	**17**
16:45	17:00	2	2	0	**12**	0	3	2	**7**	**19**	0	2	5	**11**	0	0	0	**2**	**13**	**16**
17:00	17:15	3	3	0	**17**	0	7	0	**11**	**28**	1	1	4	**9**	0	0	0	**1**	**10**	**19**
17:15	17:30	3	2	0	**11**	0	2	0	**4**	**15**	0	0	4	**7**	0	0	0	**0**	**7**	**11**
17:30	17:45	2	0	0	**6**	0	2	0	**3**	**9**	1	1	2	**6**	0	0	0	**1**	**7**	**8**
17:45	18:00	7	2	0	**14**	0	2	0	**5**	**19**	1	0	3	**11**	0	0	0	**0**	**11**	**15**
Total:	None	132	137	6	**542**	0	136	81	**502**	**1044**	148	16	131	**509**	0	1	0	**23**	**532**	**788**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Wednesday, September 28, 2022 **WO No:** 40595

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

Full Study 15 Minute U-Turn Total

Time Period		BRONSON AVE		CARLING AVE/GLEBE AVE		
		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	1	0	1
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	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	1	0	1
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	1	0	1
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	1	0	1
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	2	0	2
17:00	17:15	0	0	1	0	1
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	1	0	1
Total		0	0	8	0	8

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)	282	108	489	0	0	0	530	961	27	0	729	212
Future Volume (vph)	282	108	489	0	0	0	530	961	27	0	729	212
Satd. Flow (prot)	1501	1586	1469	0	0	0	3154	1726	0	0	3118	0
Flt Permitted	0.950	0.978					0.950					
Satd. Flow (perm)	1427	1550	1163	0	0	0	3102	1726	0	0	3118	0
Satd. Flow (RTOR)			158					3			36	
Lane Group Flow (vph)	213	220	543	0	0	0	589	1098	0	0	1046	0
Turn Type	Perm	NA	custom				Prot	NA			NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4 5									
Detector Phase	4	4	4 5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0					5.0	10.0			10.0	
Minimum Split (s)	24.0	24.0					11.0	24.0			33.0	
Total Split (s)	25.0	25.0					36.0	78.0			42.0	
Total Split (%)	22.7%	22.7%					32.7%	70.9%			38.2%	
Yellow Time (s)	3.3	3.3					3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7					2.7	2.7			2.7	
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0					6.0	6.0			6.0	
Lead/Lag	Lag	Lag					Lead				Lag	
Lead-Lag Optimize?	Yes	Yes					Yes				Yes	
Recall Mode	None	None					Min	C-Max			C-Max	
Act Effct Green (s)	25.8	25.8	57.8				26.0	72.2			40.2	
Actuated g/C Ratio	0.23	0.23	0.53				0.24	0.66			0.37	
v/c Ratio	0.64	0.60	0.79				0.79	0.97			0.90	
Control Delay	47.6	45.5	23.7				47.5	39.5			44.6	
Queue Delay	0.0	0.0	0.0				0.0	0.0			0.0	
Total Delay	47.6	45.5	23.7				47.5	39.5			44.6	
LOS	D	D	C				D	D			D	
Approach Delay		33.8						42.3			44.6	
Approach LOS		C						D			D	
Queue Length 50th (m)	43.4	44.4	65.8				61.1	203.6			108.4	
Queue Length 95th (m)	70.1	70.9	109.3				77.2	#316.0			#161.0	
Internal Link Dist (m)		210.6			112.6			392.2			142.6	
Turn Bay Length (m)			200.0				40.0					
Base Capacity (vph)	335	364	723				860	1133			1161	
Starvation Cap Reductn	0	0	0				0	0			0	
Spillback Cap Reductn	0	0	0				0	0			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.64	0.60	0.75				0.68	0.97			0.90	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	3.0
Total Split (s)	7.0
Total Split (%)	6%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

