SECTION

9

University of Ottawa
Lees Campus
Transportation Impact Assessment

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TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

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

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☐
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☐
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☐
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	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)	☐

	TDM-supportive design & infrastructure measures: *Non-residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	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	☐
	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	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☐
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

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

Legend

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

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

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

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

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

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

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

Transportation Impact Assessment – Step 4: Analysis

200 Lees Avenue

Prepared for University of Ottawa
by IBI Group
September 28, 2020

Document Control Page

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Executive Summary

IBI Group (IBI) was retained by the University of Ottawa to undertake a Transportation Impact Assessment (TIA) in support of a Site Plan Control application for the proposed redevelopment of the University of Ottawa Lees Campus, located at 200 Lees Avenue in Ottawa. The proposed redevelopment of the campus will involve the demolition of three existing buildings and replacement with a single 6-storey building. The new building will result in a net increase of 9,900 m^2 of Gross Floor Area and is expected to be fully constructed and occupied by 2023. Access to the site will continue to be provided via the signalized access intersection on Lees Avenue.

As a result of the redevelopment of the campus, on-site vehicle parking will be reduced from 361 parking spaces to 259 parking spaces. Based on historical university-wide parking utilization data, it is expected that the proposed parking supply will sufficiently accommodate the total demand generated by the redeveloped campus while eliminating much of the current over-supply in recognition of the Campus' proximity to the Lees Confederation Line light rail station. A total of 184 bicycle parking spaces will also be provided, the majority of which will be sheltered spaces, and will exceed minimum requirements.

Based on trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual, it is anticipated that the net increase in GFA of the Lees Campus will result in an increase of approximately 150 two-way person-trips during both the weekday morning and afternoon commuter peak hours. It should be noted that this magnitude of trips is not specific to the University of Ottawa but rather typical of urban post-secondary institutions in North America. Based on mode share data provided by the University of Ottawa however, this estimation of new person-trips can be stratified by travel mode as follows: 17% automobile driver, 3% automobile passenger, 65% transit, 3% cyclist, 10% walking, and 2% other. This translates to approximately 25 new vehicular trips and over 100 new walking trips per hour during periods of peak demand on the adjacent transportation network. Although the peak trip generation of the University may occur outside of the commuter peaks, impacts on the transportation network are most critical during those times.

The signalized intersection located at the site access is presently operating at an acceptable level of service for vehicles and will continue to do so with this additional travel demand. With pedestrian traffic being the primary means of travel to and from the site, the site has been designed to embrace active transportation by providing a direct travel path between the Lees light rail station and the building's main entrance, as well as numerous connections to the Rideau River trail system. A multi-use pathway is also proposed along the western edge of the site improving the cycling link to the Main Campus while providing enhanced access through the Lees Campus.

A multi-modal analysis was conducted for the segment of Lees Avenue adjacent to the campus as well as the signalized site access intersection. Both the roadway segment and intersection do not currently meet their Pedestrian and Bicycle Level of Service (PLOS and BLOS) targets as the current pedestrian and cycling infrastructure does not fit the context of a Transit-Oriented Development (TOD) zone. Remedial measures were recommended to address these deficiencies. Along Lees Avenue, it was recommended that traffic calming measures such as the installation of flexible bollards should be considered by the City as a means of reducing vehicular speeds and improving BLOS. It was also recommended that the site access intersection be completely reconstructed as a raised, protected intersection with bicycle cross-rides on all approaches and a leading pedestrian interval. These measures are expected to significantly enhance pedestrian and cyclist comfort and are appropriate given that the intersection and road are directly adjacent to Lees Station. It should be noted, however, that the recommendations are solely for the consideration of the City of Ottawa to address existing deficiencies in user comfort and are not a direct requirement or consequence of the 200 Lees development.

Intersection sight distances were reviewed at the site access intersection and it was found that there was insufficient sight distance on the southbound approach for right-turning vehicles to safely make a right-turn

on red. As such, it is recommended that the City of Ottawa consider prohibiting right-turns-on-red at this intersection during weekday peak periods. This would immediately address the sightline deficiency and improve pedestrian comfort by reducing pedestrian-vehicle conflicts while having only minimal effects on vehicular level of service. Further, flexible bollards should be considered for short segment of Lees Avenue east of the signalized intersection to serve as a traffic calming measure and improvement to cyclist comfort, by delineating the on-road bicycle lanes.

Based on the findings and recommended measures of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network.

1 Introduction

IBI Group (IBI) was retained by the University of Ottawa to undertake a Transportation Impact Assessment (TIA) in support of a Site Plan Control application for the proposed redevelopment of the University of Ottawa Lees Campus, located at 200 Lees Avenue in Ottawa.

In accordance with the City of Ottawa's Transportation Impact Assessment Guidelines, published in June 2017, the following report is divided into four major components:

- **Screening** – Prior to the commencement of a TIA, an initial assessment of the proposed development is undertaken to establish the need for a comprehensive review of the site based on three triggers: Trip Generation, Location and Safety.
- **Scoping** – This component of the TIA report describes both the existing and planned conditions in the vicinity of the development and defines study parameters such as the study area, analysis periods and analysis years of the development. It also provides an opportunity to identify any scope exemptions that would eliminate elements of scope described in the TIA Guidelines that are not relevant to the development proposal, based on consultation with City staff.
- **Forecasting** – The Forecasting component of the TIA is intended to review both the development-generated travel demand and the background network travel demand, and provides an opportunity to rationalize this demand to ensure projections are within the capacity constraints of the transportation network.
- **Analysis** – This component documents the results of any analyses undertaken to ensure that the transportation related features of the proposed development are in conformance with prescribed technical standards and that its impacts on the transportation network are both sustainable and effectively managed. It also identifies a development strategy to ensure that what is being proposed is aligned with the City of Ottawa's city-building objectives, targets and policies.

Throughout the development of a TIA report, each of the four study components above are submitted in draft form to the City of Ottawa and undergo a review by a designated Transportation Project Manager. Any comments received are addressed to the satisfaction of the City's Transportation Project Manager before proceeding with subsequent components of the study. All technical comments and responses throughout this process are included in **Appendix A**.

2 TIA Screening

An initial screening was completed to confirm the need for a Transportation Impact Assessment by reviewing the following three triggers:

- **Trip Generation**: Based on the proposed increase in size of the campus, the development is likely to exceed the minimum threshold of 60 new person-trips during weekday peak periods and therefore the Trip Generation trigger is satisfied.
- **Location**: The proposed development is located within the Lees Avenue Mixed Use Centre Design Priority Area (DPA) and the Lees Station Transit-Oriented Development (TOD) zone. As such, the Location trigger is satisfied.
- **Safety**: Boundary street conditions were reviewed to determine if there is an elevated potential for safety concerns adjacent the site. The site access intersection is located within 150m of another traffic signal and is near a horizontal curve on Lees Avenue as it passes over Highway 417. As such, the Safety trigger is satisfied.

As the proposed development meets the Trip Generation, Location and Safety triggers, the need to undertake a Transportation Impact Assessment is confirmed.

A copy of the Screening Form is provided in **Appendix B**.

3 Project Scoping

3.1 Description of Proposed Development

3.1.1 Site Location

The University of Ottawa Lees Campus is located at 200 Lees Avenue. The site is approximately 7.04 hectares in size and is bound by Lees Avenue and Highway 417 to the north, the Rideau River to the east and south and the O-Train Confederation Line tracks to the west.

The site location and its surrounding context is illustrated in **Exhibit 1**.

3.1.2 Land Use Details

The University of Ottawa Lees Campus is currently occupied by five existing post-secondary campus buildings and an outdoor sports field, as indicated in **Figure 1**. The Gross Floor Area for all five existing buildings is summarized in **Table 1**. Based on GeoOttawa, the subject site is zoned TD3[2029] and TD2[2077] – Transit Oriented Development Zone.

Figure 1 - Lees Campus: Existing Layout

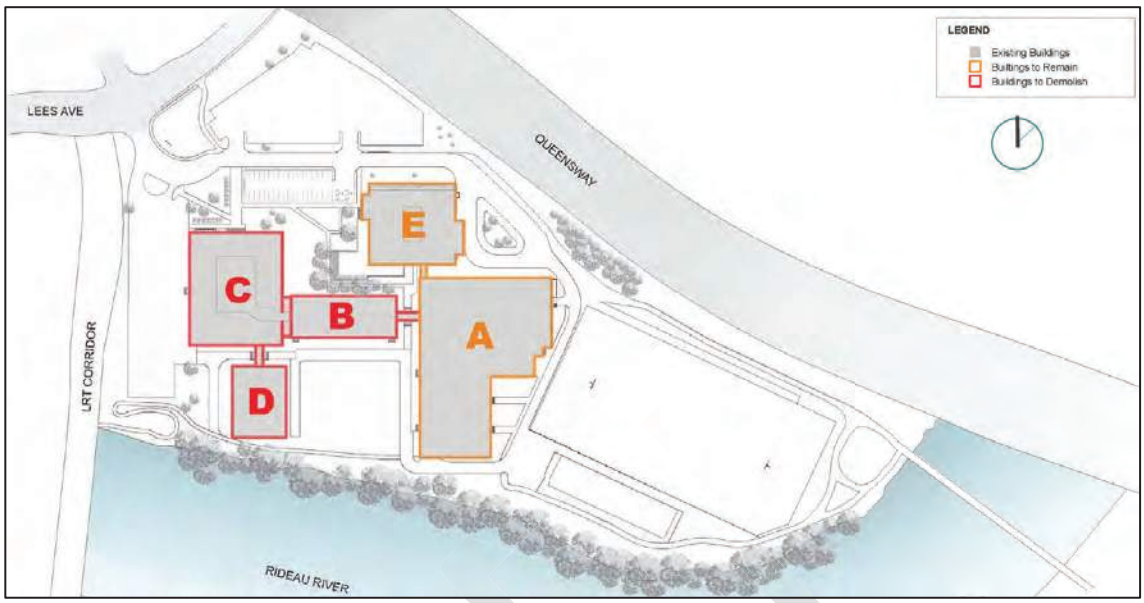


Table 1 - Land Use Statistics - Existing Buildings

BUILDING	GROSS FLOOR AREA (m^2)
A	5,631
B	2,503
C	3,099
D	1,877
E	5,883

As part of Phase 1 of redevelopment of the campus, Buildings B, C and D will be demolished/redeveloped and be replaced with a new structure for the University's Faculty of Heath Sciences. The long-term vision for the campus may also include the eventual redevelopment of Building A (2-5 years) and Building E (+/- 15 years) and the potential for infill development of existing parking areas with a mix of land uses, however, as the specific timing and details of future development within the Lees Campus have yet to be determined, the analysis undertaken for this study will be limited to only Phase 1, as proposed.

The proposed Phase 1 development includes a new 6-storey structure with approximately 17,379 square meters of Gross Floor Area (GFA).

Table 2 - Land Use Statistics – Phase 1

LAND USE	SIZE
Institutional	17,379 m^2 GFA (Net Increase of 9,900 m^2 GFA)

Of the 361 surface parking spaces currently provided in Lots G1 through G4 of the 200 Lees Campus, approximately 259 parking spaces will be retained. Further details relating to the proposed Campus parking supply will be discussed in the Analysis section of this report.

The existing site access intersection on Lees Avenue will be maintained and no new site access intersections are proposed as part of the redevelopment. The primary pedestrian access to the proposed building will be provided to the northwest oriented toward the Lees Station. Secondary pedestrian access will be provided from Parking Lot G2 to the west of the building.

The configuration of the proposed redevelopment is illustrated in **Exhibit 2**.

3.1.3 Development Phasing & Date of Occupancy

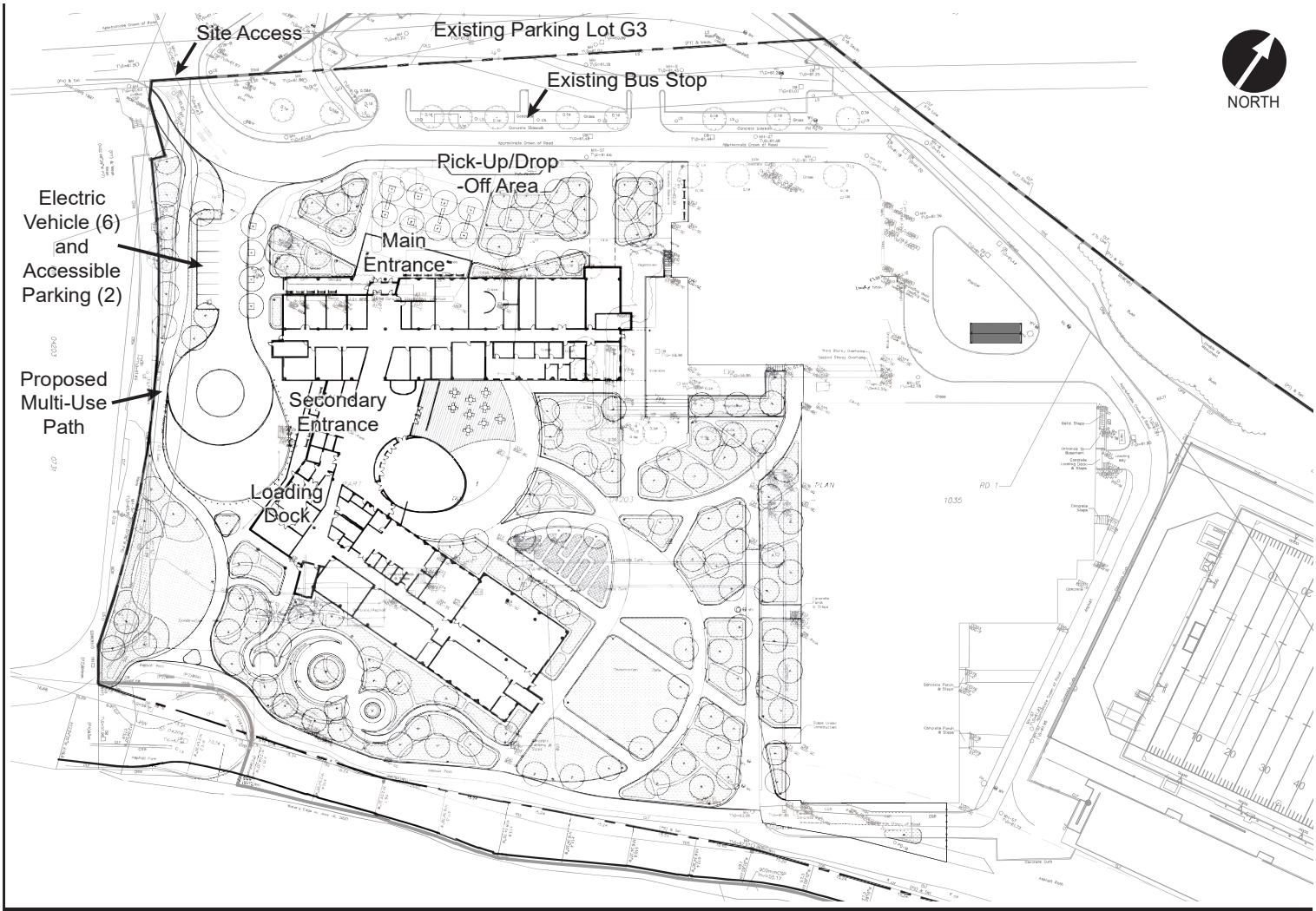
The proposed redevelopment will occur in multiple phases. Phase 1 is expected to be complete in 2023 and will include the redevelopment of buildings B, C and D while subsequent phases may occur over a period of 15 years. For the purposes of this study, the impacts of future phases will not be considered, and the study will focus only on the Phase 1 of the proposed development.

IBI

200 Lees Avenue
Transportation Impact Assessment

Exhibit 1:
Site Location

PROJECT No. 123633
DATE: September 2020
SCALE: 0m 50m 100m



IBI

200 Lees Avenue
Transportation Impact Assessment

Exhibit 2:
Proposed Development

PROJECT No. 123633
DATE: September 2020
SCALE: 0m 10m 25m

3.2 Existing Conditions

3.2.1 Existing Road Network

3.2.1.1 Roadways

The proposed development is bound by the following street(s):

- **Lees Avenue** is an urban arterial road under the jurisdiction of the City of Ottawa that extends east-west from Main Street to Mann Avenue where it becomes King Edward Avenue. The roadway has a two-lane urban cross-section and posted speed limit of 50 km/h. Between Main Street and Robinson Avenue, Lees Avenue has a right-of-way protection of 23.0m. Along the site frontage, it currently has a right-of-way that gradually widens from west to east from 20.0m to 50.5m. Up to an additional 1.5m may therefore be required on the south side of Lees Avenue along the site frontage to meet the 23.0m right-of-way protection.

Other street(s) within the context area of the proposed development are as follows:

- **Highway 417 (Queensway)** is a 400-series highway under the jurisdiction of the Ontario Ministry of Transportation (MTO) that passes through the centre of Ottawa. The highway forms part of the northern boundary of the subject site and has ten lanes of moving traffic at this location, including ramp lanes. An eastbound on- and off-ramp to the highway are located on Lees Avenue approximately 260m and 510m west of the site access intersection, respectively.

3.2.1.2 Driveways Adjacent to Development Access

Within 200m of the site access intersection are private approaches associated with nearby residential apartment buildings as well as the access road to the former Transitway which has been replaced with the O-Train Confederation Line.

3.2.1.3 Intersections

The following intersection has the greatest potential to be impacted by the proposed development:

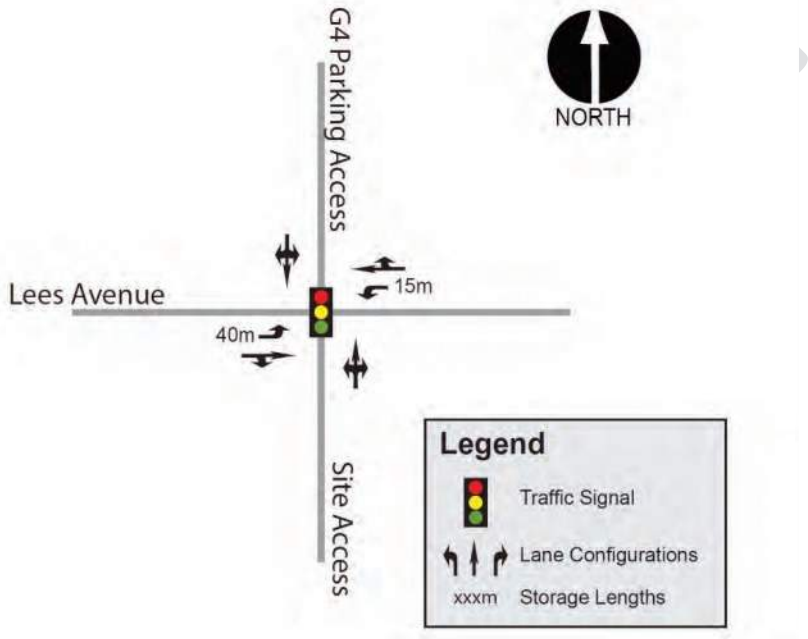
- **Lees Avenue & Lees Campus Access** intersection is a four-legged signalized intersection with left-turn lanes on the eastbound and westbound approaches. The south leg provides access to the Lees Campus while the north leg provides access to Lot G4 of the 200 Lees Avenue parking facilities.

Other intersections located within the context area of the proposed development are as follows:

- **Lees Avenue & Highway 417 Eastbound On-Ramp** is a three-legged at-grade unsignalized ramp terminal intersection with free-flow on all approaches.

The intersection control and lane configurations for the intersection of Lees Avenue & Lees Campus Access is shown below in **Figure 2**.

Figure 2 - Existing (2020) Lane Configurations and Intersection Control



3.2.1.4 Traffic Management Measures

Within the vicinity of the subject site, the only traffic calming measures currently provided are flexible stakes along the lane markings for the eastbound bike lane west of the subject site and flexible centreline signs at the pedestrian crossover (PXO) 270m east of the site access intersection.

