Gladstone Village Development

TIA Strategy Report

Prepared for:

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TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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Dated at Ottawa this 15 day of April 2021.

(City)

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

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Strategy Report

Parsons has been retained by the Ottawa Community Housing Corporation to prepare a TIA in support of a Plan of Subdivision Application for a mixed-use development known as Gladstone Village. This document follows the TIA process as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents Step 4 – Strategy Report. All City comment responses and the initial Screening Form have been provided in Appendix A.

1. Screening Form

The Screening Form confirmed the need for a TIA Report based on the Trip Generation, Location and Safety triggers. The Trip Generation trigger was met based on the large size of the development. The Location trigger was met due to the location of the proposed development site in a Transit-Oriented zone and the designation of a boundary street as Spine Route and Transit Priority Corridor. The Safety Trigger is met due to the proximity of a signalized intersection to a proposed site driveway.

2. Scoping Report

2.1. Existing and Planned Conditions

2.1.1. PROPOSED DEVELOPMENT

The proposed development site is located in a vacant land north of Gladstone Ave and between Preston St and the Trillium Line LRT corridor, as shown in **Figure 1** The subject site is currently zoned Mixed-Use Centre (MC).

The proposed development is anticipated to consist of 206 townhome units, 176 mid-rise residential units and 687 high-rise residential units. At the time of this study, the size and scope of the ancillary uses onsite had yet to be confirmed. For the purposes of this study, the proponent provided conservative approximations for potential non-residential uses to support this TIA. Approximately 100,000 sq.ft of ground floor retail, commercial and institutional space, as well as 100,000 sq.ft of office space was assumed.

The mid-rise residential units will be housed within three buildings (8-storeys each) and the high-rise residential units will be housed within four buildings (18-storeys, 20- storeys, 24- storeys and 30- storeys). The estimated full buildout horizon for the proposed development was 2031. The current concept plan is shown in **Figure 2**.

Figure 1: Local Context

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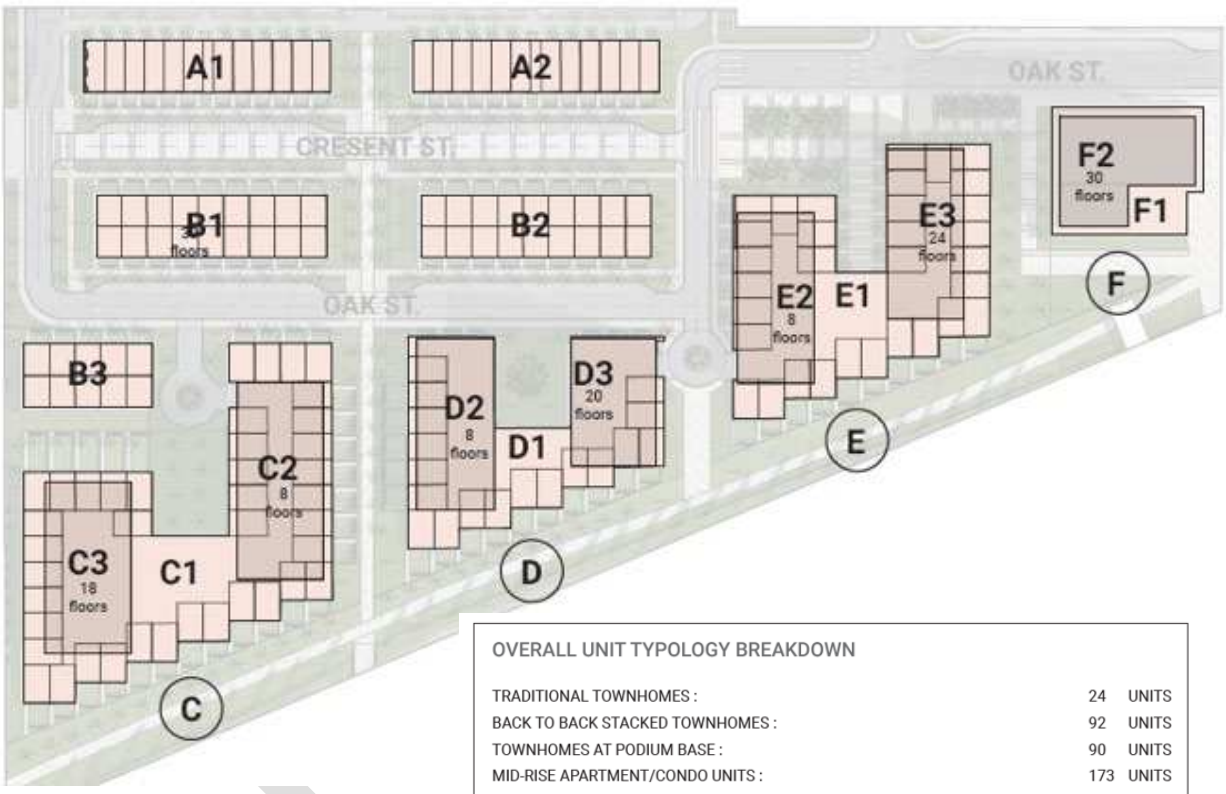
The proposed development will utilize an existing connection to Preston St via Oak St that will extend into the site, turn south before eventually connecting to Gladstone Ave. A third connection off Oak St has been proposed at Balsam St. While the current concept plan does not show an internal connection to Larch St via Oak St, this option may be considered, and will be confirmed during the Site Plan Control process.

Figure 2: Proposed Site Plan



OVERALL UNIT TYPOLOGY BREAKDOWN

TRADITIONAL TOWNHOMES :	24	UNITS
BACK TO BACK STACKED TOWNHOMES :	92	UNITS
TOWNHOMES AT PODIUM BASE :	90	UNITS
MID-RISE APARTMENT/CONDO UNITS :	173	UNITS
HIGH-RISE APARTMENT/CONDO UNITS :	669	UNITS
	1048	**UNITS**

GLADSTONE VILLAGE - DEVELOPMENT STATS

CURRENT OPTION

	GFA		UNITS +/-
BLOCK A1 - TOWNHOMES			
TOTAL	21,384	SQ.FT.	12
BLOCK A2 - TOWNHOMES			
TOTAL	21,384	SQ.FT.	12
BLOCK B1 - STACKED TOWNHOMES			
TOTAL	34,848	SQ.FT.	36
BLOCK B2 - STACKED TOWNHOMES			
TOTAL	34,848	SQ.FT.	36
BLOCK B3 - STACKED TOWNHOMES			
TOTAL	19,360	SQ.FT.	20

BLOCK C - MIXED USE			
C1 PODIUM RES	49,440	SQ.FT.	40
C1 PODIUM RETAIL / COMMERCIAL / INSTITUTIONAL	25,000	SQ.FT.	
C2 MID-RISE	59,412	SQ.FT.	67
C3 HIGH RISE	137,776	SQ.FT.	156
TOTAL	271,828	SQ.FT.	263
BLOCK D - MIXED USE			
D1 PODIUM RES	17,938	SQ.FT.	18
D1 PODIUM RETAIL / COMMERCIAL / INSTITUTIONAL	25,000	SQ.FT.	
D2 MID-RISE	46,500	SQ.FT.	53
D3 HIGH RISE	115,326	SQ.FT.	131
TOTAL	204,764	SQ.FT.	201
BLOCK E - MIXED USE			
E1 PODIUM RES	31,330	SQ.FT.	32
E1 PODIUM RETAIL / COMMERCIAL / INSTITUTIONAL	25,000	SQ.FT.	
E2 MID-RISE	46,500	SQ.FT.	53
E3 HIGH RISE	170,500	SQ.FT.	193
TOTAL	273,330	SQ.FT.	278
BLOCK F - MIXED USE			
F1 PODIUM RES	14,714	SQ.FT.	-
F1 PODIUM RETAIL / COMMERCIAL	25,000	SQ.FT.	
F2 HIGH RISE, RES / OFFICE	144,629	SQ.FT.	189
TOTAL GROSS	208,343	SQ.FT.	189

TOTALS	GFA	UNITS
	1,090,089	1048

2.1.2. EXISTING CONDITIONS

Area Road Network

The following roads were included in the TIA. Descriptions for each road within the study area have been provided below.

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 and a posted speed limit of 40km/h.

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.

Preston St is a north-south municipal arterial roadway within the City of Ottawa, that extends from Albert St in the north to Carling Ave in the south. An extension from Albert St to Sir John A. Macdonald Parkway is proposed in the City of Ottawa TMP. Within the study area, the roadway consists of a two-lane cross-section and an assumed posted speed limit of 50km/h.

Rochester St is a north-south municipal roadway within the City of Ottawa and is classified as a local road north of Gladstone Ave and a major collector south of thereof. The roadway extends from Carling Ave in the south and terminates at a neighborhood south of Albert St. The roadway consists of a two-lane cross-section, with an on-street parking lane available along both sides of the roadway. The posted speed limit is 50km/h.

Oak St is a short (dead-end) east-west municipal local roadway providing access to residential units and parking for the adjacent park area. The roadway consists of a two-lane cross-section, with a sidewalk facility on the south side only.

Laurel St is a short (dead-end) east-west municipal local roadway providing access to residential units. The roadway consists of a two-lane cross-section and sidewalk facilities on the north and south sides.

Larch St is a short (dead-end) east-west municipal local roadway providing access to residential units. The roadway consists of a two-lane cross-section and sidewalk facilities on the north side only.

Balsam St is a short (dead-end) east-west municipal local roadway providing access to residential units and the Preston Hardware store's parking lot. The roadway consists of a two-lane cross-section and sidewalk facilities on the north side and partially on the south side.

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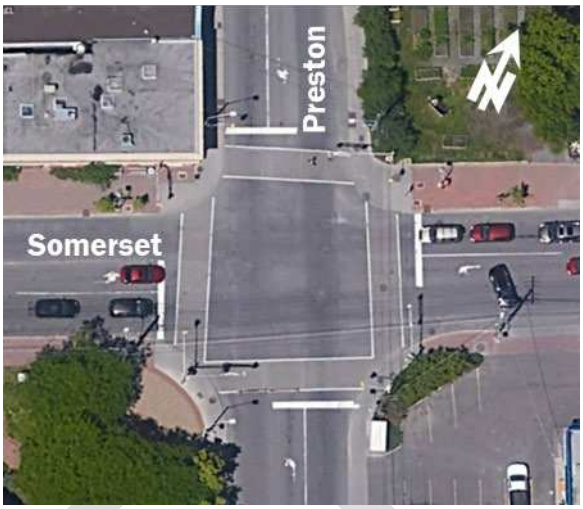
Existing Study Area Intersections

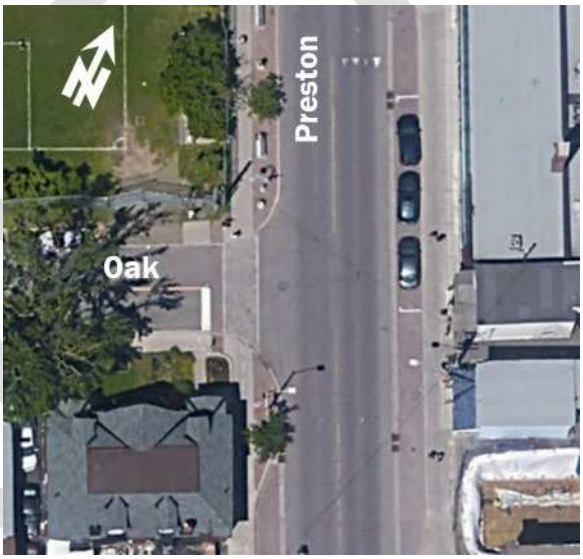
Preston/Somerset

The Preston/Somerset intersection is a four-legged signalized intersection. All legs of the intersection consist of a shared through/right-turn lane and an auxiliary left-turn lane. Right-turns on red are not permitted on weekdays between 7am and 7pm at this intersection.



Preston/Oak

The Preston/Oak intersection is an unsignalized three-legged "T" intersection, with STOP control on the minor movement only (Oak). The north leg (Preston) consists of a shared through/right-turn lane. The south leg (Preston) consists of a shared through/left-turn lane. The west leg (Oak) consists of a shared right-turn/left-turn lane. There are no restricted movements at this intersection.



Preston/Laurel

The Preston/Laurel intersection is an unsignalized three-legged "T" intersection, with STOP control on the minor movement only (Laurel). The north leg (Preston) consists of a shared through/right-turn lane. The south leg (Preston) consists of a shared through/left-turn lane. The west leg (Laurel) consists of a shared right-turn/left-turn lane. There are no restricted movements at this intersection.

