BOUTIQUE HOTEL
275 KING EDWARD AVENUE
OTTAWA, ONTARIO

TIA STRATEGY REPORT - REVISED

March 28, 2022

D. J. Halpenny & Associates Ltd.
Consulting Transportation Engineers
P. O. Box 774, Manotick, Ontario K4M 1A7

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Prepared for:

165177 Canada Inc.
22 rue Taschereau, Gatineau QC J87 2V4

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D. J. Halpenny & Associates Ltd.
Consulting Transportation Engineers
P.O. Box 774, Manotick, ON K4M 1A7 - Tel (613) 692-8662 - David@DJHalpenny.com

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INTRODUCTION

The owner of a parcel of land at the corner of King Edward Avenue and Clarence Street is in the process of preparing a Site Plan Application for the construction of an eight storey building which will provide a combination of a hotel with a small commercial component. The hotel would be located at 275 King Edward Avenue with the west limit of the site bordering King Edward Avenue. The Boutique Hotel development will contain 121 hotel suites with 134 m^2 of commercial space on the ground floor which is likely to be a sit-down restaurant. The main entrance to the building will be located at the corner of Clarence Street and King Edward Avenue. Parking will be accommodated in an underground parking garage with access onto Clarence Street.

D. J. Halpenny & Associates Ltd. was retained to prepare a Transportation Impact Assessment in support of the Site Plan Application. The following documents the steps which conform to the City of Ottawa *Transportation Impact Assessment Guidelines (2017)*. Exhibit 1.1 in the Appendix presents the consultant Certification Form.

STEP 1 - SCREENING

A Screening Form has been prepared for the project and is provided as Exhibit 1.2 in the Appendix. The Screening Form was submitted to the City of Ottawa which determined that the Trip Generation, Location, and Safety Triggers were all met and a Transportation Impact Assessment (TIA) study must continue onto the next stage. The following will address the requirements of the Scoping Document.

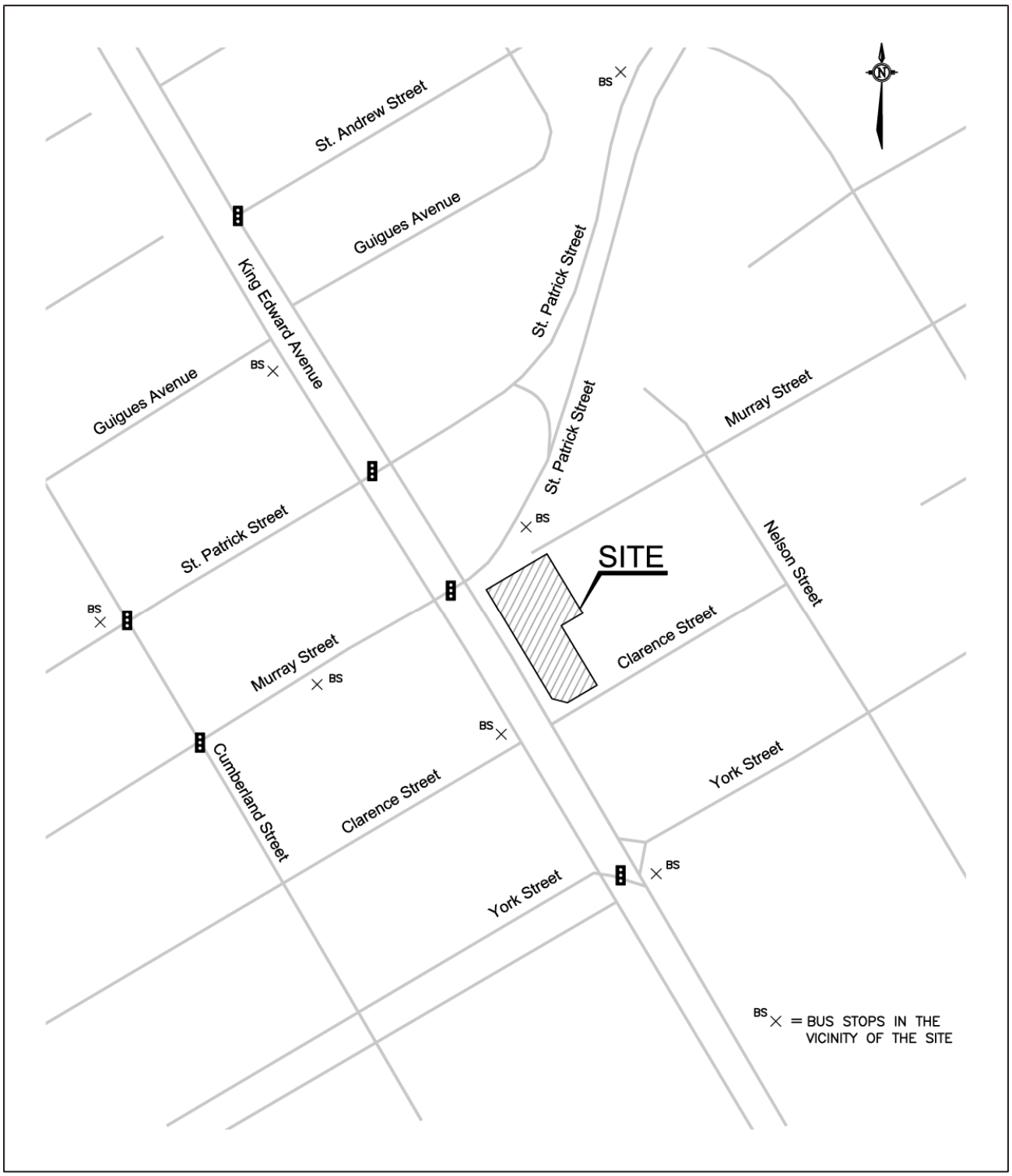
STEP 2 - SCOPING

MODULE 2.1 – Existing and Planned Conditions

Element 2.1.1 – Proposed Development

The Boutique Hotel will be a single eight storey building located at 275 King Edward Avenue. The property is located on the east side of King Edward Avenue with Murray Street at the north limit and Clarence Street at the south limit. Figure 2.1 shows the location of the Boutique Hotel.

FIGURE 2.1
SITE LOCATION PLAN



The development would contain 121 all suites hotel units intended for short and long term stays, and 134 m^2 of retail/commercial space on the ground floor. The entrance to the hotel will be located at the building corner at the intersection of King Edward Avenue and Clarence Street. The vehicular access to the underground parking garage will be from Clarence Street. The garage access will be a 6.0 m wide at the street line with full movement access. The access will be located approximately 21 m from the centre of the access to the curb line of the northbound lanes of King Edward Avenue.

The site access will be to/from a parking garage containing 49 spaces plus 2 surface spaces which exceeds City By-law requirements. The site will provide 7 bicycle spaces plus 32 spaces in the parking garage which also exceeds the City By-law requirements.

The hotel would be located on a 1,590 m^2 parcel of land. The land is primarily vacant with a small two storey apartment building located at the north end of the property. The property is currently zoned TM12 + TM (Mature Neighborhood Overlay) "Traditional Mainstreet", which will support the proposed hotel development. The hotel/condominium will be constructed in a single phase with completion expected by the year 2024. Figure 2.2 shows a conceptual site plan of the development.

Element 2.1.2 – Existing Conditions

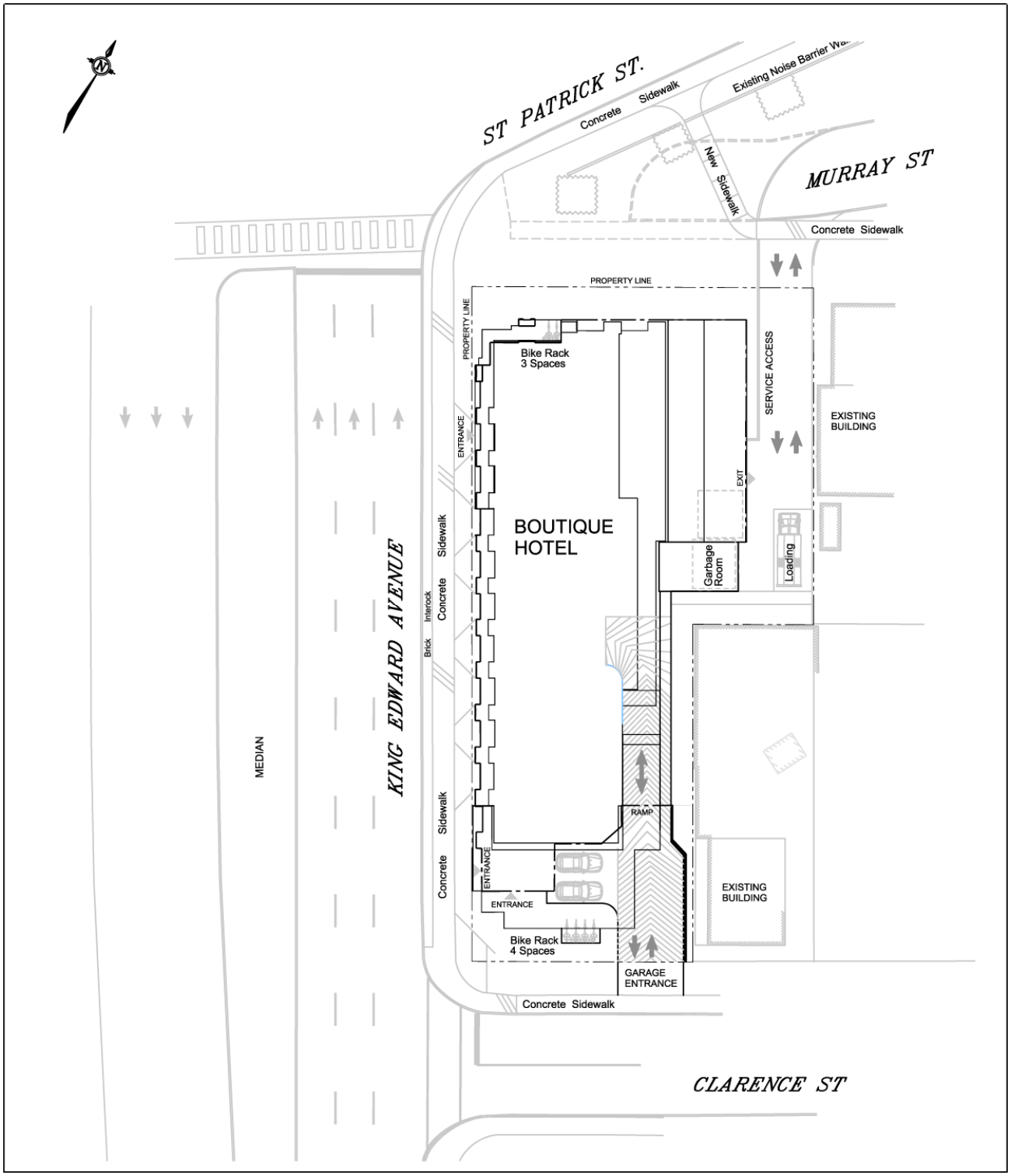
ROADS

The site will front onto King Edward Avenue which is designated as an arterial road in the City of Ottawa *Transportation Master Plan* (TMP). King Edward Avenue is a six lane urban divided road under the jurisdiction of the City of Ottawa. The southbound lanes comprise of the outside lane designated as a bus only lane from 3:30 PM to 5:30 PM Monday to Friday. The street has 1.5 m sidewalks along both sides of the road with a 1.5 m boulevard. There are no bike lanes along King Edward Avenue with no plans for their construction in the TMP. In the northbound lanes across the frontage of the site there are signs posted "No Stopping" between 3:30 PM and 5:30 PM Monday to Friday, with 3 hour parking permitted between 7:00 AM and 3:30 PM Monday to Friday. In the southbound lanes "No Stopping" is posted from 7:00 AM to 9:00 AM and 3:00 PM to 5:30 PM Monday to Friday, with 3 hour parking permitted between 9:00 AM and 3:00 PM Monday to Friday. The posted speed limit along King Edward Avenue is 40 km./h.

Clarence Street borders the south side of the site. Clarence Street is a two lane local street with a pavement width of 8.5 m. The street has 2.0 m sidewalks adjacent to the curb along both sides of the street. Parking is prohibited along the north side of the street, and there is no posted speed limit.

Eastbound St. Patrick Street is an arterial road which borders the north side of the site. The roadway contains two eastbound only lanes west of King Edward Avenue which are designated as Murray Street, with the two eastbound lanes continuing as St. Patrick Street on the east side of King Edward Avenue. Eastbound St. Patrick Street has 2.0 m sidewalks along both sides of the road and no cycling facilities. Westbound St. Patrick Street has two westbound lanes with sidewalks on both sides of the road and no cycling

FIGURE 2.2
CONCEPTUAL SITE PLAN



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facilities with the exception of a bicycle pocket between the through and right turn lanes as part of the approach to the St. Patrick/King Edward intersection. St. Patrick Street is designated in the TMP as a Spine Route in the Cycling Network - Primary Urban. "No Stopping" signs are placed along both the eastbound and westbound lanes of the road which prohibits the stopping of vehicles. The speed limit is posted at 50 km./h.

Murray Street east of King Edward Avenue is a local street with an 8.5 m pavement width. The street is approximately 100 m in length between the cul-de-sac adjacent to the site and Nelson Street. The Boutique Hotel proposes to have a service entrance from the site to the cul-de-sac.

INTERSECTIONS

Clarence/King Edward Intersection - The intersection is a two-way stop controlled intersection with a stop sign at the westbound Clarence Street approach. The median along King Edward Avenue prohibits westbound Clarence Street through movements with a "No Enter" sign at the eastbound Clarence Street approach. Below is the lane configuration and aerial photograph of the Clarence/King Edward intersection:

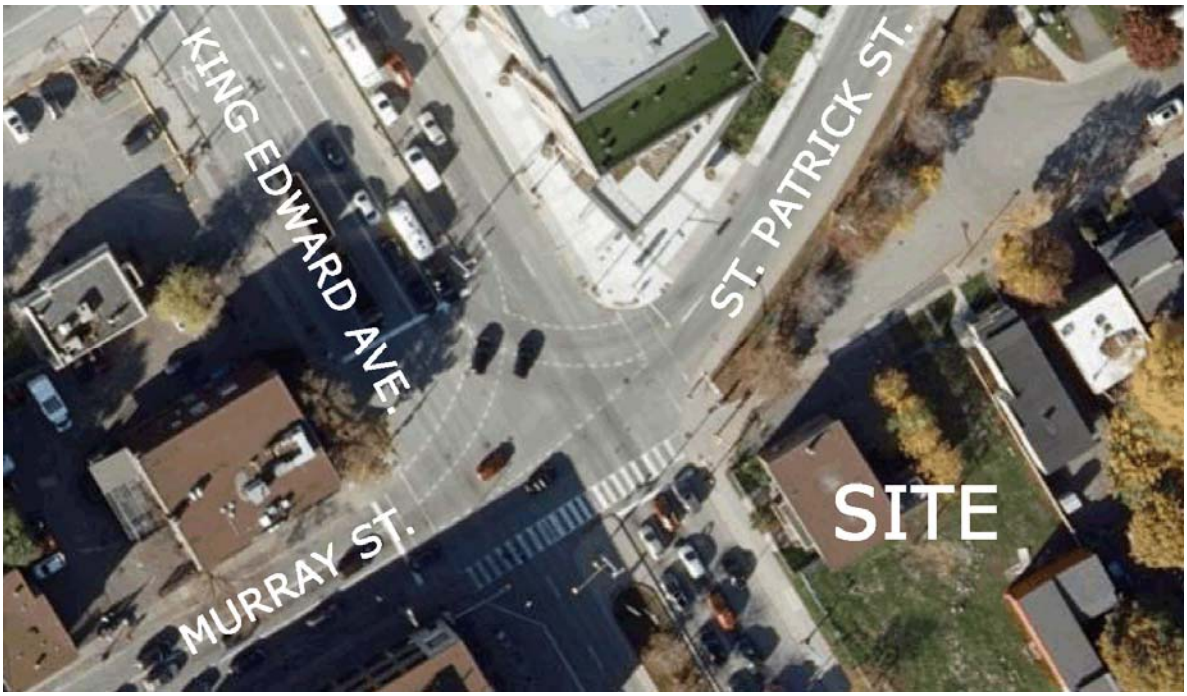
Northbound King Edward Ave.	Two through lanes One through/right lane
Southbound King Edward Ave.	Two through lanes One through/right lane (Peak PM hr. bus only lane)
Eastbound Clarence St.	No approach entry
Westbound Clarence St.	One right turn lane (Stop sign)

INTERSECTION OF CLARENCE ST. AND KING EDWARD AVE.

St. Patrick (Murray)/King Edward Intersection - The intersection of eastbound St. Patrick Street (Murray Street) and King Edward Avenue is located approximately 85 m north of Clarence Street. The intersection is controlled by traffic signals with King Edward Avenue forming the northbound and southbound approaches, Murray Street the eastbound (one-way) approach, and St. Patrick Street the receiving street for eastbound one-way traffic on the east side of King Edward Avenue. The intersection has the following lane configuration with an aerial photograph of the intersection provided below:

Northbound King Edward Ave.	Two through lanes One shared through/right lane
Southbound King Edward Ave.	Two left turn lanes Two through lanes One through lane (Buses only 3:30 - 5:30 M-F)
Eastbound Murray St.	One left turn lane (60 m storage) One shared left/through lane One shared through/right lane

INTERSECTION OF ST. PATRICK ST. (MURRAY ST.) AND KING EDWARD AVE.



Westbound St. Patrick/King Edward Intersection - The St. Patrick/King Edward intersection is located approximately 165 m north of Clarence Street. The intersection is controlled by traffic signals with King Edward Avenue forming the northbound and southbound approaches, and St. Patrick Street the westbound one-way approach. The intersection has the following lane configuration with an aerial photograph:

Northbound King Edward Ave.	Three through lanes
Southbound King Edward Ave.	Four through lanes
	One shared through/right turn lane
Westbound St. Patrick St.	One shared left/through turn lane
	One through lane
	Two channelized right turn lanes

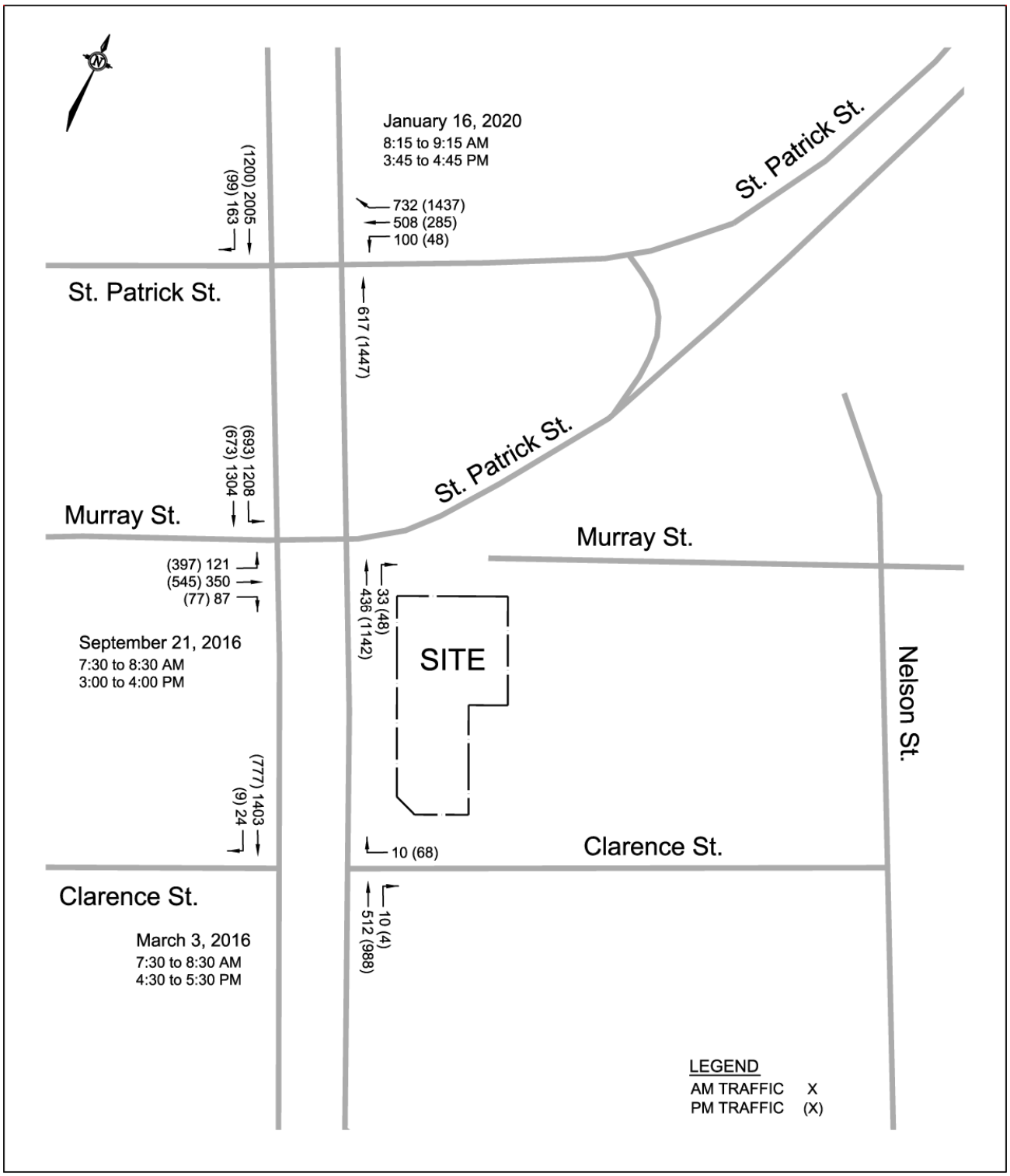
INTERSECTION OF WESTBOUND ST. PATRICK ST. AND KING EDWARD AVE.

The most recent weekday peak AM and PM hour traffic counts were obtained from the City of Ottawa and are provided in the Appendix as Exhibit 2.1 for the 2016 counts at the intersection of Clarence/King Edward, Exhibit 2.2 for the 2016 counts at the intersection of St. Patrick (Murray)/King Edward, and Exhibit 2.3 for the 2020 counts at the intersection of westbound St. Patrick/King Edward. Figure 2.3 presents the weekday peak hour counts at the intersections within the study area.