3.2.1.5 Existing Traffic Volumes

As the proposed development will consist of primarily post-secondary land uses, the weekday peak hour traffic conditions will be most affected by any associated increase in traffic. Weekday

morning and afternoon peak hour turning movement counts were therefore obtained from the City of Ottawa at the following intersection:

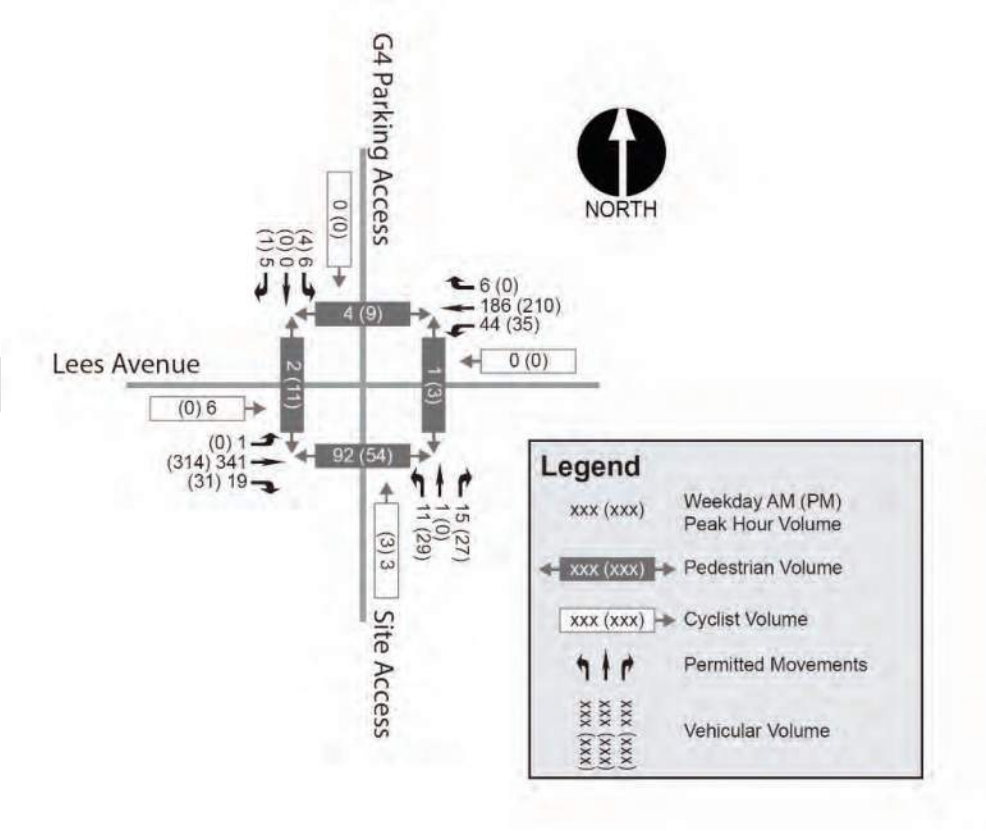
- Lees Avenue & Lees Campus Access (City of Ottawa, February 2018)

A linear 2% growth rate has been applied to through movements on Lees Avenue to estimate existing (2020) traffic volumes. Details on the source of the background growth rate will be discussed in the Forecasting section of the report.

It should be noted that at the time of the above traffic count, Lees Station was under construction and all transit service was provided via a pair of bus stops located 200m west of the site access intersection. As such, pedestrian volumes at the intersection may be under-represented given that most transit users would likely use the pedestrian crossover (PXO) located 130m west of the site to cross Lees Avenue and any transit users using eastbound buses would not need to cross Lees Avenue to get to/from the subject site. This, however, represents the best available data at the moment. It has been confirmed that the City of Ottawa does not have prior traffic data at this intersection.

Peak hour traffic volumes representative of existing conditions are shown below in **Figure 3**. Weekday morning and afternoon peak hour turning movement counts have been provided in **Appendix C**.

Figure 3 - Existing (2020) Traffic



3.2.2 Existing Bicycle and Pedestrian Facilities

The area around the subject site is well served in terms of pedestrian and cycling infrastructure. Multi-use paths (MUPs) exist on both sides of the Rideau River and the O-Train Confederation Line corridor and bike lanes are present on both sides of Lees Avenue. There are also two

pedestrian/cyclist crossings of the Rideau River near the site: Hurdman Bridge and the Rideau River Pedestrian/Cyclist Bridge. Concrete sidewalks are provided on both sides of Lees Avenue. The existing MUP along the east side of the Confederation Line corridor and immediately adjacent the Campus does not provide any direct connection to Lees Station. A set of stairs has recently been constructed adjacent the Lees Campus Access that provides an opportunity for pedestrians to access the Lees Campus and Lees Station from the MUP.

Within the subject site, concrete sidewalks and a mixture of bike lanes and sharrows are present on both sides of the main site access driveway. These serve as an internal active transportation corridor through the site to the Rideau River Pedestrian/Cyclist Bridge and the Rideau River Nature Trail.

Figure 4 below illustrates the existing cycling and shared pedestrian-cyclist network in the vicinity of the subject site.

Figure 4 - Existing Cycling Network

Source: GeoOttawa

3.2.3 Existing Transit Facilities and Service

The following transit routes, operated by OC Transpo, exists within the vicinity of the site:

- **Route #16** operates regular, all-day service between Westboro Station (Tunney's Pasture on Sundays) and Saint-Paul University, operating on 30-minute headways on weekdays and Saturdays and one-hour headways on Sundays.
- **Route #55** operates regular, all-day service between Bayshore Shopping Centre and Elmvale Acres Shopping Centre, operating on 15- to 30-minute headways on weekdays and 30-minute headways on Saturdays and Sundays.
- **Route #56** operates weekday-only peak hour service between Tunney's Pasture Station and King Edward Avenue & Union Street, operating on one-hour headways.

The above schedules were collected on May 11, 2020 and may therefore be operating on modified schedules due to the COVID-19 pandemic, as noted on the OC Transpo website.

The nearest bus stops to the site are on both sides of Lees Avenue next to Lees Station, approximately 60m west of the site access intersection. Both bus stops have a shelter and bench. Local bus routes previously entered the site to pick-up and drop-off passengers, however, since the O-Train Confederation Line began operating, buses no longer enter the site and use the bus stops on Lees Avenue instead. A campus shuttle is also provided by uOttawa with weekday service between the Main Campus, Lees Campus and Roger Guindon Hall (Hospital Campus), operating on 30-minute headways. The Campus Shuttle uses existing OC Transpo bus stops on Lees Avenue.

In addition to the above routes, the subject site is located directly adjacent to Lees Station on the O-Train Confederation Line. The Confederation Line operates between Tunney's Pasture Station and Blair Station with eleven stations in between. Under typical circumstances, the Confederation Line operates on headways of 5 minutes or less during peak periods, with a maximum headway of 15 minutes after midnight and during some time-periods on weekends.

Transit maps for the above bus routes and the City-wide rapid transit network are provided in **Appendix D**.

3.2.4 Collision History

A review of historical collision data has been undertaken for Lees Avenue within the vicinity of the proposed development. The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, have occurred over a five-year period. **Table 3** summarizes all reported collisions between January 1, 2014 and December 31, 2018.

Table 3 - Reported Collisions within Vicinity of Proposed Development

LOCATION	# OF REPORTED COLLISIONS
INTERSECTIONS	
Lees Avenue & 472m East of Chestnut Street / uOttawa Lees Campus	1
SEGMENTS	
Lees Avenue – 349m East of Chestnut Street to Lees Station	6
Lees Avenue – Lees Station to Chapel Crescent	6

Based on a preliminary review of the collision history noted above, both road segments may require further review.

Detailed collision records are provided in **Appendix E**.

3.3 Planned Conditions

3.3.1 Transportation Network

3.3.1.1 Future Road Network Projects

The 2013 Transportation Master Plan (TMP) outlines future road network modifications required in the 2031 'Affordable Network'. A review of the TMP Affordable Plan indicates that there are no planned changes to the arterial road network within the broader area surrounding the proposed development.

Beyond 2031, however, the TMP indicates that a new arterial (incorporating some existing roadways) will be constructed between the Nicholas Street & Highway 417 interchange and the

Walkley Road & Conroy Road intersection, including a new bridge over the Rideau River. The Alta Vista Transportation Corridor (AVTC) Environmental Study Report (Delcan, November 2005) indicates that the arterial will have two all-purpose vehicle lanes and two high occupancy vehicle (HOV) lanes as well as on-road bike lanes, a parallel Recreation Path and concrete sidewalks. At Lees Avenue, two at-grade ramp terminal intersections will allow northbound vehicles on the AVTC to exit onto Lees Avenue and allow vehicles on Lees Avenue to enter southbound along the AVTC, as shown below in **Figure 5**. Based on the 2019 City-Wide Development Charges Background Study (Hemson Consulting Ltd., March 15, 2019), funding for the AVTC will not be available until 2032.

Figure 5 - Alta Vista Transportation Corridor: Highway 417 / Lees Section Preferred Design

Source: Alta Vista Transportation Corridor Environmental Study Report – Figure 7-4

Based on information provided by City of Ottawa staff, Lees Avenue is scheduled for resurfacing in the next 3 to 5 years and Public Works and Environmental Services (PWES) is scheduled to complete work near Chapel Crescent and Hurdman Road in the next 2 to 3 years.

3.3.1.2 Future Transit Facilities and Services

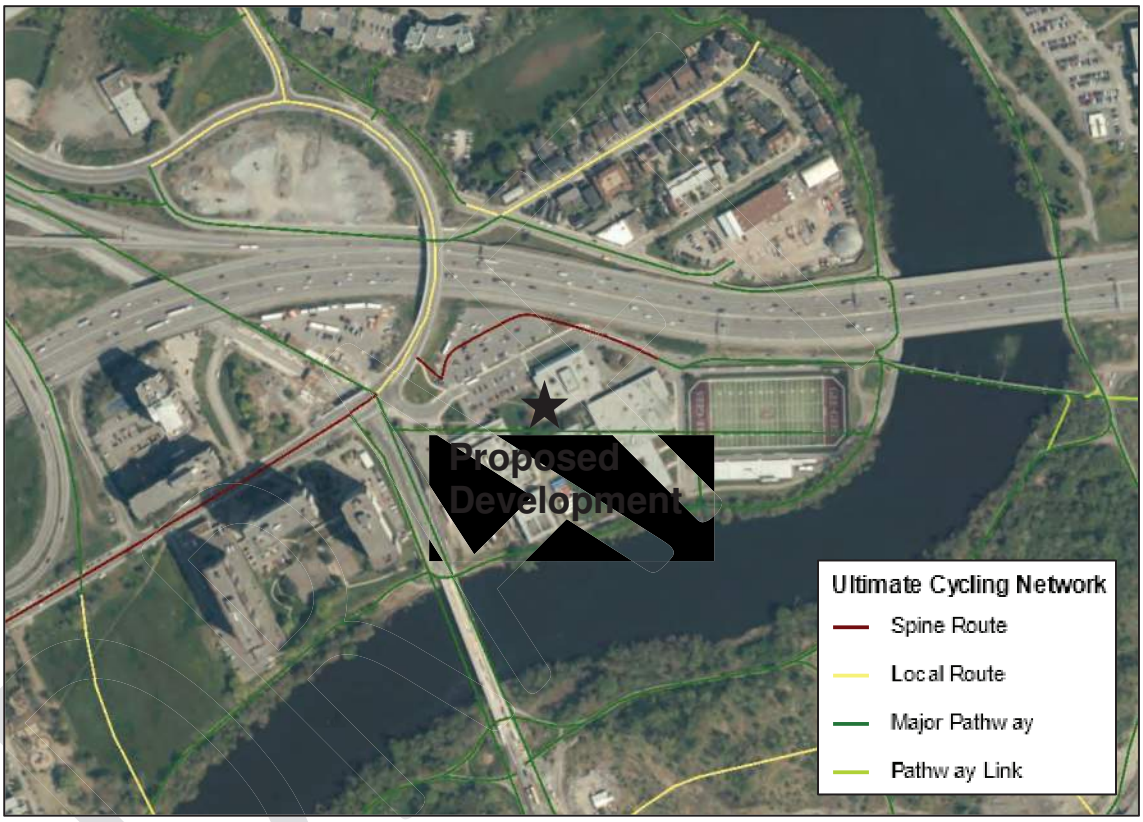
The 2013 TMP outlines the future rapid transit and transit priority (RTTP) network. A review of the TMP's 2031 'Affordable Network' indicates that the construction of the Confederation Line, now completed and in operation, was the only planned change to the RTTP network in the vicinity of the proposed development.

Beyond 2031, the TMP indicates that isolated transit priority measures may be implemented along Lees Avenue between Main Street and Lees Station.

3.3.1.3 Future Cycling and Pedestrian Facilities

The 2013 Ottawa Cycling Plan (OCP) designates Lees Avenue between Main Street and Lees Station as a 'Spine Route', which form part of a system linking the commercial, employment, institutional, residential and educational nodes throughout the city. A Spine Route also exists through the northern portion of the site between the Rideau River and Lees Station. East of Lees Station, Lees Avenue is designated a 'Local Route'. All of the existing multi-use paths noted in Section 3.2.2 are designated as 'Major Pathways' in the OCP. **Figure 6** illustrates the ultimate cycling network within the context area of the proposed development.

Figure 6 - Ultimate Cycling Network within Context Area



Source: GeoOttawa

There are no known improvements to pedestrian or cycling facilities planned within the context area.

3.3.2 Future Adjacent Developments

The City of Ottawa Transportation Impact Assessment (TIA) Guidelines specify that all significant developments proposed within the surrounding area which are likely to occur within the study's horizon year must be identified and taken into consideration in the development of future background traffic projections.

Within the context area there are four development applications that are either in the development application approval process, have already been approved and in pre-construction or are currently under construction:

- 19 Robinson Avenue – 3-storey apartment building with 47 units

- 29 Robinson Avenue – 3-storey apartment building with 51 units
- 39 Robinson Avenue – 9-storey apartment building with 193 units
- 134 Robinson Avenue – 3-storey apartment building with 51 units

3.3.3 Network Concept Screenline

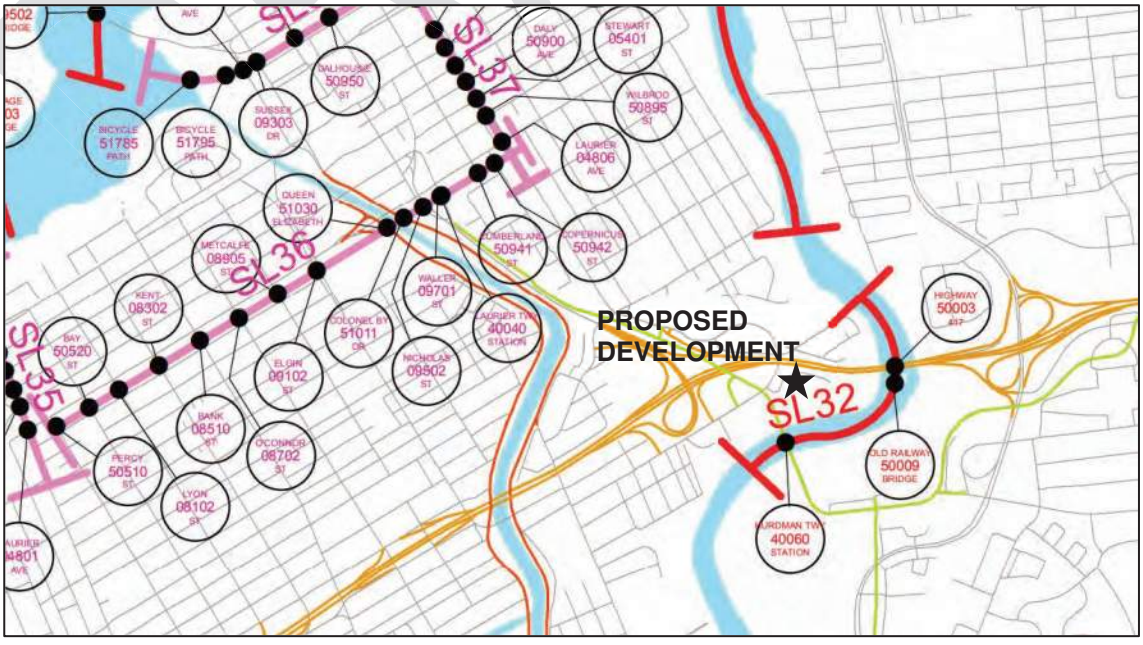
A screenline is an artificial boundary between areas of major traffic generation that captures all significant points of entry from one area to another to compare crossing demand with the available roadway capacity. Screenlines are typically located along geographical barriers such as rivers, rail lines or within the greenbelt. To capture existing flow and model future demand, count stations are established by the City of Ottawa at each crossing point along the screenline.

The nearest strategic planning screenlines adjacent to the development have been identified:

- **SL32 – Rideau River – 417** – This is the nearest north/south screenline with respect to the proposed development, and it follows the Rideau River from Hurdman Bridge to Highway 417. This screenline has three crossing points: Hurdman Transitway Station, Old Railway Bridge and Highway 417.
- **SL36 – Downtown South** – This is the nearest east/west screenline that would capture trips from the proposed development heading towards downtown, and it follows the south side of Laurier Avenue East and Laurier Avenue West from Bronson Avenue to King Edward Avenue. The screenline has 15 crossing points: Percy Street, Bay Street, Lyon Street, Kent Street, Bank Street, O'Connor Street, Metcalfe Street, Elgin Street, Queen Elizabeth Drive, Colonel By Drive, Nicholas Street, Waller Street, Laurier Transitway Station, Cumberland Street and Copernicus Street.

SL32 and SL36 are shown in **Figure 7**, as determined from the City of Ottawa's *Road Network Development Report (2013)*, a supporting document to the 2013 Transportation Master Plan (TMP). A review of the above-noted screenlines will be conducted in the Analysis component of this study.

Figure 7 - Screenlines



Source: TRANS Screenline System (2010)

3.4 Study Area

With consideration of the information presented thus far, the following intersections have been identified as being most impacted by the proposed development and will be assessed for vehicular capacity as part of this study:

- Lees Avenue & Lees Campus Access

Sustainable transportation modes are expected to represent a significant proportion of the overall site generation due to the proximity of this development to Lees Station. As such, it is expected that beyond the site access intersection site-generated traffic impacts will be relatively minimal.

Multi-Modal Level of Service (MMLOS) will be conducted for site access intersection as well as the segment of Lees Avenue adjacent to the subject site.

3.5 Time Periods

Based on the proposed post-secondary land use, traffic generated during the weekday morning and afternoon peak hour is expected to result in the most significant impact to traffic operations on the adjacent road network in terms of combined development-generated and background traffic. These two time periods will therefore be considered for operational analysis in this study.

3.6 Study Horizon Year

The following analysis years will be assessed in this study:

- Year 2023 – Full Build-Out of Phase 1
- Year 2028 – 5 Years Beyond Full Build-out of Phase 1

As previously discussed in Section 3.1, transportation impacts relating to the full implementation of the Lees Campus Master Plan will not be considered in this study as the timing and development details for future phases have yet to be determined.

3.7 Exemptions Review

The TIA Guidelines provide exemption considerations for elements of the Design Review and Network Impact components. **Table 4** summarizes the TIA modules that are not applicable to this study.

