



75 Breezehill Avenue N

Transportation Impact Assessment (TIA) Report

FINAL

Aug 2025

75 Breezehill Avenue N

Transportation Impact Assessment (TIA) Report

prepared for:
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August 15, 2025

477888-01000



Certification Form for Transportation Impact Assessment (TIA) Study

TIA Reports

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 and 2023 amendments.

Please note that the Certification is only required for the submission of a TIA. The Screening can be undertaken by a non-certified individual for the purpose of identifying if a TIA is needed or not.

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 registered¹ 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.

Dated at Ottawa this 15th day of August, 20 25.
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Signature of individual certifier that they meet the above four criteria

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TRANSPORTATION IMPACT ASSESSMENT REPORT

Parsons has been retained by The Estate of Carson Unsworth to prepare a Transportation Impact Assessment (TIA) Report in support of a Zoning By-Law Amendment (ZBLA) and Official Plan Amendment (OPA) application for a residential development located at 75 Breezehill Avenue N. This document follows the TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents the final TIA Report.

1.0 SCREENING FORM

The Screening Form confirmed the need for a TIA Report based on the site meeting each of the trip generation and location triggers. The trip generation trigger is met due to the number of person trips anticipated to be generated by the development exceeding 60 person trips per hour. The location trigger is met due to the development being located within a Protected Major Transit Station Area (PMTSA) and Design Priority Area (DPA). Note that the safety trigger was not met. The Screening Form has been provided in **Appendix A**.

2.0 SCOPING REPORT

2.1. Existing and Planned Conditions

2.1.1. Proposed Development

The proposed development is located at the municipal address of 75 Breezehill Ave N, which is bordered by Breezehill Ave N to the west, Laurel St to the south and the Trillium Line to the east. The site is currently zoned as General Industrial IG1 H(11). **Figure 1** illustrates the local context of the proposed site, while **Figure 2** illustrates the existing land uses and accesses of the proposed site properties, which includes various commercial businesses.

The development will consist of a 31-storey and a 33-storey high-rise building with a total of 479 apartment units and 429 m² (4,618 ft²) of retail space. The site will continue to use the existing Laurel St access location in the future, while the existing Breezehill Ave N access will be removed. An underground parking garage ramp is proposed to be provided along the north end of the site driveway, with 124 vehicle parking spaces proposed in the garage and 678 bicycle parking spaces proposed on the ground floor and in the garage. **Figure 3** illustrates the latest site plan, which is expected to be constructed in a single phase with an assumed buildout date of 2026 (high quality plan provided in **Appendix A**).

2.1.2. Existing Conditions

Area Road Network

Description of roads included within the study area has been provided below.

Breezehill Ave N is a north-south municipal local roadway that extends from Somerset St W in the north to approximately 130m south of Gladstone Ave. The road consists of a two-lane cross-section with a 40km/h posted speed limit, on-street parking permitted on some sections on the east side, and an existing ROW of 20m.

Laurel St is an east-west municipal local roadway that extends from Loretta Ave N in the east to Irving Ave in the west. The road consists of a two-lane cross-section with a 40km/h posted speed limit, on-street parking permitted on both sides, and an existing ROW of 20m.

Loretta Ave N is a north-south municipal local roadway that extends from Laurel St in the north to approximately 130m south of Gladstone Ave. The road consists of a two-lane cross-section with a 40km/h posted speed limit, on-street parking permitted along some sections, and an existing ROW of 20m.

Gladstone Ave is an east-west municipal major collector roadway within the City of Ottawa, that extends from Parkdale Ave in the west to Cartier St in the east. The roadway consists of a two-lane cross-section, a posted speed limit of 40km/h, and an existing ROW of 20m west of Loretta Ave and 22m between Loretta Ave and 106m west of Preston St.

Somerset St W is an east-west municipal arterial roadway within the City of Ottawa, which extends from Queen Elizabeth Dr in the east to Garland St in the west, where it continues as Wellington St W. Within the study area, the roadway consists of a two-lane cross-section with an assumed speed limit of 50km/h and a protected ROW of 20m.

Figure 1: Local Context



Figure 2: Existing Land Uses and Accesses on Site



Figure 3: Site Plan (April 2025)



Existing Study Area Intersections

Somerset/Breezehill

The Somerset/Breezehill intersection is an unsignalized three-legged intersection with stop control on the south leg only. The south approach (Breezehill) consists of a shared left/right-turn lane. The west approach (Somerset) consists of a shared through/right-turn lane. The east approach (Somerset) consists of a shared through/left-turn lane. There are no restricted movements at this intersection. An east-west pedestrian crossing is provided on the south leg and bike lanes begin/end on Somerset Ave east leg.



Breezehill/Laurel

The Breezehill/Laurel intersection is an unsignalized four-legged intersection, with stop control on all legs of the intersection. All intersection approaches consist of an all-movement lane. Trucks are not permitted to enter the south leg of the intersection. Pedestrian crossings are provided on all legs of the intersection.

Note that a temporary access permit was issued in 2022 by the City of Ottawa ROW group to allow trucks to access the Canadian Bank Note Company via Breezehill Avenue during the Laurel Street and Loretta Avenue N Renewal project.



Gladstone/Breezehill

The Gladstone/Breezehill intersection is an unsignalized four-legged intersection, with stop control on the north and south legs of the intersection. All approaches of the intersection consist of an all-movement lane. Trucks are not permitted to enter the north leg of the intersection. East-west pedestrian crossings are provided on the north and south legs of the intersections.

Note that a temporary access permit was issued in 2022 by the City of Ottawa ROW group to allow trucks to access the Canadian Bank Note Company via Breezehill Avenue during the Laurel Street and Loretta Avenue N Renewal project.



Gladstone/Loretta

The Gladstone/Loretta intersection is an unsignalized four-legged intersection, with stop control on the north and south legs of the intersection. All approaches of the intersection consist of an all-movement lane. There are no restricted movements at this intersection. East-west pedestrian crossings are provided on the north and south legs of the intersections.



Existing Driveways to Adjacent Developments

Figure 4 illustrates nonresidential adjacent accesses (red lines) within 200m of the proposed future site access (blue circle) along Laurel St. It should be noted that accesses to several individual residential unit driveways are located on both sides of Laurel St (west of Breezehill Ave N only). As shown in **Figure 4**, driveway accesses on Laurel St and Loretta Ave not specific to individual residential units include the following:

Laurel St

- A north-south one-lane driveway that stretches from Somerset St W to Gladstone Ave is located midblock between Bayswater Ave and Breezehill Ave N. This driveway provides front and rear access to residential units, apartment buildings and commercial units.

Loretta Ave

- 6 east-west driveways that provide access to commercial buildings, 2 of which are on the west side of Loretta Ave and 4 on the east side.

Figure 4: Adjacent Driveways within 200m of Site Access



Existing Area Traffic Management Measures

Existing area traffic management measures within the study area include:

- Speed humps on Breezehill Ave N, Loretta Ave N, and Laurel St
- On-street parking on the local roads;
- Limited access for heavy vehicles on local roads;
- Curb extensions at intersection corners on Breezehill Ave N at both Gladstone Ave and Somerset St W; and,
- Traffic calming signs on Breezehill Ave N.

Pedestrian/Cycling Network

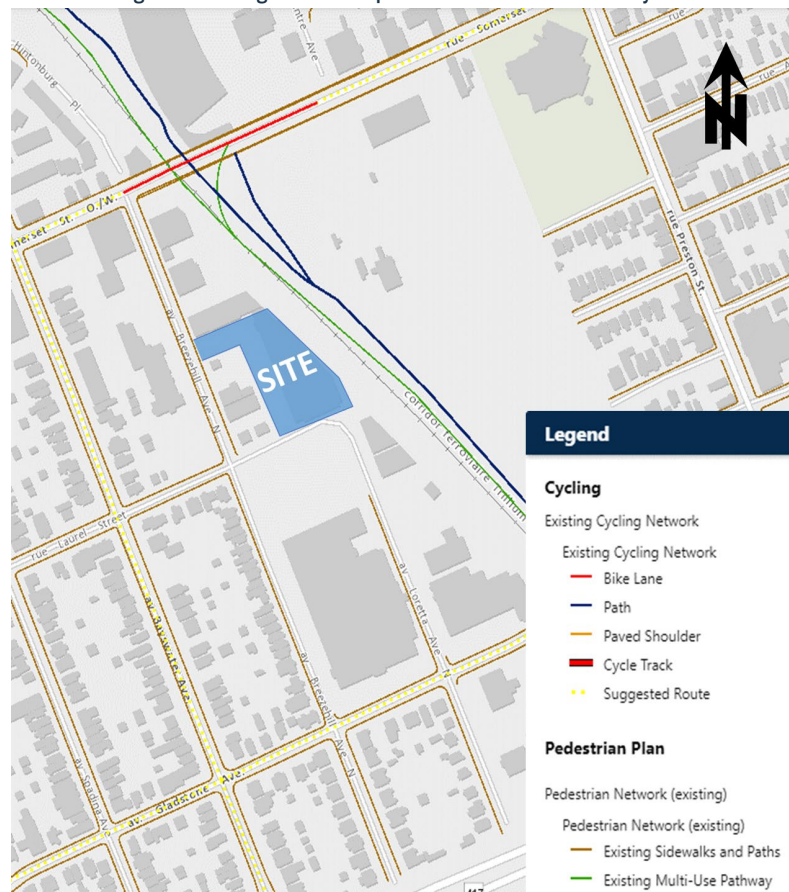
Figure 5 illustrates active transportation facilities within the study area. Sidewalks are provided on both sides of Gladstone Ave and Somerset St W within the study area. Along Breezehill Ave N, sidewalks are provided on both sides north of Laurel St and south of Gladstone Ave, and on the west side between Laurel St and Gladstone Ave. The Laurel St and Loretta Ave N renewal project was recently completed, providing new 2m concrete sidewalks along Loretta Ave N and Laurel St west of Gladstone Ave.

The Trillium Line Multi-Use Pathway (Trillium Pathway) is located east of the development site following the LRT Trillium Line on the east side. Within the study area, the Trillium Line MUP can be accessed along both Somerset St W and Gladstone Ave.

The Trillium Pathway was completed in three phases between 2012 and 2018 and is considered a key component of city's active transportation network. The Trillium Pathway was constructed from the Ottawa River Pathway MUP in the north to Prince of Wales Dr in the south, however, due to the current construction of The Ottawa Hospital (TOH) parking garage, the segment between Carling Ave and Prince of Wales Dr has been rerouted to Preston St for the duration of construction. It is estimated the Trillium Pathway serves over 1500 people per day and accommodates both pedestrians and cyclists.

Bike lanes are provided along a short 200m segment on Somerset St W east of Breezehill Ave N, with bike Sharrows pavement markings on the lanes west of Breezehill Ave N. Bayswater Ave, Gladstone Ave and Somerset St W are also suggested cycling routes. Based on the City of Ottawa Transportation Master Plan (TMP Part 1 2023), the Trillium Pathway is classified as a Cross-Town Bikeway.

Figure 5: Existing Active Transportation Facilities within Study Area



Transit Network

The existing transit network surrounding the proposed development site is illustrated in

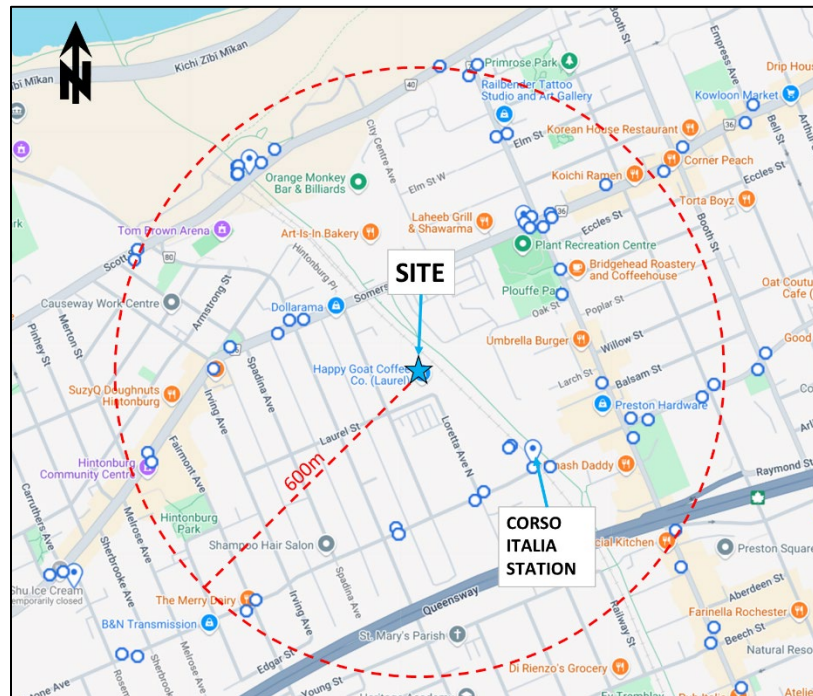
Figure 6, which has come into effect on April 27, 2025 (OC Transpo 'New Ways to Bus'). The nearest bus stops to the site are along Somerset St W and Gladstone Ave (as shown in **Figure 7**). The O-Train Trillium Line (began operating recently) operates north-south, directly east of the development site. Bus Route #14, designated a "frequent route" operates along Gladstone Ave, with the nearest bus stop at Gladstone/Loretta. Bus Route #11, designated a "frequent route", operates along Somerset St W, with the nearest bus stop at Somerset/Bayswater. Transit route maps are provided in **Appendix B**.

Under existing conditions, the Corso Italia LRT station is accessible by walking 400m via Laurel St, Loretta Ave, and Gladstone Ave. However, as part of the West Downtown Core Secondary Plan (discussed in **Section 2.1.3.1**), a proposed north-south MUP along the west side of the rail corridor will provide direct access to the new station. Once the MUP is built, the station will be within approximately 330m walking distance away from the proposed development.

Figure 6: Area Transit Network



Figure 7: Adjacent Transit Stops



Peak Hour Travel Demands

The existing peak hour traffic and pedestrian volumes at the intersections within the study area were obtained from both the City of Ottawa and separately for the following intersections:

- Somerset/Breezehill – Conducted by Parsons on Thursday, June 22, 2023
- Gladstone/Breezehill – Conducted by City of Ottawa on Wednesday, July 18, 2018
- Breezehill/Laurel and Gladstone/Loretta – both were conducted on Tuesday, April 23, 2019

The traffic volumes at study area intersections are illustrated in **Figure 8**, with pedestrian and cyclist volumes illustrated in **Figure 9**. Raw traffic count data is provided in **Appendix C**. Traffic volume differences of 50 vehicles or more between intersections were balanced to the higher volume. Therefore, the westbound through movement at the intersection of Gladstone/Breezehill was increased by approximately 100 vehicles in the afternoon peak hour to balance with the westbound egress volumes at the intersection of Gladstone/Loretta. No other adjustments were made to the traffic volumes provided. Notably, the pedestrian and cyclist volumes recorded at the study area intersections are fairly high during the peak hours, which is expected given the available active transport and transit connectivity in the area.

Figure 8: Existing Peak Hour Traffic Volumes

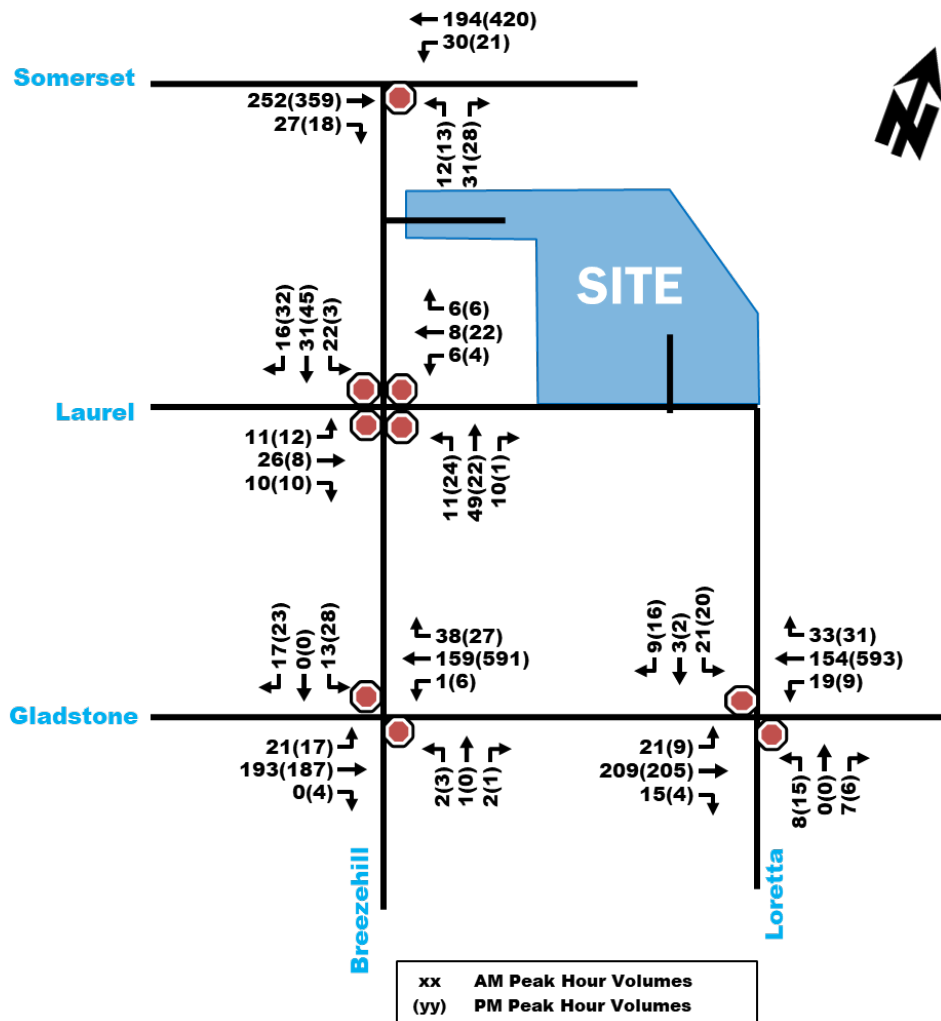
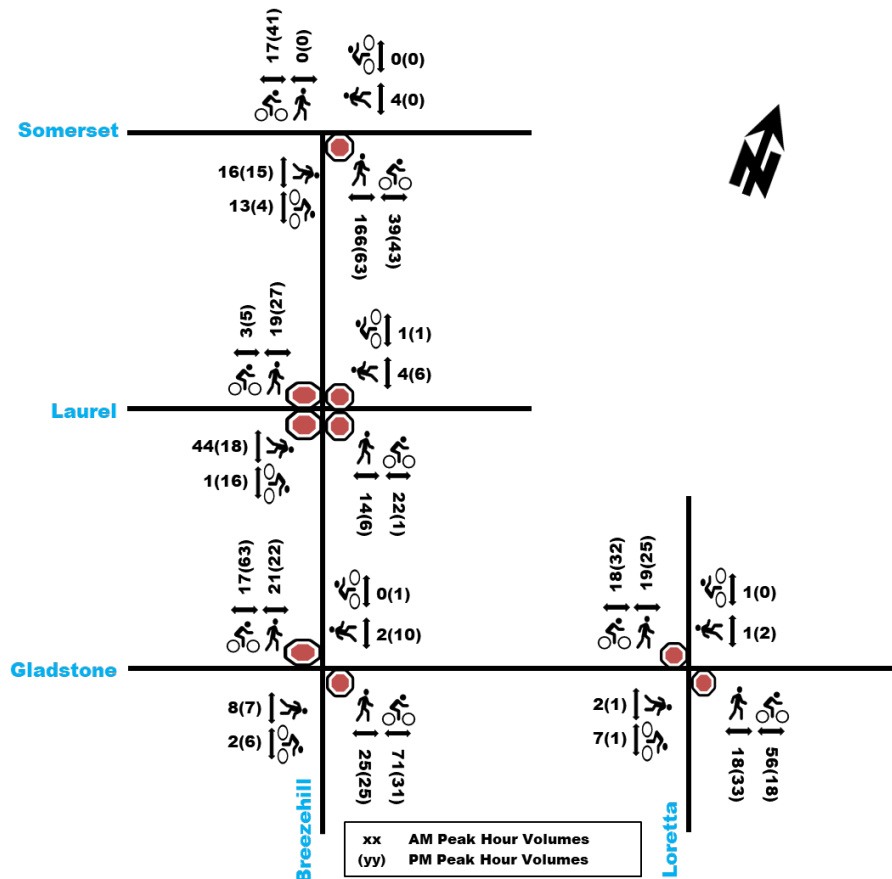


Figure 9: Existing Peak Hour Pedestrian and Cyclist Volumes



Existing Road Safety Conditions

A five-year collision history data (2015-2019, inclusive) was requested and obtained from the City of Ottawa for all intersections and road segments within the study area. Upon reviewing the collision data, the total number of collisions occurring within the study area was determined to be 9 collisions within the five-year period. Of the reported collisions, 5 resulted in property damage only and 4 resulted in non-fatal injury.

The types of impact were broken down into the following: 3 angled, 4 single motor vehicles, and 3 turning movements. None of the noted collisions involved bicycles, but one collision involved a pedestrian and resulted in a non-fatal injury. The pedestrian collision occurred at the north crosswalk of the Gladstone/Loretta intersection with an eastbound left-turning vehicle.

At study area intersections, three collisions occurred at Breezehill/Gladstone, one collision at Breezehill/Somerset, and two collisions at Gladstone/Loretta. At midblock sections of the study area, three collisions have occurred, all involving a single motor vehicle with an unattended/parked vehicle.

Using the City of Ottawa's Open Ottawa website, 2020 collision data identified one additional collision, which occurred midblock on Gladstone Ave, between Loretta Ave N and Breezehill Ave N. These collisions resulted in property damage only with an impact type labeled "other".

Based on the collision data, there are no identifiable safety concerns at intersections and road segments within the study area. The source collision data provided by the City of Ottawa is attached in **Appendix D**.

2.1.3. Planned Conditions

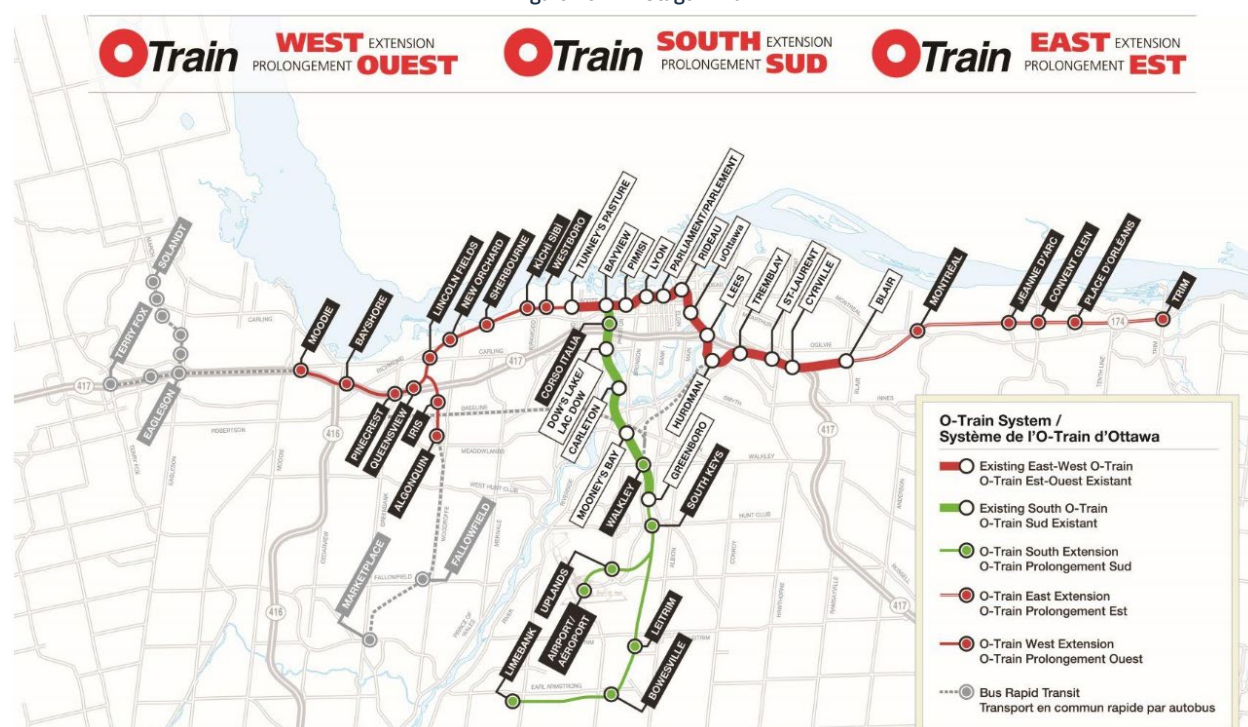
2.1.3.1. Future Transportation Network Changes

LRT Stage 2

Stage 2 of the City of Ottawa LRT system is currently under construction. Stage 2, as shown in **Figure 10**, is a combination of three extensions – south, east, and west – totaling 44 km of new rail and 24 new LRT stations. As mentioned previously, the Trillium Line is directly east of the proposed development site and has begun operating recently, which includes 8 new stations with the extension of the Trillium Line south to Limebank Rd.

As part of the Trillium Line changes, the new future Corso Italia Station is located north of Gladstone Ave within an approximately 300m radius from the proposed development. The construction of the new station will also have connectivity enhancements such as a new pedestrian and cyclist crosswalk/crossride at the MUP location along Gladstone Ave, approximately 165m west of Preston St.

Figure 10: LRT Stage 2 Plan



West Downtown Core Secondary Plan

The purpose of the Secondary Plan is to provide a “detailed area-based policy direction to guide both public and private development and investments over the next 25 years.” The potential land uses within the Corso Italia Station District, as provided in the Secondary Plan, are illustrated below in **Figure 11**.

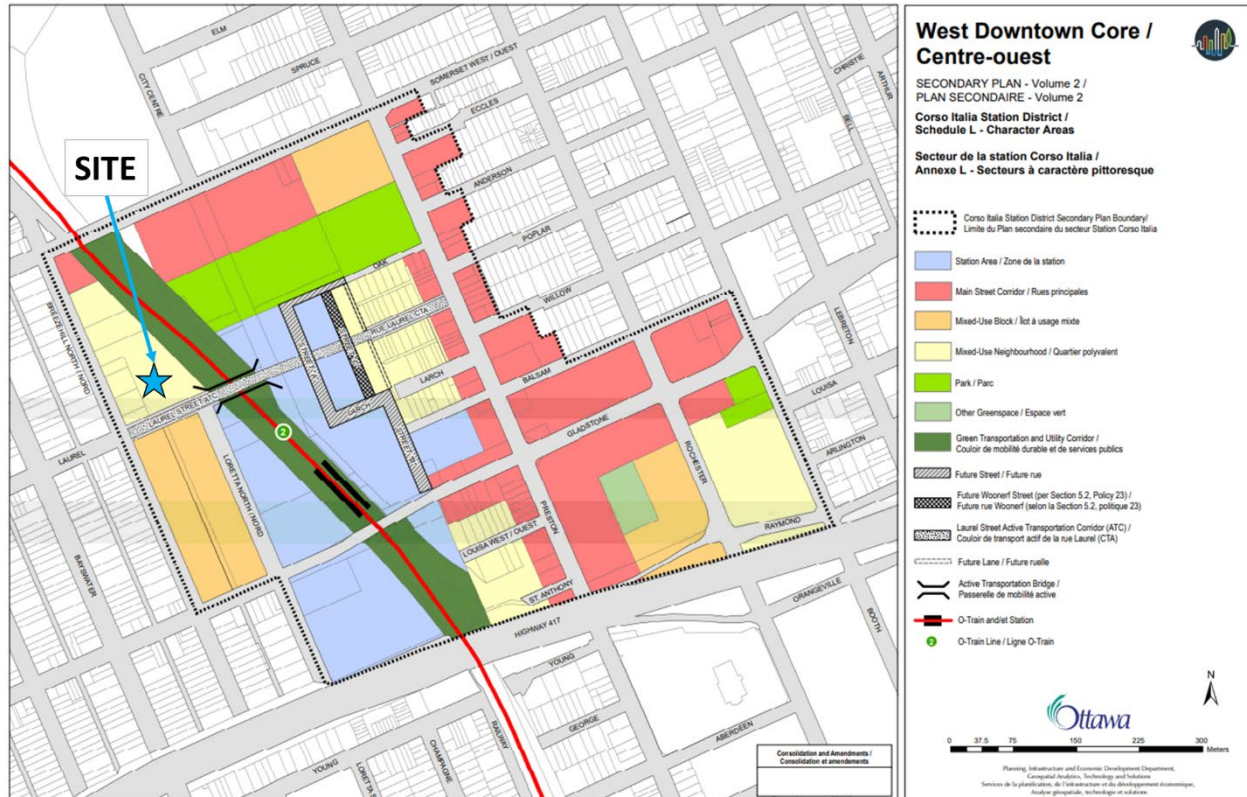
The following are some of the major considerations provided in Chapter 3: Corso Italia District of the Secondary Plan with regards to transportation, that may have an impact on the proposed 75 Breezehill Ave N development:

- A modal share target for transit, walking, and cycling to be a minimum of 85%.
- A new Laurel St Active Transportation Corridor (ATC) will connect from the dead-ends of Laurel St on the west and east sides of the Trillium Line and connect to a proposed future north-south MUP that will run parallel on the west side of the rail corridor.

All development in the Breezehill Ave N area shall support active transportation along Breezehill Ave N and Laurel St and shall provide their portion of the future MUP. As of today, there is no expected date of completion for the Laurel AT bridge and the completion date of the future MUP depends on the build-out date of the redevelopment sites along the western side of the rail corridor. The City of Ottawa TMP Part 1 (2023) indicates a feasibility study will be carried out for the purpose of assessing the proposed bridge.

- Bicycle parking is to be provided at a minimum rate of 1.0 bike parking space per residential unit.

Figure 11: Corso Italia Station District Character Areas (City of Ottawa)



1040 Somerset St W New Traffic Signal

As part of the on-going 1040 Somerset St W development, an RMA was approved for the signalization of the Breezehill Avenue N / Somerset Street W intersection. The new signal design will include pedestrian crossings on all legs, a new westbound left-turn lane, and a shortening of the westbound terminus bike lanes approximately 30m to the east.