TRANSIT

The site is serviced by OC Transpo Local Route 56 which is scheduled during peak periods Monday to Friday and Sundays. The route travels along King Edward Avenue to the downtown core and to the Tunney's Pasture Transit Station. The route schedule provides 15 minute service in the peak direction and 30 minute service in the nonpeak direction all day and weekends. The route map is provided as Exhibit 2.4 in the Appendix.

FIGURE 2.3
PEAK AM AND PM HOUR EXISTING TRAFFIC COUNTS



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Route 6 is a frequent route travelling along St. Patrick Street and Murray Street through the downtown core to the Greenboro Transit Station. The route operates 7 days a week with 15 minute service on weekdays. The route map is provided as Exhibit 2.4.

Bus stops are currently located at the Clarence/King Edward intersection for southbound transit Route 56 to the downtown core, and a block away from the hotel entrance (York/King Edward) for the northbound service. For transit Route 6 the westbound bus stop to the downtown core is located at the Cumberland/St. Patrick intersection, and eastbound bus stop on St. Patrick Street 55 m east of King Edward Avenue. The bus stop locations are shown in Figure 2.1.

COLLISION HISTORY

Collision reports were obtained from the City of Ottawa through Open Data Ottawa for the five year time period between the years January 1, 2015 and December 31, 2019. The collision reports were obtained for the three intersections of Clarence/King Edward, St. Patrick (Murray)/King Edward, and St. Patrick/King Edward. Reported collisions were also obtained along the road segment of King Edward Avenue between Clarence Street and St. Patrick Street. Table 2.1 summarizes the collisions by year and type.

Element 2.1.3 – Planned Conditions

The *Transportation Master Plan 2013* (TMP) has identified two transit priority projects in the vicinity of the Boutique Hotel development. The first is identified in the TMP under Affordable Network and Network Concept as a transit signal priority along Murray Street, St. Patrick Street and Dalhousie Street between Vanier Parkway and Rideau Street. The project would improve travel time and transit reliability. The second project is identified under Network Concept and consists of transit signal priority along King Edward Avenue which will complement the existing southbound bus lane between Sussex Drive and Rideau Street. The project would improve transit capacity for the large number of STO buses.

The following are proposed or recently developed property within the immediate area of the site:

- The Holiday Inn Express and Suites hotel is located at 235 King Edward Avenue between St. Patrick Street and Murray Street. The hotel was completed in 2019.
- A 48 unit supportive housing project is proposed at 216 Murray Street.
- An application for a Zoning By-law Amendment has been made for the property at 284 King Edward Avenue. The amendment would allow changes to be made to the existing church building or identify potential development of the site.

TABLE 2.1
COLLISION SUMMARY

YEAR	COLLISION TYPE					TOTAL
	REAR END	ANGULAR	TURNING	SIDESWIPE	OTHER (SMV)	
Clarence Street at King Edward Avenue Intersection						
2015						0
2016	2					2
2017				1		1
2018				1		1
2019						0
St. Patrick Street (Murray Street) at King Edward Avenue Intersection						
2015	5	2	2	3	3	15
2016	8	3		4	1	16
2017	3			5	1	9
2018	5	1	1	1	1	9
2019	5	1	2	3	1	12
St. Patrick Street at King Edward Avenue Intersection						
2015	6	3	1	10		20
2016	8	3	2	5	2	20
2017	6	1		11		18
2018	5	1	5	4	1	16
2019	9	2		5		16
King Edward Avenue Road Segment between Clarence Street and St. Patrick Street						
2015	1			1		2
2016				3	1	4
2017					1	1
2018				1		1
2019	2					2

MODULE 2.2 – Study Area and Time Periods

Element 2.2.1 – Study Area

The study area for the development will include the section of King Edward Avenue between Clarence Street and St. Patrick Street, and the road segments of Murray Street and St. Patrick Street (westbound). The study area would also include the intersections of Clarence/King Edward, Murray/King Edward and St. Patrick/King Edward.

The study will examine the intersection geometry and roadway segments in accordance with the City of Ottawa *Transportation Impact Assessment Guidelines (2017).*

Element 2.2.2 – Time Periods

The time period for the analysis would be the weekday peak AM and PM time period of the background roadway traffic. This would be the peak period of traffic along King Edward Avenue and adjacent streets to the site.

Element 2.2.3 – Horizon Years

The TIA will address the impact of the site generated trips from the proposed Boutique Hotel. The horizon year of the study will be the completion of the development at the year 2024. The analysis will further examine the impact at the year 2029 which represents five years beyond completion.

MODULE 2.3 – Exemptions Review

The exemptions, which provide possible reductions to the scope of work of the TIA Study, were examined using Table 4: Possible Exemptions which is provided in the City's *Transportation Impact Assessment Guidelines (2017).* Utilizing the table, the following lists the possible exemptions proposed for the TIA Study report:

MODULE	ELEMENT	EXEMPTION CONSIDERATIONS
Design Review Component		
4.1 Development Design	4.1.2 Circulation and Access	No – The intended use and function of the rear service access onto Murray Street will be examined.
	4.1.3 New Street Networks	Yes - Only required for subdivisions.
4.2 Parking	4.2.1 Parking Supply	No – The parking supply will be compared to that required as determined from City By-laws.
	4.2.2 Spillover Parking	Yes - Parking will meet the City of Ottawa By-laws. All hotel parking will be contained within the site.
Network Impact Component		
4.5 Transportation Demand Management	All Elements	No – TDM measures will be examined.
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	No – The site will have access onto Clarence Street, a local street.
4.8 Network Concept		Yes - The site would not generate more than 200 person-trips per peak hour in excess of the volume permitted by established zoning.

STEP 3 - FORECASTING

MODULE 3.1 - Development-generated Travel Demand

Element 3.1.1 – Trip Generation and Mode Shares

The Boutique Hotel will have a mixed use consisting of an all suites hotel and some leasable space likely comprising of a high-turnover sit-down restaurant. Table 3.1 presents an inventory of the type and size of development for each use.

TABLE 3.1
INVENTORY OF DEVELOPMENT USE

TYPE OF USE	NUMBER OF UNITS GROSS FLOOR
All Suites Hotel	121 units
Sit-Down Restaurant	134 m^2 (1,442 ft^2)

The number of expected site generated trips utilized the trip statistical data in the Institute of Transportation Engineers (ITE) document, *Trip Generation Manual 10th Edition*. The trip generation data was determined from the average vehicle trip rate for an All Suites Hotel (ITE 311), and a High-Turnover (Sit-Down) Restaurant (ITE 932). The trip rates are shown in Table 3.2 with the ITE trip data graphs provided in the Appendix.

TABLE 3.2
VEHICLE TRIP GENERATION RATES

Land Use	Peak AM Hour	Peak PM Hour
All Suites Hotel - ITE 311	0.34 T/Room	0.36 T/Room
Restaurant - ITE 932	9.94 T/1000 ft^2 GFA	9.77 T/1000 ft^2 GFA

The auto-trips are shown in Table 3.3 and are the product of the number of rooms/units or gross floor area for each of the land uses (Table 3.1) and the trip generation rates of Table 3.2. The number of future person-trips was determined by the number of auto-trips calculated from the ITE trip rates, and multiplied by 1.28 (from the TIA Guidelines) to convert auto-trips to person-trips. Table 3.3 shows the future peak hour auto-trips and person-trips.

TABLE 3.3
PEAK HOUR SITE GENERATED TRIPS

Trips	AUTO-TRIP GENERATION		FUTURE PERSON-TRIPS	
	Peak AM Hr.	Peak PM Hr.	Peak AM Hr.	Peak PM Hr.
All Suites Hotel	41 veh.	44 veh.	52 per.	56 per.
Restaurant	14 veh.	14 veh.	18 per.	18 per.
Total Trips	55 veh.	58 veh.	70 per.	74 per.

The Trip Reduction Factors which were provided in the TIA Guidelines were applied to the land uses as discussed below:

1) *Deduction of Existing Development Trips* - A small two floor residential building is located at the northwest corner of the site. The building is expected to generate few trips and therefore no existing trip deduction was applied.

2) *Pass-by Vehicle Trips* - Pass-by trips are trips that are already on the road and are passing by the site on their way to their primary destination. With the location of the restaurant on a high volume road with limited accessibility and on-street parking, the study has not assigned any pass-by trips to the restaurant use.

3) *Synergy or Internalization* - The site consists of an all suites hotel with limited space for food preparation and dining. With few restaurants or coffee shops in the immediate area, the TIA analysis has assumed a 50 percent reduction of the primary trips to/from the leased use (restaurant) which would be person-trips shared with the hotel.

The expected number of person-trips following the application of the three Trip Reduction Factors is shown in Table 3.4.

TABLE 3.4
TOTAL PEAK HOUR SITE GENERATED PRIMARY PERSON-TRIPS

Trips	FUTURE PERSON-TRIPS	
	Peak AM Hr.	Peak PM Hr.
All Suites Hotel	52 per.	56 per.
Restaurant	18 per.	18 per.
Internal Trip Reduction (50%)	-9 per.	-9 per.
Total Trips	61 per.	65 per.

The Boutique Hotel is located along the east side of King Edward Avenue in what the City of Ottawa designates as the "Ottawa Inner Area". The mode share for peak hour trips was determined from Table 8 in the *TRANS Trip Generation Manual - Summary Report* 2020 for High-Rise Multifamily Housing. The multifamily housing category was assumed due to the all suites hotel which caters to long term stays. Table 3.5 presents the peak AM and PM hour mode share, and the peak AM and PM hour primary and pass-by person-trips.

TABLE 3.5
MODE SHARE SUMMARY (Peak Hour Person-Trips)

FUTURE MODE SHARE TARGETS FOR HIGH-RISE HOUSING				
Travel Mode	**AM % Peak Hr.**	**AM Peak Hr. Per. Trips**	**PM % Peak Hr.**	**PM Peak Hr. Per. Trips**
Auto Driver	26%	16	25%	16
Auto Passenger	6%	4	8%	5
Transit	28%	17	21%	15
Cycling	5%	3	6%	4
Walking	34%	21	39%	25
Total	99%	61 Trips	99%	65 Trips

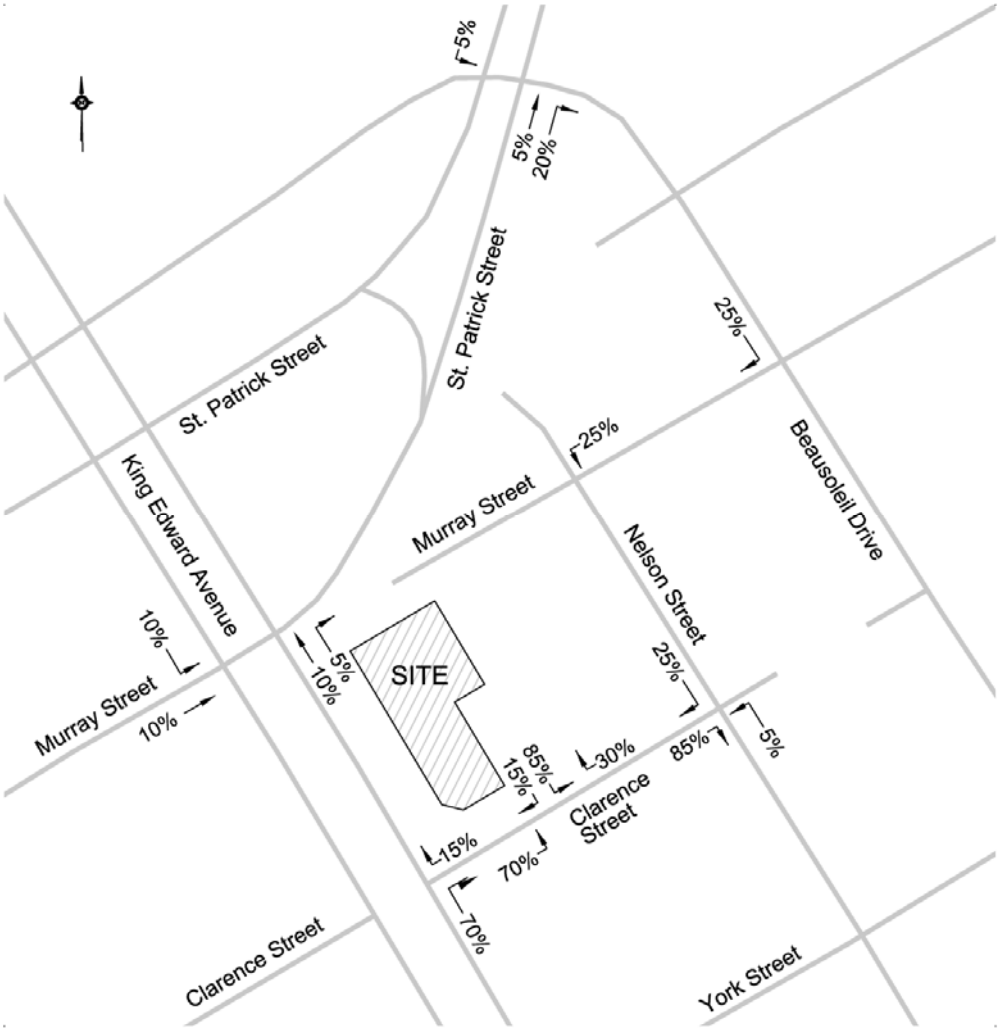
Element 3.1.2 – Trip Distribution

The distribution of the peak hour site generated primary trips from the Boutique Hotel was determined by examining the *2011 NCR Household Origin-Destination Survey* for the origin/destination of peak AM hour trips for the Ottawa Inner Area, and the peak hour traffic counts at the surrounding intersections. The survey and counts would represent trips to/from work for the long term occupants of the hotel and trips to the downtown core for visitors. The trip distribution percentage for the site trips during the weekday peak AM and PM hours are as follows:

	Peak AM & PM
To/From the north along King Edward Avenue	10%
To/From the south along King Edward Ave. and Nelson St.	30%
To/From the east along St. Patrick St., Nelson St. & King Edward Ave.	15%
To/From the west along Murray St. and King Edward Ave.	45%

Below shows the percentage of peak AM and PM hour trips entering/exiting the site.

BOUTIQUE HOTEL PRIMARY TRIP DISTRIBUTION



Element 3.1.3 – Trip Assignment

The distribution of site generated vehicle-trips entering and exiting was determined by applying the directional distribution shown in the ITE *Trip Generation Manual 10th Edition* for an All Suites Hotel (ITE 311), and a High-Turnover (Sit-Down) Restaurant) (ITE 932). Table 3.6 presents the distribution of vehicle-trips entering and exiting the hotel site.

TABLE 3.6
PEAK HOUR ASSIGNMENT OF VEHICLE-TRIPS

PEAK HOUR TRIPS / TRIP TYPE	WEEKDAY PEAK AM HR.			WEEKDAY PEAK PM HR.		
	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
All Suites Hotel	14	7 (53%)	7 (47%)	14	7 (48%)	7 (52%)
Restaurant	2	1 (55%)	1 (45%)	2	1 (62%)	1 (36%)
Total Vehicle-Trips	16	8	8	16	8	8

The trip distribution, as discussed in Element 3.1.2, was applied to the peak AM and PM peak hour vehicle-trips shown in Table 3.6. Figure 3.1 presents the peak AM and PM hour trips to/from the site.

MODULE 3.2 - Background Network Travel Demands

Element 3.2.1 – Transportation Network Plans

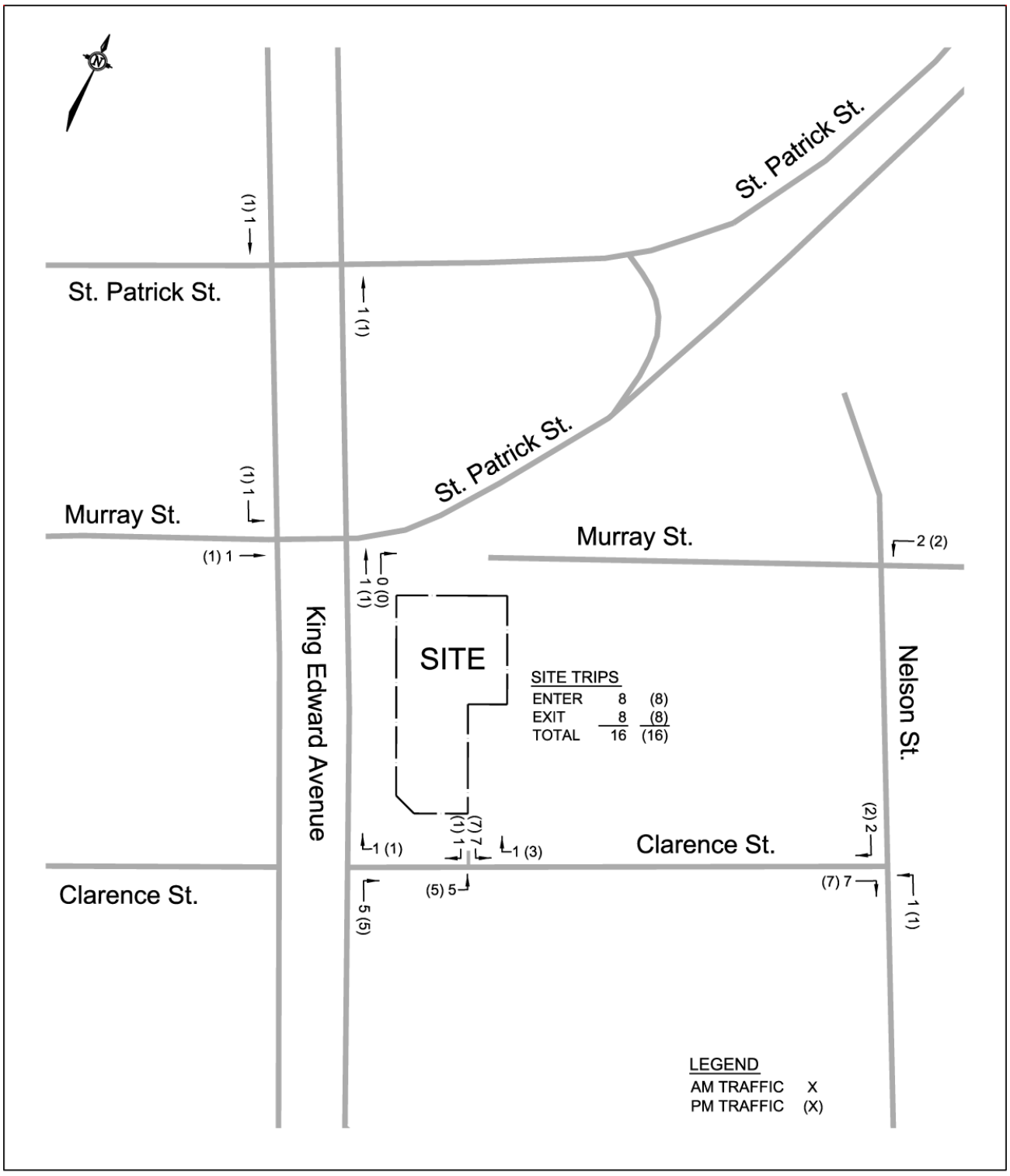
The City of Ottawa *Transportation Master Plan (TMP) 2013* was reviewed to identify transit and roadway projects in the vicinity of the development. Transit signal priority projects were identified along Murray Street, St. Patrick Street and Dalhousie Street between Vanier Parkway and Rideau Street under the Affordable Network and Network Concept which would reduce travel time and improve OC Transpo reliability. Under the Network Concept, transit signal priority is proposed along King Edward Avenue to complement the existing southbound bus lane between Sussex Drive and Rideau Street. There are no roadway modification projects proposed in the vicinity of the site.

Element 3.2.2 – Background Growth

The growth in background traffic was determined utilizing the City of Ottawa *Transportation Master Plan (TMP) 2013* population growth and employment growth statistics. The data in Exhibit 2.10 of the TMP presented the 2011 actual and 2031 projected growth for the Ottawa Inner Area. The statistical data determined the population to increase at an annual average compounded growth of 0.91 percent and employment growth at 0.84 percent.

The study has therefore assumed that the background traffic would experience an annual average compounded increase of 1.0 percent. The 1.0 percent annual increase would translate to the following growth factors which were applied to all intersection approaches:

FIGURE 3.1
PEAK AM AND PM HOUR SITE GENERATED TRIPS



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Growth Factor at the Clarence/King Edward and Murray/King Edward Intersections

2016 → 2024 = 1.083 Completion
2016 → 2029 = 1.138 Completion + 5 Years

Growth Factor at the St. Patrick/King Edward Intersection

2020 → 2024 = 1.041 Completion
2020 → 2029 = 1.094 Completion + 5 Years

Element 3.2.3 – Other Developments

Other development in the area which would contribute to the increase in background traffic is the Holiday Inn Express & Suites hotel at 235 King Edward Avenue located at the corner of King Edward Avenue and St. Patrick Street. The hotel was completed in 2019 and contains 167 rooms. The expected trips to/from the site were determined using the trip generation procedure from this study, and applied to the background traffic at the Murray/King Edward and Clarence/King Edward intersections. The Holiday Inn trips were not applied to the background traffic at the St. Patrick/King Edward intersection since the background traffic was based on the 2020 traffic counts which would already include the Holiday Inn trips.

The 48 unit supportive housing project at 216 Murray Street will remove the existing Murray Street access, and replace the access with a shared access to 256 King Edward Avenue for service and garbage truck access. There would be no new auto trips accounted for in the background traffic.

The TIA report for the apartment development at 112 Nelson Street has assigned 3 vehicle trips along King Edward Avenue past the site during the peak AM and PM hour. These trips have been accounted for in the future background traffic.

Figure 3.2 presents the 2024 peak AM and PM peak hour background vehicle traffic (does not include trips from the proposed Boutique Hotel). Figure 3.3 shows the expected 2029 peak hour background traffic which represents five years beyond completion of the development.