Table 4 - Exemptions Review

TIA MODULE	ELEMENT	EXEMPTION CONISDERATIONS	REQUIRED
DESIGN REVIEW COMPONENT			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	✓
	4.1.3 New Street Networks	• Only required for plans of subdivision	✗
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	✓
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	✗
NETWORK IMPACT COMPONENT			
4.5 Transportation Demand Management	All Elements	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	✓
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	✗
4.8 Network Concept	n/a	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	✗

4 Forecasting

4.1 Development Generated Traffic

4.1.1 Trip Generation Methodology

Site-generated traffic volumes were developed using the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) for the weekday peak hours of the adjacent transportation network. These represent the periods where the combination of background and site-generated travel demands have the greatest impact on the available network capacity. The TIA Guidelines indicate that vehicle-trip generation rates from the ITE Trip Generation Manual should be converted to person-trips through the application of a 1.28 vehicle-to-person-trip conversion factor. It is important to note that the person-trip generation estimates prepared in this study are not specific to the University of Ottawa but rather typical of urban post-secondary institutions in North America.

Following the application of the above conversion factor, the person-trips were then subdivided based on representative mode share percentages applicable to the study area to determine the number of vehicle, passenger, transit, pedestrian, cycling and 'other' trip types.

The mode share targets for the proposed development were developed based on the University of Ottawa 2019 Campus Mode Share Survey. The survey is broadly representative of student, staff and faculty mode choices for the University of Ottawa, however, primarily captures the mode share characteristics of the Main Campus. Given the unique geographical barriers surrounding the Lees Campus, these mode share were adjusted to reflect the local context.

4.1.2 Trip Generation Results

4.1.2.1 Vehicle Trip Generation

Weekday peak hour vehicular traffic volumes associated with the subject development were determined using appropriate peak hour trip generation rates from the ITE Trip Generation Manual. The **net increase** in GFA (Gross Floor Area) was used to estimate future site-generated trips. It is expected that trips generated by the existing buildings have been captured in the existing traffic data at the site access intersection. **Table 5** below summarizes the existing and proposed GFA for each building within the Lees Campus. As discussed in Section 3.1.2, Building B, C and D will be replaced with the proposed building.

Table 5 - Existing and Proposed Gross Floor Area

BUILDING	GROSS FLOOR AREA (m^2)	
	EXISTING	PROPOSED
A	5,631	5,631
B	2,503	-
C	3,099	-
D	1,877	-
E	5,883	5,883
Proposed Building	-	17,379
Net Change	**-**	**9,900**

The vehicular trip generation results for the proposed development have been summarized in **Table 6**.

Table 6 - Base Vehicular Trip Generation Results – Net Change

LAND USE	SIZE (NET CHANGE)	WEEKDAY PEAK HOUR	GENERATED TRIPS (VPH)		
			IN	OUT	TOTAL
Post-Secondary Institution	9,900 m^2	AM	89	27	116
		PM	40	85	125

Note: vph = Vehicles Per Hour *Source: ITE Trip Generation Manual*

4.1.2.2 Person Trip Generation

The TIA Guidelines indicate that a 1.28 vehicle-to-person-trip conversion rate should be utilized to convert the base vehicular trip generation results into person trips.

The resulting number of person-trips have been summarized in **Table 7**.

Table 7 - Person-Trip Generation – Net Change

LAND USE	WEEKDAY PEAK HOUR	PERSON TRIPS (PPH)		
		IN	OUT	TOTAL
Post-Secondary Institution	AM	114	34	149
	PM	51	109	160

Notes: pph = persons per hour

4.1.2.3 Mode Share Proportions

The University of Ottawa 2019 Campus Mode Share Survey serves as a foundation for the development of mode share targets for the subject site. The survey is broadly representative of student, staff and faculty mode choices for the University of Ottawa, however, approximately 91% of respondents considered the Main Campus as their primary destination while only 2% for the Lees Campus. As such, mode share adjustments were required to reflect the unique context of the subject site. Compared with the Main Campus, which is well integrated into the urban fabric, the Lees Campus is relatively isolated with physical barriers such as the Rideau River and Highway 417. The proportion of walking trips to/from the site has therefore been reduced and redistributed to transit and auto mode share for the purposes of this study.

For sites adjacent to Light Rail Transit (LRT) stations, the City of Ottawa expects new developments to target a transit mode share of at least 65% and a non-auto mode share of at least 15%. Based on the 2019 Campus Mode Share Survey, the University of Ottawa presently exceeds the overall target for non-auto modes. Nonetheless, Transportation Demand Management (TDM) measures aimed at encouraging non-auto modes will be incorporated in the proposed development, as discussed in latter sections of this report.

Table 8 summarizes the mode share derived from University of Ottawa 2019 Campus Mode Share Survey as well as the mode share targets for subject site.

Relevant extracts from the University of Ottawa 2019 Campus Mode Share Survey are provided in **Appendix F**.

Table 8 - University of Ottawa 2019 Campus Mode Share Survey Results and Proposed Mode Share Targets

TRAVEL MODE	2019 CAMPUS MODE SHARE SURVEY[1]	MODE SHARE TARGETS
Auto Driver	14%	17%
Auto Passenger	2%	3%
Transit	59%	65%
Cycling	3%	3%
Walking	20%	10%
Other	2%	2%

[1] - *Carpool trips were evenly distributed between auto driver and auto passenger. It is assumed that most carpool trips have an auto occupancy rate of two people: one driver and one passenger.*

4.1.2.4 Trip Reduction Factors

Deduction of Existing Development Trips

As discussed previously, Buildings B, C and D will be replaced with a new structure for the University's Faculty of Heath Sciences. The new building will result in a net increase of approximately 9,900 m^2 of GFA to the Lees Campus. Trips generated by the existing buildings are assumed to have been adequately captured in the City's traffic count data at the site access intersection.

Pass-by Traffic

Not Applicable: The proposed development is institutional and will not generate pass-by traffic.

Synergy/ Internalization

Not Applicable: The proposed development will include only institutional land uses; therefore, internalization reduction factors are not required for this study.

4.1.2.5 Trip Generation by Mode

The mode share targets presented above were applied to the number of development-generated person-trips to establish the number of trips per travel mode, as summarized in **Table 9**.

Table 9 – Peak Hour Person-Trips by Mode – Net Change

MODE	AM		PM	
	IN	OUT	IN	OUT
Auto Driver	19	6	9	19
Auto Passenger	4	1	2	3
Transit	74	22	33	71
Walking	4	1	1	3
Cycling	11	3	5	11
Other	2	1	1	2
Total	**149**		**159**	

Based on the above, the proposed development is expected to result in a net increase of up to 28 two-way vehicular trips and 104 two-way transit trips during the weekday peak hours. It is important to note that these trips represent a net increase over the existing demand generated by the site.

4.1.3 Trip Distribution and Assignment

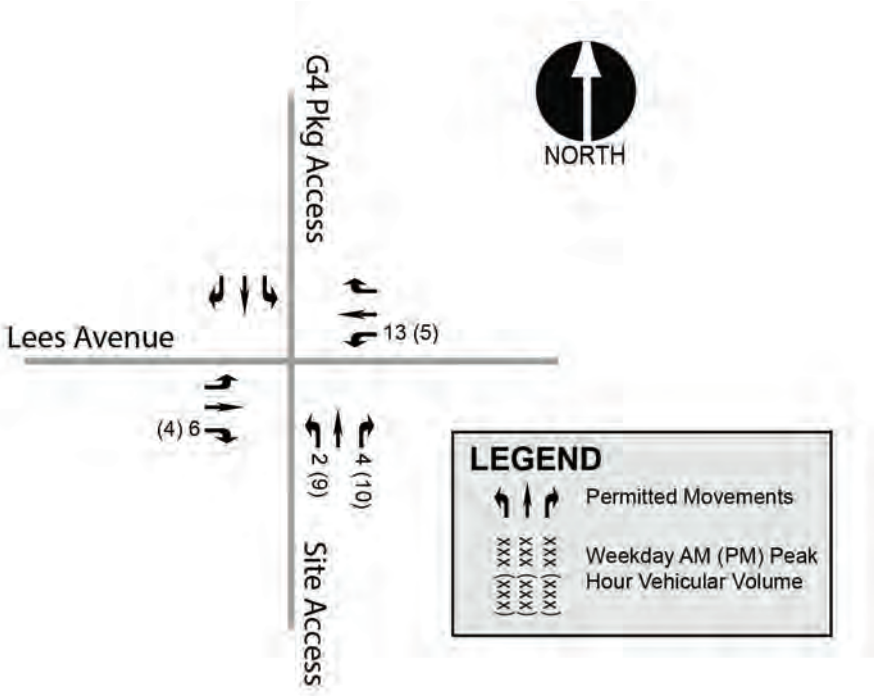
Based on existing travel patterns at the site access intersection, vehicular trips generated by the proposed development were distributed to the adjacent road network as shown in **Table 10**.

Table 10 - Distribution of Vehicular Trips

AM Peak Hour	PM Peak Hour
➢ 66% to/from the East	➢ 50% to/from the East
➢ 34% to/from the West	➢ 50% to/from the West

Utilizing the estimated number of new auto trips and applying the above distributions, future site-generated traffic volumes at the site access intersection are illustrated in **Figure 8**.

Figure 8 - Site-Generated Traffic



4.2 Background Network Traffic

4.2.1 Changes to the Background Transportation Network

To properly assess future traffic conditions, planned modifications to the transportation network that may impact travel patterns or demand within the study area have been considered. The Scoping section of this report reviewed the anticipated changes to the study area transportation network based on the Transportation Master Plan (TMP) and determined that there are currently no planned transportation network projects in the study area prior to the 2028 horizon year.

4.2.2 General Background Growth Rates

The background growth rate is intended to represent regional growth from outside the study area that will travel along the adjacent road network. Lees Avenue is well connected to Highway 417 via on- and off-ramps both upstream and downstream of the subject site. Therefore, the majority of traffic growth experienced along this corridor is expected to be a result of trips to/from Highway 417. Based on a review of traffic data collected by the Ministry of Transportation (MTO) of Highway 417 near Nicholas Street, it is estimated that Lees Avenue experiences a background traffic growth rate of approximately 2% per year. This growth rate is further supported by historical turning movement counts conducted by the City of Ottawa at the nearby Lees Avenue / King Edward Avenue & Mann Avenue intersection. As such, a linear 2% growth rate has been applied to through movements on Lees Avenue for the calculation of future background traffic volumes.

4.2.3 Other Area Development

The Scoping section of this report determined that there were active development applications for four proposed apartment buildings on Robinson Avenue. Based on the supporting transportation studies, these sites are expected to be low traffic generators, with only 18 to 25 vehicle trips on

Lees Avenue adjacent to the proposed development during weekday peak hours. These trips have therefore not been explicitly accounted for in the development of background traffic volumes and are assumed to be captured in the background growth rate.

4.3 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and its ability to effectively accommodate the additional demand generated by a new development.

4.3.1 Description of Capacity Issues

There has been little development activity within the context area of the subject site in recent years. As such, there are no records of documented capacity issues at this intersection.

4.3.2 Adjustment to Development-Generated Demands

Based on a preliminary review of existing traffic volumes at the site access intersection, no vehicular capacity issues are expected during the weekday peak hours. As the Lees Campus is expected to meet the non-auto mode share targets, no adjustments to development-generated demands are necessary.

4.3.3 Adjustment to Background Network Demands

Existing two-way peak hour traffic volumes on Lees Avenue along the site frontage are relatively low and therefore no vehicular capacity issues are anticipated at the site access intersection. Recognizing the lack of documented capacity issues at this location, no adjustments have been made to future background traffic volumes.

4.4 Traffic Volume Summary

4.4.1 Future Background Traffic Volumes

Future background traffic volumes have been established by applying a linear background growth rate to the Existing (2020) Traffic volumes, as described in previous sections of this report.

Figure 9 and **Figure 10** present the future background traffic volumes anticipated for the 2023 and 2028 analysis years, respectively.

Figure 9 - Future (2023) Background Traffic

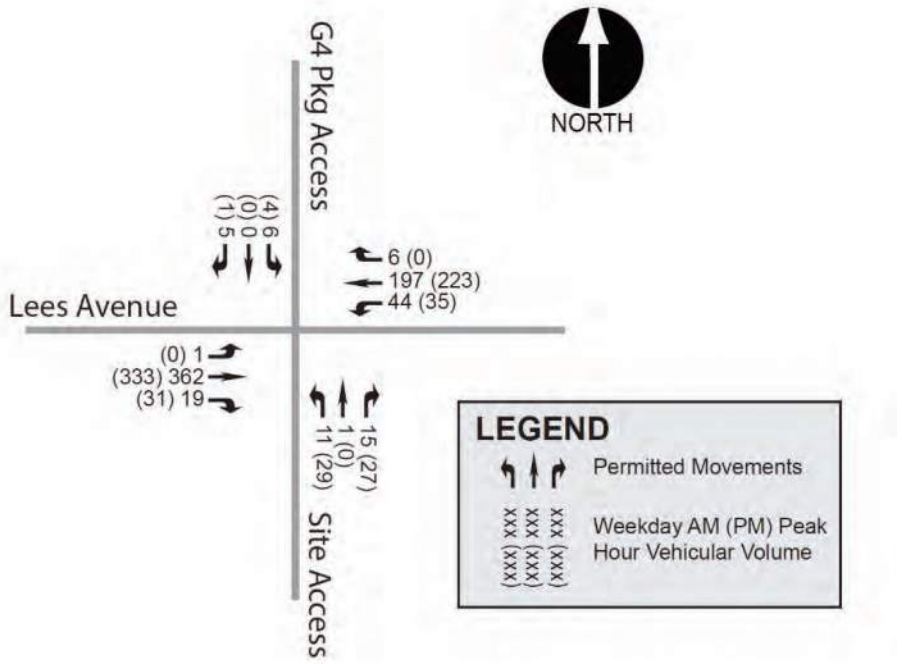
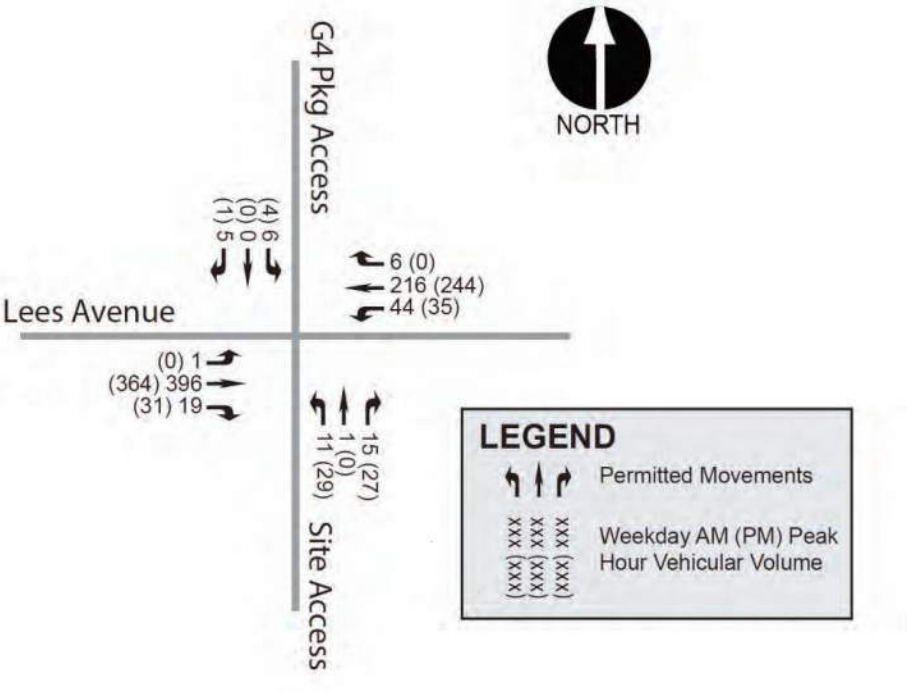


Figure 10 - Future (2028) Background Traffic



4.4.2 Future Total Traffic Volumes

Future total traffic volumes have been established by combining the site-generated traffic volumes with the future background traffic volumes.

Figure 11 and **Figure 12** present the future total traffic volumes anticipated for the 2023 and 2028 analysis years, respectively.

Figure 11 - Future (2023) Total Traffic

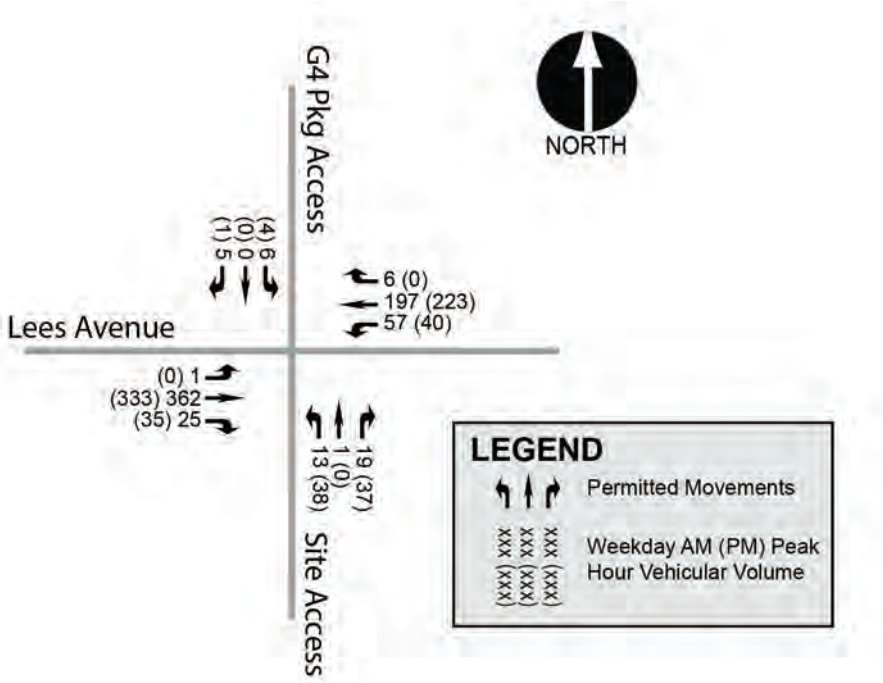
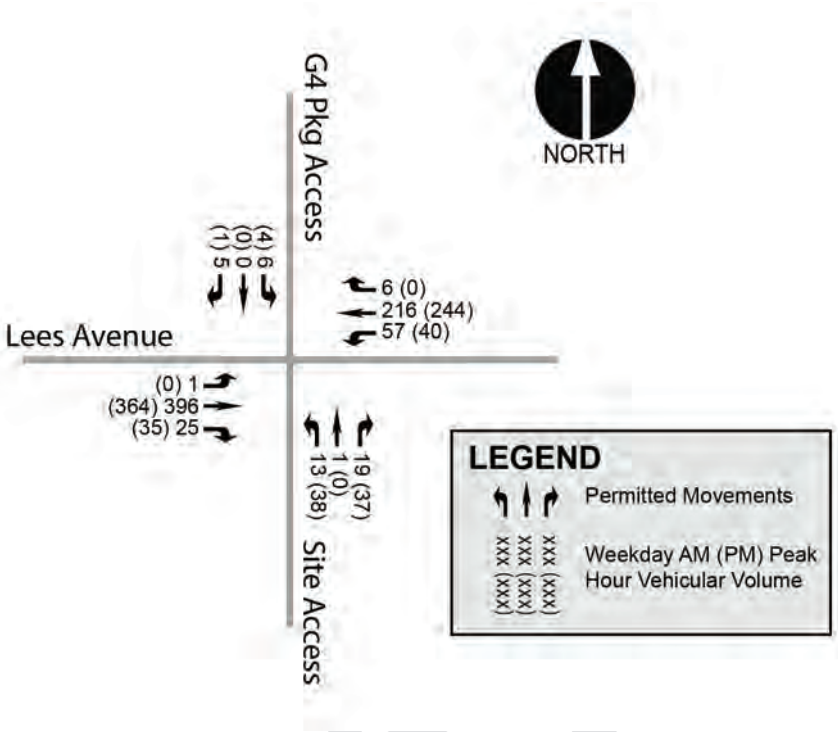


Figure 12 - Future (2028) Total Traffic



5 Analysis

5.1 Development Design

5.1.1 Design for Sustainable Modes

For consistency with the City of Ottawa's Urban Design Guidelines and transportation policies, new developments shall provide safe and efficient access for all users, while creating an environment that encourages walking, cycling and transit use.