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Preston/Larch

The Preston/Larch intersection is an unsignalized three-legged “T” intersection, with STOP control on the minor movement only (Larch). The north leg (Preston) consists of a shared through/right-turn lane. The south leg (Preston) consists of a shared through/left-turn lane. The west leg (Larch) consists of a shared right-turn/left-turn lane. There are no restricted movements at this intersection.

Preston/Balsam

The Preston/Balsam intersection is an unsignalized four-legged intersection, with STOP control on the minor movements (Balsam). All legs of the intersection consist of a single all-movement lane. A Pedestrian Crossover (PXO) is provided on the north leg of the intersection. There are no restricted movements at this intersection.

Preston/Gladstone

The Preston/Gladstone intersection is a signalized four-legged intersection. The north and south legs (Preston) consist of a shared through/right-turn lane and an auxiliary left-turn lane. The east leg (Gladstone) consists of a shared through/right-turn lane and an auxiliary left-turn lane. The west leg (Gladstone) consists of a single all-movement lane. There are no restricted movements at this intersection.

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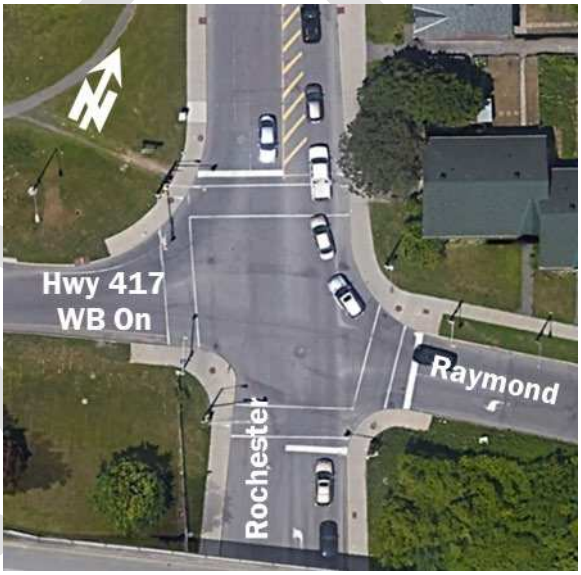
Gladstone/Rochester

The Gladstone/Rochester intersection is a signalized four-legged intersection. The east leg (Gladstone) consists of a shared through/right-turn lane and an auxiliary left-turn lane. The west leg consists of a shared through/right-turn lane. The south leg (Rochester) consists of a shared through/right-turn lane and an auxiliary left-turn lane. The north leg consists of a single all-movement lane. Eastbound left-turns are prohibited at this intersection and trucks are not permitted to enter the north leg.

Rochester/Raymond/Hwy 417 WB On Ramp

The intersection is a signalized four-legged intersection, with signal control on the north, south and east legs. The west leg (Hwy 417 WB On Ramp) is a one-way westbound ramp. The south leg (Rochester) consists of a through lane and an auxiliary left-turn lane. The north leg (Rochester) consists of a through lane and an auxiliary right-turn lane. The east leg (Raymond) consists of a shared through/right-turn lane and an auxiliary left-turn lane. There are no restricted movements at this intersection.



Rochester/Orangeville/Hwy 417 EB Off Ramp

The intersection is a signalized four-legged intersection, with signal control on the north, south and west legs. The east leg (Orangeville) is a one-way eastbound roadway. The north leg (Rochester) consists of a through lane and a shared through/left-turn lane. The south leg (Rochester) consists of a through lane and a shared through/right-turn lane. The west leg (Hwy 417 WB Off Ramp) consists of a through/left-turn lane and a through/right-turn lane. Trucks are not permitted to enter the east leg (Orangeville) of the intersection.

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Existing Driveways to Adjacent Developments

Four existing local roadways are adjacent to the subject site, Oak, Laurel, Larch, and Balsam. These roads primarily access townhomes along Oak St, Laurel St, Larch St, and Balsam St (north side), and some small businesses. The Preston Hardware parking lot access is located on the south side of Balsam. There are minor accesses within 200m of the proposed Oak/Gladstone intersection serving minor restaurant parking lots, homes, and private parking lots.

Pedestrian/Cycling Network

Given the urban context, sidewalk facilities are provided throughout the study area, including both sides of Preston St, Gladstone Ave, Rochester St, and Laurel St. They are only provided on the south side of Oak St, and on the north side of Larch St and Balsam St. Two Pedestrian Crossovers (PXO) are provided along Preston St, one located on the north leg of the Preston/Balsam intersection, and one on the south side of the Preston/Anderson intersection (the latter is located approximately 35m north of Oak St).

In terms of cycling facilities, the Trillium Line Multi-Use Pathway (MUP) runs north-south, directly west of the proposed development and adjacent to the Trillium Line LRT corridor. This is a well-travelled MUP that provides regional pedestrian cycling connectivity from the Trans Canada Trail to the north (along the Ottawa River) to the Rideau Canal Western Pathway at Dow's Lake to the south. Additionally, both Somerset St W and Gladstone Ave are classified as spine routes in the City of Ottawa.

Transit Network

Due to the current circumstances regarding COVID-19, many bus services have been altered by OC Transpo on March 30, 2020, to operate on a different schedule, due to the lower transit ridership volumes. The following description of OC Transpo routes within the study area reflect the typical bus operations prior to the March 30 service changes:

- **Route #2 (O-Train Bayview <-> Greenboro):** this route operates as a replacement to the O-Train Line 2 during its expansion process. Route #2 operates at a rate of every 12 minutes every day throughout the week. The nearest bus stop to the site is at the intersection of Preston/Balsam.
- **Route #11 (Parliament <-> Bayshore):** identified by OC Transpo as a "Frequent Route", this route operates all day, 7 days a week and at an average rate of every 15 minutes during weekday peak hours. The nearest bus stop to the site is at the intersection of Preston/Somerset.
- **Route #14 (St-Laurent <-> Tunney's Pasture):** identified by OC Transpo as a "Frequent Route", this route operates all day, 7 days a week and at an average rate of every 15-to-30 minutes during weekday peak hours. The nearest bus stop to the site is at the intersection of Preston/Gladstone.
- **Route #85 (Gatineau <-> Bayshore)**: identified by OC Transpo as a "Frequent Route", this route operates at a high frequency within the study area. Route #85 operates 7 days a week, at an average rate of every 15 minutes or less during weekday peak hours. The nearest bus stops to the site are along Preston St.
- **Route #114 (Rideau <-> Carlington)**: identified by OC Transpo as a "Local Route", this route operates from Monday to Friday on a selected trip only basis. The nearest bus stio to the site is at the intersection of Preston/Gladstone.

The transit network for the study area is illustrated in **Figure 3** and the transit route maps are provided in **Appendix B**. **Figure 4** illustrates the bus stop locations.

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Figure 3: Area Transit Network

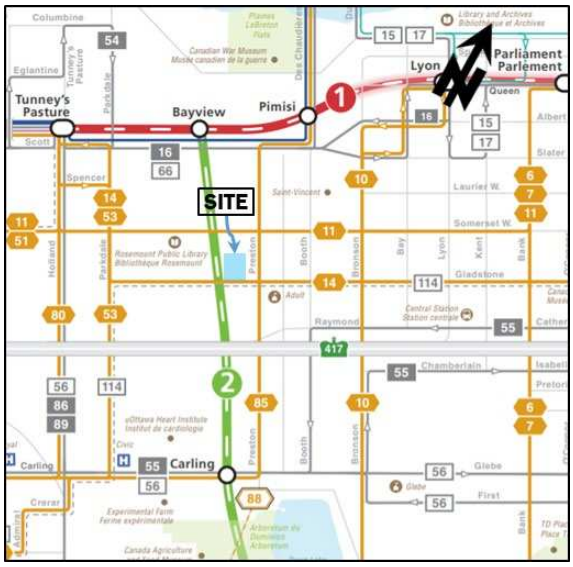
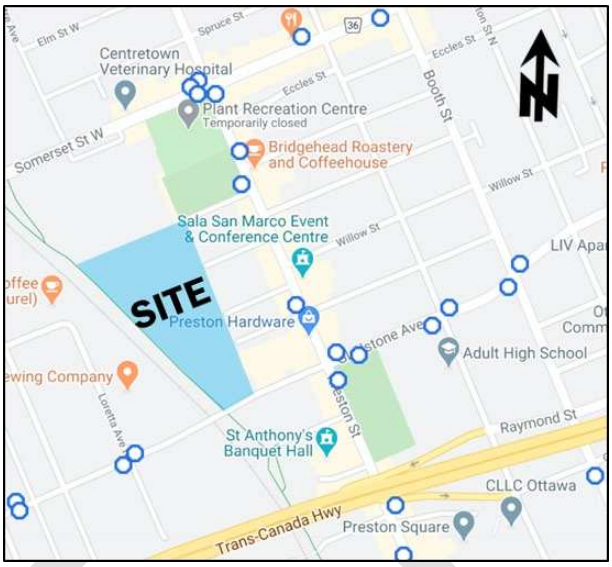


Figure 4: Bus Stop Locations



Peak Hour Travel Demands

The existing peak hour traffic volumes at the signalized intersections within the study area were obtained from the City of Ottawa and are illustrated in **Figure 5**. The raw traffic volume counts have been provided in **Appendix C**. With regards to the unsignalized intersections along Preston St, inbound and outbound traffic volumes from minor streets (Oak, Laurel and Larch) were assumed based on a conservative 1 vehicle trip per residential unit estimate. This is a conservative assumption as the 2009 TRANS Report indicates a trip rate of approximately 0.70 to 0.75 vehicles per single-detached unit in the Urban Area during the morning and afternoon peak hours (TRANS Trip Generation Study, Table 6.3).

A morning and afternoon peak hour traffic count was completed by Parsons December 2, 2020, for the intersection of Preston/Balsam. For simplicity and ensuring a more conservative approach, the through volumes at all unsignalized intersections on Preston were balanced based on the volumes at the intersection of Gladstone/Preston intersection.

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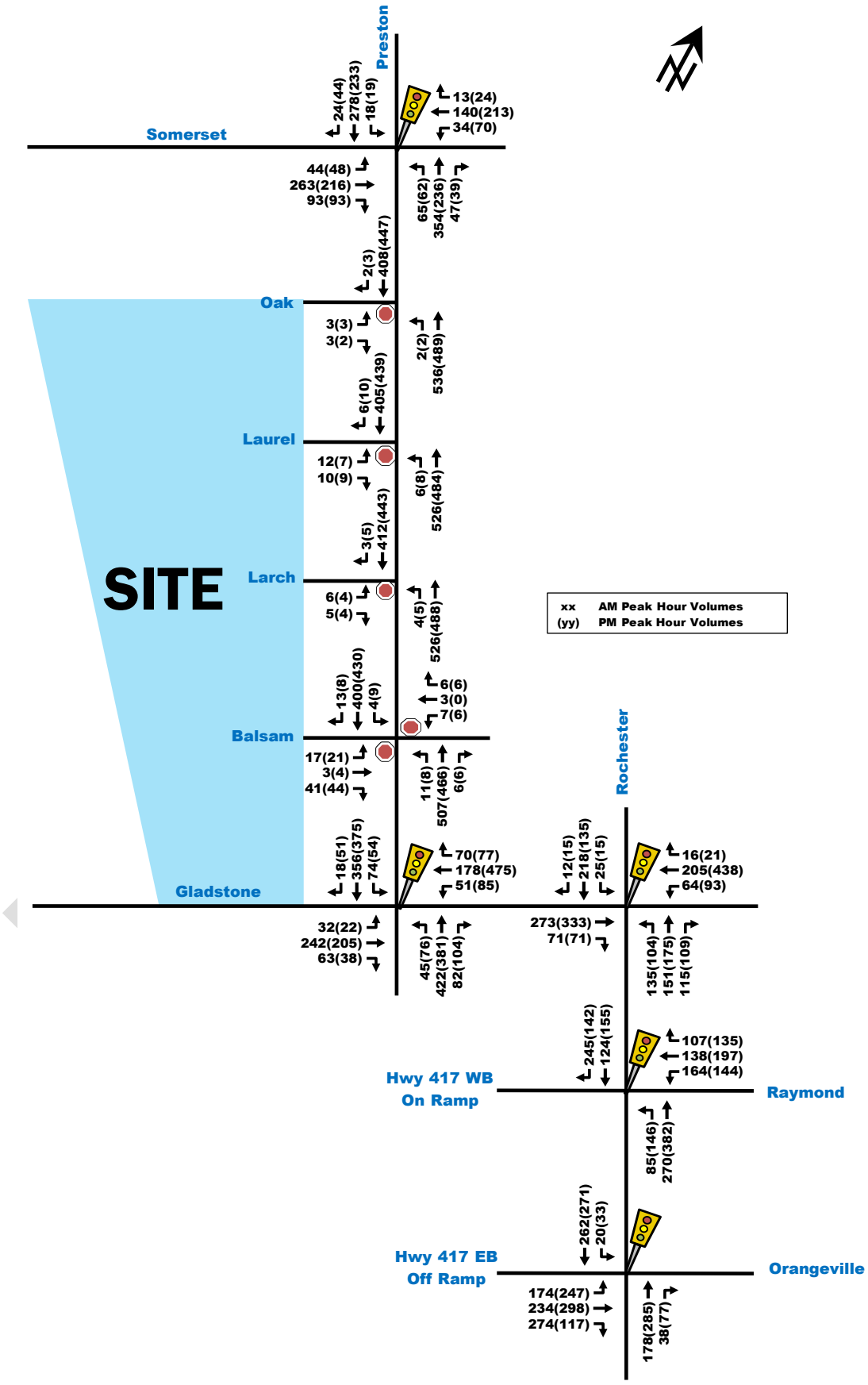
Figure 5: Existing Peak Hour Traffic Volumes