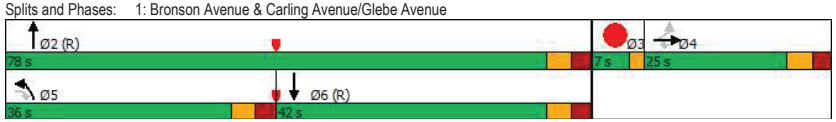
Intersection Summary

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 83.1%	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: 1: Bronson Avenue & Carling Avenue/Glebe Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	277	113	504	0	0	0	463	909	30	0	1121	274
Future Volume (vph)	277	113	504	0	0	0	463	909	30	0	1121	274
Satd. Flow (prot)	1560	1598	1469	0	0	0	3216	1728	0	0	3177	0
Flt Permitted	0.950	0.979					0.950					
Satd. Flow (perm)	1462	1555	1336	0	0	0	3181	1728	0	0	3177	0
Satd. Flow (RTOR)			91					3			32	
Lane Group Flow (vph)	213	221	560	0	0	0	514	1043	0	0	1550	0
Turn Type	Perm	NA	custom				Prot	NA			NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4 5									
Detector Phase	4	4	4 5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0					5.0	10.0			10.0	
Minimum Split (s)	24.0	24.0					11.0	24.0			33.0	
Total Split (s)	24.0	24.0					29.0	99.0			70.0	
Total Split (%)	18.5%	18.5%					22.3%	76.2%			53.8%	
Yellow Time (s)	3.3	3.3					3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7					2.7	2.7			2.7	
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0					6.0	6.0			6.0	
Lead/Lag	Lag	Lag					Lead				Lag	
Lead-Lag Optimize?	Yes	Yes					Yes				Yes	
Recall Mode	None	None					Min	C-Max			C-Max	
Act Effct Green (s)	25.0	25.0	54.0				23.0	93.0			64.0	
Actuated g/C Ratio	0.19	0.19	0.42				0.18	0.72			0.49	
v/c Ratio	0.76	0.74	0.92				0.90	0.84			0.98	
Control Delay	67.7	65.3	52.3				73.0	21.4			50.5	
Queue Delay	0.0	0.0	0.0				0.0	0.0			0.0	
Total Delay	67.7	65.3	52.3				73.0	21.4			50.5	
LOS	E	E	D				E	C			D	
Approach Delay		58.5						38.4			50.5	
Approach LOS		E						D			D	
Queue Length 50th (m)	54.8	56.6	117.4				67.2	171.8			197.1	
Queue Length 95th (m)	#92.1	#92.7	#190.9				#97.2	250.3			#253.6	
Internal Link Dist (m)		210.6			112.6			392.2			142.6	
Turn Bay Length (m)			200.0				40.0					
Base Capacity (vph)	281	299	608				568	1237			1580	
Starvation Cap Reductn	0	0	0				0	0			0	
Spillback Cap Reductn	0	0	0				0	0			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.76	0.74	0.92				0.90	0.84			0.98	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.5
Total Split (s)	7.0
Total Split (%)	5%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

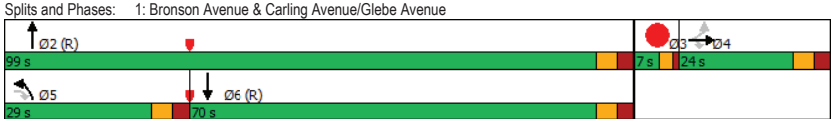
Intersection Summary

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 47.9	Intersection LOS: D
Intersection Capacity Utilization 89.4%	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: 1: Bronson Avenue & Carling Avenue/Glebe Avenue



