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593 Laurier Avenue West

Transportation Impact Assessment

593 Laurier Avenue West
Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

August 5, 2020

Novatech File: 119019
Ref: R-2020-100

August 5, 2020

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: Mr. Wally Dubyk
Project Manager, Infrastructure Approvals

Dear Mr. Dubyk:

Reference: 593 Laurier Avenue West
Transportation Impact Assessment Report
Novatech File No. 119019

We are pleased to submit the following Transportation Impact Assessment report in support of Zoning By-law Amendment and Site Plan applications for the above address. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017).

If you have any questions or comments regarding this report, please feel free to contact the undersigned.

Yours truly,

NOVATECH

B. Byvelds

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic



TIA Plan Reports

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

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

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

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

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

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

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

Dated at Ottawa this 5 day of August, 2020 .
(City)

Name: Brad Byvelds
(Please Print)

Professional Title: P. Eng. - Project Coordinator

B. Byvelds

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

Office Contact Information (Please Print)	
Address:	240 Michael Cowpland Drive
City / Postal Code:	Ottawa, ON K2M 1P6
Telephone / Extension:	613-254-9643 ext. 286
E-Mail Address:	b.byvelds@novaetch-eng.com

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EXECUTIVE SUMMARY

This Transportation Impact Assessment (TIA) Scoping report has been prepared in support of Zoning By-law Amendment and Site Plan Control applications for 593 Laurier Avenue West. Currently the property is occupied by a low-rise residential building.

The subject property is located at the northwest corner of the Bronson Avenue/Laurier Avenue West intersection and is surrounded by the following:

- An apartment building to the north;
- Bronson Avenue and the Nanny Goat Hill Community Garden to the east;
- Laurier Avenue West and an apartment building to the south; and
- Apartment buildings to the west.

The proposed development is a nine-storey addition to the existing residential building at 593 Laurier Avenue West. The proposed development will maintain the six dwelling units in the existing building and provide 57 units in the new addition. The existing driveway to Laurier Avenue West will be retained and will lead to two visitor parking spaces.

The proposed study area for the modules in the Design Review component is the development property and the boundary roads (i.e., Laurier Avenue West and Bronson Avenue). However, given the access proximity to a signalized intersection, intersection capacity analysis will be completed at the access and the Bronson Avenue/Laurier Avenue West intersection.

The time periods chosen for this TIA are the weekday AM and PM peak hours. The TIA will review the 2021 build out year and the 2026 horizon year.

The conclusions and recommendations of this TIA can be summarized as follows:

On-site Design

- Pedestrian walkways will be provided between the existing and proposed building entrances and the sidewalk along Laurier Avenue West. The sidewalk will be depressed and continuous across the proposed access.
- All TDM requirements in the TDM Infrastructure Checklist are met, excluding measure 6.1.1. Relief of the minimum resident and visitor parking requirements in the ZBL is being sought for the proposed development.
- The proposed access will serve two parking spaces. Vehicles will be required to drive into the access and reverse out onto Laurier Avenue West.
- Garbage bins will be wheeled out using the western pathway for curbside garbage collection along Laurier Avenue West.

Parking

- The proposed bicycle parking will exceed the minimum requirement of the ZBL. However, relief from the minimum vehicle parking provisions is required.
- The expectation is that residents will choose walking, cycling and using transit for their daily commutes. The subject site is located in close proximity to local transit along Bronson Avenue and Slater Street/Albert Street, the Lyon Street and Pimisi Transit Stations, and numerous carshare services.
- Two parking spaces are proposed to accommodate visitors to the development. It is accepted that on-street parking nearby is at or near capacity and visitors driving to the site

could not rely on it. There are seven commercial parking lots of varying size within 400m of the site, which make driving a private vehicle to the site less convenient, but certainly not impossible.

Boundary Streets

- Laurier Avenue West meets the target BLOS but does not meet the target PLOS. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required.
- The east side of Bronson Avenue is currently operating with a PLOS E. The target PLOS A is unachievable on this side of the roadway due to the operating speed of 50km/hr and the average daily curb traffic in excess of 3,000 vehicles.
- The west side of Bronson Avenue is currently operating with a PLOS B. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required.
- Mixed use traffic lanes are currently provided along Bronson Avenue adjacent to the subject site, achieving a BLOS E. To achieve the target BLOS D, bike lanes are required along Bronson Avenue.

Access Design

- The width and location of the proposed access adhere to the requirements of the City's Private Approach By-law and Zoning By-law.
- The proposed driveway is located 15m from the curb line at the Bronson Avenue intersection, measured at the property line, adhering to the corner clearance requirements of TAC.
- The Bronson Avenue/Laurier Avenue West intersection is currently operating with a level of service C or better during the AM and PM peak hours. The 95th percentile eastbound queue is approximately 10m during both the weekday AM and PM peak hours and is not anticipated to block the proposed access.

Transportation Demand Management

- The proposed development conforms to the City's TDM initiatives by providing easy access to area pedestrian, bicycle and transit facilities.
- The following measures will be implemented upon opening of the proposed development:
 - Conduct periodic surveys to identify travel-related behaviors;
 - Display local area maps with walking/cycling access routes and key destinations;
 - Display relevant transit schedules and route maps;
 - Contract with provider to install on-site bikeshare station; and
 - Provide a multimodal travel option information package to new residents.

1.0 SCREENING

1.1 Introduction

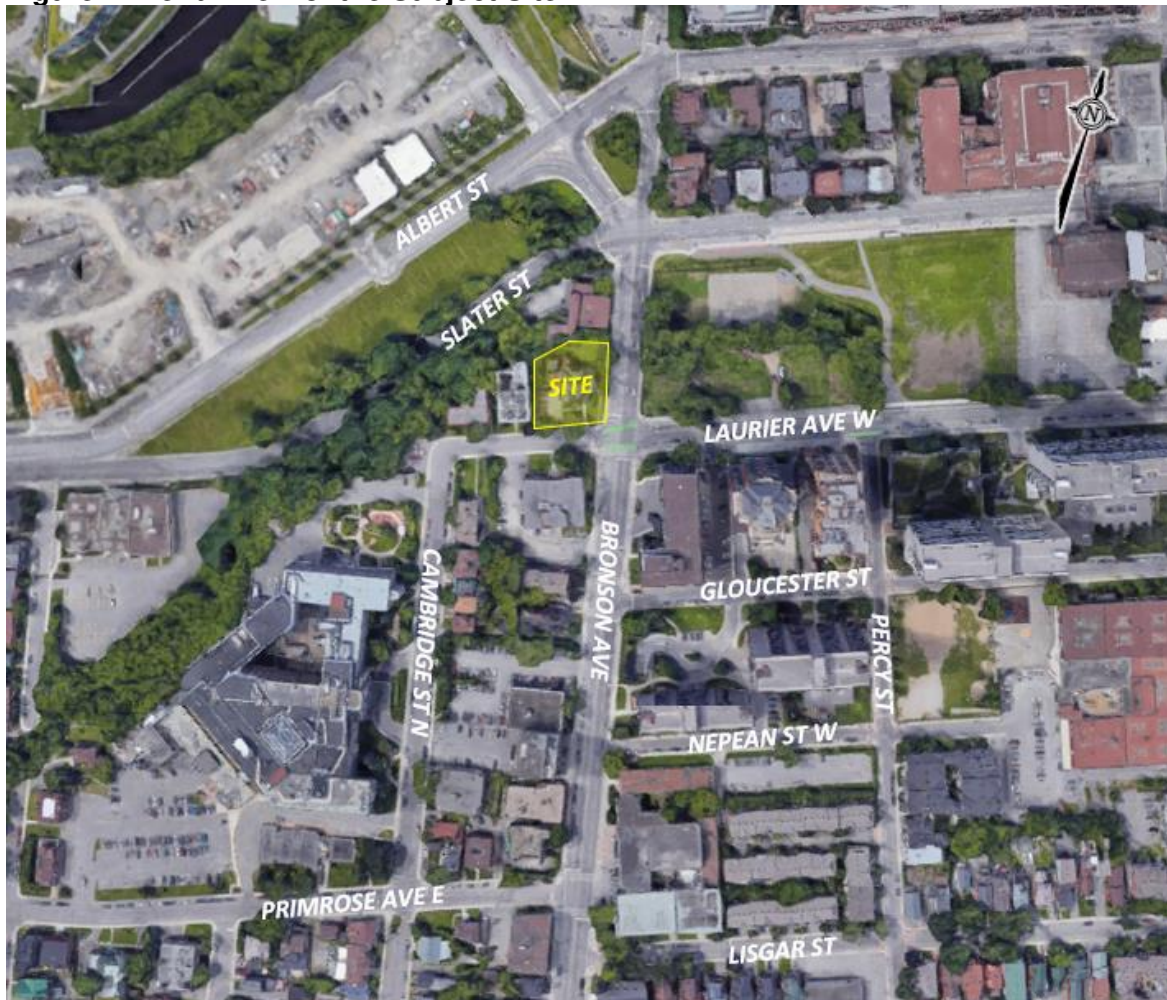
This Transportation Impact Assessment (TIA) Scoping report has been prepared in support of Zoning By-law Amendment and Site Plan Control applications for 593 Laurier Avenue West. Currently the property is occupied by a low-rise residential building.

The subject property is located at the northwest corner of the Bronson Avenue/Laurier Avenue West intersection and is surrounded by the following:

- An apartment building to the north;
- Bronson Avenue and the Nanny Goat Hill Community Garden to the east;
- Laurier Avenue West and an apartment building to the south; and
- Apartment buildings to the west.

An aerial view of the subject site is provided in **Figure 1**.

Figure 1: Aerial View of the Subject Site



1.2 Proposed Development

The subject site is currently zoned Residential Fourth Density, Subzone T (R4T) and is located in the General Urban Area.

The proposed development is a nine-storey addition to the existing residential building at 593 Laurier Avenue West. The proposed development will maintain the six dwelling units in the existing building and provide 57 units in the new addition. The existing driveway to Laurier Avenue West will be retained and will lead to two visitor parking spaces.

The development is anticipated to be completed in a single phase, with full build out by 2021.

A copy of the proposed site plan is included in **Appendix A**.

1.3 Screening Form

The City's 2017 TIA Guidelines identifies three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form. A copy of the TIA screening form is included in **Appendix B**.

The trigger results are as follows:

- Trip Generation Trigger – The development is not anticipated to generate over 60 person trips/peak hour; further assessment is not required based on this trigger.
- Location Triggers – The development is located within a Transit Oriented Development (TOD) zone; further assessment is required based on this trigger
- Safety Triggers – A driveway is within 150m of the traffic signal at Bronson Avenue/Laurier Avenue West; further assessment is required based on this trigger.

Based on the foregoing, the proposed development meets the location and safety triggers for completing a TIA.