Existing Road Safety Conditions

A five-year collision history data (2014-2018, inclusive) was requested and obtained from the City of Ottawa for all intersections and road segments within the study area. It was determined that a total of 100 collisions involving two or more vehicles have occurred at intersections and road segments bounding the Gladstone Village site. Of the 100 collisions, 31 resulted from rear ends, 23 from turning movements, 15 from sideswipes, 23 from angled collisions, 2 from approaching and 6 from "other". Furthermore, the majority of collisions, 71 collisions, resulted in property damage only, while 29 resulted in non-fatal injuries. The source collision data provided by the City of Ottawa and detailed analysis results are provided in **Appendix D**.

A standard unit of measure for assessing collisions at an intersection is based on the number of collisions per million entering vehicles (MEV). Intersections with a ratio of 1.0 Collisions/MEV or greater are considered to be at a higher risk for collisions. Based on the City of Ottawa TIA Guidelines (2017), a collision pattern is characterized as a sequence of more than six collisions of the same impact type occurring for a specific movement within a five-year period. At signalized intersections within the study area, reported collisions have historically taken place at a rate of:

- 0.61 Collisions/MEV at the intersection of Gladstone Ave/Preston St. A total of 23 collisions occurred at this intersection in the past five-years, with no particular collision patterns observed. The highest sequence of collisions that occurred is 5 rear end collisions in the northbound approach.
- 0.71 Collisions/MEV at the intersection of Gladstone Ave/Rochester St. A total of 21 collisions occurred at this intersection with no particular collision pattern observed. The highest sequence of collisions that occurred is 5 angled collisions in the eastbound approach. The number of eastbound angled collisions may decrease in the future as a result of the recent prohibition of the EBL movement.
- 0.67 Collisions/MEV at the intersection of Preston St/Somerset St W. A total of 22 collisions occurred at this intersection with no particular collision pattern observed. The highest sequence of collisions that occurred is 5 rear end collisions in the westbound approach.

With regards to road segments on the development site's boundary streets, the number of collisions that have occurred are as follows:

- 24 collisions at different locations along Preston St, between Somerset St W and Gladstone Ave. The collisions are comprised of 7 rear ends, 3 turning movement, 4 sideswipe, 6 angled, 1 approaching and 3 "other" collisions.
- 4 collisions along Gladstone Ave, between Loretta Ave N and Preston St. The collisions are comprised of 1 rear end, 1 sideswipe, 1 angled and 1 approaching collisions.
- 5 collisions along Gladstone Ave, between Preston St and Rochester St. The collisions are comprised of 1 rear end, 1 turning movement, 1 sideswipe and 2 angled collisions.

Overall, there were no indications of significant safety concerns within the study area based on the historical collision review.

2.1.3. PLANNED CONDITIONS

Stage 2 LRT

The Light Rail Transit (LRT) in the City of Ottawa has entered Stage 2 of its development, which will include the extending of Trillium Line rail corridor to Limebank in Riverside South. The Trillium Line expansion is expected to be completed by year 2022. Along with the expansion, new stations will be constructed along the Trillium Line, including Corso Italia Station (formerly Gladstone Station), which will be constructed immediately north of Gladstone Ave and west of the proposed Gladstone Village development site.

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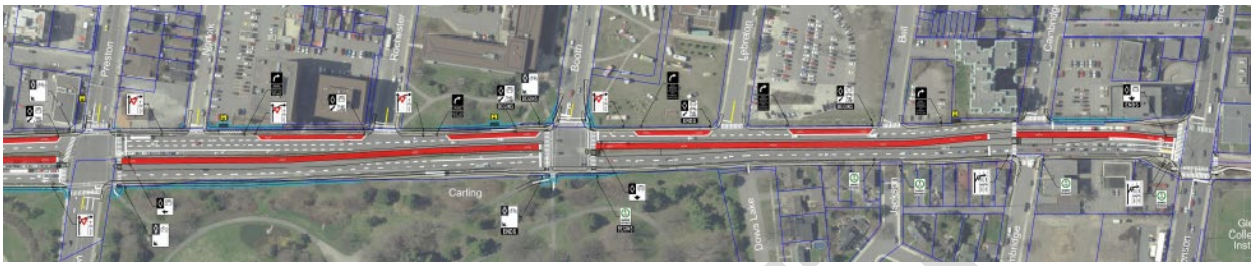
Carling Transit Priority Study

The Carling Avenue Transit Priority Study is currently underway to provide a Recommended Functional Design Plan. The current plan within the vicinity of the site is shown as Figure 6. The timing of the planned modifications is unknown at this time; however, it is understood that implementation would ideally occur in the next five years.

Figure 6: Carling Avenue Transit Priority Plan



Source: https://ottawa.ca/en/carling-avenue-transit-priority-measures

Gladstone Transit Priority

As seen in Figure 7, Gladstone Avenue is proposed a transit priority corridor with isolated measures as per the 2031 Affordable Network within the Transportation Master Plan. The isolated transit priority corridor measures are proposed from Elgin Street to the future Corso Italia LRT Station, passing adjacent to the site on Gladstone Avenue.

Figure 7: Transportation Master Plan: 2031 Affordable Network

Source: https://ottawa.ca/en/planning-development-and-construction/official-plan-and-master-plans/transportation-master-plan

Other future transportation network changes may include:

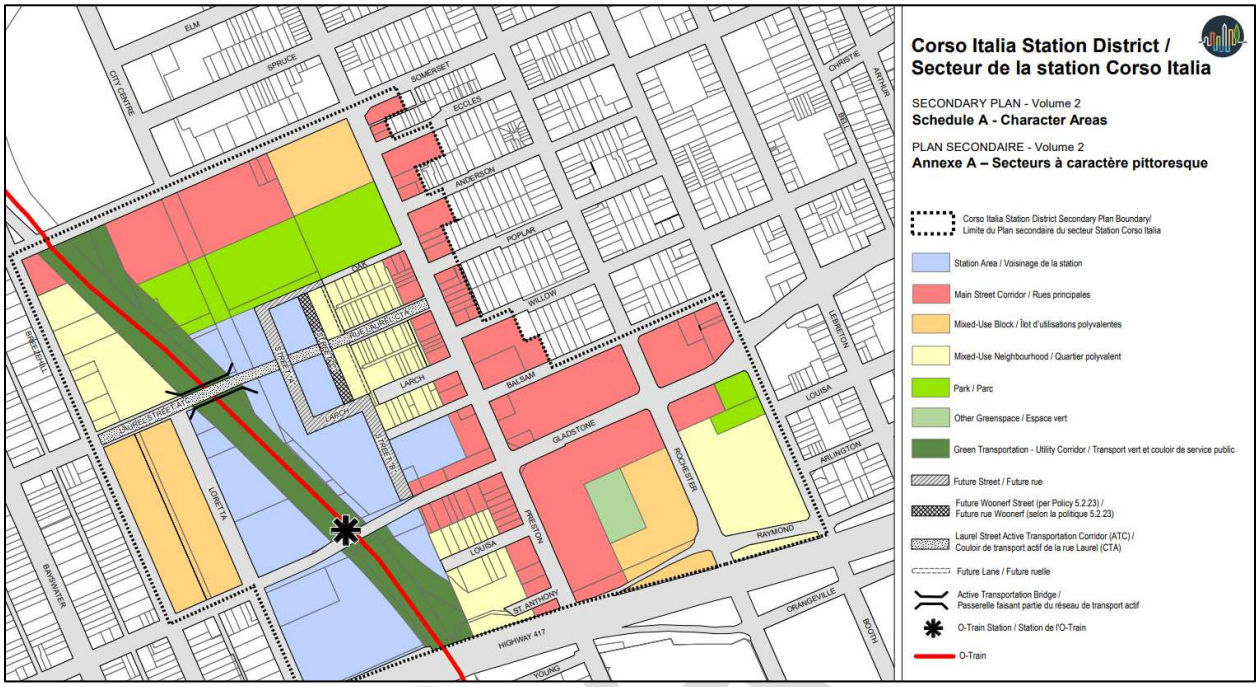
- The extension of Preston St from its north terminus at Albert St to Sir John A. Parkway as illustrated in the TMP's Network Concept and Affordable Network. However, City staff have confirmed that this has not been budgeted for as of yet.
- The potential signalization of the Trillium Line MUP crossing on Gladstone Ave.

Corso Italia (formerly Gladstone) Station District Secondary Plan

Previously, three planning studies were undertaken by the City of Ottawa around the future adjacent LRT Stations at Bayview Station, Gladstone Station and Preston-Carling Station. The purpose of these studies was to examine how the areas around these stations may be redeveloped. Since then, Secondary Plans have been completed

for both Bayview Station and Preston-Carling Station. The Gladstone Station study was put on hold for several years and reinitiated in May 2019 and the secondary plan was approved by the Planning Committee in February 2021. The potential land uses within the Corso Italia District, as provided in the Secondary Plan, are illustrated in **Figure 8**.

Figure 8: Corso Italia Station District Potential Land Use (from City of Ottawa)



Other Area Developments

The following section outlines adjacent developments within the study area. It should be noted that, based on the City of Ottawa's Development Applications search tool, many applications have been initiated surrounding the development site. However, the majority of these applications involve minor renovations to an existing development, or the construction of a low-rise residential building. **Figure 9** illustrates the locations of major other area developments, relative to the Gladstone Village development site.

951 Gladstone Ave and 145 Loretta Ave North

A mixed-use development proposed by Trinity Development Group, which will consist of 745 residential units, 206,480 sq.ft. of office space and 17,894 sq.ft. of retail space. The development will be fully constructed by 2023. During the morning peak hour, the development is anticipated to generate approximately 141 vehicle trips and 940 person trips. During the afternoon peak hour, the development is anticipated to generate approximately 144 vehicle trips and 958 person trips.

811 Gladstone Ave

A residential development is proposed by the Ottawa Community Housing Corporation at 811 Gladstone Ave. The development will consist of 108 residential units and 32 townhomes and is expected to be constructed in 2020. During the morning peak hour, the development is expected to generate 15 vehicle trips and 100 total person trips. During the afternoon peak hour, the development is expected to generate 16 vehicle trips and 105 total person trips. Given the low projected number of vehicle trips, the traffic impact caused by this development is considered negligible. As such, it will not be included in the future background volumes illustrated in this report.

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Figure 9: Other Nearby Developments

818 Gladstone Ave (Rochester Heights)

The Ottawa Community Housing Corporation is proposing a mixed-use development at 818 Gladstone Ave. The site is currently occupied by nine residential building, for which a Demolition Control Application has been received by the City. The new development will consist of 673 residential units, as well as 71,600 ft^2 commercial space. The anticipated year of occupancy for this development is 2028.

Other Developments

The following are other anticipated future developments that were worth noting, but were not included in the future background volumes due to lack of available information or were considered far enough away to have limited impact on the study area.