Appendix D

Collision Data

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
2018-04-16	2018	13:43	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2018-04-18	2018	7:42	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2018-06-15	2018	12:34	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2019-04-05	2019	14:36	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-12-10	2019	15:45	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-10-14	2020	8:46	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
2021-11-24	2021	16:37	BRONSON AVE btwn CARLING AVE & CLEMOW AVE (__3ZA3OV)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2018-02-21	2018	16:27	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2018-03-26	2018	18:54	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2018-04-03	2018	15:20	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2018-05-18	2018	2:11	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
2018-09-09	2018	12:43	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	0	0	0	0
2018-10-09	2018	7:36	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2018-11-30	2018	8:50	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-01-31	2019	16:30	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	05 - Packed snow	0	0	0	0
2019-02-03	2019	13:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	03 - Loose snow	0	0	0	0
2019-02-17	2019	18:04	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	05 - Dusk	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
2019-03-06	2019	11:42	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	0	0	0	1
2019-03-07	2019	11:54	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-04-05	2019	19:17	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-05-30	2019	21:49	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	07 - Dark	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	02 - Wet	0	0	1	0
2019-06-11	2019	17:54	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-06-18	2019	8:53	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2019-07-05	2019	19:27	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	0	0	0	0
2019-08-11	2019	0:09	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-08-19	2019	14:05	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	0	0	0	0
2019-08-23	2019	19:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2019-09-02	2019	20:19	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-10-08	2019	7:18	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2019-10-23	2019	10:55	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2019-11-14	2019	10:07	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	04 - Slush	0	0	0	0
2019-11-27	2019	16:01	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2019-11-28	2019	8:49	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2019-12-19	2019	11:03	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-01-17	2020	14:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2020-01-18	2020	10:40	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2020-01-19	2020	17:17	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	03 - Snow	05 - Dusk	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	03 - Loose snow	0	0	0	0
2020-01-20	2020	16:30	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
2020-02-04	2020	14:50	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-02-13	2020	16:36	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2020-02-17	2020	15:48	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2020-05-27	2020	9:20	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2020-07-04	2020	8:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-08-10	2020	14:31	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	0	0	0	0
2020-09-21	2020	20:51	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-10-26	2020	18:53	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	02 - Wet	0	0	0	0
2020-10-26	2020	23:16	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	02 - Non-fatal injury	02 - Angle	02 - Wet	0	0	0	0
2020-11-13	2020	11:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2020-11-24	2020	14:30	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2020-12-09	2020	8:13	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
2021-06-17	2021	10:52	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	0	0	0	0
2021-09-20	2021	8:22	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
2021-09-22	2021	16:15	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2021-10-07	2021	18:00	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2021-10-20	2021	21:20	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
2021-10-24	2021	15:24	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2021-10-30	2021	14:13	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
2021-11-24	2021	15:40	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2021-11-24	2021	16:06	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2021-12-01	2021	20:13	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2021-12-06	2021	13:28	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
2021-12-09	2021	23:44	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	01 - Dry	0	0	0	0
2022-02-18	2022	17:40	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
2022-03-07	2022	18:42	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	03 - Snow	07 - Dark	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
2022-04-12	2022	18:43	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2022-07-02	2022	7:42	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	0	0	0	0
2022-09-13	2022	15:50	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Jan-05, Thu,14:06	Clear	Sideswipe	P.D. only	Wet	East	Turning right	Pick-up truck	Other motor vehicle	0
					East	Turning left	Municipal transit bus	Other motor vehicle	
2017-Jan-13, Fri,09:55	Clear	Sideswipe	P.D. only	Wet	East	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Truck - tank	Other motor vehicle	