Breezehill Ave N Renewal

Breezehill Ave N is expected to undergo renewal to replace its aging sanitary sewers and watermain between Somerset St W and Gladstone Ave. As part of the project, full road reconstruction is expected to be implemented, which will include physical design changes that promote traffic calming as part of the City's 30km/h policy. The major aspects of the design are as follows:

- 2m wide sidewalks on both sides of Breezehill Ave from Somerset St W to Laurel St and on the west side of Breezehill Ave from Laurel St to Gladstone Ave. Sidewalk on the east side of Breezehill Ave will be 1.8m from Laurel St to Gladstone Ave.
- Road narrowing to 8.5m down the entirety of Breezehill Ave between Somerset St W and Gladstone Ave except for any location with a curb extension.

- Two 1.5m wide mid-block curb extensions located between Somerset St W and Laurel St, each narrowing the road to 7m. One will be located on the east side at 53 Breezehill Ave between the property access and north property line. The other will be located 57m north of Laurel St on the west side.
- Two locations with 1.25m wide opposing mid-block curb extensions on both sides of Breezehill Ave that will narrow the road width to 6m. They will be located in front of 134 & 158 Breezehill Ave.
- Four new speed humps will be added along Breezehill Ave and will be at the following locations: in front of 134 Breezehill, 150 Breezehill Ave, 40m north of Laurel St, and 97m north of Laurel St. The existing speed hump approximately located 70m south of Somerset St W shall be maintained while the other existing speed hump approximately located 70m north of Laurel St will be removed.

Construction is expected to begin May 2025 and be completed by late fall 2025.

2.1.3.2. Other Study Area Developments

The following section outlines adjacent future developments in the study area to be considered in the TIA. The criteria for inclusion of other area developments are the proximity to the proposed development site and the potential impact to study area intersections. Developments that are either approved or have an active planning application in the City are included below and illustrated as part of the map in **Figure 12**.

1) 951 Gladstone Ave and 145 Loretta Ave N

A mixed-use development proposed by Commvesco Levinson Viner (CLV), which will consist of 849 residential units, 193,015 sq.ft. of office space and 17,611 sq.ft. of retail space. The development will be fully constructed by 2026. During the morning peak hour, the development is anticipated to generate approximately 136 vehicle trips and 645 person trips. During the afternoon peak hour, the development is anticipated to generate approximately 149 vehicle trips and 678 person trips.

3) 1010 Somerset St W

The City of Ottawa and Ottawa Community Housing is proposing a new community hub on 19 acres of land that will include facilities such as an elementary school, childcare facility, affordable housing, limited mixed-use private developments etc. The development is currently in the concept planning phase and is expected to be constructed in the long-term future. Due to there being no active development application and in the preliminary stages of planning, this development will not be considered in the analysis phase.

2) 1040 Somerset St W

Claridge Homes is proposing a 30-storey mixed-use building that will provide 268 units and 141m² of commercial retail space. The development will be fully constructed by the year 2025. Based on the TIA (prepared by Novatech), the proposed development is expected to generate a total of 24 and 26 vehicle trips for the morning and afternoon peak hours.

3) 1050 Somerset St W

Claridge Homes is proposing a 28-storey mixed-use building that will provide 271 condo units and 567 m² of commercial space. The traffic analysis report provided on the Development Applications search tool appears to be outdated, having been prepared in 2012, and inconsistent with the proposed site statistics. As such, it is assumed that the application is on hold and this development will not be included in the future background volumes provided in this report.

4) Gladstone Village, 933 Gladstone Ave

The Ottawa Community Housing Corporation is proposing a large-scale development in the vacant lands directly east of the Trillium Line. Phase 1 is anticipated to be constructed in 2024, which will include 338 apartment unit in mid to high-rise buildings, along with first floor commercial space. Phase 1 is expected to generate approximately 21 new vehicle trips and 141 total person trips during peak hours. Full development buildout was

assumed to be by 2031, where the development will generate up to 118 vehicle trips and 953 person trips during peak hours.

5) 975 Gladstone Ave

The Canada Bank Note building at 975 Gladstone Ave is proposing a 347 m² warehouse addition near Laurel St to the existing building, along with a 177 m² secured loading bay. This expansion is not expected to result in any significant increase in traffic volumes.

Figure 12: Other Area Developments



2.2. Study Area and Time Periods

Full buildout of the proposed residential development is assumed to be 2026. As such, the horizon years being analyzed in this report are 2026 and 2031 (five years after full buildout) horizon years, using the weekday morning and afternoon peak hour time periods.

Proposed study area intersections and boundary roads are outlined below and highlighted in **Figure 13**.

- Somerset/Breezehill (unsignalized)
- Gladstone/Breezehill (unsignalized)
- Gladstone/Loretta (unsignalized)
- Breezehill/Laurel (unsignalized)
- Breezehill Ave N, between Laurel St and Somerset St
- Laurel St, between Breezehill Ave N and Loretta Ave N

Figure 13: Study Area Intersections



2.3. Exemption Review

The modules/elements in **Table 1** are recommended to be exempt from the TIA Report based on the City's TIA guidelines.

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 – 4.4 Design Review Component	All elements except for 4.2.1	Not required for applications involving ZBLA. However, a brief description may be provided.
4.8 Network Concept	4.8 Network Concept	Only required if proposed development is anticipated to generate more than 200 person-trips over the permitted zoning

3.0 FORECASTING REPORT

3.1. Development Generated Travel Demand

3.1.1. Trip Generation and Mode Shares

To properly consider the impact of the proposed developments site-generated trips on the adjacent road network, the existing trips generated by the currently occupied land-uses have been considered for the purpose of estimating the net number of 'new' future trips on the adjacent road network. As such, existing trips will be calculated and deducted from future site-generated trips, as shown in the following sections.

Existing Site Trip Generation

The site is currently occupied by a two-storey building with a total building footprint of approximately 32,690 ft² and comprises of several commercial units including an HVAC contractor, sign shop, self-storage facility, U-Haul truck rental desk, and a coffee shop. The trips generated by the existing site were estimated using the

appropriate vehicle trips rates identified in the ITE Trip Generation Manual, 10th Edition and summarized below in **Table 2**.

ITE's "Specialty Trade Contractor" land use trip rates were assumed to be appropriate for the existing HVAC contractor and sign shop, while the "Mini-Warehouse" land use trip rates were assumed to be appropriate for the self-storage facility. Note the proposed ITE trip rates for coffee shops were deemed excessive considering the size, context and location of the existing coffee shop. Much of the ITE survey data that informs the trip rates are based on surveys conducted within suburban areas and during decades where high auto-driver mode shares are expected. For the purpose of this report, ITE's the "High Turnover (Sit-Down) Restaurants" trip rate was thought to result in a more realistic number of trips for the existing coffee shop and has therefore been used for the purpose of this analysis.

Table 2: Existing Commercial Trip Generation Rates

Land Use	Data Source	Vehicle Trip Rates	
		AM Peak Hour	PM Peak Hour
Mini-Warehouse	ITE 180	$T = 0.09(x);$	$T = 0.15(x);$
Specialty Trade Contractor	ITE 151	$T = 1.66(x);$	$T = 1.93(x);$
High Turnover (Sit-Down) Restaurant	ITE 932	$T = 9.57(x);$	$T = 9.05(x);$
Notes: T = Average Vehicle Trip Ends x = 1,000 ft ² GFA			

Total person trips were then calculated by multiplying the vehicle trip rates in **Table 2** by the person trip factor of 1.28, resulting in the number of peak hour person trips generated by each use shown below in **Table 3**.

Table 3: Existing Commercial Peak Hour Person Trip Generation

Land Use	GFA (ft ²)	AM Peak Hour Person Trips	PM Peak Hour Person Trips
Mini-Warehouse	20,398	2	4
Specialty Trade Contractor	6,910	15	17
High Turnover (Sit-Down) Restaurant	5,382	66	62
Total	32,690	83	83

Once the total number of person trips have been determined, a breakdown for different travel modes can be calculated using the appropriate mode share percentages obtained from the TRANS 2020 Trip Generation Manual for commercial developments in the "Ottawa West" district as provided below in **Table 4**.

Table 4: Existing Commercial Mode Share Percentages

Travel Mode	TRANS 2020	
	AM Mode Share	PM Mode Share
Auto Driver	55%	51%
Auto Passenger	11%	16%
Transit	11%	10%
Cycling	0%	5%
Walking	23%	18%
Total Person Trips	100%	100%

The mode share percentages in Table 4 are then adjusted to better reflect the site context with respect to each land use as shown in Table 5.

Table 5: Proposed Adjusted Existing Commercial Mode Share Percentages

Travel Mode	Self-Storage Facility & HVAC Contractor	Coffee Shop
	Mode Share	Mode Share
Auto Driver	85%	40%
Auto Passenger	10%	15%
Transit	5%	10%
Cycling	0%	10%
Walking	0%	25%
Total Person Trips	100%	100%

The mode shares are then applied to their respective number of person trips and are summarized below in **Table 6**, **Table 7**, and **Table 8**.

Table 6: Self-Storage Facility Trip Generation by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	85%	1	1	2	1	2	3
Auto Passenger	10%	0	0	0	0	1	1
Transit	5%	0	0	0	0	0	0
Cycling	0%	0	0	0	0	0	0
Walking	0%	0	0	0	0	0	0
Total Person Trips	100%	1	1	2	1	3	4

Table 7: HVAC Contractor Trip Generation by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	85%	10	4	14	10	5	15
Auto Passenger	10%	1	0	1	1	1	2
Transit	5%	0	0	0	0	0	0
Cycling	0%	0	0	0	0	0	0
Walking	0%	0	0	0	0	0	0
Total Person Trips	100%	11	4	15	11	6	17

Table 8: Coffee Shop Trip Generation by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	40%	15	12	27	15	10	25
Auto Passenger	15%	6	5	11	6	4	10
Transit	10%	3	3	6	3	2	5
Cycling	10%	3	3	6	3	2	5
Walking	25%	9	7	16	10	7	17
Total Person Trips	100%	36	30	66	37	25	62

The person trips generated by mode for each land use are summed to determine the total existing commercial person trips, summarized below in **Table 9**.

Table 9: Total Existing Commercial Trip Generation by Mode

Travel Mode	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	26	17	43	26	17	43
Auto Passenger	7	5	12	7	6	13
Transit	3	3	6	3	2	5
Cycling	3	3	6	3	2	5
Walking	9	7	16	10	7	17
Total Person Trips	48	35	83	49	34	83

As shown in **Table 9**, there are up to 43 vehicle trips, 6 transit trips, and 22 non-motorized trips assumed to be generated by the existing development.

Future Site Trip Generation

The proposed development will consist of 479 residential units and approximately 4,618 ft² of ground floor commercial space, housed within two apartment buildings that are 27 and 29-storeys high. The following future site trip generation analysis for the residential and the commercial uses are conducted separately.

Residential

The appropriate trip generation rates for a high-rise apartment land use were obtained from the 2020 TRANS Trip Generation Manual. Table 3 in the Manual provides person-trip rates during the peak morning and afternoon periods (7am-9:30am and 3:30PM-6PM) and are summarized in **Table 10** below.

Table 10: Residential Trip Generation Trip Rates

Land Use	Data Source	Trip Rates	
		AM Peak Period (7-9:30am)	PM Peak Period (3:30-6pm)
High-Rise Apartments	TRANS 2020	T = 0.8(du);	T = 0.9(du);
Notes: T = Average Vehicle Trip Ends du = Dwelling unit			

Using the trip rates provided in **Table 10**, the total number of person trips generated during the morning and afternoon peak periods can be found in **Table 11**.

Table 11: Residential Units Peak Period Person Trip Generation

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
High-Rise Apartments	479	383	431

The proposed development is anticipated to generate 383 and 431 person trips during the morning and afternoon peak periods, respectively. The total peak period person trips in **Table 11** are then divided into the different travel modes, as shown in **Table 12**, using mode share percentages obtained from the 2020 TRANS Manual for the “Ottawa West” district.

Table 12: Peak Period Trips Mode Shares Breakdown

Travel Mode	Mode Share	AM Peak Period Person Trip	Mode Share	PM Peak Period Person Trips
Auto Driver	29%	109	33%	142
Auto Passenger	11%	44	11%	49
Transit	41%	158	26%	111
Cycling	3%	13	7%	29
Walking	16%	60	23%	100
Total Person Trips	100%	383	100%	431

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario. In the 2020 TRANS Manual, Table 4 provides conversions rates from peak period to peak hours for different mode shares. The conversion rates for both AM and PM are provided in **Table 13** below.

Table 13: Peak Period to Peak Hour Conversion Factors (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver & Auto Passenger	0.48	0.44
Transit	0.55	0.47
Cycling	0.58	0.48
Walking	0.58	0.52

Using the conversion rates in **Table 13** and the peak period person trips for different travel modes in **Table 12**, the peak hour trips for different travel modes can be calculated as shown in **Table 14**.

Table 14: Peak Hour Trips, with Actual Mode Share Percentages

Travel Mode	AM Peak Hour Trips	PM Peak Hour Trips
Auto Driver	52	62
Auto Passenger	21	22
Transit	87	52
Cycling	7	14
Walking	35	52
Total Person Trips	202	202

As shown in **Table 14**, the proposed development is anticipated to generate a total of approximately 202 person trips during both the morning and afternoon peak hours. Vehicle trips are anticipated to be approximately 52 and 62 veh/h during the morning and afternoon peak hours, respectively. Active transportation mode shares (cycling and walking) generate 42 and 66 trips per hour while the transit mode share is expected to generate 87 and 52 trips.

However, considering that the development is located within a 400m walking distance of the Corso Italia LRT station (based on existing facilities) and a 330m walking distance once the new western MUP is constructed, the transit mode share is expected to be significantly higher. As such the TRANS mode share assumptions were adjusted to reflect the opportune location of the site with respect to LRT and the Trillium Pathway more appropriately, as shown in **Table 15**. As anticipated by the West Downtown Core Secondary Plan, an 85% non-auto driver mode share has been assumed, where the same mode share percentages were assume to occur in the morning and afternoon peak hours.

Table 15: Adjusted Mode Share Percentages and Peak Hour Trips

Travel Mode	Mode Share	AM Peak Hour Trips	PM Peak Hour Trips
Auto Driver	15%	30	30
Auto Passenger	5%	10	10
Transit	50%	102	102
Cycling	5%	10	10
Walking	25%	50	50
Total Person Trips	100%	202	202

Inbound and outbound percentages were obtained from Table 9 of the 2020 TRANS Manual and applied to each travel mode in **Table 15** as shown in **Table 16**.

Table 16: Residential Inbound/Outbound Person Trips by Mode

Travel Mode	Mode Shares	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (31%)	Out (69%)	Total	In (58%)	Out (42%)	Total
Auto Driver	15%	9	21	30	17	13	30
Auto Passenger	5%	3	7	10	6	4	10
Transit	50%	32	70	102	59	43	102
Cycling	5%	3	7	10	6	4	10
Walking	25%	16	34	50	29	21	50
Total Person Trips	100%	63	140	202	118	85	202

As shown in **Table 16**, 30 new vehicular trips, 102 new transit trips and 60 new active transportation trips are forecasted to be generated in the morning and afternoon peak hours from the proposed development.

Commercial

The commercial uses of the proposed development consist of a total of 5 small retail spaces ranging between 561 ft² to 1,426 ft². The trips generated were determined by using the most appropriate vehicle trips rates identified in the ITE Trip Generation Manual, 11th Edition and summarized below in **Table 17**. Similar to the rationale for the existing site generation, a simplified trip rate was used for the proposed commercial component

of the development. The latest site plan notes some of the anticipated commercial uses to be a convenience store, food retail, and a walk-in bank. However, it was found the “Convenience Store” ITE trip rates were more applicable for suburban high-auto-driver mode share locations. Therefore, the “Super Market” trip rate was considered more suitable for all the commercial retail space given the contextual location and the multi-use nature of the proposed development.

Table 17: Commercial Trip Generation Rates

Land Use	Data Source	Vehicle Trip Rates	
		AM Peak Hour	PM Peak Hour
Super Market	ITE 850	$T = 2.86(x);$	$T = 8.95(x);$
Notes: T = Average Vehicle Trip Ends x = 1,000 ft ² GFA			

Person trips were then calculated by multiplying the vehicle trip rates in **Table 17** by the person trip factor of 1.28, resulting in the number of peak hour person trips generated by each use shown below in **Table 18**.

Table 18: Commercial Peak Hour Person Trips

Land Use	GFA (ft ²)	AM Peak Hour Person Trips	PM Peak Hour Person Trips
Super Market	4,618	17	53

As a result, the commercial land-use component of the proposed development is anticipated to generate 17 and 53 person trips during the morning and afternoon peak hours, respectively.

Trip Internalization

It is anticipated that most of the trips attracted by the commercial uses will primarily be a result of the residents of the site. The trips generated by the commercial uses are further justified to primarily generate internal trips due to:

- The high residential density and mixed-use nature of the development
- The type of land-uses (retail food) and small GFA of each individual retail space
- The general location of the development within an established neighborhood, its offset to busier roads (Somerset St W and Gladstone Ave), and site frontage along a local road.

As a result, an 80% trip reduction factor will be applied to the proposed commercial site-generated person trips outlined in **Table 18**. The adjusted mode share percentages developed in **Table 15** were then applied to the reduced peak hour person trips, resulting in the assumed external trips and are summarized below in **Table 19**.

Table 19: Proposed Commercial Site-Generated Person Trips

Travel Mode	Mode Shares	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (31%)	Out (69%)	Total	In (58%)	Out (42%)	Total
Auto Driver	15%	1	1	2	1	1	2
Auto Passenger	5%	0	0	0	0	0	0
Transit	50%	0	1	1	3	3	6
Cycling	5%	0	0	0	0	0	0
Walking	25%	0	0	0	1	2	3
Total Person Trips	100%	1	2	3	5	6	11

The proposed development first-floor commercial spaces are anticipated to generate up to 2 new auto-driver trips, 6 new transit trips, and 3 new walking trips.

Net Site-Generated Trips

The ‘net’ projected site-generated trips are then calculated by deducting the estimated existing trips in **Table 9** from the forecasted sum of the residential trips in **Table 16** and commercial trips in **Table 19**. The resulting net site-generated trips are summarized below in **Table 20**.

Table 20: 'Net' Projected Inbound/Outbound Site-Generated Person Trips

Travel Mode	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	10	22	32	18	14	32
<i>Existing Auto Driver</i>	-26	-17	-43	-26	-17	-43
Auto Passenger	3	7	10	6	4	10
Transit	32	71	103	62	46	108
Cycling	3	7	10	6	4	10
Walking	16	34	50	30	23	53
Total Person Trips	38	122	160	109	80	189
Total 'New' Auto Trips	-15	5	-10	-12	-3	-15

As a result, the proposed development is forecasted to result in up to 15 fewer auto trips along with generated up to 108 transit trips, 10 cycling trips, and 53 walking trips during both the morning and afternoon peak hours. Since the existing site generates more inbound vehicle trips during the morning peak hour compared to the future residential site given its commercial uses, this results in an overall reduction to vehicle trips in the surrounding road network, hence the negative 'new' auto trips numbers shown in **Table 20**.

3.1.2. Trip Distribution and Assignment

Based on the 2011 OD Survey (Ottawa West district) and the location of adjacent arterial roadways and neighbourhoods, the distribution of site-generated traffic volumes was estimated as follows:

- 10% to/from the north via Bayview Station Rd and Somerset St W;
- 25% to/from the south via Bayswater Ave and Preston St;
- 35% to/from the east via Hwy 417, Gladstone Ave, and Somerset St W; and,
- 30% to/from the west via Hwy 417 and Scott St.

The total future site-generated traffic volumes were then assigned to the network and illustrated below in **Figure 14** and the 'net' anticipated new auto trips of the proposed development (provided in **Table 16**) are shown in **Figure 15**. The negative distributed volumes in **Figure 15** represents the difference in the existing site-generated trips and the projected future site-generated trips.

Figure 14: Future Site-Generated Traffic Volumes

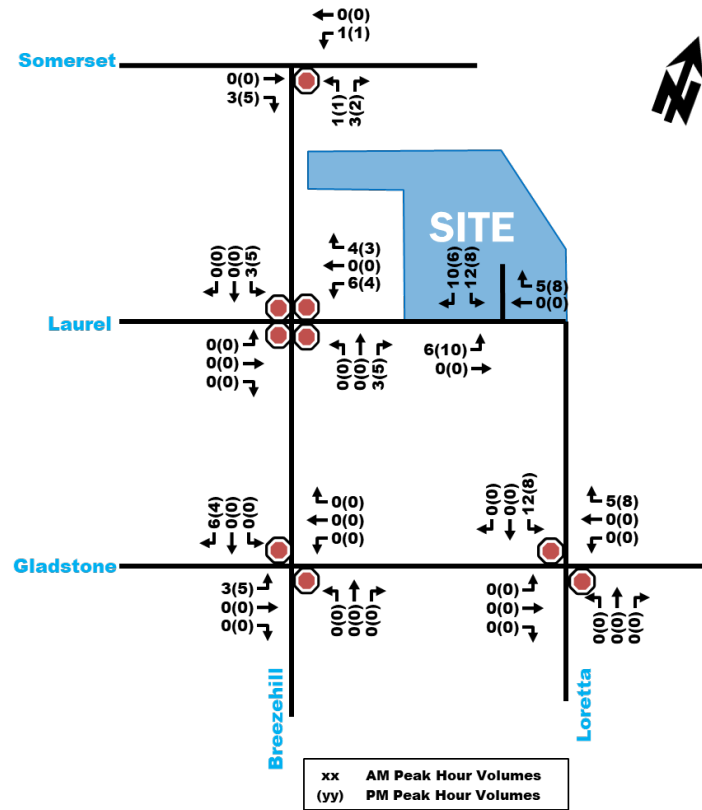
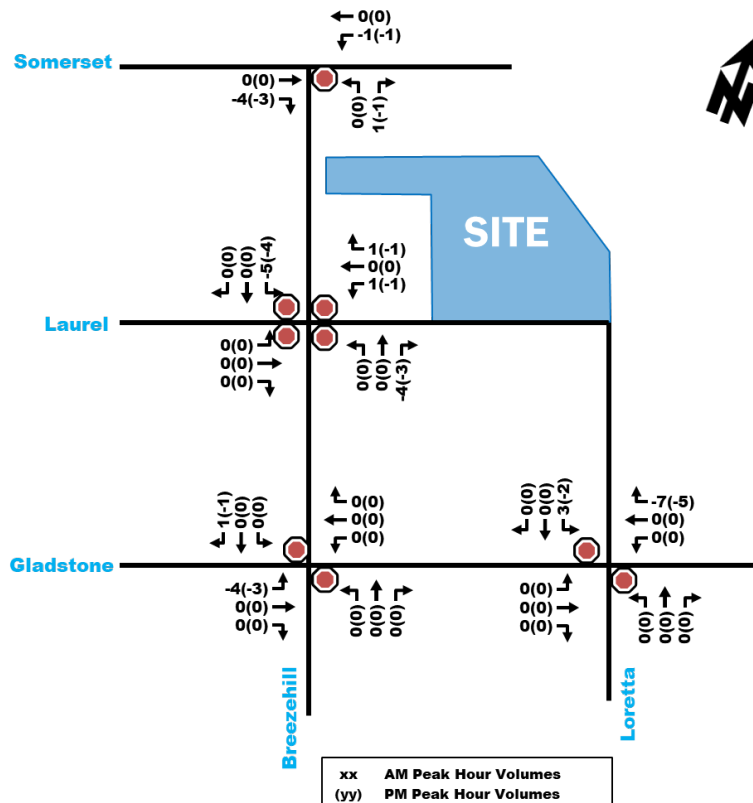


Figure 15: 'Net' Site-Generated Traffic Volumes



3.2. Background Network Traffic

3.2.1. Transportation Network Plans

Refer to **Section 2.1.3.1** for a detailed description of future transportation network changes. Major changes include the construction of the Corso Italia Station along the Trillium Line and the LRT corridor extensions which will bring 77% of all residents in the City of Ottawa within a five-kilometer radius of the rail (as cited by the City of Ottawa's LRT Stage 2 Project Overview page).

3.2.2. Background Growth

The 2021 TIA (prepared by Parsons) for the Gladstone Village Development conducted a regression analysis of historical count data that determined a 0% background growth rate to be suitable for the entirety of the study area road network including Gladstone Ave, Somerset St W, and Laurel St.

The 2018 TIA (prepared by CGH Transportation) for 951 Gladstone & 145 Loretta utilized a 0% background growth rate for all intersections based on "documented" volumes decreasing over the last 10 years.

The 2021 TIA (prepared by Novatech) for 1040 Somerset St W applied a background growth rate of 1% for Bayswater St and Somerset St; 1.5% for Gladstone Ave; and 0% for Preston St, Breezehill Ave, and Laurel Street.

With the addition of the new Corso Italia LRT station along with measures proposed through the Corso Italia Station District plans, it is expected there will be a high transit mode share within the study area that will result in an overall reduction in vehicle trips. Based on the previously mentioned studies, the proposed development being in a well-developed area near downtown Ottawa, and the proposed development's location relative to the new LRT station, it was determined that a future background traffic growth rate of 0% is suitable for the purpose of this study.

3.2.3. Other Developments

As mentioned in **Section 2.1.3.2**, five adjacent future developments with active development applications have been identified in the study area. The anticipated traffic volumes generated by the future developments at 975 Gladstone and 1050 Somerset St W will not be included in the future background traffic due to minimal site generated volumes and lack of project progress since 2012, respectively. Traffic volumes generated by the following adjacent future developments will be considered:

- 1040 Somerset St W (Full-buildout 2025)
- 951 Gladstone Ave and 145 Lorette Ave N (Full-buildout 2026)
- Gladstone Village, 933 Gladstone Ave (Full-buildout 2031)

Figures illustrating future site-generated traffic volumes of adjacent development were obtained from their respective TIA Reports and provided in **Appendix E**. The future adjacent development traffic volumes are added to existing traffic volumes to result in future background 2026 and 2031, illustrated in **Figure 16** and **Figure 17**. Since no background growth was applied to the network, the Gladstone Village (Buildout 2031) traffic volumes are the single difference between the 2026 and 2031 horizon years. The volumes for this site are very minimal, totaling an approximate 14 trips during peak hours.

Figure 16: Future Background 2026 Traffic Volumes

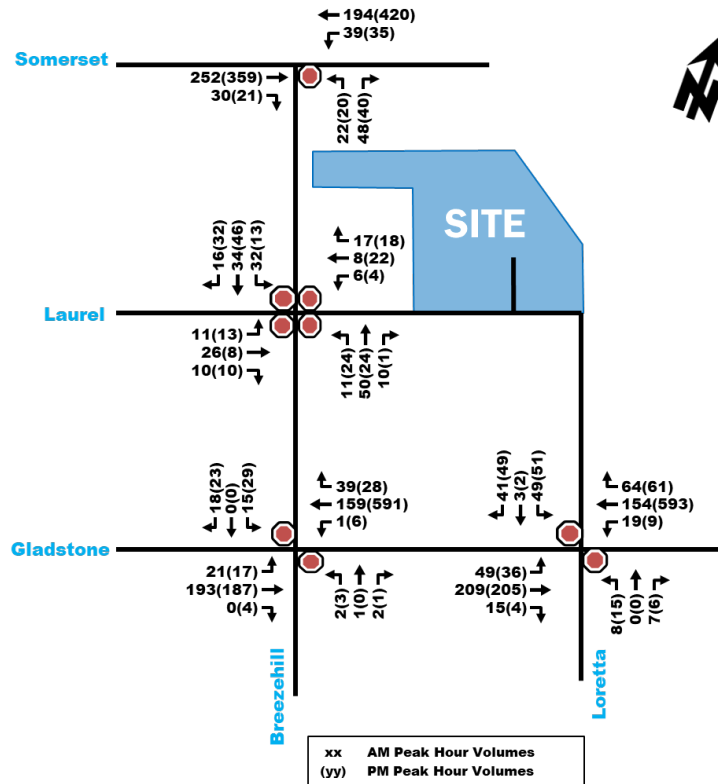
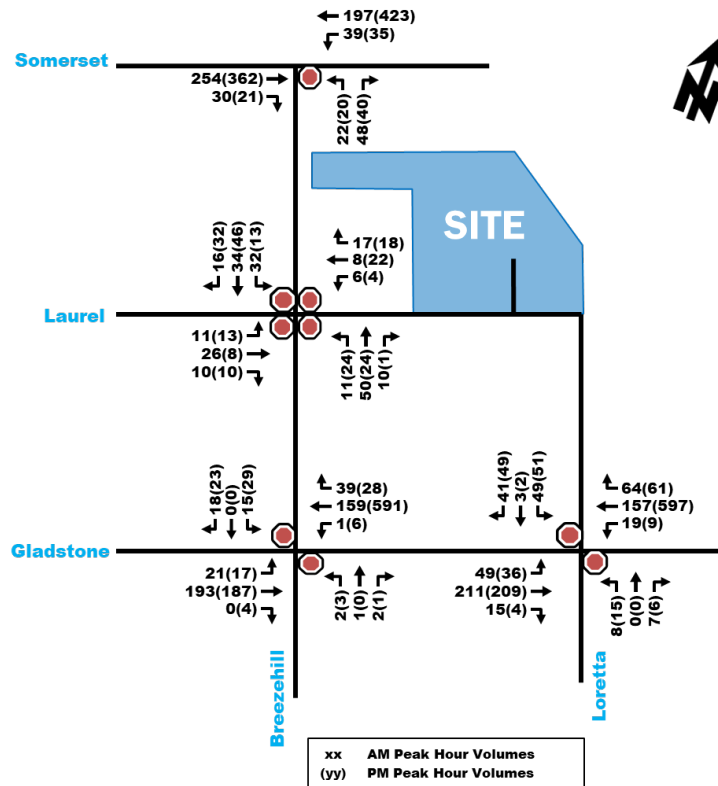


Figure 17: Future Background 2031 Traffic Volumes



3.3. Demand Rationalization

The following section indicates factors that may be used to rationalize the future travel demands in the study area and determine if there are potential capacity limitations and how they may be addressed.