- **Preston Hardware**, located at 248 Preston St and along Balsam St, is planning to expand its premises by constructing a new residential development and providing truck access to the existing store. The application is still in its early stages and no information was available at the time of this study.
- A **Federal building (PSPC/Canada Lands)** is located at 1010 Somerset St W in the land directly north of the Gladstone Village site. Due to servicing limitations, the site may be redeveloped in conjunction with the development of Gladstone Village. A TIA Study has not yet been competed for this expansion.
- **The Ottawa Hospital** is constructing a new campus at 930 Carling Ave and 520 Preston St. The site will take up considerable space but is also anticipated to promote active and transit modes of travel. At the time of this study, a TIA Study was being prepared in support of a zoning application, but has yet to be approved.
- **Canada Lands Company (CLC)** is proposing to construct a mixed-use development at 552 Booth St, consisting of five residential buildings containing 1,000 dwelling units and five heritage buildings containing 142,200 sq.ft. of retail/office space. The site is currently occupied by a Natural Resources Canada office/research complex. The new development is expected to be constructed by 2025. While the development is expected to generate 175 vehicle trips during both morning and afternoon peak

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hours, most vehicles are anticipated to utilize both Hwy 417 and Carling Ave, which is outside the area of influence of the Gladstone Village site.

2.2. Study Area and Time Periods

The proposed development is a mixed-use residential development that is anticipated to be fully constructed by 2031. As such, the horizon year being analyzed in this report is 2031 using the weekday morning and afternoon peak hour time period traffic volumes.

Note that the TIA Guidelines typically require analysis of a second horizon year at five-years after full buildout (i.e. 2036). Although the City of Ottawa TMP and affordable networks only provide plans for up to 2031, horizon year 2036 will be included for the purposes of this TIA report. Proposed study area intersections are outlined below and highlighted in **Figure 10**.

- Preston St/Somerset St W;
- Preston St/Gladstone Ave;
- Gladstone Ave/Rochester St;
- Rochester St/Raymond St/Hwy 417 WB On Ramp;
- Rochester St/Orangeville St/Hwy 417 EB Off Ramp;
- Preston St/Oak St;
- Preston St/Laurel St;
- Preston St/Larch St; and
- Preston St/Balsam St.

Figure 10: Study Area

2.3. Exemption Review

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.2 Circulation and Access	This element is not required for applications involving Plan of Subdivision.
4.2 Parking	All	This module is not required for applications involving Plan of Subdivision.

3. Forecasting

3.1. Development Generated Travel Demand

3.1.1. TRIP GENERATION AND MODE SHARES

Trip Generation Rates

The proposed development will consist of 206 residential townhome units, 176 mid-rise apartment units and 687 high-rise apartment units, approximately 100,000 ft² of retail/commercial/institutional space that is anticipated to be used primarily by the local community, as well as 100,000 ft² of office space. Note that the size of the non-residential land uses (retail/commercial/institutional and office spaces) are based on very conservative estimates as the exact sizes have not been confirmed yet.

The appropriate trip generation rates for townhomes, mid-rise apartment units and high-rise apartment units were obtained from the 2009 TRANS Trip Generation Residential Trip Rates Report (Table 6.3) based on the "Core" Area location of the development. For the purposes of this report, the trip generation rates for the non-residential land uses were obtained from the ITE Trip Generation Manual (10th edition), assuming "Shopping Center" for the retail/commercial/institutional land use and "General Office Building" for the office land use. The trip rates are summarized in **Table 2** below.

Table 2: Proposed Development Trip Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Townhomes	TRANS	T = 0.34(du);	T = 0.38(du);
Mid-Rise Apartments	TRANS	T = 0.17(du);	T = 0.16(du);
High-Rise Apartments	TRANS	T = 0.17(du);	T = 0.16(du);
Shopping Center	ITE 820	T = 0.94(x);	T = 3.81(x);
General Office Building	ITE 710	T = 1.16(x); T = 0.94(x) + 26.49;	T = 1.15(x); Ln(T) = 0.95Ln(x) + 0.36;

Notes: *T = Average Vehicle Trip Ends*
du = Dwelling unit
x = Gross Floor Area (1,000 ft²)

Mode Shares

Mode share percentages are used to identify the percentage of different travel modes (auto driver, auto passenger, transit and non-motorized (walk/bike)) with regards to the total person trips that are expected to be generated by the proposed development. For residential land uses, mode share percentages are first obtained from the 2009 TRANS Report (Table 3.13), as shown in **Table 3**.

Table 3: 2009 TRANS Report Residential Mode Share Percentages

Travel Mode	Mode Shares			
	Townhomes		Mid/High-Rise Apartments	
	AM	PM	AM	PM
Auto Driver	33%	39%	27%	23%
Auto Passenger	5%	4%	3%	6%
Transit	22%	15%	27%	29%
Walk/Bike	40%	42%	43%	42%
Total	**100%**	**100%**	**100%**	**100%**

Once the total person trips are determined for the residential land use using the above mode shares, they are distributed once again into the different travel modes using new mode shares that are obtained from the 2011 NCR Household Origin-Destination Survey. The 2011 OD Survey considers trips to, from and within a particular district in Ottawa. As the proposed development is located in the Ottawa Inner Area district, the respective mode share percentages are represented in **Table 4**. For the retail/commercial/institutional land use, these percentages would apply directly.

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Table 4: 2011 NCR Mode Share Percentages (Ottawa Inner Area District)

Travel Mode	Mode Share
Auto Driver	40%
Auto Passenger	10%
Transit	20%
Walk/Bike	30%
Total	**100%**

However, these mode shares do not account for the location of the proposed Gladstone Village development immediately next to the future Corso Italia LRT Station. With regards to transit-oriented development (TOD) areas, particularly for LRT stations along the Confederation Line, the City identifies mode share targets to be 20% auto driver and auto passenger, 65% transit and 15% active transportation modes.

The Corso Italia (Gladstone) LRT Station is located along the O-Train's Trillium Line, it would offer a great level of transit connectivity in the area, but with planned intensification noted in the Corso Italia Station District Secondary Plan. Therefore, a lower transit mode share was assumed for the proposed Gladstone Village development to reflect greater active travel potential being located near the City Core Area. For the retail/commercial/institutional component of the development, these uses are expected to primarily serve the local community, thereby generating a high non-motorized (walk/bike) number of trips and lower transit and auto driver trips. The modified mode share targets provided in **Table 5** will be applied to determine the site generated person trips of the future Gladstone Village development.

Table 5: Gladstone Village Future Mode Share Percentages

Travel Mode	Gladstone Village Future Mode Shares	
	Residential + Office	Retail/Commercial/Institutional
Auto Driver	15%	10%
Auto Passenger	5%	5%
Transit	50%	25%
Walk/Bike	30%	60%
Total	**100%**	**100%**

Residential Trip Generation

Using the respective residential trip rates in **Table 2**, the total number of vehicles per hour generated by the proposed residential land uses of Gladstone Village are calculated for the morning and afternoon peak hours, as shown in **Table 6**. The total vehicle trips were also divided into inbound and outbound vehicle trips per hour, using percentages obtained from the 2009 TRANS Report (Table 3.17).

Table 6: Residential Units Vehicle Trip Generation

Land Use	Dwelling Units	AM Peak (Vehicles/h)			PM Peak (Vehicles/h)		
		In	Out	Total	In	Out	Total
Townhomes	206	25	45	70	41	37	78
Mid-Rise Apartments	176	7	23	30	17	11	28
High-Rise Apartments	687	28	89	117	68	42	110

The vehicle trips per hour in **Table 6** represent the auto driver mode share percentage of the total person trips generated by the proposed development. Using the mode share percentages provided in **Table 3**, the total person trips and trips generated by other travel modes can be derived for the proposed townhome, mid-rise apartment and high-rise apartment land uses as shown in **Table 7**, **Table 8** and **Table** 9 respectively.

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Table 7: Townhomes Mode Shares Breakdown (2009 TRANS Report)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In (37%)	Out (63%)	Total		In (53%)	Out (47%)	Total
Auto Driver	33%	25	45	70	39%	41	37	78
Auto Passenger	5%	4	7	11	4%	4	4	8
Transit	22%	17	29	46	15%	15	15	30
Non-motorized	40%	31	54	85	42%	44	40	84
Total Person Trips	**100%**	**77**	**135**	**212**	**100%**	**104**	**96**	**200**

Table 8: Mid-Rise Apartments Mode Shares Breakdown (2009 TRANS Report)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In (24%)	Out (76%)	Total		In (62%)	Out (38%)	Total
Auto Driver	27%	7	23	30	23%	17	11	28
Auto Passenger	3%	0	4	4	6%	4	3	7
Transit	27%	6	23	29	29%	21	14	35
Non-motorized	43%	11	37	48	42%	32	20	52
Total Person Trips	**100%**	**24**	**87**	**111**	**100%**	**74**	**48**	**122**

Table 9: High-Rise Apartments Mode Shares Breakdown (2009 TRANS Report)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In (24%)	Out (76%)	Total		In (62%)	Out (38%)	Total
Auto Driver	27%	28	89	117	23%	68	42	110
Auto Passenger	3%	3	10	13	6%	18	11	29
Transit	27%	27	89	116	29%	87	52	139
Non-motorized	43%	44	143	187	42%	124	76	200
Total Person Trips	**100%**	**102**	**331**	**433**	**100%**	**297**	**181**	**478**

Based on the tables above, the proposed residential land use is anticipated to generate a total of 756 and 800 person trips per hour during the morning and afternoon peak hours respectively. The total peak hour person trips are then divided into the different travel modes using the modified future mode share percentages in **Table 5**. The projected number of trips anticipated to be generated by the residential land uses of Gladstone Village are provided in **Table 10**.

Table 10: Total Residential Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	15%	30	84	114	70	49	119
Auto Passenger	5%	12	25	37	22	18	40
Transit	50%	103	274	377	238	162	400
Non-motorized	30%	62	166	228	142	99	241
Total Person Trips	**100%**	**207**	**549**	**756**	**472**	**328**	**800**
Total New Auto Trips		**30**	**84**	**114**	**70**	**49**	**119**

As shown in **Table 10**, the total number of vehicle trips anticipated to be generated by the residential land uses are 114 and 119 vehicles per hour during the morning and afternoon peak hours.

Retail/Commercial/Institutional and Office Trip Generation

The local context for commercial retail uses, i.e. along Preston St and Gladstone Ave, are generally small-scale providing specialty goods/services. As such, the retail/commercial/institutional component of Gladstone Village was expected to provide a similar form of land uses that would be used mostly by the local community. At this early stage of the process, there was no information on potential tenants or specific uses onsite. Therefore, the "Shopping Center" land use was used as a very conservative assumption to determine the number of trips generated by the retail/commercial/institutional uses.

Using the trip rates provided in **Table 2**, the total number of person trips per hour generated by the proposed retail/commercial/institutional and office land uses of Gladstone Village are multiplied by a factor of 1.28, as per TIA standards, to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. The resulting total person trips per hours are summarized in **Table 11**.

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Table 11: Non-Residential Person Trips

Land Use	GFA (ft²)	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Shopping Center	100,000	74	46	120	234	254	488
General Office	100,000	132	22	154	23	123	146

Using the total person trips in **Table 11** and the modified future mode share percentages in **Table 5**, the person trips anticipated to be generated by the retail/commercial/industrial land use are shown in **Table 12**, while the person trips anticipated to be generated by the office land use are shown in **Table 13**. The anticipated commercial retail uses proposed onsite are intended to serve the local community and Centertown area. As such, a percentage of the vehicle trips generated are anticipated to be pass-by vehicles. Furthermore, a **20% reduction in trips** was applied to the retail/commercial/institutional land uses to account for multi-purpose/internal trips between institutional and retail/commercial land uses.

Table 12: Shopping Center Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (62%)	Out (38%)	Total	In (48%)	Out (52%)	Total
Auto Driver	10%	6	4	10	19	21	40
Auto Passenger	5%	3	2	6	10	10	20
Transit	25%	14	9	23	46	50	97
Non-motorized	60%	35	22	57	112	122	234
Total Person Trips	**100%**	**59**	**37**	**96**	**187**	**203**	**390**
Less Pass-by	34% (PM)	0	0	0	-6	-7	-14
Total New Auto Trips		**6**	**4**	**10**	**13**	**14**	**26**

Table 13: Office Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (62%)	Out (38%)	Total	In (48%)	Out (52%)	Total
Auto Driver	15%	20	4	24	4	19	23
Auto Passenger	5%	7	1	8	2	7	9
Transit	50%	66	11	77	11	61	72
Non-motorized	30%	39	6	45	6	36	42
Total Person Trips	**100%**	**132**	**22**	**154**	**23**	**123**	**146**
Total New Auto Trips		**20**	**4**	**24**	**4**	**19**	**23**

As shown in **Table 12**, the retail/commercial/institutional land uses are anticipated to generate a total of 96 and 390 person trips per hour, as well as 10 and 26 vehicle trips per hour, during the morning and afternoon peak hours respectively. The average pass-by percentage of a Shopping Center is 34%, which was applied to the afternoon peak hour only, as the morning peak hour trips are minimal. As shown in **Table 13**, the office land use is anticipated to generate a total of 154 and 146 person trips per hour, as well as 24 and 23 vehicle trips per hour, during the morning and afternoon peak hours respectively.