2.0 SCOPING

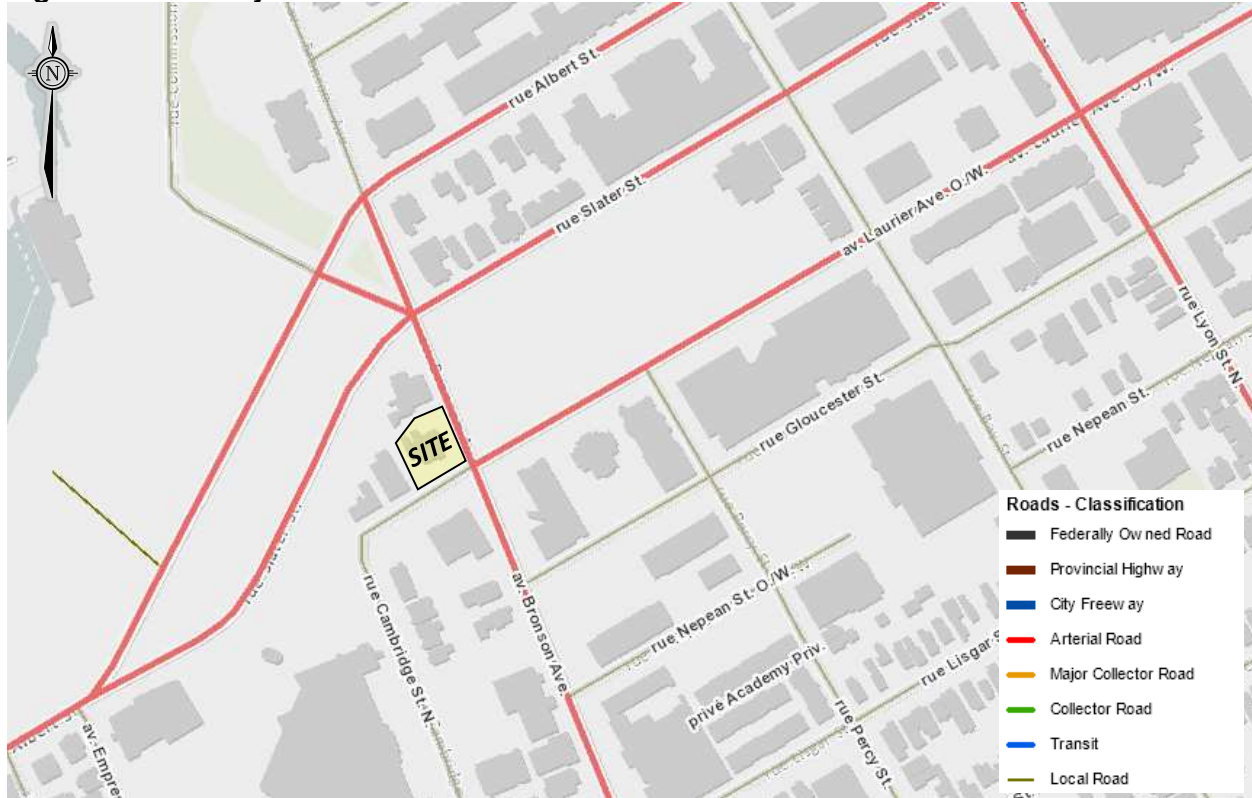
2.1 Existing Conditions

This section provides a review of existing conditions in the vicinity of the subject site including: roadways, intersections, driveways, pedestrian and cycling facilities, transit, area traffic management measures, traffic volumes, and collision records.

2.1.1 Roadways

The roadway network of the greater area surrounding the subject site is illustrated in **Figure 2**.

Figure 2: Roadway Network



All study area roadways fall under the jurisdiction of the City of Ottawa.

Laurier Avenue West is an east-west roadway that is classified as a local road west of Bronson Avenue and an arterial road east of Bronson Avenue. West of Bronson Avenue, it has a two-lane undivided urban cross section with on-street parking prohibitions on both sides of the roadway. East of Bronson Avenue it has a two-lane undivided urban cross section with cycle tracks and an eastbound parking lane. Laurier Avenue West has a regulatory speed limit of 50km/hr in the vicinity of the subject site. East of Bronson, Laurier Avenue West is a truck route.

Bronson Avenue is a north-south arterial roadway with a four-lane undivided urban cross section and a regulatory speed limit of 50km/h in the vicinity of the subject site. South of Laurier Avenue West, the curbside lanes are generally used for parking on evenings and weekends. Bronson Avenue is a truck route. The City of Ottawa’s Official Plan identifies a right of way (ROW) protection of 23m along Bronson Avenue between Albert Street and Colonel By Drive. The existing right-of-way along the frontage of the subject site is approximately 20m. Given the location of the existing retaining wall abutting the eastern property line which has been identified as a contributing heritage feature, it will not be practical to provide a widening along the Bronson Avenue frontage.

2.1.2 Intersections

Bronson Avenue/Laurier Avenue West

- Signalized intersection, with bike signals on the east/west approaches
- Eastbound/Westbound: one approach lane.
- Northbound/Southbound: two approach lanes
- Eastbound/Westbound right turn on red prohibitions
- Westbound through movements are prohibited.
- Southbound left turns are prohibited.
- Standard crosswalks are provided on the east and north approaches, a textured crosswalk is provided on the south approach, and a textured crosswalk with zebra/ladder markings is provided on the west approach.
- Cross-rides with green thermoplastic paint are provided in the east-west direction.



2.1.3 Driveways

In accordance with the City's 2017 TIA guidelines, a review of adjacent driveways along the boundary roads (within 200m of the subject site) was conducted:

Bronson Avenue, west side:

- One driveway to the residential building at 140 Bronson Avenue
- One driveway serving the residential building at 600 Laurier Avenue West and the law office at 176 Bronson Avenue
- One driveway to the office building at 176 Bronson Avenue
- One driveway to the office building at 190 Bronson Avenue

Bronson Avenue, east side:

- Two one-way accesses serving the lay-by for the residential building at 175 Bronson Avenue
- One access to the Bronson Centre at 211 Bronson Avenue

Laurier Avenue West, south side:

- One driveway to the residential building at 600 Laurier Avenue West
- One access to underground parking for the residential building at 175 Bronson Avenue
- One access to underground parking for the residential building at 556 Laurier Avenue West

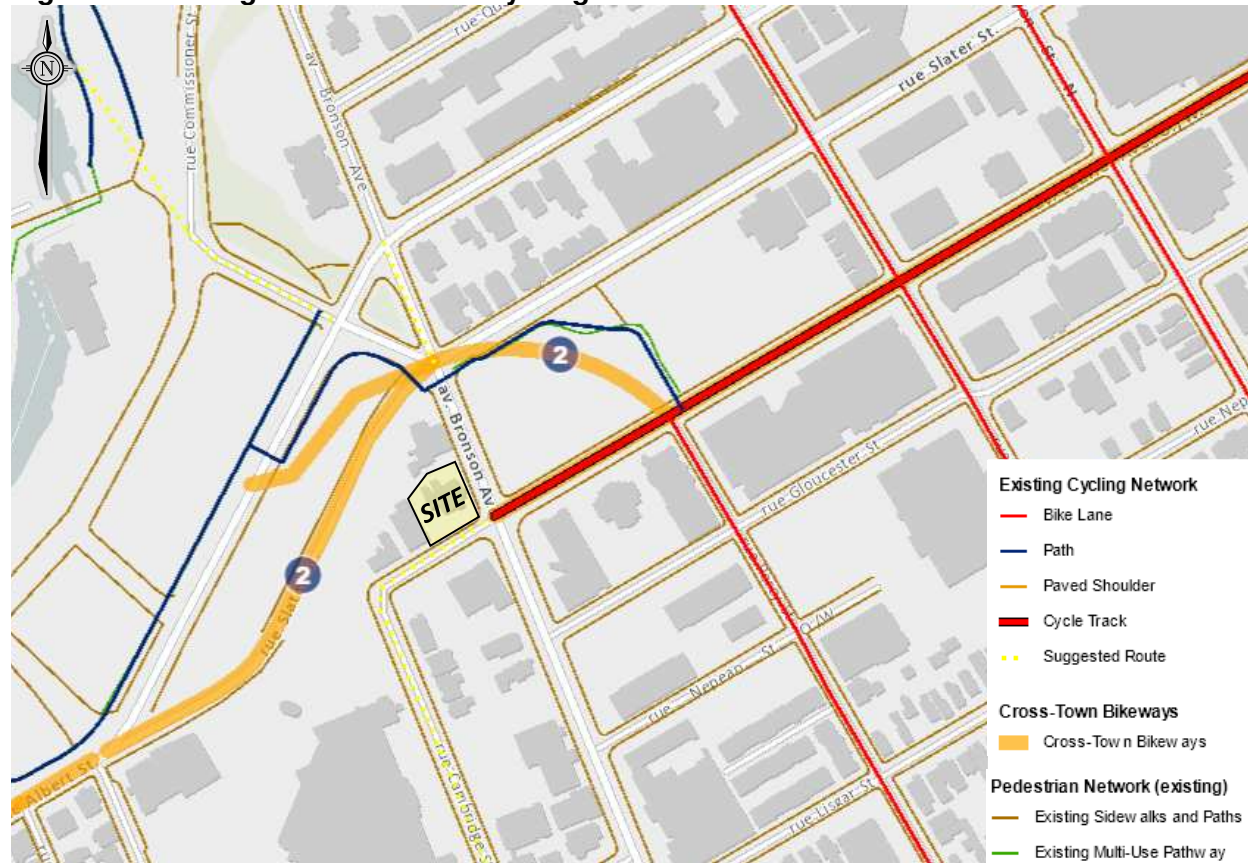
Laurier Avenue West, north side:

- Depressed curb along the northwest corner of the Laurier Avenue West/Cambridge Street North bend, leading to a private parking area

2.1.4 Pedestrian and Cycling Facilities

The existing pedestrian and cycling infrastructure provided in the greater area surrounding the subject site is illustrated in **Figure 3**.

Figure 3: Existing Pedestrian and Cycling Infrastructure



Within the vicinity of the subject site, sidewalks are provided along both sides of all study area roadways.

Cycle tracks are provided on Laurier Avenue West, east of Bronson Avenue. Sharrows are painted along Laurier Avenue West, west of Bronson Avenue. Bike lanes are provided along Percy Street, Bay Street and Lyon Street. A Multi-Use Pathway (MUP) is provided along the north side of Albert Street, west of Commissioner Street. A MUP is also provided from Laurier Avenue West east of Bronson Avenue, to Bronson Avenue at Slater Street, continuing along the south side of Commissioner Street/Albert Street and crossing Albert Street at a midblock location.

The City of Ottawa’s 2013 Cycling Plan identifies Laurier Avenue West, east of Bronson Avenue as a Spine Cycling Route and Laurier Avenue West, west of Bronson Avenue as a Local Route in the Ultimate Cycling Network. Albert Street, Percy Street, Bay Street, and Slater Street are also identified as Spine Cycling Routes while Cambridge Street North, Primrose Avenue East and Arthur Street are identified as Local Routes. Cross-town Bikeway 2 follows Laurier Avenue West and the existing MUP to Albert Street.

2.1.5 Transit

An aerial view of existing transit service in the vicinity of the subject site can be found in **Figure 4**. The nearest bus stops to the subject site are summarized in the following table. OC Transpo Route information is included in **Appendix C**.

Table 1: OC Transpo Stops

OC Transpo Bus Stop	Location	Route(s) Served
#6626	West side of Bronson Avenue, south of Laurier Avenue West	10
#6627	East side of Bronson Avenue, south of Laurier Avenue West	10
#3005	South side of Slater Street, between Bronson Avenue and Bay Street	10,16
#3004	North side of Albert Street, between Bronson Avenue and Bay Street	10,16
Lyon Station	Lyon Street at Queen Street	Line 1 (LRT) Buses: 10,15,16,17,57,61,75, STO service
Pimisi Station	Booth Street, north of Albert Street	Line 1 (LRT) Buses: 16,57,61,63, 66,75,85,185

OC Transpo Route 10 travels from Lyon Station to Hurdman Station. It operates seven days a week, with all day service. Route 10 generally operates with 15-minute headways.

OC Transpo Route 16 travels from Westboro to Main Street. It operates seven days a week, with all day service. Route 16 generally operates with 15- to 30-minute headways.