The total projected 2026 and 2031 traffic volumes can be calculated by superimposing the site-generated traffic shown in **Figure 14**, onto the total future background traffic shown in **Figure 16** and **Figure 17**. As previously mentioned in **Section 3.2.3**, the total projected 2026 and 2031 traffic volumes would differ by just 14 trips during peak hours and are illustrated in **Figure 18** and **Figure 19**, respectively. The approach for this study was to proceed without applying any reductions to the study area traffic volumes, reflecting a worst-case scenario. The impact of the proposed development's site-generated traffic volumes on the study area intersections and roadways will be determined in the subsequent sections of the TIA report.

Site-Generated and Background Traffic Volumes

The proposed development is anticipated to result in up to 15 fewer vehicle trips during peak hours (i.e. approximately 1 less vehicle every 4 minutes), which is considered to be a negligible amount of traffic. The site-generated traffic volumes are not expected to result in any notable impact to the study area intersections.

Total projected traffic volumes illustrated in **Figure 18** and **Figure 19** indicate that background traffic along Somerset St W may reach approximately 400 to 450 veh/h in the peak direction, which is considered acceptable for an arterial road. Background traffic along Gladstone Ave may reach approximately 600 to 650 veh/h in the peak direction, which exceeds the ideal two-way threshold of 600 veh/h along major collector roads, as indicated by the TIA Guidelines. These volumes will be further discussed in subsequent sections of the TIA Report.

Future LRT Plans

As mentioned in previous sections, the LRT is currently undergoing expansions in various directions of the city, which will see the construction of many new LRT stations. The Trillium line, which includes the future Corso Italia Station directly adjacent to the proposed development site recently began operations. As reflected by the mode share assumptions in **Section 3.1.1**, the LRT is expected to offset most trips generated by the development through transit, thereby limiting vehicle trips generated by the site.

Additional plans by the Corso Italia District include improvements to the active transportation facilities in the area that will naturally result in increased cycling and walking, this includes:

- Constructing a new Laurel St Active Transportation Corridor (ATC) that will connect from the dead-ends of Laurel St on the west and east sides of the Trillium Line, to be used by cyclists and pedestrians only.
- A new future north-south MUP proposed to run parallel to the rail corridor, on the west side.
- Future developments in the district are required to provide bicycle parking at a minimum rate of 1.0 bike parking space per residential unit.

Therefore, the current and anticipated future improvements to transit, cycling and walking facilities in the study area are expected to result in significant reductions in vehicle traffic for new and existing developments, which includes background traffic volumes.

TDM Measures

Transportation Demand Management (TDM) Measures are measures implemented by developers to encourage residents of the future development to use alternative travel modes to personal vehicles, such as transit and active transport (walking and biking). For transit, example measures include potentially subsidizing public transport passes and having high quality walking routes to transit stations. For walking and biking, measures include providing walkable routes and sufficient bicycle parking. It is expected that the proposed development and future developments in the area will have TDM measures in place that will reduce reliance on personal vehicles and increase alternative travel modes. Proposed TDM Measures are outlined in subsequent sections as part of this report, but will be confirmed as part of future Site Plan Control Application for the development.

Figure 18: Total Projected 2026 Traffic Volumes

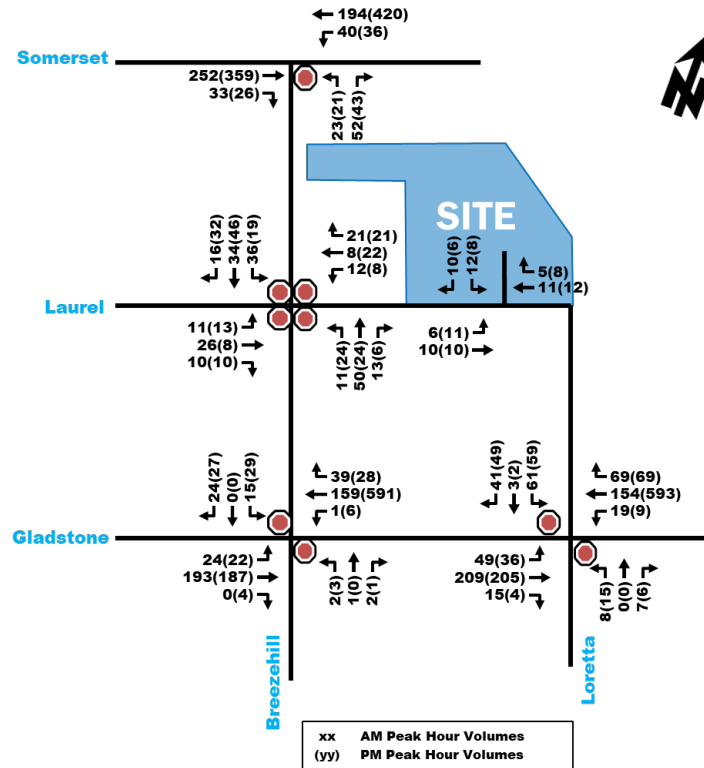
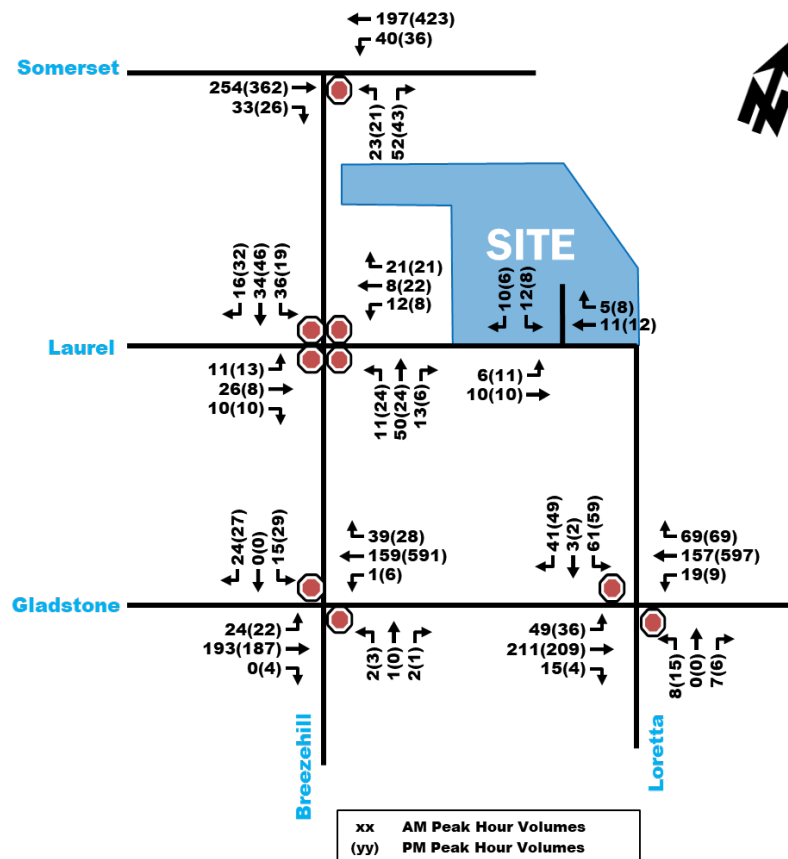


Figure 19: Total Projected 2031 Traffic Volumes



4.0 ANALYSIS

4.1. Development Design

4.1.1. Design for Sustainable Modes

The West Downtown Core Secondary Plan proposes that a new north-south MUP be provided on the west side of the Trillium Line transit corridor, between the Queensway bridge and Somerset St W. The proposed MUP will be accessible through the site with internal sidewalks. The site plan shows the new west Trillium Line MUP primarily on private property, as required by the West Downtown Core Secondary Plan. The proposed design includes 2.0m accommodated on private property which will be provided via a dedicated easement as per the policy permissions of Section 5.3.3 of the Secondary Plan and the remaining 1.5 metres along the abutting city property line. Consequently, the revised site plan includes a total width of the proposed new MUP of 3.5m to provide ample space to separate pedestrians and cyclists as per policy Section 5.3.4 of the Secondary Plan.

Additionally, the development is expected to provide 2.0m wide sidewalk along Laurel St. Pedestrian pathways are located throughout the site, providing ample connections between all building entry/exits and existing and future City of Ottawa pedestrian facilities.

The bicycle parking areas are located primarily within the underground parking garage and ground floor with approximately 7 exterior spaces along the proposed MUP adjacent to the center internal pedestrian pathway. The remainder 671 spaces are distributed evenly between the ground floor, P1 and P2 and are accessible via several direct internal pedestrian pathways from either Laurel St or the future proposed MUP.

The TDM-supportive Design and Infrastructure Checklist is provided in **Appendix F** and discussed in more detail in **Section 4.5**.

4.1.2. Circulation and Access

The site access road will expand internally to form a turnaround area at the end of the internal driveway and allow circulation for vehicles entering the site. The underground parking garage ramp will be accessible at the end of the internal driveway. In addition, the latest site plan indicates an 18.5m moving/lay-by area will be located along the east side of the internal driveway just prior to the internal turnaround area and is not expected to impede the site circulation. Garbage pickup locations are assumed to be located along the internal driveway directly adjacent to 'Building B' and at the end of the internal driveway next to the parking garage ramp, where the garbage bins will be wheeled out from each building.

Additional information and confirmation about garbage pickup routes and locations will be finalized in future site plan revisions as part of the Site Plan Control Application, including details of the specifications and geometry of the site access and circulation. Accommodation of municipal design vehicles and detailed review of their anticipated routes will also be reviewed as part of future applications.

4.2. Parking

4.2.1. Parking Supply

Based on the City of Ottawa Parking Provisions, the development site is located in "Area Z" of Schedule 1A where, according to Section 101 (2) of the Parking Provisions, the proposed development is not required to provide a minimum number of off-street motor vehicle parking spaces. Additionally, Section 102 of the Parking Provisions indicates that the required minimum visitor parking rate of 0.1 spaces per residential unit, not including the first 12 units and no more than 30 spaces per building, results in 47 required visitor parking spaces for the proposed development.

In addition to being in "Area Z" of Schedule 1A, the proposed development is located within 600m of a rapid transit station and in "Area B" of Schedule 1 of the Zoning By-Law Parking Provisions, making the site subject to

a maximum number of parking spaces. Section 103 of the Parking Provisions indicates the maximum parking rate for the proposed development is 1.75 spaces per residential unit, limiting the maximum number of permitted parking spaces (resident and visitor) to 838 spaces.

For bike parking, the West Downtown Core Secondary Plan requires a minimum rate of 1.0 spaces per residential unit, which would equate to 479 bike spaces for the 479 proposed units.

As previously mentioned in **Section 2.1.1**, the development proposes to provide a total of approximately 124 vehicle parking spaces – 47 of which will be designated for visitor parking, in an underground parking garage and approximately 678 bicycle parking spaces – 671 of which will be located indoors throughout the ground floor and parking levels, and the remaining 7 located outdoors. Therefore, all parking requirements are expected to be met.

Considering the proposed development offers a 199-bicycle parking space surplus and is within the area of the Corso Italia District of the West Downtown Core Secondary Plan, it exhibits the expectation of high transit and active transportation mode shares that are in line with the City's vision of promoting sustainable travel modes by providing significant bike parking and reduced vehicle parking.

4.3. Boundary Street Design

Exempt — see **Table 1**

4.4. Access Intersection Design

The site access is located on the north side of Laurel St, approximately 40m east of Breezehill Ave N. The access is anticipated to be stop controlled on the southbound approach. Further details of the site access design, including compliance with the City of Ottawa's Private Approach By-Law requirements, will be reviewed during the future SPC application.

4.5. Transportation Demand Management

4.5.1. Context for TDM

The proposed development is located within a Design Priority Area (DPA) and Protected Major Transit Station Areas (PMTSAs) where the future Corso Italia Station will be located. The property is owned by The Estate of Carson Unsworth.

Considering the proposed land-use of the development as a residential building, it is expected the AM peak trips will be residents leaving the site to work and returning to the site from work during the PM peak. **Sections 3.1.1** and **3.1.2** describe the anticipated site generated trips per travel mode and predicts the destinations of travelers based on the 2011 OD-Survey for Ottawa.

The development is proposing 479 apartment units within 27 and 29 storey buildings. The site plan indicates there will be 48 studio units (10%), 208 one-bedroom units (43%), 193 two-bedroom units (41%), and 30 three-bedroom units (6%).

4.5.2. Need and Opportunity

Considering the development's location in a well-developed core area of the City of Ottawa, its relative location to the nearby Corso Italia LRT station, the expected future street renewal projects, and the improvements to active transportation facilities in the area, there will be a natural increase in transit and active transportation mode shares and a decrease in auto trips.

4.5.3. TDM Program

Both the TDM Supportive Design and Infrastructure Checklist and the TDM Measures Checklist has been provided in **Appendix F**. The proposed measures are as follows:

TDM Supportive Development Design and Infrastructure Checklist

- All ten (10) required measures related to Walking and Cycling (facilities and bicycle parking) and Vehicle Parking have been satisfied.
- Nine (9) of the fourteen (14) basic measures related to Walking and Cycling, Parking and Ridesharing have been satisfied, namely:
 - Locating building close to street with no parking areas between entrance and street.
 - Locating building entrances to minimize walk distance to sidewalks and transit.
 - Locating building doors and windows to ensure visibility of pedestrians.
 - Providing safe, direct, and attractive walking routes to transit.
 - Ensuring walking routes are secure, visible, and lighted.
 - Providing lighting, landscaping and benches along walking and cycling routes.
 - Provide wayfinding signage for site accesses.
 - Provide bicycle parking spaces equivalent to the expected number of residents.
 - Provide a designated area for carpool drivers.
- Four (4) of the seven (7) better measures related to Walking and Cycling: End of trip facilities and Carsharing & Bike sharing, namely:
 - Secure bicycle parking spaces equivalent to number of units
 - Provide bike repair station adjacent to main bicycle parking area.
 - Provide up to three carshare parking spaces.
 - Provide separate areas for short-term and long-term parking.

TDM Measures Checklist

- Four (4) of the seven (7) basic measures related to the Walking and Cycling, Transit, Parking, and TDM Marketing & Communications have been recommended and are as follows:
 - Display local area maps with walking/cycling access routes.
 - Display relevant transit schedules and route maps at entrances.
 - Unbundle parking cost from monthly rent.
 - Provide a multimodal travel option information package to new residents.

It should be noted that TDM Measures checklist is yet to be finalized and will be confirmed in full during the SPC Application.

4.6. Neighbourhood Traffic Management

This module compares the maximum two-way traffic of a local or collector road during morning and afternoon peak hours, to the respective threshold provided by the City of Ottawa TIA Guidelines.

Site-generated traffic of the proposed development are expected to use local roads; Breezehill Ave, Laurel St and Loretta Ave; and the major collector road Gladstone Ave as part of their access route to/from the proposed development. The thresholds provided in the TIA Guidelines indicate an ideal maximum two-way traffic volume of 120 veh/h for local roads and 600 veh/h for major collector roads, during peak hours. **Table 21** provides a comparison of existing and total projected traffic volumes to their respective peak hour ideal thresholds. It should be noted that much of the increase in traffic volume is the result of multiple future developments in the area.

Table 21: Existing and Projected Traffic volumes Comparison to Thresholds

Roadway	Classification	Daily Threshold	Peak Hour Threshold	Peak Hour Two-Way Volumes AM (PM)	
				Existing	2031 Projected
Breezehill Ave N	Local	1,000	120	135 (120)	155 (142)
Laurel St	Local	1,000	120	78 (44)	99 (67)
Loretta Ave	Local	1,000	120	68 (78)	202 (194)
Gladstone Ave	Major Collector	5,000	600	443 (864)	503 (928)

As shown in **Table 21**, two-way peak hour traffic volumes exceed the respective ideal threshold for the existing conditions during the AM peak hour along Breezehill Ave N and the PM peak hour along Gladstone Ave. For future conditions, ideal thresholds were exceeded along Breezehill Ave N and Loretta Ave for both morning and afternoon peak hours and along Gladstone Ave for the afternoon peak hour. The following is noted:

- **Breezehill Ave N:** Although volumes exceed the 120 veh/h recommended threshold of a local road, no major concerns are identified. The future Breezehill Ave Renewal Project is expected to provide traffic calming measures such as several new curb extensions and speed humps that will deter any potential cut-through traffic and mitigate safety concerns.
- **Laurel St:** Traffic volumes are not expected to exceed the 120 veh/h threshold for a local road during peak hours, in both existing and projected conditions.
- **Loretta Ave:** The majority of traffic volumes along Loretta Ave are the result of trips generated by the future development at 951 Gladstone Ave & 145 Loretta N, which produces a significant increase in volumes along Loretta Ave, exceeding the 120veh/h recommended threshold of a local road. The future Laurel St and Loretta Ave N Project is expected to provide traffic calming measures that will significantly reduce traffic or safety concerns.
- **Gladstone Ave:** Traffic volumes during the afternoon peak hour significantly exceed the 600veh/h recommended threshold of a major collector road. However, these volumes are not unexpected, given the function of Gladstone Ave, its proximity to the Highway 417 and the major intersecting roadways throughout the corridor. If desired, the City may choose to reclassify the road to an arterial, although with the upcoming improvements to transit in the area and the City's constant advocacy for sustainable travel modes, these traffic volumes may stagnate or decrease in the future. As such, a reclassification is not considered necessary at this time.

It is important to note that the thresholds provided in the TIA Guidelines are ideal suggestions and not firm requirements for traffic volumes. If desired, the city may choose to reclassify roadways as needed, although the upcoming renewal projects of Breezehill Ave, Laurel St and Loretta Ave are expected to help mitigate many of the safety concerns on these roads. Additionally, the future Corso Italia LRT station is expected to increase transit usage within the area and result in reduced traffic in general. The intersection capacity analysis is conducted in **Section 4.9**, which will confirm if any concerns are expected for traffic operations at study area intersections.

4.7. Transit

As shown in **Table 20**, the proposed development is expected to generate up to approximately 108 transit person trips during both peak hours. The new Corso Italia Station as part the O-Train Line 2 currently operates with a 12-minute headway and provides a capacity of 420 passengers per train resulting in an hourly capacity of 2,100 passengers. Coupled with the existing bus routes in the study area, the transit network is expected to have a significant capacity surplus that can easily accommodate the future site-generated transit trips and future background ridership growth.

4.8. Review of Network Concept

Exempt – see **Table 1**.

4.9. Intersection Design

4.9.1. Intersection Control

Stop control will be provided for vehicles exiting the site onto Laurel St; the site access will permit full movements in/out of site.

4.9.2. Intersection Design

Synchro 11 Trafficware was used to analyze intersection performance of intersections within the study area. Critical movements at each of the intersections were assessed based on either the movement with the highest volume-to-capacity ratio (for signalized intersections), or the movement experiencing the highest average delay (for unsignalized intersections). It should be noted that, as per the TIA Guidelines, the Peak Hour Factor (PHF) used for analysis was 0.90 in existing conditions and 1.0 in all future scenario conditions.

Based on the 1040 Somerset St W TIA, the Somerset/Breezehill intersection will be converted into a signalized intersection with the addition of a westbound left-turn lane. See detailed roadway modification design in **Appendix G**. The intersection is expected to be upgraded the same buildout year (2025) of 1040 Somerset St W. For the purposes of this analysis, Somerset/Breezehill will be modelled as a signalized intersection for future background and total projected scenarios.

As previously mentioned in **Section 3.2.3**, the Gladstone Village site generated traffic is the single difference between the 2026 and 2031 horizon years and is expected to generate a maximum of 14 vehicle trips during the peak hours. Considering the negligible increase in trips from other developments in 2031 and the 0% growth rate applied to the background traffic, only the existing conditions, 2031 background conditions, and 2031 total projected conditions will be analyzed.

All Synchro detailed reports for existing and future conditions have been provided in **Appendix H**.

Existing Conditions

Table 22 below summarizes the intersection performance of study area intersections, based on existing traffic volumes illustrated in **Figure 8**.

Table 22: Existing Conditions Intersection Performance

Intersection	Weekday AM Peak (PM Peak)				
	Critical Movement			Intersection 'As a Whole'	
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS
Somerset/Breezehill (U)	B(B)	13.2(14.5)	NB(NB)	1.6(1.0)	A(A)
Gladstone/Breezehill (U)	B(C)	11.7(19.9)	NB(SB)	1.3(1.5)	A(A)
Breezehill/Laurel (U)	A(A)	7.5(7.5)	NB(NB)	7.5(7.4)	A(A)
Gladstone/Loretta (U)	B(C)	12.8(19.8)	SB(SB)	2.0(1.5)	A(A)
Note: Analysis of signalized intersections assumes a PHF of 0.9 and a saturation flow rate of 1800 veh/h/lane. (U) – Unsignalized intersection, movement with highest average delay identified as critical movement.					

As shown in **Table 22**, the intersections 'as a whole' all operate at a LOS 'A' during the morning and afternoon peak hours with critical movements operating at a LOS 'C' or better.

Future Background 2031 Conditions

Table 23 below summarizes the Synchro traffic operations at study area intersections, based on future background 2031 traffic volumes in **Figure 17**.

Table 23: Future Background 2031 Conditions Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Somerset/Breezehill (S)	A(A)	0.30(0.29)	NBL(WBT)	5.7(5.3)	A(A)	0.23(0.29)
Gladstone/Breezehill (U)	B(C)	11.8(18.4)	NB(SB)	1.3(1.4)	A(A)	-
Breezehill/Laurel (U)	A(A)	7.6(7.5)	SB(NB)	7.5(7.4)	A(A)	-
Gladstone/Loretta (U)	B(C)	14.4(23.8)	SB(SB)	3.3(3.2)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection, movement with highest v/c ratio identified as critical movement. (U) – Unsignalized intersection, movement with highest average delay identified as critical movement.						

As shown in **Table 23**, the future signalized intersection of Somerset/Breezehill 'as a whole' is expected to operate at LOS 'A', with critical movements also expected to operate at LOS 'A' during both peak hours. The remaining study area intersections are expected to operate similar to existing conditions.

Total Projected 2031 Conditions

Table 24 below summarizes the Synchro traffic operations at study area intersections, based on total projected 2031 traffic volumes in **Figure 19**.

Table 24: Total Projected 2031 Conditions Traffic Volumes

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Somerset/Breezehill (S)	A(A)	0.32(0.29)	NBL(WBT)	5.7(5.3)	A(A)	0.23(0.29)
Gladstone/Breezehill (U)	B(C)	11.7(18.4)	NB(SB)	1.3(1.4)	A(A)	-
Breezehill/Laurel (U)	A(A)	7.6(7.5)	SB(NB)	7.5(7.4)	A(A)	-
Gladstone/Loretta (U)	B(D)	14.4(23.6)	SB(SB)	3.4(3.1)	A(A)	-
Laurel/Site Access (U)	A(A)	8.8(8.8)	SB(SB)	2.1(2.5)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection, movement with highest v/c ratio identified as critical movement. (U) – Unsignalized intersection, movement with highest average delay identified as critical movement.						

As shown in **Table 24**, the total projected conditions operate very similar to 2031 background conditions with slight increases in intersection delays.

5.0 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Based on the results summarized herein, the following transportation related conclusions are offered:

Proposed Development

- The Estate of Carson Unsworth is proposing a development located at 75 Breezehill Ave N. The development is anticipated to be constructed in a single phase by 2026.
- The development will consist of 479 apartment units housed in 27-storey and 29-storey residential buildings, and 429 m² dedicated commercial space.
- Approximately 124 vehicle parking spaces are provided in an underground parking garage. Additionally, 678 bicycle parking spaces are provided on the ground floor and in the underground parking garage.
- Access to the development will be provided through an internal driveway along the north side of Laurel Street. Stop control was assumed for vehicles exiting the site.
- The proposed development is anticipated to generate a 'net' total of up to 189 person trips during peak hours, which comprise of 15 fewer vehicle trips, 10 new passenger trips, 108 new transit trips and 63 new active transport (walking and cycling) trips. Accounting for the existing site-generated trips results in a reduction to the overall network auto-driver trips.

- The development is to be located within 400m walking distance of the new Corso Italia LRT Station based on existing conditions and a 330m walking distance once the western MUP is constructed. As a result, transit usage is expected to be very high, and active transportation modes were also expected to be high given the City's intensification policies reflected in the West Downtown Core Secondary Plan.
- A suite of TDM measures are anticipated to be adopted by the Estate of Carson Unsworth for the purpose of ensuring sustainable transit and active mode travel patterns are maintained. The comprehensive list of measures will be confirmed in the future SPC application, but is currently expected to include, but not limited to, the following:
 - Providing safe, direct and attractive walking routes to transit.
 - Designing roads for cyclist circulation.
 - Providing lighting, landscaping and benches along walking and cycling routes.
 - Providing a permanent bike repair station.

Existing and Future Background Conditions

- In existing conditions, the intersections 'as a whole' operated at a LOS 'A' or better during peak hours, while critical movements operated at a LOS 'C' or better.
- A background traffic growth rate of 0% per year was applied to the study area intersections based on anticipated future traffic trends, where transit usage and active transport are expected to increase and offset personal vehicle usage. Traffic volumes from currently active development applications were added separately.
- Given that no background growth rate was applied to study area intersections and the minimal change in volumes due to future adjacent development volumes, future background traffic volumes between horizon years 2026 and 2031 were found to be nearly similar.
- In the future background 2031 conditions, overall study area conditions were shown to operate similar to existing conditions, with some movements continuing to experience temporary congestion. The proposed traffic signal at Somerset/Breezehill is expected to operate at LOS 'A' during both peak hours.

Projected Conditions

- With regards to neighbourhood traffic management, it was determined that the current road classification for Breezehill Ave N, Laurel St, Loretta Ave, and Gladstone Ave were appropriate for the site context. The future Breezehill Ave renewal project is expected to help mitigate safety concerns along the road. Gladstone Ave traffic volumes may adjust in the future given the significant improvement in transit and active transport facilities and initiatives planned in the area.
- In the 2031 total projected conditions future vehicle/walking/cycling trips on the adjacent road network generated by the proposed development were incorporated in the Synchro model. The intersection analysis results have been summarized below:
 - All intersections within the study area operated 'as a whole' at a LOS 'A' during both peak hours. The future Somerset/Breezehill signalized intersection signal timings were optimized in Synchro, resulting in improved intersection operations.
 - Critical movements of all intersections operate at a LOS 'D' or better during both peak hours.

Future Study Area Modifications

- Stage 2 LRT will include further expansions to the east and west of the city.
- A new north-south MUP is proposed on the west side of the Trillium Line, with a new active transportation corridor connecting the east and west sides of Laurel St.

- Breezehill Ave, Laurel St, and Loretta Ave are set to undergo full road reconstructions that will implement new sidewalk facilities, speed humps, and curb extensions to improve the overall accessibility and safety for all road users.
- No additional off-site roadway modifications are triggered by the proposed development.

Overall, the proposed development as outlined in this study generates minimal traffic and can be accommodated by the adjacent road network. The development plan leverages its location in close proximity to the future Corso Italia LRT Station with abundant active transportation facilities. The proposed development is recommended to proceed from a transportation perspective.