Total Trips Generated

The total person trips anticipated to be generated by the residential, retail/commercial/institutional and office land uses of the future Gladstone Village development are provided in **Table 14**.

Table 14: Total Trips Generated by Gladstone Village

Travel Mode	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
	In	Out	Total	In	Out	Total
Auto Driver	56	92	148	93	89	182
Auto Passenger	22	28	51	34	35	69
Transit	183	294	477	295	273	569
Non-motorized	136	194	330	260	257	517
Total Person Trips	**398**	**608**	**1,006**	**682**	**654**	**1,336**
Less Pass-by	0	0	0	-6	-7	-14
Total New Auto Trips	**56**	**92**	**148**	**87**	**82**	**168**

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Based on the results provided in **Table 14**, the future development is anticipated to generate approximately 1,000 and 1,340 person trips, as well as 150 and 170 vehicle trips during the morning and afternoon peak hours respectively.

3.1.2. TRIP DISTRIBUTION AND ASSIGNMENT

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

- 35% to/from the east via HWY-417 and Gladstone Avenue;
- 30% to/from the west HWY-417 and Gladstone Avenue;
- 15% to/from the north via Preston Street; and,
- 20% to/from the south via Preston Street.

The anticipated 'new' and 'Pass-By' auto trips for the proposed development from **Table 14** were then assigned to the road networks as shown in **Figure 11**.

3.1.3. TRANSPORTATION NETWORK PLANS

Refer to **Section 2.1.3**: **Planned Conditions**.

3.1.4. BACKGROUND GROWTH

A regression analysis was conducted using historic traffic count data (years 2002, 2004, 2006, 2011 and 2017) at the intersection of Gladstone/Preston. The results are summarized in **Table 15** below, with detailed analysis provided in **Appendix E**.

Table 15: Historical Background Traffic Growth at Gladstone/Preston

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-1.32%	-1.07%	0.23%	1.27%	**-0.38%**
AM Peak	-1.43%	-1.00%	0.70%	1.42%	**-0.29%**
PM Peak	-1.60%	-1.67%	0.67%	2.21%	**-0.13%**

As shown in **Table 15**, the intersection of Gladstone/Preston only experienced growth on the west leg of the intersection. We expect this may be the result of cut-through WB traffic utilizing local roads on Gladstone Ave to access more major roadways, such as Wellington St and Carling Ave, while avoiding busy and potentially more congested routes. It may also be the result of more traffic utilizing the Hwy 417 WB on-ramp on Parkdale Ave. All other legs of the intersection have experienced either negative growth or no growth.

It should also be noted that the Gladstone Station (now Corso Italia Station) District CDP – Transportation Review report (prepared by MMM Group in June 2015) considers future developments in the area in order to determine future traffic volumes in the Corso Italia Station District, but did not apply a traffic growth rate.

Therefore, a traffic growth rate of 0% will be applied to the study area intersections.

3.1.5. OTHER DEVELOPMENTS

Descriptions of other area developments taking place within the study area was provided in **Section 2.1.3** - **Other Area Developments**. Traffic volumes generated by the other area development at 951 Gladstone Ave & 145 Loretta Ave North were considered in the analysis.

The anticipated site-generated traffic volumes of this development are illustrated in **Figure 12**, which was obtained from the approved TIA report on the City's Development Application website. Additionally, a TIA report for the future "Rochester Heights" development at 818 Gladstone Ave is in the process of being completed by Parsons. While a full TIA report has not been produced yet, the currently forecasted traffic volumes illustrated in **Figure 13** were provided and incorporated into the analysis.

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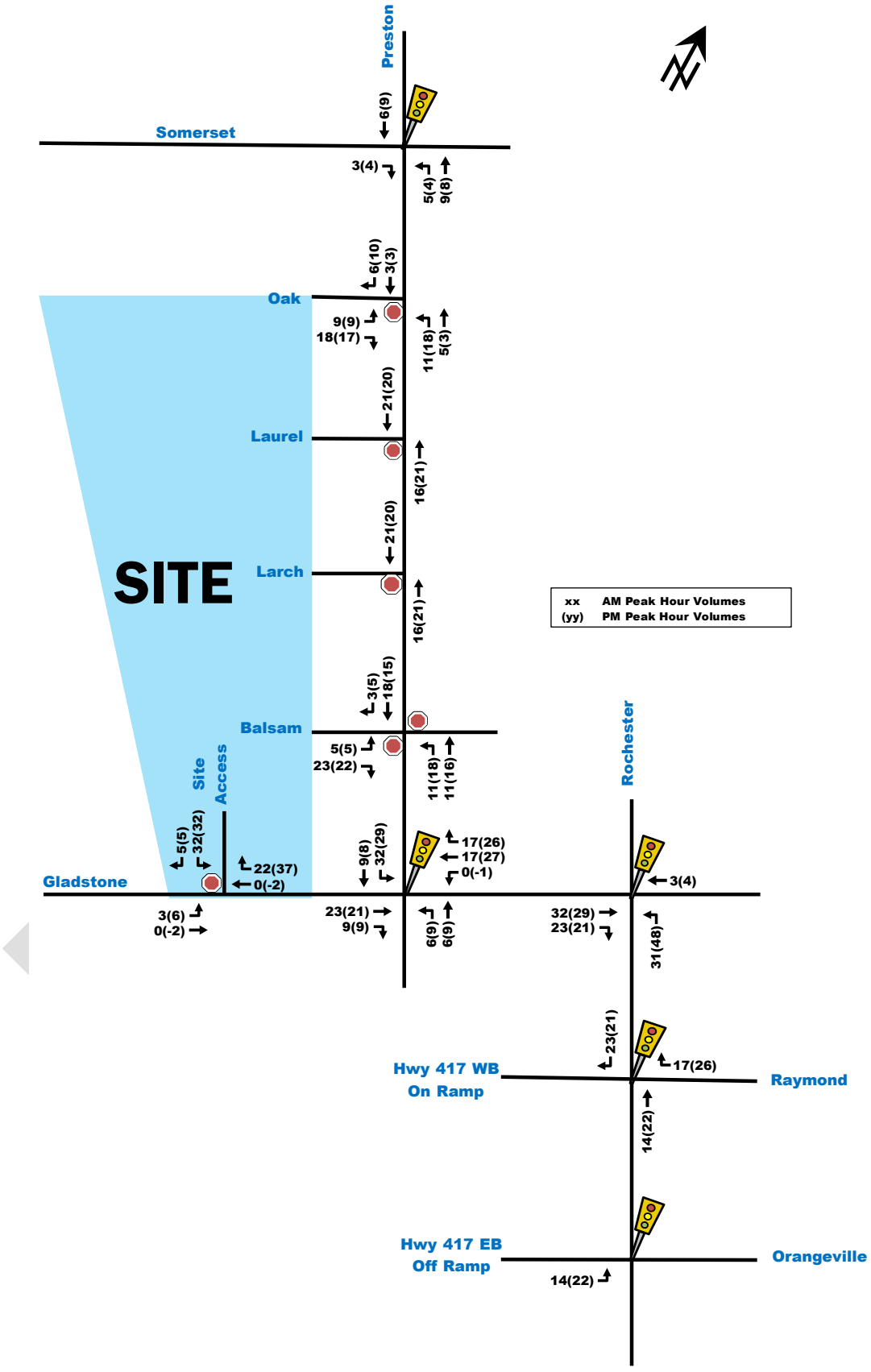
Figure 11: 'New' and 'Pass-By' Site-Generated Traffic



3.2. Background Network Traffic

Figure 12: 951 Gladstone Ave & 145 Loretta Ave North

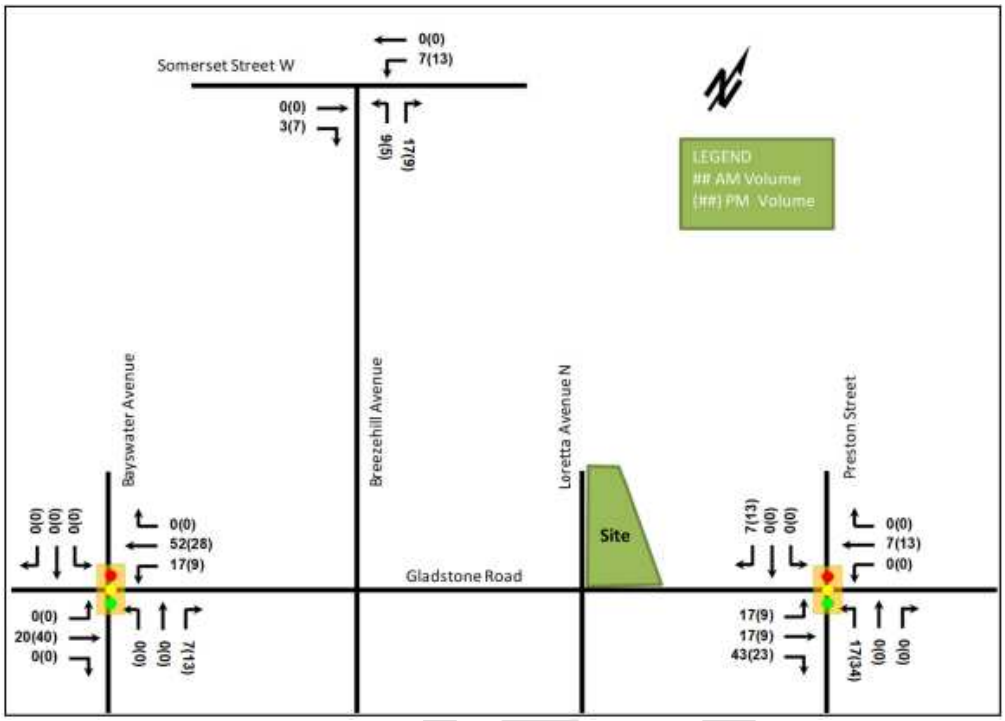


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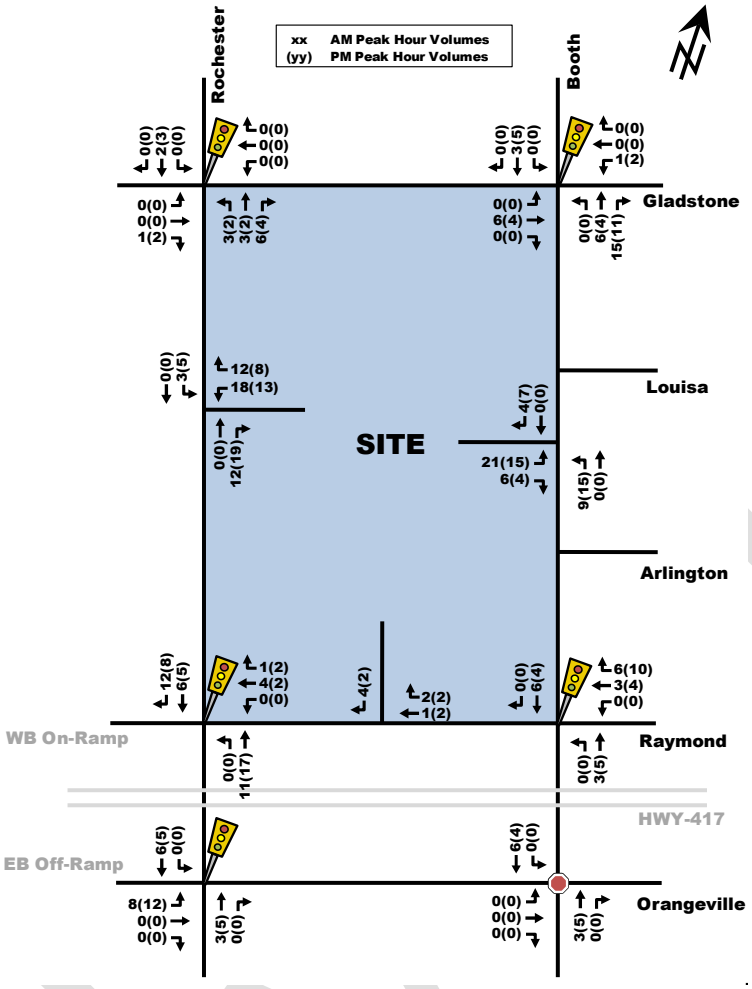
Figure 13: Rochester Heights – 818 Gladstone Ave



3.3. Demand Rationalization

Existing peak hour traffic volumes along Preston and Gladstone range between 500 and 650 vphpl in the peak direction respectively, which was reasonable for major collector and arterial roads. Since the annual growth was estimated to be 0%, the future background traffic volumes were not expected to increase significantly.