2017-May-14, Sun,09:47	Rain	Angle	P.D. only	Wet	East	Unknown	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-May-30, Tue,12:13	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Jun-22, Thu,19:10	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2017-Jul-06, Thu,13:20	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Municipal transit bus	Other motor vehicle	
2017-Aug-12, Sat,11:00	Clear	Rear end	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle	0
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2017-Sep-14, Thu,18:43	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2017-Oct-02, Mon,19:43	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Oct-10, Tue,10:53	Clear	Sideswipe	P.D. only	Dry	East	Turning left	Truck and trailer	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2017-Nov-09, Thu,10:57	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Truck - tractor	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Nov-14, Tue,18:16	Clear	Sideswipe	P.D. only	Dry	East	Turning right	Passenger van	Other motor vehicle	0
					East	Turning right	Bus (other)	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Dec-11, Mon,16:40	Clear	Rear end	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-23, Sat,13:28	Snow	Rear end	P.D. only	Packed snow	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Feb-21, Wed,16:27	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Mar-26, Mon,18:54	Clear	Rear end	P.D. only	Dry	East	Turning left	Unknown	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Apr-03, Tue,15:20	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-May-18, Fri,02:11	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Sep-09, Sun,12:43	Clear	SMV other	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Tree, shrub, stump	0
2018-Oct-09, Tue,07:36	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Nov-30, Fri,08:50	Clear	Sideswipe	P.D. only	Dry	North	Merging	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-31, Thu,16:30	Clear	Rear end	P.D. only	Packed snow	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Feb-03, Sun,13:00	Snow	SMV other	P.D. only	Loose snow	North	Going ahead	Automobile, station wagon	Snowbank/drift	0
2019-Feb-17, Sun,18:04	Clear	Rear end	Non-fatal injury	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Mar-06, Wed,11:42	Clear	SMV other	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Pedestrian	1
2019-Mar-07, Thu,11:54	Clear	Sideswipe	P.D. only	Dry	East	Turning left	Passenger van	Other motor vehicle	0
					East	Turning left	Truck - tank	Other motor vehicle	
2019-Apr-05, Fri,19:17	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-May-30, Thu,21:49	Rain	Turning movement	Non-fatal injury	Wet	West	Going ahead	Bicycle	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Cyclist	
2019-Jun-11, Tue,17:54	Clear	Sideswipe	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-18, Tue,08:53	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Truck - open	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jul-05, Fri,19:27	Clear	Other	P.D. only	Dry	North	Stopped	Automobile, station wagon	Debris falling off vehicle	0
					South	Unknown	Unknown	Other	
2019-Aug-11, Sun,00:09	Clear	Sideswipe	P.D. only	Dry	East	Turning left	Truck - tractor	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Aug-19, Mon,14:05	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-23, Fri,19:00	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Sep-02, Mon,20:19	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Oct-08, Tue,07:18	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Oct-23, Wed,10:55	Clear	Sideswipe	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Nov-14, Thu,10:07	Snow	Rear end	P.D. only	Slush	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-27, Wed,16:01	Rain	Sideswipe	P.D. only	Wet	North	Turning left	Unknown	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2019-Nov-28, Thu,08:49	Rain	Sideswipe	P.D. only	Wet	North	Going ahead	Unknown	Other motor vehicle	0
					North	Going ahead	School bus	Other motor vehicle	
2019-Dec-19, Thu,11:03	Clear	Sideswipe	P.D. only	Dry	North	Turning left	Fire vehicle	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2020-Jan-17, Fri,14:00	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2020-Jan-18, Sat,10:40	Clear	Sideswipe	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Jan-19, Sun,17:17	Snow	Rear end	Non-fatal injury	Loose snow	North	Changing lanes	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Municipal transit bus	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	
2020-Jan-20, Mon,16:30	Clear	Rear end	P.D. only	Wet	North	Changing lanes	Pick-up truck	Other motor vehicle	0
					North	Turning left	Passenger van	Other motor vehicle	
2020-Feb-04, Tue,14:50	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Feb-13, Thu,16:36	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Truck - dump	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2020-Feb-17, Mon,15:48	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-May-27, Wed,09:20	Clear	Rear end	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle	0
					North	Unknown	Unknown	Other motor vehicle	
					North	Unknown	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Jul-04, Sat,08:00	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Aug-10, Mon,14:31	Clear	Sideswipe	Non-fatal injury	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Passenger van	Other motor vehicle	
2020-Sep-21, Mon,20:51	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2020-Oct-26, Mon,18:53	Clear	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Oct-26, Mon,23:16	Clear	Angle	Non-fatal injury	Wet	East	Turning right	Municipal transit bus	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2020-Nov-13, Fri,11:00	Clear	Sideswipe	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2020-Nov-24, Tue,14:30	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					North	Slowing or stopping	Pick-up truck	Other motor vehicle	
2020-Dec-09, Wed,08:13	Snow	Rear end	P.D. only	Ice	East	Slowing or stopping	Unknown	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE @ CARLING AVE/GLEBE AVE