The subject site is also located within a 600m radius of the Pimisi and Lyon Light Rail Transit (LRT) Stations, with service to the Confederation Line and numerous OC Transpo Routes, providing coverage across the City of Ottawa.

Figure 4: Study Area Transit Network



2.1.6 Existing Area Traffic Management Measures

As described above, several movements are restricted at the Laurier Avenue West/Bronson Avenue intersection, including:

- No right turn on red for eastbound and westbound movements
- Westbound through movement prohibited (with the exception of bicycles)
- Southbound left turn movement prohibited

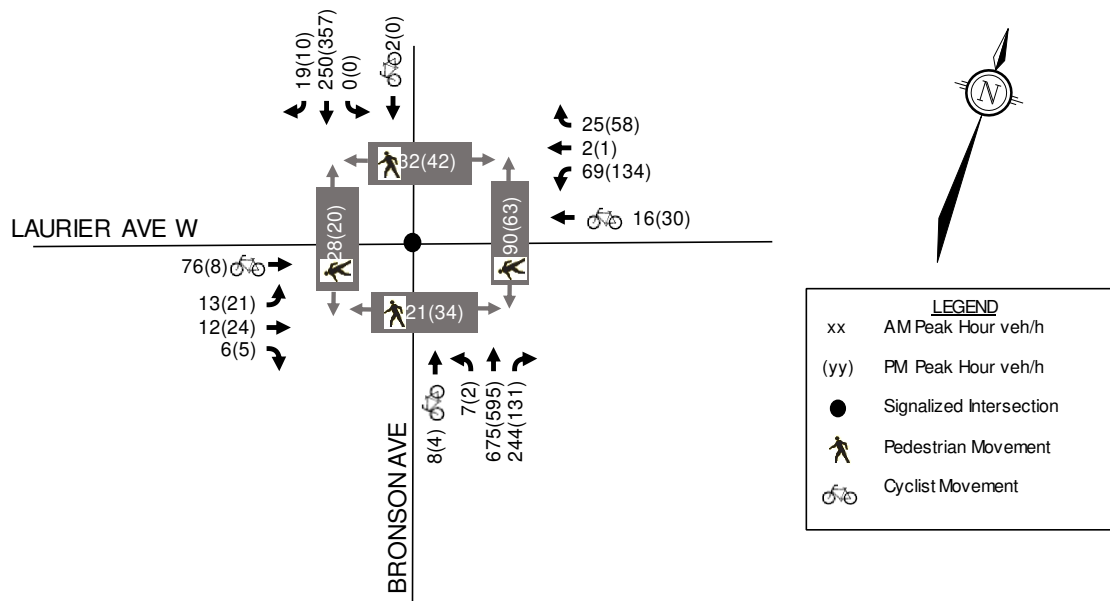
Currently, there are no other existing Area Traffic Management (ATM) measures within the study area.

2.1.7 Existing Traffic Volumes

Weekday traffic counts were obtained from the City of Ottawa at the Bronson Avenue/Laurier Avenue West intersection to determine the existing pedestrian, cyclist and vehicular traffic volumes. The traffic count was completed on August 29, 2017 (Tuesday).

Existing traffic volumes within the study area are shown in **Figure 5**. Traffic count data is included in **Appendix D**.

Figure 5: Existing Traffic Volumes



As described in Section 2.1.6, there are turn movement restrictions at the Laurier Avenue West/Bronson Avenue intersection. A total of 31 vehicles performed the prohibited westbound through manoeuvre while 4 vehicles performed the prohibited southbound left turn manoeuvre over the course of the 8-hour traffic count.

2.1.8 Collision Records

Historical collision data from the last five years was obtained from the City's Public Works and Service Department for the study area. Copies of the collision summary report are included in **Appendix E**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. **Table 2** summarizes the number of collisions from January 1, 2014 to December 31, 2018.

Table 2: Reported Collisions

Intersection	Impact Types					Total Number of Collisions
	Angle	Sideswipe	Rear End	Turning Movement	SMV/ Other	
Bronson Avenue/Laurier Avenue West	5	0	1	3	5	14

A total of fourteen collisions were reported at the Bronson Avenue/Laurier Avenue West intersection over the course of the last five years. Of these, there were five angle impacts, three turning movement impacts, one rear end impact, and five single-vehicle/other collisions. Of the total fourteen collisions, four involved pedestrians and two involved cyclists. Five of the collisions occurred in wet/snowy conditions. A total of eight collisions did cause injuries, but none caused fatalities.

Of the five single-vehicle/other collisions, four involved pedestrians and one involved a delivery truck reversing. Of the collisions involving pedestrians, one involved an eastbound right turning vehicle, one involved a westbound right turning vehicle, one involved a westbound left turning vehicle, and one involved a southbound through vehicle.

Of the five angle impacts, two involved northbound vehicles colliding with westbound vehicles, one involved a southbound vehicle and an eastbound vehicle, one involved a northbound right turning vehicle and an eastbound vehicle, and the other involved a northbound right turning vehicle and an eastbound cyclist.

The collision history at the Bronson Avenue/Laurier Avenue West intersection does not result in any identifiable collision patterns.

2.2 Planned Conditions

2.2.1 Planned Roadway Improvements

The City of Ottawa's Transportation Master Plan (TMP) identifies Bronson Avenue as a Transit Priority Corridor with isolated measures in the 2031 Rapid Transit and Transit Priority (RTTP) Network. The TMP's 2031 Affordable Network includes transit signal priority along Bronson Avenue between the Southeast Transitway and Carling Avenue. The 2031 Network Concept also includes transit signal priority and queue jump lanes between Carling Avenue and the Confederation Line, however this is currently unaffordable.

The Ottawa Cycling Plan (OCP) identifies new bike lanes on Scott Street and Albert Street, from Holland Avenue to Bronson Avenue as part of project P1-31. The OCP also identifies the

implementation of shared use lanes on Cambridge Avenue North (from Laurier Avenue West to Primrose Avenue), on Primrose Avenue (from Cambridge Avenue to Arthur Street) and on Arthur Street, as part of the Centretown Neighbourhood Bikeway (project P3-11).

2.2.2 Other Area Developments

A new development has been approved for 31 Cambridge Street, 192 & 196 Bronson Avenue. The site is currently under construction and will consist of 251 apartment units and approximately 1,800 square feet of ground floor retail. A driveway connection to Bronson Avenue is proposed.

2.3 Study Area and Time Periods

The proposed study area for the modules in the Design Review component is the development property and the boundary roads (i.e., Laurier Avenue West and Bronson Avenue). However, given the access proximity to a signalized intersection, intersection capacity analysis will be completed at the access and the Bronson Avenue/Laurier Avenue West intersection.

The time periods chosen for this TIA are the weekday AM and PM peak hours. The TIA will review the 2021 build out year and the 2026 horizon year.

2.4 Exemptions Review

This module reviews possible exemptions from the final TIA, as outlined in the TIA Guidelines. As described in Section 3.0, the trip generation trigger was not met. Therefore, the Network Impact Component (Modules 4.5 to 4.9) of the TIA analysis is exempt from further review.

The applicable exemptions for this site are shown in **Table 3**.

Table 3: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Applies
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	<ul style="list-style-type: none"> Only required for site plans 	No
	4.1.3 New Street Networks	<ul style="list-style-type: none"> Only required for plans of subdivision 	Yes
4.2 Parking	4.2.1 Parking Supply	<ul style="list-style-type: none"> Only required for site plans 	No
	4.2.2 Spillover Parking	<ul style="list-style-type: none"> Only required for site plans where parking supply is 15% below unconstrained demand 	No

Although exempt from the analysis, City staff have requested the TIA include Module 4.5: Transportation Demand Management (TDM).

Based on the foregoing, the following modules will be included in the TIA report:

- Module 4.1: Development Design
- Module 4.2: Parking
- Module 4.3: Boundary Streets
- Module 4.4: Access Design
- Module 4.5: Transportation Demand Management

3.0 FORECASTING

3.1 Development-Generated Traffic

3.1.1 Trip Generation

The proposed development is a nine-storey residential building addition to the existing building at 593 Laurier Avenue West. The proposed development will maintain the six dwelling units in the existing building and provide 57 units in the new addition.

Trips generated by the proposed residential uses during the weekday AM and PM peak hours have been estimated using the relevant recommended rates outlined in the 2009 TRANS *Trip Generation Manual*. The vehicle trip generation rates, taken from Table 6.3 of the TRANS report, correspond to Mid-Rise Apartments (3-10 Floors) in the Urban Area (inside the greenbelt). The vehicle trip generation using the aforementioned rates have been converted to person trips using the assumed modal shares in the in Table 3.13 of the TRANS report. The directional split between inbound and outbound trips are based on the blended splits presented in Table 3.17 of the TRANS report.

Estimates of the person trips generated by the proposed development are summarized in **Table 4**.

Table 4: Person Trip Generation

Land Use	Units/ GFA	AM Peak (PPH)			PM Peak (PPH)		
		IN	OUT	TOT	IN	OUT	TOT
Mid-Rise Apartments	63	10	31	41	28	17	45

The 2011 TRANS O-D Survey Report indicates that the proposed development is located within the Ottawa Inner Area along the border with the Ottawa Centre District. As the subject site is also located within 600m of the Lyon Street and Pimisi LRT Stations, the site is also located within a Transit-Oriented Development (TOD) Zone. In TOD Zones, the transit share is assumed to increase significantly compared to the TRANS O-D district.

A comparison of the assumed modal shares for a TOD zone and the modal shares for both the Ottawa Inner Area and Ottawa Centre District is presented in **Table 5**. The modal shares for the TRANS districts are based on all observed trips from/within the district during the AM peak and to/within the district during the PM peak.

Table 5: Modal Share by District/Zone

Travel Mode	TOD Zone	Ottawa Inner Area	Ottawa Centre
Auto Driver	15%	35%	30%
Auto Passenger	5%	10%	10%
Transit	65%	20%	25%
Non-Auto	15%	35%	35%

Given the sites proximity to rapid transit and limited number of parking spaces (two visitor parking spaces only) the above modal shares have been adjusted as follows:

- 5% Auto Driver – Reduced to reflect the limited number of on-site parking spaces
- 5% Auto Passenger – Consistent with TOD Zone
- 35% Non-Auto – Consistent with both Ottawa Inner Area and Ottawa Centre
- 55% Transit – increased to reflect TOD Zone

A full breakdown of the projected person trips by modal share are shown in **Table 6**.

Table 6: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
Person Trips		10	31	41	28	17	45
Auto Driver	5%	0	2	2	1	1	2
Auto Passenger	5%	0	2	2	1	1	2
Transit	55%	6	17	23	16	9	25
Non-Auto	35%	3	11	14	10	6	16

From the previous table, the proposed development is projected to generate an additional two vehicle trips during the AM and PM peak hours.

As the development does not meet the 60 person trip generation trigger discussed in Section 3.0, trip distribution and trip assignment is not required.

3.2 Background Traffic

A review of the City of Ottawa's Strategic Long-Range Transportation Model (comparing snapshots of 2011 and 2031 AM peak hour volumes) to determine an appropriate background growth rate for the study area roadways. Based on discussions with City staff, following removal of transit lanes, Slater Street is anticipated to be more attractive to drivers due to less friction from bus traffic. As such, the removal of bus lanes along Slater Street will have implications on the traffic volumes and travel patterns on the adjacent road network.

Based on the Long-Range Model, traffic volumes along Bronson Avenue are anticipated to increase by approximately 2% per annum. Traffic volumes along Laurier Avenue West west of Bronson are anticipated to increase by approximately 1% per annum, while Laurier Avenue West east of Bronson Avenue is anticipated to decrease by approximately 1% per annum. Captures of the Long-Range Model in the vicinity of the subject site are included in **Appendix D**.