The future site-generated and adjacent development peak hour traffic volumes will add traffic to the adjacent road network, but the overall impact will be minor due to the influence of the upcoming Corso Italia LRT Station. Therefore, the proposed travel demand assumptions were considered acceptable.

4. Analysis

4.1. Development Design

4.1.1. DESIGN FOR SUSTAINABLE MODES

Design related elements will be discussed in more detail in the future Site Plan Application submission of the proposed development. The City of Ottawa's TDM-Supportive Development Design and Infrastructure has been provided in **Appendix F**.

Car parking spaces are proposed to be provided both in underground parking garages for each of the mid-rise and high-rise residential building and in private driveways for the townhome units. Bicycle parking spaces are also anticipated to be provided in the underground parking garage and on the surface.

As illustrated in the Site Plan (**Figure 2**), pedestrian and cycling facilities will be provided throughout the Gladstone Village site, including sidewalks along both sides of the internal Oak driveway, pedestrian crossings at various points of Oak and internal pathways connecting to/from the Trillium Line MUP. The sidewalks and pathways will also connect to the existing sidewalk facilities on Gladstone, Balsam, Larch, Laurel and Oak.

Transit operations of the existing bus routes operating in the area may be modified by OC Transpo once the Corso Italia LRT Station is fully constructed.

4.1.2. CIRCULATION AND ACCESS

Exempt – see Section 2.3.

4.1.3. NEW STREET NETWORKS

Oak St represents the spine of the internal road network that connects to the external network at Preston St and Gladstone Ave. A new internal road connection is proposed at the intersection of Balsam St and Oak St that will provide secondary access to the site. The Oak St internal road network is expected to function as a local road and provides various crossing points for the future multi-use pathways and sidewalks to ensure great connectivity for pedestrians and cyclists to surrounding networks and transit amenities as shown in the Site Plan (**Figure 2**). An internal woonerf is proposed between townhome units, providing access for garbage and other City services. Multiple connection points will be provided to the Trillium Pathway, with a potential connection between Blocks C and D to a future pedestrian bridge crossing over the Trillium Line.

The future intersection of Oak/Gladstone is anticipated to be unsignalized and there will not be any significant modifications to existing off-site intersections or roadways. Therefore a Road Modification Approval (RMA) report which consists of functional design drawings, was not considered necessary.

However, a new pedestrian crossing (PXO) may be considered the Preston/Laurel intersection, to provide pedestrians with a higher level of connectivity to areas on the other side of Preston St. This location was considered suitable for a PXO based on a future desire line, extending from existing sidewalks provided on Laurel St connecting to the proposed internal pathway, and eventually to the proposed pedestrian bridge crossing over the Trillium Line. It is also adequately spaced from the two existing PXOs on Preston St, at Balsam St and Anderson St. These considerations will be confirmed during the Site Plan Control process.

4.2. Parking

The number of parking spaces anticipated to be provided have not been confirmed as of yet. However, based on the City of Ottawa Parking Provisions, the development is located in “Area Z: Near Major LRT Stations”, where no off-street vehicle parking is required to be provided. Nonetheless, as mentioned previously, parking will be provided as needed in underground parking garages for the residential buildings and as private driveways for the townhomes. Visitor parking for the residential land uses is required to be provided at a rate of 0.1 per dwelling unit, which equates to 107 parking spaces required for the 1,069 dwelling units proposed.

4.3. Boundary Street Design

Using discrete quantitative methods, the Multi-Modal Level of Service (MMLOS) analysis describes the level of convenience and comfort experienced by pedestrians, cyclists, transit, and trucks. MMLOS analysis was conducted at the boundary roads of the proposed development, Gladstone Ave, Oak St, and Balsam St. The geometry and features along the boundary streets are anticipated to be the same in both existing and future horizon year conditions. Below is a description of the proposed development’s boundary streets at the site’s frontage:

Gladstone Ave (major collector road classification)

- 2.0m wide sidewalk and no boulevard,
- 2 lanes total (1 EB and 1 WB),
- 3.7m wide lanes,

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- Operating speed of 40km/h,
- More than 3000 average daily curb lane traffic volume,
- No on-street parking, cycling facilities or transit facilities, and
- Not a designated truck route.

Oak St and Balsam St (local road classifications)

- 1.8m wide sidewalk and no boulevard,
- 2 lanes total (1 EB and 1 WB),
- 3.5m wide curb-side lanes,
- Operating speed of 40km/h or less,
- Less than 3000 average daily curb lane traffic volume,
- On-street parking on one side of the road,
- No cycling or transit facilities, and
- Not a designated truck route.

Detailed analysis results have been provided in **Appendix G**. **Table 16** below provides a summary of the results, along with the minimum desirable targets obtained from the MMLOS Guidelines, for each respective travel mode. The targets are based on the proposed development site's location in a "within 300m of a school" Policy Area for existing conditions and in a "within 600m of a rapid transit station" Policy Area for future conditions, both of which provide the same MMLOS targets.

Table 16: MMLOS Analysis, Boundary Road Segments

Road Segment	Level of Service							
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLOS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Gladstone Ave	C	A	B	B	D	D	B	No Target
Oak St	B	A	A	D	N/A	N/A	N/A	No Target
Balsam St	B	A	A	D	N/A	N/A	C	No Target

Red font in the table above indicates that the respective desirable target has not been met. As shown in **Table 16**, the pedestrian LOS targets are not met at any of the road segments. Gladstone Ave does not achieve the PLOS 'A' due to the high average daily curb lane traffic volume and lack of boulevard. Oak St and Balsam St both would require wider boulevard and sidewalk widths to achieve the PLOS 'A', which may not be achievable due to a limited right-of-way.

It should be noted that there are no applicable TLOS results or targets for Oak St and Balsam St as they are local roads with limited accessibility and no transit operations. Similarly, trucks are rarely anticipated to access Oak St, as such, there is no applicable analysis result. On Balsam St, trucks may access the Preston Hardware Store in existing and future conditions, this will be discussed in more detail in **Section 4.4**. Note that no TkLOS targets are available for these boundary roads in the MMLOS Guidelines.

4.4. Access Intersection Design

The main access intersections to the proposed development are proposed at three locations, Oak St, Balsam St, and Gladstone Ave, all of which are anticipated will permit all turning movements. The following discussion has been provided to inform the City of any potential design challenges at these locations.

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Preston/Oak Existing Intersection

The Oak currently provides access to single-family homes on south side and a parking on the north side adjacent to Plouffe Park. As shown in **Figure 2**, Oak will be extended into Gladstone Village down to Gladstone, providing access to parking garage ramps and Balsam. No changes to the existing Preston/Oak design were anticipated.

Gladstone/Oak New Site Access

There are potential design challenges with the future Gladstone/Oak intersection. The key factors have been noted in **Figure 14**.

The Trillium Pathway crosses Gladstone approximately 45m west of the proposed Gladstone/Oak access location, and early indications from City staff is this crossing will be signalized in the future, once the Corso Italia LRT Station is constructed. The purpose of the signal is to "provide safe crossing for pedestrians and cyclists and accommodate increasing demand." The proximity of these two future intersections may create design challenges, particularly if an eastbound left-turn lane or traffic signal are triggered at Gladstone/Oak in the future. Therefore, a traffic control signal was not considered at this intersection.

Another consideration for the Gladstone/Oak intersection is the Preston Hardware site at the northwest corner of Preston/Gladstone, directly adjacent to the future Oak St connection. At the time of this study, the owners of these lands indicated their intention to expand the existing business and redesign the site. One of the key issues cited by the local Councilor was the existing truck loading bay fronting onto Gladstone, which causes trucks to block the sidewalk and portions of the roadway at certain times of the day. The implications and possible mitigation of this concern were not be considered in this TIA due to the uncertain timing and status of the Preston Hardware development proposal, but should be reviewed during the future Preston Hardware development application.

Figure 14: Balsam St and Larch St ROW

The MTO left-turn lane warrant analysis for unsignalized intersections at the Gladstone/Oak access confirmed a left-turn lane was not warranted in the future. Further detail regarding future intersection operations and anticipated queues at Gladstone/Oak have been provided in **Section 4.9.2**.

Balsam Access

Balsam currently provides access to the local businesses (primarily the Preston Hardware) and a small number of single-family homes. There are no plans to alter the design of the Preston/Balsam intersection to support the subject site. It is expected that this roadway will provide secondary access to Gladstone Village, adding a small amount of new traffic to the roadway. Operationally, no modifications are expected to be needed to support the proposed development. This location was also the preferred location for secondary access to the site based on public feedback.

However, there are potential design constraints to connecting to Balsam St. Two corner buildings abut the property line at the intersection of Preston St, and only 11.5m of right-of-way is available, as shown in **Figure 15**.

The future role of Balsam also remains unclear since it is tied to the future Preston Hardware expansion plan. If the planned expansion proposes to increase delivery and traffic activity on Balsam, rather than Gladstone, there may be insufficient capacity to accommodate traffic from both developments. Therefore, Balsam may not be a suitable choice for secondary access to the Gladstone Village site.

One potential option is to allow vehicular access via **Larch St**, which has an appropriate 18m ROW and adequate pedestrian facilities to reduce the demand on Balsam St. Balsam may even be closed at Oak St to general traffic in this scenario, to ensure traffic infiltration is not possible.

These are options for City staff to consider as part of the future Preston Hardware expansion development application.

Figure 15: Balsam St and Larch St ROW

4.5. Transportation Demand Management

The TDM Measures Checklist for potential applications onsite has been provided in **Appendix F**.

4.6. Neighbourhood Traffic Management

This module of the TIA Report is required if the development relies on local or collector roads for access. Preston and Somerset are both classified as arterial roads, and were not included in this analysis.

Based on the TIA Guidelines, the maximum one-way traffic volume threshold is 120 veh/h for local roads and 600 veh/h for major collector roads. Using the existing (**Figure 5**) and total projected 2031 traffic volumes (derived in Section 4.9.1), the following observations were made:

- Traffic volumes on Oak and Balsam are not expected to exceed the maximum one-way threshold of 120 veh/h of local roads.
- Traffic volumes on Rochester are not expected to exceed the maximum one-way threshold of 600 veh/h of a major collector road.
- Westbound traffic volumes on Gladstone were shown to exceed the maximum one-way threshold of 600 veh/h in both existing and future conditions, during the afternoon peak hour only.

Among the internal roads, Oak is the primary roadway connection while Balsam is a minor connection. Oak is expected to be designed with sufficient capacity to accommodate local traffic needs. As previously noted, Balsam has some design constraints given the limited right-of-way (11.5m) available, which may affect its upper capacity limit. However, if pedestrian facilities are minimized, there may be sufficient pavement width to accommodate vehicle traffic for the future site.

Rochester, while not directly adjacent to the subject site, was expected to carry some development traffic well within its acceptable limit.

Westbound traffic on Gladstone was expected to increase to approximately 700 veh/h, exceeding the threshold by approximately 100 vehicles. This result was only 65 vph higher than existing conditions. The City may elect to reclassify Gladstone Ave to an arterial road, but is contrary to the City's current intensification policies and promoting alternate modes of transportation within the City Core Area, specifically pedestrian, cycling and transit. These initiatives are ongoing and will take time to mature before a lasting influence on travel behaviour is recognized. Therefore, there were no long-term concerns with neighbourhood traffic management; no adjustments to existing roadway classifications were recommended.

4.7. Transit

The Trillium Line expansion is expected to be constructed by 2022, which includes the construction of Corso Italia Station (formerly Gladstone Station). As a result, transit usage will improve greatly in the area and auto usage will decrease. OC Transpo may also decide to make modifications to the existing bus routes in the area to appropriately accommodate the future demand.

4.8. Review of Network Concept

Estimated site generated vehicle trips were approximately 150 during the morning peak hour and 170 during the afternoon peak hour. This result reflects the influence of the Corso Italia LRT Station and anticipated intensification in the nearby communities (as outlined in the Corso Italia Station District Secondary Plan), which will greatly increase transit and active transportation use to the site. Therefore, the number of vehicle trips will be manageable considering the area network currently has spare roadway capacity during the peak hour periods.