As discussed in Section 3.2, the site is currently well integrated into the adjacent pedestrian and cyclist network and is also located directly adjacent to Lees Station and therefore within a Transit-Oriented Development (TOD) zone. The main arrival plaza for the new building will be oriented towards this light rail station, connections to the adjacent pathway network are proposed and the current over-supply of parking has been significantly reduced to encourage the use of public transit and other active modes of transportation. Existing linkages to the adjacent pedestrian and cycling network will be maintained.

These design and infrastructure elements contribute to a development that significantly reduces dependence on private automobile usage by integrating well with the existing sustainable transportation infrastructure.

The TDM-Supportive Development Design and Infrastructure Checklist was completed and is provided in **Appendix H**. This checklist identifies specific measures that are being considered in association with the proposed development to offset the vehicular impact on the adjacent road network.

5.1.2 Circulation and Access

All site-related traffic will access the site via the existing signalized intersection on Lees Avenue. A designated pick-up and drop-off zone will be provided near the arrival plaza to facilitate these activities and to minimize disruptions to on-site traffic flow. A turning circle is also proposed along the western edge of the Campus which will provide an alternate pick-up/drop off area via a secondary building entrance and is intended to serve as the primary passenger loading area for ParaTranspo services.

Loading and delivery activities associated with the movement of goods and waste will occur at the loading dock located near the southwest corner of the new proposed building. A vehicle swept path analysis has been completed which confirms that a standard WB-20 vehicle can use the loading dock, as illustrated on **Exhibit 1**. A depressed truck apron with contrasting surface material has been proposed to accommodate the circulation of oversized vehicles while defining a standard-width turning circle and drive aisle for general traffic.

5.1.3 New Street Networks

Not Applicable: The New Street Networks element is exempt from this TIA, as defined in the study scope. This element is not required for development applications involving site plans.

5.2 Parking

5.2.1 Parking Supply

The 200 Lees Campus currently has a total of 367 vehicle parking spaces, subdivided amongst four parking lots. **Table 11** summarizes the number of parking spaces per parking lot by permit as well as the peak utilization recorded in 2018 and 2019.

Table 11 - Existing Parking Supply and Utilization

PARKING LOT	G1	G2	G3	G4	TOTAL
Total Spaces	38	78	137	114	367
Permits					
➢ Regular	32	71	137	114	354
➢ Accessible	2	0	0	0	2
➢ Reserved	4	4	0	0	8
➢ 5 Minutes	0	1	0	0	1
➢ Pay & Display	0	2	0	0	2
➢ Total	38	78	137	114	367
Peak Utilization (2019)	68.75%	61.54%	37.96%	34.21%	44.99%
Peak Utilization (2018)	71.05%	47.44%	54.01%	9.57%	40.57%

Based on the provisions for Area Z of the Zoning Bylaw, no off-street parking is required for this development, however, as the development is located within a 600m walking distance of Lees Station the maximum off-street parking supply that can be provided is 347 spaces.

The proposed development will result in a reduction of parking from 367 spaces down to 259 spaces. Lot G1 will be removed entirely and Lot G2 will be reduced to only 8 spaces while Lots G3 and G4 will remain as-is. The proposed parking supply was established based on a review of parking occupancy data collected by the University in late 2019 and is expected to accommodate the demand associated with the proposed redevelopment. Future infill development may continue to reduce the overall parking supply ratio of the Lees Campus.

It should be noted that the Lees Campus maintains a sport field and frequently hosts major events at off-peak periods which generate a parking demand. The University has confirmed that the proposed parking supply will be sufficient in accommodating the parking demand generated by these events.

The City of Ottawa also has an agreement in place with the University for the use of 106 spaces during off-peak (summer) periods.

Additionally, a total of 184 bicycle parking spaces will be provided: 32 secured and sheltered spaces, 120 sheltered spaces, and 32 unsheltered spaces. Based on the Zoning Bylaw, a minimum of 116 bicycle parking spaces are also required for the Lees Campus as a whole.

5.2.2 Spillover Parking

Parking utilization data for all University-owned lots was collected in 2019 and was analysed in order to establish a university-wide parking rate. Based on this university-wide parking rate, a specialized parking rate was developed in recognition of the unique context of the Lees Campus. Based on this rate and the current size of the campus, it was estimated that approximately 45% of the existing parking demand at the Lees Campus is park-and-ride demand generated by the Main Campus. Taking into consideration the proposed size of the redeveloped campus and the existing park-and-ride demand, it is estimated that a total minimum parking supply of 206 parking spaces is required in order to meet the parking demand generated by the Lees Campus and park-and-ride demand generated by the Main Campus while maintaining a targeted peak parking utilization rate of 85%. As such, the proposed parking supply of 259 parking spaces is expected to exceed the required parking supply, therefore, no further review of parking will be necessary for

the purposes of this study. As noted, subsequent development phases may further reduce the parking ratio of the Lees Campus through the development of existing surface lots.

5.3 Boundary Streets

Lees Avenue is the only boundary street adjacent to the proposed development. As a Complete Street concept has not been completed for this roadway, segment-based Multi-Modal Level of Service (MMLOS) analysis and historical collision analysis has been conducted for the portion adjacent to the subject site.

5.3.1 Mobility

Segment-based Multi-Modal Level of Service (MMLOS) results for Lees Avenue along the proposed development frontage are provided in **Table 12** below.

Details of the Multi-Modal Level of Service (MMLOS) analysis are provided in **Appendix G**.

Table 12 - Segment MMLOS Results

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
EXISTING & FUTURE CONDITIONS				
Lees Avenue – Development Frontage	**E** (Target: A)	**C** (Target: B[1])	D (Target: D)	C (Target: E)

Notes:

[1] – Adjacent to the subject site, Lees Avenue is designated a 'Local Route'. West of Lees Station it is designated a 'Spine Route'.

The results of the Segment MMLOS indicate that Lees Avenue is not presently meeting the minimum desirable target for both pedestrians and cyclists. Achieving a PLOS of 'A' would require either a reduction in traffic volumes or a substantial reduction in operating speeds. Significant improvements could, however, be achieved if a 2.0m boulevard was provided adjacent to the proposed development. To achieve a BLOS of 'B' or better, operating speeds on Lees Avenue would need to reduce to 50 km/h or the bike lanes would need to be replaced with cycle tracks. Although Lees Avenue is posted at 50km/h, there is limited vehicular friction east of the site which may contribute to higher operating speeds as compared to the segment to the west. Traffic calming measures such as the installation of flexible bollards may better delineate the on-street bicycle lanes and should be considered by the City as a means of reducing vehicular speeds and improving the BLOS.

Further consideration should be given to reducing the speed limit to 40 km/h in the vicinity of Lees Station in order to improve pedestrian and cyclist comfort within the Transit-Oriented Development (TOD) zone.

5.3.2 Road Safety

A summary of all reported collisions within the study period over the past five years was presented in the Scoping section of this TIA. The City requires a safety review if at least six collisions for any one movement or of a discernible pattern have occurred over a five-year period. Preliminary analysis identified some intersections and road segments of potential concern, therefore further review was conducted, as summarized below:

Lees Avenue – 349m East of Chestnut Street to Lees Station

In the past five years, there have been a total of six collisions along this roadway segment. Of these collisions, there were three single motor vehicle (SMV) collisions and one rear end, angle and turning movement collision. Poor winter surface conditions such as snow or ice were present during three of these collisions which indicates that insufficient winter maintenance and/or snow drifting may have been a factor in these collisions. No other collision patterns were observed.

Lees Avenue – Lees Station to Chapel Crescent

Of the six collisions that occurred in the past five years, there have been two head-on collisions, two SMV collisions, one rear end collision and one angle collision. Loose snow on the roadway was present during two of these events which may again indicate that insufficient winter maintenance and/or snow drifting was a potential contributing factor. No other collision patterns were observed.

Given the collision patterns observed along these two segments of Lees Avenue, it is suggested that the City of Ottawa consider enhanced or more frequent winter maintenance along this corridor as a preventative measure.

5.4 Access Intersections

5.4.1 Location and Design of Access

The existing site access intersection has been assessed to determine its conformance with the City of Ottawa Private Approach By-law 2003-447, with particular confirmation of the following items:

- Width: A private approach shall have a minimum width of 2.4m and a maximum width of 9.0m.
    - The private approach is currently approximately 7.0m wide, provided the on-street bike lanes are not included in the overall width. ✓
- Quantity and Spacing of Private Approaches: For sites with frontage between 46 and 150 metres, one (1) two-way and two (2) one-way, or two (2) two-way private approaches are permitted. Any two private approaches must be separated by at least 9.0m and can be reduced to 2.0m in the case of two one-way driveways. On lots that abut more than one roadway, these provisions apply to each frontage separately.
    - The frontage on Lees Avenue is approximately 113m and therefore the single two-way approach is compliant with the by-law. ✓
- Distance from Private Approach to Any Other Private Approach: Private approaches must be a minimum of 30m from any other private approach for properties that abut on or are within 46m of an arterial roadway and have 100 to 199 parking spaces.
    - The private approach is approximately 250m from the nearest intersecting street line. ✓
- Distance from Private Approach to Nearest Intersecting Street Line: Private approaches must be a minimum of 30m from the nearest intersection street line for properties that abut on or are within 46m of an arterial roadway and have 100 to 199 parking spaces.
    - The private approach is approximately 78m from the next closest private approach. ✓
- Distance from Property Line: Private approaches must be at least 3.0m from the abutting property line, however this requirement can be reduced to 0.3m provided that the access

is a safe distance from the access serving the adjacent property, sight lines are adequate and that it does not create a traffic hazard.

- The private approach is currently on the western edge of the property line, however, given that to the west of the property is the O-Train Confederation Line there are no concerns with regards to its location. ✓

5.4.2 Access Intersection Control

The site access driveway is currently traffic signal controlled. Intersection capacity analysis presented in Section 5.9.3 of this report indicates that maintaining this form of intersection control is sufficient to achieve acceptable levels of service (i.e. LOS 'D' or better) throughout the timeframe of the study.

5.4.2.1 Traffic Signal Warrants

Not Applicable – As discussed above, the site access driveway is already traffic signal controlled.

5.4.2.2 Roundabout Analysis

Not Applicable - As per the City's Roundabout Implementation Policy, intersections that satisfy any of the following criteria should be screened utilizing the Roundabout Initial Feasibility Screening Tool:

- At any new City intersection
- Where traffic signals are warranted
- At intersections where capacity or safety problems are being experienced

Since the site access driveway does not meet any of the above criteria, a roundabout analysis is not required.

5.4.3 Access Intersection Design (MMLOS)

Based on the results of the MMLOS analysis, the site access intersection is not currently meeting its pedestrian, cyclist and truck MMLOS targets. See Section 5.9.4 for additional details and recommended improvements.

5.5 Transportation Demand Management (TDM)

The City of Ottawa is committed to implementing Transportation Demand Management (TDM) measures on a City-wide basis in an effort to reduce automobile dependence, particularly during the weekday peak travel periods. TDM initiatives are aimed at encouraging individuals to use non-auto modes of travel during the peak periods.

5.5.1 Context for TDM

As discussed previously, the proposed development is located immediately adjacent to Lees Station and is within a Transit-Oriented Development (TOD) zone as well as the Lees Avenue Mixed Use Centre Design Priority Area (DPA). It is expected that the site will be open during typical class hours and closed at night. The majority of person-trips generated by the site will be generated by students going to/from class, with a smaller proportion of trips generated by faculty and staff.

The Forecasting section of this report presented the mode share targets used to estimate future development traffic which were based on the University of Ottawa 2019 Campus Mode Share Survey and refined based on the unique characteristics of the site and its location.

The University of Ottawa already operates a robust program of TDM measures that result in a low existing overall auto mode share. For example, some of the TDM measures currently implemented are:

- A mandatory transit pass program all full-time students are automatically registered in as part of their university enrolment;
- A free inter-campus shuttle service; and
- Requiring the purchase of a parking pass for the majority of parking facilities.

5.5.2 Need and Opportunity

The proposed development is located next to Lees Station which is part of the City's rapid transit network with trains operating on headways of 5 minutes or less during peak periods. This makes transit attractive option for students and staff on the Lees Campus, particularly since it provides a quick and convenient travel option between the Main Campus and the Lees Campus. This is further encouraged by the mandatory transit pass program all full-time students are registered in. Furthermore, the site is well integrated into an extensive pathway network which facilitates active transportation modes such as walking and cycling, although the relative isolation of the site has also been considered in setting mode share targets. As such, it is anticipated that there is a low probability that the proposed mode share targets will not be met.

5.5.3 TDM Program

The proposed development conforms to the City's TDM principles by providing convenient and direct connections to adjacent pedestrian, cycling and transit facilities. The City of Ottawa's TDM Measures Checklist was completed for the proposed development and is provided in **Appendix H**.

In general, the University of Ottawa intends to continue operating the current program of TDM measures. Given the low auto mode share observed in the University of Ottawa 2019 Campus Mode Share Survey, it is not expected that additional measures will be required to accommodate the proposed development.

5.6 Neighbourhood Traffic Management

5.6.1 Adjacent Neighbourhoods

Not Applicable – As noted in Section 3.7, as the site does not rely on collector or local roadways for access a review of Neighbourhood Traffic Management thresholds is not required.

5.7 Transit

5.7.1 Route Capacity

The additional transit demand generated by the proposed development was provided in Section 4.1.2.5. The results have been summarized in **Table 13**.

Table 13 - Development Generated Transit Demand

PERIOD	PEAK PERIOD DEMAND	
	IN	OUT
AM	74	22
PM	33	71

As shown above, the proposed redevelopment of the Lees Campus will result in a net increase in two-way transit ridership volumes of roughly 96 and 104 passengers during the weekday morning and afternoon peak hours, respectively. It is expected that these transit trips will be easily accommodated by LRT service at Lees Station which has a two-way peak capacity of 10,700 passengers per hour in each direction.

5.7.1 Transit Priority Measures

Transit priority measures are not required at any of the signalized study area intersections to accommodate site-generated transit trips, given that most transit demand is expected to be accommodated by the O-Train Confederation Line.

5.8 Review of Network Concept

Not Applicable: The Network Concept module is exempt from this TIA, as defined in the study scope. This element is only required when the proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning.

5.9 Intersection Design

The following sections summarize the methodology and results of the multi-modal intersection capacity analysis conducted within the study area.

5.9.1 Intersection Control

As discussed in Section 5.4.2, the site access driveway is currently traffic signal controlled. Based on the results of the analyses, this form of traffic control is sufficient to achieve acceptable Levels of Service (LOS 'D' or better).

5.9.2 Intersection Analysis Criteria (Automobile)

The following section outlines the City of Ottawa's methodology for determining motor vehicle Level-of-Service (LOS) at signalized and unsignalized intersections.

5.9.2.1 Signalized Intersections

In qualitative terms, the Level-of-Service (LOS) defines operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of such factors as delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. LOS can also be related to the ratio of the volume to capacity (v/c) which is simply the relationship of the traffic volume (either measured or forecast) to the capability of the intersection or road section to accommodate a given traffic volume. This capability varies depending on the factors described above. LOS are given letter designations from 'A' to 'F'. LOS 'A' represents the best operating conditions and LOS 'E' represents the level at which the intersection or an approach to the intersection is carrying the maximum traffic volume that can, practicably, be accommodated. LOS 'F' indicates that the intersection is operating beyond its theoretical capacity.

The City of Ottawa has developed criteria as part of the Transportation Impact Assessment Guidelines, which directly relate the volume to capacity (v/c) ratio of a signalized intersection to a LOS designation. These criteria are presented in **Table 14** as follows:

Table 14 - LOS Criteria for Signalized Intersections

LOS	VOLUME TO CAPACITY RATIO (v/c)
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

The intersection capacity analysis technique provides an indication of the LOS for each movement at the intersection under consideration and for the intersection as a whole. The overall v/c ratio for an intersection is defined as the sum of equivalent volumes for all critical movements at the intersection divided by the sum of capacities for all critical movements.

The Level of Service calculation is based on locally-specific parameters as described in the TIA Guidelines and incorporates existing signal timing plans obtained from the City of Ottawa. The analysis existing conditions utilized a Peak Hour Factor (PHF) of 0.90, while future conditions considers optimized signal timing plans and use of a Peak Hour Factor (PHF) of 1.0 to recognize peak spreading beyond a 15-minute period in congested conditions.

5.9.2.2 Unsignalized Intersections

The capacity of an unsignalized intersection can also be expressed in terms of the LOS it provides. For an unsignalized intersection, the Level of Service is defined in terms of the average movement delays at the intersection. This is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. The average delay for any particular minor movement at the un-signalized intersection is a function of the capacity of the approach and the degree of saturation.

The Highway Capacity Manual 2010 (HCM), prepared by the Transportation Research Board, includes the following Levels of Service criteria for un-signalized intersections, related to average movement delays at the intersection, as indicated in **Table 15**.

Table 15 - LOS Criteria for Unsignalized Intersections

LOS	DELAY (seconds)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The unsignalized intersection capacity analysis technique included in the HCM and used in the current study provides an indication of the Level of Service for each movement of the intersection under consideration. By this technique, the performance of the unsignalized intersection can be compared under varying traffic scenarios, using the Level of Service concept in a qualitative sense. One unsignalized intersection can be compared with another unsignalized intersection using this concept. Level of Service 'E' represents the capacity of the movement under consideration and generally, in large urban areas, Level of Service 'D' is considered to represent an acceptable operating condition. Level of Service 'E' is considered an acceptable operating condition for planning purposes for intersections located within Ottawa's Urban Core the downtown and its vicinity). Level of Service 'F' indicates that the movement is operating beyond its design capacity.

5.9.3 Intersection Capacity Analysis

Following the established intersection capacity analysis criteria described above, the existing and future conditions are analyzed during the weekday peak hours using the traffic volumes derived in this study. The results of the intersection capacity analysis are presented below in **Table 16**.

The Synchro output files have been provided in **Appendix I**.

Table 16 - Intersection Capacity Analysis: Lees Avenue & Site Access / G4 Parking Lot Access

TRAFFIC CONDITION	AM PEAK HOUR		PM PEAK HOUR	
	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Existing (2020) Traffic	A (0.54)	EBTR (0.54)	A (0.48)	EBTR (0.48)
Future (2023) Background Traffic	A (0.51)	EBTR (0.51)	A (0.45)	EBTR (0.45)
Future (2028) Background Traffic	A (0.55)	EBTR (0.55)	A (0.49)	EBTR (0.49)
Future (2023) Total Traffic	A (0.52)	EBTR (0.52)	A (0.46)	EBTR (0.46)
Future (2028) Total Traffic	A (0.56)	EBTR (0.56)	A (0.50)	EBTR (0.50)

As summarized above, the site access intersection is anticipated to operate at Level of Service (LOS) 'A' within the horizon year of this study.

5.9.4 Intersection Design (MMLOS)

5.9.4.1 Intersection MMLOS Methodology

Analysis criteria for each of the four non-auto modes are briefly described as follows:

Intersection Pedestrian Level of Service (PLOS)

The PLOS at intersections is based on several factors including the number of traffic lanes that pedestrians must cross, corner radii, and whether the crossing allows for permissive or protective right or left turns, among others. The City of Ottawa target for PLOS within 600m of a rapid transit station is 'A'.

Intersection Bicycle Level of Service (BLOS)

The BLOS at intersections is dependent on several factors: the number of lanes that the cyclist is required to cross to make a left-turn; the presence of a dedicated right-turn lane on the approach; and the operating speed of each approach. The City target for BLOS within 600m of a rapid transit station is 'C' along spine routes on arterial roads, 'B' along on local routes and 'D' elsewhere.