For the purposes of this study, a 2% per annum growth rate has been applied to through volumes along Bronson Avenue, a 1% per annum growth rate has been applied to Laurier Avenue west of Bronson Avenue, and no growth is assumed for Laurier Avenue east of Bronson Avenue.

A summary of other area developments was described in Section 4.2.2. Traffic generated by the 31 Cambridge Street, 192 & 196 Bronson Avenue development currently under construction has been added to background traffic in the study area. Relevant excerpts from the 2014 Transportation Brief Addendum are included in **Appendix F**.

Background traffic volumes for the 2021 build out and 2026 horizon year are shown in **Figures 6 and 7**.

Figure 6: 2021 Background Traffic Volumes

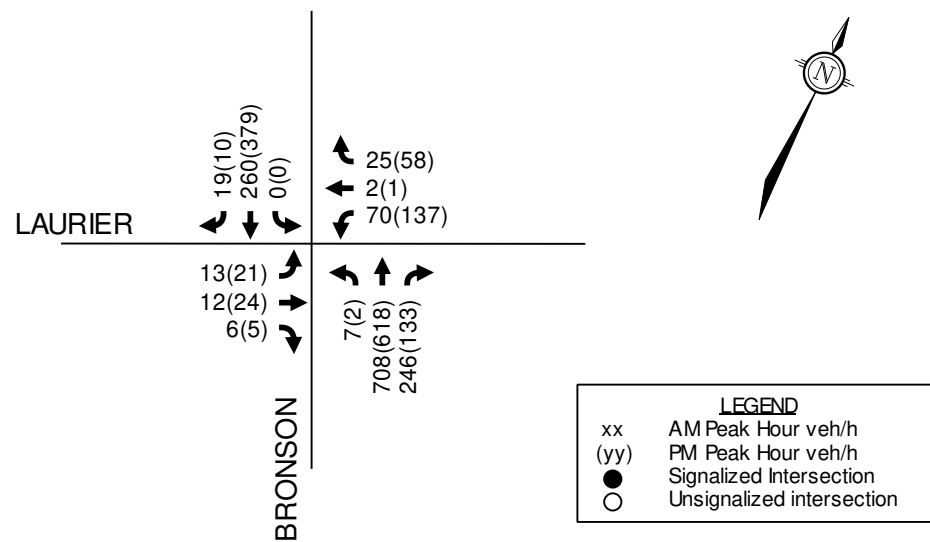
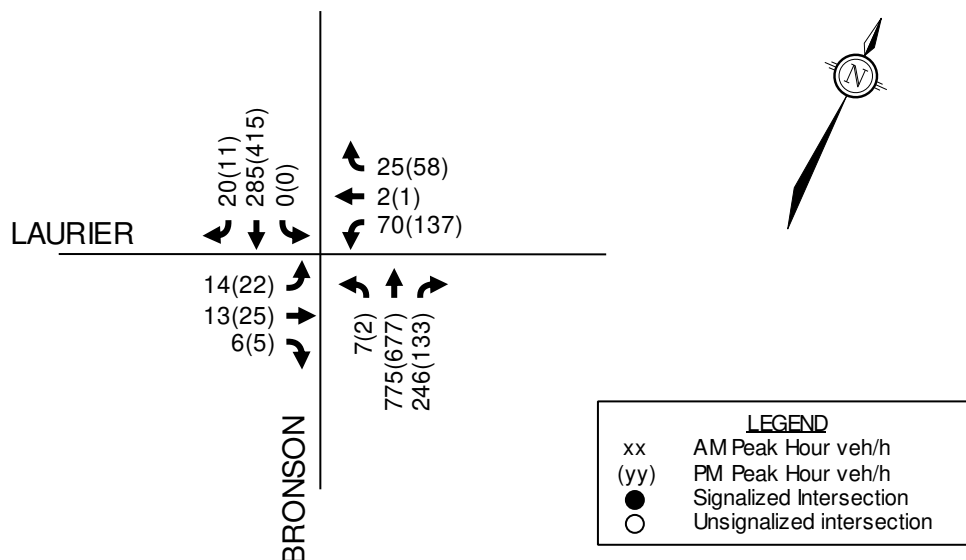


Figure 7: 2026 Background Traffic Volumes



4.0 ANALYSIS

4.1 Development Design

4.1.1 Design for Sustainable Modes

Pedestrian walkways will be provided between the existing and proposed building entrances and the sidewalk along Laurier Avenue West. The sidewalk will be depressed and continuous across the proposed access.

OC Transpo's service design guideline for peak period service is to provide service within a five minute (400m) walk of the home, school and work location of 95% of urban residents. The actual walking distance from the main building entrance to the nearest bus stops was measured. Stop #6626 is a 75m walk, stop #6627 is a 70m walk, stop #3004 is a 360m walk, and stop #3005 is a 240m walk from the proposed development.

Bicycle parking for the proposed development will be in accordance with the City of Ottawa's Zoning By-Law (ZBL). Bicycle parking will be provided in a storage room on the ground floor.

A review of the Transportation Demand Management (TDM) – Supportive Development Design and Infrastructure Checklist has been completed. A copy of the TDM checklist is included in **Appendix G**. All TDM requirements in the TDM Infrastructure Checklist are met, excluding measure 6.1.1. Relief of the minimum resident and visitor parking requirements in the ZBL is being sought for the proposed development.

4.1.2 Circulation and Access

The proposed access will serve two parking spaces. Vehicles will be required to drive into the access and reverse out onto Laurier Avenue West.

Garbage bins will be wheeled out using the western pathway for curbside garbage collection along Laurier Avenue West.

4.2 Parking

4.2.1 Parking Supply

The subject site is located in Area B on Schedule 1 and Area X on Schedule 1A of the City of Ottawa's ZBL.

Table 7: Parking Requirements per Zoning By-Law

Land Use	Rate	Units	Required	Proposed
<i>Vehicle Parking</i>				
Apartment	0.5 per unit in excess of 12 (Resident)	63	26	0
	0.1 per unit in excess of 12 (Visitor)		5	2
<i>Bicycle Parking</i>				
Apartment	0.5 per unit	63	32	38

The proposed bicycle parking will exceed the minimum requirement of the ZBL. However, relief from the minimum vehicle parking provisions is required.

4.2.2 Spillover Parking

The subject site is in Area X on Schedule 1A of the Zoning By-law which requires 0.5 resident parking spaces per dwelling unit, for any units in excess of 12 and 0.1 visitor parking spaces per dwelling unit, for any units in excess of 12. Although the provisions of Schedule 1A are accepted, it is worth noting that the site is surrounded on three sides by Area Z on Schedule 1A which requires zero resident parking. For the 63 proposed units, 26 resident and five visitor spaces are required. It is proposed to provide zero resident parking and two visitor spaces.

The expectation is that residents will choose walking, cycling and using transit for their daily commutes as they will be in a prime location 450m west of the main commercial downtown core (taken as east of Lyon Street) and within an 800m walk of Lyon and Pimisi LRT stations. The site is within 70m of bus services on Bronson Avenue and within 240m of services on Slater and Albert Streets. There is a share car Communauto ‘station’ at 600 Laurier Avenue West, directly across the street from the subject site. This could conveniently be used by residents for occasional car use. There is a second station 160m south on Bronson and a third and fourth within 500m as back-ups. This is an appropriate location to reduce resident parking to zero.

Two parking spaces are proposed to accommodate visitors to the development. Five visitor parking spaces are required under the Zoning By-law. This suggests that 60% of the visitors who would have parked on the site will need to either park off-site or use alternative means of transport. It is accepted that on-street parking nearby is at or near capacity and visitors driving to the site could not rely on it. There are seven commercial parking lots of varying size within 400m of the site, which make driving a private vehicle to the site less convenient, but certainly not impossible. It is not logical to discourage private car use among residents whilst encouraging it for visitors. It is logical for visitors to the site to adopt the approach of the residents and not rely on private cars at all. The proposal discourages visitors from driving private vehicles to the site but does not make it impossible to do so. This approach only works if there are viable alternatives and for this site there are. The site’s location is in an area of the City that is rich with transit and share car and active transport options.

A review of TDM initiatives that will be implemented within the building to promote use of non-auto modes of transportation and reduce the parking demand by the proposed development is included in Section 4.5 below.

4.3 Boundary Street Design

This section provides a review of the boundary streets (Laurier Avenue West and Bronson Avenue) using complete streets principles. The Multi-Modal Level of Service (MMLOS) guidelines produced by IBI Group in 2015 were used to evaluate the LOS of the boundary roadways for each mode of transportation. Schedule ‘B’ of the City of Ottawa’s Official Plan indicates both boundary roadways are in the ‘General Urban Area’. Both boundary streets are also located within 600m of a rapid transit station (Lyon and Pimisi Stations).

Targets for the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS), and Truck Level of Service (TkLOS) for the study area roadways are based on the targets for General Urban Area and targets within 600m of a rapid transit station, as identified in Exhibit 22 of the MMLOS guidelines.

The following summarizes the findings of the MMLOS segment analysis.

4.3.1 Pedestrian Level of Service (PLOS)

Exhibit 4 of the MMLOS guidelines has been used to evaluate the segment PLOS of the boundary roadways. Exhibit 22 of the MMLOS guidelines suggest a target PLOS A for all road classes within 600m of a rapid transit station. The results of the segment PLOS analysis are summarized in the following table.

Table 8: PLOS Segment Analysis

Sidewalk Width	Boulevard Width	Avg. Daily Curb Lane Traffic Volume	Presence of On-Street Parking	Operating Speed	Segment PLOS
Laurier Avenue West (North Side)					
1.5m	0 m	< 3,000 vpd	No	50 km/h	E
Laurier Avenue West (South Side)					
1.5m	0 m	< 3,000 vpd	No	50 km/h	E
Bronson Avenue (East Side)					
1.5 m	0m	> 3,000 vpd	No	50 km/h	E
Bronson Avenue (West Side)					
1.8m	0 m	< 3,000 vpd	No	50 km/h	B

4.3.2 Bicycle Level of Service (BLOS)

Exhibit 11 of the MMLOS guidelines has been used to evaluate the segment BLOS of the boundary roadways. Exhibit 22 of the MMLOS guidelines suggest a target BLOS B for Local Routes on local roads (Laurier Avenue West) and a target BLOS D for arterial roads without cycling classification (Bronson Avenue) within 600m of a rapid transit station. The results of the segment BLOS analysis are in the following table.

Table 9: BLOS Segment Analysis

Road Class	Bike Route	Type of Bikeway	Travel Lanes	Operating Speed	Segment BLOS
Laurier Avenue West					
Local	Local	Mixed Traffic	One in each direction	50 km/h	B
Bronson Avenue					
Arterial	None	Mixed Traffic	Two in each Direction	50 km/h	E

4.3.3 Transit Level of Service (TLOS)

Exhibit 15 of the MMLOS guidelines has been used to evaluate the TLOS of the boundary roadways. Exhibit 22 of the MMLOS guidelines suggest a target TLOS D for arterial roadways along transit priority corridors with isolated measures. As transit service is not provided along Laurier Avenue West adjacent to the site, the TLOS has not been analyzed along this roadway. The results of the TLOS analysis are summarized in the following table

Table 10: TLOS Segment Analysis

Facility Type	Level/Exposure to Congestion Delay, Friction and Incidents			Segment TLOS
	Congestion	Friction	Incident Potential	
Bronson Avenue				
Mixed Traffic	Yes	Low	Medium	D

4.3.4 Truck Level of Service (TkLOS)

Exhibit 20 of the MMLOS guidelines has been used to evaluate the segment TkLOS of the boundary roadways. Exhibit 22 of the MMLOS guidelines suggests a target TkLOS D for truck routes on arterial roadways within 600m of a rapid transit station (Bronson Avenue). As Laurier Avenue West adjacent to the site is not designated as a truck route, the TkLOS has not been analyzed along this roadway. The results of the segment TkLOS analysis are summarized in the following table.