With regards to anticipated site-generated transit trips, they range from approximately 480 trips during the morning peak hour to 570 trips during the afternoon peak hour. The LRT is expected to comfortably accommodate these transit users. Therefore, the transit and auto networks are anticipated to perform acceptably with the added volumes from the Gladstone Village.

4.9. Intersection Design

4.9.1. INTERSECTION CONTROL

Stop control will be provided on Oak approaching Gladstone. All other off-site intersection controls in the study area will continue to operate as in existing conditions. As mentioned previously, the Trillium Line MUP crossing at Gladstone Ave may be signalized in the future. This scenario will be revisited in the future Site Plan Application (SPA) for Gladstone Village.

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4.9.2. INTERSECTION DESIGN

Synchro 10 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. All Synchro report outputs for existing and future conditions have been provided in **Appendix H**.

Existing Conditions

Table 17 below summarizes the intersection performance of study area intersections, based on existing conditions traffic volumes illustrated in **Figure 5**.

Table 17: 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	v/c
Preston/Somerset (S)	D(B)	0.86(0.68)	EBT(EBT)	29.1(23.3)	C(A)	0.72(0.55)
Preston/Gladstone (S)	E(E)	0.91(0.97)	EBT(WBT)	23.8(30.5)	B(C)	0.67(0.80)
Rochester/Gladstone (S)	C(B)	0.73(0.70)	EBT(WBT)	22.9(24.2)	A(B)	0.59(0.61)
Rochester/Hwy 417 WB on/Raymond (S)	B(C)	0.64(0.74)	WBT(WBT)	13.5(16.5)	A(A)	0.50(0.57)
Rochester/Hwy 417 EB off/Orangeville (S)	D(E)	0.86(0.92)	EBT(EBT)	19.2(24.9)	B(A)	0.63(0.48)
Preston/Oak (U)	B(C)	14.0(15.2)	EB(EB)	0.1(0.1)	-	-
Preston/Laurel (U)	C(C)	15.2(15.6)	EB(EB)	0.4(0.4)	-	-
Preston/Larch (U)	C(C)	15.9(17.3)	EB(EB)	0.3(0.2)	-	-
Preston/Balsam (U)	C(D)	22.0(25.5)	WB(EB)	1.7(2.3)	-	-

Note: Analysis of signalized intersections assumes a PHF of 0.9 and a saturation flow rate of 1800 veh/h/lane.
(S) – Signalized intersection.
(U) – Unsignalized intersection.

As shown in **Table 16**, the signalized intersections 'as a whole' operate at a LOS 'C' or better during the morning and afternoon peak hours. The critical WBT movement at the intersection of Preston/Gladstone operates near capacity during the afternoon peak hour. With regards to unsignalized intersections, critical movements operate at a LOS 'C' or better during both peak hours.

Total Future Background 2031

Table 18 below summarizes the Synchro traffic operations at study area intersections, based on total future background 2031 traffic volumes, which consist of the existing traffic volumes added to the total volumes of future other area developments as shown in **Figure 16** below.

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Figure 16: Future Background 2031 Traffic Volumes

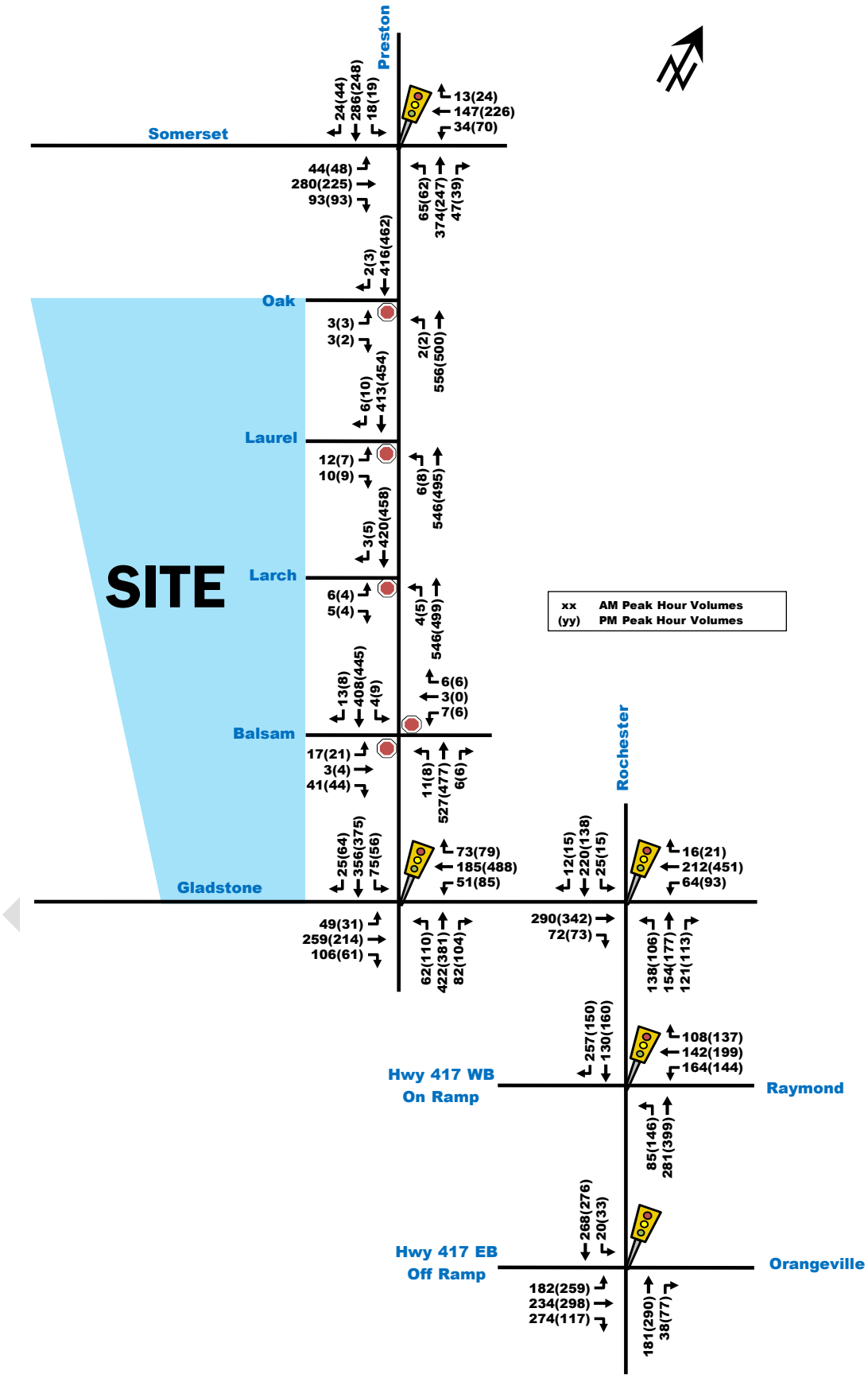

Table 18: Total Future Background 2031 Intersection Performance

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
Preston/Somerset (S)	D(B)	0.81(0.63)	EBT(EBT)	27.0(22.4)	B(A)	0.68(0.51)
Preston/Gladstone (S)	F(D)	1.07(0.90)	EBT(WBT)	33.3(25.7)	C(C)	0.72(0.74)
Rochester/Gladstone (S)	B(B)	0.69(0.65)	EBT(WBT)	21.6(22.8)	A(A)	0.55(0.56)
Rochester/Hwy 417 WB on/Raymond (S)	A(C)	0.60(0.72)	WBT(WBT)	12.9(15.7)	A(A)	0.47(0.54)
Rochester/Hwy 417 EB off/Orangeville (S)	D(D)	0.82(0.86)	EBT(EBT)	17.5(22.2)	A(A)	0.59(0.45)
Preston/Oak (U)	B(B)	13.8(14.4)	EB(EB)	0.1(0.1)	-	-
Preston/Laurel (U)	B(B)	14.6(14.6)	EB(EB)	0.4(0.4)	-	-
Preston/Larch (U)	C(C)	15.3(16.2)	EB(EB)	0.2(0.2)	-	-
Preston/Balsam (U)	C(C)	20.7(21.7)	WB(EB)	1.5(1.9)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) – Signalized intersection.
(U) – Unsignalized intersection.

As shown in **Table 18**, operations are similar to or slightly better than existing conditions due to increasing the PHF to 1.0 and limited growth on the adjacent road network. However, the eastbound through movement at Preston/Gladstone is projected to experience heavier congestion during the peak hours.

Total Projected 2031

Based on total projected 2031 traffic volumes in **Figure 17**, study area intersections were analyzed using Synchro, with results summarized in **Table 19** below. Note that the walking/cycling trips anticipated to be generated by the proposed development were accounted for in the Synchro model.

Table 19: Total Projected 2031 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
Preston/Somerset (S)	D(B)	0.82(0.64)	EBT(EBT)	28.0(22.5)	B(A)	0.69(0.52)
Preston/Gladstone (S)	C(D)	0.73(0.82)	EBT(WBT)	23.1(28.0)	B(C)	0.68(0.74)
Rochester/Gladstone (S)	C(B)	0.80(0.66)	EBT(WBT)	24.4(23.8)	B(A)	0.63(0.57)
Rochester/Hwy 417 WB on/Raymond (S)	B(C)	0.63(0.74)	WBT(WBT)	12.7(15.9)	A(A)	0.50(0.57)
Rochester/Hwy 417 EB off/Orangeville (S)	D(D)	0.82(0.86)	EBT(EBT)	17.6(22.6)	A(A)	0.59(0.45)
Preston/Oak (U)	B(C)	14.3(15.7)	EB(EB)	0.7(0.8)	-	-
Preston/Laurel (U)	C(C)	16.0(16.6)	EB(EB)	0.4(0.4)	-	-
Preston/Larch (U)	C(C)	16.9(18.7)	EB(EB)	0.2(0.2)	-	-
Preston/Balsam (U)	D(D)	26.7(34.9)	WB(EB)	2.6(3.8)	-	-
Gladstone/Oak (U)	B(C)	13.9(21.7)	SB(SB)	0.8(0.9)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) – Signalized intersection.
(U) – Unsignalized intersection.

As shown in **Table 19**, the signalized intersections 'as a whole' are projected to operate at a LOS 'C' or better during the morning and afternoon peak hours, with critical movements operating at LOS 'D' or better. Note that phase splits at the Preston/Gladstone intersection were optimized in Synchro for both peak hours, which improved traffic operations. Unsignalized intersections, including the future Gladstone/Oak intersection, operated at a LOS 'D' or better during both peak hours.