Intersection Transit Level of Service (TLOS)

Intersection TLOS is based on the average signal delay experienced by transit vehicles at each intersection. The City Target TLOS within 600m of a rapid transit corridor is 'D'.

Intersection Truck Level of Service (TkLOS)

The Truck LOS (TkLOS) is based on the right-turn radii, as well as the number of receiving lanes for vehicles making a right-turn from the traffic lane being analyzed. The City of Ottawa target for TkLOS along arterial road within 600m of a rapid transit station is 'D' for truck routes or 'E' for non-truck routes.

5.9.4.2 Intersection MMLOS Results

An analysis of the existing and future conditions for each mode has been conducted based on the methodology prescribed in the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines. The Level of Service (LOS) for each mode has been calculated for each intersection where signals exist or are anticipated.

The intersection MMLOS results for existing and future conditions have been summarized in **Table 17**.

Detailed intersection MMLOS analysis results are provided **Appendix G**.

Table 17 - Intersection MMLOS – Existing & Future Conditions

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
EXISTING & FUTURE CONDITIONS				
Lees Avenue & Lees Campus Access	**C** (Target: A)	**E** (Target: B[1])	C (Target: D)	D (Target: E)

Notes:

[1] – Adjacent to the subject site, Lees Avenue is designated a 'Local Route'. West of Lees Station it is designated a 'Spine Route'.

5.9.4.3 Summary of Potential Improvements

Based on the MMLOS results outlined in **Table 17**, the following measures have been identified that could improve conditions for each travel mode:

Pedestrians

- The analysis indicates that the site access intersection is presently operating below the City's PLOS target of 'A' primarily as a result of crossing distance and delays to pedestrians associated with the short pedestrian walk time. PLOS has two components, a geometric component and a delay component, and both must be improved to achieve a PLOS of 'A'. A raised intersection, shorter cycle length and leading pedestrian interval may have benefit to the PLOS, however due to the crossing distance, the overall PLOS would remain 'C'.

Cyclists

- Based on the analysis, it is assumed that the westbound approach of the intersection presently does not meet the BLOS targets as it is assumed that operating speeds on the westbound approach are over 50 km/h and cyclists must cross a lane to make a left turn at the intersection. Providing two-stage left-turn bike boxes or constructing a protected intersection, combined with traffic calming measures on the westbound approach would help achieve the BLOS at this intersection.

Transit

- The results of the analysis indicate that the site access intersection is expected to meet its TLOS target under existing and future traffic conditions. As such, no modifications are recommended to improve transit performance.

Truck

- Although the turning radii are small, the presence of bike lanes effectively functions as a second receiving lane, resulting in a TkLOS of 'D' at the site access intersection and thereby meeting the TkLOS target.

To satisfy existing Level of Service deficiencies with respect to bicycle and pedestrian modes adjacent to the new Lees Station, it is recommended that the City of Ottawa consider reconstructing the intersection as a raised, protected intersection with bicycle cross-rides on all approaches. Supplementary MMLOS analysis was completed which demonstrates that leading pedestrian intervals on the eastbound and westbound approaches would be of benefit. Although this would represent a significant modification, it would be appropriate given the local context. The intersection is the nearest crossing location for Lees Station. Enhancing the pedestrian and cyclist crossing would further encourage the use of LRT for residents in the area as well as for students, faculty and staff at Lees Campus. Furthermore, as the Lees Campus is located across Lees Avenue from Lees Station, it is anticipated that many transit trips generated by the Lees Campus will use Lees Station, generating an increased pedestrian crossing demand which would benefit from this configuration.

It should be noted that the recommended measures listed above are intended only as suggestions to the City on how the MMLOS within the study area could be improved. The MMLOS analysis identifies existing deficiencies in the study area which are not expected to be significantly exacerbated by the proposed development.

5.10 Geometric Review

The following section reviews all geometric requirements for the study area intersections.

5.10.1 Sight Distance and Corner Clearances

Based on the intersection sight distance requirements from the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Road, there is insufficient sight distance on the southbound approach for right-turning vehicles to safely make a right-turn on red at the site access intersection. As such, it is recommended that the City consider prohibiting right-turns on red on all approaches at this intersection. This would both address the sight distance deficiency as well as improve the Pedestrian Level of Service (PLOS) at the intersection. Sensitivity analysis has indicated that the intersection would operate at an acceptable Level of Service (i.e. LOS 'D' or better) with right-turns on red prohibited.

5.10.2 Auxiliary Lane Analysis

Auxiliary turning lane requirements for all intersections within the study area are described as follows:

5.10.2.1 Signalized Auxiliary Left-Turn Requirements

A review of auxiliary left-turn lane storage requirements was completed at all signalized intersections within the study area under Future (2028) Total Traffic conditions. The review compared the projected 95th percentile queue lengths from Synchro operational results, and the standard queue length calculation based on the following equation:

$$Storage\ Length = \frac{NL}{C} \times 1.5$$

Where:
N = number of vehicles per hour
L = Length occupied by a vehicle in the queue = 7 m
C = number of traffic signal cycles per hour

The results of the auxiliary left-turn lane analysis are summarized below in **Table 18**.

Table 18 - Auxiliary Left-Turn Storage Analysis at Signalized Intersections

INTERSECTION	APPROACH	95TH %ILE QUEUE LENGTH / CALCULATED QUEUE (M)		EXISTING STORAGE LENGTH (M)	STORAGE DEFICIENCY (M)
		AM PEAK HR	PM PEAK HR		
Lees Avenue & Site Access / G4 Parking Lot Access	EB	0.7 / 0.2	10.2 / 9.4	40	-
	WB	0.0 / 0.0	7.3 / 6.8	15	-

Based on the results of the left-turn lane analysis presented in **Table 18** above and confirmed through intersection capacity analysis, no storage deficiencies are anticipated under Future (2028) Total traffic conditions.

5.10.2.2 Signalized Auxiliary Right-Turn Lane Requirements

Section 9.14 of TAC suggests that auxiliary right-turn lanes shall be considered when more than 10% of vehicles on an approach are turning right and when the peak hour demand exceeds 60 vehicles. The purpose of this guideline is to mitigate operational impacts to through-traffic, particularly on high-speed arterial roadways, and may not be applicable in all circumstances.

As indicated in **Figure 12**, none of the right-turn movements at the signalized site access intersection exceed 60 vehicles per hour and therefore the site access intersection does not meet the criteria for auxiliary right-turn lanes.

5.11 Summary of Improvements Indicated and Modification Options

Based on the intersection capacity, Multi-Modal Level of Service and auxiliary lane analyses results presented above, no off-site improvements to the adjacent road network are required as a direct consequence of the proposed development in order to accommodate multi-modal transportation demands generated by the site. The sight distance analysis, however, indicated that there is currently insufficient sight distance on the southbound approach for vehicles to safely make a right-turn-on-red. As such, it is recommended that right-turns-on-red be prohibited at this intersection and a leading pedestrian interval be introduced during peak periods as an immediate mitigation measure to improve Pedestrian Level of Service.

The MMLOS results also indicated existing deficiencies with respect to user comfort for bicycle and pedestrian modes. Based on the analysis, the City could partially address these deficiencies by reconstructing the intersection as a raised, 'protected intersection' with segregated pedestrian crossings and bicycle cross-rides, complete with two-stage bike boxes on all approaches. It should be noted however that these are existing deficiencies and the suggested intersection modifications are not required to safely accommodate the proposed development.

6 Conclusion

The proposed redevelopment of the University of Ottawa Lees Campus at 200 Lees Avenue will increase the total Gross Floor Area (GFA) of the campus from 18,993 m^2 to 28,893 m^2, a net increase of 9,900 m^2. This increase in GFA is expected to generate an additional 149 and 160 two-way person-trips during the weekday morning and afternoon peak hours, respectively. Most of these person-trips are expected to be completed via transit (65%) and non-auto modes (15%), with only 20% of trips completed via private vehicle (17% auto drive and 3% auto passenger). Overall, the site is expected to generate up to 28 new two-way vehicle-trips and up to 104 new two-way transit-trips. Intersection capacity analysis indicated that the site access intersection is expected to operate at an acceptable Level of Service (LOS) through to the study horizon year.

The site has been designed to promote non-auto travel modes. The main entrance to the new building faces Lees Station, and the campus is well integrated into the adjacent pedestrian and cycling network. The University of Ottawa already operates a robust Transportation Demand Management (TDM) program which it intends to continue operating at the Lees Campus.

Multi-modal analyses were also completed for the site access intersection as well as the segment of Lees Avenue adjacent to the site. As a result of these analyses, it is recommended that the City consider implementing the following measures to support the proposed development:

- Introduce right-turn-on-red restrictions on all approaches of the signalized site access intersection during weekday peak periods;
- Introduce a leading pedestrian interval; and
- Consider the installation of flexible bollards for a short segment of Lees Avenue, east of the signalized intersection to serve as a traffic calming measure and increase cyclist comfort.

The analysis also identified existing deficiencies with regards to pedestrian and bicycle level of service at the site access intersection. It is therefore recommended that the City give future consideration to the implementation of a 'Protected Intersection' at the site access to facilitate community access to Lees Station by foot or by bike, however it is important to note that this improvement is not triggered by or required to accommodate the proposed development.

Based on the findings and recommended measures of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network.

Appendix A – City Circulation Comments

Step 1 & 2 Submission (Screening & Scoping) – Circulation Comments & Response

Report Submitted: May 25, 2020
Comments Received: May 26, 2020
Transportation Project Manager: Wally Dubyk

- Lees Avenue is designated as an Arterial road within the City's Official Plan with a ROW protection of 23.0 metres. The surveyor is to review the protected ROW limits.
  - IBI Response: Noted. Section 3.2.1.1 has been updated and notes that up to 3.0m may be required on the south side of Lees Avenue.

- Road resurfacing along Lees Avenue is scheduled to start 3-5 years.
  - IBI Response: Section 3.3.1.1 has been updated to include the above road resurfacing.

Step 3 Submission (Forecasting) – Circulation Comments & Response

Report Submitted: June 1, 2020
Comments Received: June 12, 2020
Transportation Project Manager: Wally Dubyk

General

Road Resurfacing along Lees Avenue is scheduled to start 3-5 years.

- **IBI Response:** This has been discussed in Section 3.3.1.1 of the report, below Figure 5.

Work by PWES scheduled to start 2-3 years.

- **IBI Response:** Section 3.3.1.1 has been updated to mention this scheduled project.

Is this development proposing additional parking spaces?

- **IBI Response:** Details of the proposed parking supply are discussed in Section 5.2 of the report.

The Screening Form indicated that the TIA Triggers have been met. Further TIA reports will be required. Areas of interest are MMLOS and TDM measures.

- **IBI Response:** Noted. Particular attention has been given to the MMLOS and TDM components of the TIA. Please see Sections 5.3.1, 5.4.3, 5.5 and 5.9.4.

Lees Avenue is designated as an Arterial road within the City's Official Plan with a ROW protection of 23.0 metres. The ROW limits are to be shown on all the drawings and the offset distance to be dimensioned from the existing centerline of pavement.

ROW interpretation – Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the City. The centreline is a line running down the middle of a road surface, equidistant from both edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.

- **IBI Response:** The site plan has been updated to designate the extents of the ROW protection as well as the offset distance from the existing centerline of pavement.

Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

- **IBI Response:** The details of the proposed bicycle parking have been discussed in Section 5.2.

Transportation Engineering

In Section 3.2.1.5, clarify that the existing traffic count data from 2018 was subject to a 2% growth rate.

- **IBI Response:** Section 3.2.1.5 has been updated to clarify this point.

If proposed parking provisions are insufficient to support the auto modal share for the development, include the parking spillover module as part of the strategy report.

- **IBI Response:** Noted. Details of the proposed parking supply are discussed in Section 5.2.

Appendix B – Screening Form

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Municipal Address	200 Lees Avenue
Descrip on of Loca on	The site is bound by Lees Avenue ighway 41 to the north, the Rideau River to the south east and the Light Rail (LRT) corridor to the west 
Land Use Classi ca on	Post-Secondary Ins tu onal
Development Size (units)	N A
Development Size (m^2)	1 , m^2 GFA
Number of Accesses and Loca ons	Exis ng signalized access intersec on on Lees Avenue to remain
Phase of Development	Phase 1: Buildings B, C D to be demolished redeveloped in the short-term Phase 2+: Building A & E to be redeveloped, long-term
Buildout ear	Phase 1 Comple on: 202

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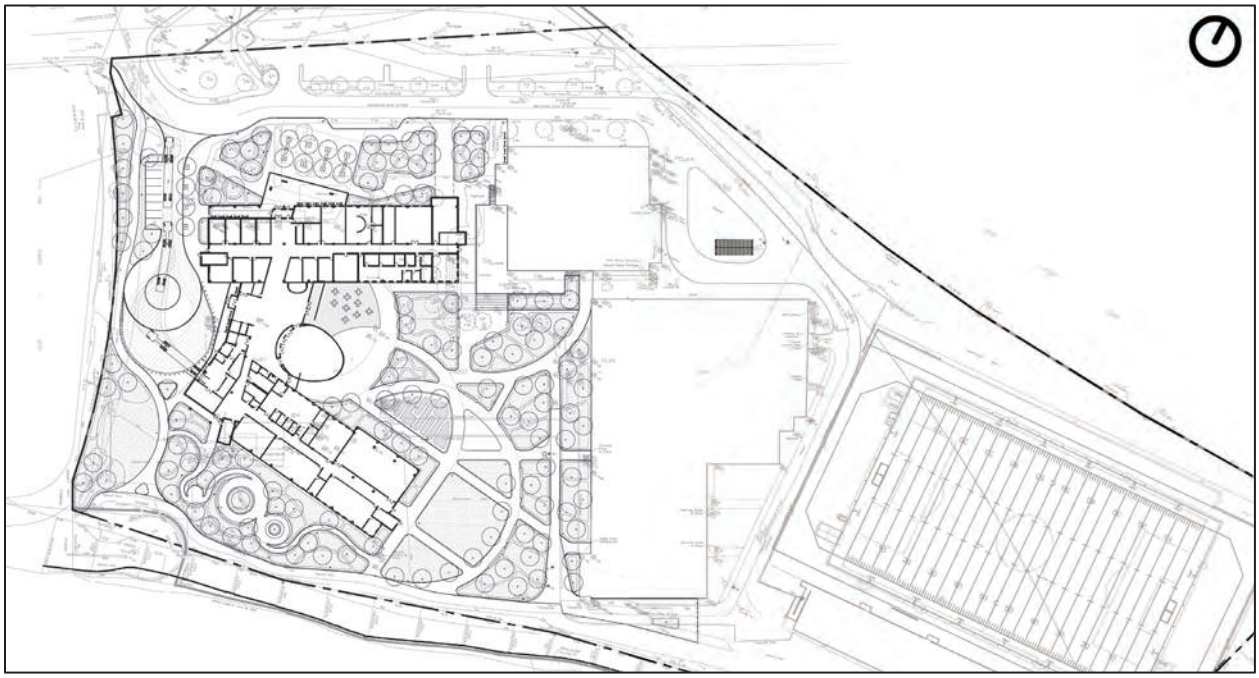

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Considering the Development s Land Use type and Size (as lled out in the previous sec on), please refer to the Trip Genera on Trigger checks below.

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Single-family homes	40 units
Townhomes or apartments	0 units
O ce	,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or co ee shop	100 m^2
Des na on retail	1,000 m^2
Gas sta on or convenience market	5 m^2

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

With over 15,000 m^2 of new ins tu onal space planned, the development is likely to generate a net increase of more than 0 person-trips during the weekday peak hours.

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

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

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	z°’	No
Are posted speed limits on a boundary street are 80 km hr or greater		✓
Are there any horizontal ver cal curvatures on a boundary street that limits sight lines at a proposed driveway	✓	
Is the proposed driveway within the area of in uence of an adjacent tra c signal or roundabout (i.e. within 00 m of intersec on in rural condi ons, or within 150 m of intersec on in urban suburban condi ons)	✓	
Is the proposed driveway within auxiliary lanes of an intersec on		✓
Does the proposed driveway make use of an exis ng median break that serves an exis ng site?		✓
Is there is a documented history of tra c opera ons or safety concerns on the boundary streets within 500 m of the development		✓
Does the development include a drive-thru facility		✓

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	z ° ’	No
Does the development sa sfy the Trip Genera on Trigger?	✓	
Does the development sa sfy the Loca on Trigger?	✓	
Does the development sa sfy the Safety Trigger?	✓	

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Appendix C – Turning Movement Counts

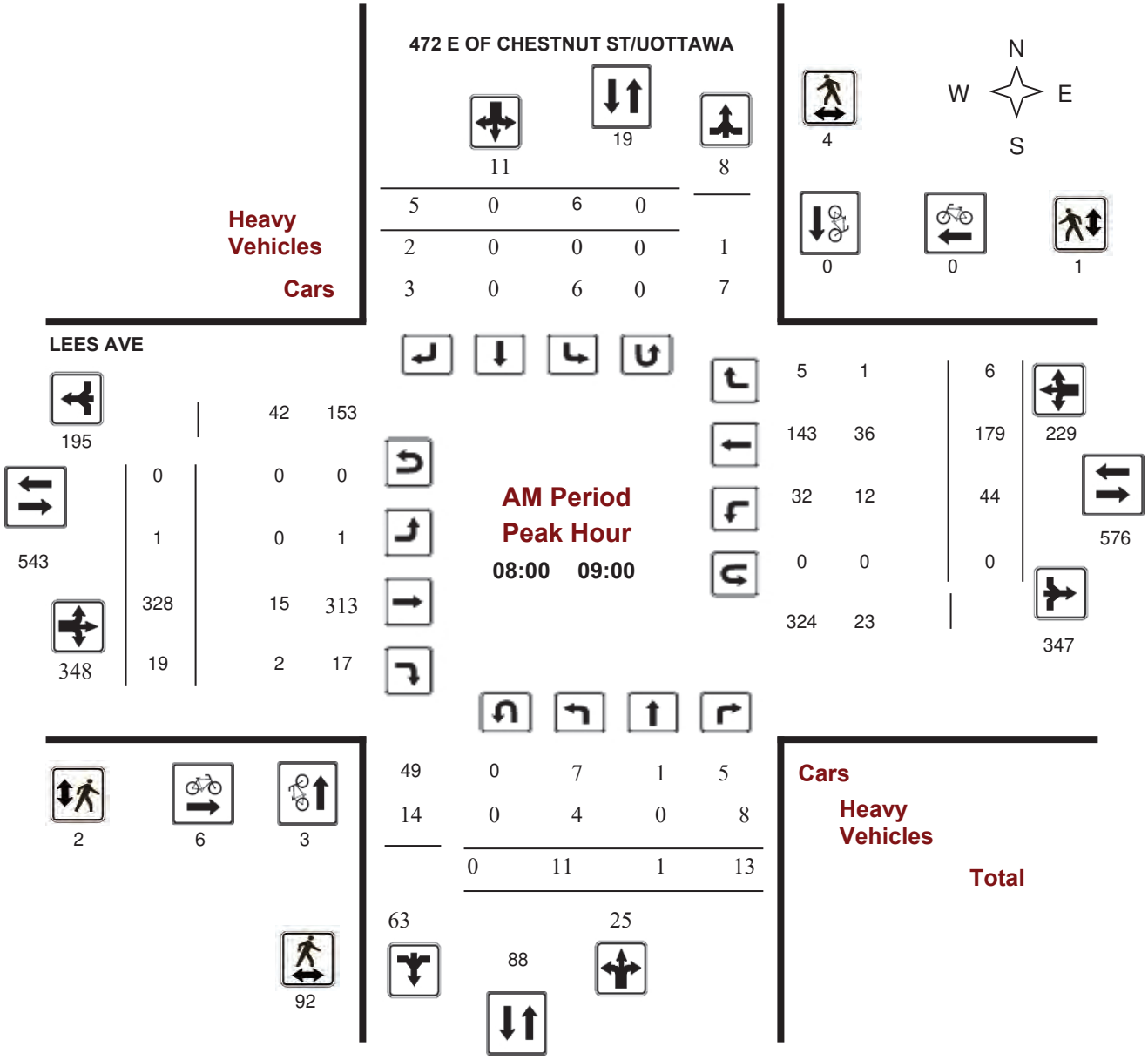
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