Traffic Control: Traffic signal **Total Collisions:** 69

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2021-Jun-17, Thu,10:52	Clear	Sideswipe	Non-fatal injury	Dry	North	Changing lanes	Truck - closed	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Sep-20, Mon,08:22	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Sep-22, Wed,16:15	Rain	Sideswipe	P.D. only	Wet	East	Turning left	Unknown	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Oct-07, Thu,18:00	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Oct-20, Wed,21:20	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Oct-24, Sun,15:24	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2021-Oct-30, Sat,14:13	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Nov-24, Wed,15:40	Clear	Rear end	P.D. only	Dry	North	Unknown	Passenger van	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2021-Nov-24, Wed,16:06	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle	0
					North	Going ahead	Municipal transit bus	Other motor vehicle	
2021-Dec-01, Wed,20:13	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Unknown	Other motor vehicle	0
					East	Stopped	Municipal transit bus	Other motor vehicle	
2021-Dec-06, Mon,13:28	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Truck - closed	Other motor vehicle	
2021-Dec-09, Thu,23:44	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Bus (other)	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: BRONSON AVE btwn CLEMOW AVE & CARLING AVE

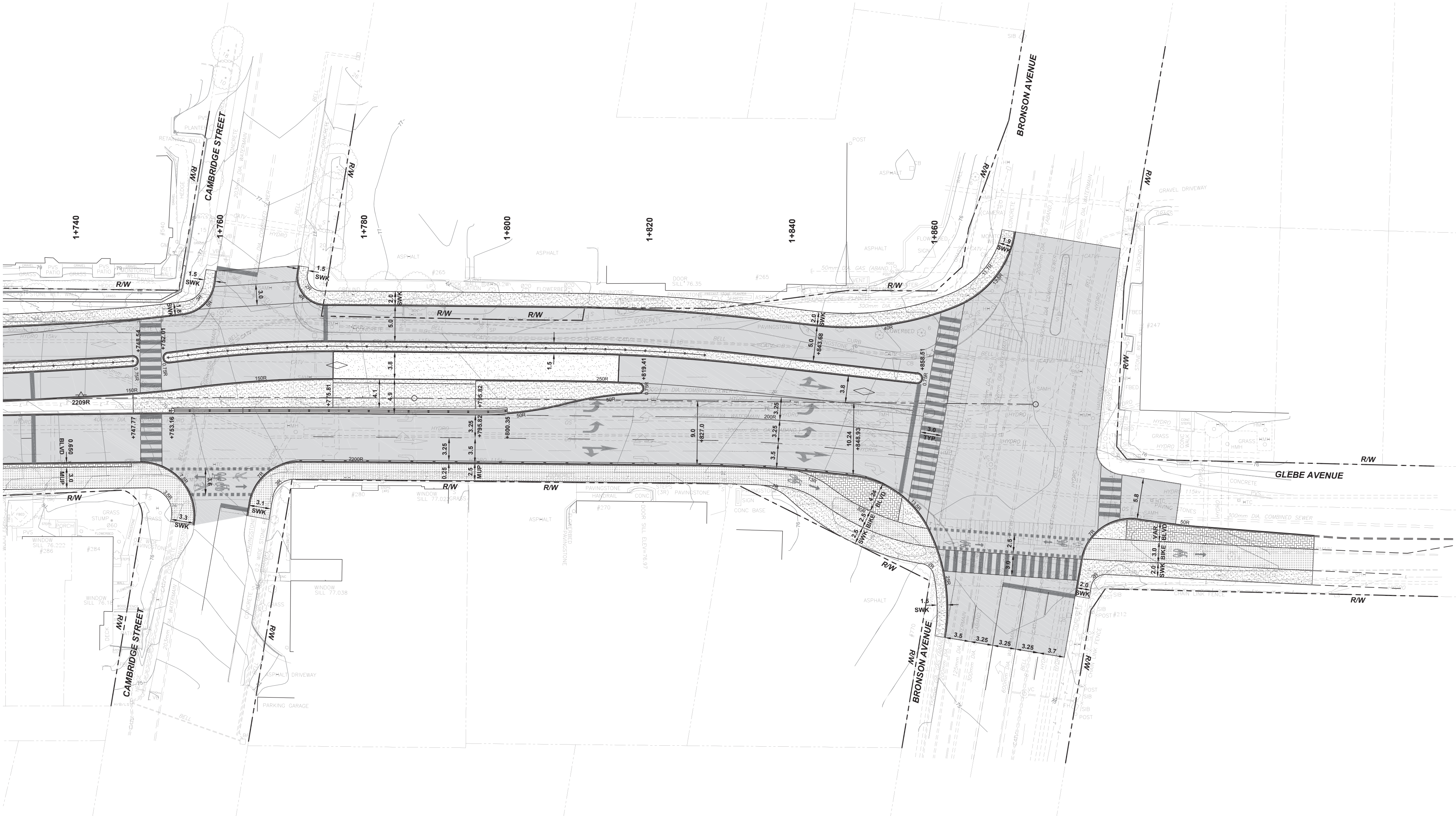
Traffic Control: No control **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Jun-19, Mon,12:45	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-16, Mon,13:43	Freezing Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-18, Wed,07:42	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jun-15, Fri,12:34	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Police vehicle	Other motor vehicle	
2019-Apr-05, Fri,14:36	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Dec-10, Tue,15:45	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Oct-14, Wed,08:46	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Nov-24, Wed,16:37	Clear	Rear end	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Municipal transit bus	Other motor vehicle	