Prepared By:



Jordan Terada, E.I.T.
Transportation Analyst

Reviewed By:



Basel Ansari, P.Eng.
Transportation Engineer

Appendix A:

Screening Form and Site Plan

City of Ottawa 2017 TIA Guidelines

Date

12-Dec-24

TIA Screening Form

Project

75 Breezehill Ave N TIA Report

Project Number

477888-01000

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	No

Module 1.1 - Description of Proposed Development

Municipal Address	75 Breezehill Avenue N, Ottawa, ON K1Y 2H6
Description of location	Bounded by Larel St, Breezehill Ave and Trillium Line
Land Use	Residential apartments building
Development Size	Two high-rise buildings (27 and 29-storey), 479 units
Number of Accesses and Locations	Access along Laurel Street
Development Phasing	Single phase assumed
Buildout Year	2026
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger

Land Use Type	Multi-High Rise Res (3+ Storeys)	
Development Size	479	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers

Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	No
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	Yes
Location Trigger Met?	Yes

Module 1.4 - Safety Triggers

Posted Speed Limit on any boundary road	<80	km/h
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
A proposed driveway is 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) or 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	
Does the development include a drive-thru facility?	No	
Safety Trigger Met?	No	

PROPOSED 27-STOREY APARTMENT BUILDING
222 RESIDENTIAL UNITS

PROPOSED 29-STOREY APARTMENT BUILDING
247 RESIDENTIAL UNITS

UG PARKING RAMP

LAUREL STREET

BREEZHILL AVENUE

LOT 38, LOT 39, LOT 40, LOT 41, LOT 42, LOT 43, LOT 44, LOT 45, LOT 46, LOT 47, LOT 48, LOT 49, LOT 50, LOT 51, LOT 52, LOT 53, LOT 54, LOT 55, LOT 56, LOT 57, LOT 58, LOT 59, LOT 60, LOT 61, LOT 62, LOT 63, LOT 64, LOT 65, LOT 66, LOT 67, LOT 68, LOT 69, LOT 70, LOT 71, LOT 72, LOT 73, LOT 74, LOT 75, LOT 76, LOT 77, LOT 78, LOT 79, LOT 80, LOT 81, LOT 82, LOT 83, LOT 84, LOT 85, LOT 86, LOT 87, LOT 88, LOT 89, LOT 90, LOT 91, LOT 92, LOT 93, LOT 94, LOT 95, LOT 96, LOT 97, LOT 98, LOT 99, LOT 100, LOT 101, LOT 102, LOT 103, LOT 104, LOT 105, LOT 106, LOT 107, LOT 108, LOT 109, LOT 110, LOT 111, LOT 112, LOT 113, LOT 114, LOT 115, LOT 116, LOT 117, LOT 118, LOT 119, LOT 120, LOT 121, LOT 122, LOT 123, LOT 124, LOT 125, LOT 126, LOT 127, LOT 128, LOT 129, LOT 130, LOT 131, LOT 132, LOT 133, LOT 134, LOT 135, LOT 136, LOT 137, LOT 138, LOT 139, LOT 140, LOT 141, LOT 142, LOT 143, LOT 144, LOT 145, LOT 146, LOT 147, LOT 148, LOT 149, LOT 150, LOT 151, LOT 152, LOT 153, LOT 154, LOT 155, LOT 156, LOT 157, LOT 158, LOT 159, LOT 160, LOT 161, LOT 162, LOT 163, LOT 164, LOT 165, LOT 166, LOT 167, LOT 168, LOT 169, LOT 170, LOT 171, LOT 172, LOT 173, LOT 174, LOT 175, LOT 176, LOT 177, LOT 178, LOT 179, LOT 180, LOT 181, LOT 182, LOT 183, LOT 184, LOT 185, LOT 186, LOT 187, LOT 188, LOT 189, LOT 190, LOT 191, LOT 192, LOT 193, LOT 194, LOT 195, LOT 196, LOT 197, LOT 198, LOT 199, LOT 200, LOT 201, LOT 202, LOT 203, LOT 204, LOT 205, LOT 206, LOT 207, LOT 208, LOT 209, LOT 210, LOT 211, LOT 212, LOT 213, LOT 214, LOT 215, LOT 216, LOT 217, LOT 218, LOT 219, LOT 220, LOT 221, LOT 222, LOT 223, LOT 224, LOT 225, LOT 226, LOT 227, LOT 228, LOT 229, LOT 230, LOT 231, LOT 232, LOT 233, LOT 234, LOT 235, LOT 236, LOT 237, LOT 238, LOT 239, LOT 240, LOT 241, LOT 242, LOT 243, LOT 244, LOT 245, LOT 246, LOT 247, LOT 248, LOT 249, LOT 250, LOT 251, LOT 252, LOT 253, LOT 254, LOT 255, LOT 256, LOT 257, LOT 258, LOT 259, LOT 260, LOT 261, LOT 262, LOT 263, LOT 264, LOT 265, LOT 266, LOT 267, LOT 268, LOT 269, LOT 270, LOT 271, LOT 272, LOT 273, LOT 274, LOT 275, LOT 276, LOT 277, LOT 278, LOT 279, LOT 280, LOT 281, LOT 282, LOT 283, LOT 284, LOT 285, LOT 286, LOT 287, LOT 288, LOT 289, LOT 290, LOT 291, LOT 292, LOT 293, LOT 294, LOT 295, LOT 296, LOT 297, LOT 298, LOT 299, LOT 300, LOT 301, LOT 302, LOT 303, LOT 304, LOT 305, LOT 306, LOT 307, LOT 308, LOT 309, LOT 310, LOT 311, LOT 312, LOT 313, LOT 314, LOT 315, LOT 316, LOT 317, LOT 318, LOT 319, LOT 320, LOT 321, LOT 322, LOT 323, LOT 324, LOT 325, LOT 326, LOT 327, LOT 328, LOT 329, LOT 330, LOT 331, LOT 332, LOT 333, LOT 334, LOT 335, LOT 336, LOT 337, LOT 338, LOT 339, LOT 340, LOT 341, LOT 342, LOT 343, LOT 344, LOT 345, LOT 346, LOT 347, LOT 348, LOT 349, LOT 350, LOT 351, LOT 352, LOT 353, LOT 354, LOT 355, LOT 356, LOT 357, LOT 358, LOT 359, LOT 360, LOT 361, LOT 362, LOT 363, LOT 364, LOT 365, LOT 366, LOT 367, LOT 368, LOT 369, LOT 370, LOT 371, LOT 372, LOT 373, LOT 374, LOT 375, LOT 376, LOT 377, LOT 378, LOT 379, LOT 380, LOT 381, LOT 382, LOT 383, LOT 384, LOT 385, LOT 386, LOT 387, LOT 388, LOT 389, LOT 390, LOT 391, LOT 392, LOT 393, LOT 394, LOT 395, LOT 396, LOT 397, LOT 398, LOT 399, LOT 400, LOT 401, LOT 402, LOT 403, LOT 404, LOT 405, LOT 406, LOT 407, LOT 408, LOT 409, LOT 410, LOT 411, LOT 412, LOT 413, LOT 414, LOT 415, LOT 416, LOT 417, LOT 418, LOT 419, LOT 420, LOT 421, LOT 422, LOT 423, LOT 424, LOT 425, LOT 426, LOT 427, LOT 428, LOT 429, LOT 430, LOT 431, LOT 432, LOT 433, LOT 434, LOT 435, LOT 436, LOT 437, LOT 438, LOT 439, LOT 440, LOT 441, LOT 442, LOT 443, LOT 444, LOT 445, LOT 446, LOT 447, LOT 448, LOT 449, LOT 450, LOT 451, LOT 452, LOT 453, LOT 454, LOT 455, LOT 456, LOT 457, LOT 458, LOT 459, LOT 460, LOT 461, LOT 462, LOT 463, LOT 464, LOT 465, LOT 466, LOT 467, LOT 468, LOT 469, LOT 470, LOT 471, LOT 472, LOT 473, LOT 474, LOT 475, LOT 476, LOT 477, LOT 478, LOT 479, LOT 480, LOT 481, LOT 482, LOT 483, LOT 484, LOT 485, LOT 486, LOT 487, LOT 488, LOT 489, LOT 490, LOT 491, LOT 492, LOT 493, LOT 494, LOT 495, LOT 496, LOT 497, LOT 498, LOT 499, LOT 500, LOT 501, LOT 502, LOT 503, LOT 504, LOT 505, LOT 506, LOT 507, LOT 508, LOT 509, LOT 510, LOT 511, LOT 512, LOT 513, LOT 514, LOT 515, LOT 516, LOT 517, LOT 518, LOT 519, LOT 520, LOT 521, LOT 522, LOT 523, LOT 524, LOT 525, LOT 526, LOT 527, LOT 528, LOT 529, LOT 530, LOT 531, LOT 532, LOT 533, LOT 534, LOT 535, LOT 536, LOT 537, LOT 538, LOT 539, LOT 540, LOT 541, LOT 542, LOT 543, LOT 544, LOT 545, LOT 546, LOT 547, LOT 548, LOT 549, LOT 550, LOT 551, LOT 552, LOT 553, LOT 554, LOT 555, LOT 556, LOT 557, LOT 558, LOT 559, LOT 560, LOT 561, LOT 562, LOT 563, LOT 564, LOT 565, LOT 566, LOT 567, LOT 568, LOT 569, LOT 570, LOT 571, LOT 572, LOT 573, LOT 574, LOT 575, LOT 576, LOT 577, LOT 578, LOT 579, LOT 580, LOT 581, LOT 582, LOT 583, LOT 584, LOT 585, LOT 586, LOT 587, LOT 588, LOT 589, LOT 590, LOT 591, LOT 592, LOT 593, LOT 594, LOT 595, LOT 596, LOT 597, LOT 598, LOT 599, LOT 600, LOT 601, LOT 602, LOT 603, LOT 604, LOT 605, LOT 606, LOT 607, LOT 608, LOT 609, LOT 610, LOT 611, LOT 612, LOT 613, LOT 614, LOT 615, LOT 616, LOT 617, LOT 618, LOT 619, LOT 620, LOT 621, LOT 622, LOT 623, LOT 624, LOT 625, LOT 626, LOT 627, LOT 628, LOT 629, LOT 630, LOT 631, LOT 632, LOT 633, LOT 634, LOT 635, LOT 636, LOT 637, LOT 638, LOT 639, LOT 640, LOT 641, LOT 642, LOT 643, LOT 644, LOT 645, LOT 646, LOT 647, LOT 648, LOT 649, LOT 650, LOT 651, LOT 652, LOT 653, LOT 654, LOT 655, LOT 656, LOT 657, LOT 658, LOT 659, LOT 660, LOT 661, LOT 662, LOT 663, LOT 664, LOT 665, LOT 666, LOT 667, LOT 668, LOT 669, LOT 670, LOT 671, LOT 672, LOT 673, LOT 674, LOT 675, LOT 676, LOT 677, LOT 678, LOT 679, LOT 680, LOT 681, LOT 682, LOT 683, LOT 6

Appendix B:

Transit Route Maps



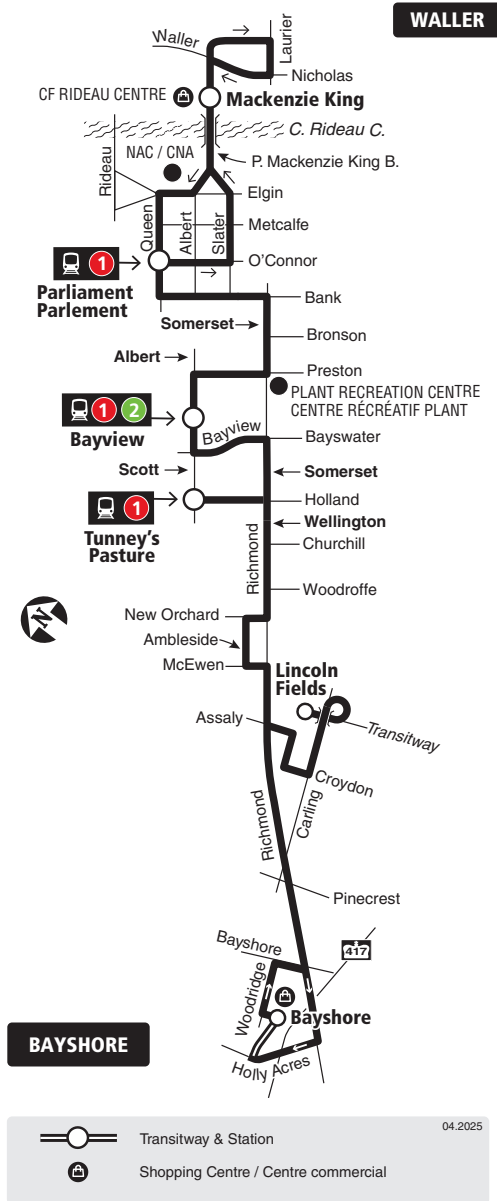
11

Fréquent

WALLER BAYSHORE

7 days a week / 7 jours par semaine

All day service
Service toute la journée



2025.04

This route starts on April 27, 2025 when the New Ways to Bus network comes into effect.

Ce circuit sera mis en service
le 27 avril 2025, lorsque le réseau
L'autobus réinventé entrera en vigueur.

Customer Service /
Service à la clientèle 613-560-5000

Security / Sécurité 613-741-2478



octranspo.com

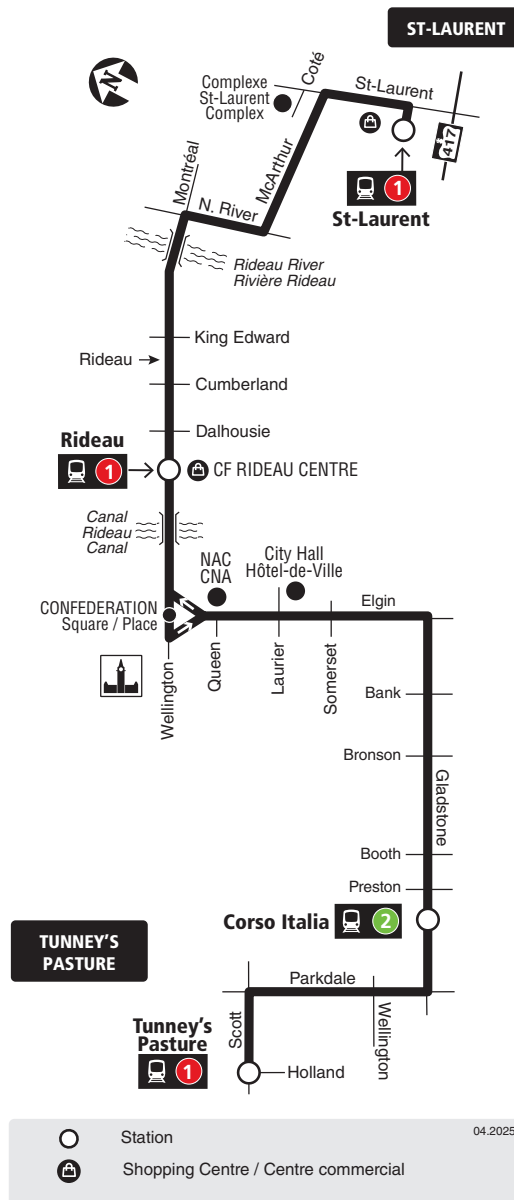
14

Fréquent

ST-LAURENT
TUNNEY'S PASTURE

7 days a week / 7 jours par semaine

All day service
Service toute la journée



2025.04

This route starts on April 27, 2025 when the New Ways to Bus network comes into effect.

Ce circuit sera mis en service
le 27 avril 2025, lorsque le réseau
L'autobus réinventé entrera en vigueur.

Customer Service /
Service à la clientèle 613-560-5000

Security / Sécurité 613-741-2478

OC Transpo

octranspo.com

Appendix C:

Traffic Data



Turning Movement Count Bicycle Summary Flow Diagram



Breezehill Avenue & Laurel Street

Ottawa, ON

Bicycles

(Including electric bicycles and electric scooters)

Note:
Bicycle volumes are **NOT** included in vehicle totals.

Tuesday, April 23, 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward ► 15

Laurel St.

Laurel St.

51

94

43

(A) 49

44

34 7 7 1

Total Bicycle Volume

121

Approaching Intersection
(A+B+C+D)

(D) 23

41

Bicycles
comprise
9.15%
of total traffic

18

Includes all bicycles
travelling on sidewalks.

Breezehill Ave.

All Pedestrian Crossings

126
152 17
Total 345
50

Laurel St.

Eastbound

Laurel St.

Westbound

Breezehill Ave.

Northbound

Breezehill Ave.

Southbound

Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	6	1	0	0	7	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	10
0800-0900	15	6	1	0	22	0	2	1	0	3	0	1	0	0	1	1	0	0	1	2	28
0900-1000	4	1	0	0	5	0	2	0	0	2	0	0	0	0	0	2	0	0	0	2	9
1130-1230	1	1	0	0	2	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	5
1230-1330	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	4
1500-1600	3	2	0	0	5	0	3	2	0	5	0	0	0	0	0	2	1	11	0	14	24
1600-1700	1	0	0	0	1	0	4	1	0	5	0	1	0	0	1	0	2	14	0	16	23
1700-1800	0	0	0	0	0	0	4	1	0	5	0	0	0	0	0	0	4	9	0	13	18
Totals	31	11	1	0	43	0	16	7	0	23	1	5	0	0	6	7	7	34	1	49	121

Comments:

A cedar hedge growing along the property frontage on the southwest quadrant is creating a serious sightline problem. The majority of the cyclists as well as some drivers ignore the all-way stop control. Vehicles parked too close to the intersection on both Laurel Street, east of Breezehill Avenue and Breezehill Avenue, south of Laurel Street create a sightline problem. School buses comprise 8.16% of the heavy vehicle traffic.

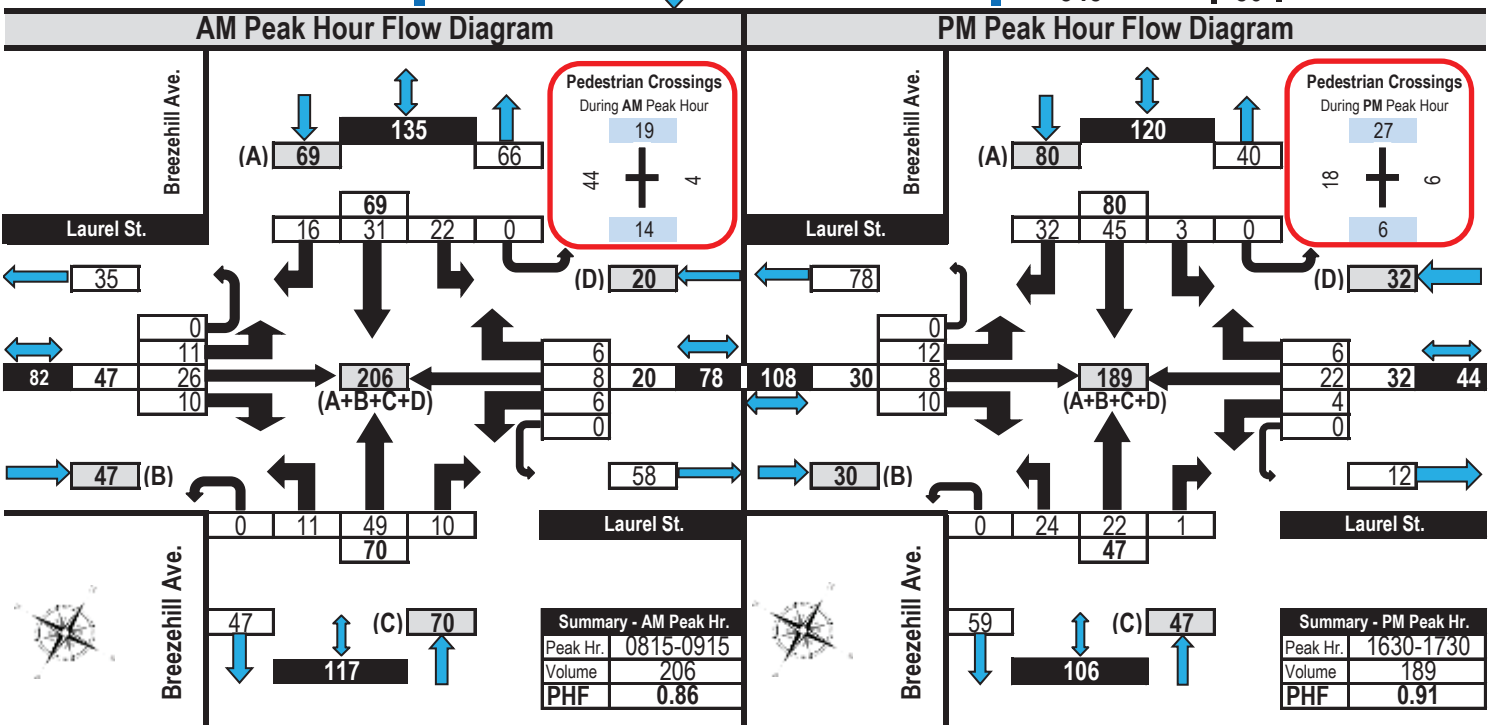
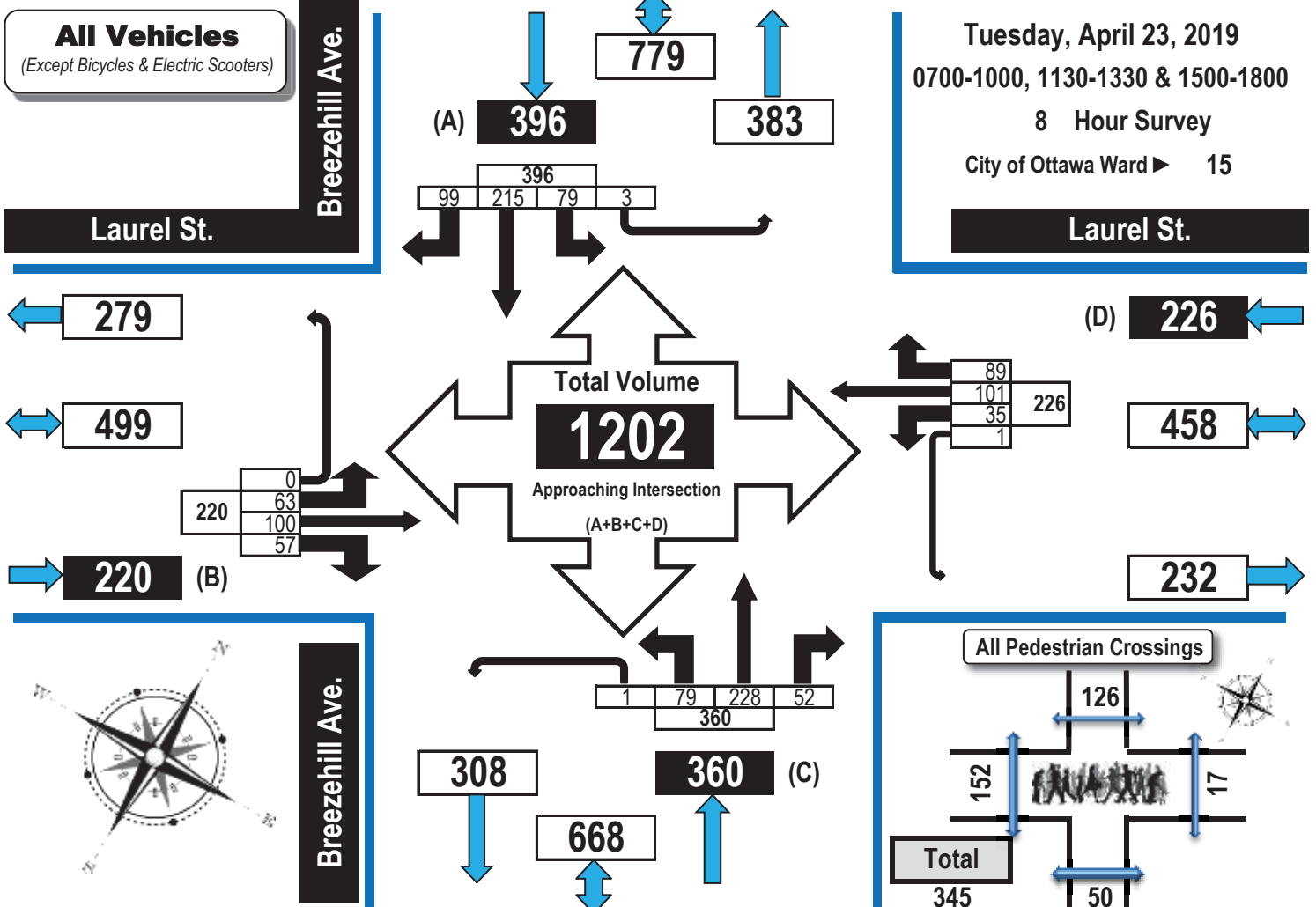


Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams All Vehicles Except Bicycles



Breezehill Avenue & Laurel Street

Ottawa, ON





Turning Movement Count

Summary, OFF and EVENING Peak Hour

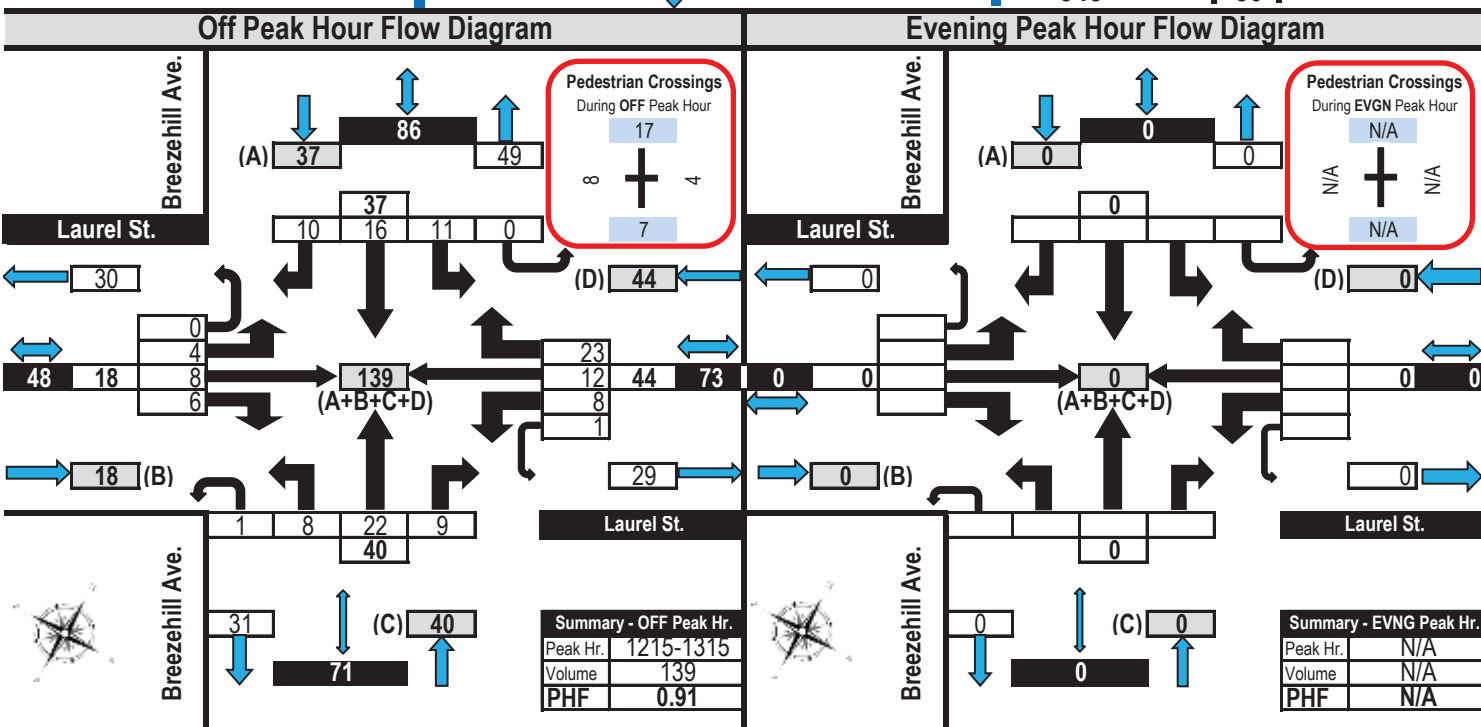
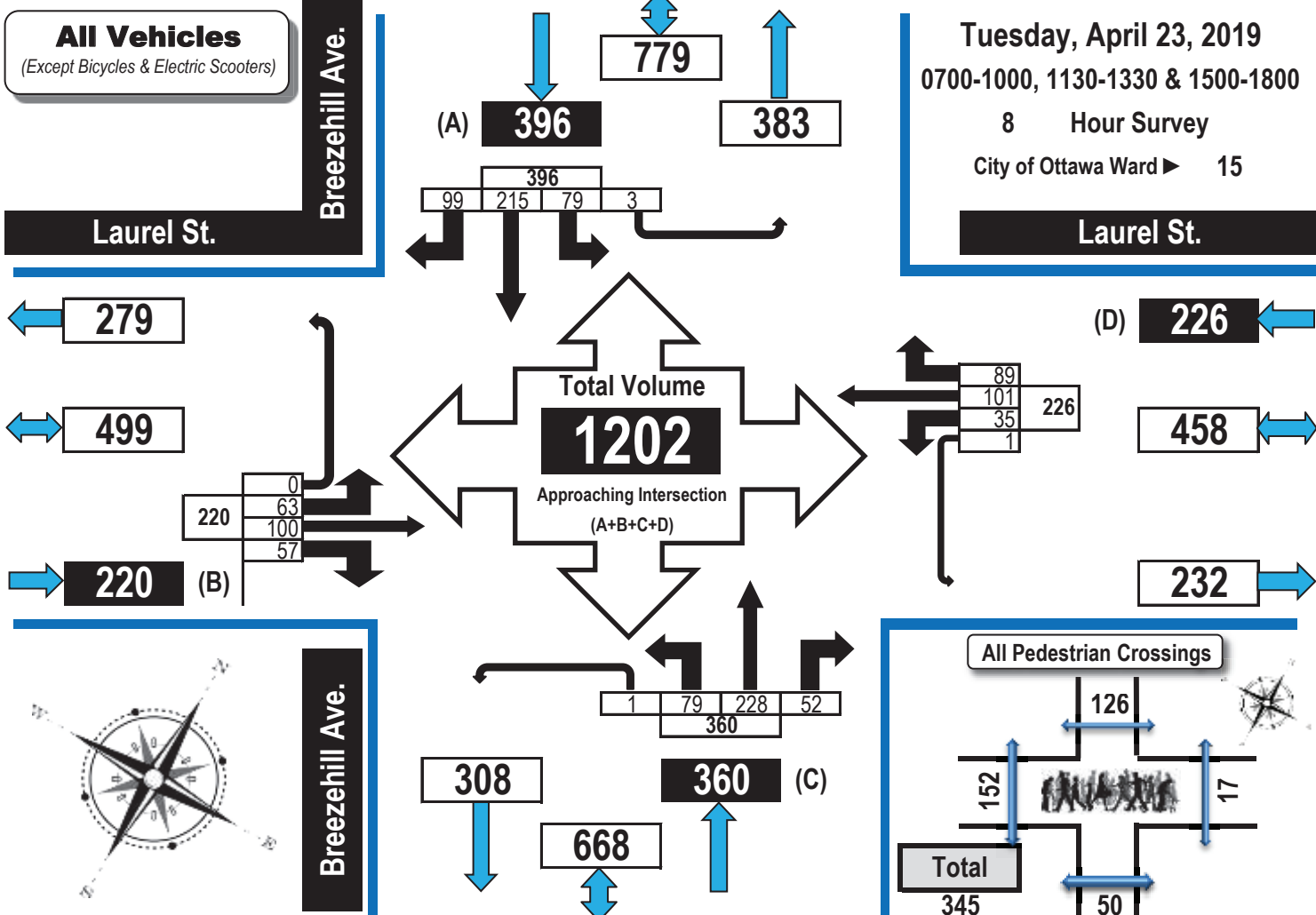
Flow Diagrams

All Vehicles Except Bicycles



Breezhill Avenue & Laurel Street

Ottawa, ON



Turning Movement Count Heavy Vehicle Summary Flow Diagram



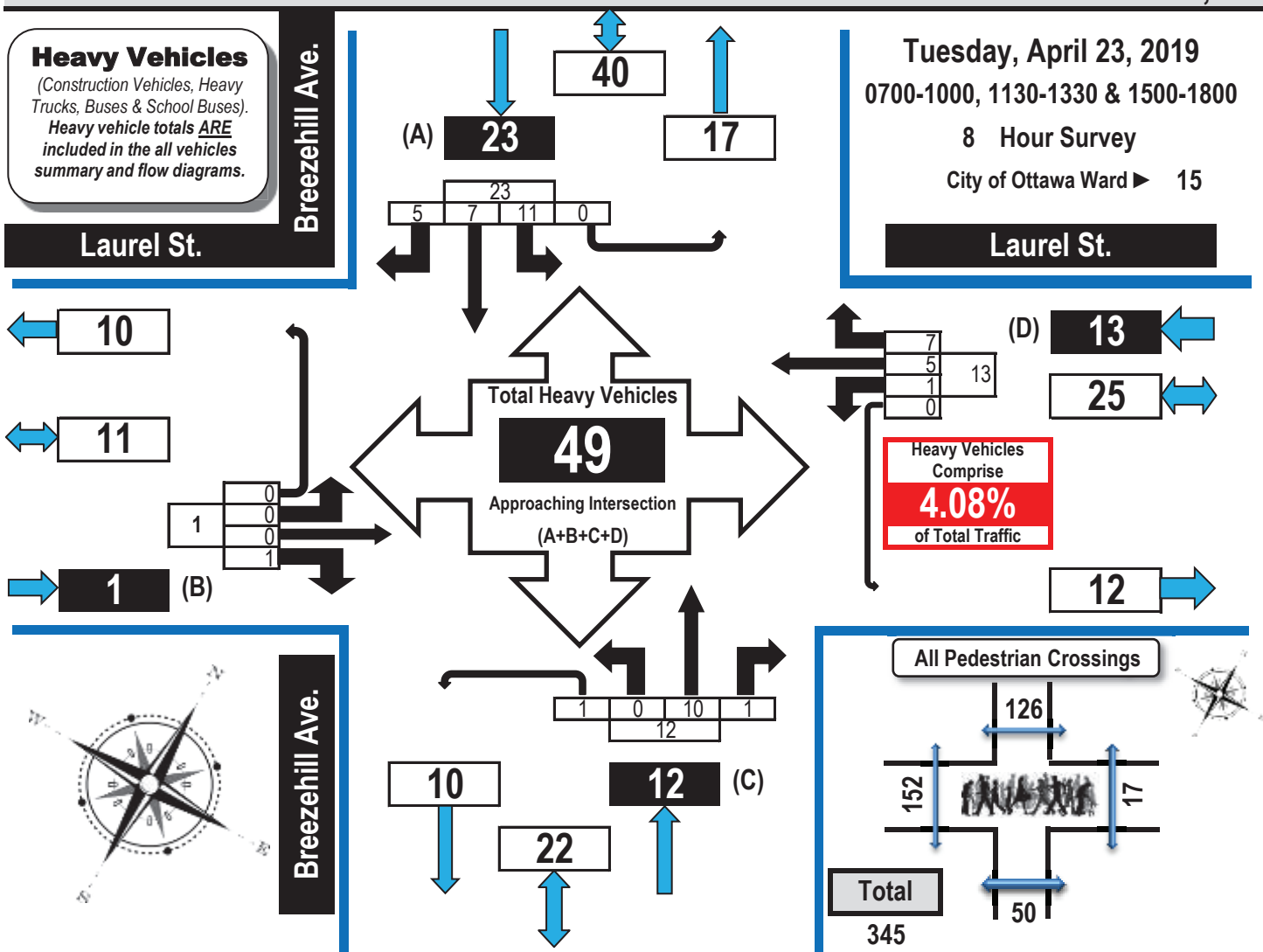
Breezehill Avenue & Laurel Street

Ottawa, ON

Heavy Vehicles

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

Tuesday, April 23, 2019
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 15



Laurel St.