472 E OF CHESTNUT ST/UOTTAWA @ LEES AVE

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37572
Device: Miovision



Comments

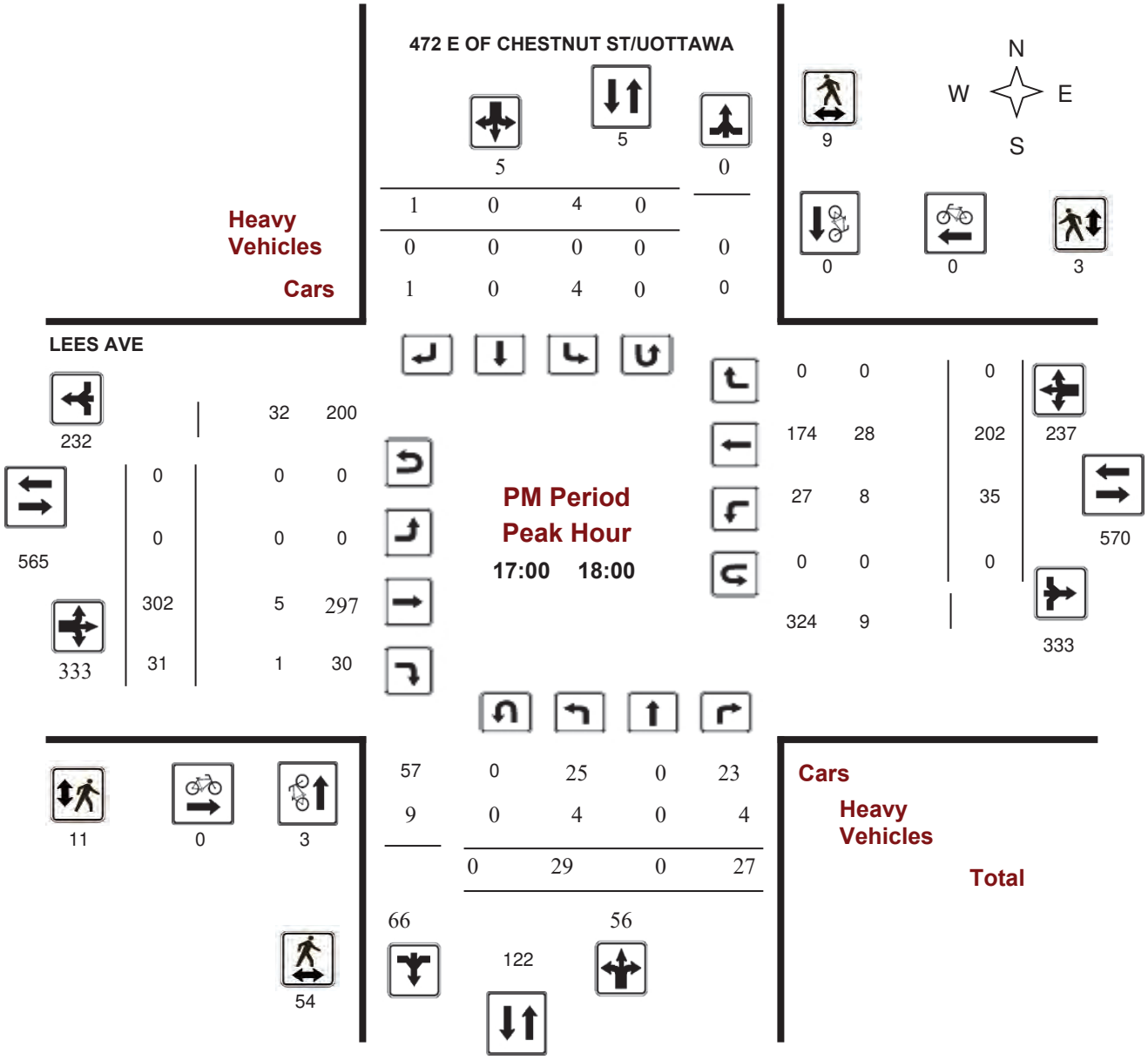
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

472 E OF CHESTNUT ST/UOTTAWA @ LEES AVE

Survey Date: Thursday, February 22, 2018 **WO No:** 37572

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



Comments

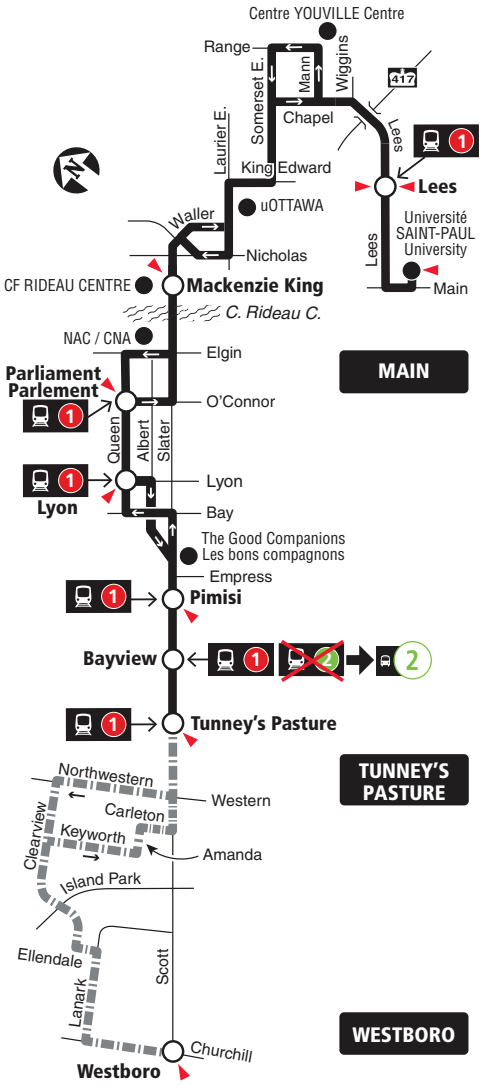
Appendix D – OC Transpo Routes

16 MAIN

TUNNEY'S PASTURE
WESTBORO

Local

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



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

2020.04

Schedule / Horaire.....613-560-1000
Text / Texto 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-741-4390**
Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité **613-741-2478**

Effective May 3, 2020
En vigueur 3 mai 2020

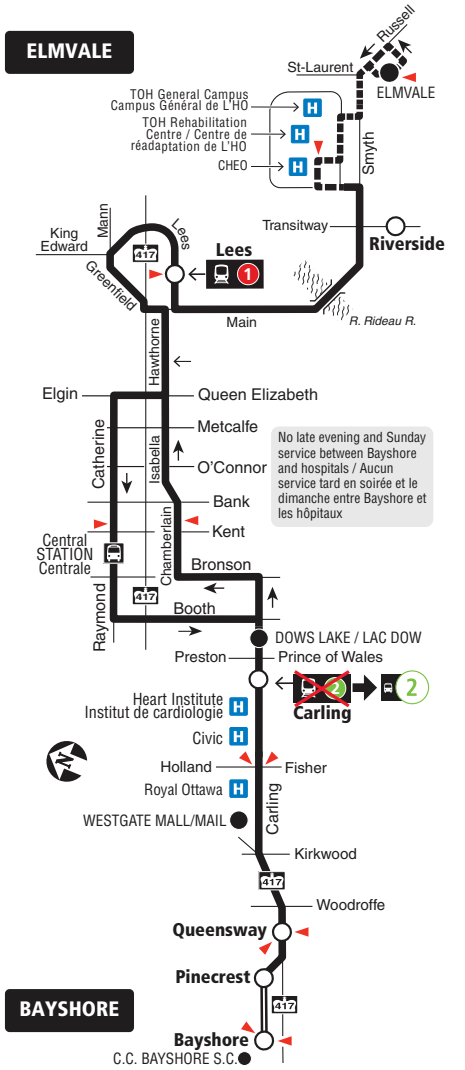
OC Transpo
INFO 613-741-4390
octranspo.com

55 ELMVALE / BAYSHORE

Local

7 days a week / 7 jours par semaine

On Sundays and evenings, service only between Elmvale and General campus of the Ottawa Hospital /
Service le dimanche et en soirée seulement entre Elmvale et le campus Général de l'Hôpital d'Ottawa



Transitway & Station

Late evenings and Sundays: service only between Elmvale and the Ottawa Hospital, General Campus

Service tard en soirée et le dimanche: seulement entre Elmvale et le campus Général de l'Hôpital d'Ottawa

Timepoint / Heures de passage

2020.05

Schedule / Horaire.....613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-741-4390**

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

Security / Sécurité..... **613-741-2478**

Effective May 3, 2020
En vigueur 3 mai 2020

OC Transpo

INFO 613-741-4390
octranspo.com

56

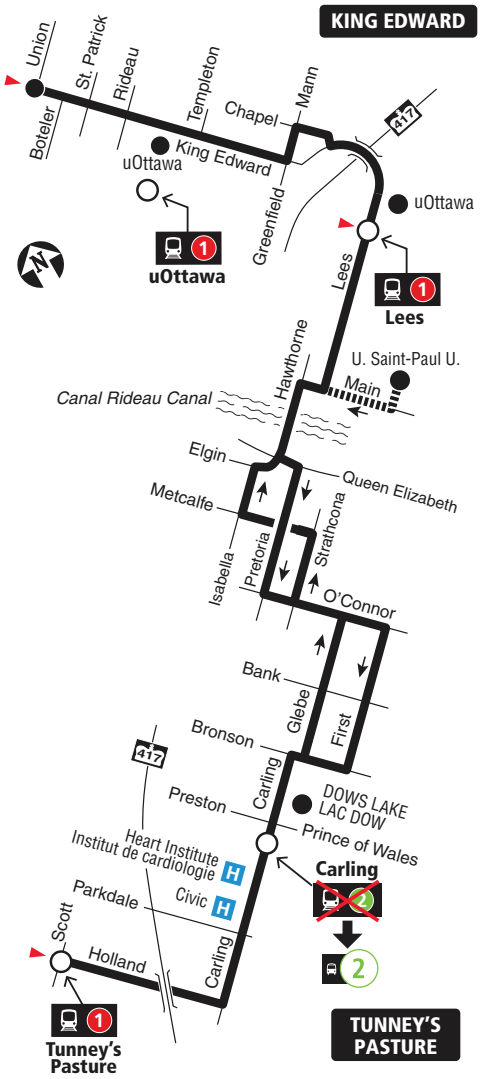
KING EDWARD
TUNNEY'S PASTURE

Local

Monday to Friday / Lundi au vendredi

Peak periods only

Périodes de pointe seulement



Station

Some trips / Certains trajets

Timepoint / Heures de passage

2020.04

Schedule / Horaire.....613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-741-4390**

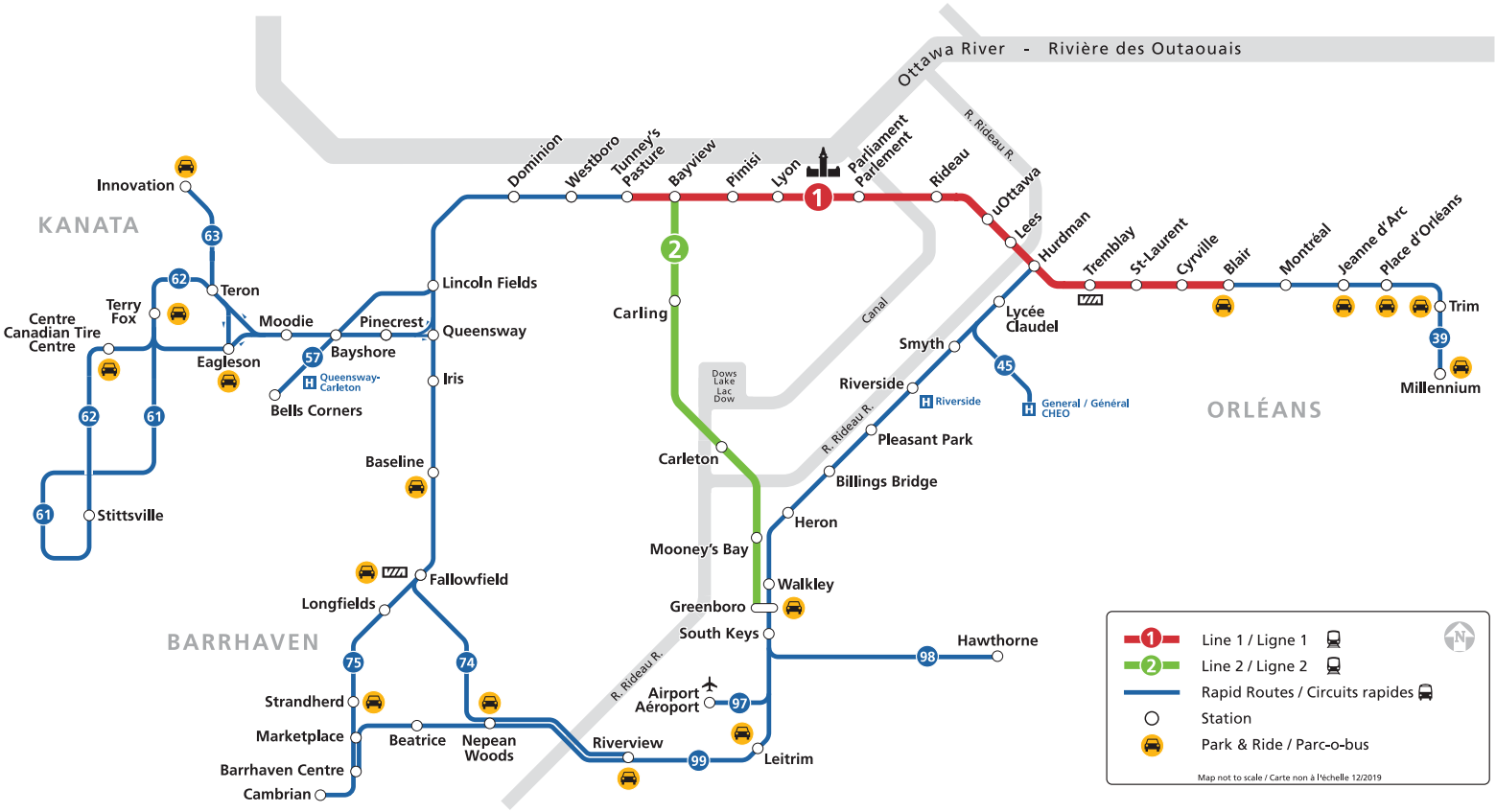
Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité..... **613-741-2478**

Effective May 3, 2020
En vigueur 3 mai 2020

OC Transpo

INFO 613-741-4390
octranspo.com


Ottawa River - Rivière des Outaouais
R. Rideau R.
KANATA
BARRHAVEN
ORLÉANS
Innovation
Teron
Terry Fox
Centre Canadian Tire Centre
Moodie
Eagleson
Pinecrest
Bayshore
Queensway-Carleton
Bells Corners
Lincoln Fields
Queensway
Iris
Baseline
Stittsville
Fallowfield
Longfields
Strandherd
Marketplace
Barrhaven Centre
Cambrian
Beatrice
Nepean Woods
Dominion
Westboro
Tunney's Pasture
Bayview
Pimisi
Lyon
Parliament Parlement
Rideau
uOttawa
Lees
Hurdman
Tremblay
St-Laurent
Cyrville
Blair
Montréal
Jeanne d'Arc
Place d'Orléans
Trim
Millennium
Carling
Dows Lake Lac Dow
Canal
Carleton
Mooney's Bay
Greenboro
South Keys
Airport Aéroport
Riverview
Leitrim
Hawthorne
Lycée Claudel
Smyth
Riverside
General / Général CHEO
Pleasant Park
Billings Bridge
Heron
Walkley
Line 1 / Ligne 1
Line 2 / Ligne 2
Rapid Routes / Circuits rapides
Station
Park & Ride / Parc-o-bus
Map not to scale / Carte non à l'échelle 12/2019

Appendix E – Collision Data

City Operations - Transportation Services

Collision Details Report - Public Version

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

Location: 472 E OF CHESTNUT ST/UOTTAWA @ LEES AVE

Traffic Control: Traffic signal **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Sep-30, Wed,18:56	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: LEES AVE btwn CHAPEL CRES & TRANSIT

Traffic Control: No control **Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Oct-21, Wed,14:02	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Jan-18, Mon,01:00	Clear	SMV other	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
2016-Apr-06, Wed,21:57	Snow	Approaching	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Jan-30, Mon,16:17	Clear	Approaching	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

2017-Sep-24, Sun,16:20	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-08, Mon,15:35	Snow	SMV other	Non-fatal injury	Loose snow	East	Going ahead	Automobile, station wagon	Pedestrian	1

Location: LEES AVE btwn 349 E OF CHESTNUT ST & TRANSIT

Traffic Control: No control

Total Collisions: 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-13, Mon,04:33	Clear	SMV other	Non-fatal injury	Wet	East	Changing lanes	Delivery van	Ran off road	
2016-Mar-20, Sun,16:09	Clear	Angle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jun-15, Wed,20:00	Clear	Turning movement	P.D. only	Dry	West	Making "U" turn	Automobile, station wagon	Other motor vehicle	
					West	Overtaking	Motorcycle	Other motor vehicle	
2018-Feb-07, Wed,13:55	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Municipal transit bus	Other motor vehicle	
2018-Feb-23, Fri,20:30	Clear	SMV unattended vehicle	P.D. only	Ice	West	Unknown	Unknown	Unattended vehicle	
2018-Jan-08, Mon,06:00	Clear	SMV other	Non-fatal injury	Packed snow	West	Going ahead	Unknown	Pedestrian	1

Appendix F – Trip Generation Data

University/College
(550)

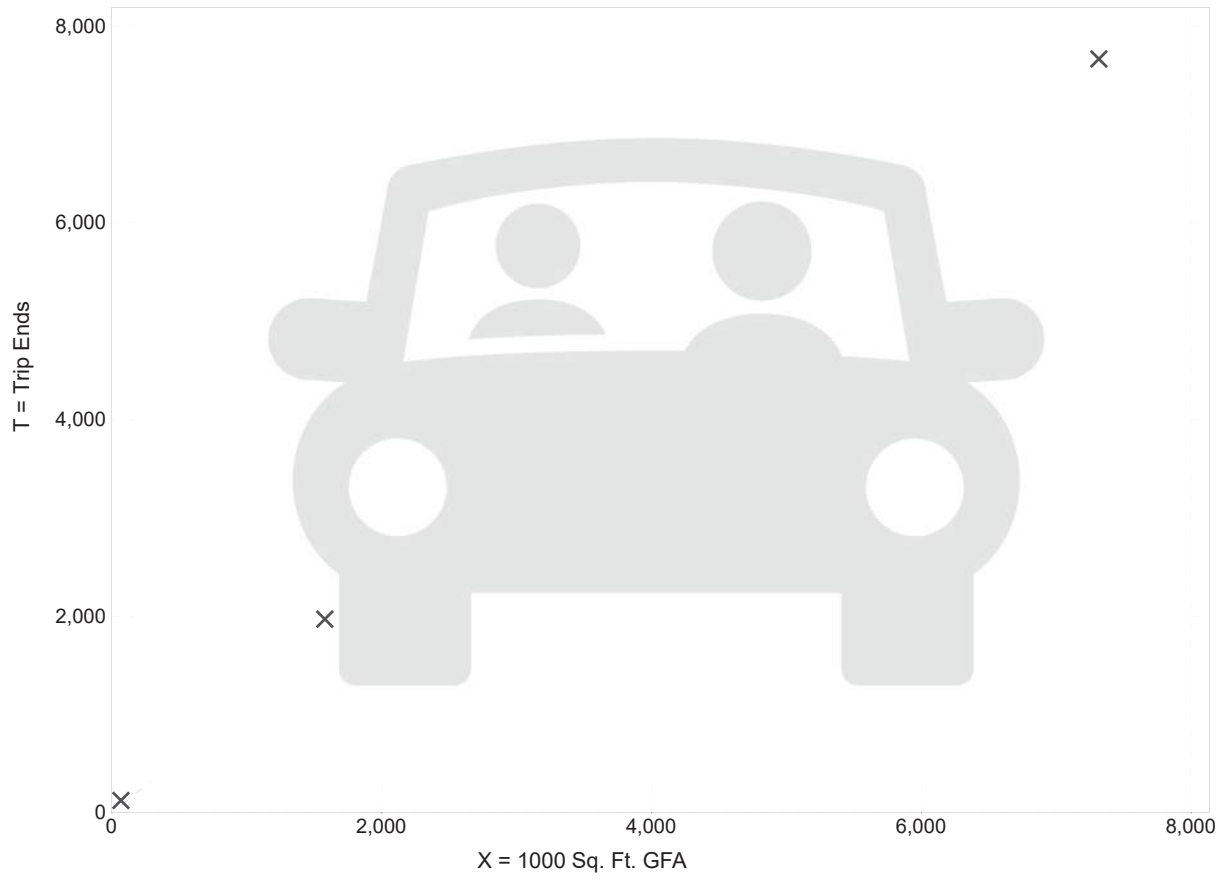
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 2990
Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.09	1.05 - 1.80	0.12