MODULE 3.3 - Demand Rationalization

The Boutique Hotel is located in the Ottawa Inner Area in close proximity to employment, entertainment, and other amenities. The hotel would be a low trip generator adjacent to a major roadway. The expected trip demand would have a minor impact on the surrounding roadway network. The trip demand would not result in an issue with capacity of the intersections within the study area.

The total vehicular traffic is the sum of the peak hour site generated primary trips as shown in Figure 3.1, and the peak hour background traffic (Figure 3.2 for the year 2024 and Figure 3.3 for the year 2029). Figure 3.4 presents the total unbalanced 2024 peak hour vehicular traffic and Figure 3.5 the total 2029 peak hour vehicular traffic.

FIGURE 3.2
2024 PEAK AM AND PM HOUR BACKGROUND TRAFFIC

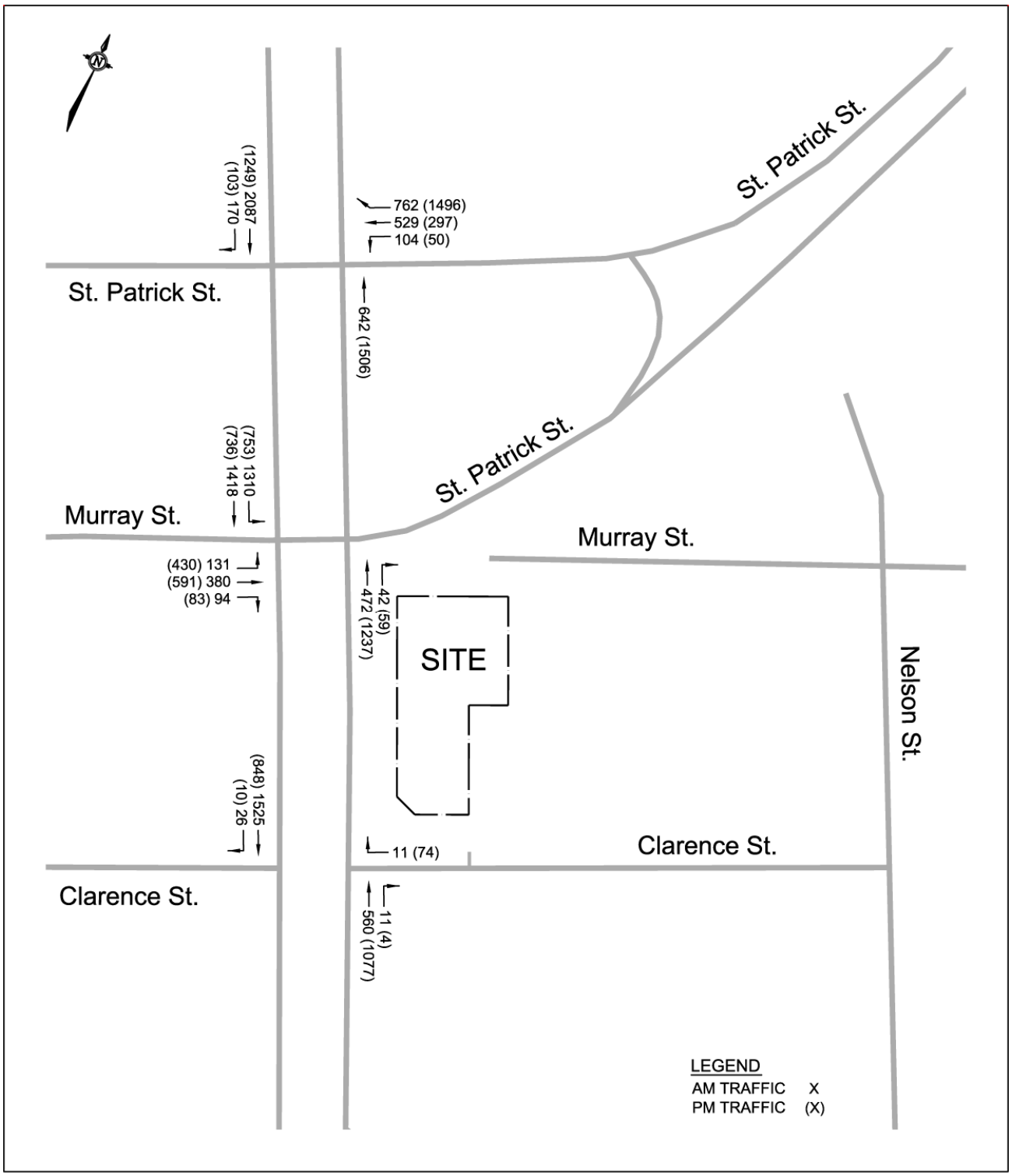

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FIGURE 3.3
2029 PEAK AM AND PM HOUR BACKGROUND TRAFFIC

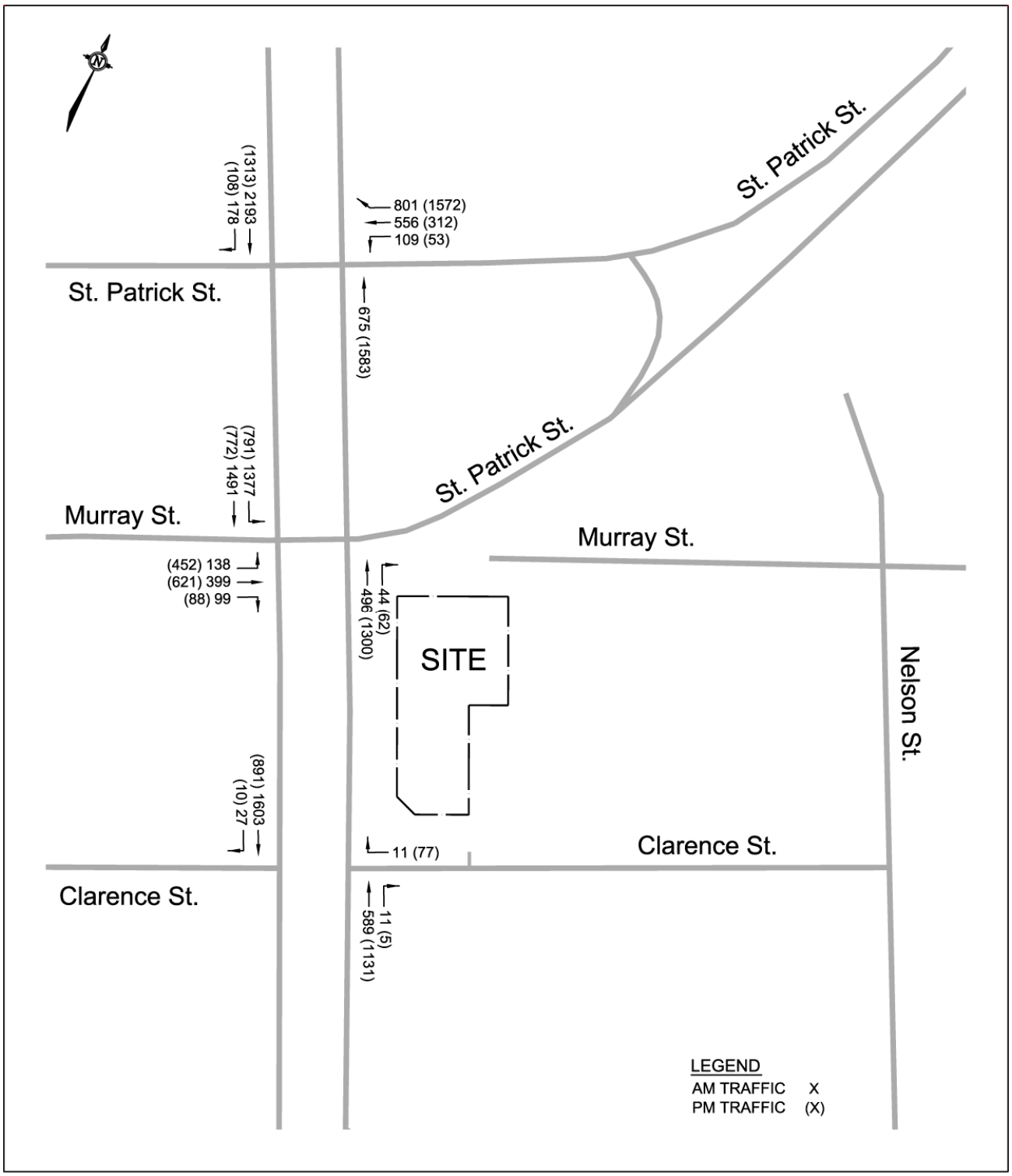

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FIGURE 3.4
2024 PEAK AM AND PM HOUR TOTAL TRAFFIC

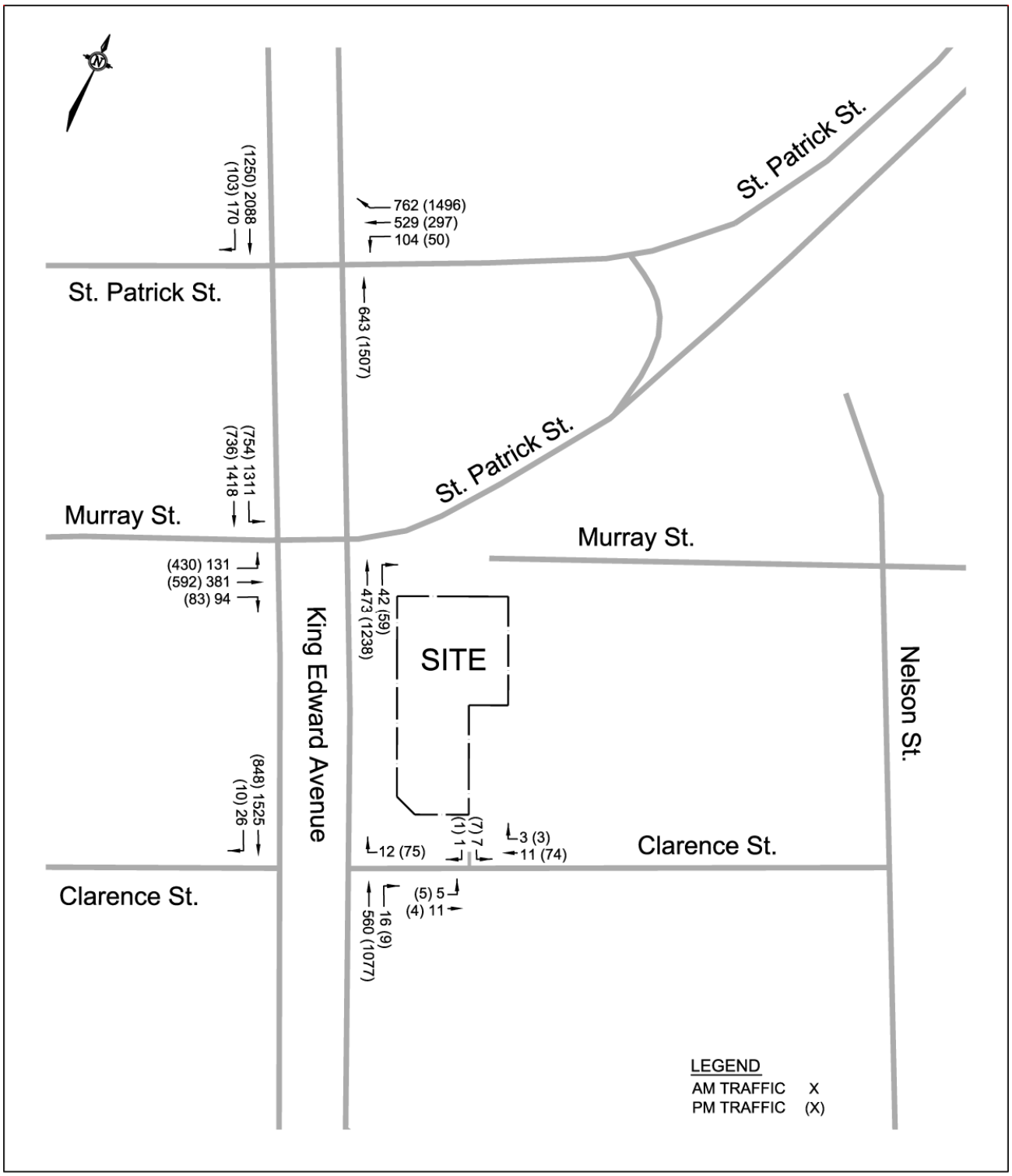

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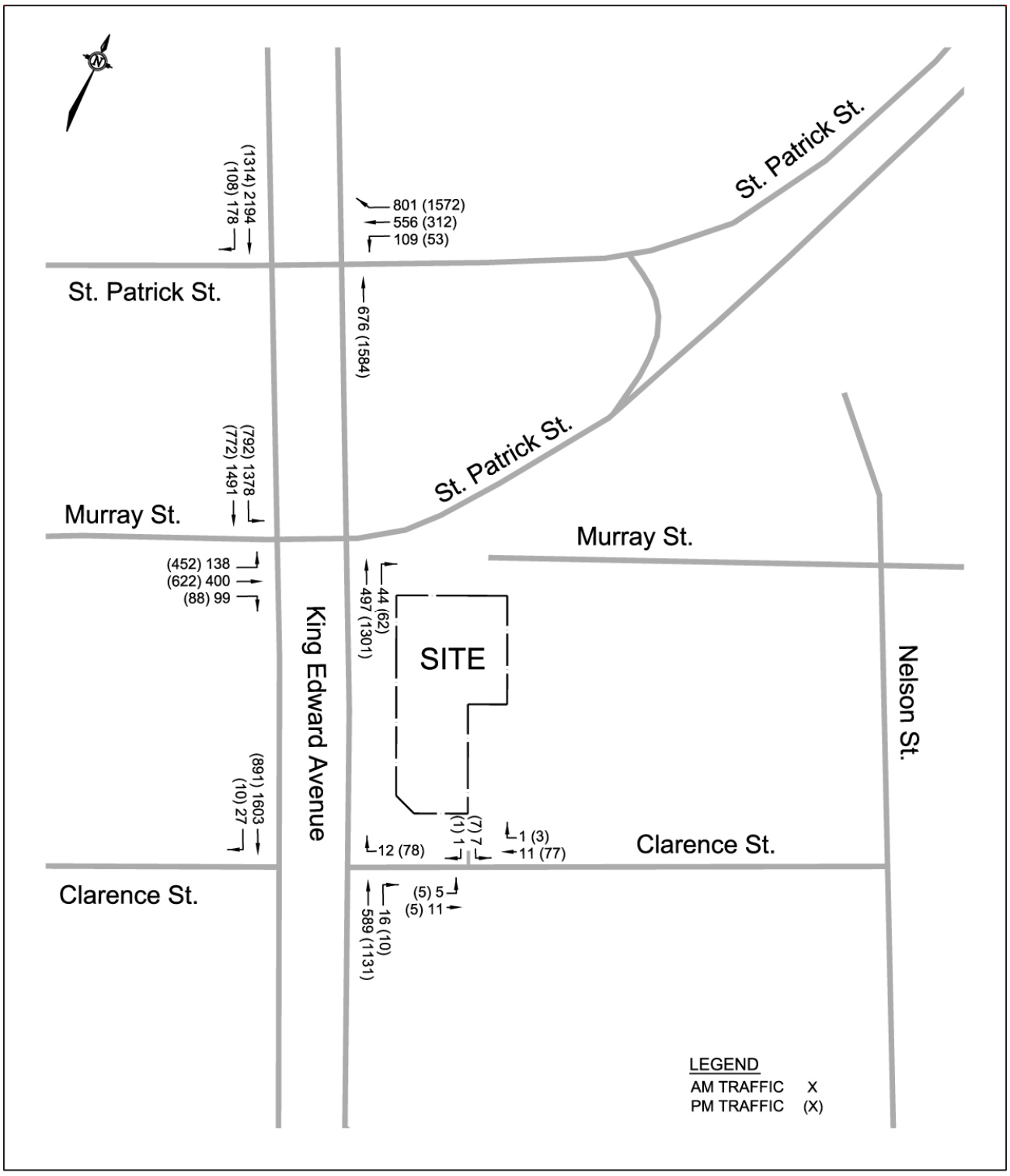
FIGURE 3.5
2029 PEAK AM AND PM HOUR TOTAL TRAFFIC



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STEP 4 – ANALYSIS

MODULE 4.1 – Development Design

Element 4.1.1 – Design for Sustainable Modes

The Boutique Hotel will be providing 49 parking spaces within the two level parking garage and an additional 2 spaces on the ground level next to the Clarence Street hotel entrance for a total of 51 parking spaces.

The site will provide bicycle storage racks for 7 bikes, 4 bike spaces at the Clarence Street entrance and 3 storage spaces close to the entrance at the north end of the building along St. Patrick Street. There will be storage for 32 bicycles on the first floor of the parking garage. The number of spaces for bicycle storage meets the City of Ottawa By-law.

All of the urban streets within the study area have pedestrian sidewalks along both sides of the road. St. Patrick Street and Murray Street west of King Edward Avenue are designated in the TMP as a Spine Route in the Cycling Network - Primary Urban.

A new sidewalk connection is proposed at the northeast corner of the site which would connect the sidewalk along the south side of Murray Street (local street east of King Edward Avenue) to the existing sidewalk along St. Patrick Street which would increase the landscaped area at the corner of the Murray/King Edward intersection. The new sidewalk connection would require the removal of a portion of the existing barrier wall. The new sidewalk will replace the existing sidewalk connection to the southeast corner of the Murray/King Edward intersection.

Transit service is provided along King Edward Avenue, Murray Street and St. Patrick Street by Routes 6 and 56. Route 6 provides peak AM and PM hour service every 15 minutes, and Route 56 peak AM hour service every 25 minutes and peak PM hour every 20 minutes. The route maps are provided in Exhibit 2.4 in the Appendix, with the bus stop locations shown in Figure 1.1.

The study has utilized the *TDM - Supportive Development Design and Infrastructure Checklist* for a Non-Residential Development which is provided below. The checklist examines the opportunity to implement facilities which are supportive of sustainable modes.

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	☒ Located next to the sidewalk
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒ Located at the corner of King Edward & Clarence
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒ Building doors located at the hotel lobby reception
	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)*	☒ Bus stops are located along the street either past the site or within a block along adjacent streets. The Rideau Centre LRT station is located approximately 1000 m from the site
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)*	☒ The building is located close to the sidewalk providing safe access to the entrance

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)*	☒ Concrete sidewalks adjacent to paving stones
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)*	☒ Sidewalks and open areas designed to City policies
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)*	☒ The site is well connected to the pedestrian sidewalk network
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒ Transit stops are easily by city sidewalks
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☒ All routes along public sidewalks are illuminated by street lights
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)*	☒ Bicycle racks are located close to the building entrance
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)*	☒ The number of bicycle parking spaces will meet the required spaces under the zoning by-laws
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)*	☒ All bike rack and bicycle storage spaces are horizontal
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)*	☒ Parking may be shared between the hotel and the restaurant
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	☒ The 134 m^2 leasable space may consist of a sit-down restaurant open to patrons of the hotel and the public

Element 4.1.2 – Circulation and Access

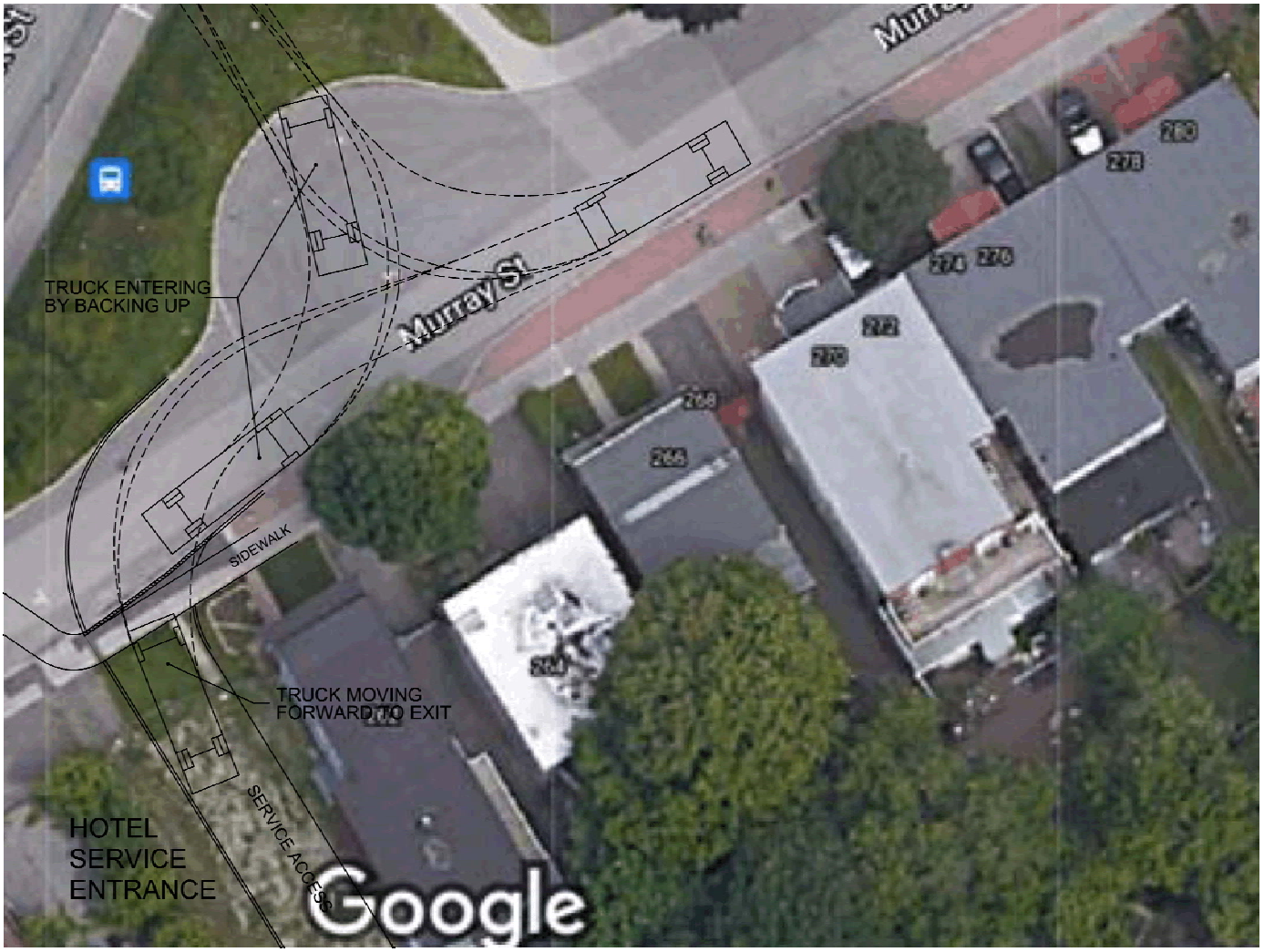
The site will have one access point to the underground parking garage. The access will be located onto Clarence Street approximately 21 m east of King Edward Avenue (centre of access to the edge of the outside curb of the northbound lane of King Edward Avenue). The entrance to the garage would be 6.0 m in width at the curb line of the street.