Table 11: TkLOS Segment Analysis

Curb Lane Width	Number of Travel Lanes per Direction	Segment TkLOS
Bronson Avenue (Northbound)		
> 3.7m	2	A
Bronson Avenue (Southbound)		
3.5m	2	A

4.3.5 Segment MMLOS Summary

A summary of the results of the segment MMLOS analysis for the boundary roadways is provided in the following table.

Table 12: Segment MMLOS Summary

Segment	PLOS	BLOS	TLOS	TkLOS
Laurier Avenue West	E	B	-	-
Target	A	B	-	-
Bronson Avenue	E	E	D	A
Target	A	D	D	D

The results of the segment MMLOS analysis can be summarized as follows:

- Neither boundary street meets the target PLOS; and
- Bronson Avenue does not meet the target BLOS.

Laurier Avenue West

Laurier Avenue West meets the target BLOS but does not meet the target PLOS. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required. This has been identified for the City’s consideration as funding becomes available.

Bronson Avenue

Bronson Avenue meets the target TLOS and TkLOS but does not meet the target PLOS and BLOS.

The east side of Bronson Avenue is currently operating with a PLOS E. The target PLOS A is unachievable on this side of the roadway due to the operating speed of 50km/hr and the average daily curb traffic in excess of 3,000 vehicles. The west side of Bronson Avenue is currently operating with a PLOS B. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required.

Mixed use traffic lanes are currently provided along Bronson Avenue adjacent to the subject site, achieving a BLOS E. To achieve the target BLOS D, bike lanes are required along Bronson Avenue.

The above modifications to improve the PLOS and BLOS along Bronson Avenue have been identified for the City’s consideration as funding becomes available.

4.4 Access Intersection Design

The proposed development will be served by one all movement access along Laurier Avenue West.

Section 25 (c) of the City of Ottawa’s Private Approach By-law (PABL) identifies a requirement for two-way accesses to have a width no greater than 9m, as measured at the street line. Section 107 (1)(a) of the ZBL identifies a minimum width of 6.7m for a two-way driveway to a parking lot. The proposed access will have a width of 6.8m measured at the property line and 5m at the streetline, adhering to the requirements of the City’s PABL and ZBL.

Section 25 (o) of the City's PABL identifies a minimum distance of 6m between the private approach and the nearest intersecting streetline. The access will be located approximately 12m from the eastern property line and 10m from the western property line.

Transportation Association of Canada (TAC) identifies a minimum corner clearance of 15m between the nearest edge of a driveway and the curb line at a signalized intersection. The proposed driveway is located 15m from the curb line at the Bronson Avenue intersection, measured at the property line, adhering to the corner clearance requirements of TAC.

A review of intersection operations at the Bronson Avenue/Laurier Avenue West intersection was conducted to understand the anticipated queue lengths along Laurier Avenue West in proximity to the proposed access. The traffic signal timing plan for this intersection was obtained from the City of Ottawa. Intersection operations for the 2026 horizon year are summarized in the following table. Detailed Synchro reports are included in **Appendix H**.

Table 13: 2026 Background Intersection Operations

Intersection	AM Peak			PM Peak		
	V/C	LOS	Mvmt	V/C	LOS	Mvmt
Bronson Avenue/ Laurier Avenue West	0.48	A	NB	0.69	B	WB

The Bronson Avenue/Laurier Avenue West intersection is currently operating with a level of service B or better during the AM and PM peak hours. The 95th percentile eastbound queue is approximately 10m during both the weekday AM and PM peak hours and is not anticipated to block the proposed access.

4.5 Transportation Demand Management

The proposed development conforms to the City's TDM initiatives by providing easy access to area pedestrian, bicycle and transit facilities. A review of the TDM – Measures Checklist has been conducted, and is included in **Appendix G**.

The following measures will be implemented upon opening of the proposed development:

- Conduct periodic surveys to identify travel-related behaviors;
- Display local area maps with walking/cycling access routes and key destinations;
- Display relevant transit schedules and route maps;
- Contract with provider to install on-site bikeshare station; and
- Provide a multimodal travel option information package to new residents.

The aforementioned TDM initiatives will help promote non-auto modes of transportation to residents and reduce the parking demand by the proposed development. Further details are provided on the TDMN checklist provided in **Appendix G**.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, the conclusions and recommendations of this TIA can be summarized as follows:

On-site Design

- Pedestrian walkways will be provided between the existing and proposed building entrances and the sidewalk along Laurier Avenue West. The sidewalk will be depressed and continuous across the proposed access.
- All TDM requirements in the TDM Infrastructure Checklist are met, excluding measure 6.1.1. Relief of the minimum resident and visitor parking requirements in the ZBL is being sought for the proposed development.
- The proposed access will serve two parking spaces. Vehicles will be required to drive into the access and reverse out onto Laurier Avenue West.
- Garbage bins will be wheeled out using the western pathway for curbside garbage collection along Laurier Avenue West.

Parking

- The proposed bicycle parking will exceed the minimum requirement of the ZBL. However, relief from the minimum vehicle parking provisions is required.
- The expectation is that residents will choose walking, cycling and using transit for their daily commutes. The subject site is located in close proximity to local transit along Bronson Avenue and Slater Street/Albert Street, the Lyon Street and Pimisi Transit Stations, and numerous carshare services.
- Two parking spaces are proposed to accommodate visitors to the development. It is accepted that on-street parking nearby is at or near capacity and visitors driving to the site could not rely on it. There are seven commercial parking lots of varying size within 400m of the site, which make driving a private vehicle to the site less convenient, but certainly not impossible.

Boundary Streets

- Laurier Avenue West meets the target BLOS but does not meet the target PLOS. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required.
- The east side of Bronson Avenue is currently operating with a PLOS E. The target PLOS A is unachievable on this side of the roadway due to the operating speed of 50km/hr and the average daily curb traffic in excess of 3,000 vehicles.
- The west side of Bronson Avenue is currently operating with a PLOS B. To achieve the target PLOS A, either a 1.8m sidewalk and 2.0m boulevard or 2.0m sidewalk and 0.5m or greater boulevard is required.
- Mixed use traffic lanes are currently provided along Bronson Avenue adjacent to the subject site, achieving a BLOS E. To achieve the target BLOS D, bike lanes are required along Bronson Avenue.

Access Design

- The width and location of the proposed access adhere to the requirements of the City's Private Approach By-law and Zoning By-law.
- The proposed driveway is located 15m from the curb line at the Bronson Avenue intersection, measured at the property line, adhering to the corner clearance requirements of TAC.
- The Bronson Avenue/Laurier Avenue West intersection is currently operating with a level of service C or better during the AM and PM peak hours. The 95th percentile eastbound queue is approximately 10m during both the weekday AM and PM peak hours and is not anticipated to block the proposed access.

Transportation Demand Management

- The proposed development conforms to the City's TDM initiatives by providing easy access to area pedestrian, bicycle and transit facilities.
- The following measures will be implemented upon opening of the proposed development:
 - Conduct periodic surveys to identify travel-related behaviors;
 - Display local area maps with walking/cycling access routes and key destinations;
 - Display relevant transit schedules and route maps;
 - Contract with provider to install on-site bikeshare station; and
 - Provide a multimodal travel option information package to new residents.

NOVATECH

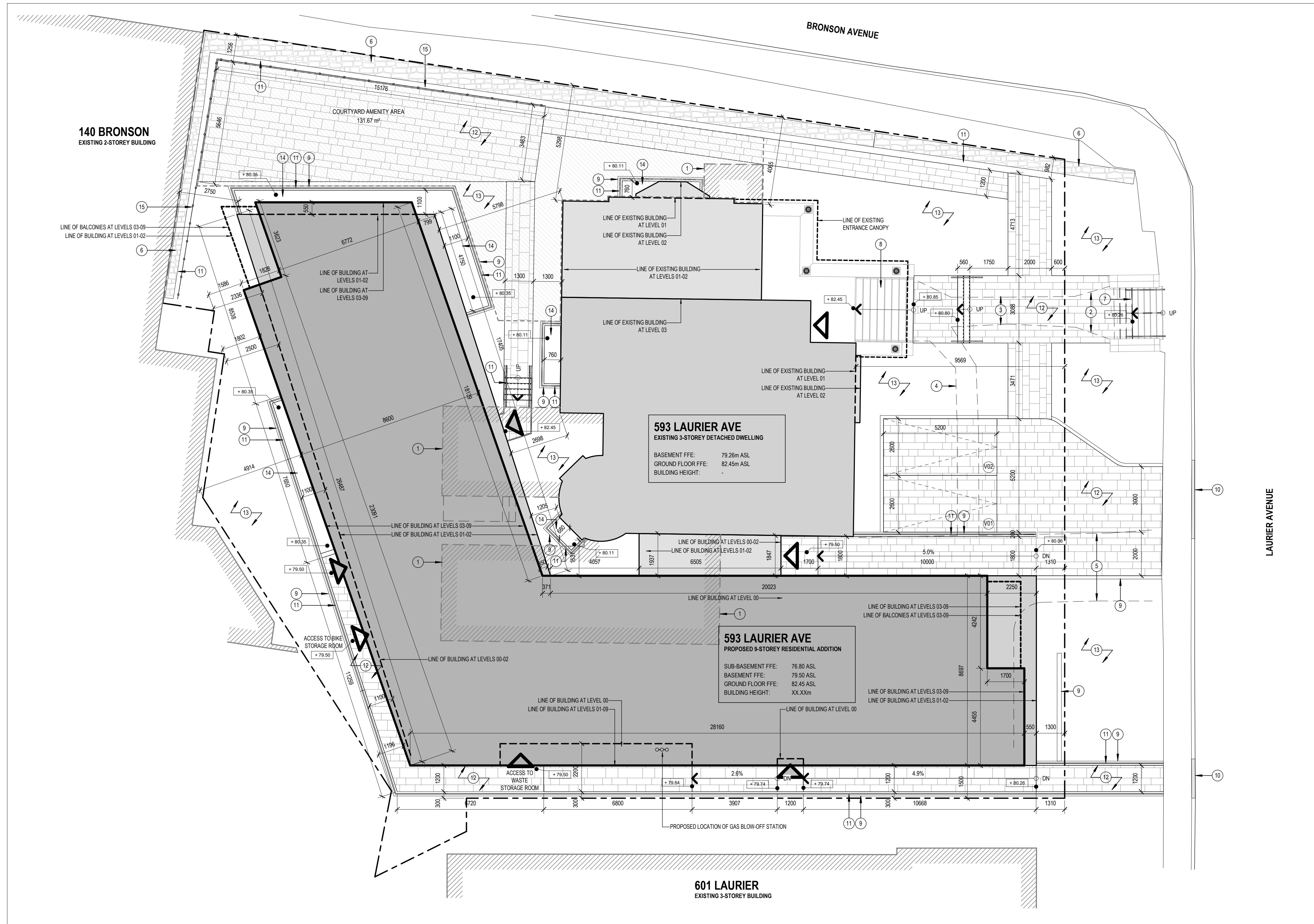
Prepared by:



Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

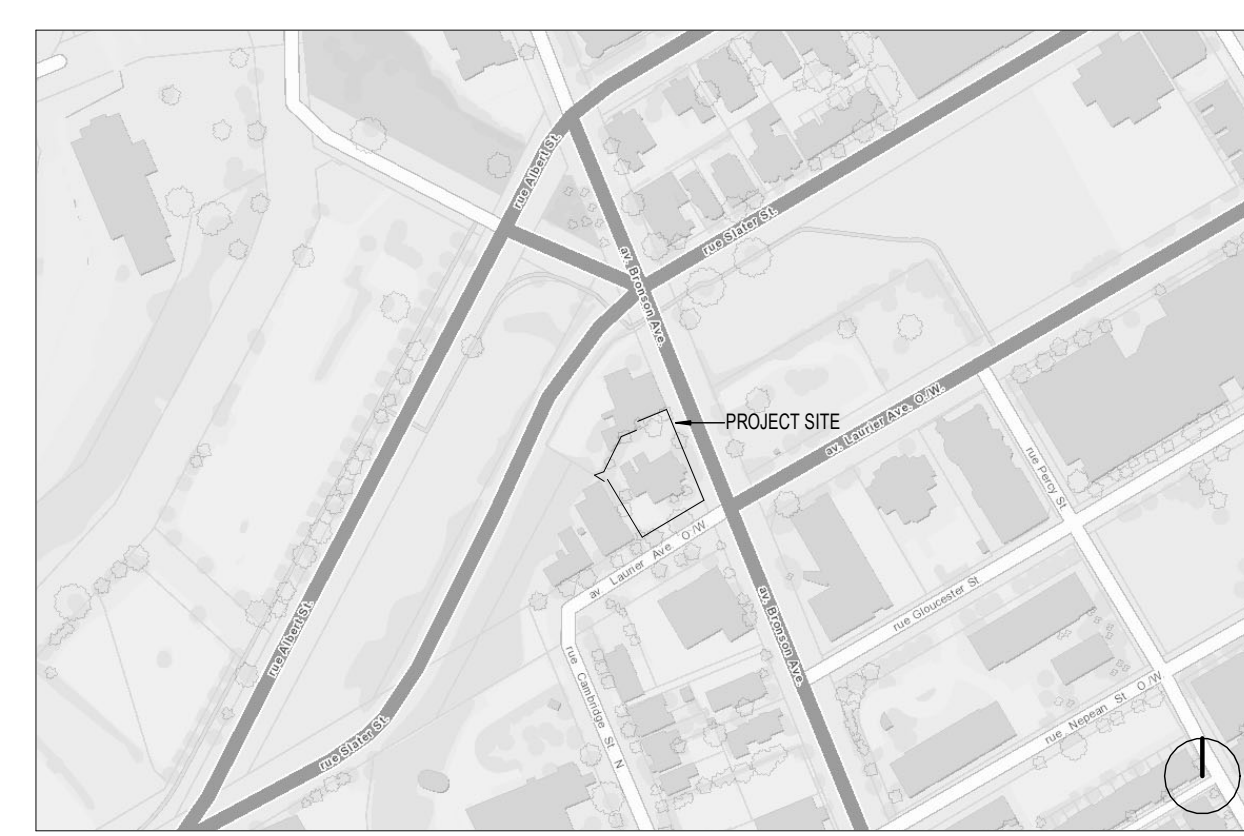
APPENDIX A

Site Plan



1 SITE PLAN
SP-01 SCALE: 1 : 100

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



SITE & PROJECT STATISTICS

Zoning Designation: RAT

PROJECT STATISTICS

Lot Area: 1,491m²
 Building Height: XXX
 Front Yard: 1.3m
 Rear Yard: 2.75m
 Net Side Yard: 1.2m
 Number of Proposed Units: 57 (Tower) + (6) Existing Dwelling

PARKING CALCULATION
As per Section 107

Distance to LRT: 395m

Required Parking: 26 spaces
 0 spaces for first 12 units - Section 107(3)
 0.5 spaces/unit for 51 units - Table 107

Resident Parking Provided: 0 spaces

VISITOR PARKING CALCULATION
As per Section 102

Required Visitor Parking: 6 spaces
 0 spaces for first 12 units - Section 102(3)
 0.1 spaces/unit for 51 units - Table 102

Visitor Parking Provided: 2 spaces
 Total Parking Provided: 2 spaces

BICYCLE PARKING CALCULATION
As per Table 111A

Required Parking: 32 spaces
 0.5 spaces/unit for 63 units [111A(i)]

Total Resident Parking: 36 spaces

AMENITY AREA CALCULATION
As per Table 137

Total Amenity Area Req'd: 378m²
 6m²/unit for 63 units

Communal Amenity Req'd: 169m²
 Min of 50% of Total Amenity Area

Private Amenity Area Provided: 62.6m²

Tower Level 01: -
 Tower Level 02: -
 Tower Level 03: 11.8m²
 Tower Level 04: 11.8m²
 Tower Level 05: 11.8m²
 Tower Level 06: 11.8m²
 Tower Level 07: 11.8m²
 Tower Level 08: 11.8m²
 Tower Level 09: 11.8m²
 Heritage Level 00: -
 Heritage Level 01: -
 Heritage Level 02: -
 Heritage Level 03: -

Communal Amenity Provided: 309.3m²
 Heritage Level 01: 42.7m²
 At Grade Parkspace: 131.7m²
 Roof Terrace: 134.8m²

Total Amenity Area Provided: 381.8m²

TOPOGRAPHIC PLAN OF SURVEY OF PART OF LOTS 40 CONFESSION A (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF NEPEAN CITY OF OTTAWA

FARLEY, SMITH & DENIS SURVEYING LTD. 2019

SURVEY INFO
SCALE: NTS

SITE PLAN LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- FIRE HYDRANT
- NEW STREET LIGHT
- STREET LIGHT TO BE REMOVED
- BICYCLE PARKING
- AMENITY AREAS AT GRADE

LEGEND
SCALE: NTS

- 1** PORTION OF EXISTING BUILDING TO BE DEMOLISHED
- 2** EXISTING ASPHALT WALKWAY TO BE REMOVED
- 3** EXISTING CONCRETE WALKWAY TO BE REMOVED
- 4** EXISTING INTERLOCK WALKWAY TO BE REMOVED
- 5** EXISTING ASPHALT DRIVEWAY & PARKING TO BE REMOVED
- 6** EXISTING STONE RETAINING WALL TO BE PROTECTED
- 7** EXISTING STAIR TO BE MODIFIED TO SUIT NEW GRADING
- 8** EXISTING CONCRETE GABLE & WOOD STAIRS TO REMAIN
- 9** RETAINING WALL (REFER TO CIVIL)
- 10** DEPRESSED CURB (REFER TO CIVIL)
- 11** STEEL PICKET GUARD CW HANDRAIL AS REQUIRED
- 12** INTERLOCKING STONE (REFER TO LANDSCAPE)
- 13** SOFT LANDSCAPING (REFER TO LANDSCAPE)
- 14** WINDOW WELL
- 15** 2m TALL WOOD SOUND BARRIER

KEYNOTE LEGEND
SCALE: N.T.S.

2 ZONING
SP-01 SCALE: 1 : 1

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

ISSUED FOR COORDINATION	2020-07-29
ISSUED FOR COORDINATION	2020-07-21
ISSUED FOR COORDINATION	2020-07-20
ISSUED FOR SITE PLAN CONTROL	2019-12-09
ISSUED FOR COORDINATION	2019-11-05
ISSUED FOR COORDINATION	2019-10-18
ISSUED FOR COORDINATION	2019-09-26
ISSUED FOR COORDINATION	2019-08-27
ISSUED FOR COORDINATION	2019-04-02

ISSUE RECORD

1	PORTION OF EXISTING BUILDING TO BE DEMOLISHED	2020-07-29
2	EXISTING ASPHALT WALKWAY TO BE REMOVED	2020-07-21
3	EXISTING CONCRETE WALKWAY TO BE REMOVED	2020-07-20
4	EXISTING INTERLOCK WALKWAY TO BE REMOVED	2019-12-09
5	EXISTING ASPHALT DRIVEWAY & PARKING TO BE REMOVED	2019-11-05
6	EXISTING STONE RETAINING WALL TO BE PROTECTED	2019-10-18
7	EXISTING STAIR TO BE MODIFIED TO SUIT NEW GRADING	2019-09-26
8	EXISTING CONCRETE GABLE & WOOD STAIRS TO REMAIN	2019-08-27
9	RETAINING WALL (REFER TO CIVIL)	2019-04-02
10	DEPRESSED CURB (REFER TO CIVIL)	
11	STEEL PICKET GUARD CW HANDRAIL AS REQUIRED	
12	INTERLOCKING STONE (REFER TO LANDSCAPE)	
13	SOFT LANDSCAPING (REFER TO LANDSCAPE)	
14	WINDOW WELL	
15	2m TALL WOOD SOUND BARRIER	

project1 studio
Project1 Studio Incorporated
1613.884.9339 | email@project1studio.ca

593 LAURIER
593 LAURIER AVE.
OTTAWA, ON

PROJ	SCALE	DRAWN	REVIEWED
1908	NOTED	LB	RMK

SITE PLAN

SP-01

APPENDIX B

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	593 Laurier Avenue West
Description of Location	Northwest corner of Bronson Ave/Laurier Ave W
Land Use Classification	Residential
Development Size (units)	63 units
Development Size (m ²)	
Number of Accesses and Locations	1 access (existing - access on Laurier Ave W to remain)
Phase of Development	1
Buildout Year	2021

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m ²
Industrial	5,000 m ²
Fast-food restaurant or coffee shop	100 m ²
Destination retail	1,000 m ²
Gas station or convenience market	75 m ²

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*	✓	

*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
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)?	✓	
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		X
Does the development satisfy the Location Trigger?	✓	
Does the development satisfy the Safety Trigger?	✓	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C

OC Transpo System Information



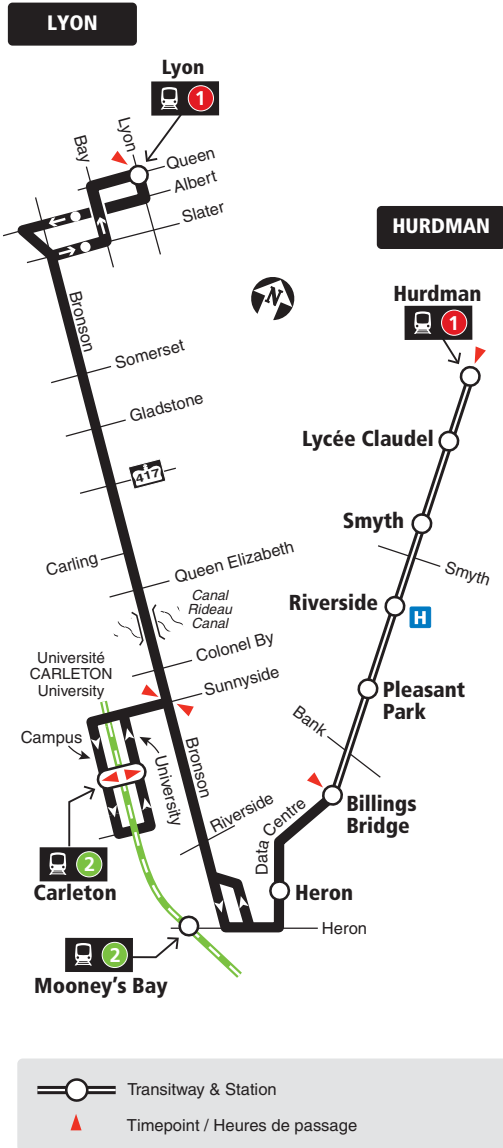
10

LYON
HURDMAN

Fréquent

7 days a week / 7 jours par semaine

All day service
Service toute la journée



2019.07



Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture
de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... 613-563-4011