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

University/College
(550)

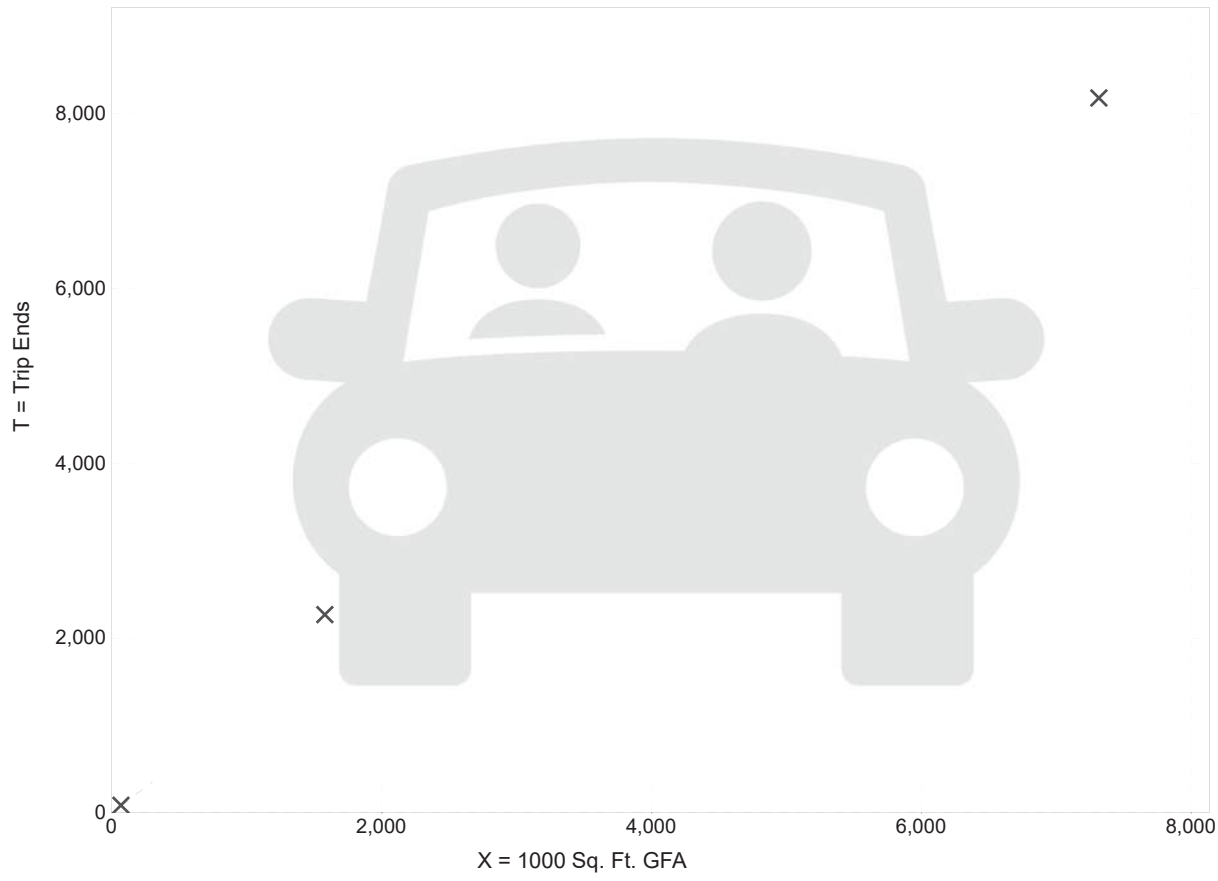
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 2990
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.17	1.12 - 1.43	0.15

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ****

University of Ottawa 2019 Campus Mode Share Survey Results

Q8. During the academic year, which campus is your PRIMARY destination?

Answer Choices	Students	Faculty	Staff	Overall
Main Campus (downtown)	91.94%	86.57%	79.74%	90.61%
Main Campus (200 Lees)	2.64%	0.00%	4.58%	2.47%
Roger Guindon Campus (451 Smyth Rd)	4.62%	8.96%	15.69%	5.77%
Alta Vista Campus (600 & 850 Peter Morand Crescent)	0.81%	4.48%	0.00%	1.15%

Q13. What is your PRIMARY commuting method for travelling to and from the University of Ottawa for the majority of the school year?

Answer Choices	Students	Faculty	Staff	Overall
Driving alone by car, truck or van	8.24%	34.33%	33.33%	12.60%
Carpool with people who live in my household or residence	1.45%	5.97%	13.07%	2.65%
Carpool with people who do NOT live in my household or residence	0.40%	2.99%	3.27%	0.85%
Public transit (OC Transpo, O-Train, Para Transpo, STO, Park & Ride, Rack & Roll)	63.89%	26.87%	29.41%	57.78%
Private transportation services (Thom Transit, Leduc Bus Lines, etc.)	1.08%	1.49%	1.96%	1.18%
Bicycle	1.36%	13.43%	6.54%	2.99%
On foot	21.99%	11.94%	7.19%	20.00%
Inline skates or skateboard	0.03%	0.00%	0.00%	0.02%
Taxi	0.00%	0.00%	0.00%	0.00%
Other (please specify)	1.56%	2.99%	5.23%	1.94%

Appendix G – MMLOS Analysis

Multi-Modal Level of Service **August 20, 2020**

200 Lees Avenue

Scenario: Existing & Future Conditions

INTERSECTIONS		Lees Avenue & Lees Campus Access			
		NORTH leg	SOUTH leg	EAST leg	WEST leg
Pedestrian	Lanes (do NOT include lanes protected by bulb-outs)	2	2	3	3
	Median	No Median	No Median	Median (>2.4m)	Median (>2.4m)
	Island Refuge				
	Conflicting Left Turns (from street to right)	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns (from street to left)	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR? (from street to left)	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval? (on cross street)	No	No	No	No
	Corner Radius	> 3m to 5m	> 5m to 10m	> 3m to 5m	> 5m to 10m
	Right Turn Channel	No right turn channel	No right turn channel	No right turn channel	No right turn channel
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	LOS (PETSI)	**87 B**	**86 B**	**72 C**	**71 C**
	Cycle Length (sec)	56.4	56.4	56.4	56.4
	Pedestrian Walk Time (solid white symbol) (sec)	7	7	7	7
	LOS (Delay,seconds)	**22.7 C**	**22.7 C**	**22.7 C**	**22.7 C**
	Overall Level of Service	**C**			
Cyclist	Type of Bikeway	Mixed Traffic	Bike Lanes/Cycle Track	Bike Lanes/Cycle Track	Bike Lanes/Cycle Track
	Turning Speed (based on corner radius & angle)				
	Right Turn Storage Length				
	Dual Right Turn?				
	Shared Through-Right?	Yes			
	Bike Box?	No	No	No	No
	Number of Lanes Crossed for Left Turns	No Lanes Crossed	No Lanes Crossed	1 Lane Crossed	1 Lane Crossed
	Operating Speed on Approach	≤ 40km/h	≤ 40km/h	≥ 60km/h	≥ 60km/h
	Dual Left Turn Lanes?	No	No	No	No
	Level of Service	**B**	**B**	**E**	**E**
		E			
Transit	Average Signal Delay			≤20 sec	≤20 sec
	Level of Service			**C**	**C**
		C			
Truck	Turning Radius (Right Turn)		< 10m		< 10m
	Number of Receiving Lanes		2+		2+
			D		**D**
		D			

SEGMENTS			Lees Avenue (Adjacent to 200 Lees)		
			1	2	3
Pedestrian	Sidewalk Width		2.0 or more		
	Boulevard Width		0		
	AADT		> 3000		
	On-Street Parking		No		
	Operating Speed		51 to 60 km/h		
	Level of Service		**E**		
			E		
Cyclist	Type of Bikeway		Bike Lanes Not Adjacent Parking Lane		
	Number of Travel Lanes (per direction)		1 Travel Lane Per Direction		
	Raised Median?		No		
	Bike Lane Width		≥1.5 m to <1.8 m wide bike lane		
	Bike Lane Plus Parking Lane Width		N/A		
	Operating Speed		60 km/h		
	Bike Lane Blockages (Commercial Areas)		Rare		
	Median Refuge				
	Number of Travel Lanes on Sidestreet				
	Sidestreet Operating Speed				
	Level of Service		**C**		
Transit	Facility Type		Mixed Traffic		
	Friction		Limited parking/driveway friction		
	Level of Service		**D**		
Truck	Curb Lane Width		≤3.5		
	Number of Travel Lanes		2		
			C		
			C		

Appendix H – TDM Checklists

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

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

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☐
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☐
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☐
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	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)	☐

	TDM-supportive design & infrastructure measures: *Non-residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	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	☐
	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	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☐
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

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

Legend

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

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

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

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

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

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

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

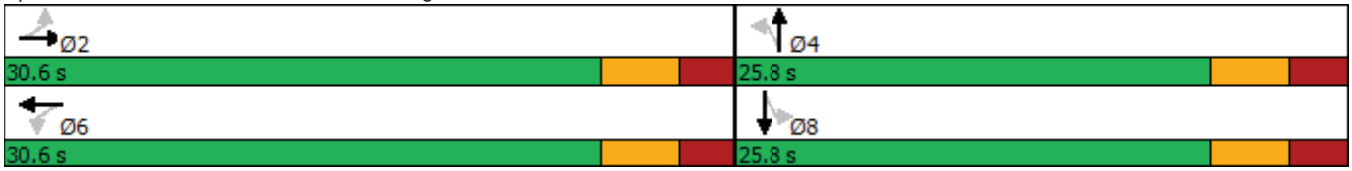
Appendix I – Intersection Capacity Analyses

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	341	19	44	186	6	11	1	15	6	0	5
Future Volume (vph)	1	341	19	44	186	6	11	1	15	6	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor	1.00	0.99		0.92	1.00			0.99			0.99	
Frt		0.992			0.995			0.923			0.938	
Flt Protected	0.950			0.950				0.980			0.974	
Satd. Flow (prot)	1695	1699	0	1361	1509	0	0	1124	0	0	1389	0
Flt Permitted	0.624			0.449				0.927			0.913	
Satd. Flow (perm)	1108	1699	0	593	1509	0	0	1062	0	0	1301	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			4			17			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	4		92	92		4	2		1	1		2
Confl. Bikes (#/hr)									3			
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
Heavy Vehicles (%)	2%	5%	11%	27%	20%	17%	36%	2%	53%	0%	2%	40%
Adj. Flow (vph)	1	379	21	49	207	7	12	1	17	7	0	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	400	0	49	214	0	0	30	0	0	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	30.6	30.6		30.6	30.6		25.8	25.8		25.8	25.8	
Total Split (%)	54.3%	54.3%		54.3%	54.3%		45.7%	45.7%		45.7%	45.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	18	18		4	4		1	1		94	94	
Act Effct Green (s)	25.0	25.0		25.0	25.0			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.37			0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.00	0.54		0.19	0.32			0.08			0.03	
Control Delay	9.0	15.1		12.4	12.2			8.5			0.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.0	15.1		12.4	12.2			8.5			0.1	
LOS	A	B		B	B			A			A	
Approach Delay		15.1			12.2			8.5			0.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	28.7		3.0	13.6			0.9			0.0	
Queue Length 95th (m)	0.7	50.4		8.9	26.5			5.1			0.3	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)	40.0			15.0								
Base Capacity (vph)	482	743		258	659			399			507	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.54		0.19	0.32			0.08			0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 56.4			
Actuated Cycle Length: 57.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

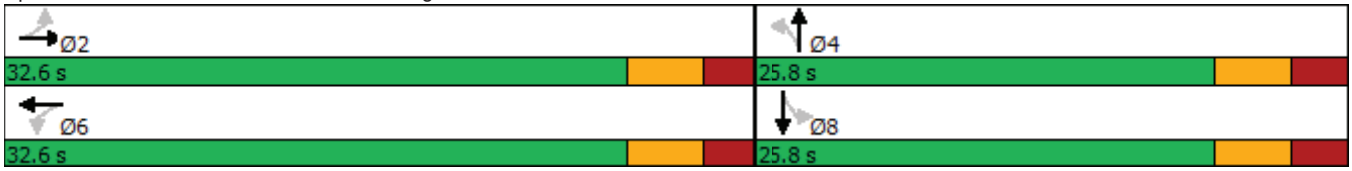


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	314	31	35	210	0	29	0	27	4	0	1
Future Volume (vph)	0	314	31	35	210	0	29	0	27	4	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor		0.99		0.95				0.98			0.99	
Frt		0.987						0.935			0.973	
Flt Protected				0.950				0.975			0.962	
Satd. Flow (prot)	1784	1742	0	1406	1596	0	0	1430	0	0	1658	0
Flt Permitted				0.472				0.882			0.885	
Satd. Flow (perm)	1784	1742	0	664	1596	0	0	1284	0	0	1521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11						49			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	9		54	54		9	11		3	3		11
Confl. Bikes (#/hr)									3			
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
Heavy Vehicles (%)	2%	2%	3%	23%	14%	2%	14%	2%	15%	2%	2%	2%
Adj. Flow (vph)	0	349	34	39	233	0	32	0	30	4	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	383	0	39	233	0	0	62	0	0	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	32.6	32.6		32.6	32.6		25.8	25.8		25.8	25.8	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		44.2%	44.2%		44.2%	44.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	11	11		9	9		3	3		54	54	
Act Effct Green (s)		27.0		27.0	27.0			21.0			21.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.35			0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.48		0.13	0.32			0.13			0.01	
Control Delay		13.5		10.9	11.9			6.6			0.0	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		13.5		10.9	11.9			6.6			0.0	
LOS		B		B	B			A			A	
Approach Delay		13.5			11.8			6.6				
Approach LOS		B			B			A				
Queue Length 50th (m)		26.4		2.3	15.2			0.9			0.0	
Queue Length 95th (m)		46.2		7.1	28.3			7.3			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)				15.0								
Base Capacity (vph)		797		301	725			485			569	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.48		0.13	0.32			0.13			0.01	

Intersection Summary			
Area Type:	Other		
Cycle Length: 58.4			
Actuated Cycle Length: 59.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

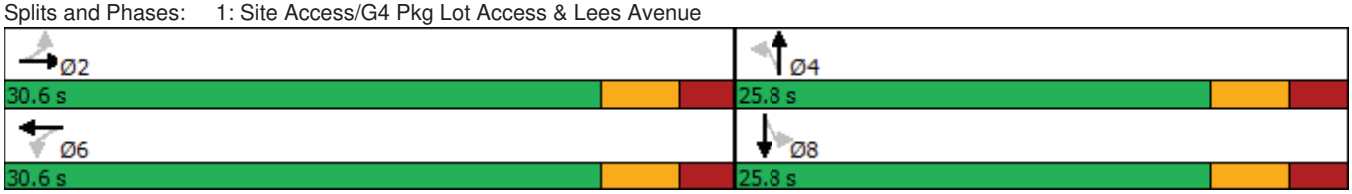


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	362	19	44	197	6	11	1	15	6	0	5
Future Volume (vph)	1	362	19	44	197	6	11	1	15	6	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor	0.99	1.00		0.98	1.00			0.94			0.93	
Frt		0.993			0.996			0.925			0.939	
Flt Protected	0.950			0.950				0.980			0.973	
Satd. Flow (prot)	1695	1712	0	1361	1511	0	0	1129	0	0	1315	0
Flt Permitted	0.630			0.469				0.928			0.916	
Satd. Flow (perm)	1118	1712	0	661	1511	0	0	1015	0	0	1237	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			15			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	4		18	18		4	94		1	1		94
Confl. Bikes (#/hr)			6						3			
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%	5%	11%	27%	20%	17%	36%	2%	53%	0%	2%	40%
Adj. Flow (vph)	1	362	19	44	197	6	11	1	15	6	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	381	0	44	203	0	0	27	0	0	11	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	30.6	30.6		30.6	30.6		25.8	25.8		25.8	25.8	
Total Split (%)	54.3%	54.3%		54.3%	54.3%		45.7%	45.7%		45.7%	45.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	18	18		4	4		1	1		94	94	
Act Effct Green (s)	25.0	25.0		25.0	25.0			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.37			0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.00	0.51		0.15	0.31			0.07			0.02	
Control Delay	9.0	14.5		11.6	12.0			8.7			0.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.0	14.5		11.6	12.0			8.7			0.1	
LOS	A	B		B	B			A			A	
Approach Delay		14.5			12.0			8.7			0.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	26.8		2.7	12.9			0.8			0.0	
Queue Length 95th (m)	0.7	47.2		7.9	25.1			4.9			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)	40.0			15.0								
Base Capacity (vph)	486	749		287	659			380			484	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.51		0.15	0.31			0.07			0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 56.4			
Actuated Cycle Length: 57.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 61.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	333	31	35	223	0	29	0	27	4	0	1
Future Volume (vph)	0	333	31	35	223	0	29	0	27	4	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor		1.00		0.99				0.95			0.98	
Frt		0.987						0.935			0.973	
Flt Protected				0.950				0.975			0.962	
Satd. Flow (prot)	1784	1754	0	1406	1596	0	0	1430	0	0	1639	0
Flt Permitted				0.492				0.885			0.887	
Satd. Flow (perm)	1784	1754	0	720	1596	0	0	1248	0	0	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11						49			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	9		11	11		9	54		3	3		54
Confl. Bikes (#/hr)									3			
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%	3%	23%	14%	2%	14%	2%	15%	2%	2%	2%
Adj. Flow (vph)	0	333	31	35	223	0	29	0	27	4	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	35	223	0	0	56	0	0	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	32.6	32.6		32.6	32.6		25.8	25.8		25.8	25.8	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		44.2%	44.2%		44.2%	44.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	11	11		9	9		3	3		54	54	
Act Effct Green (s)		27.0		27.0	27.0			21.0			21.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.35			0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.45		0.11	0.31			0.12			0.01	
Control Delay		13.0		10.4	11.8			6.1			0.0	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		13.0		10.4	11.8			6.1			0.0	
LOS		B		B	B			A			A	
Approach Delay		13.0			11.6			6.1				
Approach LOS		B			B			A				
Queue Length 50th (m)		24.7		2.1	14.5			0.5			0.0	
Queue Length 95th (m)		43.2		6.5	27.1			6.5			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)				15.0								
Base Capacity (vph)		803		327	725			472			564	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.45		0.11	0.31			0.12			0.01	