The ramp to the underground parking garage would be 4.3 m wide and would be restricted to one-way traffic entering and exiting the garage. The garage entrance would be secured by a garage door which would be operated by a Vehicle Priority controller with in ground detection loops which would activate traffic lights (green/red).

The traffic lights would restrict the ramp to one-way vehicle movement along the ramp to the parking garage. A similar system has been installed in Ottawa at the Henderson Square development at 65 Templeton Street.

The service entrance is from the 18 m diameter cul-de-sac at the west end of Murray Street. Service and delivery trucks would enter from Murray Street, and exit by backing up and turning around at the cul-de-sac, or they may back in if preferable. The garbage containers are kept in an enclosure next to the building. The containers are moved out of the enclosures and the garbage trucks drive in to empty, then back out to the cul-de-sac where they would turn around in a three point turn. On-street parking is prohibited within the cul-de-sac and driveway entrance to the hotel service entrance. A truck turning template is provided below showing the maneuver for a service truck backing into the hotel service entrance, and a service truck travelling forward to exit the site.

TRUCK TURNING MANEUVER INTO THE SERVICE ENTRANCE



Element 4.1.3 – New Street Networks

Exempt as determined in the Scoping Document.

MODULE 4.2 – Parking

Element 4.2.1 – Parking Supply

The Boutique Hotel development will provide 49 vehicle parking spaces in a two level parking garage with 2 surface parking spaces by the Clarence Street entrance for a total of 51 parking spaces. The City of Ottawa parking By-law requires a minimum of 35 vehicle parking spaces consisting of 27 spaces for the hotel and 8 spaces for the restaurant determined as follows:

Hotel	1 space / 2 guest suites for the first 40 suites =	20 spaces
	1 space / 12 guest suites for the balance (81) =	7 spaces
		27 spaces for 121 suites
Restaurant	5 spaces / 100 m^2 of GFA for 134 m^2	8 spaces
	TOTAL Requirement	35 spaces

The development will provide 27 bicycle storage spaces in the underground parking garage, and an additional 7 spaces in surface bike storage racks for a total of 34 available bike spaces. The City of Ottawa By-law requires a minimum of 5 bicycle parking spaces determined as follows:

1 space / 1000 m^2 of GFA = 4,888 m^2 = 5 TOTAL Required storage spaces

Element 4.2.2 – Spillover Parking

Exempt as determined in the Scoping Document.

MODULE 4.3 – Boundary Street Design

The City of Ottawa Complete Streets concept allows for the safe movement of everyone whether they choose to walk, bike, drive, or take public transit. The boundary roads to the hotel development would consist of King Edward Avenue which borders the west side of the site, Murray Street a one-way eastbound street and St. Patrick Street a one-way westbound street. King Edward Avenue is designated as an arterial road with an urban divided cross section and a posted speed limit of 40 km./h. past the site. Murray Street and St. Patrick Street are both designated as arterial roads with an urban cross section and are both restricted to one-way traffic.

The multi-modal level of service for the King Edward Avenue street segment between Clarence Street and St. Patrick Street, and Murray Street and St. Patrick Street were determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The following examined the MMLOS for the various modes of travel along the King Edward Avenue, Murray Street and St. Patrick Street street segments.

King Edward Avenue - Clarence Street to St. Patrick Street

PEDESTRIAN LEVEL OF SERVICE (PLOS)

Sidewalks exist on both the east and west sides of King Edward Avenue. Sidewalks on King Edward Avenue along the road segment between Clarence Street and St. Patrick Street consists of a 1.5 m sidewalk and 1.5 m boulevard. The hotel site between Clarence Street and Murray Street will provide a 1.2 m boulevard, 2.0 m sidewalk, and a paving stone landscaped area as the boulevard, and between the sidewalk and building face.

The pedestrian Level of Service (PLOS) for the King Edward Avenue road segment as determined in the City of Ottawa *Multi-Modal Level of Service (MMLOS) Worksheet* was a PLOS "C". The worksheet is provided as Exhibit 4.1 in the Appendix.

BICYCLE LEVEL OF SERVICE (BLOS)

King Edward Avenue is designated as an arterial road in the City of Ottawa *Transportation Master Plan* (TMP). The TMP does not identify King Edward Avenue as a cycling Spine Route. There are no designated cycling lanes along King Edward Avenue. The southbound lanes designate a transit priority lane between 3:30 PM and 5:30 PM Monday to Friday which is a shared bus/bike lane. The MMLOS Worksheet shown in Exhibit 4.1 determined the road segment to function at a BLOS "E".

TRANSIT LEVEL OF SERVICE (TLOS)

OC Transpo provides service along King Edward Avenue past the site with bus stops for Route 56 located across from the site for southbound service, and approximately 100 m from the site at the York/King Edward intersection for northbound service. The location of the bus stops are shown in Figure 2.1 with the transit route schedule provided as Exhibit 2.4.

The street segment was determined to function at a TLOS "D" which was mainly attributed to the travel time delay and mixed traffic along King Edward Avenue. The bus priority lane along the southbound lanes was not considered in the analysis since it was designated only during peak PM hours Monday to Friday. The MMLOS Worksheet is provided as Exhibit 4.1.

TRUCK LEVEL OF SERVICE (TkLOS)

The street segment past the site was determined to function at a TkLOS "A" for trucks as shown in the Appendix as Exhibit 4.1.

Murray Street - Cumberland Street to Beausoleil Drive

PEDESTRIAN LEVEL OF SERVICE (PLOS)

Murray Street has sidewalks along both sides of the road which are adjacent to the curb between Cumberland Street and King Edward Avenue. Between King Edward Avenue and Beausoleil Drive there is a sidewalk adjacent to the curb on the north side of the road which terminates 100 m east of King Edward Avenue. There is a sidewalk on the south side which is adjacent to the curb for a distance of 60 m east of King Edward Avenue, then continues with a boulevard between the sidewalk and travel lane to Beausoleil Drive. The pedestrian Level of Service (PLOS) for the Murray Street road segment as determined in the City of Ottawa *Multi-Modal Level of Service (MMLOS) Worksheet* was a PLOS "E". The worksheet is provided as Exhibit 4.2 in the Appendix.

BICYCLE LEVEL OF SERVICE (BLOS)

Murray Street is designated as a Spine Route in the TMP. There are no cycling facilities along the road. On-street parking is prohibited along the road segment. The MMLOS Worksheet in Exhibit 4.2 determined the segment to function at a BLOS "E".

TRANSIT LEVEL OF SERVICE (TLOS)

OC Transpo Route 6 travels along Murray Street past the site. Transit Route 6 travels along Murray Street for eastbound service with bus stops within a couple of blocks of the site. The location of the bus stops are shown in Figure 2.1 with the transit route schedule provided as Exhibit 2.4. The street segment was determined to function at a TLOS "D" which was mainly attributed to the travel time delay and mixed traffic along King Edward Avenue. The MMLOS Worksheet is provided as Exhibit 4.2.

TRUCK LEVEL OF SERVICE (TkLOS)

The street segment along Murray Street was determined to function at a TkLOS "A" for trucks as shown in the Appendix as Exhibit 4.2.

St. Patrick Street - Beausoleil Drive to Cumberland Street

PEDESTRIAN LEVEL OF SERVICE (PLOS)

St. Patrick Street has a sidewalk with a boulevard along the north side of the road between Beausoleil Drive and King Edward Avenue. Between King Edward Avenue and Cumberland Street there are sidewalks on both sides of the street adjacent to the curb. The pedestrian Level of Service (PLOS) for the St. Patrick Street road segment was a PLOS "D". The worksheet is provided as Exhibit 4.3 in the Appendix.

BICYCLE LEVEL OF SERVICE (BLOS)

St. Patrick Street is a westbound one-way street designated as a Spine Route in the TMP. There are no cycling facilities along the road. On-street parking is prohibited along the road segment between Beausoleil Drive and King Edward Avenue. Parking is permitted along both the north and south sides of St. Patrick Street between King Edward Avenue and Cumberland Street. The MMLOS Worksheet shown in Exhibit 4.2 determined the segment to function at a BLOS "E".

TRANSIT LEVEL OF SERVICE (TLOS)

OC Transpo Route 6 travels westbound along St. Patrick Street. Transit Route 6 travels along Murray Street for eastbound service to the downtown core and Rideau Centre LRT Station. The Route 6 bus stop is located at the Cumberland/St. Patrick intersection located approximately 350 m from the site. The location of the bus stops are shown in Figure 2.1 with the transit route schedule provided as Exhibit 2.4. The street segment was determined to function at a TLOS "D" which was mainly attributed to the travel time delay and mixed traffic along King Edward Avenue. The MMLOS Worksheet is provided as Exhibit 4.3.

TRUCK LEVEL OF SERVICE (TkLOS)

The street segment along St. Patrick Street was determined to function at a TkLOS "A" for trucks as shown in the Appendix as Exhibit 4.3.

Traffic collisions along the King Edward Avenue street segment between Clarence Street and St. Patrick Street are shown in Table 2.1 in Element 2.1.2. Over the five year period between January 1, 2015 and December 31, 2019, 10 collisions were recorded along the King Edward Avenue road segment. Of the 10 collisions, 5 were labeled sideswipe with 3 of the sideswipe collisions occurring in 2016. The pattern of collisions did not identify any measures which could be taken to reduce the number of collisions.

The King Edward Avenue, Murray Street and St. Patrick Street road segments were analyzed to determine the level of service which was compared to the MMLOS targets for pedestrians, bicycles, and transit. The calculated Level of Service (LOS) was determined using the Multi-Modal Level of Service Worksheet provided as Exhibit 4.1 in the Appendix. The LOS targets were obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines* for a Traditional Mainstreet as designated in the Official Plan - Urban Policy Plan. Table 4.1 summarizes the MMLOS results for the road segments and targets.

TABLE 4.1
MULTI-MODAL (MMLOS) SEGMENT SUMMARY TABLE

STREET SEGMENT	Level of Service (LOS) – 2029				
	Pedestrian	Bicycle	Transit	Auto	Truck
King Edward Avenue					
Calculated	C	E	D	N/A	A
Target	B	D	D	N/A	D
Murray Street					
Calculated	E	E	D	N/A	A
Target	C	C	D	N/A	D
St. Patrick Street					
Calculated	D	E	D	N/A	A
Target	C	C	D	N/A	D

The pedestrian LOS (PLOS) did not meet the target due to the volume of traffic along King Edward Avenue, Murray Street and St. Patrick Street. If possible, decreasing the traffic would allow the road segment to meet the PLOS target for King Edward Avenue, Murray Street and St. Patrick Street.

The lower level of the bicycle LOS (BLOS) was due to the number of roadway lanes, volume of traffic and speed of vehicles. The level of service would be met along King Edward Avenue and improved along Murray Street and St. Patrick Street by constricting a curbside bike lane.

The transit level of service (TLOS) meets the target value.

The truck level of service (TkLOS) meets the target value.

MODULE 4.4 – Access Intersection Design

Element 4.4.1 – Location and Design of Access

The main access to the site would be a full movement access located on the north side of Clarence Street approximately 21 m from the centre of the access to the curb line of the northbound King Edward Avenue lanes. The access would be 6.0 m in width and would provide access to an underground parking garage. There are two surface parking spaces at the site access which are short term spaces for guest check-in. The access provides approximately 14 m of queuing space (2 vehicles) between the sidewalk and the card reader for the garage door which would be sufficient to contain all vehicles to queue within the site. There is an existing driveway directly across the street on the south side of Clarence Street which provides access to apartment buildings on Clarence Street.

There is a service access at the north side of the building which would be restricted to garbage trucks and service vehicles. The access would be located onto the west side of the cul-de-sac on Murray Street which is designated as a local street.

Element 4.4.2 – Intersection Control

The site access will be a private driveway onto Clarence Street. The access would be a full movement access controlled by a stop sign at the southbound exit approach.

The intersection of Clarence Street and King Edward Avenue is a right-in/right-out "T" intersection. The intersection would be a two-way stop-controlled intersection with Clarence Avenue forming the westbound stop approach.

Both the Murray/King Edward and St. Patrick/King Edward intersections are controlled by traffic signals.

Isolated transit priority measures are already in place along the King Edward Avenue southbound lanes which designated the outside lane to shared transit/bicycles between 3:30 PM and 5:30 PM Monday to Friday. The TMP has identified under Network Concept transit signal priority along King Edward Avenue between Sussex Drive and Rideau Street which will complement the existing southbound transit priority lanes.

Element 4.4.3 – Intersection Design

The analysis of the Clarence/King Edward, Murray/King Edward and St. Patrick/King Edward intersections were completed for all modes using the *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Highway Capacity Manual (HCM) 2010*. Each mode will be addressed in the following sections:

VEHICLE LEVEL OF SERVICE (LOS) – Intersection Capacity Analysis

The analysis of the intersections will use the *Highway Capacity Software, Version 7.9.5,* which uses the capacity analysis procedure as documented in the *Highway Capacity Manual (HCM) 2010 and HCM 6th Edition*.

For unsignalized intersections, the level of service of each lane movement and approach is determined as a function of the average control delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected control delay at the approach.

LEVEL OF SERVICE	AVERAGE CONTROL DELAY	
Level of Service A	0-10 sec./vehicle	Little or No Delay
Level of Service B	>10-15 sec./vehicle	Short Traffic Delays
Level of Service C	>15-25 sec./vehicle	Average Traffic Delays
Level of Service D	>25-35 sec./vehicle	Long Traffic Delays
Level of Service E	>35-50 sec./vehicle	Very Long Traffic Delays
Level of Service F	>50 sec./vehicle	Extreme Delays – Demand Exceeds Capacity

The expected length of queue at the critical lane movements for an unsignalized intersection was determined by the calculation of the 95th percentile queue at the lane approach as shown on the analysis work sheets provided in the Appendix. The 95th percentile queue length is the calculated 95th greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95th percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicles.

For a signalized intersection, the operation or level of service of an intersection is determined from the volume to capacity ratio (v/c) for each lane movement as documented by the City of Ottawa in the *Transportation Impact Assessment Guidelines (2017)*. The following relates the level of service with the volume to capacity ratio at each lane movement.

LEVEL OF SERVICE	VOLUME TO CAPACITY RATIO
Level of Service A	0 to 0.60
Level of Service B	0.61 to 0.70
Level of Service C	0.71 to 0.80
Level of Service D	0.81 to 0.90
Level of Service E	0.91 to 1.00
Level of Service F	> 1.00

The results of the analysis are discussed in detail in the following sections:

Clarence Street and King Edward Avenue Intersection

The Clarence/King Edward Intersection is a right-in/right/out "T" intersection controlled by a centre median along King Edward Avenue. The intersection is a two-way stop-controlled intersection with a stop sign at the westbound Clarence Street approach.

The operational analysis determined that using the 2016 traffic counts, the intersection would function at a LOS "B" during the peak AM hour and a LOS "C" during the peak PM hour. The operation of the intersection is summarized in Table 4.2 with the 2016 analysis sheets provided as Exhibit 4.4 and 4.5.

TABLE 4.2
CLARENCE/KING EDWARD INTERSECTION – LOS & Delay (sec/veh)

APPROACH	**WEEKDAY PEAK AM HOUR** Existing - 2016 **Background - 2024** *2029* **Total - *2024*** (2029)		**WEEKDAY PEAK PM HOUR** Existing - 2016 **Background - 2024** *2029* **Total - *2024*** (2029)	
	LOS	**Approach Delay**	**LOS**	**Approach Delay**
WB Right	B **B** *B* ***B*** (B)	10.1 **10.3** *10.4* ***10.4*** (10.5)	C **C** *C* ***C*** (C)	15.4 **16.6** *17.4* ***16.7*** (17.5)

The intersection would continue to operate at a LOS “B” during the peak AM hour and LOS “C” during the peak PM hour for the 2024 background and total traffic when the development is expected to be completed, and during the 2029 background and total analysis periods. Table 4.2 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 4.6 to Exhibit 4.13.

The 95th percentile queue at the westbound Clarence Street approach would be 0.9 vehicles (7 m) during the peak PM hour. The queue would not interfere with the operation of the site access to the parking garage.

The intersection would operate at an acceptable level of service following the development of the site. There would be no requirement for any intersection modification due to the hotel development.

Murray Street and King Edward Avenue Intersection

The intersection of Murray Street and King Edward Avenue is controlled by traffic signals with King Edward Avenue forming the northbound and southbound approaches, and Murray Street the eastbound approach.

The operational analysis using the 2016 traffic counts determined that the intersection functioned at a LOS “A” during the peak AM hour and a LOS “B” during the peak PM hour. Table 4.3 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 4.14 for the peak AM hour and Exhibit 4.15 for the peak PM hour.

TABLE 4.3
MURRAY/KING EDWARD INTERSECTION – LOS & v/c

APPROACH	**WEEKDAY PEAK AM HOUR** Existing - 2016 **Background - 2024** *2029* **Total - *2024*** (2029)		**WEEKDAY PEAK PM HOUR** Existing - 2016 **Background - 2024** *2029* **Total - *2024*** (2029)	
	LOS	**v/c**	**LOS**	**v/c**
EB Left	A **A** *A* ***A*** (A)	0.496 **0.502** *0.508* ***0.501*** (0.507)	D **D** *D* ***D*** (D)	0.878 **0.891** *0.901* ***0.891*** (0.901)
EB Through	D **D** *D* ***D*** (D)	0.813 **0.827** *0.834* ***0.827*** (0.835)	B **B** *B* ***B*** (B)	0.684 **0.695** *0.703* ***0.696*** (0.704)
EB Right	D **D** *D* ***D*** (D)	0.835 **0.845** *0.850* ***0.845*** (0.851)	B **B** *B* ***B*** (B)	0.688 **0.697** *0.705* ***0.698*** (0.706)
NB Through	A **A** *A* ***A*** (A)	0.425 **0.517** *0.543* ***0.518*** (0.544)	D **D** *E* ***D*** (E)	0.831 **0.906** *0.952* ***0.907*** (0.953)
NB Right	A **A** *A* ***A*** (A)	0.434 **0.528** *0.554* ***0.529*** (0.555)	D **D** *E* ***D*** (E)	0.831 **0.906** *0.952* ***0.907*** (0.953)
SB Left	D **E** *E* ***E*** (E)	0.872 **0.921** *0.984* ***0.922*** (0.986)	E **E** *F* ***E*** (F)	0.838 **0.980** *1.082* ***0.982*** (1.084)
SB Through	A **A** *A* ***A*** (A)	0.434 **0.480** *0.510* ***0.480*** (0.511)	A **A** *A* ***A*** (A)	0.408 **0.462** *0.496* ***0.462*** (0.496)
Total	A **B** *B* ***B*** (B)	0.565 **0.621** *0.656* ***0.621*** (0.656)	B **C** *C* ***C*** (C)	0.679 **0.742** *0.782* ***0.742*** (0.783)

At the year 2024 when the hotel development is expected to be completed and at 2029 which is five years beyond completion, the intersection would function at a LOS "B" during the peak AM hour and LOS "C" during the peak PM hour for both the background traffic (without site trips) and total traffic which includes the site generated trips. The analysis of the intersection is shown in Table 4.3 and Exhibits 4.16 to 4.23.

All analysis scenarios used the existing lane configuration and traffic signal timing plan with no modifications to signal timing. The intersection would operate at an acceptable level of service following the development of the site. There would be no requirement for any intersection modification due to the development of the site.

St. Patrick Street and King Edward Avenue Intersection

The intersection of St. Patrick Street and King Edward Avenue is controlled by traffic signals with King Edward Avenue forming the northbound and southbound approaches and St. Patrick Street the westbound approach.

The operational analysis was conducted for the existing 2020 traffic counts, and the 2024 and 2029 background and total traffic. The analysis determined that for all scenarios, the intersection functioned at a LOS "A" as shown in Table 4.4. The analysis sheets are provided as Exhibit 4.24 to Exhibit 4.33.

TABLE 4.4
ST. PATRICK/KING EDWARD INTERSECTION – LOS & v/c

APPROACH	**WEEKDAY PEAK AM HOUR** Existing - 2020 **Background - 2024** *2029* **Total -** ***2024*** (2029)		**WEEKDAY PEAK PM HOUR** Existing - 2020 **Background - 2024** *2029* **Total -** ***2024*** (2029)	
	LOS	**v/c**	**LOS**	**v/c**
WB Left	D **D** *D* ***D*** (D)	0.881 **0.886** *0.892* ***0.886*** (0.892)	C **D** *D* ***D*** (D)	0.807 **0.813** *0.820* ***0.813*** (0.820)
WB Through	C **C** *D* ***C*** (D)	0.800 **0.805** *0.811* ***0.805*** (0.811)	C **C** *C* ***C*** (C)	0.727 **0.733** *0.740* ***0.733*** (0.740)
NB Through	A **A** *A* ***A*** (A)	0.484 **0.516** *0.560* ***0.517*** (0.561)	B **B** *C* ***B*** (C)	0.641 **0.673** *0.716* ***0.673*** (0.716)
SB Through	A **A** *A* ***A*** (A)	0.444 **0.466** *0.494* ***0.466*** (0.494)	A **A** *A* ***A*** (A)	0.252 **0.263** *0.277* ***0.263*** (0.277)
SB Right	A **A** *A* ***A*** (A)	0.426 **0.452** *0.488* ***0.453*** (0.488)	A **A** *A* ***A*** (A)	0.215 **0.228** *0.244* ***0.228*** (0.244)
Total	A **A** *A* ***A*** (A)	0.329 **0.514** *0.546* ***0.515*** (0.546)	A **A** *A* ***A*** (A)	0.384 **0.401** *0.425* ***0.402*** (0.425)

The existing, background and total 2024 and 2029 analysis scenarios used the existing lane configuration and traffic signal timing plan with no modifications to signal timing. The intersection would operate at an acceptable level of service following the

development of the site. There would be no requirement for any intersection modification due to the hotel development.