Security / Sécurité..... 613-741-2478



INFO 613-741-4390
octranspo.com

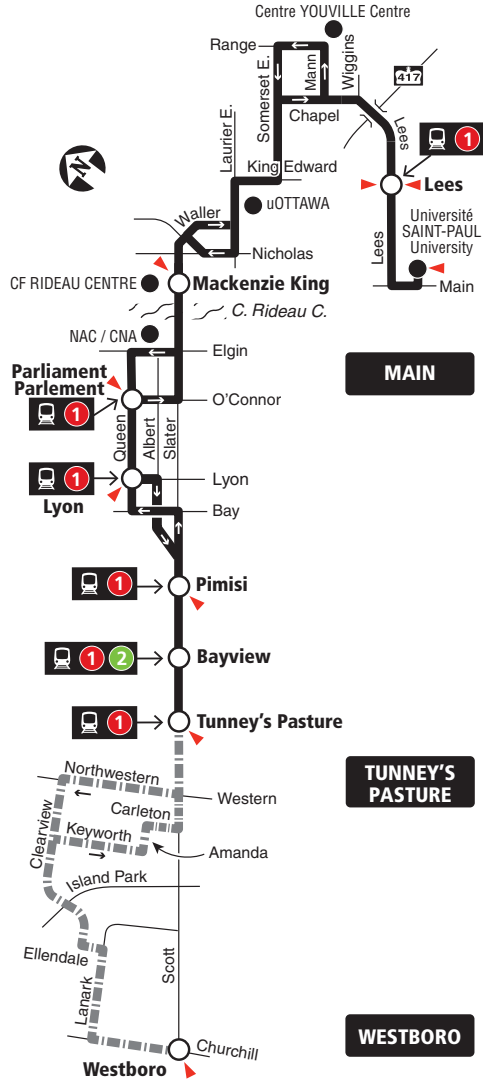


16

MAIN TUNNEY'S PASTURE WESTBORO

Local

7 days a week / 7 jours par semaine
All day service
Service toute la journée



- Station
- ▬▬▬▬ No Sunday service / Aucun service le dimanche
- ▲ Timepoint / Heures de passage

2019.07

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... 613-563-4011
 Security / Sécurité..... 613-741-2478

OC Transpo INFO 613-741-4390
 octranspo.com

APPENDIX D

Traffic Count Data

Turning Movement Count - Peak Hour Diagram

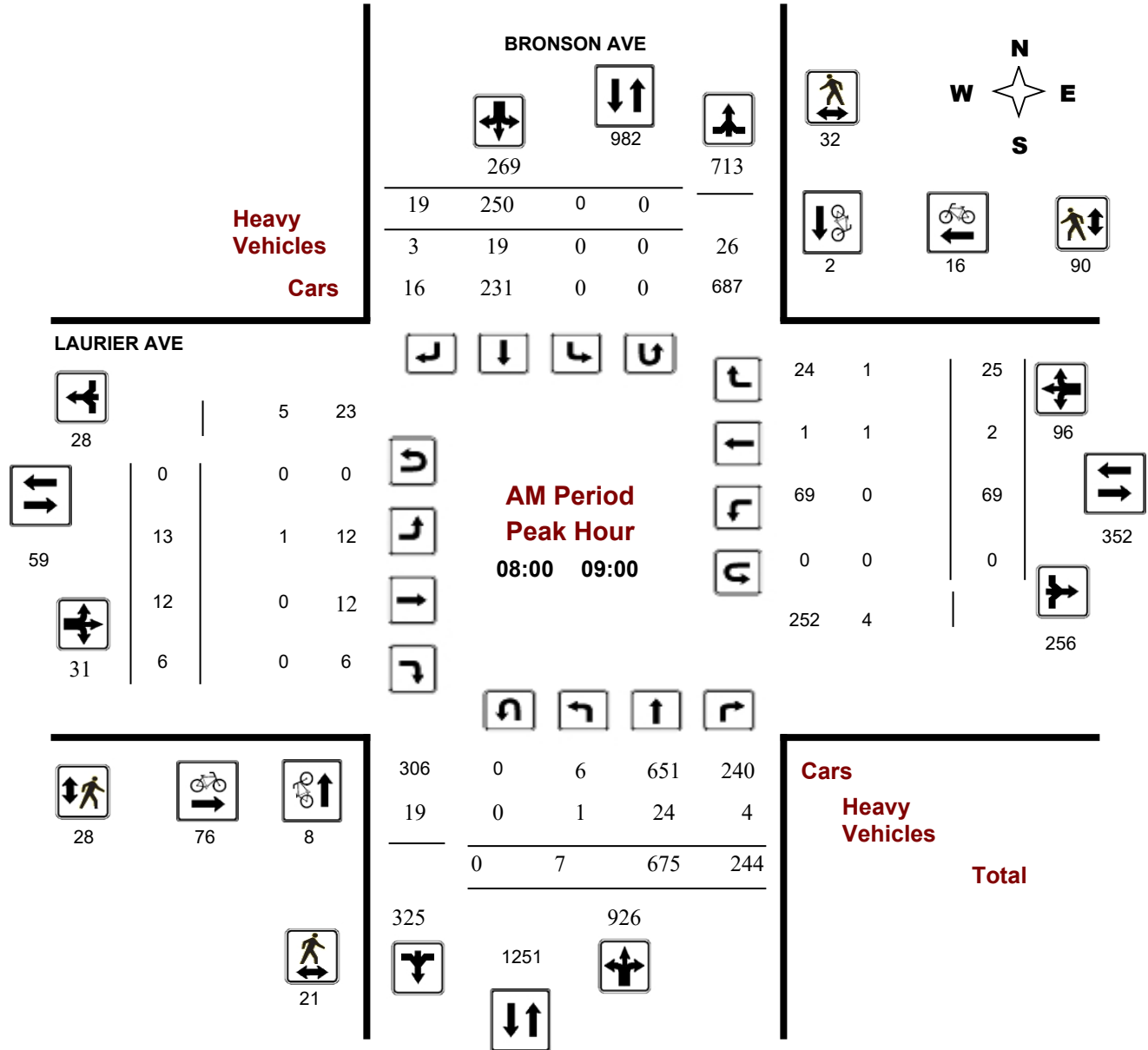
BRONSON AVE @ LAURIER AVE

Survey Date: Tuesday, August 29, 2017

Start Time: 07:00

WO No: 37217

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ LAURIER AVE

Survey Date: Tuesday, August 29, 2017

WO No: 37217

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, August 29, 2017

Total Observed U-Turns

AADT Factor

Northbound: 3 Southbound: 0
 Eastbound: 0 Westbound: 0

1.25

BRONSON AVE

LAURIER AVE

Period	BRONSON AVE Northbound					BRONSON AVE Southbound					LAURIER AVE Eastbound					LAURIER AVE Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	6	522	196	724	999	0	258	17	275	999	9	9	5	23	90	50	2	15	67	90	1089
08:00 09:00	7	675	244	926	1195	0	250	19	269	1195	13	12	6	31	127	69	2	25	96	127	1322
09:00 10:00	4	466	142	612	826	0	205	9	214	826	9	13	9	31	132	67	15	19	101	132	958
11:30 12:30	6	311	141	458	674	1	206	9	216	674	4	13	9	26	138	82	5	25	112	138	812
12:30 13:30	4	336	130	470	668	1	181	16	198	668	11	11	15	37	139	81	2	19	102	139	807
15:00 16:00	6	606	116	728	1068	0	332	8	340	1068	30	19	6	55	247	134	2	56	192	247	1315
16:00 17:00	6	551	145	702	1026	2	314	8	324	1026	17	18	11	46	266	159	1	60	220	266	1292
17:00 18:00	5	484	121	610	903	0	282	11	293	903	10	10	14	34	195	111	2	48	161	195	1098
Sub Total	44	3951	1235	5230	7359	4	2028	97	2129	7359	103	105	75	283	1334	753	31	267	1051	1334	8693
U Turns				3	3				0	3				0	0				0	0	3
Total	44	3951	1235	5233	7362	4	2028	97	2129	7362	103	105	75	283	1334	753	31	267	1051	1334	8696
EQ 12Hr	61	5492	1717	7274	10233	6	2819	135	2959	10233	143	146	104	393	1854	1047	43	371	1461	1854	12087
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr	55	4943	1545	6546	9210	5	2537	121	2663	9210	129	131	94	354	1669	942	39	334	1315	1669	10878
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														0.9							
AVG 24Hr	72	6475	2024	8576	12065	7	3324	159	3489	12065	169	172	123	464	2186	1234	51	438	1722	2186	14251
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.

APPENDIX E

Collision Records



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: BRONSON AVE @ LAURIER AVE

Traffic Control: Traffic signal

Total Collisions: 14

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-May-07, Thu,18:44	Clear	SMV other	Non-fatal injury	Dry	West	Turning right	Pick-up truck	Pedestrian	1
2015-Jun-30, Tue,10:04	Clear	Other	P.D. only	Dry	East	Reversing	Truck - open	Other motor vehicle	
					West	Stopped	Delivery van	Other motor vehicle	
2015-Jun-30, Tue,17:24	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Oct-19, Mon,13:59	Clear	SMV other	Non-fatal injury	Dry	East	Turning right	Pick-up truck	Pedestrian	1
2016-Jan-14, Thu,07:06	Snow	Angle	P.D. only	Loose snow	North	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Apr-06, Wed,14:50	Snow	Rear end	P.D. only	Slush	North	Unknown	Unknown	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jun-02, Thu,02:20	Clear	Turning movement	P.D. only	Dry	North	Turning right	Truck - tank	Other motor vehicle	

					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jun-28, Tue,15:54	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	
2016-Jul-15, Fri,19:03	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Oct-27, Thu,23:12	Snow	SMV other	Non-fatal injury	Wet	West	Turning left	Pick-up truck	Pedestrian	1
2017-Mar-06, Mon,18:41	Freezing Rain	SMV other	Non-fatal injury	Slush	South	Going ahead	Automobile, station wagon	Pedestrian	1
2017-Aug-19, Sat,14:11	Clear	Angle	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Cyclist	
					East	Going ahead	Bicycle	Other motor vehicle	
2018-Apr-25, Wed,08:50	Rain	Angle	Non-fatal injury	Wet	North	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	
2018-Oct-13, Sat,21:59	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	