Eastbound

Laurel St.

Westbound

Breezehill Ave.

Northbound

Breezehill Ave.

Southbound

Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2	0	0	0	2	4
0800-0900	0	0	0	0	0	0	0	0	3	3	0	0	1	0	1	3	0	3	0	6	10
0900-1000	0	0	1	0	1	1	2	1	0	4	0	4	0	0	4	2	2	1	0	5	14
1130-1230	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	3	0	0	4	6
1230-1330	0	0	0	0	0	0	0	1	0	1	0	2	0	1	3	0	0	0	0	0	4
1500-1600	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	1	0	1	0	2	4
1600-1700	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	3
1700-1800	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	1	0	0	2	4
Totals	0	0	1	0	1	1	5	7	0	13	0	10	1	1	12	11	7	5	0	23	49

Comments:

A cedar hedge growing along the property frontage on the southwest quadrant is creating a serious sightline problem. The majority of the cyclists as well as some drivers ignore the all-way stop control. Vehicles parked too close to the intersection on both Laurel Street, east of Breezehill Avenue and Breezehill Avenue, south of Laurel Street create a sightline problem. School buses comprise 8.16% of the heavy vehicle traffic.

Turning Movement Count Pedestrian Crossings Summary and Flow Diagram

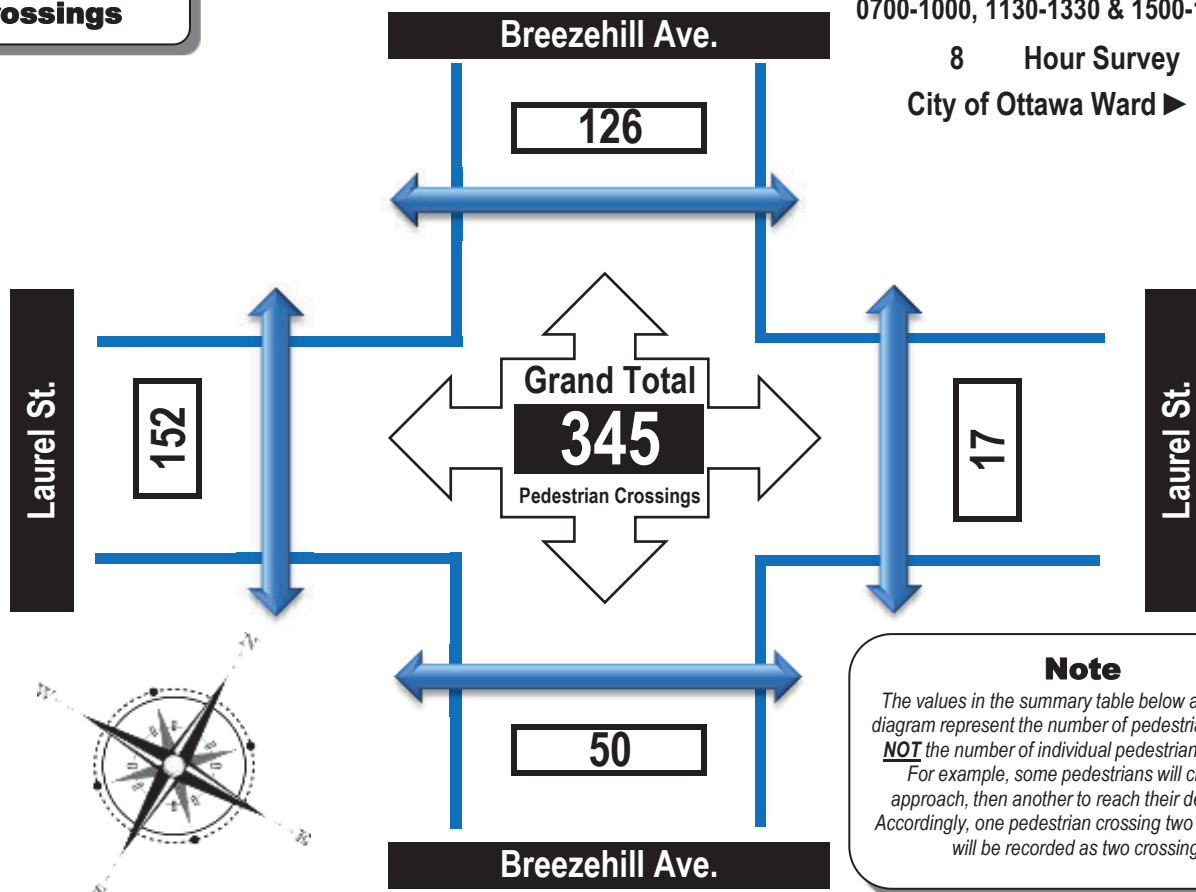


Breezehill Avenue & Laurel Street

Ottawa, ON

Pedestrian Crossings

Tuesday, April 23, 2019
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 15



Time Period	West Side Crossing Laurel St.	East Side Crossing Laurel St.	Street Total	South Side Crossing Breezehill Ave.	North Side Crossing Breezehill Ave.	Street Total	Grand Total
0700-0800	5	1	6	3	8	11	17
0800-0900	54	4	58	14	18	32	90
0900-1000	2	0	2	0	4	4	6
1130-1230	11	3	14	6	22	28	42
1230-1330	3	2	5	6	7	13	18
1500-1600	50	0	50	12	23	35	85
1600-1700	12	1	13	2	22	24	37
1700-1800	15	6	21	7	22	29	50
Totals	152	17	169	50	126	176	345

Comments:

A cedar hedge growing along the property frontage on the southwest quadrant is creating a serious sightline problem. The majority of the cyclists as well as some drivers ignore the all-way stop control. Vehicles parked too close to the intersection on both Laurel Street, east of Breezehill Avenue and Breezehill Avenue, south of Laurel Street create a sightline problem. School buses comprise 8.16% of the heavy vehicle traffic.



Turning Movement Count

Summary Report Including Peak Hours, AADT and Expansion Factors

All Vehicles Except Bicycles



Breezehill Avenue & Laurel Street

Ottawa, ON

Survey Date: Tuesday, April 23, 2019

Start Time: 0700

AADT Factor: 0.7

Weather AM: Partly Cloudy +10° C

Survey Duration: 8 Hrs.

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Weather PM: Overcast + 17° C

Surveyor(s): T. Carmody

Laurel St.						Laurel St.						Breezehill Ave.						Breezehill Ave.					
Eastbound						Westbound						Northbound						Southbound					
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	4	16	4	0	24	2	5	7	0	14	38	7	26	7	0	40	10	17	2	0	29	69	107
0800-0900	12	19	5	0	36	6	8	11	0	25	61	12	44	9	0	65	15	36	18	0	69	134	195
0900-1000	12	19	11	0	42	4	11	10	0	25	67	4	39	8	0	51	14	21	9	0	44	95	162
1130-1230	6	14	5	0	25	5	10	17	0	32	57	6	15	3	0	24	10	25	6	2	43	67	124
1230-1330	4	5	5	0	14	6	11	16	1	34	48	5	25	16	1	47	13	17	10	1	41	88	136
1500-1600	4	9	12	0	25	6	19	16	0	41	66	14	29	6	0	49	8	29	8	0	45	94	160
1600-1700	12	11	10	0	33	4	19	7	0	30	63	9	27	0	0	36	6	33	18	0	57	93	156
1700-1800	9	7	5	0	21	2	18	5	0	25	46	22	23	3	0	48	3	37	28	0	68	116	162
Totals	63	100	57	0	220	35	101	89	1	226	446	79	228	52	1	360	79	215	99	3	396	756	1202

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

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

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➔ 12 expansion factor of 1.39																							
Equ. 12 Hr	88	139	79	0	306	49	140	124	1	314	620	110	317	72	1	500	110	299	138	4	550	1051	1671

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.7																							
AADT 12-hr	61	97	55	0	214	34	98	87	1	220	434	77	222	51	1	350	77	209	96	3	385	736	1170

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																							
AADT 24 Hr	80	127	73	0	280	45	129	113	1	288	568	101	291	66	1	459	101	274	126	4	505	964	1532

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.86											Highest Hourly Vehicle Volume Between 0700h & 1000h												
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0815-0915	11	26	10	0	47	6	8	6	0	20	67	11	49	10	0	70	22	31	16	0	69	139	206
OFF Peak Hour Factor → 0.91											Highest Hourly Vehicle Volume Between 1130h & 1330h												
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1215-1315	4	8	6	0	18	8	12	23	1	44	62	8	22	9	1	40	11	16	10	0	37	77	139
PM Peak Hour Factor → 0.91											Highest Hourly Vehicle Volume Between 1500h & 1800h												
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1630-1730	12	8	10	0	30	4	22	6	0	32	62	24	22	1	0	47	3	45	32	0	80	127	189

Comments:

A cedar hedge growing along the property frontage on the southwest quadrant is creating a serious sightline problem. The majority of the cyclists as well as some drivers ignore the all-way stop control. Vehicles parked too close to the intersection on both Laurel Street, east of Breezehill Avenue and Breezehill Avenue, south of Laurel Street create a sightline problem. School buses comprise 8.16% of the heavy vehicle traffic.

Notes:

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

Survey Date: Wednesday, July 18, 2018

Start Time: 07:00

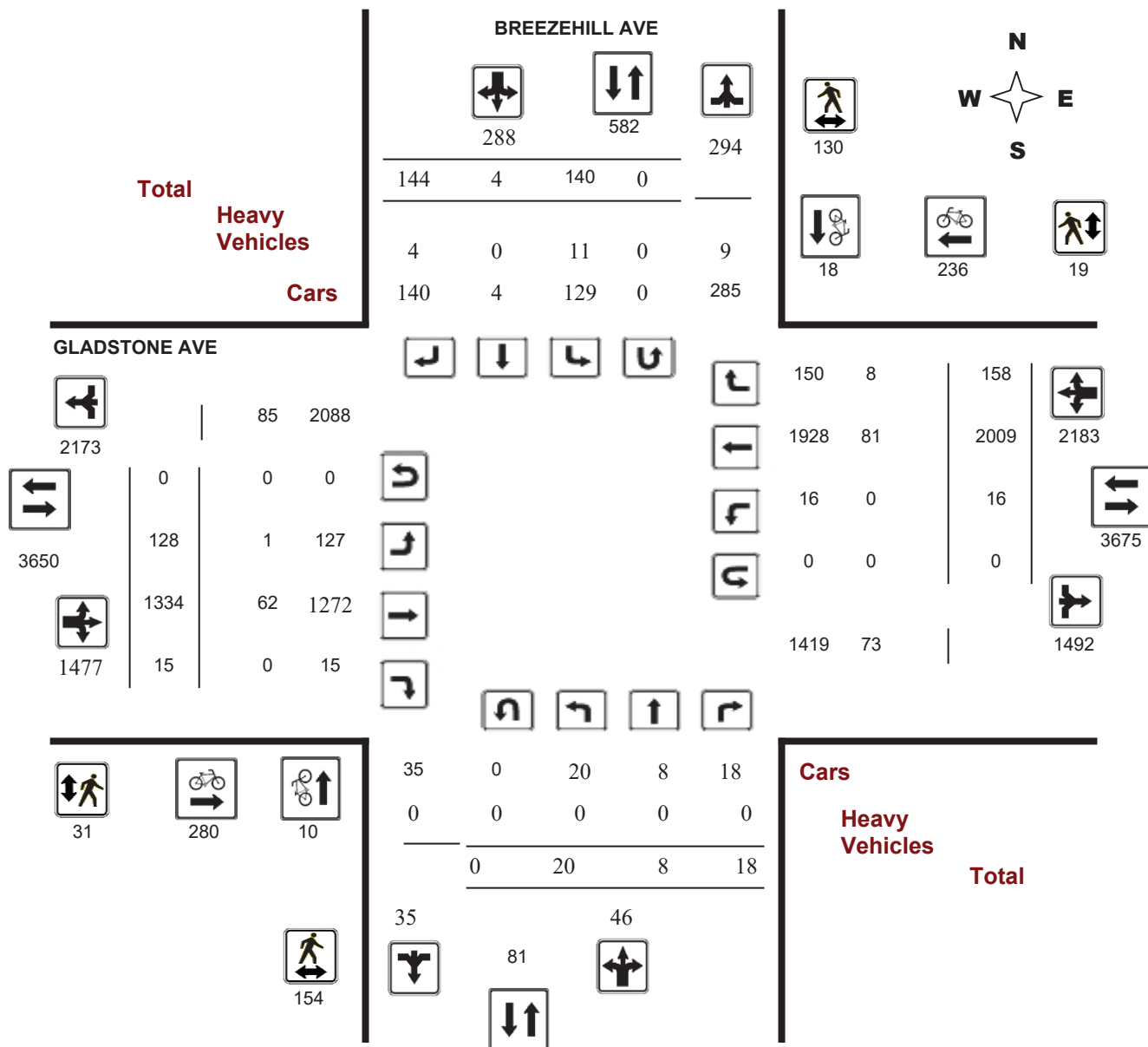
WO No:

37971

Device:

Miovision

Full Study Diagram



Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No:

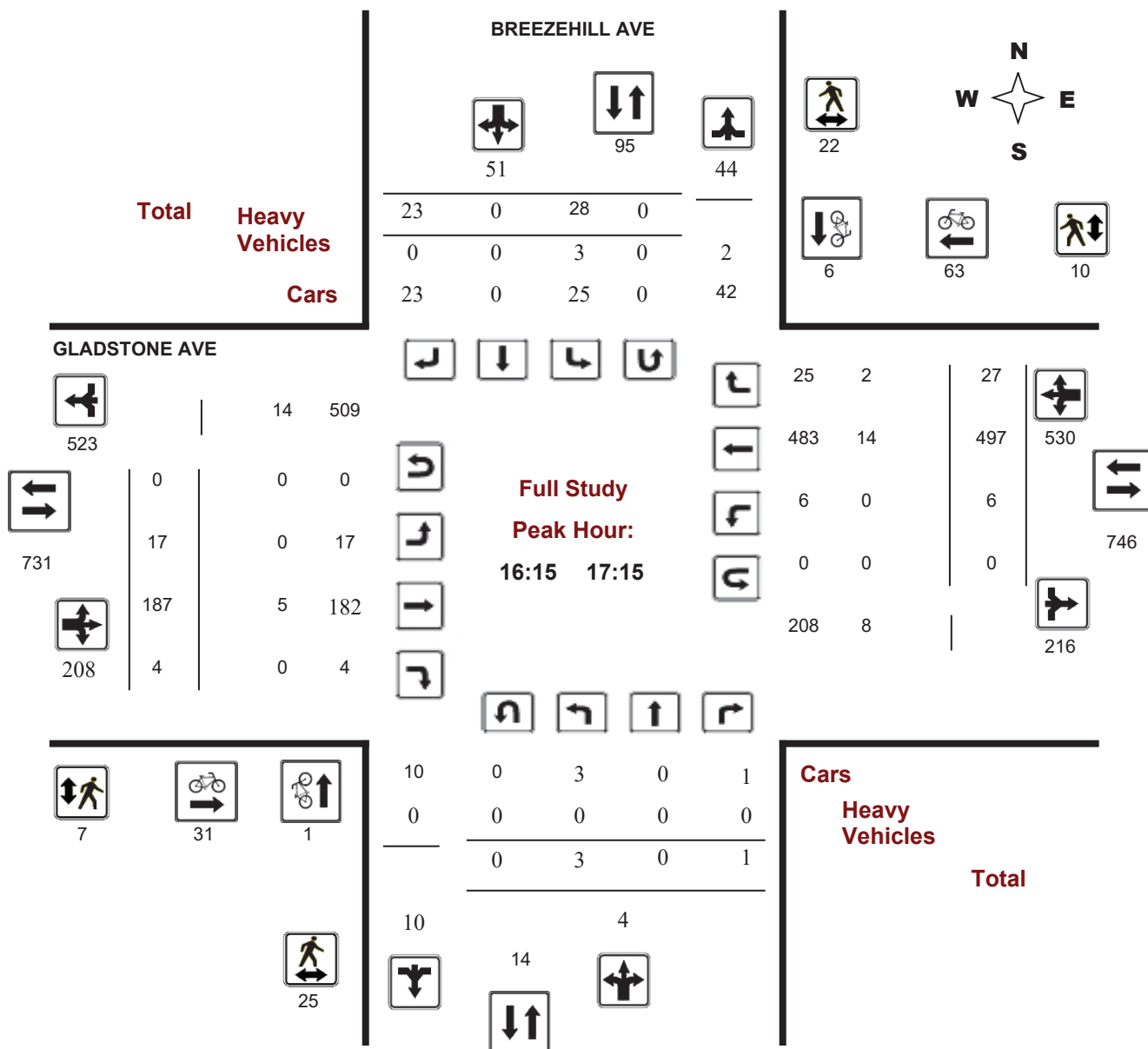
37971

Start Time: 07:00

Device:

Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

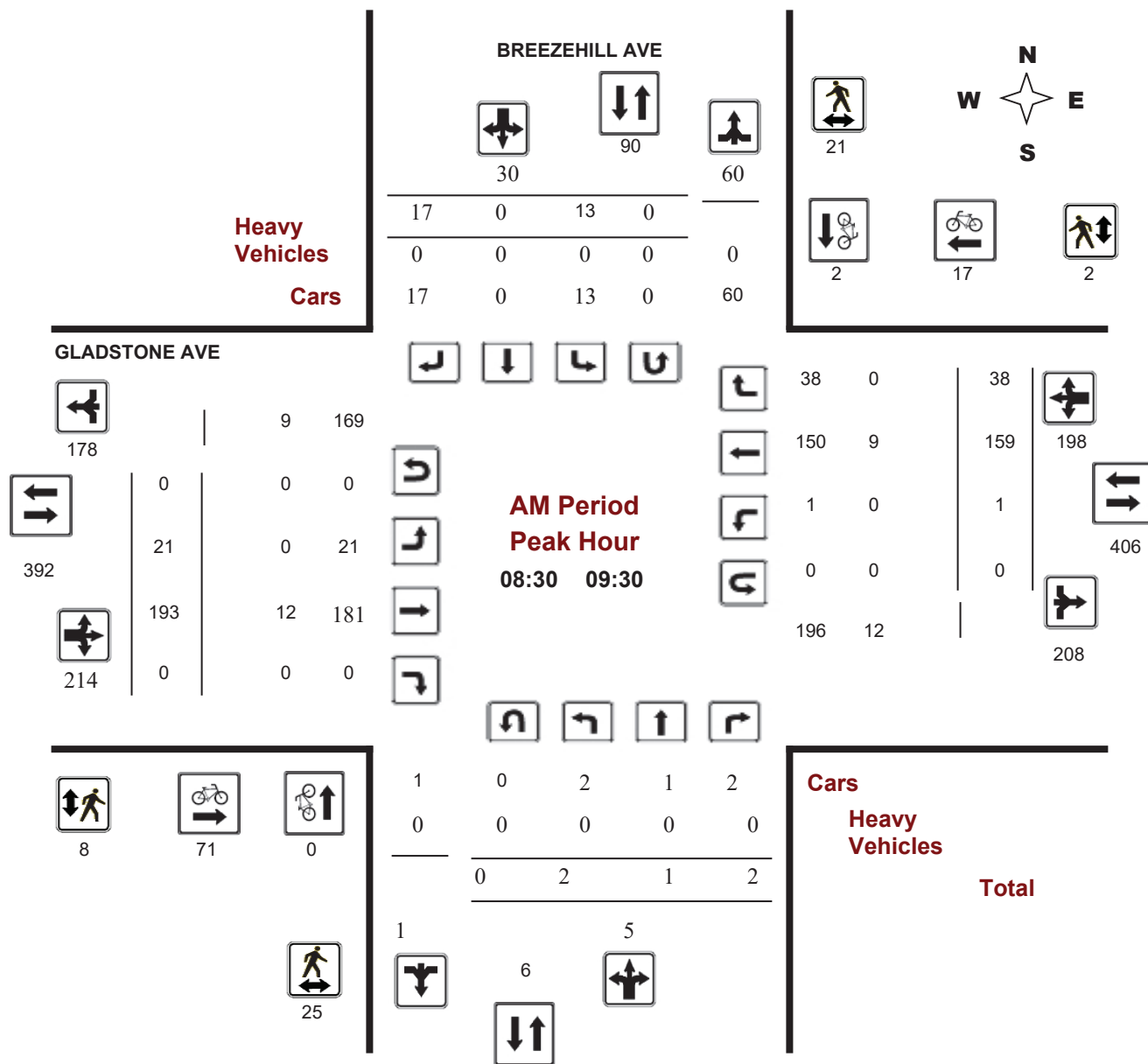
BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

Start Time: 07:00

WO No: 37971

Device: Miovision



Turning Movement Count - Peak Hour Diagram

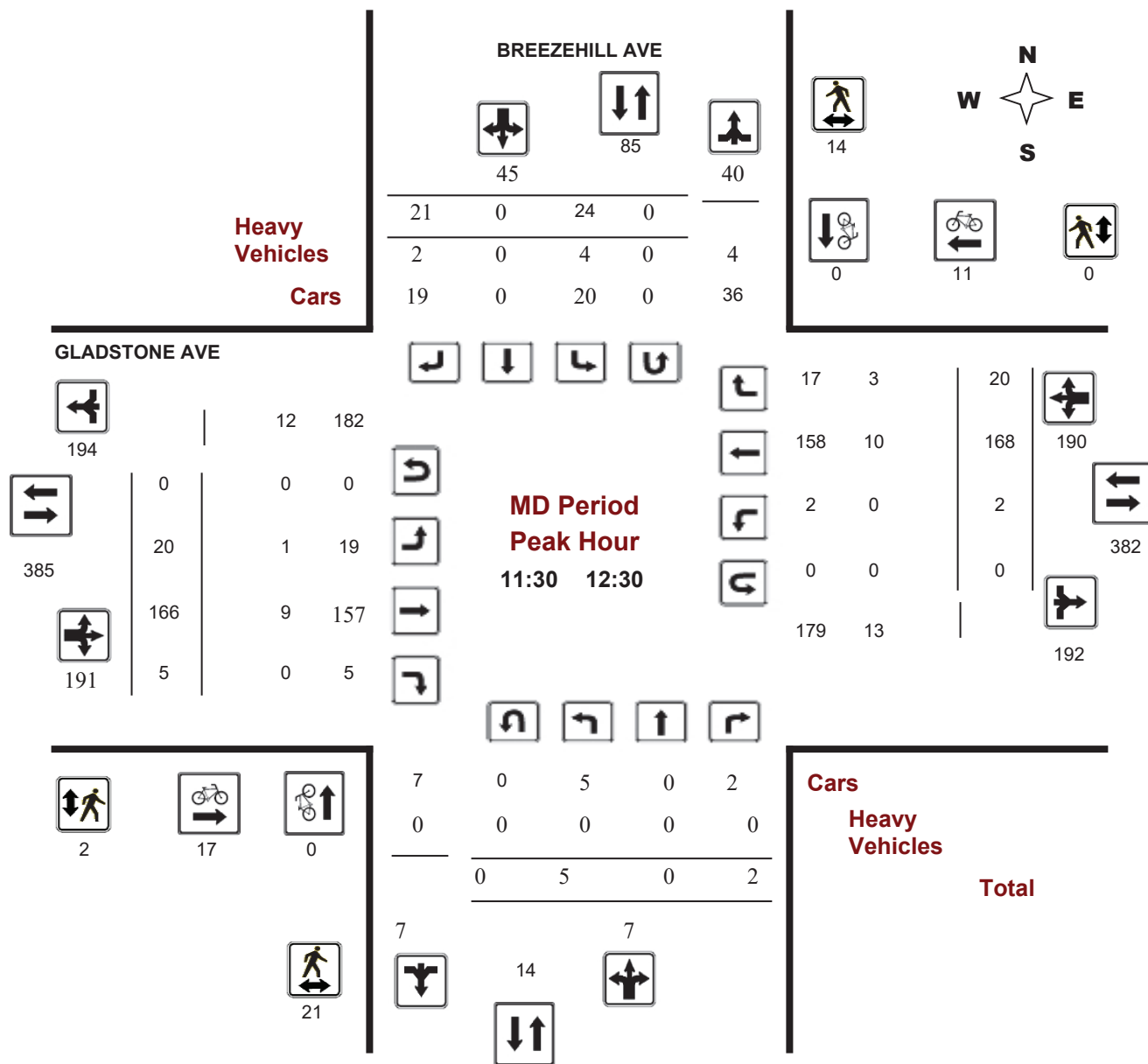
BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

Start Time: 07:00

WO No: 37971

Device: Miovision



Turning Movement Count - Peak Hour Diagram

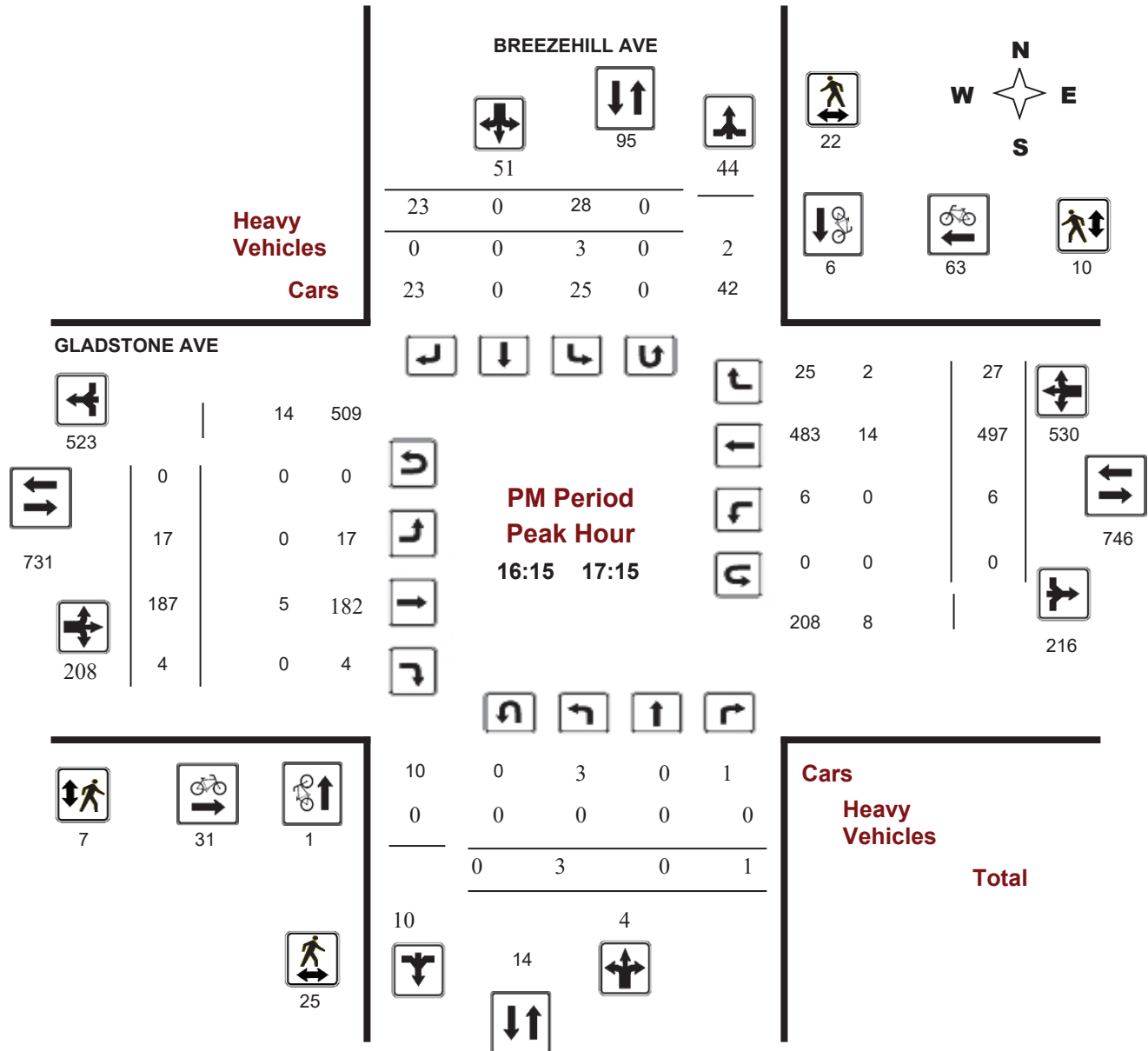
BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