The MMLOS level of service was determined for all modes utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Multi-Modal Level of Service (MMLOS) Worksheet*. The multi-modal level of service for intersections was examined for the signalized Murray/King Edward and St. Patrick/King Edward intersections utilizing the 2029 traffic and roadway geometry.

PEDESTRIAN LEVEL OF SERVICE (PLOS) - Intersection Capacity Analysis

Both the Murray/King Edward and St. Patrick/King Edward intersections have pedestrian activated traffic signals. The Murray/King Edward intersection has a pedestrian cross walk at the south, east and west approaches. The St. Patrick/King Edward intersection has pedestrian cross walks at all intersection approaches including the westbound channelized right turn approach.

The MMLOS analysis worksheet provided as Exhibit 4.34 determined both intersections to have a PLOS “F”. The low level of service is mainly attributed to the number of lanes crossed by pedestrians.

BICYCLE LEVEL OF SERVICE (BLOS) - Intersection Capacity Analysis

There are no bike lanes along King Edward Avenue, Murray Street and St. Patrick Street. There is a shared bus priority lane along southbound King Edward Avenue between 3:30 PM and 5:30 PM Monday to Friday. Murray Street and St. Patrick Street are both designated as Spine Routes in the City of Ottawa TMP.

The MMLOS worksheet analysis provided in Exhibit 4.34 determined the Murray/King Edward intersection to function at a BLOS ”E” and the St. Patrick/King Edward intersection at a BLOS “F”. The lower level of service is mainly attributed to the lack of dedicated cycling facilities and the number of lanes to be crossed in making a left turn movement.

TRANSIT LEVEL OF SERVICE (TLOS) - Intersection Capacity Analysis

OC Transpo provides transit service along King Edward Avenue with Route 56, and along Murray Street and St. Patrick Street with Route 6. Both intersections determined a TLOS “D” which meets target as shown in Exhibit 4.34. King Edward Avenue in the vicinity of the development does have a transit priority lane along the southbound lanes during the weekday PM time period.

TRUCK LEVEL OF SERVICE (TkLOS) - Intersection Capacity Analysis

The analysis determined the Murray/King Edward intersection to have a TkLOS “D” and the St. Patrick/King Edward intersection to have a TkLOS “B” which meets the MMLOS target. The analysis sheet is provided as Exhibit 4.34.

INTERSECTION MMLOS SUMMARY

The Murray/King Edward and St. Patrick/King Edward intersections were analyzed to determine the level of service which was compared to the MMLOS targets for pedestrians, bicycles, trucks, transit and autos. The calculated Level of Service (LOS) was determined using the *Multi-Modal Level of Service Worksheet* provided as Exhibit 4.34 in the Appendix, and the *Highway Capacity Software, Version 7.9.5* for the vehicle LOS. The LOS targets were obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines* for a Traditional Mainstreet as designated in the Official Plan - Urban Policy Plan. Table 4.5 summarizes the MMLOS results for the intersections and targets.

TABLE 4.5
MULTI-MODAL (MMLOS) INTERSECTION SUMMARY TABLE

INTERSECTION	Level of Service (LOS) – 2029				
	Pedestrian	Bicycle	Transit	Auto	Truck
Murray/King Edward					
Calculated	F	E	D	C	D
Target	B	D	D	D	D
St. Patrick/King Edward					
Calculated	F	F	D	A	B
Target	B	D	D	D	D

The pedestrian level of service (PLOS) did not meet the target mainly due to the number of lanes crossed by pedestrians at the intersections.

The lower bicycle level of service (BLOS) was due to the mixed use traffic along the road and the number of lanes crossed in making a left turn movement at the intersections. The level of service would be improved by providing a dedicated cycling lane or physically separating the cycling lane from the travel lanes.

The transit level of service (TLOS) meets the target value.

The auto or vehicle level of service (LOS) meets the target value

The truck level of service (TkLOS) meets the target value.

If the pedestrian and bicycle level of service targets are not achieved, the result would be a minor increase in delay for the crossing of pedestrians and cyclists at the Murray/King Edward and St. Patrick/King Edward intersections.

MODULE 4.5 – Transportation Demand Management

Element 4.5.1 – Context for TDM

The hotel development is located on King Edward Avenue, a divided arterial road with mainly commercial uses and a hotel at the St. Patrick/King Edward intersection. To the east of the development the uses are mainly apartment/multi-family residential with some commercial.

The study has distributed the expected site trips following an examination of the existing traffic counts taken at adjacent intersections, and origin-destination surveys for the Ottawa-Carleton region. With the low number of site generated trips, site trips higher than expected would have a very minor impact along King Edward Avenue and the residential area east of the proposed development. Any additional trips would not trigger the need for additional TDM measures to be implemented.

Element 4.5.2 – Need and Opportunity

The hotel development would not require a program to promote various mode shares as the development is close to the downtown core with available transit routes and pedestrian/cycling facilities which would promote the use of alternative modes of travel. The site does provide parking which exceeds the By-law requirements which would eliminate spillage of parking onto the surrounding neighbourhood.

Element 4.5.3 – TDM Program

TDM measures could be implemented to encourage travel by sustainable modes which would be applied to the hotel development. The TDM measures which would reduce the number of vehicle trips would consist of the encouragement of transit by providing transit schedules/routes maps and short term transit passes to patrons when they are checking into the hotel.

The study has utilized the TDM Measures Checklist for a Non-Residential Development which examines the implementation of facilities that are supportive of sustainable modes. The following provides the checklist which examines the Site Plan and transportation components for the proposed hotel development.

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	☒ Walking/cycling maps can be made available in the lobby
	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	☒ Transit Maps can be made available in the lobby and/or at check-in
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	☒ Preloaded PRESTO cards could be provided at check-in of the hotel
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)	☒ Parking charges could be part of the check-in
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)	☒ On-site parking could be charged which may reduce vehicle trips from visitors

			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	☐

MODULE 4.6 – Neighbourhood Traffic Management

Element 4.6.1 – Adjacent Neighbourhoods

The Boutique Hotel has the main access onto Clarence Street which is designated in the TMP as a local street. Hotel trips generated by the site would travel along Clarence Street to King Edward Avenue, or along Clarence Street to Nelson Street and then to Rideau Street. Nelson Street is also designated as a local street.

Traffic counts taken in 2016 along Clarence Street showed the average 24 hour count to be 435 vehicles. The addition of the expected site trips would not increase vehicular traffic beyond the maximum threshold of a local street. Nelson Street would have a similar volume of traffic at the north end which is predominately residential, but may increase at the approach to the signalized Nelson/Rideau intersection due to the commercial uses close to Rideau Street. The impact of expected trips from the site would be minor and would not change the existing classification of the surrounding streets.

MODULE 4.7 - Transit

Element 4.7.1 – Route Capacity

The site is well served by OC Transpo bus routes. With the number of expected transit person trips to be low, it would be doubtful if the number of site generated transit trips would determine the need to provide additional capacity to the existing transit routes.

Element 4.7.2 – Transit Priority

Transit priority measures are already in place along King Edward Avenue. The transit priority measures would reduce transit travel time and increases reliability along King Edward Avenue. The TMP has identified as a Network Concept the installation of signal priority along King Edward Avenue between Sussex Drive and Rideau Street which will complement the existing southbound bus lane.

MODULE 4.8 – Review of Network Concept

Exempt as determined in the Scoping Document.

MODULE 4.9 – Intersection Design

Element 4.9.1 – Intersection Control

Three intersections were examined in the TIA study. The Murray/King Edward and the St. Patrick/King Edward intersections located north of the site are both controlled by traffic signals. The third intersection is Clarence/King Edward which is restricted to right-in/right-out turning movements. The intersection is a “T” intersection controlled by

a stop sign at the westbound Clarence Street (local street) approach. There would be no requirement to change the method of traffic controls at the intersections.

Isolated transit priority measures are already in place along the southbound lanes of King Edward Avenue past the site.

Element 4.9.2 – Intersection Design

The Clarence/King Edward, Murray/King Edward and St. Patrick/King Edward intersections were all examined utilizing the *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Highway Capacity Software, Version 7.9.5,* which uses the capacity analysis procedure as documented in the *Highway Capacity Manual (HCM) 2010 and HCM 6th Edition*.

The intersections were analyzed in Element 4.4.3 - Intersection Design to determine the level of service for each mode of travel. The level of service was completed for the existing traffic counts, background traffic, and total traffic at all three intersections. The analysis years were at the completion of the hotel in 2024 and at five years beyond completion in 2029.

The calculated 2029 level of service was compared to the level of service targets listed in Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines*. The MMLOS for each signalized intersection is presented in Table 4.5 - MULTI-MODAL (MMLOS) INTERSECTION SUMMARY TABLE contained in this study report.

The following summarizes the calculated 2029 operation of the Murray/King Edward and St. Patrick/King Edward intersections, and the factors for why they have not met targets for all modes:

Pedestrian (PLOS) - The pedestrian level of service did not meet target due to the number of lanes crossed by pedestrians at the intersections.

Bicycle (BLOS) - The bicycle level of service did not meet target due to the mixed use traffic along the roads (no separate cycling lane), and the number of lanes crossed in making a left turn movement at intersections.

Transit (TLOS) - The transit level of service met the MMLOS target.

Auto (LOS) - The vehicle level of service met the MMLOS target.

Truck (TkLOS) - The truck level of service met the MMLOS target.

SUMMARY

A Site Plan has been prepared for the development of a 1,590 m^2 parcel of land at 275 King Edward Avenue. The site is located at the northeast corner of the intersection of King Edward Avenue and Clarence Street. The Site Plan proposes the land to be developed as an all suites hotel.

The site proposal would contain one 8 storey building which will provide 121 hotel suites for short and long term stays. The site will also contain a 134 m^2 leasable area on the ground floor which would possibly be a high-turnover sit-down restaurant servicing patrons of the hotel and general public. The site would have one access point to an underground parking garage with access onto Clarence Street. The centre of the access will be located approximately 21 m east of the outside curb of the northbound King Edward Avenue lanes. The garage will contain 76 parking spaces with an additional 2 short term surface parking spaces for hotel check in. The hotel development is expected to be completed and occupied by the year 2024.

The Transportation Impact Assessment report has established a study area which would include the King Edward Avenue, Murray Street and St. Patrick Street road segments, and the Clarence/King Edward, Murray/King Edward and St. Patrick/King Edward intersections. The operational analysis will be conducted for the weekday peak AM and PM hours at the completion of the hotel development in 2024, and at five years beyond completion at the year 2029. The TIA analysis has examined all modes of transportation along the road segments and the intersections within the study area. The transportation analysis has determined the following:

1. The proposed hotel development would consist of 121 all suites units. The hotel plus restaurant uses are expected to generate 8 vehicle trips arriving and 8 vehicle trips departing for a total of 16 trips during both the weekday peak AM hour and PM hour.

2. The development would provide 2 surface parking spaces and 49 spaces in an underground parking garage for a total of 51 parking spaces. Bicycle racks for the storage of 7 bikes will be provided close to the building entrance, plus additional racks for 32 bikes in the parking garage. The number of parking spaces provided for vehicles and bikes meet City of Ottawa By-laws.

3. The site access onto Clarence Street would have a width of 6.0 m and would provide full movement access. The vehicle analysis determined that the expected vehicular queuing at the westbound Clarence Street approach to the Clarence/King Edward intersection would not extend and block the access to the hotel parking garage.

4. The MMLOS analysis of the King Edward Avenue, Murray Street and St. Patrick Street street segments determined that the transit TLOS and the truck TkLOS met the MMLOS targets, but the pedestrian PLOS and bicycle BLOS targets

were not met. The low level of service of the PLOS and BLOS was attributed to the number of travel lanes and the volume and speed of traffic along King Edward Avenue. The hotel development would have a minor impact on the level of service of the road segment with no requirement for modifications to King Edward Avenue.

5. The MMLOS analysis examined the operation of the signalized intersections of Murray/King Edward and St. Patrick/King Edward. The 2029 analysis determined that the transit TLOS, auto LOS and truck TkLOS met the MMLOS targets. The pedestrian PLOS and bicycle BLOS did not meet the target due to the number of lanes crossed by pedestrians at intersections, and the mixed use traffic and the number of lanes bicycles crossed in making left turn movements at intersections. The BLOS could be improved by the provision of exclusive bike lanes along the road. The hotel development would have a minor impact on the level of service of the intersections within the study area. There would be no requirement for intersection modifications due to the hotel development.

6. The Clarence/King Edward intersection is a two-way stop controlled intersection with a stop sign at the westbound Clarence Street approach. The intersection was determined to function at an acceptable level of service following the development of the site. There would be no requirement for intersection modifications due to the hotel development.

Prepared by:

David J. Halpenny, M. Eng., P. Eng.

APPENDIX

CERTIFICATION FORM

SCREENING FORM

TRAFFIC COUNTS

OC TRANSPO BUS ROUTES

ITE TRIP GENERATION GRAPHS

MMLOS ROAD SEGMENT ANALYSIS WORKSHEET

HCM OPERATIONAL ANALYSIS WORKSHEETS

MMLOS INTERSECTION ANALYSIS WORKSHEET

EXHIBIT 1.1
CERTIFICATION FORM

Certification Form for TIA Study PM

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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

Dated at Ottawa (City) this 2nd day of September, 20 21.

Name : David J. Halpenny

Professional title: President, D. J. Halpenny & Associates Ltd.

D J Halpenny

Signature of individual certifier that s/he meets the above criteria

Office Contact Information (Please Print)	
Address:	P.O. Box 774
City / Postal Code:	Manotick ON K4M 1A7
Telephone / Extension:	613-692-8662
E-Mail Address:	David@DJHalpenny.com

Stamp

EXHIBIT 1.2
SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**275 King Edward Avenue, Ottawa**
Description of Location	Boutique Hotel - northeast corner of Clarence St. & King Edward Ave.
Land Use Classification	"TM 12 + TM (Mature Neighborhood Overlay)" Zoning - Traditional Mainstreet
Development Size (units)	121 Hotel Suites and 134 m^2 retail/commercial
Development Size (m^2)	1,574 m^2 Lot Area
Number of Accesses and Locations	Entrance from Clarence St. Service entrance from Murray St.
Phase of Development	Single Phase of development
Buildout Year	2024

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

2. Trip Generation Trigger

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

Land Use Type	Minimum Development Size
Hotel Suites and Condominium units	121 units
Retail/commercial	134 m^2

	Yes	No
121 Hotel Suites = 56 Person Trips **Retail/Commercial = 18 Person Trips** **Total Development = 74 Person Trips > 60 Peak Hour Person Trips**	X	

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

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

3. Location Triggers

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

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

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

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	X	
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

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

5. Summary

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

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

EXHIBIT 2.1
2016 PEAK AM HOUR TRAFFIC COUNTS - Clarence/King Edward

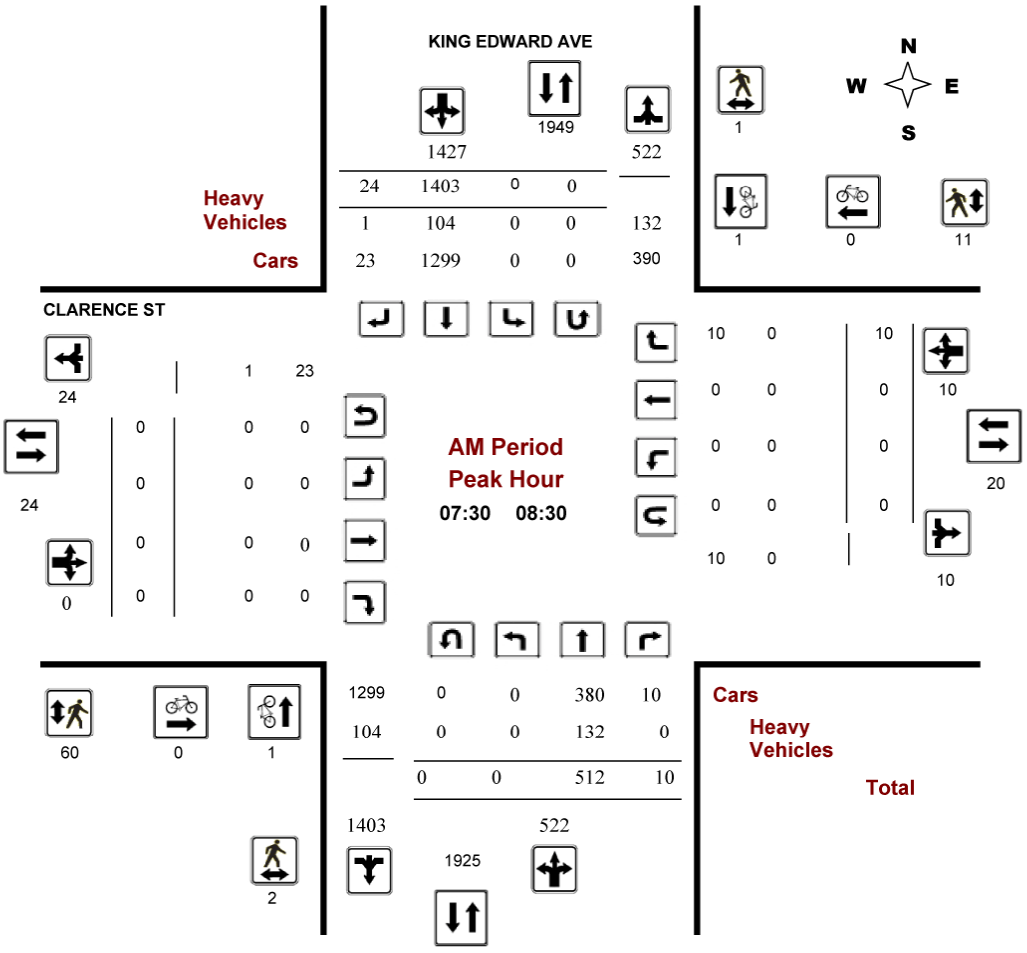
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CLARENCE ST @ KING EDWARD AVE

Survey Date: Thursday, March 03, 2016 **WO No:** 35763

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



Comments

2016 PEAK PM HOUR TRAFFIC COUNTS - Clarence/King Edward

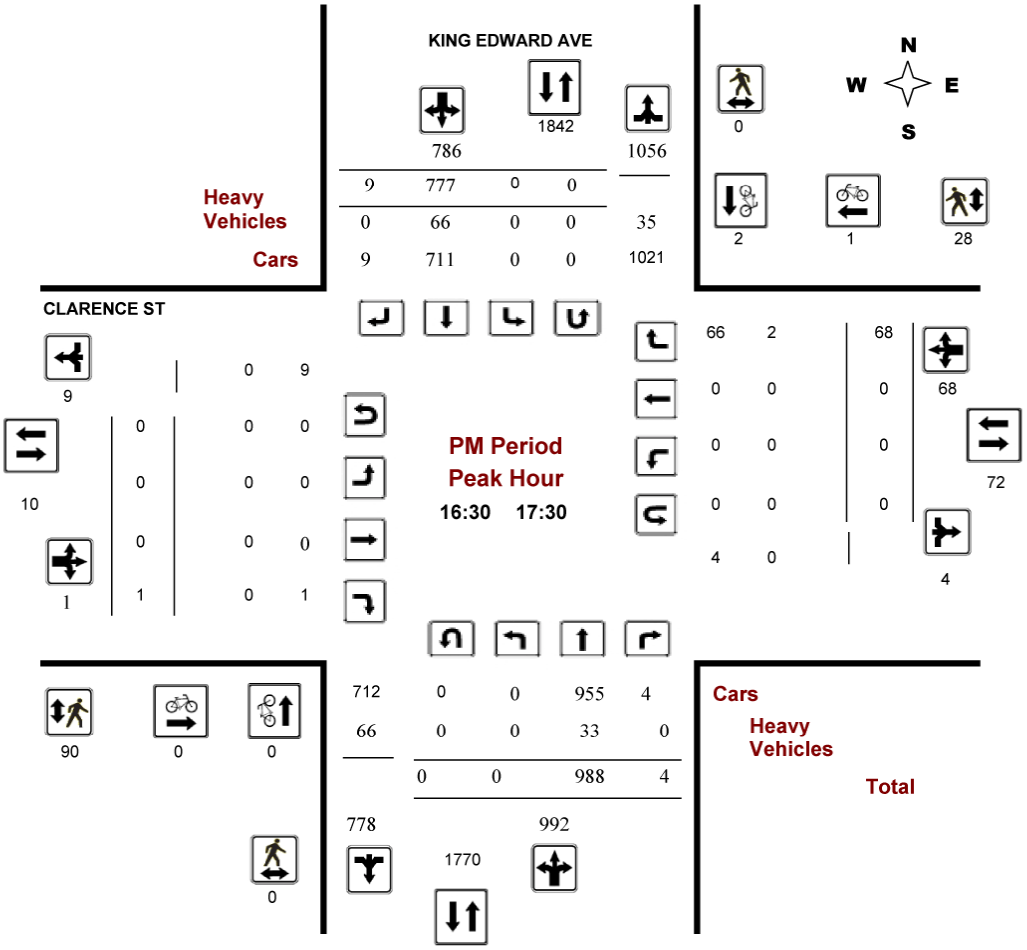
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CLARENCE ST @ KING EDWARD AVE