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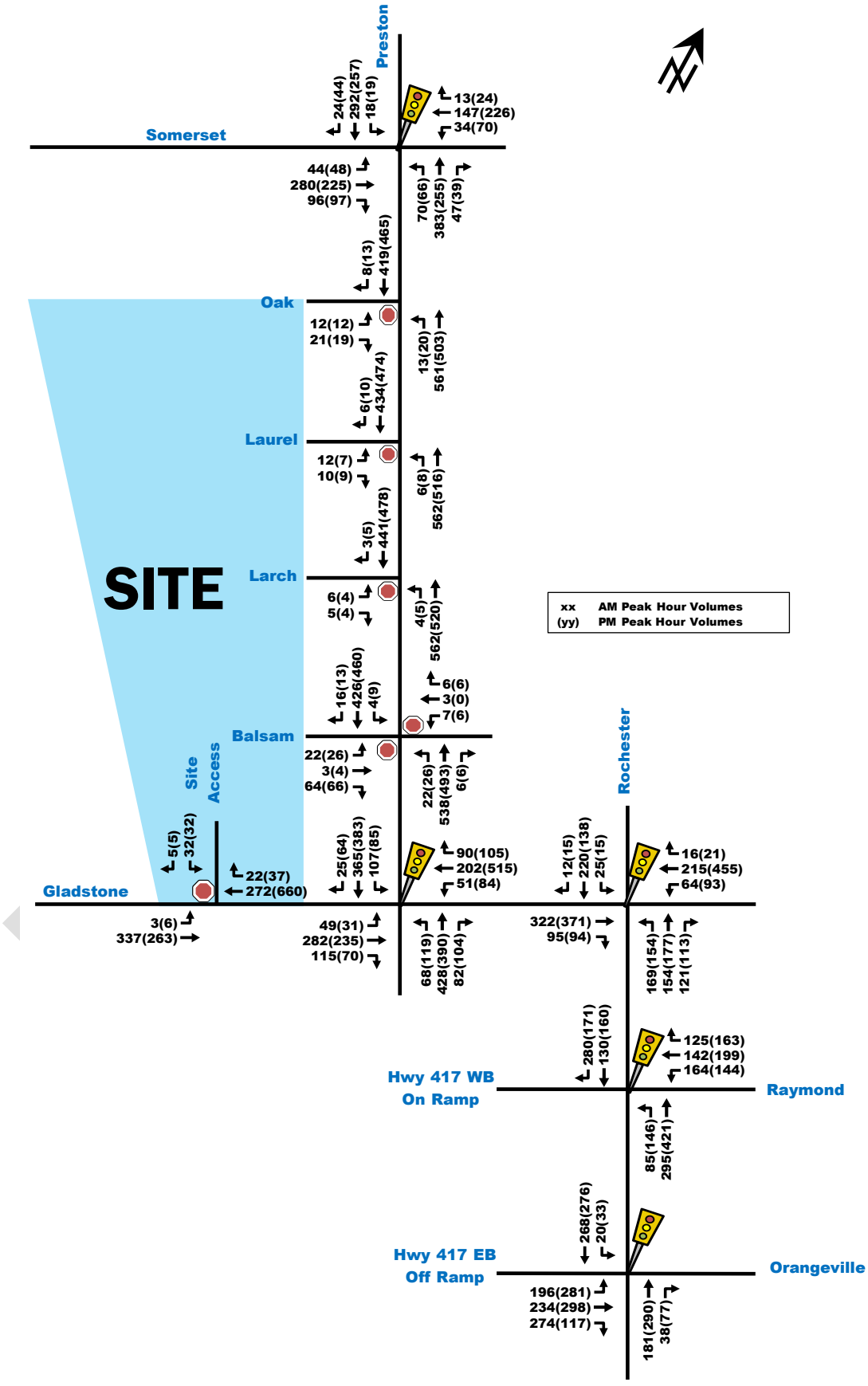
Figure 17: Total Projected 2031 Traffic Volumes



Additional queuing analysis was completed to identify potential traffic conflicts along the Gladstone corridor between the future Trillium Pathway signalized crossing, the proposed Gladstone/Oak intersection, and the nearby signalized Preston/Gladstone intersection. This section is approximately 160m in length, which carries the risk of queue spillback interrupting intersection operations.

The 95th percentile queue length analysis for the 2031 horizon year in Synchro indicated that the WB and EB traffic queues at the future Gladstone/Oak intersection were negligible during both morning and afternoon peak hours, mainly due to free flow movements on Gladstone. The EB queue length at Preston/Gladstone was approximately 90m in the morning peak hour and 50m in the afternoon peak hour, which did not extend to the future Oak access, located approximately 110m west of the Preston/Gladstone intersection.

The Preston/Balsam intersection operated at LOS D in the 2031 horizon year, but this result did not consider potential influence of ongoing City transit and intensification initiatives to reduce background traffic on the adjacent road network, which may help alleviate the traffic demand at this location. However, the Preston Hardware expansion was also not accounted for, which may add traffic and delivery activity on Balsam. The previously discussed design and traffic capacity constraints on Balsam may not adequately accommodate site generated traffic from both developments, in which case an alternative secondary access to Gladstone Village via Larch St may be more appropriate.

As outlined in Sections 4.4 and 4.6, it will be important for the City to consider these factors as plans for the Preston Hardware site advance in the future.

MMLOS Analysis

As per requirements of the TIA Guidelines, MMLOS analysis was conducted for signalized intersections. While no signalized intersections exist at the frontage of the proposed development site, the intersection of Preston/Gladstone was analyzed as it is within reasonable distance. Since there are no anticipated future modifications at this intersection, analysis was conducted assuming existing conditions. The analysis is conducted for four different travel modes, including pedestrian, cyclist, transit, and trucks. For each travel mode, a minimum desirable LOS target is obtained from the City of Ottawa TIA Guidelines. In existing conditions, the MMLOS targets are based on a "within 300m of a school" policy area, while in future conditions they are based on a "within 600m of a rapid transit station" policy area. Note that both policy areas provide the exact same MMLOS targets. A summary of the analysis results and respective minimum desirable LOS targets are provided in **Table 20**, with the detailed analysis provided in **Appendix H**.

Table 20: Signalized Intersection MMLOS Analysis

Intersection	Level of Service							
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLOS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Preston/Gladstone	C	A	D	C	F	D	F	D

Red font in the table above indicates that the desirable target LOS is not achieved. As shown in **Table 20**, none of the minimum desirable LOS targets have been met at the intersection of Preston/Gladstone due to the following reasons:

- With regards to pedestrian LOS, the results are largely based on the number of lanes that pedestrians have to cross, followed by the degree of comfort and safety that pedestrians feel while crossing. This includes factors such as the amount of interference with crossing pedestrians due to permissible vehicle left-turns and right-turns. To achieve a PLOS 'A' at this particular intersection, given that reducing the number of lanes is not an ideal solution, raised crosswalks would need to be provided along with protected vehicle left-turns and prohibited right-turns on red. Nonetheless, there are currently no safety concerns at this intersection with regards to pedestrians.

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- With regards to bicycle LOS, the target LOS is not achieved due to the lack of cycling facilities at the intersection (i.e. cyclists operate in mixed traffic conditions). However, there are no safety concerns for cyclists at this intersection, as operating speeds are low in the area and the Trillium Line Pathway provides a high level of safe connectivity dedicated to pedestrians and cyclists.
- With regards to transit LOS, the target LOS is not achieved due to the high delays experienced by the east and west approaches (Gladstone Ave) of the intersection. Since buses operate in mixed traffic, they experience the same level of delay as general traffic at the intersection. Adjusting the signal timing and phasing of the intersection to provide more dedicated green time to the Gladstone Ave approaches may help reduce the traffic delays.
- With regards to truck LOS, the target LOS is not achieved due to the narrow corner radiuses of the intersection and the number of receiving lanes (1 receiving lane on all legs of the intersection). However, it should be noted that the MMLOS Guidelines do not take into account the geometric arrangement of the left-turn lanes. The stop bars of the left-turn lanes on the east and south legs of the intersection are set back from the stop bars of their respective through/right-turn lanes, thereby providing ample room for trucks to complete their left or right turning movements.

5. Findings, Conclusions and Recommendations

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

Proposed Development

- Ottawa Community Housing Corporation is proposing a large-scale mixed-use development known as Gladstone Village in a vacant land located in the northwest quadrant of the Gladstone/Trillium Line Corridor crossing.
- The development will consist of approximately 200 townhome units, 175 mid-rise apartment units and 690 high-rise apartment units, with a conservative estimate of 100,000 sq.ft of retail/commercial/ institutional space and 100,000 sq.ft of office space.
- Access to the adjacent road network will be provided by the existing Preston/Oak and Preston/Balsam intersections, and a new intersection has been proposed at Oak/Gladstone.
- Parking will be provided in an underground structure for the mid and high-rise buildings, with private driveways and surface parking for the townhome units.
- The development is anticipated to generate a total of 1,006 and 1,336 person trips during the morning and afternoon peak hours, respectively. Approximately 150 and 170 vehicle trips were anticipated in the morning and afternoon peak hour periods respectively.
- Gladstone Village will be located directly adjacent to the future Corso Italia LRT Station (formerly Gladstone Station), which is anticipated to be constructed by 2022 as part of the Stage 2 O-Train Trillium Line 2 expansion. As a result, transit usage was expected to be very high, and active transportation modes (walking and cycling) were also expected to be high given the City's intensification policies reflected in the Corso Italia Station District Secondary Plan.

Existing and Future Background Conditions

- Under existing conditions, traffic operations at the Gladstone/Preston intersection operated near capacity during the afternoon peak hour. All other existing intersections operated within City standards.
- A review of historical traffic volumes indicated a decreasing growth trend at the Gladstone/Preston intersection. Therefore, a linear background traffic growth rate of 0% per year was applied to the study area. A select number of adjacent development traffic volumes were added separately based on recent traffic studies.

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- In the future background 2031 conditions, overall study area conditions did not change significantly. However, the EBT movement at the intersection of Preston/Gladstone demonstrated increased congestion in the morning peak hour.
- MMLOS analysis for boundary streets was conducted for Gladstone Ave, Oak St and Balsam St. The results indicate that the pedestrian LOS targets are not met on any of the boundary roads. Bicycle, transit, and truck targets were met.
- MMLOS analysis was conducted for the signalized intersection Preston/Gladstone. The analysis indicated that the desirable LOS targets were not achieved. However, there are no safety concerns anticipated.

Projected Conditions

- Existing and future traffic volumes on Gladstone Ave were shown to exceed the City recommended major collector road capacity (600 veh/h) in the westbound direction during the afternoon peak hour by 40 and 100 veh/h respectively. These results were considered acceptable based on historical trends of decreasing traffic growth, and the future impacts of City transit and active transportation initiatives on future background traffic (e.g. Stage 2 LRT construction), which were not accounted for in the analysis.
- In total projected 2031 conditions, including future vehicle/walking/cycling trips on the adjacent road network generated by the proposed development were incorporated in the Synchro model. The analysis results have been summarized below:
    - All signalized intersections within the study area operated at a LOS 'C' or better during both peak hours. The Preston/Gladstone intersection signal timings were, improving the intersection's operations.
    - Unsignalized intersections, including the future site access at Gladstone Ave, operate at a LOS 'D' or better during both peak hours.

Design Considerations

- Stop control on the side street was assumed at the proposed Gladstone/Oak intersection, on the Oak St approach. Gladstone Ave would remain free flow. Left-turn warrant analysis confirmed an EB left-turn was not required.
- The Trillium Pathway crosses Gladstone approximately 45m west of the proposed Gladstone/Oak intersection, and early indications from City staff is this crossing will be signalized in the future, once the Corso Italia LRT Station is constructed. The existing Gladstone/Preston signalized intersection is approximately 110m to the east of the proposed intersection.

  Additional queuing analysis was completed to identify any potential traffic conflicts along this short corridor. The results indicated that the WB and EB traffic queues at the future Gladstone/Oak intersection were negligible during both morning and afternoon peak hours. The EB queue length at Preston/Gladstone is approximately 90m in the morning peak hour and 50m in the afternoon peak hour, which does not extend to the future Gladstone/Oak access, located approximately 110m west of the Preston/Gladstone intersection.

  Therefore, no additional modifications were required at the Gladstone/Oak intersection.
- Another consideration for the Gladstone/Oak intersection is the adjacent Preston Hardware site. At the time of this study, the owners were contemplating an expansion; however, no information was available regarding the future site plan. Therefore, the scope and implications of the expansion could not be considered in this TIA.
- Balsam currently provides access to the local businesses (primarily the Preston Hardware) and single-family homes. There are no plans to alter the design of the Preston/Balsam intersection to support the subject site. The intersection operates at a LOS D ultimately, without consideration of the Preston

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Hardware potential expansion. Balsam is highly constrained by two corner buildings that abut the property line with a total right-of-way of only 11.5m, which may not be sufficient to accommodate traffic from both future developments. Thus, Balsam may not be a suitable choice for secondary access to the Gladstone Village site despite being the preferred choice by the local community.

Larch St which has an 18m ROW and adequate pedestrian facilities, may be a suitable alternative access to reduce future traffic demand on Balsam St, and avoid compounding traffic impacts from the potential Preston Hardware expansion. These considerations may be reviewed further during the Site Plan Control process for the Gladstone Village development.

- Based on the preliminary design review of the proposed access intersections, no significant off-site roadway modifications were expected. Therefore, an RMA is not required.
- A new pedestrian crossing (PXO) may be considered the Preston/Laurel intersection, to provide pedestrians with a higher quality crossing across Preston St. This location was considered suitable for a PXO based on the potential desire line through the proposed development and crossing over the Trillium Line. This potential modification will also be confirmed during the Site Plan Control process.

The proposed development as outlined in the preceding study can be accommodated by the adjacent road network at the 2031 horizon. The development plan leverages its location in close proximity to the future Corso Italia LRT Station with abundant active transportation facilities and a modern site design to mitigate traffic impacts. The analysis confirmed that no off-site roadway modifications were needed to support the development based on information available at the time of this study. A key consideration for City staff is the status of the Preston Hardware site expansion, which may trigger some design and capacity challenges in the future. Overall, the development is recommended from a transportation perspective.

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