Intersection Summary

Area Type: Other
Cycle Length: 58.4
Actuated Cycle Length: 59.4
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 57.7% ICU Level of Service B
Analysis Period (min) 15

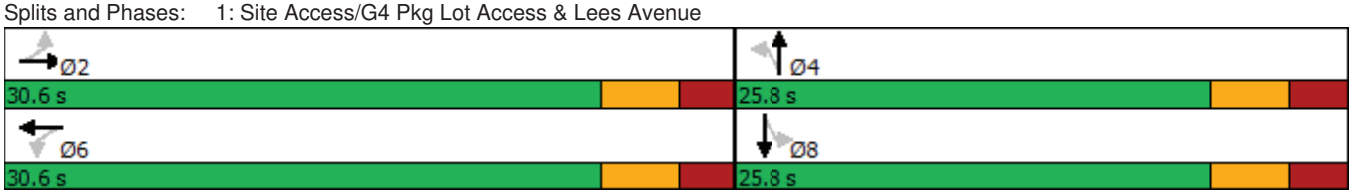
Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	396	19	44	216	6	11	1	15	6	0	5
Future Volume (vph)	1	396	19	44	216	6	11	1	15	6	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor	1.00	1.00		0.99	1.00			0.94			0.93	
Frt		0.993			0.996			0.925			0.939	
Flt Protected	0.950			0.950				0.980			0.973	
Satd. Flow (prot)	1695	1712	0	1361	1511	0	0	1129	0	0	1315	0
Flt Permitted	0.620			0.434				0.928			0.916	
Satd. Flow (perm)	1101	1712	0	613	1511	0	0	1015	0	0	1237	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			15			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	4		18	18		4	94		1	1		94
Confl. Bikes (#/hr)			6						3			
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%	5%	11%	27%	20%	17%	36%	2%	53%	0%	2%	40%
Adj. Flow (vph)	1	396	19	44	216	6	11	1	15	6	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	415	0	44	222	0	0	27	0	0	11	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	30.6	30.6		30.6	30.6		25.8	25.8		25.8	25.8	
Total Split (%)	54.3%	54.3%		54.3%	54.3%		45.7%	45.7%		45.7%	45.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	18	18		4	4		1	1		94	94	
Act Effct Green (s)	25.0	25.0		25.0	25.0			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.37			0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.00	0.55		0.17	0.34			0.07			0.02	
Control Delay	9.0	15.4		11.9	12.4			8.7			0.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.0	15.4		11.9	12.4			8.7			0.1	
LOS	A	B		B	B			A			A	
Approach Delay		15.4			12.3			8.7			0.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	30.0		2.6	14.3			0.8			0.0	
Queue Length 95th (m)	0.7	52.5		8.1	27.5			4.9			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)	40.0			15.0								
Base Capacity (vph)	479	749		266	659			380			484	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.55		0.17	0.34			0.07			0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 56.4			
Actuated Cycle Length: 57.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	364	31	35	244	0	29	0	27	4	0	1
Future Volume (vph)	0	364	31	35	244	0	29	0	27	4	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor		1.00		0.99				0.95			0.98	
Frt		0.988						0.935			0.973	
Flt Protected				0.950				0.975			0.962	
Satd. Flow (prot)	1784	1756	0	1406	1596	0	0	1430	0	0	1639	0
Flt Permitted				0.460				0.885			0.887	
Satd. Flow (perm)	1784	1756	0	674	1596	0	0	1248	0	0	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						49			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	9		11	11		9	54		3	3		54
Confl. Bikes (#/hr)									3			
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%	3%	23%	14%	2%	14%	2%	15%	2%	2%	2%
Adj. Flow (vph)	0	364	31	35	244	0	29	0	27	4	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	395	0	35	244	0	0	56	0	0	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	32.6	32.6		32.6	32.6		25.8	25.8		25.8	25.8	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		44.2%	44.2%		44.2%	44.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	11	11		9	9		3	3		54	54	
Act Effct Green (s)		27.0		27.0	27.0			21.0			21.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.35			0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.49		0.11	0.34			0.12			0.01	
Control Delay		13.7		10.6	12.1			6.1			0.0	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		13.7		10.6	12.1			6.1			0.0	
LOS		B		B	B			A			A	
Approach Delay		13.7			11.9			6.1				
Approach LOS		B			B			A				
Queue Length 50th (m)		27.5		2.1	16.0			0.5			0.0	
Queue Length 95th (m)		47.9		6.6	29.8			6.5			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)				15.0								
Base Capacity (vph)		803		306	725			472			564	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.49		0.11	0.34			0.12			0.01	

Intersection Summary			
Area Type:	Other		
Cycle Length: 58.4			
Actuated Cycle Length: 59.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

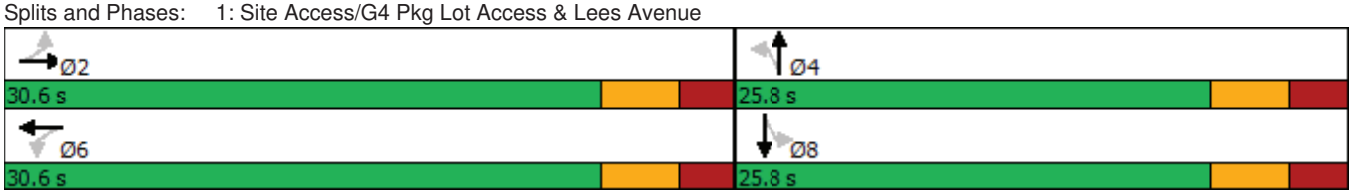
Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	362	25	57	197	6	13	1	19	6	0	5
Future Volume (vph)	1	362	25	57	197	6	13	1	19	6	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor	0.99	1.00		0.98	1.00			0.90			0.89	
Frt		0.990			0.996			0.922			0.939	
Flt Protected	0.950			0.950				0.981			0.973	
Satd. Flow (prot)	1695	1704	0	1361	1511	0	0	1121	0	0	1249	0
Flt Permitted	0.630			0.463				0.927			0.915	
Satd. Flow (perm)	1118	1704	0	653	1511	0	0	965	0	0	1174	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			3			19			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	4		18	18		4	172		1	1		172
Confl. Bikes (#/hr)			6						3			
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%	5%	11%	27%	20%	17%	36%	2%	53%	0%	2%	40%
Adj. Flow (vph)	1	362	25	57	197	6	13	1	19	6	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	387	0	57	203	0	0	33	0	0	11	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	30.6	30.6		30.6	30.6		25.8	25.8		25.8	25.8	
Total Split (%)	54.3%	54.3%		54.3%	54.3%		45.7%	45.7%		45.7%	45.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	18	18		4	4		1	1		172	172	
Act Effct Green (s)	25.0	25.0		25.0	25.0			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.37			0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.00	0.52		0.20	0.31			0.09			0.02	
Control Delay	9.0	14.7		12.4	12.0			8.5			0.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.0	14.7		12.4	12.0			8.5			0.1	
LOS	A	B		B	B			A			A	
Approach Delay		14.6			12.1			8.5			0.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	27.3		3.5	12.9			0.9			0.0	
Queue Length 95th (m)	0.7	48.2		10.0	25.1			5.4			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)	40.0			15.0								
Base Capacity (vph)	486	746		284	659			365			461	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.52		0.20	0.31			0.09			0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 56.4			
Actuated Cycle Length: 57.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	333	35	40	223	0	38	0	37	4	0	1
Future Volume (vph)	0	333	35	40	223	0	38	0	37	4	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor		1.00		0.99				0.88			0.95	
Frt		0.986						0.933			0.973	
Flt Protected				0.950				0.975			0.962	
Satd. Flow (prot)	1784	1751	0	1406	1596	0	0	1427	0	0	1592	0
Flt Permitted				0.487				0.878			0.882	
Satd. Flow (perm)	1784	1751	0	713	1596	0	0	1143	0	0	1455	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12						49			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	9		11	11		9	158		3	3		158
Confl. Bikes (#/hr)									3			
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%	3%	23%	14%	2%	14%	2%	15%	2%	2%	2%
Adj. Flow (vph)	0	333	35	40	223	0	38	0	37	4	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	368	0	40	223	0	0	75	0	0	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	32.6	32.6		32.6	32.6		25.8	25.8		25.8	25.8	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		44.2%	44.2%		44.2%	44.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	11	11		9	9		3	3		158	158	
Act Effct Green (s)		27.0		27.0	27.0			21.0			21.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.35			0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.46		0.12	0.31			0.17			0.01	
Control Delay		13.1		10.7	11.8			7.8			0.0	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		13.1		10.7	11.8			7.8			0.0	
LOS		B		B	B			A			A	
Approach Delay		13.1			11.6			7.8				
Approach LOS		B			B			A				
Queue Length 50th (m)		24.9		2.4	14.5			1.8			0.0	
Queue Length 95th (m)		44.0		7.2	27.1			9.0			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)				15.0								
Base Capacity (vph)		802		324	725			435			546	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.46		0.12	0.31			0.17			0.01	

Intersection Summary			
Area Type:	Other		
Cycle Length: 58.4			
Actuated Cycle Length: 59.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 60.8%		ICU Level of Service B	
Analysis Period (min) 15			

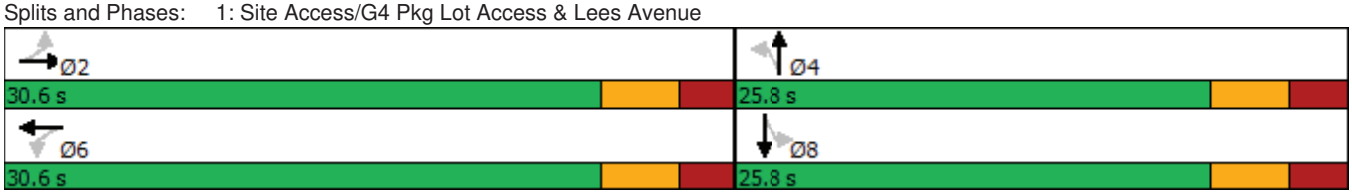
Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	396	25	57	216	6	13	1	19	6	0	5
Future Volume (vph)	1	396	25	57	216	6	13	1	19	6	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor	1.00	1.00		0.99	1.00			0.90			0.89	
Frt		0.991			0.996			0.922			0.939	
Flt Protected	0.950			0.950				0.981			0.973	
Satd. Flow (prot)	1695	1706	0	1361	1511	0	0	1121	0	0	1249	0
Flt Permitted	0.620			0.428				0.927			0.915	
Satd. Flow (perm)	1101	1706	0	604	1511	0	0	965	0	0	1174	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			3			19			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	4		18	18		4	172		1	1		172
Confl. Bikes (#/hr)			6						3			
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%	5%	11%	27%	20%	17%	36%	2%	53%	0%	2%	40%
Adj. Flow (vph)	1	396	25	57	216	6	13	1	19	6	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	421	0	57	222	0	0	33	0	0	11	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	30.6	30.6		30.6	30.6		25.8	25.8		25.8	25.8	
Total Split (%)	54.3%	54.3%		54.3%	54.3%		45.7%	45.7%		45.7%	45.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	18	18		4	4		1	1		172	172	
Act Effct Green (s)	25.0	25.0		25.0	25.0			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.37			0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.00	0.56		0.22	0.34			0.09			0.02	
Control Delay	9.0	15.6		12.8	12.4			8.5			0.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.0	15.6		12.8	12.4			8.5			0.1	
LOS	A	B		B	B			A			A	
Approach Delay		15.5			12.5			8.5			0.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	30.6		3.5	14.3			0.9			0.0	
Queue Length 95th (m)	0.7	53.4		10.2	27.5			5.4			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)	40.0			15.0								
Base Capacity (vph)	479	746		263	659			365			461	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.56		0.22	0.34			0.09			0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 56.4			
Actuated Cycle Length: 57.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 63.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	364	35	40	244	0	38	0	37	4	0	1
Future Volume (vph)	0	364	35	40	244	0	38	0	37	4	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	40.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. 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
Ped Bike Factor		1.00		0.99				0.88			0.95	
Frt		0.987						0.933			0.973	
Flt Protected				0.950				0.975			0.962	
Satd. Flow (prot)	1784	1754	0	1406	1596	0	0	1427	0	0	1592	0
Flt Permitted				0.456				0.878			0.882	
Satd. Flow (perm)	1784	1754	0	668	1596	0	0	1143	0	0	1455	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11						49			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		195.1			169.5			129.2			108.5	
Travel Time (s)		14.0			12.2			9.3			7.8	
Confl. Peds. (#/hr)	9		11	11		9	158		3	3		158
Confl. Bikes (#/hr)									3			
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%	3%	23%	14%	2%	14%	2%	15%	2%	2%	2%
Adj. Flow (vph)	0	364	35	40	244	0	38	0	37	4	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	399	0	40	244	0	0	75	0	0	5	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.6	22.6		22.6	22.6		26.8	26.8		26.8	26.8	
Total Split (s)	32.6	32.6		32.6	32.6		25.8	25.8		25.8	25.8	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		44.2%	44.2%		44.2%	44.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.6	5.6		5.6	5.6			5.8			5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	11	11		9	9		3	3		158	158	
Act Effct Green (s)		27.0		27.0	27.0			21.0			21.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.35			0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.50		0.13	0.34			0.17			0.01	
Control Delay		13.7		10.9	12.1			7.8			0.0	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		13.7		10.9	12.1			7.8			0.0	
LOS		B		B	B			A			A	
Approach Delay		13.7			11.9			7.8				
Approach LOS		B			B			A				
Queue Length 50th (m)		27.8		2.4	16.0			1.8			0.0	
Queue Length 95th (m)		48.5		7.3	29.8			9.0			0.0	
Internal Link Dist (m)		171.1			145.5			105.2			84.5	
Turn Bay Length (m)				15.0								
Base Capacity (vph)		803		303	725			435			546	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.50		0.13	0.34			0.17			0.01	

Intersection Summary			
Area Type:	Other		
Cycle Length: 58.4			
Actuated Cycle Length: 59.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/G4 Pkg Lot Access & Lees Avenue

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Memorandum

To/Attention	Sylviane Charette, uOttawa	**Date**	November 3, 2020
From	David Hook, IBI Group	**Project No**	123633
cc	James Hildebrand, uOttawa		
Subject	200 Lees Avenue - Transportation Impact Assessment (Step 4: Analysis) - City of Ottawa Comments		

The following comments were received from the City planner, Jean-Charles Renaud (Jean-Charles.Renaud@ottawa.ca) on October 26, 2020. These comments relate to the Draft Transportation Impact Assessment (Step 4) submission to the City of Ottawa for the proposed Faculty of Health Sciences development at 200 Lees. The following comments may impact the detailed design of the site and will need to be formally addressed and responded to prior to the submission of any Site Plan Control (SPC) application to the City.

200 Lees Avenue
File No. D02-02-13-0009

Draft TIA – IBI Group, Dated September 25, 2020

Comments

Transportation Engineering

Section 5.1.1 Design for Sustainable Modes:

The TDM-Supportive Development Design and Infrastructure Checklist provided in Appendix H has a note which says, "draft - to be completed prior to submission". Please complete the checklist. Once completed, list the notable measures within Section 5.1.1 for easy reference and review.

Within either Section 5.1.1 or Section 5.2.1 describe the location of the proposed bicycle parking spaces (e.g. how many are adjacent to the main entrance, how many are adjacent to the secondary entrance, how many are elsewhere).

Detail how the proposed MUP on the west side of the site integrates with site access intersection. MUP users must be split into separate pedestrian and cycling facilities at signalized intersections and cyclists require facilities to connect to the Lees Avenue on-street bike lanes,

otherwise a dismount and walk condition is required as the MUP approaches the southwest corner of the intersection.

Section 5.1.2 Circulation and Access:

Exhibit 1 does not show how a standard WB-20 vehicle can use the loading dock. Please provide swept path analysis and correct reference. Confirm accommodation of a WB-20 vehicle is required for the needs of the University.

Section 5.2.2 Spillover Parking:

Provide analysis of university-wide parking rate, estimated specialized parking rate, and estimated 45% park-and-ride demand.

Section 5.5.3 TDM Program:

The TDM Measures Checklist provided in Appendix H has a note which says, "draft - to be completed prior to submission". Please complete the checklist. Once completed, list the notable measures within Section 5.5.3 for easy reference and review.

Section 5.9.4 Intersection Design (MMLOS) and Section 5.10 Geometric Review:

As part of this application, please engage with the City's Traffic Signal Design team to implement bike boxes on the northbound and southbound approaches as a low-cost measure to improve accommodation of sustainable modes at the access intersection and partially address the noted BLOS deficiency. The City typically favors bike boxes behind the crosswalk per Figure 4.50 of OTM 18 (to be confirmed with Traffic Signal Design). Adjustments to the inductive loop detection may be required. Bike boxes generally function best in conjunction with a no right turn on red condition, which the study is separately recommending due to sight distance deficiencies.

Ensure the additional property on the south side of Lees Avenue (up to 1.5m) is transferred to the City in order for Lees Avenue to meet the 23m right-of-way protection. Consider providing additional property on the southwest corner of the site access intersection to facilitate the future upgrade of the intersection to a 'protected intersection' as recommended in Section 5.9.4.3.

Traffic Signal Operations

1. The report estimates that 45% of existing parking demand at the Lees Campus is park-and-ride demand generated from the Main Campus (see Section 5.2.2 Spillover Parking). Are these park-and-ride trips included in the new site-generated trips (i.e. 149 person-trips per AM peak hour and 159 person-trips per PM peak hour)?

2. At the Lees Ave & Lees Campus Access intersection, the northbound and southbound phases are actuated. Revise recall mode in Synchro models accordingly.

3. How were the conflicting pedestrian volumes determined for the future 2023 and 2028 background scenarios?

4. Are site-generated pedestrian volumes from both walking and transit included in the Synchro model (i.e. conflicting pedestrian volumes and pedestrian calls per hour)?

5. The number of pedestrian calls per hour does not necessarily equal pedestrian volume per hour since pedestrians can travel in groups. Refer to Synchro 10 User Guide (section 11-9 Pedestrian Calls) for methods of estimating pedestrian calls.

6. Include traffic generated by other area developments (~350 residential units on Robinson Ave). Even if the number of related new vehicle trips are low, new pedestrian trips to/from transit station are expected.

7. The intersection at Lees & the HWY 417 E on-ramp (342 m east of Chestnut) is controlled by a pedestrian signal. Revise TIA Report section 3.2.1.3 Intersections.

8. Why do the overall and critical movement V/C ratios decrease for 2023 scenarios compared to existing 2020 scenarios? Given the growth in eastbound/westbound volumes on Lees, V/C is expected to increase.

9. Modify the TIA Report in accordance with all the above.

Street Lighting

If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.

Alterations and/or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider.

Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing street light plant.

Traffic Signal Design

From Exhibit 2: Proposed Development, it could be read that the TCS at LEES AVE, 472 EAST OF CHESTNUT might be impacted by proposed geometry change as shown.

Due to the proposed changes in the existing roadway geometry for the purpose of construction of a new TCS(s) or modifications to existing TCS(s) the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re-design to the proponent or involved consulting entity.

Sylviane Charette – November 3, 2020

If the proposed traffic signals are warranted/approved for installation or modifications to existing TCS are approved, and RMA approved, please forward an approved geometry detail design drawings (dwg digital format in NAD 83 coordinates) including following: base mapping, existing and new underground utilities/sewers, new/existing catch basins locations, AutoTurn-Radius Modeling for approved vehicles and approved pavement markings drawings in separate files , no Xref files attached in master file(s), for detail traffic plant design lay out.

Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424x23035. If not sure as per above request and more detail info needed as per input files, (i.e. format, etc.) please ask for our Dispatch checklist document and it will be gladly provided.

Wally Dubyk
Transportation Project Manager - Transportation Approvals
Development Review, Central & South Branches
613-580-2424 x13783