Start Time: 07:00

WO No: 37971

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, July 18, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

.90

BREEZEHILL AVE

GLADSTONE AVE

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	0	1	2	3	8	1	10	19	22	17	132	0	149	0	101	16	117	266	288
08:00 09:00	1	1	3	5	10	0	20	30	35	23	202	0	225	1	156	27	184	409	444
09:00 10:00	3	1	1	5	22	0	20	42	47	24	157	0	181	2	143	32	177	358	405
11:30 12:30	5	0	2	7	24	0	21	45	52	20	166	5	191	2	168	20	190	381	433
12:30 13:30	1	2	3	6	17	2	15	34	40	13	157	1	171	2	175	9	186	357	397
15:00 16:00	4	3	3	10	18	0	20	38	48	8	164	1	173	0	347	16	363	536	584
16:00 17:00	1	0	1	2	25	0	24	49	51	17	199	5	221	3	478	24	505	726	777
17:00 18:00	5	0	3	8	16	1	14	31	39	6	157	3	166	6	441	14	461	627	666
Sub Total	20	8	18	46	140	4	144	288	334	128	1334	15	1477	16	2009	158	2183	3660	3994
U Turns	0			0	0			0	0	0			0	0			0	0	0
Total	20	8	18	46	140	4	144	288	334	128	1334	15	1477	16	2009	158	2183	3660	3994
EQ 12Hr	28	11	25	64	195	6	200	401	465	178	1854	21	2053	22	2793	220	3035	5088	5553
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																		1.39	
AVG 12Hr	25	10	22	57	176	5	180	361	418	160	1669	19	1848	20	2514	198	2732	4580	4998
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																		.90	
AVG 24Hr	33	13	29	75	231	7	236	474	549	210	2186	25	2421	26	3293	259	3578	5999	6548

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

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

BREEZEHILL AVE

GLADSTONE AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total	
07:00	07:15	0	0	0	0	2	0	1	3	3	3	32	0	35	0	18	2	20	55	58
07:15	07:30	0	0	0	0	1	0	3	4	4	4	28	0	32	0	30	8	38	70	74
07:30	07:45	0	1	1	2	0	0	3	3	5	3	36	0	39	0	18	4	22	61	66
07:45	08:00	0	0	1	1	5	1	3	9	10	7	36	0	43	0	35	2	37	80	90
08:00	08:15	0	0	1	1	4	0	4	8	9	4	40	0	44	0	30	4	34	78	87
08:15	08:30	0	0	1	1	1	0	7	8	9	10	49	0	59	0	40	8	48	107	116
08:30	08:45	1	1	0	2	3	0	8	11	13	4	53	0	57	0	42	7	49	106	119
08:45	09:00	0	0	1	1	2	0	1	3	4	5	60	0	65	1	44	8	53	118	122
09:00	09:15	1	0	1	2	2	0	2	4	6	4	38	0	42	0	27	14	41	83	89
09:15	09:30	0	0	0	0	6	0	6	12	12	8	42	0	50	0	46	9	55	105	117
09:30	09:45	0	0	0	0	9	0	7	16	16	3	35	0	38	2	38	8	48	86	102
09:45	10:00	2	1	0	3	5	0	5	10	13	9	42	0	51	0	32	1	33	84	97
11:30	11:45	2	0	1	3	5	0	5	10	13	3	44	0	47	1	39	4	44	91	104
11:45	12:00	1	0	0	1	7	0	4	11	12	9	43	1	53	1	39	2	42	95	107
12:00	12:15	1	0	0	1	7	0	7	14	15	7	40	1	48	0	42	6	48	96	111
12:15	12:30	1	0	1	2	5	0	5	10	12	1	39	3	43	0	48	8	56	99	111
12:30	12:45	0	1	0	1	8	0	3	11	12	5	36	0	41	0	37	4	41	82	94
12:45	13:00	0	1	3	4	5	1	5	11	15	5	37	0	42	1	31	1	33	75	90
13:00	13:15	0	0	0	0	2	0	4	6	6	2	45	0	47	0	49	2	51	98	104
13:15	13:30	1	0	0	1	2	1	3	6	7	1	39	1	41	1	58	2	61	102	109
15:00	15:15	2	1	0	3	2	0	6	8	11	2	43	1	46	0	67	5	72	118	129
15:15	15:30	1	1	1	3	4	0	3	7	10	0	37	0	37	0	87	4	91	128	138
15:30	15:45	1	1	0	2	7	0	4	11	13	2	39	0	41	0	88	2	90	131	144
15:45	16:00	0	0	2	2	5	0	7	12	14	4	45	0	49	0	105	5	110	159	173
16:00	16:15	0	0	0	0	2	0	6	8	8	4	56	1	61	0	103	5	108	169	177
16:15	16:30	1	0	1	2	10	0	10	20	22	2	56	2	60	2	124	5	131	191	213
16:30	16:45	0	0	0	0	6	0	2	8	8	8	46	2	56	0	118	9	127	183	191
16:45	17:00	0	0	0	0	7	0	6	13	13	3	41	0	44	1	133	5	139	183	196
17:00	17:15	2	0	0	2	5	0	5	10	12	4	44	0	48	3	122	8	133	181	193
17:15	17:30	1	0	2	3	4	1	2	7	10	0	49	1	50	2	112	3	117	167	177
17:30	17:45	2	0	1	3	1	0	6	7	10	2	34	2	38	1	114	2	117	155	165
17:45	18:00	0	0	0	0	6	0	1	7	7	0	30	0	30	0	93	1	94	124	131
Total:		20	8	18	46	140	4	144	288	334	128	1334	15	1477	16	2009	158	2183	334	3,994

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

BREEZEHILL AVE

GLADSTONE AVE

Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	11	2	13	13
07:15	07:30	1	0	1	7	4	11	12
07:30	07:45	1	1	2	13	8	21	23
07:45	08:00	2	0	2	8	9	17	19
08:00	08:15	2	1	3	24	7	31	34
08:15	08:30	0	0	0	19	4	23	23
08:30	08:45	0	0	0	36	2	38	38
08:45	09:00	0	1	1	19	2	21	22
09:00	09:15	0	1	1	14	6	20	21
09:15	09:30	0	0	0	2	7	9	9
09:30	09:45	0	0	0	7	5	12	12
09:45	10:00	0	0	0	6	6	12	12
11:30	11:45	0	0	0	3	1	4	4
11:45	12:00	0	0	0	3	4	7	7
12:00	12:15	0	0	0	7	1	8	8
12:15	12:30	0	0	0	4	5	9	9
12:30	12:45	0	0	0	2	2	4	4
12:45	13:00	0	0	0	1	2	3	3
13:00	13:15	0	1	1	3	2	5	6
13:15	13:30	0	1	1	1	4	5	6
15:00	15:15	1	2	3	3	9	12	15
15:15	15:30	0	0	0	9	6	15	15
15:30	15:45	0	1	1	10	11	21	22
15:45	16:00	0	0	0	4	7	11	11
16:00	16:15	0	0	0	4	7	11	11
16:15	16:30	0	0	0	10	10	20	20
16:30	16:45	1	0	1	8	18	26	27
16:45	17:00	0	3	3	6	14	20	23
17:00	17:15	0	3	3	7	21	28	31
17:15	17:30	2	3	5	9	24	33	38
17:30	17:45	0	0	0	11	15	26	26
17:45	18:00	0	0	0	9	11	20	20
Total		10	18	28	280	236	516	544



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

BREEZEHILL AVE

GLADSTONE 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	6	5	11	1	0	1	12
07:15 07:30	5	3	8	1	1	2	10
07:30 07:45	7	3	10	0	2	2	12
07:45 08:00	2	3	5	0	2	2	7
08:00 08:15	5	4	9	0	0	0	9
08:15 08:30	8	2	10	3	0	3	13
08:30 08:45	11	6	17	2	1	3	20
08:45 09:00	5	9	14	4	0	4	18
09:00 09:15	6	3	9	2	1	3	12
09:15 09:30	3	3	6	0	0	0	6
09:30 09:45	1	2	3	2	0	2	5
09:45 10:00	6	3	9	0	0	0	9
11:30 11:45	7	7	14	0	0	0	14
11:45 12:00	5	1	6	1	0	1	7
12:00 12:15	3	4	7	1	0	1	8
12:15 12:30	6	2	8	0	0	0	8
12:30 12:45	2	5	7	2	0	2	9
12:45 13:00	2	2	4	1	0	1	5
13:00 13:15	4	3	7	0	0	0	7
13:15 13:30	2	3	5	0	0	0	5
15:00 15:15	9	3	12	0	0	0	12
15:15 15:30	3	1	4	1	0	1	5
15:30 15:45	6	3	9	0	0	0	9
15:45 16:00	4	7	11	0	0	0	11
16:00 16:15	2	7	9	0	0	0	9
16:15 16:30	3	7	10	1	5	6	16
16:30 16:45	5	6	11	4	3	7	18
16:45 17:00	7	3	10	0	1	1	11
17:00 17:15	10	6	16	2	1	3	19
17:15 17:30	5	7	12	0	1	1	13
17:30 17:45	0	2	2	0	1	1	3
17:45 18:00	4	5	9	3	0	3	12
Total	154	130	284	31	19	50	334



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

BREEZEHILL AVE

GLADSTONE AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5
07:15 07:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
07:30 07:45	0	0	0	0	0	0	1	1	1	0	1	0	1	0	2	1	3	4	5
07:45 08:00	0	0	0	0	0	0	0	0	0	0	6	0	6	0	5	0	5	11	11
08:00 08:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5
08:15 08:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0	4	8	8
08:30 08:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
08:45 09:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4
09:00 09:15	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0	4	8	8
09:15 09:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
09:30 09:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	1	5	6	6
09:45 10:00	0	0	0	0	1	0	0	1	1	0	3	0	3	0	2	0	2	5	6
11:30 11:45	0	0	0	0	2	0	1	3	3	0	4	0	4	0	1	0	1	5	8
11:45 12:00	0	0	0	0	0	0	1	1	1	1	2	0	3	0	4	0	4	7	8
12:00 12:15	0	0	0	0	1	0	0	1	1	0	2	0	2	0	3	0	3	5	6
12:15 12:30	0	0	0	0	1	0	0	1	1	0	1	0	1	0	2	3	5	6	7
12:30 12:45	0	0	0	0	0	0	1	1	1	0	1	0	1	0	4	0	4	5	6
12:45 13:00	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3
13:00 13:15	0	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5
13:15 13:30	0	0	0	0	1	0	0	1	1	0	2	0	2	0	1	0	1	3	4
15:00 15:15	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6
15:15 15:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
15:30 15:45	0	0	0	0	1	0	0	1	1	0	1	0	1	0	1	0	1	2	3
15:45 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	1	5	7	7
16:15 16:30	0	0	0	0	2	0	0	2	2	0	2	0	2	0	3	0	3	5	7
16:30 16:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	1	3	4	4
16:45 17:00	0	0	0	0	1	0	0	1	1	0	2	0	2	0	6	1	7	9	10
17:00 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3
17:15 17:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
17:30 17:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
17:45 18:00	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
Total: None	0	0	0	0	11	0	4	15	15	1	62	0	63	0	81	8	89	152	167



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BREEZEHILL AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 18, 2018

WO No: 37971

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

BREEZEHILL AVE

GLADSTONE AVE

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

DIRECTIONAL TRAFFIC FLOW

Intersection: Somerset St W at Breezehill Ave

DATE: Day: 22 Month: 6 Year: 2023 Day of Week: Thursday

Observer: Jordan Terada Weather: Sunny

Chkd by: _____ Date: _____

TIME PERIOD: From: 8:15 am To: 9:15 am

N



Pedestrians

↔	18
↑↓	16

Street Name:
Somerset St W EB

HV Bikes

Pass. Vehicles

Street Name:

Bikes	HV	Pass. Vehicles
0	0	0
39	16	236
0	1	26

Street Name:
Breezehill Ave NB

Pass. Vehicles

Bikes HV

8	0	27
4	0	4
0	0	18

0	0	0
180	14	17
26	4	13

Pass. Vehicles

HV Bikes

Street Name:
Somerset St W WB

Pedestrians

↔	166
↑↓	4

DIRECTIONAL TRAFFIC FLOW

Intersection: Somerset St W at Breezehill Ave

DATE: Day: 22 Month: June Year: 2023 Day of Week: Thursday

Observer: Jordan Terada Weather: Sunny

Chkd by: _____ Date: _____

TIME PERIOD: From: 4:30: pm To: 5:30

N



Pedestrians

↔	40
↕	15

Street Name:
Somerset St EB

HV Bikes

Pass. Vehicles

Street Name:

Bikes HV Pass. Vehicles

0	0	
---	---	--

R

S

L

R

43	13	
----	----	--

S

S

1	0	
---	---	--

R

L

S

R

Pass. Vehicles

HV Bikes

13	0	26
0	0	2
2	0	7

Pass. Vehicles

Bikes HV

Street Name:
Somerset St WB

Pedestrians

↔	63
↕	0



Turning Movement Count Bicycle Summary Flow Diagram



Gladstone Avenue & Loretta Avenue North

Ottawa, ON

Bicycles

(Including electric bicycles and electric scooters)

Note:
Bicycle volumes are **NOT** included in vehicle totals.

Loretta Ave. (N)

Gladstone Ave.

Tuesday, April 23, 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward 15

Gladstone Ave.

120

269

149

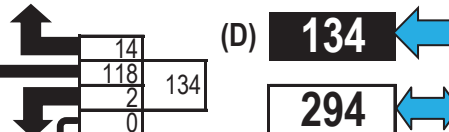
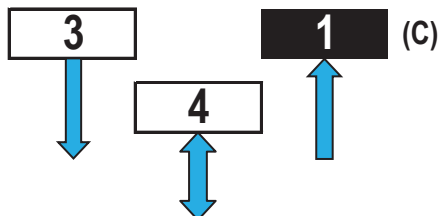
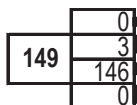
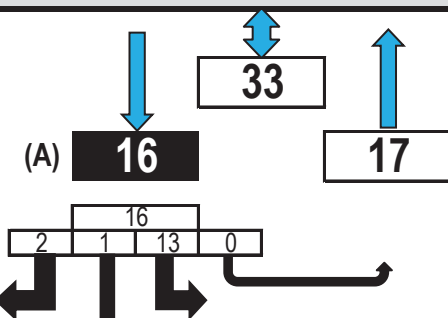
Includes all bicycles travelling on sidewalks.

Loretta Ave. (N)

Total Bicycle Volume

300

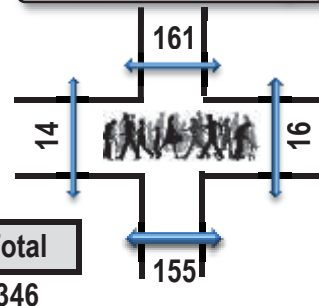
Approaching Intersection
(A+B+C+D)



Bicycles
comprise
6.36%
of total traffic

160

All Pedestrian Crossings



Gladstone Ave.

Eastbound

Gladstone Ave.

Westbound

Loretta Ave. (N)

Northbound

Loretta Ave. (N)

Southbound

Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	26	0	0	26	0	9	1	0	10	0	0	0	0	0	1	1	0	0	2	38
0800-0900	1	55	0	0	56	1	15	2	0	18	0	0	1	0	1	7	0	0	0	7	82
0900-1000	0	15	0	0	15	0	8	0	0	8	0	0	0	0	0	1	0	0	0	1	24
1130-1230	0	3	0	0	3	0	5	0	0	5	0	0	0	0	0	1	0	0	0	1	9
1230-1330	0	8	0	0	8	0	4	1	0	5	0	0	0	0	0	1	0	0	0	1	14
1500-1600	1	10	0	0	11	0	14	1	0	15	0	0	0	0	0	1	0	1	0	2	28
1600-1700	1	17	0	0	18	1	29	2	0	32	0	0	0	0	0	1	0	0	0	1	51
1700-1800	0	12	0	0	12	0	34	7	0	41	0	0	0	0	0	0	0	1	0	1	54
Totals	3	146	0	0	149	2	118	14	0	134	0	0	1	0	1	13	1	2	0	16	300

Comments:

No traffic issues noted during survey. OCTranspo and school buses comprise 41.05% of the heavy vehicle traffic.



Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams All Vehicles Except Bicycles



Gladstone Avenue & Loretta Avenue North

Ottawa, ON

All Vehicles

(Except Bicycles & Electric Scooters)

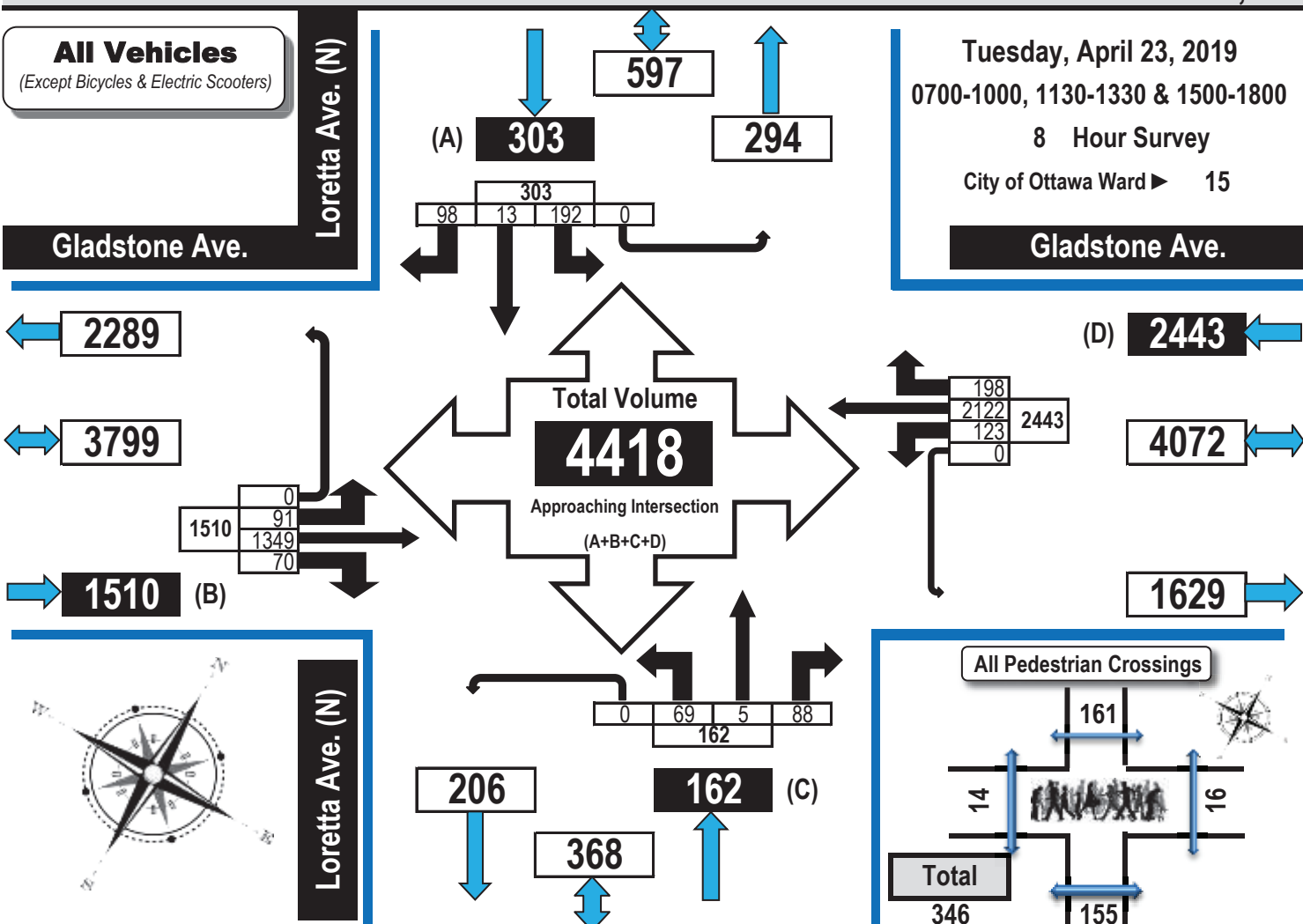
Tuesday, April 23, 2019

0700-1000, 1130-1330 & 1500-1800

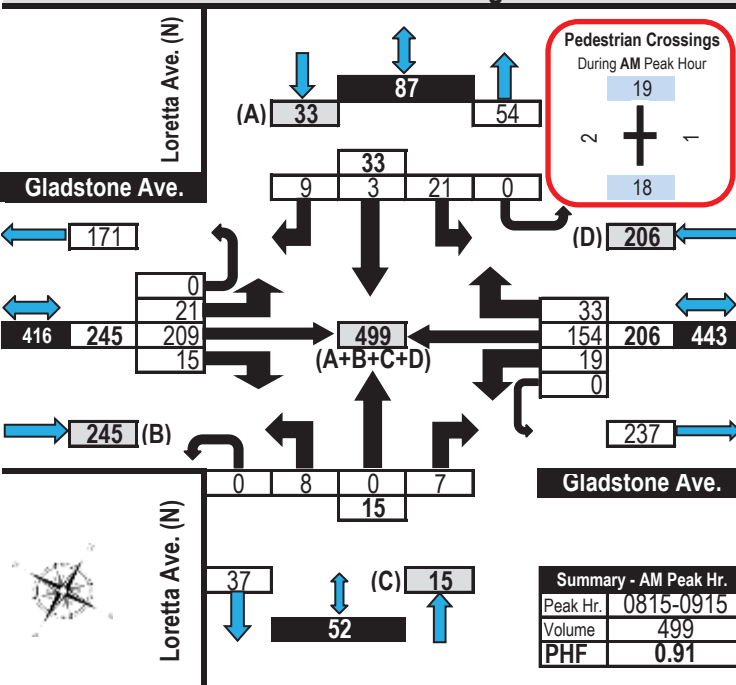
8 Hour Survey

City of Ottawa Ward 15

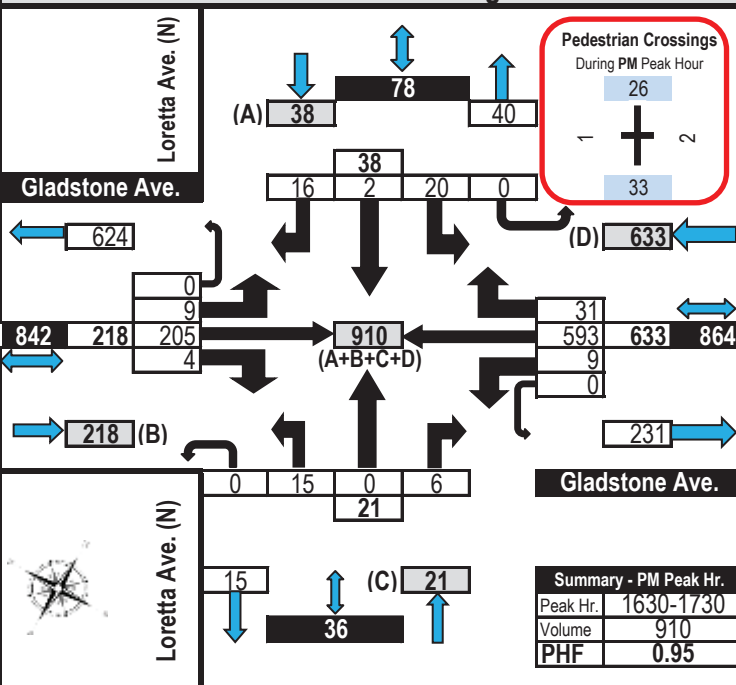
Gladstone Ave.



AM Peak Hour Flow Diagram



PM Peak Hour Flow Diagram





Turning Movement Count Heavy Vehicle Summary Flow Diagram



Gladstone Avenue & Loretta Avenue North

Ottawa, ON

Heavy Vehicles

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

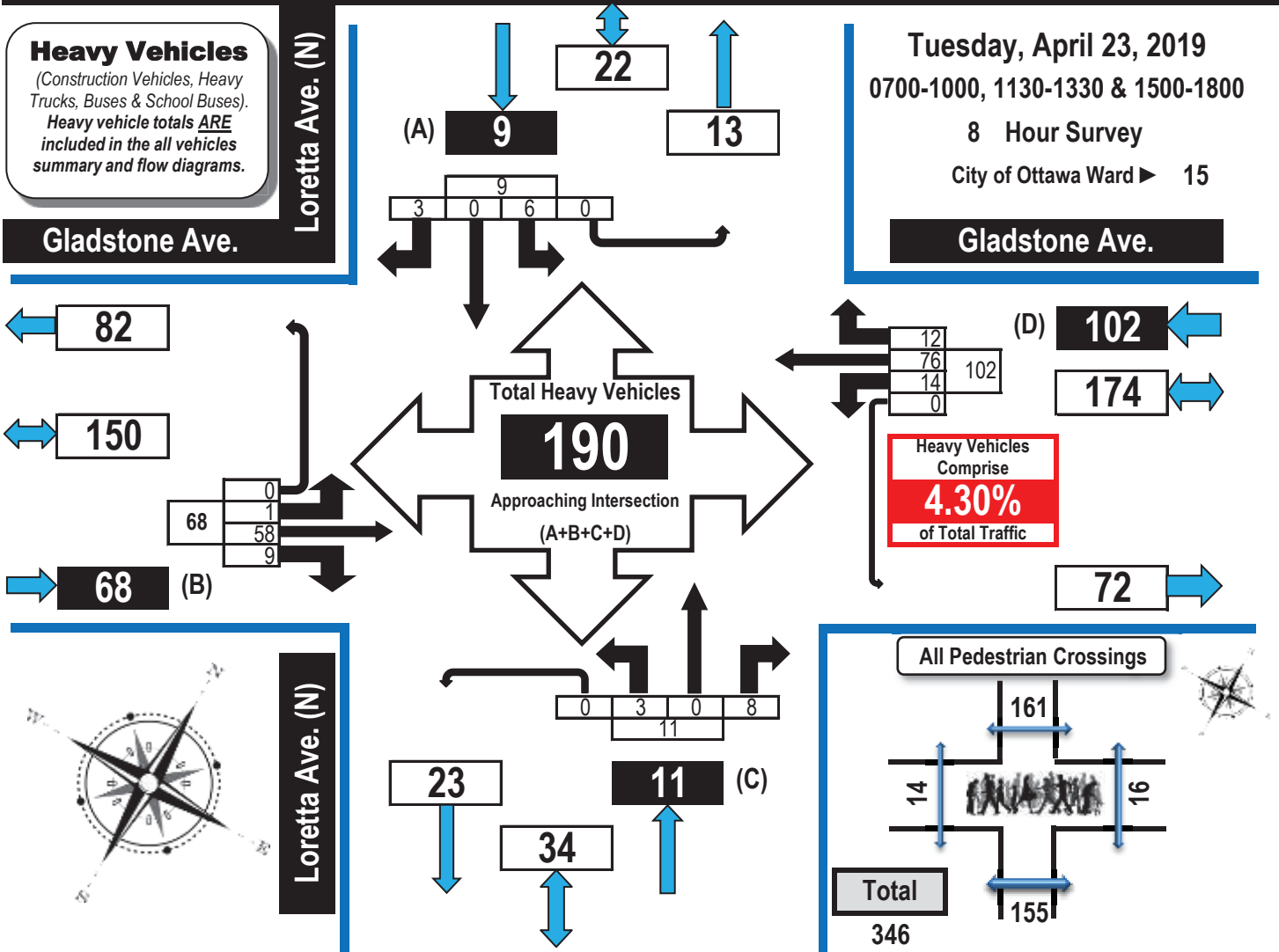
Tuesday, April 23, 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward ► 15

Gladstone Ave.



Gladstone Ave.

Eastbound

Gladstone Ave.

Westbound

Loretta Ave. (N)

Northbound

Loretta Ave. (N)

Southbound

Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	6	2	0	8	1	7	1	0	9	0	0	1	0	1	0	0	0	0	0	18
0800-0900	0	8	1	0	9	0	10	3	0	13	0	0	4	0	4	2	0	0	0	2	28
0900-1000	1	14	1	0	16	2	15	3	0	20	0	0	0	0	0	1	0	2	0	3	39
1130-1230	0	9	3	0	12	1	7	1	0	9	1	0	0	0	1	0	0	1	0	1	23
1230-1330	0	4	0	0	4	5	13	2	0	20	0	0	1	0	1	0	0	0	0	0	25
1500-1600	0	6	1	0	7	3	7	1	0	11	0	0	2	0	2	1	0	0	0	1	21
1600-1700	0	5	1	0	6	1	10	0	0	11	2	0	0	0	2	1	0	0	0	1	20
1700-1800	0	6	0	0	6	1	7	1	0	9	0	0	0	0	0	1	0	0	0	1	16
Totals	1	58	9	0	68	14	76	12	0	102	3	0	8	0	11	6	0	3	0	9	190

Comments:

No traffic issues noted during survey. OCTranspo and school buses comprise 41.05% of the heavy vehicle traffic.