Appendix E

Carling Avenue Transit Priority Measures Project Preliminary Design

CGH TRANSPORTATION


CAMBRIDGE STREET
BRONSON AVENUE
GLEBE AVENUE
1+740
1+760
1+780
1+800
1+820
1+840
1+860
R/W
SWK
MUP
BLVD
BIKE
TYP
ASPHALT
CONCRETE
PAVINGSTONE
HYDRO
BELL
GRASS
PARKING GARAGE
ASPHALT DRIVEWAY
GRAVEL DRIVEWAY
POST
2209R
2200R
150R
250R
200R
50R
+748.54
+752.01
+747.77
+753.16
+775.81
+795.82
+800.35
+819.41
+827.0
+843.68
+848.93
+858.51
3.5
3.25
3.25
3.25
3.7

Appendix F

MMLOS Worksheets

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc**	**Project**	**2023-181**
Scenario	**Existing/Future**	**Date**	**2024-11-29**
Comments			

SEGMENTS			Carling Ave	Carling Ave	Bronson Ave
			Ex	Fut	Ex/Fut
Pedestrian	Sidewalk Width Boulevard Width		≥ 2 m < 0.5	≥ 2 m < 0.5	1.8 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**C**	**E**	**F**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**-**	**-**	**-**
	Level of Service		**-**	**-**	**-**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		4-5 lanes total	4-5 lanes total	4-5 lanes total
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	≥ 50 to 60 km/h
	# of Lanes & Operating Speed LoS		**E**	**E**	**E**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		**-**	**-**	**-**
	Bike Lane Blockages				
	Blockage LoS		**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		**-**	**-**	**-**
	Level of Service		**-**	**-**	**-**
Transit	Facility Type		Bus lane	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Cf ≤ 60	Vt/Vp ≥ 0.8	
	Level of Service		**B**	**D**	**-**
Truck	Truck Lane Width		≤ 3.2 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		> 1	1	> 1
	Level of Service		**D**	**B**	**A**
Auto	**Level of Service**	**Not Applicable**			

Appendix G

TDM Worksheets

CGH TRANSPORTATION

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

Legend

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

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

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

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

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

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

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

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

Legend

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

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

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

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

	TDM measures: *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	☐