Survey Date: Thursday, March 03, 2016 **WO No:** 35763

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



Comments

EXHIBIT 2.2
2016 PEAK AM HOUR TRAFFIC COUNTS - St. Patrick (Murray)/King Edward

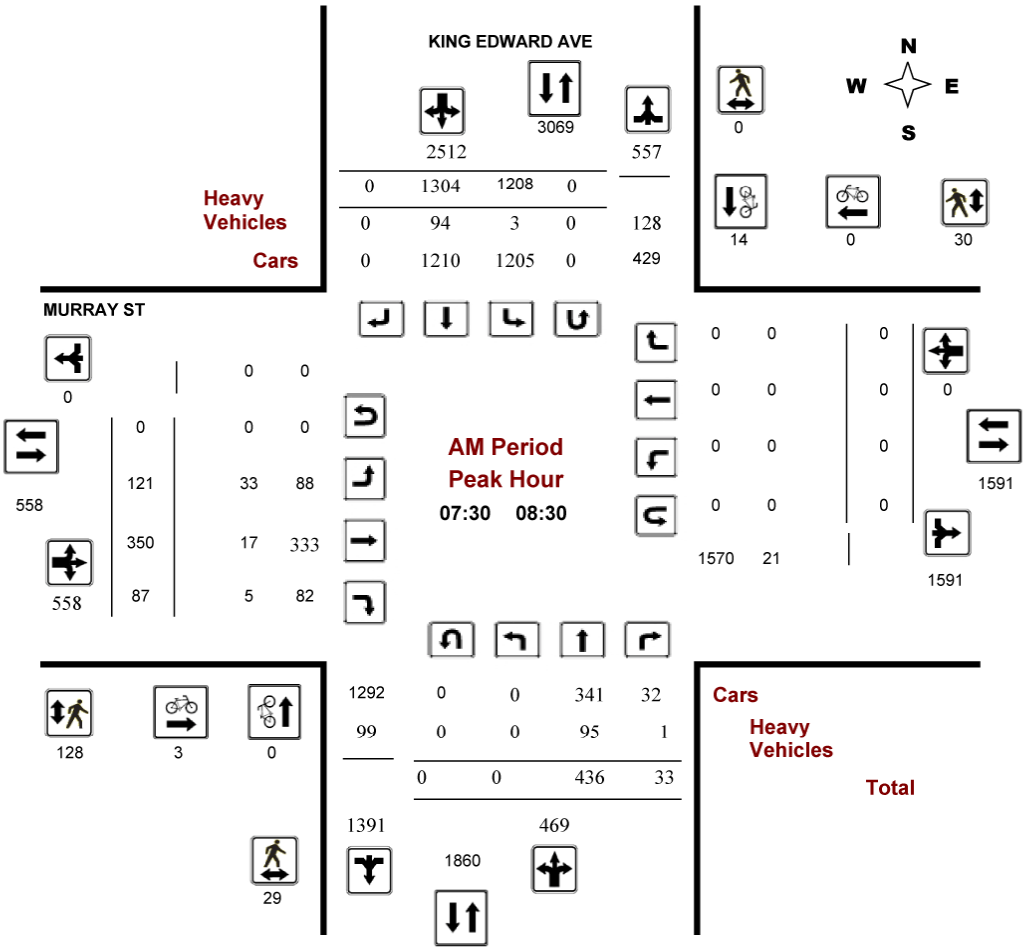
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KING EDWARD AVE @ MURRAY ST

Survey Date: Wednesday, September 21, 2016 **WO No:** 36335

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



Comments

2016 PEAK PM HOUR TRAFFIC COUNTS - St. Patrick (Murray)/King Edward

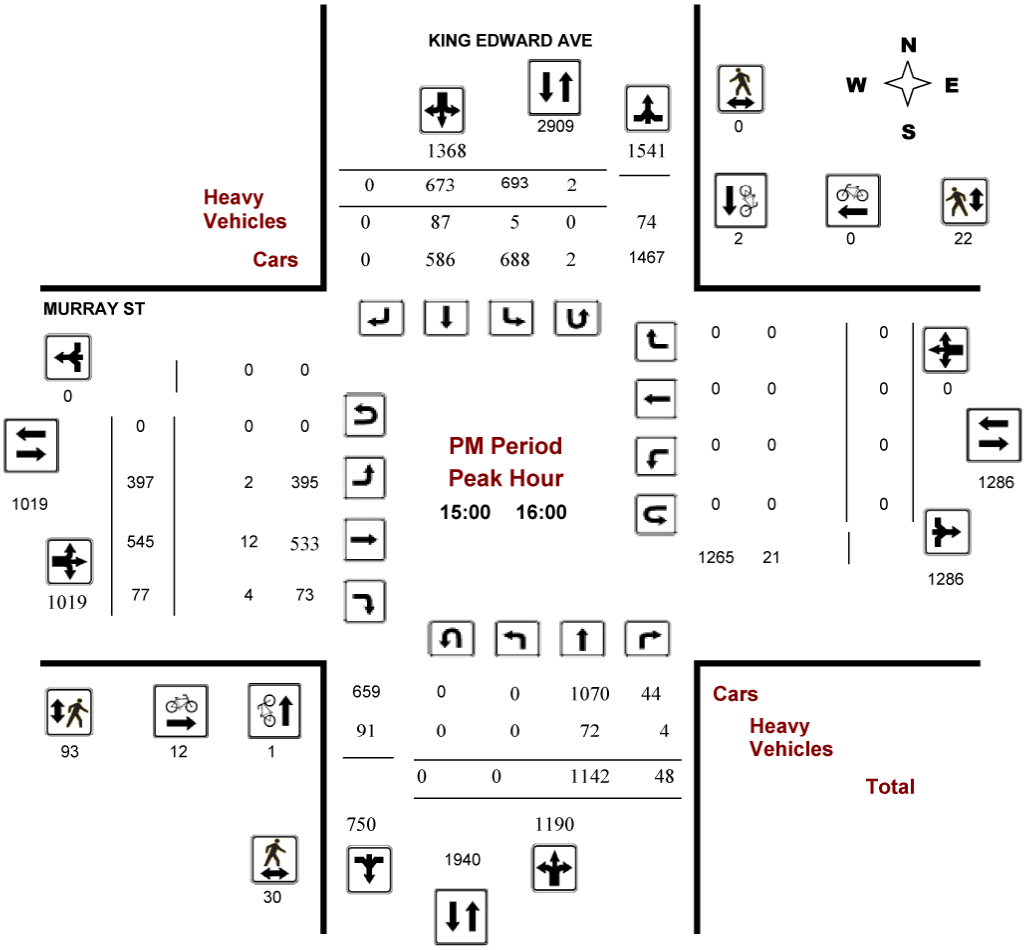
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KING EDWARD AVE @ MURRAY ST

Survey Date: Wednesday, September 21, 2016 **WO No:** 36335

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



Comments

EXHIBIT 2.3
2020 PEAK AM HOUR TRAFFIC COUNTS - St. Patrick/King Edward

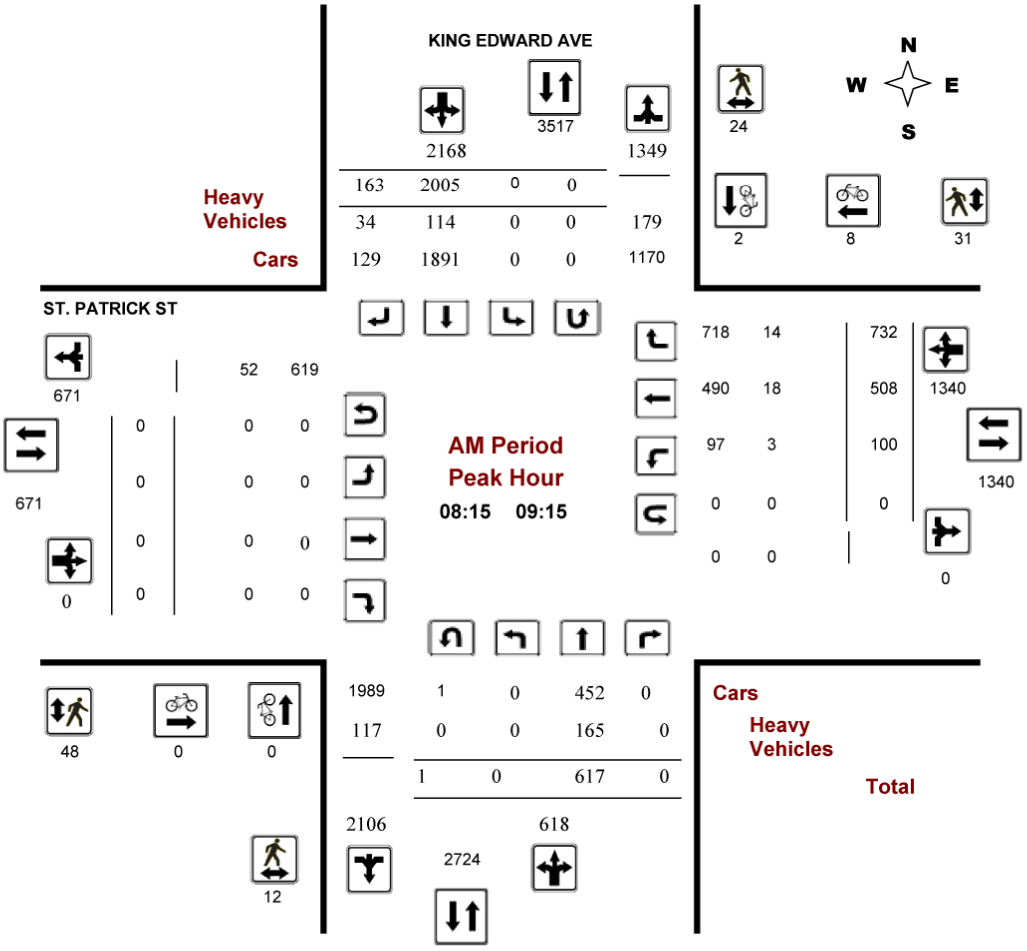
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KING EDWARD AVE @ ST. PATRICK ST

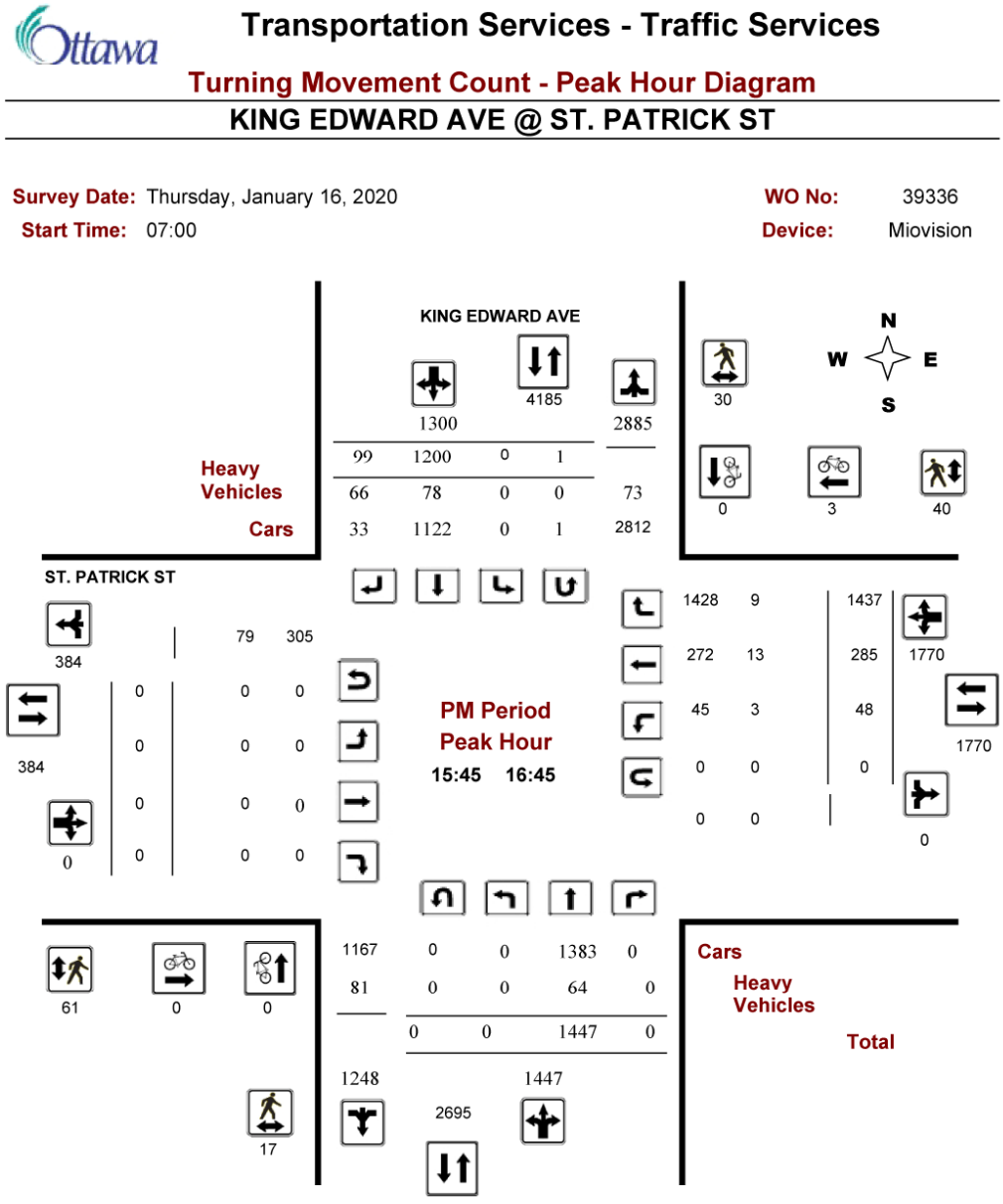
Survey Date: Thursday, January 16, 2020 **WO No:** 39336

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



Comments 5470821 - THU JAN 16, 2020 - 8HRS - LORETTA

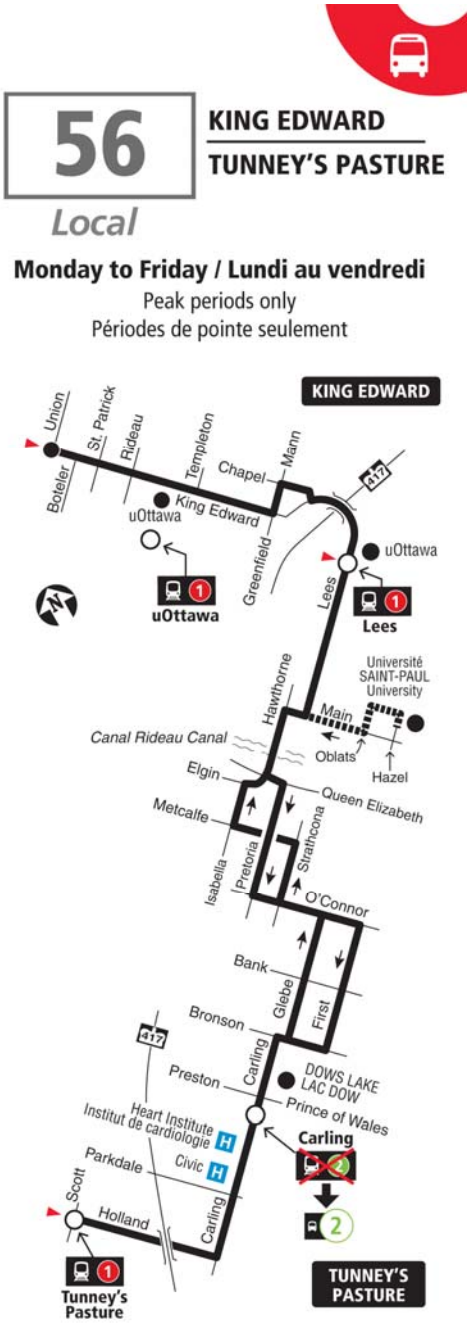
2020 PEAK PM HOUR TRAFFIC COUNTS - St. Patrick/King Edward



Comments 5470821 - THU JAN 16, 2020 - 8HRS - LORETTA

EXHIBIT 2.4
OC TRANSPO BUS ROUTES

ROUTE 56



ROUTE 6

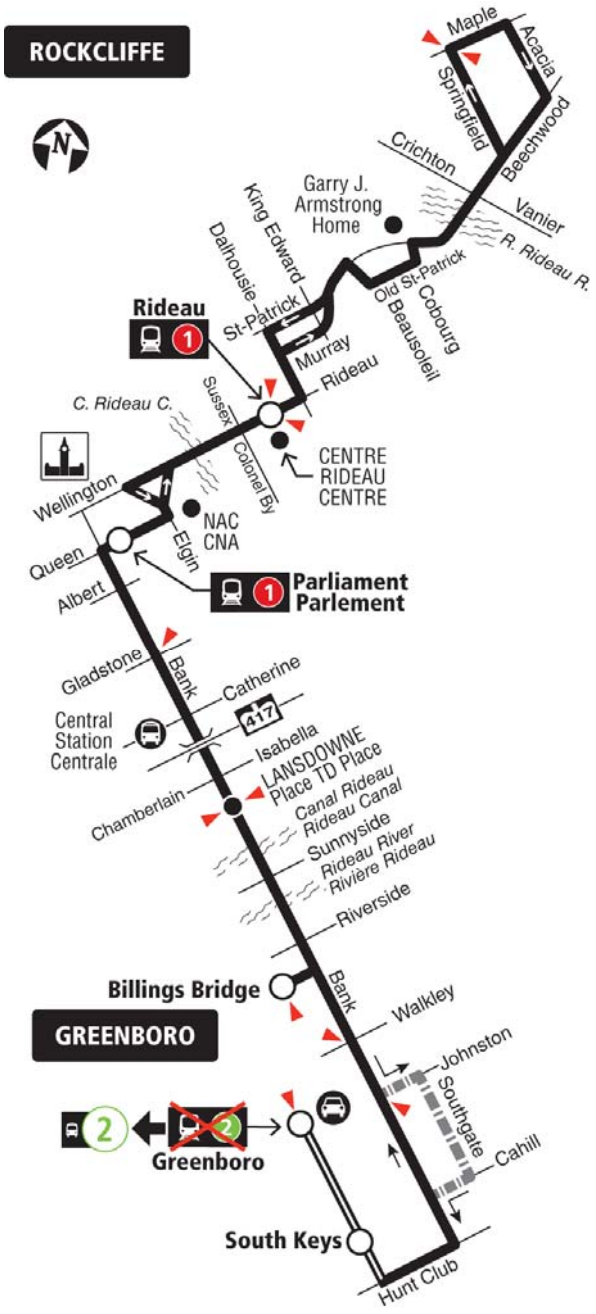


EXHIBIT 3.1
ITE TRIP GENERATION 10th Ed. – All Suites Hotel - Peak AM Hr.

All Suites Hotel
(311)

Vehicle Trip Ends vs:	**Rooms**
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:	8
Avg. Num. of Rooms:	177
Directional Distribution:	53% entering, 47% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.34	0.13 - 0.51	0.13

Data Plot and Equation

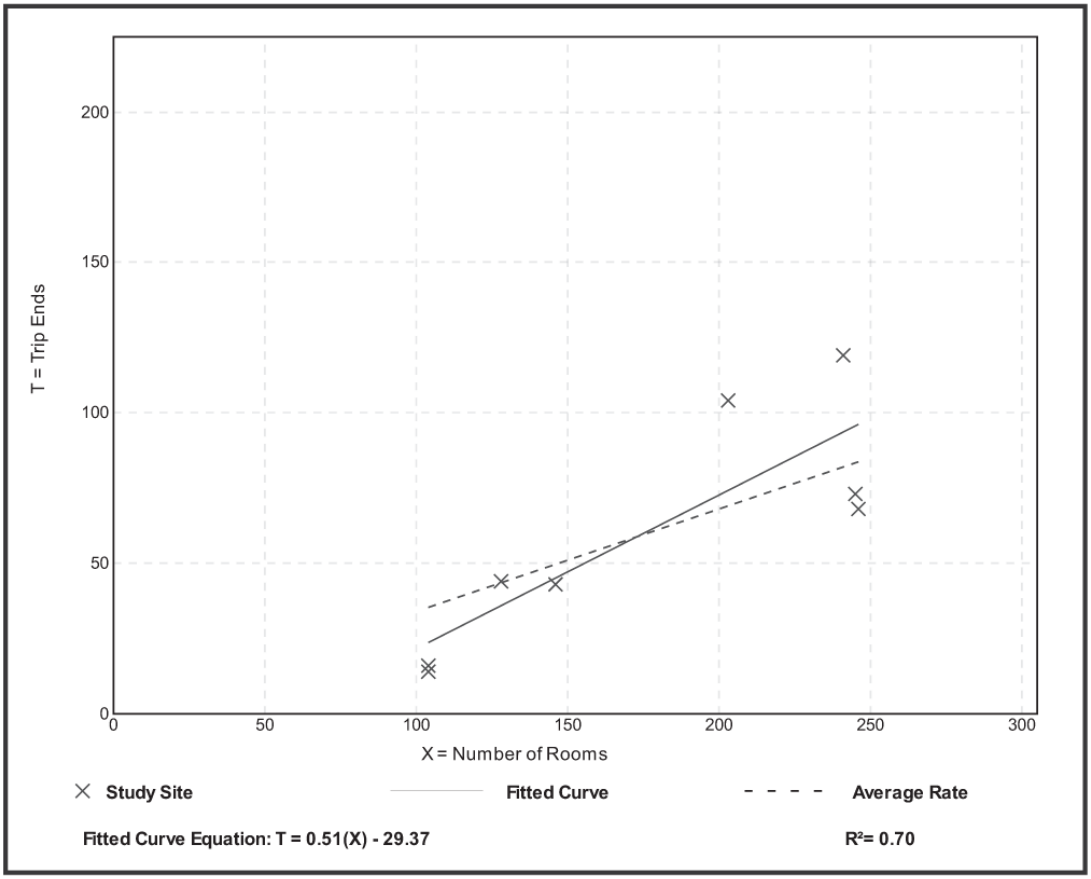


EXHIBIT 3.2
ITE TRIP GENERATION 10th Ed. – All Suites Hotel - Peak PM Hr.