Turning Movement Count Pedestrian Crossings Summary and Flow Diagram

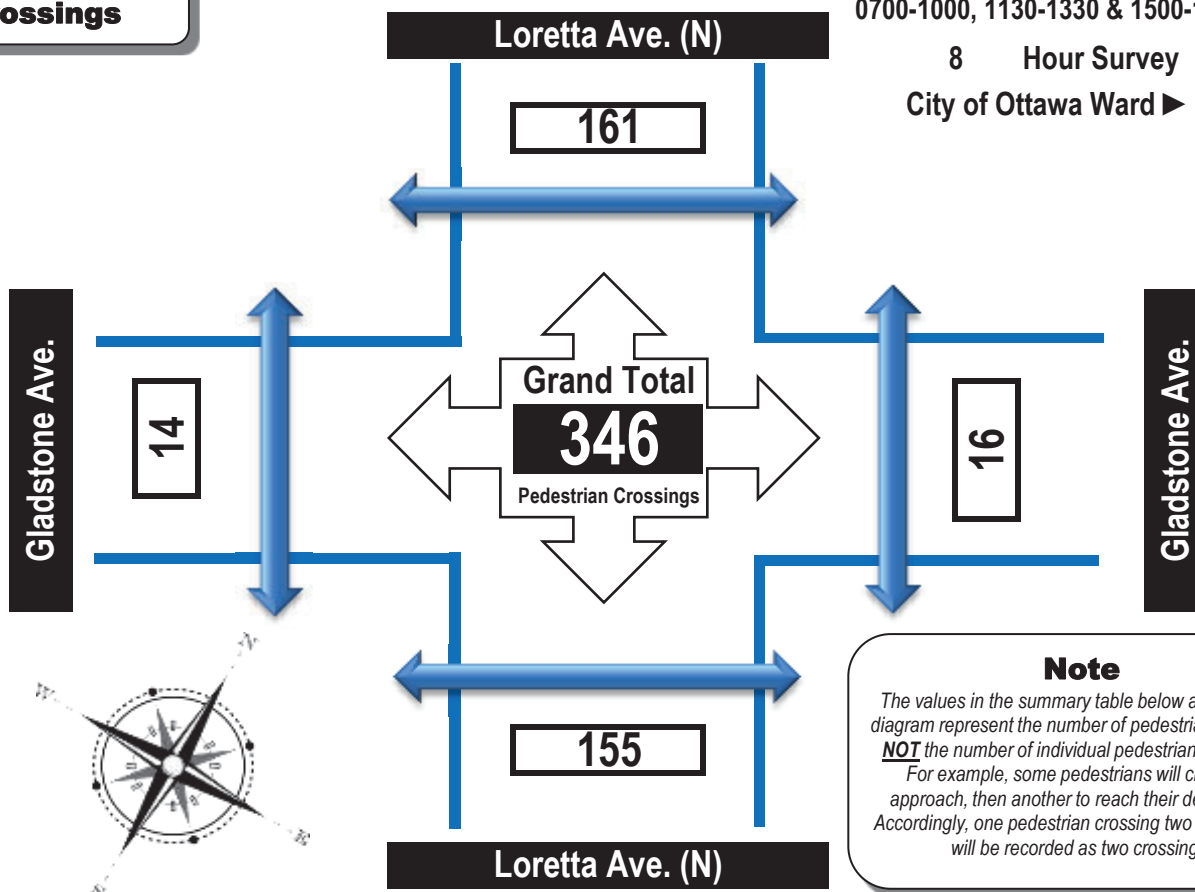


Gladstone Avenue & Loretta Avenue North

Ottawa, ON

Pedestrian Crossings

Tuesday, April 23, 2019
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 15



Time Period	West Side Crossing Gladstone Ave.	East Side Crossing Gladstone Ave.	Street Total	South Side Crossing Loretta Ave. (N)	North Side Crossing Loretta Ave. (N)	Street Total	Grand Total
0700-0800	6	2	8	13	15	28	36
0800-0900	2	2	4	14	16	30	34
0900-1000	0	0	0	16	17	33	33
1130-1230	2	3	5	15	20	35	40
1230-1330	2	5	7	12	19	31	38
1500-1600	0	1	1	24	23	47	48
1600-1700	0	0	0	27	28	55	55
1700-1800	2	3	5	34	23	57	62
Totals	14	16	30	155	161	316	346

Comments:

No traffic issues noted during survey. OCTranspo and school buses comprise 41.05% of the heavy vehicle traffic.



Turning Movement Count

Summary Report Including Peak Hours, AADT and Expansion Factors

All Vehicles Except Bicycles



Gladstone Avenue & Loretta Avenue North

Ottawa, ON

Survey Date: Tuesday, April 23, 2019

Start Time: 0700

AADT Factor: 0.7

Weather AM: Partly Cloudy +10° C

Survey Duration: 8 Hrs.

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Weather PM: Overcast +17° C

Surveyor(s): T. Carmody

Gladstone Ave.						Gladstone Ave.						Loretta Ave. (N)						Loretta Ave. (N)					
Eastbound						Westbound						Northbound						Southbound					
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	6	142	18	0	166	22	112	24	0	158	324	1	0	6	0	7	13	3	4	0	20	27	351
0800-0900	17	214	9	0	240	19	140	35	0	194	434	8	0	10	0	18	20	2	3	0	25	43	477
0900-1000	16	168	11	0	195	24	160	27	0	211	406	2	0	7	0	9	14	2	11	0	27	36	442
1130-1230	12	137	10	0	159	7	164	25	0	196	355	7	1	7	0	15	24	0	9	0	33	48	403
1230-1330	11	136	11	0	158	25	145	19	0	189	347	3	1	9	0	13	26	3	15	0	44	57	404
1500-1600	10	174	5	0	189	13	358	22	0	393	582	26	1	35	0	62	39	1	24	0	64	126	708
1600-1700	9	188	2	0	199	4	525	18	0	547	746	11	1	10	0	22	37	1	20	0	58	80	826
1700-1800	10	190	4	0	204	9	518	28	0	555	759	11	1	4	0	16	19	1	12	0	32	48	807
Totals	91	1349	70	0	1510	123	2122	198	0	2443	3953	69	5	88	0	162	192	13	98	0	303	465	4418

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

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

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39																							
Equ. 12 Hr	126	1875	97	0	2099	171	2950	275	0	3396	5495	96	7	122	0	225	267	18	136	0	421	646	6141
Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.7																							
AADT 12-hr	89	1313	68	0	1469	120	2065	193	0	2377	3846	67	5	86	0	158	187	13	95	0	295	452	4299
24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																							
AADT 24 Hr	116	1719	89	0	1925	157	2705	252	0	3114	5039	88	6	112	0	206	245	17	125	0	386	593	5631

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.91												Highest Hourly Vehicle Volume Between 0700h & 1000h											
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0815-0915	21	209	15	0	245	19	154	33	0	206	451	8	0	7	0	15	21	3	9	0	33	48	499
OFF Peak Hour Factor → 0.86												Highest Hourly Vehicle Volume Between 1130h & 1330h											
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1200-1300	11	146	12	0	169	15	166	20	0	201	370	5	2	6	0	13	21	2	9	0	32	45	415
PM Peak Hour Factor → 0.95												Highest Hourly Vehicle Volume Between 1500h & 1800h											
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1630-1730	9	205	4	0	218	9	593	31	0	633	851	15	0	6	0	21	20	2	16	0	38	59	910

Comments:

No traffic issues noted during survey. OCTranspo and school buses comprise 41.05% of the heavy vehicle traffic.

Notes:

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

Appendix D:

Collision Data



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: BREEZEHILL AVE N btwn SOMERSET ST W & LAUREL ST									
Traffic Control: No control									
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Sep-29, Thu,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	East	Unknown	Unknown	Unattended vehicle	0
Total Collisions: 1									
Location: BREEZEHILL AVE @ GLADSTONE AVE									
Traffic Control: Stop sign									
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Dec-07, Wed,15:25	Clear	Turning movement	Non-fatal injury	Wet	East	Turning left	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Passenger van	Other motor vehicle	
2018-Jun-28, Thu,16:27	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-14, Fri,23:13	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
Total Collisions: 3									
Location: BREEZEHILL AVE @ SOMERSET ST									
Traffic Control: Stop sign									
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Dec-14, Mon,16:00	Clear	Angle	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
Total Collisions: 1									
Location: GLADSTONE AVE @ LORETTA AVE									
Traffic Control: Stop sign									
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Nov-11, Wed,19:26	Rain	Turning movement	Non-fatal injury	Wet	East	Making "U" turn	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jun-15, Fri,22:14	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Pedestrian	1



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: LAUREL ST btwn BREEZEHILL AVE N & LORETTA AVE N

Traffic Control: No control

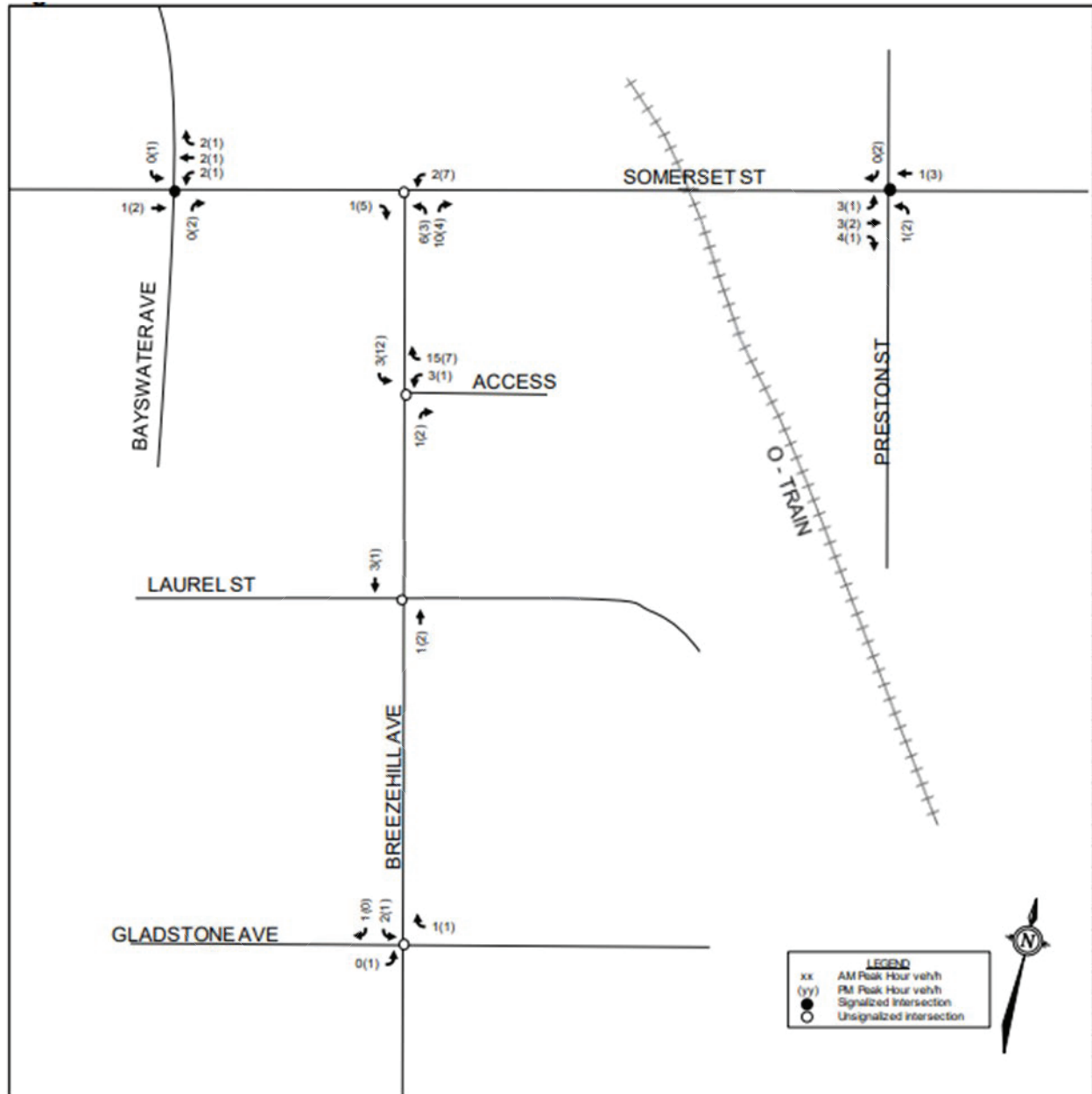
Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jun-06, Sat,20:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	0
2019-Feb-05, Tue,00:00	Snow	SMV unattended vehicle	P.D. only	Ice	East	Unknown	Unknown	Unattended vehicle	0

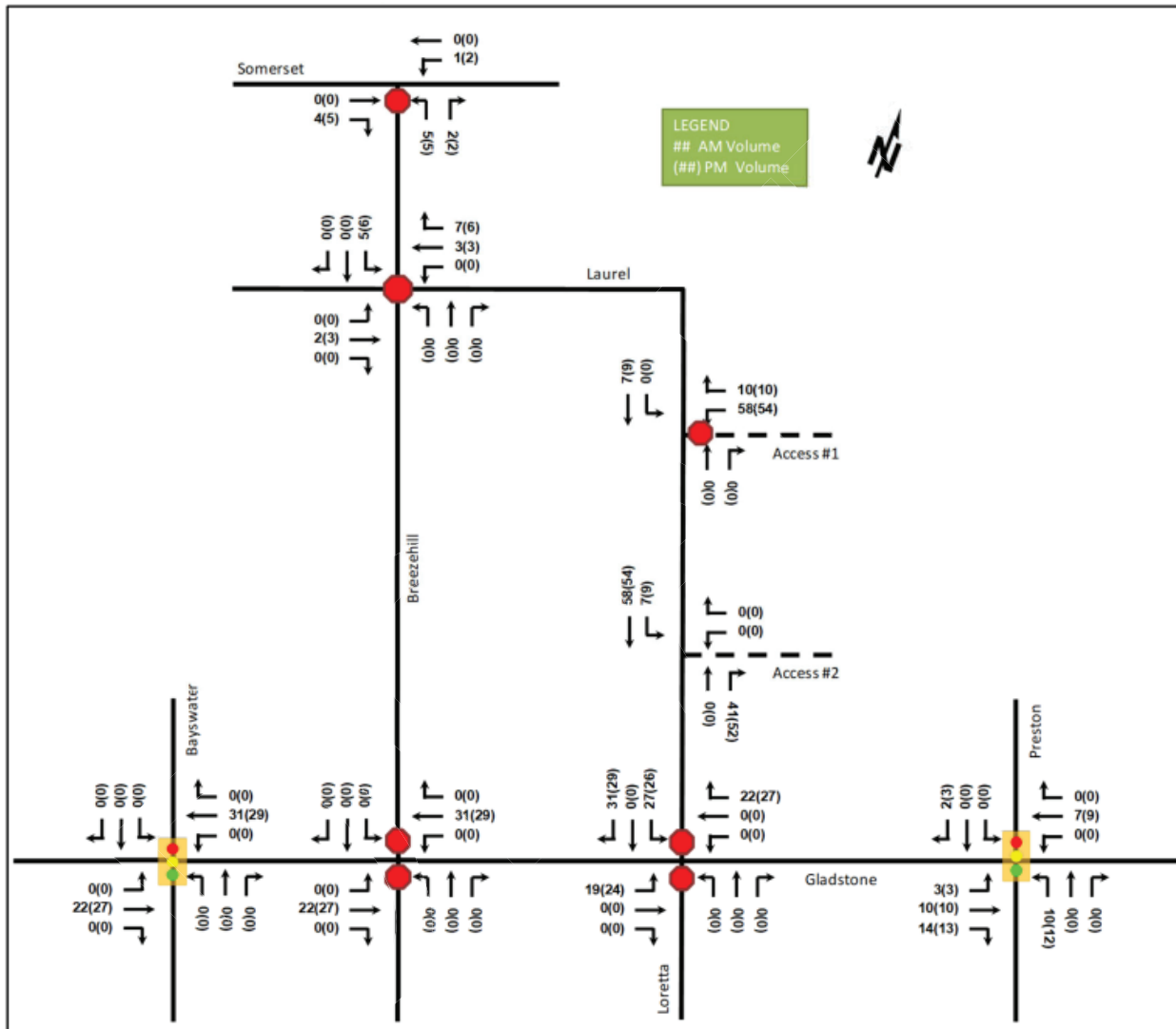
Appendix E:

Other Developments Traffic Volumes

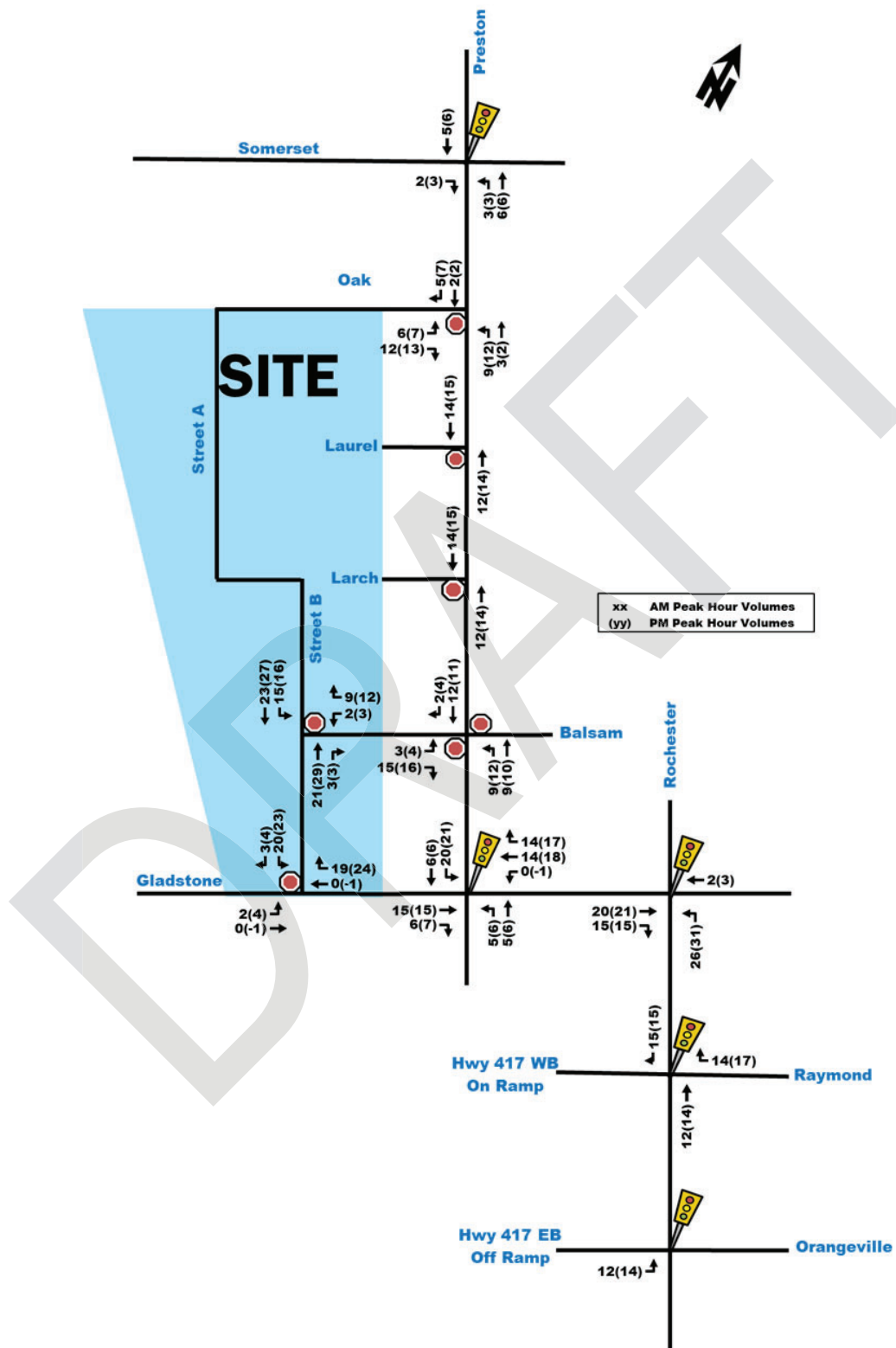
1040 Somerset St W Site Generated Traffic Volumes



951 Gladstone Ave and 145 Loretta Ave N Site Generated Traffic Volumes



Gladstone Village, 933 Gladstone Site Generated Traffic Volumes



Appendix F:

TDM Checklists

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	☐
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 (<i>multi-family, condominium</i>)	☒
2.2 Bicycle skills training		
BETTER	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	☐

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>)	☒
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	☐
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 (<i>subdivision</i>)	☐
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 (<i>multi-family</i>)	☐
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	☐
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 (<i>condominium</i>)	☐
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	☒

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	☒
6.2 Personalized trip planning			
BETTER	★	6.2.1 Offer personalized trip planning to new residents	☐

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

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

TDM-supportive design & infrastructure measures: <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	☒
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (<i>see Official Plan policy 4.3.3</i>)	☒
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>)	☒

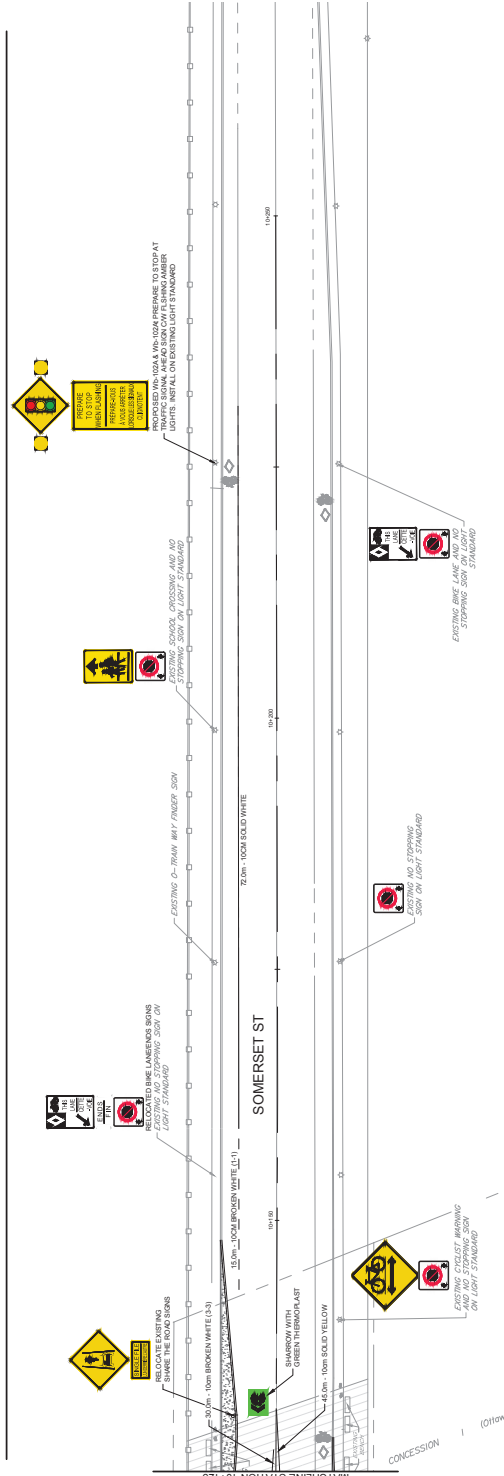
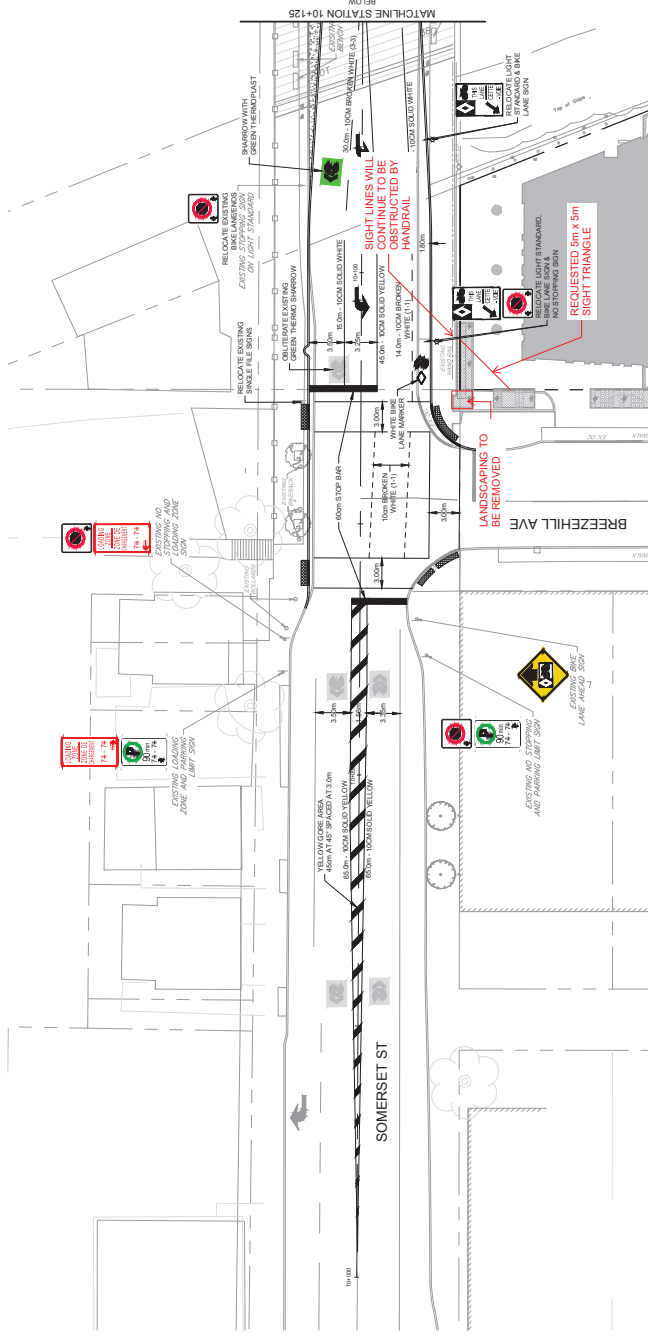
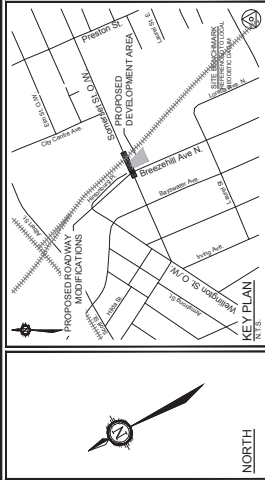
TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (<i>see Official Plan policy 4.3.10</i>)	☒
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>)	☒
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>)	☒
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☒
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☒
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☒

TDM-supportive design & infrastructure measures: <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 (<i>see Official Plan policy 4.3.6</i>)	☒
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 (<i>see Zoning By-law Section 111</i>)	☒
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 (<i>see Zoning By-law Section 111</i>)	☒
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☒
2.2 Secure bicycle parking			
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (<i>see Zoning By-law Section 111</i>)	☒
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☒
2.3 Bicycle repair station			
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☒
3. TRANSIT			
3.1 Customer amenities			
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

TDM-supportive design & infrastructure measures: <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	☒
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>)	☒
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	☐
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>)	☐
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)	☒

Appendix G:

Somerset/Breezehill Roadway Modification Design



NOTE:
THE PORTION OF ALL POLE LINES, CONDUITS,
UNDERGROUND UTILITIES AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THIS DRAWING. THE LOCATION OF ALL SUCH UTILITIES,
STRUCTURES AND CONDUITS IS NOT GUARANTEED.
THE EXACT LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

FOR REVIEW ONLY

SCALE	1:250
1:250	1:250
0 2 4 6 8 10	0 2 4 6 8 10
DATE	DEC 10/22
BY	0.00
REVISION	
No.	