APPENDIX F

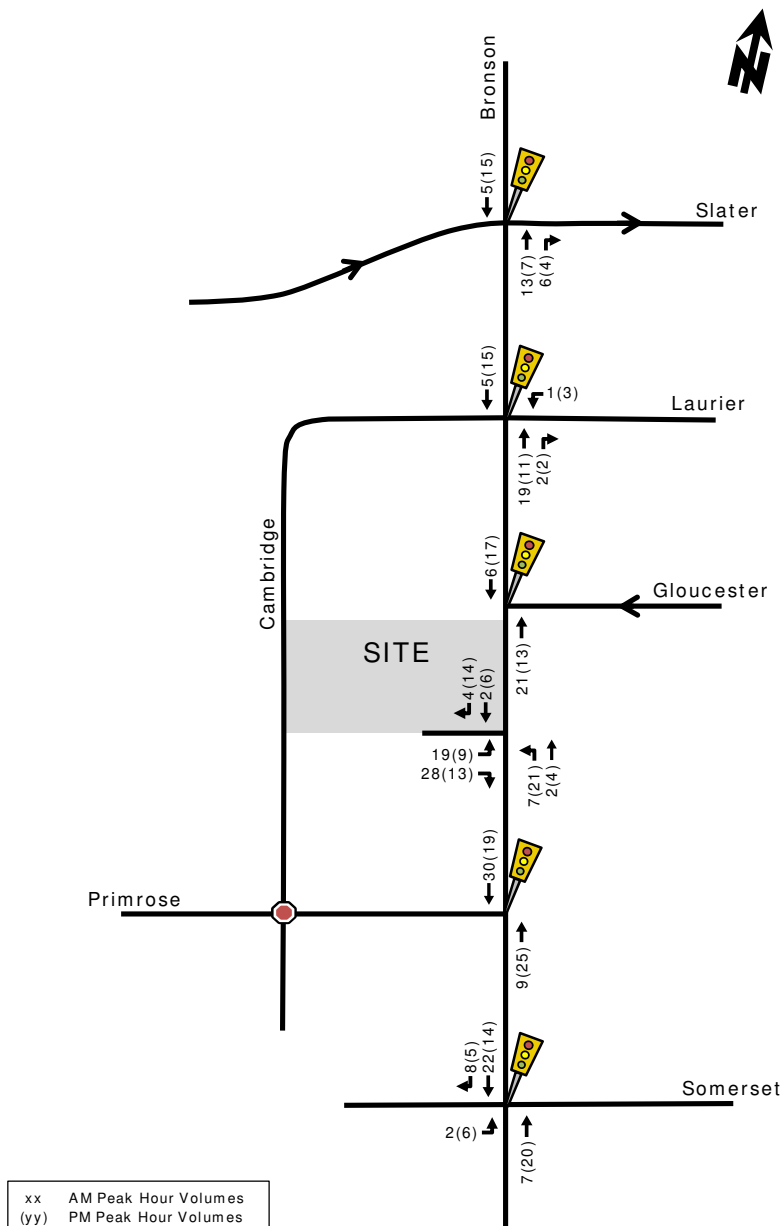
Relevant Excerpts from Other Transportation Studies

parking lot. Therefore the revised 'net' two-way vehicle increase in traffic is approximately 45 and 50 veh/h during the weekday morning and afternoon peak hours, respectively. This is approximately 5 to 10 veh/h less than the site-trip generation assessed in the original TB.

2.2 Revised Vehicle Traffic Distribution and Assignment

Traffic distribution and assignment was revised to reflect the proposed site access/egress to Bronson Street and the update site trip-generation. The revised site-generated 'new' and 'pass-by' trips are illustrated in Figure 1. As no retail parking is proposed for the subject site, the retail trips will not use the site driveway. This is reflected in Figure 1.

Figure 1: Revised 'New' and 'Pass-by' Site-Generated Traffic Volumes



APPENDIX G

TDM Checklists

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

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

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

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

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/> Not Applicable
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input type="checkbox"/>
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

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

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: <i>Residential developments</i>		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 <input type="checkbox"/>
1.2 Travel surveys		
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress <input checked="" type="checkbox"/> Surveys will be implemented in the form of emails to tenants every quarter.
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 (<i>multi-family, condominium</i>) <input checked="" type="checkbox"/> Maps and related information will be displayed in entrances and/or amenity areas.
2.2 Bicycle skills training		
BETTER		2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses <input type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/> Maps and related information will be displayed in entrances and/or amenity areas.
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	<input type="checkbox"/>
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	<input checked="" type="checkbox"/> Preloaded PRESTO cards with a month's worth of transit given with a yearly lease.
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
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 (<i>subdivision</i>)	<input type="checkbox"/>
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)	<input type="checkbox"/>
4. CARSHARING & BIKESHARING		
4.1 Bikeshare stations & memberships		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station (<i>multi-family</i>)	<input checked="" type="checkbox"/> Bike share options will be provided in the bike storage room.
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	<input type="checkbox"/>
4.2 Carshare vehicles & memberships		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
5. PARKING		
5.1 Priced parking		
BASIC ★	5.1.1 Unbundle parking cost from purchase price (<i>condominium</i>)	<input type="checkbox"/> Not applicable. No tenant parking provided.
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	<input type="checkbox"/> Not applicable. No tenant parking provided.

TDM measures: <i>Residential developments</i>		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	<input checked="" type="checkbox"/> Tenants will receive packaged information by way of email or pamphlet.
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

APPENDIX H

Synchro Analysis Reports

593 Laurier Avenue West
 3: Bronson Avenue & Laurier Avenue West

2026 Background Traffic
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	13	6	70	2	25	7	775	246	0	285	20
Future Volume (vph)	14	13	6	70	2	25	7	775	246	0	285	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.96			0.96			0.97			1.00	
Frt		0.975			0.965			0.964			0.990	
Flt Protected		0.979			0.965							
Satd. Flow (prot)	0	1628	0	0	1622	0	0	3110	0	0	3143	0
Flt Permitted		0.830			0.765			0.953				
Satd. Flow (perm)	0	1356	0	0	1258	0	0	2964	0	0	3143	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								95			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		80.7			128.1			75.5			88.8	
Travel Time (s)		5.8			9.2			5.4			6.4	
Confl. Peds. (#/hr)	32		21	21		32	28		90	90		28
Confl. Bikes (#/hr)			76			16			8			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	2%	2%	2%	2%	4%	14%	4%	2%	0%	8%	16%
Adj. Flow (vph)	14	13	6	70	2	25	7	775	246	0	285	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	33	0	0	97	0	0	1028	0	0	305	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2					
Detector Phase	4	4		8	8		2	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)	19.0	19.0		19.0	19.0		30.5	30.5			30.5	
Total Split (s)	21.0	21.0		21.0	21.0		39.0	39.0			39.0	
Total Split (%)	32.3%	32.3%		32.3%	32.3%		60.0%	60.0%			60.0%	
Maximum Green (s)	15.0	15.0		15.0	15.0		33.5	33.5			33.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.2	2.2			2.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			5.5			5.5	

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Number of Detectors		
Detector Template		
Leading Detector (m)		
Trailing Detector (m)		
Detector 1 Position(m)		
Detector 1 Size(m)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(m)		
Detector 2 Size(m)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	3.0	3.0
Total Split (s)	5.0	5.0
Total Split (%)	8%	8%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		

593 Laurier Avenue West
 3: Bronson Avenue & Laurier Avenue West

2026 Background Traffic
 AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lag	Lag		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0				3.0
Recall Mode	None	None		None	None		C-Max	C-Max				C-Max
Walk Time (s)	2.0	2.0		2.0	2.0		13.0	13.0				13.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		12.0	12.0				12.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0				0
Act Effct Green (s)		11.5			11.5			46.3				46.3
Actuated g/C Ratio		0.18			0.18			0.71				0.71
v/c Ratio		0.14			0.44			0.48				0.14
Control Delay		23.0			29.9			6.2				4.4
Queue Delay		0.0			0.0			0.0				0.0
Total Delay		23.0			29.9			6.2				4.4
LOS		C			C			A				A
Approach Delay		23.0			29.9			6.2				4.4
Approach LOS		C			C			A				A
Queue Length 50th (m)		3.5			10.8			24.1				5.6
Queue Length 95th (m)		9.3			21.6			46.1				11.9
Internal Link Dist (m)		56.7			104.1			51.5				64.8
Turn Bay Length (m)												
Base Capacity (vph)		312			290			2140				2245
Starvation Cap Reductn		0			0			0				0
Spillback Cap Reductn		0			0			0				0
Storage Cap Reductn		0			0			0				0
Reduced v/c Ratio		0.11			0.33			0.48				0.14

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	64 (98%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.48
Intersection Signal Delay:	7.8
Intersection Capacity Utilization:	57.9%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 3: Bronson Avenue & Laurier Avenue West

 Ø2 (R)	 Ø3	 Ø4
39 s	5 s	21 s
 Ø6 (R)	 Ø7	 Ø8
39 s	5 s	21 s

Lane Group	Ø3	Ø7
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
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		

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2026 Background Traffic
 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	25	5	137	1	58	2	677	133	0	415	11
Future Volume (vph)	22	25	5	137	1	58	2	677	133	0	415	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.98			0.94			0.98			1.00	
Frt		0.987			0.960			0.975			0.996	
Flt Protected		0.979			0.966							
Satd. Flow (prot)	0	1684	0	0	1606	0	0	3169	0	0	3366	0
Flt Permitted		0.844			0.759			0.954				
Satd. Flow (perm)	0	1426	0	0	1217	0	0	3023	0	0	3366	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								45				5
Link Speed (k/h)		48			48			48				48
Link Distance (m)		80.7			128.1			75.5				88.8
Travel Time (s)		6.1			9.6			5.7				6.7
Confl. Peds. (#/hr)	42		34	34		42	20		63	63		20
Confl. Bikes (#/hr)			8			30			4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	20%	2%	2%	2%	2%	5%	2%	0%	2%	10%
Adj. Flow (vph)	22	25	5	137	1	58	2	677	133	0	415	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	196	0	0	812	0	0	426	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2				2
Detector Template	Left	Thru		Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8				1.8
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex				Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA				NA
Protected Phases		4			8			2				6
Permitted Phases	4			8			2					
Detector Phase	4	4		8	8		2	2				6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	19.0	19.0		19.0	19.0		30.5	30.5				30.5
Total Split (s)	26.0	26.0		26.0	26.0		39.0	39.0				39.0
Total Split (%)	37.1%	37.1%		37.1%	37.1%		55.7%	55.7%				55.7%
Maximum Green (s)	20.0	20.0		20.0	20.0		33.5	33.5				33.5
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3				3.3
All-Red Time (s)	2.7	2.7		2.7	2.7		2.2	2.2				2.2
Lost Time Adjust (s)		0.0			0.0			0.0				0.0
Total Lost Time (s)		6.0			6.0			5.5				5.5

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Number of Detectors		
Detector Template		
Leading Detector (m)		
Trailing Detector (m)		
Detector 1 Position(m)		
Detector 1 Size(m)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(m)		
Detector 2 Size(m)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	3.0	3.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		

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 PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lag	Lag		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0				3.0
Recall Mode	None	None		None	None		C-Max	C-Max				C-Max
Walk Time (s)	2.0	2.0		2.0	2.0		13.0	13.0				13.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		12.0	12.0				12.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0				0
Act Effct Green (s)		16.4			16.4			42.1				42.1
Actuated g/C Ratio		0.23			0.23			0.60				0.60
v/c Ratio		0.16			0.69			0.44				0.21
Control Delay		20.2			36.4			8.9				7.5
Queue Delay		0.0			0.0			0.0				0.0
Total Delay		20.2			36.4			8.9				7.5
LOS		C			D			A				A
Approach Delay		20.2			36.4			8.9				7.5
Approach LOS		C			D			A				A
Queue Length 50th (m)		5.4			23.5			25.1				11.7
Queue Length 95th (m)		11.7			38.5			46.8				22.9
Internal Link Dist (m)		56.7			104.1			51.5				64.8
Turn Bay Length (m)												
Base Capacity (vph)		419			357			1836				2026
Starvation Cap Reductn		0			0			0				0
Spillback Cap Reductn		0			0			0				0
Storage Cap Reductn		0			0			0				0
Reduced v/c Ratio		0.12			0.55			0.44				0.21

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 64 (91%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.5
 Intersection LOS: B
 Intersection Capacity Utilization 55.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Bronson Avenue & Laurier Avenue West



Lane Group	Ø3	Ø7
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
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		