All Suites Hotel
(311)

Vehicle Trip Ends vs:	**Rooms**
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:	9
Avg. Num. of Rooms:	171
Directional Distribution:	48% entering, 52% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.36	0.22 - 0.47	0.08

Data Plot and Equation

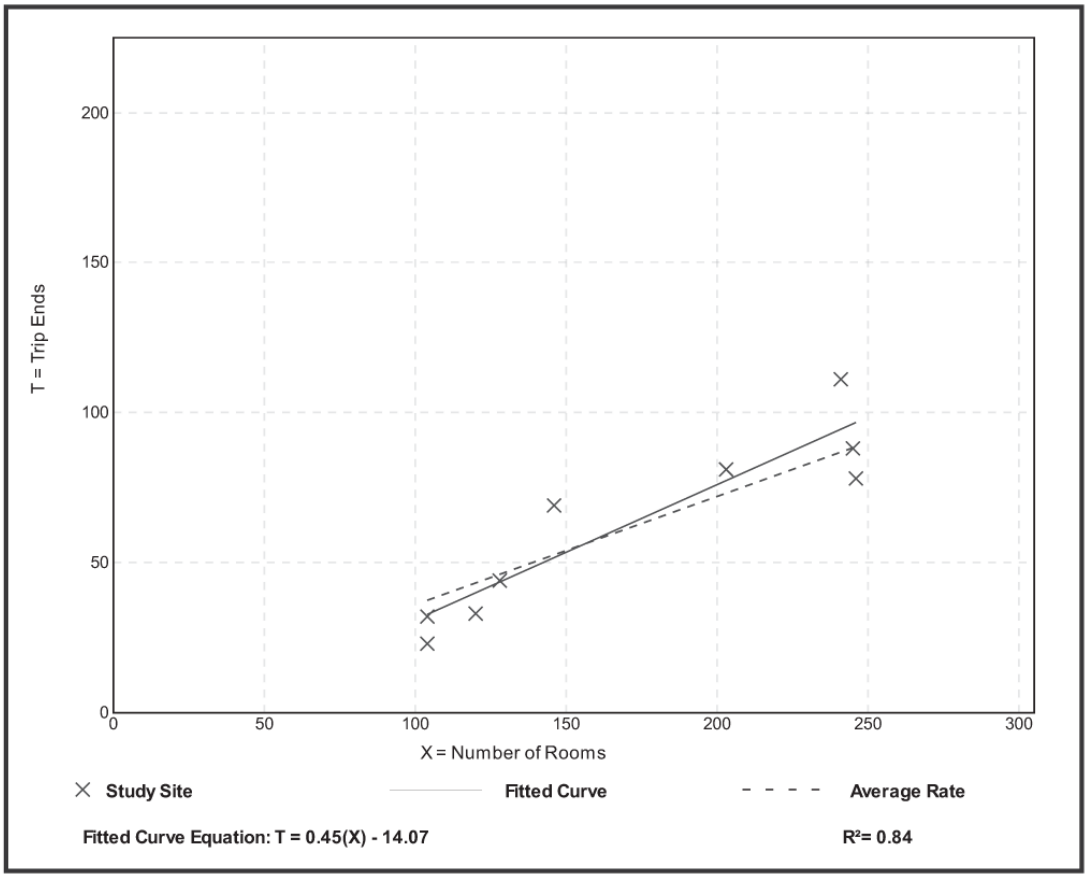


EXHIBIT 3.3
ITE TRIP GENERATION 10th Ed. – High-Turnover (Sit-Down) Restaurant - Peak AM Hr.

High-Turnover (Sit-Down) Restaurant
(932)

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:	39
1000 Sq. Ft. GFA:	5
Directional Distribution:	55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.94	0.76 - 102.39	11.33

Data Plot and Equation

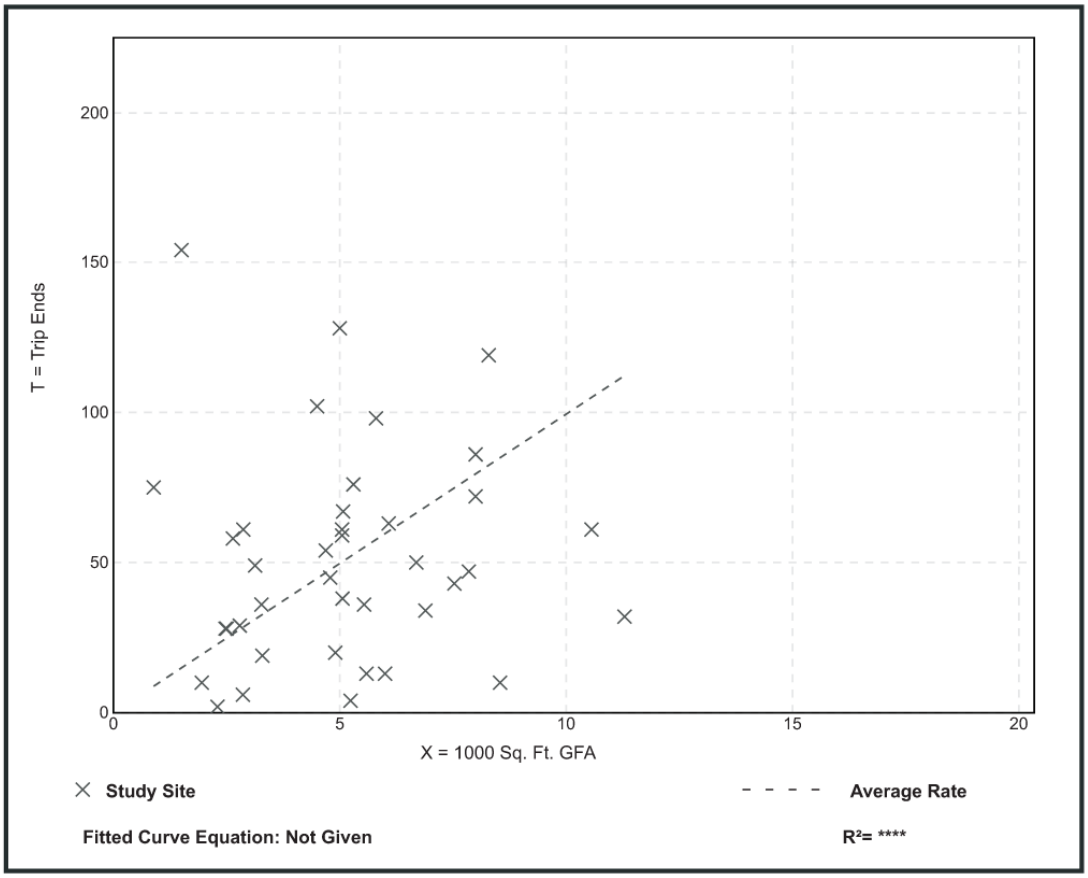


EXHIBIT 3.4
ITE TRIP GENERATION 10th Ed. – High-Turnover (Sit-Down) Restaurant - Peak PM Hr.

High-Turnover (Sit-Down) Restaurant
(932)

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:	107
1000 Sq. Ft. GFA:	6
Directional Distribution:	62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.77	0.92 - 62.00	7.37

Data Plot and Equation

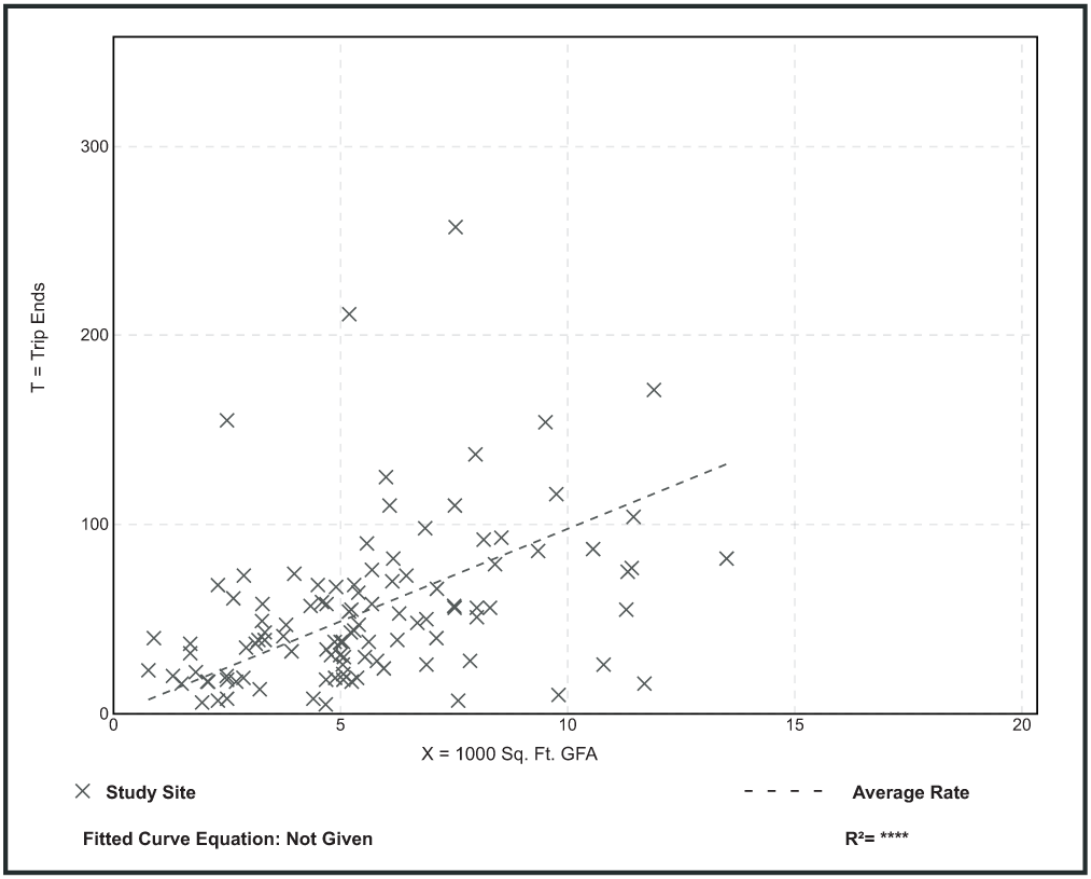


EXHIBIT 4.1
2029 MMLOS ROAD SEGMENT - King Edward Avenue

Multi-Modal Level of Service - Segments Form

Consultant		Project	Boutique Hotel
Scenario	Total 2029 Traffic	Date	Jan-22
Comments	King Edward Avenue		
	Clarence St. to St. Patrick St.		

SEGMENTS		King Edward	Clarence-Murra 1	Murray-St.Patrick 2	Section 3
Pedestrian	Sidewalk Width Boulevard Width	C	1.8 m 0.5 - 2 m	1.8 m 0.5 - 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	
	Operating Speed On-Street Parking		> 30 to 50 km/h yes	> 30 to 50 km/h yes	
	Exposure to Traffic PLoS		C	C	-
	Effective Sidewalk Width		3.0 m	3.0 m	
	Pedestrian Volume		250 ped/hr	250 ped/hr	
	Crowding PLoS		A	A	-
	Level of Service		C	C	-
Bicycle	Type of Cycling Facility	E	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		≥ 6 lanes total	≥ 6 lanes total	
	Operating Speed		>40 to <50 km/h	>40 to <50 km/h	
	# of Lanes & Operating Speed LoS		E	E	-
	Bike Lane (+ Parking Lane) Width		~~≥ 1.8 m~~	~~≥ 1.8 m~~	
	Bike Lane Width LoS		~~A~~	~~A~~	-
	Bike Lane Blockages		~~Rare~~	~~Rare~~	
	Blockage LoS		~~A~~	~~A~~	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		B	B	-
	Level of Service		E	E	-
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	
	Level of Service		D	D	-
Truck	Truck Lane Width	A	> 3.7 m	> 3.7 m	
	Travel Lanes per Direction		> 1	> 1	
	Level of Service		A	A	-

EXHIBIT 4.2
2029 MMLOS ROAD SEGMENT - Murray Street

Multi-Modal Level of Service - Segments Form

Consultant		Project	Boutique Hotel
Scenario	Total 2029 Traffic	Date	Jan-22
Comments	Murray Street		
	Cumberland St. to Beausoleil Dr.		

SEGMENTS		Murray	Cumberland-King E	King Edward-Beaus	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	E	1.5 m 0.5 - 2 m	1.5 m 0.5 - 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 50 to 60 km/h no	
	Exposure to Traffic PLoS		E	E	-
	Effective Sidewalk Width		3.0 m	2.5 m	
	Pedestrian Volume		250 ped/hr	250 ped/hr	
	Crowding PLoS		A	B	-
	Level of Service		E	E	-
Bicycle	Type of Cycling Facility	E	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		E	E	-
	Bike Lane (+ Parking Lane) Width		~~≥ 1.8 m~~	~~≥ 1.8 m~~	
	Bike Lane Width LoS		~~A~~	~~A~~	-
	Bike Lane Blockages		~~Rare~~	~~Rare~~	
	Blockage LoS		~~A~~	~~A~~	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		B	B	-
	Level of Service		E	E	-
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	
	Level of Service		D	D	-
Truck	Truck Lane Width	A	> 3.7 m	> 3.7 m	
	Travel Lanes per Direction		> 1	> 1	
	Level of Service		A	A	-

EXHIBIT 4.3
2029 MMLOS ROAD SEGMENT - St. Patrick Street

Multi-Modal Level of Service - Segments Form

Consultant		Project	Boutique Hotel
Scenario	Total 2029 Traffic	Date	Jan-22
Comments	St. Patrick Strreet		
	Beausoleil Dr. to Cumberland St.		

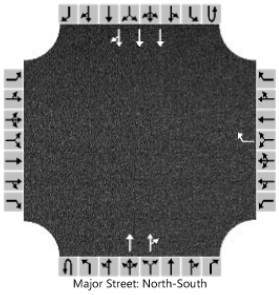
SEGMENTS		St. Patrick St.	Beausoleil-King Ed	King Edward-Cumb	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	D	≥ 2 m 0.5 - 2 m	≥ 2 m < 0.5	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 50 to 60 km/h yes	
	Exposure to Traffic PLoS		D	D	-
	Effective Sidewalk Width		3.0 m	3.0 m	
	Pedestrian Volume		250 ped/hr	250 ped/hr	
	Crowding PLoS		A	A	-
	Level of Service		D	D	-
Bicycle	Type of Cycling Facility	E	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		E	E	-
	Bike Lane (+ Parking Lane) Width		~~≥ 1.8 m~~	~~≥ 1.8 m~~	
	Bike Lane Width LoS		~~A~~	~~A~~	-
	Bike Lane Blockages		~~Rare~~	~~Rare~~	
	Blockage LoS		~~A~~	~~A~~	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		B	B	-
	Level of Service		E	E	-
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	
	Level of Service		D	D	-
Truck	Truck Lane Width	A	> 3.7 m	> 3.7 m	
	Travel Lanes per Direction		> 1	> 1	
	Level of Service		A	A	-

EXHIBIT 4.4
2016 EXISTING PEAK AM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2016	North/South Street	King Edward Avenue
Time Analyzed	Peak AM Hour	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	0	0	0	3	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								10			512	10			1403	24
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.92								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.31								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								11								
Capacity, c (veh/h)								716								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.0								
Control Delay (s/veh)								10.1								
Level of Service (LOS)								B								
Approach Delay (s/veh)						10.1										
Approach LOS						B										

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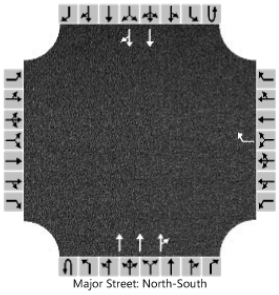
EXHIBIT 4.5
2016 EXISTING PEAK PM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2016	North/South Street	King Edward Avenue
Time Analyzed	Peak PM Hour	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	3	0	0	0	2	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								68			988	4			777	9
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								7.1								
Critical Headway (sec)								7.12								
Base Follow-Up Headway (sec)								3.9								
Follow-Up Headway (sec)								3.91								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								74								
Capacity, c (veh/h)								419								
v/c Ratio								0.18								
95% Queue Length, Q_{95} (veh)								0.6								
Control Delay (s/veh)								15.4								
Level of Service (LOS)								C								
Approach Delay (s/veh)						15.4										
Approach LOS						C										

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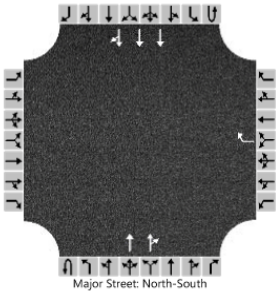
EXHIBIT 4.6
2024 BACKGROUND PEAK AM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2024	North/South Street	King Edward Avenue
Time Analyzed	Peak AM Hour (Background)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	0	0	0	3	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								11			560	11			1525	26
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.92								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.31								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								12								
Capacity, c (veh/h)								688								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.1								
Control Delay (s/veh)								10.3								
Level of Service (LOS)								B								
Approach Delay (s/veh)						10.3										
Approach LOS						B										

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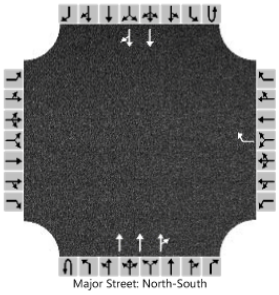
EXHIBIT 4.7
2024 BACKGROUND PEAK PM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2024	North/South Street	King Edward Avenue
Time Analyzed	Peak PM Hour (Background)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	3	0	0	0	2	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								74			1077	4			848	10
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								7.1								
Critical Headway (sec)								7.12								
Base Follow-Up Headway (sec)								3.9								
Follow-Up Headway (sec)								3.91								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								80								
Capacity, c (veh/h)								390								
v/c Ratio								0.21								
95% Queue Length, Q_{95} (veh)								0.8								
Control Delay (s/veh)								16.6								
Level of Service (LOS)								C								
Approach Delay (s/veh)						16.6										
Approach LOS						C										

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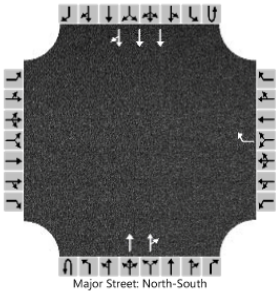
EXHIBIT 4.8
2029 BACKGROUND PEAK AM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2029	North/South Street	King Edward Avenue
Time Analyzed	Peak AM Hour (Background)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	0	0	0	3	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								11			589	11			1603	27
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.92								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.31								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								12								
Capacity, c (veh/h)								673								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.1								
Control Delay (s/veh)								10.4								
Level of Service (LOS)								B								
Approach Delay (s/veh)						10.4										
Approach LOS						B										

HCS™ TWSC Version 7.9.5
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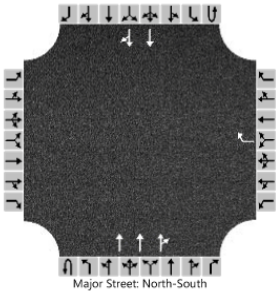
EXHIBIT 4.9
2029 BACKGROUND PEAK PM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2029	North/South Street	King Edward Avenue
Time Analyzed	Peak PM Hour (Background)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	3	0	0	0	2	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								77			1131	5			891	10
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								7.1								
Critical Headway (sec)								7.12								
Base Follow-Up Headway (sec)								3.9								
Follow-Up Headway (sec)								3.91								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								84								
Capacity, c (veh/h)								373								
v/c Ratio								0.22								
95% Queue Length, Q_{95} (veh)								0.8								
Control Delay (s/veh)								17.4								
Level of Service (LOS)								C								
Approach Delay (s/veh)						17.4										
Approach LOS						C										

HCS™ TWSC Version 7.9.5
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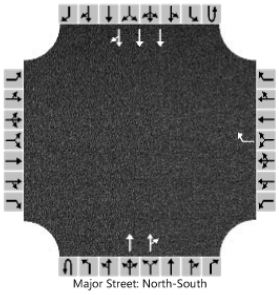
EXHIBIT 4.10
2024 TOTAL PEAK AM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2024	North/South Street	King Edward Avenue
Time Analyzed	Peak AM Hour (Total)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	0	0	0	3	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								12			560	16			1525	26
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.92								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.31								

Delay, Queue Length, and Level of Service

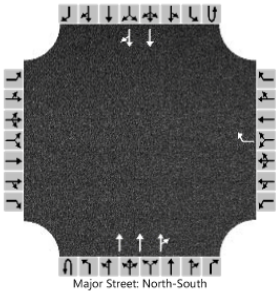
Flow Rate, v (veh/h)								13								
Capacity, c (veh/h)								686								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.1								
Control Delay (s/veh)								10.4								
Level of Service (LOS)								B								
Approach Delay (s/veh)						10.4										
Approach LOS						B										

EXHIBIT 4.11
2024 TOTAL PEAK PM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2024	North/South Street	King Edward Avenue
Time Analyzed	Peak PM Hour (Total)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	3	0	0	0	2	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								75			1077	9			848	10
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								7.1								
Critical Headway (sec)								7.12								
Base Follow-Up Headway (sec)								3.9								
Follow-Up Headway (sec)								3.91								

Delay, Queue Length, and Level of Service

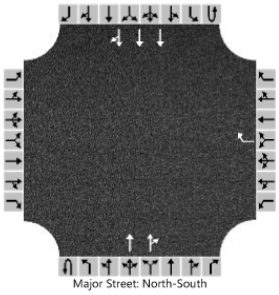
Flow Rate, v (veh/h)								82								
Capacity, c (veh/h)								388								
v/c Ratio								0.21								
95% Queue Length, Q_{95} (veh)								0.8								
Control Delay (s/veh)								16.7								
Level of Service (LOS)								C								
Approach Delay (s/veh)						16.7										
Approach LOS						C										

EXHIBIT 4.12
2029 TOTAL PEAK AM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2029	North/South Street	King Edward Avenue
Time Analyzed	Peak AM Hour (Total)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	0	0	0	3	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								12			589	16			1603	27
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.92								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.31								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								13								
Capacity, c (veh/h)								670								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.1								
Control Delay (s/veh)								10.5								
Level of Service (LOS)								B								
Approach Delay (s/veh)						10.5										
Approach LOS						B										

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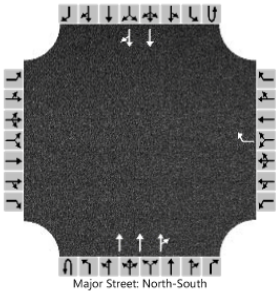
EXHIBIT 4.13
2029 TOTAL PEAK PM HOUR ANALYSIS - Clarence/King Edward