NOVATECH
Engineering & Construction
Suite 200, 340 McLeod Campbell Drive
Ottawa, Ontario, Canada K2M 1T6
Telephone: (613) 234-8807
Fax: (613) 234-8807
Website: www.novatech.ca

LOCATION
CITY OF OTTAWA
SOMERSET STREET ROADWAY MODIFICATION
DRAWING NAME
PROPOSED PAVEMENT MARKINGS
& SIGNAGE
DRAWING NO.
112191-RM
REV # 1
112191
P-PAVING

Appendix H:

Synchro Analysis Reports

Existing Conditions

Lanes, Volumes, Timings
1: Breezehill Ave N & Somerset St W

Existing AM
12/04/2023



Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	252	194	12
Future Volume (vph)	252	194	12
Sign Control	Free	Free	Stop
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis

1: Breezehill Ave N & Somerset St W

Existing AM
12/04/2023

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	252	27	30	194	12	31
Future Volume (Veh/h)	252	27	30	194	12	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	280	30	33	216	13	34
Pedestrians	16			4	166	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	3.5			3.5	3.5	
Percent Blockage	0			0	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			476	759		465
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476	759		465
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			97	96		94
cM capacity (veh/h)			1033	343		568
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	310	249	47			
Volume Left	0	33	13			
Volume Right	30	0	34			
cSH	1700	1033	481			
Volume to Capacity	0.18	0.03	0.10			
Queue Length 95th (m)	0.0	0.8	2.5			
Control Delay (s)	0.0	1.4	13.3			
Lane LOS			A B			
Approach Delay (s)	0.0	1.4	13.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			43.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Breezehill Ave N & Gladstone Ave

Existing AM
12/04/2023



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	193	159	1	0
Future Volume (vph)	193	159	1	0
Sign Control	Free	Free	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 39.3%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis

2: Breezehill Ave N & Gladstone Ave

Existing AM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	193	0	1	159	38	2	1	2	13	0	17
Future Volume (Veh/h)	21	193	0	1	159	38	2	1	2	13	0	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	214	0	1	177	42	2	1	2	14	0	19
Pedestrians		8			2			25			21	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	240			239			512	527	241	486	506	227
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	240			239			512	527	241	486	506	227
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	97	100	98
cM capacity (veh/h)	1319			1318			446	442	792	475	454	805
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	237	220	5	33								
Volume Left	23	1	2	14								
Volume Right	0	42	2	19								
cSH	1319	1318	539	622								
Volume to Capacity	0.02	0.00	0.01	0.05								
Queue Length 95th (m)	0.4	0.0	0.2	1.3								
Control Delay (s)	0.9	0.0	11.7	11.1								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.9	0.0	11.7	11.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			39.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Breezehill Ave N & Laurel St

Existing AM
12/04/2023



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	26	8	49	31
Future Volume (vph)	26	8	49	31
Sign Control	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 26.8%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis 3: Breezehill Ave N & Laurel St

Existing AM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	26	10	6	8	6	11	49	10	22	31	16
Future Volume (vph)	11	26	10	6	8	6	11	49	10	22	31	16
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	29	11	7	9	7	12	54	11	24	34	18
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	52	23	77	76								
Volume Left (vph)	12	7	12	24								
Volume Right (vph)	11	7	11	18								
Hadj (s)	-0.05	-0.09	-0.02	-0.04								
Departure Headway (s)	4.2	4.2	4.1	4.1								
Degree Utilization, x	0.06	0.03	0.09	0.09								
Capacity (veh/h)	822	820	846	857								
Control Delay (s)	7.5	7.3	7.5	7.5								
Approach Delay (s)	7.5	7.3	7.5	7.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay	7.5											
Level of Service	A											
Intersection Capacity Utilization	26.8%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
4: Loretta Ave & Gladstone Ave

Existing AM
12/04/2023

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Configurations	↕	↕	↕	↕
Traffic Volume (vph)	209	154	0	3
Future Volume (vph)	209	154	0	3
Sign Control	Free	Free	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 28.6%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis

4: Loretta Ave & Gladstone Ave

Existing AM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	209	15	19	154	33	8	0	7	21	3	9
Future Volume (Veh/h)	21	209	15	19	154	33	8	0	7	21	3	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	232	17	21	171	37	9	0	8	23	3	10
Pedestrians		2			1			18			19	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	227			267			550	574	260	546	564	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	227			267			550	574	260	546	564	210
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			98	100	99	95	99	99
cM capacity (veh/h)	1334			1290			421	411	775	427	416	825
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	272	229	17	36								
Volume Left	23	21	9	23								
Volume Right	17	37	8	10								
cSH	1334	1290	536	491								
Volume to Capacity	0.02	0.02	0.03	0.07								
Queue Length 95th (m)	0.4	0.4	0.7	1.8								
Control Delay (s)	0.8	0.9	11.9	12.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.8	0.9	11.9	12.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			28.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Breezehill Ave N & Somerset St W

Existing PM
12/04/2023



Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	359	420	13
Future Volume (vph)	359	420	13
Sign Control	Free	Free	Stop
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 51.4%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis

1: Breezehill Ave N & Somerset St W

Existing PM
12/04/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↘↙	
Traffic Volume (veh/h)	359	18	21	420	13	28
Future Volume (Veh/h)	359	18	21	420	13	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	399	20	23	467	14	31
Pedestrians	15				63	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	3.5				3.5	
Percent Blockage	0				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			482		1000	472
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			482		1000	472
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		95	95
cM capacity (veh/h)			1061		258	581
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	419	490	45			
Volume Left	0	23	14			
Volume Right	20	0	31			
cSH	1700	1061	418			
Volume to Capacity	0.25	0.02	0.11			
Queue Length 95th (m)	0.0	0.5	2.7			
Control Delay (s)	0.0	0.6	14.7			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	14.7			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			51.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Breezehill Ave N & Gladstone Ave

Existing PM
12/04/2023



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	187	591	0	0
Future Volume (vph)	187	591	0	0
Sign Control	Free	Free	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 49.0%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis

2: Breezehill Ave N & Gladstone Ave

Existing PM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	187	4	6	591	27	3	0	1	28	0	23
Future Volume (Veh/h)	17	187	4	6	591	27	3	0	1	28	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	19	208	4	7	657	30	3	0	1	31	0	26
Pedestrians		7			10			25			22	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	709			237			992	996	245	967	983	701
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	709			237			992	996	245	967	983	701
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	100	86	100	94
cM capacity (veh/h)	884			1320			203	235	786	224	239	435
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	231	694	4	57								
Volume Left	19	7	3	31								
Volume Right	4	30	1	26								
cSH	884	1320	249	288								
Volume to Capacity	0.02	0.01	0.02	0.20								
Queue Length 95th (m)	0.5	0.1	0.4	5.5								
Control Delay (s)	1.0	0.1	19.7	20.6								
Lane LOS	A	A	C	C								
Approach Delay (s)	1.0	0.1	19.7	20.6								
Approach LOS			C	C								
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			49.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Breezehill Ave N & Laurel St

Existing PM
12/04/2023



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	8	22	22	45
Future Volume (vph)	8	22	22	45
Sign Control	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 26.0%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis 3: Breezehill Ave N & Laurel St

Existing PM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	8	10	4	22	6	24	22	1	3	45	32
Future Volume (vph)	12	8	10	4	22	6	24	22	1	3	45	32
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	9	11	4	24	7	27	24	1	3	50	36
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	33	35	52	89								
Volume Left (vph)	13	4	27	3								
Volume Right (vph)	11	7	1	36								
Hadj (s)	-0.09	-0.06	0.13	-0.20								
Departure Headway (s)	4.1	4.2	4.3	3.9								
Degree Utilization, x	0.04	0.04	0.06	0.10								
Capacity (veh/h)	834	831	819	902								
Control Delay (s)	7.3	7.3	7.5	7.3								
Approach Delay (s)	7.3	7.3	7.5	7.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.4									
Level of Service			A									
Intersection Capacity Utilization			26.0%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
4: Loretta Ave & Gladstone Ave

Existing PM
12/04/2023

				
Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	205	593	0	2
Future Volume (vph)	205	593	0	2
Sign Control	Free	Free	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 49.1%			ICU Level of Service A	
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis

4: Loretta Ave & Gladstone Ave

Existing PM
12/04/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	205	4	9	593	31	15	0	6	20	2	16
Future Volume (Veh/h)	9	205	4	9	593	31	15	0	6	20	2	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	10	228	4	10	659	34	17	0	7	22	2	18
Pedestrians		1			2			33			25	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	718			265			999	1021	265	980	1006	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	718			265			999	1021	265	980	1006	702
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	100	99	90	99	96
cM capacity (veh/h)	877			1286			204	228	766	219	233	435
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	242	703	24	42								
Volume Left	10	10	17	22								
Volume Right	4	34	7	18								
cSH	877	1286	259	279								
Volume to Capacity	0.01	0.01	0.09	0.15								
Queue Length 95th (m)	0.3	0.2	2.3	4.0								
Control Delay (s)	0.5	0.2	20.3	20.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.5	0.2	20.3	20.2								
Approach LOS			C	C								
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			49.1%		ICU Level of Service				A			
Analysis Period (min)			15									

2031 Future Background Conditions

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025



Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	→	↰	→	↰
Traffic Volume (vph)	254	39	197	22
Future Volume (vph)	254	39	197	22
Lane Group Flow (vph)	309	42	214	76
Turn Type	NA	Perm	NA	Prot
Protected Phases	4		8	2
Permitted Phases		8		
Detector Phase	4	8	8	2
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	23.1	23.2	23.2	24.2
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.0
All-Red Time (s)	1.8	1.9	1.9	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.2	5.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	C-Min	None
Act Effct Green (s)	53.4	53.3	53.3	8.7
Actuated g/C Ratio	0.76	0.76	0.76	0.12
v/c Ratio	0.23	0.06	0.15	0.30
Control Delay	4.5	4.7	4.3	14.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.7	4.3	14.8
LOS	A	A	A	B
Approach Delay	4.5		4.4	14.8
Approach LOS	A		A	B
Queue Length 50th (m)	8.2	1.0	5.6	2.7
Queue Length 95th (m)	27.6	5.5	19.5	10.5
Internal Link Dist (m)	84.4		143.1	218.2
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1364	663	1433	709
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	0.23	0.06	0.15	0.11

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 30 (43%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 43.8%

ICU Level of Service A

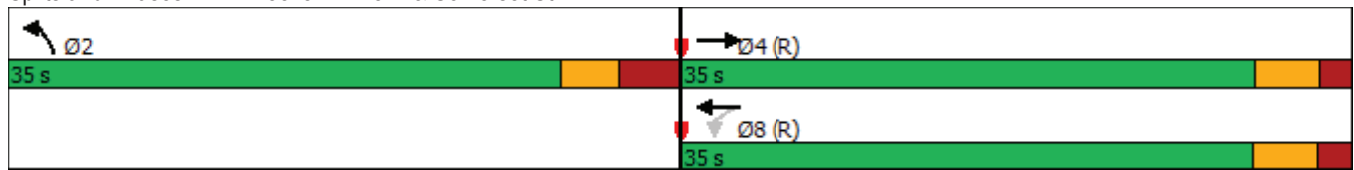
Analysis Period (min) 15

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025

Splits and Phases: 1: Breezehill Ave N & Somerset St W



Lanes and Geometrics

2: Breezehill Ave N & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	193	159	1	0
Future Volume (vph)	193	159	1	0
Lane Group Flow (vph)	233	216	5	36
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 37.9% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
2: Breezehill Ave N & Gladstone Ave

05/16/2025

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	193	0	1	159	39	2	1	2	15	0	18
Future Vol, veh/h	21	193	0	1	159	39	2	1	2	15	0	18
Conflicting Peds, #/hr	21	0	25	25	0	21	8	0	2	2	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	210	0	1	173	42	2	1	2	16	0	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	236	0	0	235	0	0	495	519	237	477	498	223
Stage 1	-	-	-	-	-	-	281	281	-	217	217	-
Stage 2	-	-	-	-	-	-	214	238	-	260	281	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1331	-	-	1332	-	-	485	461	802	498	474	817
Stage 1	-	-	-	-	-	-	726	678	-	785	723	-
Stage 2	-	-	-	-	-	-	788	708	-	745	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1303	-	-	1298	-	-	450	431	780	477	443	793
Mov Cap-2 Maneuver	-	-	-	-	-	-	450	431	-	477	443	-
Stage 1	-	-	-	-	-	-	693	648	-	753	707	-
Stage 2	-	-	-	-	-	-	762	692	-	725	648	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0			11.8			11.3		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	536	1303	-	-	1298	-	-	609				
HCM Lane V/C Ratio	0.01	0.018	-	-	0.001	-	-	0.059				
HCM Control Delay (s)	11.8	7.8	0	-	7.8	0	-	11.3				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2				

Lanes and Geometrics

3: Breezehill Ave N & Laurel St

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	26	8	50	34
Future Volume (vph)	26	8	50	34
Lane Group Flow (vph)	51	34	77	89
Sign Control	Stop	Stop	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 27.3% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	26	10	6	8	17	11	50	10	32	34	16
Future Vol, veh/h	11	26	10	6	8	17	11	50	10	32	34	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	28	11	7	9	18	12	54	11	35	37	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	23%	19%	39%
Vol Thru, %	70%	55%	26%	41%
Vol Right, %	14%	21%	55%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	47	31	82
LT Vol	11	11	6	32
Through Vol	50	26	8	34
RT Vol	10	10	17	16
Lane Flow Rate	77	51	34	89
Geometry Grp	1	1	1	1
Degree of Util (X)	0.088	0.059	0.037	0.102
Departure Headway (Hd)	4.095	4.166	3.97	4.101
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	867	847	887	867
Service Time	2.156	2.253	2.063	2.159
HCM Lane V/C Ratio	0.089	0.06	0.038	0.103
HCM Control Delay	7.6	7.5	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.1	0.3

Lanes and Geometrics

4: Loretta Ave & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	211	157	0	3
Future Volume (vph)	211	157	0	3
Lane Group Flow (vph)	298	262	17	101
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 40.0% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
4: Loretta Ave & Gladstone Ave

05/16/2025

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	211	15	19	157	64	8	0	7	49	3	41
Future Vol, veh/h	49	211	15	19	157	64	8	0	7	49	3	41
Conflicting Peds, #/hr	19	0	18	18	0	19	2	0	1	1	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	229	16	21	171	70	9	0	8	53	3	45
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	260	0	0	263	0	0	635	663	256	615	636	227
Stage 1	-	-	-	-	-	-	361	361	-	267	267	-
Stage 2	-	-	-	-	-	-	274	302	-	348	369	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1304	-	-	1301	-	-	391	382	783	403	395	812
Stage 1	-	-	-	-	-	-	657	626	-	738	688	-
Stage 2	-	-	-	-	-	-	732	664	-	668	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1279	-	-	1277	-	-	341	344	768	371	356	795
Mov Cap-2 Maneuver	-	-	-	-	-	-	341	344	-	371	356	-
Stage 1	-	-	-	-	-	-	614	585	-	689	662	-
Stage 2	-	-	-	-	-	-	673	639	-	629	581	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.6			13.1			14.4		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	460	1279	-	-	1277	-	-	484				
HCM Lane V/C Ratio	0.035	0.042	-	-	0.016	-	-	0.209				
HCM Control Delay (s)	13.1	7.9	0	-	7.9	0	-	14.4				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.8				

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025



Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	→	↰	→	↰
Traffic Volume (vph)	362	35	423	20
Future Volume (vph)	362	35	423	20
Lane Group Flow (vph)	383	35	423	60
Turn Type	NA	Perm	NA	Prot
Protected Phases	4		8	2
Permitted Phases		8		
Detector Phase	4	8	8	2
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	23.1	23.2	23.2	24.2
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.0
All-Red Time (s)	1.8	1.9	1.9	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.2	5.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	C-Min	None
Act Effect Green (s)	56.8	56.8	56.8	8.6
Actuated g/C Ratio	0.81	0.81	0.81	0.12
v/c Ratio	0.27	0.05	0.29	0.26
Control Delay	4.5	4.5	4.7	15.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.5	4.7	15.1
LOS	A	A	A	B
Approach Delay	4.5		4.6	15.1
Approach LOS	A		A	B
Queue Length 50th (m)	10.9	0.8	12.7	2.3
Queue Length 95th (m)	36.2	4.8	41.1	9.1
Internal Link Dist (m)	84.4		143.1	218.2
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1426	727	1447	681
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	0.27	0.05	0.29	0.09

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 5.3

Intersection LOS: A

Intersection Capacity Utilization 44.4%

ICU Level of Service A

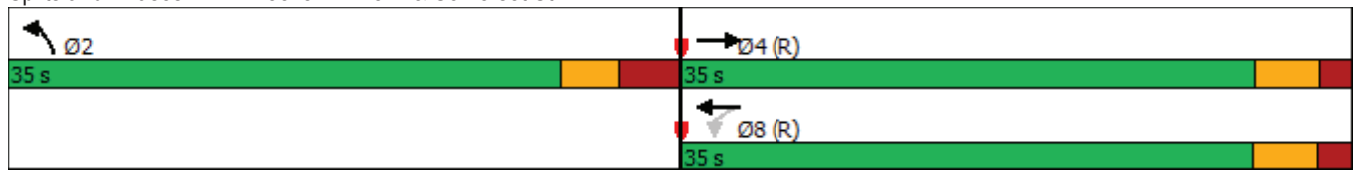
Analysis Period (min) 15

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025

Splits and Phases: 1: Breezehill Ave N & Somerset St W



Lanes and Geometrics

2: Breezehill Ave N & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	187	591	0	0
Future Volume (vph)	187	591	0	0
Lane Group Flow (vph)	208	625	4	52
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 49.0% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
2: Breezehill Ave N & Gladstone Ave

05/16/2025

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	187	4	6	591	28	3	0	1	29	0	23
Future Vol, veh/h	17	187	4	6	591	28	3	0	1	29	0	23
Conflicting Peds, #/hr	22	0	25	25	0	22	7	0	10	10	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	187	4	6	591	28	3	0	1	29	0	23
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	641	0	0	216	0	0	884	901	224	873	889	634
Stage 1	-	-	-	-	-	-	248	248	-	639	639	-
Stage 2	-	-	-	-	-	-	636	653	-	234	250	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	943	-	-	1354	-	-	266	278	815	271	282	479
Stage 1	-	-	-	-	-	-	756	701	-	464	470	-
Stage 2	-	-	-	-	-	-	466	464	-	769	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	922	-	-	1320	-	-	239	258	786	256	261	465
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	258	-	256	261	-
Stage 1	-	-	-	-	-	-	721	669	-	444	456	-
Stage 2	-	-	-	-	-	-	437	451	-	744	669	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.1			17.6			18.4		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	289	922	-	-	1320	-	-	320				
HCM Lane V/C Ratio	0.014	0.018	-	-	0.005	-	-	0.163				
HCM Control Delay (s)	17.6	9	0	-	7.7	0	-	18.4				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.6				

Lanes and Geometrics

3: Breezehill Ave N & Laurel St

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	8	22	24	46
Future Volume (vph)	8	22	24	46
Lane Group Flow (vph)	31	44	49	91
Sign Control	Stop	Stop	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 25.5% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	8	10	4	22	18	24	24	1	13	46	32
Future Vol, veh/h	13	8	10	4	22	18	24	24	1	13	46	32
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	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	8	10	4	22	18	24	24	1	13	46	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.2	7.5	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	49%	42%	9%	14%
Vol Thru, %	49%	26%	50%	51%
Vol Right, %	2%	32%	41%	35%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	31	44	91
LT Vol	24	13	4	13
Through Vol	24	8	22	46
RT Vol	1	10	18	32
Lane Flow Rate	49	31	44	91
Geometry Grp	1	1	1	1
Degree of Util (X)	0.057	0.035	0.049	0.099
Departure Headway (Hd)	4.22	4.101	3.974	3.92
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	844	864	892	909
Service Time	2.27	2.17	2.04	1.964
HCM Lane V/C Ratio	0.058	0.036	0.049	0.1
HCM Control Delay	7.5	7.3	7.2	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.2	0.3

Lanes and Geometrics

4: Loretta Ave & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	209	597	0	2
Future Volume (vph)	209	597	0	2
Lane Group Flow (vph)	249	667	21	102
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 52.2% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	36	209	4	9	597	61	15	0	6	51	2	49
Future Vol, veh/h	36	209	4	9	597	61	15	0	6	51	2	49
Conflicting Peds, #/hr	25	0	33	33	0	25	1	0	2	2	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	209	4	9	597	61	15	0	6	51	2	49
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	683	0	0	246	0	0	988	1017	246	959	989	654
Stage 1	-	-	-	-	-	-	316	316	-	671	671	-
Stage 2	-	-	-	-	-	-	672	701	-	288	318	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	910	-	-	1320	-	-	226	238	793	237	247	467
Stage 1	-	-	-	-	-	-	695	655	-	446	455	-
Stage 2	-	-	-	-	-	-	445	441	-	720	654	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	887	-	-	1276	-	-	185	212	765	219	220	455
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	212	-	219	220	-
Stage 1	-	-	-	-	-	-	641	604	-	415	439	-
Stage 2	-	-	-	-	-	-	391	425	-	680	603	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.1			21.7			23.8		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	236	887	-	-	1276	-	-	292				
HCM Lane V/C Ratio	0.089	0.041	-	-	0.007	-	-	0.349				
HCM Control Delay (s)	21.7	9.2	0	-	7.8	0	-	23.8				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.5				

2031 Total Projected Conditions

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025



Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	→	↰	→	↰
Traffic Volume (vph)	254	40	197	23
Future Volume (vph)	254	40	197	23
Lane Group Flow (vph)	312	43	214	80
Turn Type	NA	Perm	NA	Prot
Protected Phases	4		8	2
Permitted Phases		8		
Detector Phase	4	8	8	2
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	23.1	23.2	23.2	24.2
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.0
All-Red Time (s)	1.8	1.9	1.9	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.2	5.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	C-Min	None
Act Effct Green (s)	53.4	53.3	53.3	8.7
Actuated g/C Ratio	0.76	0.76	0.76	0.12
v/c Ratio	0.23	0.06	0.15	0.32
Control Delay	4.5	4.8	4.3	14.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.8	4.3	14.8
LOS	A	A	A	B
Approach Delay	4.5		4.4	14.8
Approach LOS	A		A	B
Queue Length 50th (m)	8.3	1.1	5.6	2.9
Queue Length 95th (m)	27.9	5.6	19.5	10.8
Internal Link Dist (m)	84.4		143.1	218.2
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1356	663	1433	711
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	0.23	0.06	0.15	0.11

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 30 (43%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 44.3%

ICU Level of Service A

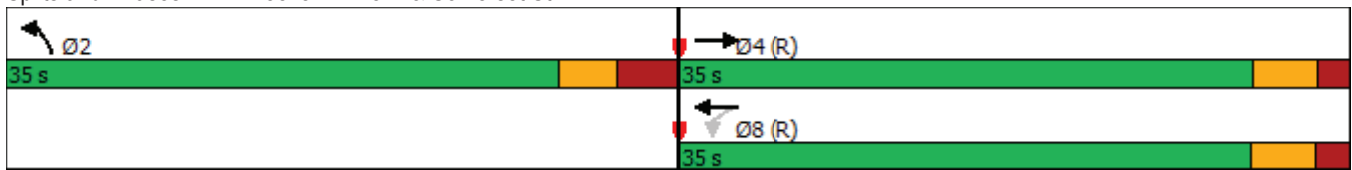
Analysis Period (min) 15

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025

Splits and Phases: 1: Breezehill Ave N & Somerset St W



Lanes and Geometrics

2: Breezehill Ave N & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	193	159	1	0
Future Volume (vph)	193	159	1	0
Lane Group Flow (vph)	236	216	5	42
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 40.3% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
2: Breezehill Ave N & Gladstone Ave

05/16/2025

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	193	0	1	159	39	2	1	2	15	0	24
Future Vol, veh/h	24	193	0	1	159	39	2	1	2	15	0	24
Conflicting Peds, #/hr	21	0	25	25	0	21	8	0	2	2	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	210	0	1	173	42	2	1	2	16	0	26
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	236	0	0	235	0	0	504	525	237	483	504	223
Stage 1	-	-	-	-	-	-	287	287	-	217	217	-
Stage 2	-	-	-	-	-	-	217	238	-	266	287	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1331	-	-	1332	-	-	478	458	802	494	470	817
Stage 1	-	-	-	-	-	-	720	674	-	785	723	-
Stage 2	-	-	-	-	-	-	785	708	-	739	674	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1303	-	-	1298	-	-	439	427	780	471	438	793
Mov Cap-2 Maneuver	-	-	-	-	-	-	439	427	-	471	438	-
Stage 1	-	-	-	-	-	-	685	642	-	750	707	-
Stage 2	-	-	-	-	-	-	752	692	-	717	642	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0			11.9			11.1		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	528	1303	-	-	1298	-	-	628				
HCM Lane V/C Ratio	0.01	0.02	-	-	0.001	-	-	0.068				
HCM Control Delay (s)	11.9	7.8	0	-	7.8	0	-	11.1				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2				

Lanes and Geometrics

3: Breezehill Ave N & Laurel St

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	26	8	50	34
Future Volume (vph)	26	8	50	34
Lane Group Flow (vph)	51	46	80	92
Sign Control	Stop	Stop	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 28.1% ICU Level of Service A

Analysis Period (min) 15

Intersection

Intersection Delay, s/veh 7.6

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	26	10	12	8	22	11	50	13	35	34	16
Future Vol, veh/h	11	26	10	12	8	22	11	50	13	35	34	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	28	11	13	9	24	12	54	14	38	37	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

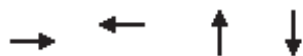
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.3	7.6	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	23%	29%	41%
Vol Thru, %	68%	55%	19%	40%
Vol Right, %	18%	21%	52%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	74	47	42	85
LT Vol	11	11	12	35
Through Vol	50	26	8	34
RT Vol	13	10	22	16
Lane Flow Rate	80	51	46	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.092	0.059	0.051	0.106
Departure Headway (Hd)	4.097	4.186	4.013	4.133
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	865	841	876	859
Service Time	2.165	2.282	2.112	2.198
HCM Lane V/C Ratio	0.092	0.061	0.053	0.107
HCM Control Delay	7.6	7.6	7.3	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.2	0.4

Lanes and Geometrics

4: Loretta Ave & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	211	157	0	3
Future Volume (vph)	211	157	0	3
Lane Group Flow (vph)	298	267	17	115
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 41.3% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	49	211	15	19	157	69	8	0	7	62	3	41
Future Vol, veh/h	49	211	15	19	157	69	8	0	7	62	3	41
Conflicting Peds, #/hr	19	0	18	19	0	18	2	0	1	1	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	229	16	21	171	75	9	0	8	67	3	45
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	265	0	0	264	0	0	639	669	257	618	640	230
Stage 1	-	-	-	-	-	-	362	362	-	270	270	-
Stage 2	-	-	-	-	-	-	277	307	-	348	370	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1299	-	-	1300	-	-	389	379	782	402	393	809
Stage 1	-	-	-	-	-	-	657	625	-	736	686	-
Stage 2	-	-	-	-	-	-	729	661	-	668	620	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1274	-	-	1275	-	-	339	341	766	370	353	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	339	341	-	370	353	-
Stage 1	-	-	-	-	-	-	614	584	-	687	660	-
Stage 2	-	-	-	-	-	-	670	636	-	629	579	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.6			13.2			15.3		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	458	1274	-	-	1275	-	-	465				
HCM Lane V/C Ratio	0.036	0.042	-	-	0.016	-	-	0.248				
HCM Control Delay (s)	13.2	7.9	0	-	7.9	0	-	15.3				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1				

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025



Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	→	↰	→	↰
Traffic Volume (vph)	362	36	423	21
Future Volume (vph)	362	36	423	21
Lane Group Flow (vph)	388	36	423	63
Turn Type	NA	Perm	NA	Prot
Protected Phases	4		8	2
Permitted Phases		8		
Detector Phase	4	8	8	2
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	23.1	23.2	23.2	24.2
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.0
All-Red Time (s)	1.8	1.9	1.9	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.2	5.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	C-Min	None
Act Effct Green (s)	56.8	56.7	56.7	8.6
Actuated g/C Ratio	0.81	0.81	0.81	0.12
v/c Ratio	0.27	0.05	0.29	0.27
Control Delay	4.5	4.5	4.7	15.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.5	4.7	15.2
LOS	A	A	A	B
Approach Delay	4.5		4.7	15.2
Approach LOS	A		A	B
Queue Length 50th (m)	11.1	0.9	12.8	2.4
Queue Length 95th (m)	36.6	4.9	41.1	9.5
Internal Link Dist (m)	84.4		143.1	218.2
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1419	723	1446	682
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	0.27	0.05	0.29	0.09

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 5.3

Intersection LOS: A

Intersection Capacity Utilization 45.2%

ICU Level of Service A

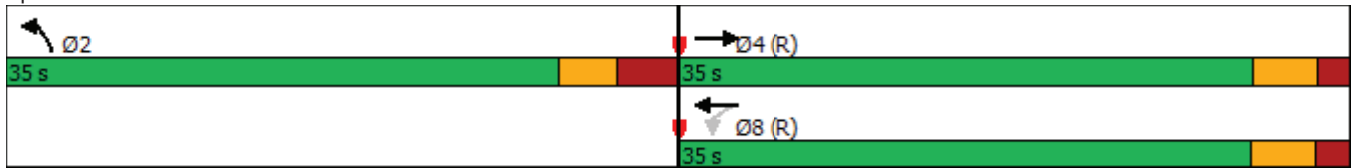
Analysis Period (min) 15

Lanes and Geometrics

1: Breezehill Ave N & Somerset St W

05/16/2025

Splits and Phases: 1: Breezehill Ave N & Somerset St W



Lanes and Geometrics

2: Breezehill Ave N & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	187	591	0	0
Future Volume (vph)	187	591	0	0
Lane Group Flow (vph)	213	625	4	56
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 48.8% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
2: Breezehill Ave N & Gladstone Ave

05/16/2025

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	22	187	4	6	591	28	3	0	1	29	0	27
Future Vol, veh/h	22	187	4	6	591	28	3	0	1	29	0	27
Conflicting Peds, #/hr	22	0	25	25	0	22	7	0	10	10	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	187	4	6	591	28	3	0	1	29	0	27
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	641	0	0	216	0	0	896	911	224	883	899	634
Stage 1	-	-	-	-	-	-	258	258	-	639	639	-
Stage 2	-	-	-	-	-	-	638	653	-	244	260	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	943	-	-	1354	-	-	261	274	815	266	279	479
Stage 1	-	-	-	-	-	-	747	694	-	464	470	-
Stage 2	-	-	-	-	-	-	465	464	-	760	693	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	922	-	-	1320	-	-	232	252	786	251	257	465
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	252	-	251	257	-
Stage 1	-	-	-	-	-	-	708	659	-	441	456	-
Stage 2	-	-	-	-	-	-	432	451	-	731	658	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.1			18			18.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	282	922	-	-	1320	-	-	323				
HCM Lane V/C Ratio	0.014	0.024	-	-	0.005	-	-	0.173				
HCM Control Delay (s)	18	9	0	-	7.7	0	-	18.5				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.6				

Lanes and Geometrics

3: Breezehill Ave N & Laurel St

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	8	22	24	46
Future Volume (vph)	8	22	24	46
Lane Group Flow (vph)	31	51	54	97
Sign Control	Stop	Stop	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 26.0% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	8	10	8	22	21	24	24	6	19	46	32
Future Vol, veh/h	13	8	10	8	22	21	24	24	6	19	46	32
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	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	8	10	8	22	21	24	24	6	19	46	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.3	7.5	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	42%	16%	20%
Vol Thru, %	44%	26%	43%	47%
Vol Right, %	11%	32%	41%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	31	51	97
LT Vol	24	13	8	19
Through Vol	24	8	22	46
RT Vol	6	10	21	32
Lane Flow Rate	54	31	51	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.063	0.036	0.057	0.107
Departure Headway (Hd)	4.173	4.124	4.003	3.959
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	852	857	883	899
Service Time	2.231	2.205	2.079	2.011
HCM Lane V/C Ratio	0.063	0.036	0.058	0.108
HCM Control Delay	7.5	7.4	7.3	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.2	0.4

Lanes and Geometrics

4: Loretta Ave & Gladstone Ave

05/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	209	597	0	2
Future Volume (vph)	209	597	0	2
Lane Group Flow (vph)	249	676	21	110
Sign Control	Free	Free	Stop	Stop

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 53.4% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	36	209	4	9	597	70	15	0	6	59	2	49
Future Vol, veh/h	36	209	4	9	597	70	15	0	6	59	2	49
Conflicting Peds, #/hr	25	0	33	33	0	25	1	0	2	2	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	209	4	9	597	70	15	0	6	59	2	49
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	692	0	0	246	0	0	993	1026	246	963	993	658
Stage 1	-	-	-	-	-	-	316	316	-	675	675	-
Stage 2	-	-	-	-	-	-	677	710	-	288	318	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	903	-	-	1320	-	-	224	235	793	235	245	464
Stage 1	-	-	-	-	-	-	695	655	-	444	453	-
Stage 2	-	-	-	-	-	-	443	437	-	720	654	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	880	-	-	1276	-	-	183	209	765	217	218	452
Mov Cap-2 Maneuver	-	-	-	-	-	-	183	209	-	217	218	-
Stage 1	-	-	-	-	-	-	641	604	-	413	437	-
Stage 2	-	-	-	-	-	-	388	421	-	680	603	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.1			21.9			25.7		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	234	880	-	-	1276	-	-	282				
HCM Lane V/C Ratio	0.09	0.041	-	-	0.007	-	-	0.39				
HCM Control Delay (s)	21.9	9.3	0	-	7.8	0	-	25.7				
HCM Lane LOS	C	A	A	-	A	A	-	D				
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.8				