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Clarence/King Edward
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	11/15/2021	East/West Street	Clarence Street
Analysis Year	2029	North/South Street	King Edward Avenue
Time Analyzed	Peak PM Hour (Total)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Boutique Hotel		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	3	0	0	0	2	0
Configuration								R			T	TR			T	TR
Volume (veh/h)								78			1131	10			891	10
Percent Heavy Vehicles (%)								1								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								7.1								
Critical Headway (sec)								7.12								
Base Follow-Up Headway (sec)								3.9								
Follow-Up Headway (sec)								3.91								

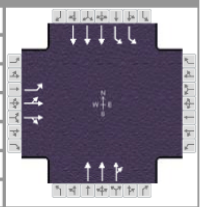
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								85								
Capacity, c (veh/h)								371								
v/c Ratio								0.23								
95% Queue Length, Q_{95} (veh)								0.9								
Control Delay (s/veh)								17.5								
Level of Service (LOS)								C								
Approach Delay (s/veh)						17.5										
Approach LOS						C										

EXHIBIT 4.14
2016 EXISTING PEAK AM HOUR ANALYSIS - Murray/King Edward

HCS7 Signalized Intersection Results Summary

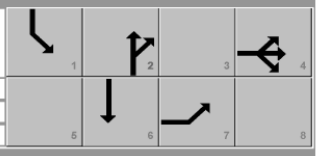
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2016_ex_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	121	350	87					436	33	1208	1304	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	47.4	29.4	20.0	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	3.7	6.5	3.6	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		26.9				38.9	54.1	93.1
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		19.0					45.4	
Green Extension Time (*g e*), s		1.1				0.0	2.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					0.62	

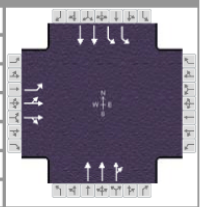
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	132	247	228					343	167	1313	1417	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1514	1730	1561					1589	1517	1639	1545	
Queue Service Time (*g s*), s	9.4	16.5	17.0					11.2	11.1	43.4	15.6	
Cycle Queue Clearance Time (*g c*), s	9.4	16.5	17.0					11.2	11.1	43.4	15.6	
Green Ratio (*g/C*)	0.18	0.18	0.18					0.25	0.25	0.46	0.70	
Capacity (*c*), veh/h	265	303	274					807	385	1505	3267	
Volume-to-Capacity Ratio (*X*)	0.496	0.813	0.835					0.425	0.434	0.872	0.434	
Back of Queue (Q), ft/ln (95 th percentile)	178.9	300.9	274.2					218.2	197.9	615.5	218.7	
Back of Queue (Q), veh/ln (95 th percentile)	6.4	11.6	11.0					7.8	7.9	24.2	8.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	44.7	47.6	47.8					37.5	37.5	29.3	7.7	
Incremental Delay (*d 2*), s/veh	0.5	2.0	2.6					1.6	3.5	5.1	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	45.2	49.6	50.4					39.1	41.1	34.4	8.1	
Level of Service (LOS)	D	D	D					D	D	C	A	
Approach Delay, s/veh / LOS	49.0	D		0.0			39.7	D		20.8	C	
Intersection Delay, s/veh / LOS	27.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.71	B	1.86	B
Bicycle LOS Score / LOS	0.99	A			0.77	A	1.99	B

EXHIBIT 4.15
2016 EXISTING PEAK PM HOUR ANALYSIS - Murray/King Edward

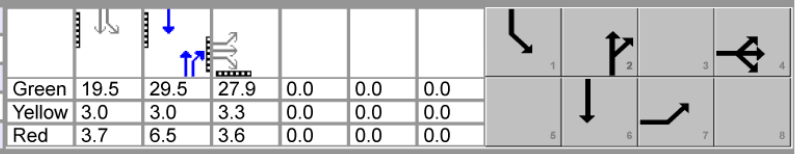
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2016_ex_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	397	545	77					1142	48	693	673	

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	19.5	29.5	27.9	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		34.8				39.0	26.2	65.2
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		26.2					23.5	
Green Extension Time (*g e*), s		1.7				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.23					1.00	

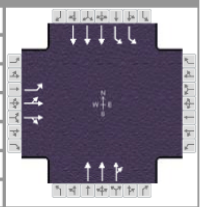
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	432	347	329					870	424	753	732	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1701	1758	1655					1716	1670	1652	1580	
Queue Service Time (*g s*), s	24.2	17.5	17.6					23.5	23.6	21.5	13.0	
Cycle Queue Clearance Time (*g c*), s	24.2	17.5	17.6					23.5	23.6	21.5	13.0	
Green Ratio (*g/C*)	0.29	0.29	0.29					0.31	0.31	0.27	0.57	
Capacity (*c*), veh/h	491	508	478					1047	509	899	1792	
Volume-to-Capacity Ratio (*X*)	0.878	0.684	0.688					0.831	0.831	0.838	0.408	
Back of Queue (Q), ft/ln (95 th percentile)	417.5	304.2	285.1					415.7	419	356.2	212	
Back of Queue (Q), veh/ln (95 th percentile)	16.6	11.9	11.4					15.9	16.8	14.1	7.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	33.9	31.5	31.6					32.4	32.4	34.3	12.4	
Incremental Delay (*d 2*), s/veh	10.8	1.5	1.7					7.7	14.6	6.7	0.7	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	44.7	33.0	33.2					40.0	47.0	41.0	13.1	
Level of Service (LOS)	D	C	C					D	D	D	B	
Approach Delay, s/veh / LOS	37.6	D		0.0			42.3	D		27.3	C	
Intersection Delay, s/veh / LOS	35.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.47	B	2.61	C	1.70	B	1.88	B
Bicycle LOS Score / LOS	1.40	A			1.20	A	1.71	B

EXHIBIT 4.16
2024 BACKGROUND PEAK AM HOUR ANALYSIS - Murray/King Edward

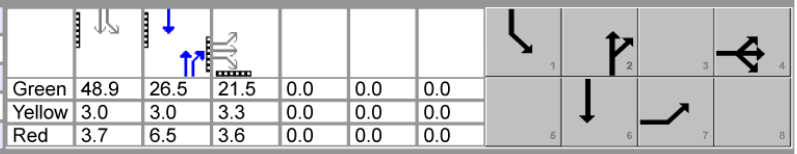
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2024_bak_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	380	94					472	42	1310	1418	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	48.9	26.5	21.5	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		28.4				36.0	55.6	91.6
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		20.3					50.7	
Green Extension Time (*g e*), s		1.2				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.01					1.00	

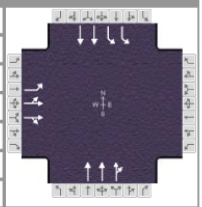
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	142	268	247					377	182	1424	1541	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1514	1730	1564					1589	1503	1639	1545	
Queue Service Time (*g s*), s	10.1	17.9	18.3					12.4	12.7	48.7	18.4	
Cycle Queue Clearance Time (*g c*), s	10.1	17.9	18.3					12.4	12.7	48.7	18.4	
Green Ratio (*g/C*)	0.19	0.19	0.19					0.23	0.23	0.47	0.69	
Capacity (*c*), veh/h	284	324	293					729	345	1546	3211	
Volume-to-Capacity Ratio (*X*)	0.502	0.827	0.845					0.517	0.528	0.921	0.480	
Back of Queue (*Q*), ft/ln (95 th percentile)	192	325.6	298					246.1	224	701.2	252	
Back of Queue (*Q*), veh/ln (95 th percentile)	6.9	12.5	11.9					8.8	9.0	27.6	9.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	43.7	46.9	47.1					40.4	40.6	29.6	8.7	
Incremental Delay (*d 2*), s/veh	0.5	3.4	4.8					2.6	5.7	9.2	0.5	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	44.3	50.3	51.9					43.1	46.2	38.8	9.2	
Level of Service (LOS)	D	D	D					D	D	D	A	
Approach Delay, s/veh / LOS	49.6	D		0.0			44.1	D		23.4	C	
Intersection Delay, s/veh / LOS	30.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.72	B	1.86	B
Bicycle LOS Score / LOS	1.03	A			0.79	A	2.12	B

EXHIBIT 4.17
2024 BACKGROUND PEAK PM HOUR ANALYSIS - Murray/King Edward

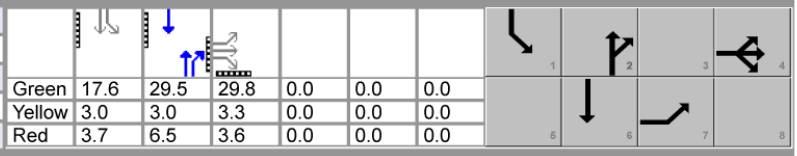
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2024_bak_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	430	591	83					1237	59	753	736	

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	17.6	29.5	29.8	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		36.7				39.0	24.3	63.3
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		28.2					26.6	
Green Extension Time (*g e*), s		1.6				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.46					1.00	

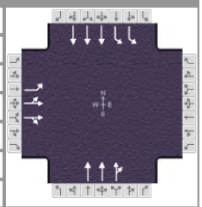
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	467	376	356					949	460	818	800	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1701	1758	1657					1716	1664	1652	1580	
Queue Service Time (*g s*), s	26.2	18.9	18.9					26.5	26.6	24.6	15.3	
Cycle Queue Clearance Time (*g c*), s	26.2	18.9	18.9					26.5	26.6	24.6	15.3	
Green Ratio (*g/C*)	0.31	0.31	0.31					0.31	0.31	0.25	0.55	
Capacity (*c*), veh/h	524	542	511					1047	508	835	1731	
Volume-to-Capacity Ratio (*X*)	0.891	0.695	0.697					0.906	0.906	0.980	0.462	
Back of Queue (Q), ft/ln (95 th percentile)	455.3	324.7	303.8					478.2	486.5	465.5	244.3	
Back of Queue (Q), veh/ln (95 th percentile)	18.1	12.7	12.2					18.3	19.5	18.5	9.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	33.0	30.4	30.5					33.4	33.4	37.1	13.9	
Incremental Delay (*d 2*), s/veh	13.3	2.1	2.3					12.8	22.4	26.2	0.9	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	46.3	32.6	32.8					46.1	55.8	63.3	14.8	
Level of Service (LOS)	D	C	C					D	E	E	B	
Approach Delay, s/veh / LOS	38.0		D	0.0			49.3		D	39.3		D
Intersection Delay, s/veh / LOS	42.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.47	B	2.61	C	1.70	B	1.89	B
Bicycle LOS Score / LOS	1.48	A			1.26	A	1.82	B

EXHIBIT 4.18
2029 BACKGROUND PEAK AM HOUR ANALYSIS - Murray/King Edward

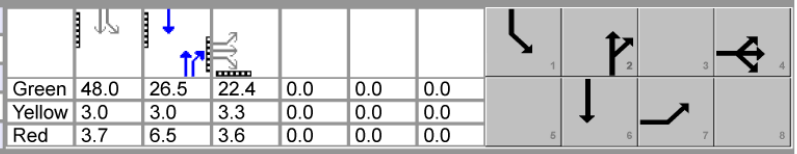
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2029_bak_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	399	99					496	44	1377	1491	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	48.0	26.5	22.4	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		29.3				36.0	54.7	90.7
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		21.2					56.1	
Green Extension Time (*g e*), s		1.2				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.01					1.00	

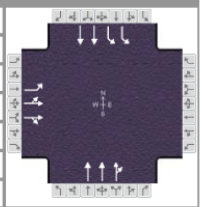
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	150	282	260					396	191	1497	1621	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1514	1730	1565					1589	1503	1639	1545	
Queue Service Time (*g s*), s	10.6	18.8	19.2					13.2	13.5	54.1	20.3	
Cycle Queue Clearance Time (*g c*), s	10.6	18.8	19.2					13.2	13.5	54.1	20.3	
Green Ratio (*g/C*)	0.20	0.20	0.20					0.23	0.23	0.46	0.68	
Capacity (*c*), veh/h	295	337	305					729	345	1521	3175	
Volume-to-Capacity Ratio (*X*)	0.508	0.834	0.850					0.543	0.554	0.984	0.510	
Back of Queue (Q), ft/ln (95 th percentile)	201	342.5	313					257.8	235.1	826.3	275.9	
Back of Queue (Q), veh/ln (95 th percentile)	7.2	13.2	12.5					9.2	9.4	32.5	10.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	43.1	46.4	46.6					40.7	40.8	31.7	9.3	
Incremental Delay (*d 2*), s/veh	0.5	4.7	6.3					2.9	6.3	19.3	0.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	43.7	51.1	52.9					43.6	47.1	51.0	9.9	
Level of Service (LOS)	D	D	D					D	D	D	A	
Approach Delay, s/veh / LOS	50.1		D	0.0			44.8		D	29.7		C
Intersection Delay, s/veh / LOS	34.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.72	B	1.86	B
Bicycle LOS Score / LOS	1.06	A			0.81	A	2.20	B

EXHIBIT 4.19
2029 BACKGROUND PEAK PM HOUR ANALYSIS - Murray/King Edward

HCS7 Signalized Intersection Results Summary

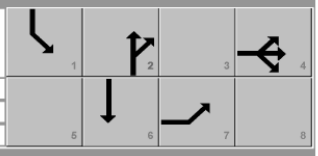
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2029_bak_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	452	621	88					1300	62	791	772	

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	16.4	29.5	31.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		37.9				39.0	23.1	62.1
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		29.6					26.1	
Green Extension Time (*g e*), s		1.4				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.69					1.00	

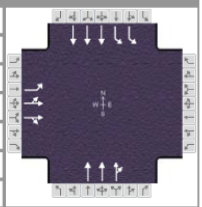
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	491	396	374					997	484	860	839	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1701	1758	1657					1716	1664	1652	1580	
Queue Service Time (*g s*), s	27.6	19.8	19.8					28.3	28.5	24.1	16.8	
Cycle Queue Clearance Time (*g c*), s	27.6	19.8	19.8					28.3	28.5	24.1	16.8	
Green Ratio (*g/C*)	0.32	0.32	0.32					0.31	0.31	0.24	0.54	
Capacity (*c*), veh/h	545	563	531					1047	508	794	1692	
Volume-to-Capacity Ratio (*X*)	0.901	0.703	0.705					0.952	0.952	1.082	0.496	
Back of Queue (Q), ft/ln (95 th percentile)	482.3	338.9	316.8					529.3	540.4	583.1	264.7	
Back of Queue (Q), veh/ln (95 th percentile)	19.1	13.2	12.7					20.2	21.6	23.1	9.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	32.5	29.8	29.8					34.0	34.0	38.0	14.9	
Incremental Delay (*d 2*), s/veh	15.2	2.5	2.7					18.5	29.7	56.5	1.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.6	32.3	32.6					52.5	63.8	94.5	16.0	
Level of Service (LOS)	D	C	C					D	E	F	B	
Approach Delay, s/veh / LOS	38.4		D	0.0			56.2		E	55.7		E
Intersection Delay, s/veh / LOS	50.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.47	B	2.61	C	1.70	B	1.89	B
Bicycle LOS Score / LOS	1.53	B			1.30	A	1.89	B

EXHIBIT 4.20
2024 TOTAL PEAK AM HOUR ANALYSIS - Murray/King Edward

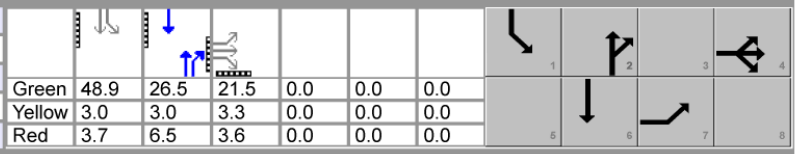
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2024_tot_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	381	94					473	42	1311	1418	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	48.9	26.5	21.5	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		28.4				36.0	55.6	91.6
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		20.4					50.8	
Green Extension Time (*g e*), s		1.2				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.01					1.00	

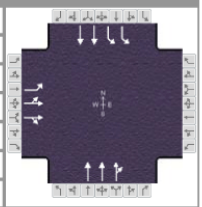
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	142	268	248					377	182	1425	1541	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1514	1730	1565					1589	1503	1639	1545	
Queue Service Time (*g s*), s	10.1	17.9	18.4					12.5	12.8	48.8	18.4	
Cycle Queue Clearance Time (*g c*), s	10.1	17.9	18.4					12.5	12.8	48.8	18.4	
Green Ratio (*g/C*)	0.19	0.19	0.19					0.23	0.23	0.47	0.69	
Capacity (*c*), veh/h	284	324	294					729	345	1545	3210	
Volume-to-Capacity Ratio (*X*)	0.501	0.827	0.845					0.518	0.529	0.922	0.480	
Back of Queue (Q), ft/ln (95 th percentile)	191.8	326	298.4					246.5	224.5	703.6	252.5	
Back of Queue (Q), veh/ln (95 th percentile)	6.9	12.5	11.9					8.8	9.0	27.7	9.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	43.7	46.9	47.1					40.5	40.6	29.6	8.7	
Incremental Delay (*d 2*), s/veh	0.5	3.5	4.9					2.6	5.7	9.3	0.5	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	44.2	50.3	52.0					43.1	46.3	39.0	9.2	
Level of Service (LOS)	D	D	D					D	D	D	A	
Approach Delay, s/veh / LOS	49.6	D		0.0			44.1	D		23.5	C	
Intersection Delay, s/veh / LOS	30.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.72	B	1.86	B
Bicycle LOS Score / LOS	1.03	A			0.80	A	2.12	B

EXHIBIT 4.21
2024 TOTAL PEAK PM HOUR ANALYSIS - Murray/King Edward

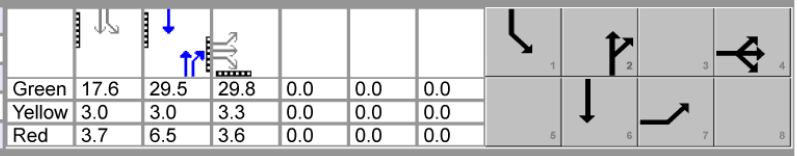
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2024_tot_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	430	592	83					1238	59	754	736	

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	17.6	29.5	29.8	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		36.7				39.0	24.3	63.3
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		28.2					26.7	
Green Extension Time (*g e*), s		1.6				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.46					1.00	

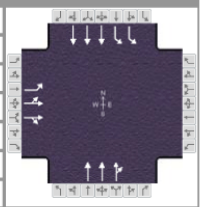
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	467	377	357					949	460	820	800	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1701	1758	1657					1716	1664	1652	1580	
Queue Service Time (*g s*), s	26.2	18.9	19.0					26.5	26.6	24.7	15.3	
Cycle Queue Clearance Time (*g c*), s	26.2	18.9	19.0					26.5	26.6	24.7	15.3	
Green Ratio (*g/C*)	0.31	0.31	0.31					0.31	0.31	0.25	0.55	
Capacity (*c*), veh/h	524	542	511					1047	508	835	1731	
Volume-to-Capacity Ratio (*X*)	0.891	0.696	0.698					0.907	0.907	0.982	0.462	
Back of Queue (Q), ft/ln (95 th percentile)	455.2	325.2	304.6					478.8	487.2	467.1	244.3	
Back of Queue (Q), veh/ln (95 th percentile)	18.1	12.7	12.2					18.3	19.5	18.5	9.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	33.0	30.5	30.5					33.4	33.4	37.1	13.9	
Incremental Delay (*d 2*), s/veh	13.3	2.1	2.3					12.8	22.5	26.5	0.9	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	46.3	32.6	32.8					46.2	55.9	63.6	14.8	
Level of Service (LOS)	D	C	C					D	E	E	B	
Approach Delay, s/veh / LOS	38.0	D		0.0			49.4	D		39.5	D	
Intersection Delay, s/veh / LOS	42.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.47	B	2.61	C	1.70	B	1.89	B
Bicycle LOS Score / LOS	1.48	A			1.26	A	1.82	B

EXHIBIT 4.22
2029 TOTAL PEAK AM HOUR ANALYSIS - Murray/King Edward

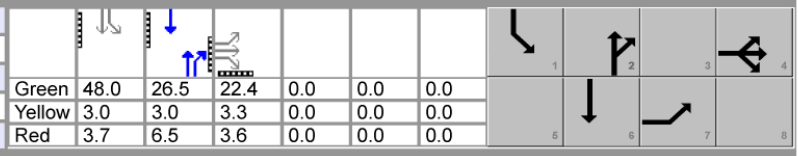
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2029_tot_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	400	99					497	44	1378	1491	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	48.0	26.5	22.4	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		29.3				36.0	54.7	90.7
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		21.2					56.2	
Green Extension Time (*g e*), s		1.2				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.01					1.00	

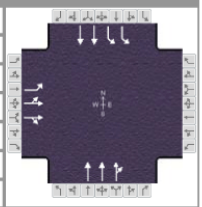
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	150	282	260					397	191	1498	1621	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1514	1730	1566					1589	1504	1639	1545	
Queue Service Time (*g s*), s	10.6	18.8	19.2					13.2	13.5	54.2	20.3	
Cycle Queue Clearance Time (*g c*), s	10.6	18.8	19.2					13.2	13.5	54.2	20.3	
Green Ratio (*g/C*)	0.20	0.20	0.20					0.23	0.23	0.46	0.68	
Capacity (*c*), veh/h	296	338	306					729	345	1520	3173	
Volume-to-Capacity Ratio (*X*)	0.507	0.835	0.851					0.544	0.555	0.986	0.511	
Back of Queue (Q), ft/ln (95 th percentile)	200.9	343.2	313.9					258.2	235.4	828.6	275.9	
Back of Queue (Q), veh/ln (95 th percentile)	7.2	13.2	12.6					9.2	9.4	32.6	10.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	43.1	46.4	46.6					40.7	40.8	31.8	9.4	
Incremental Delay (*d 2*), s/veh	0.5	4.7	6.3					2.9	6.3	19.6	0.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	43.6	51.1	52.9					43.6	47.2	51.4	9.9	
Level of Service (LOS)	D	D	D					D	D	D	A	
Approach Delay, s/veh / LOS	50.2		D	0.0			44.8		D	29.8		C
Intersection Delay, s/veh / LOS	35.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.72	B	1.86	B
Bicycle LOS Score / LOS	1.06	A			0.81	A	2.20	B

EXHIBIT 4.23
2029 TOTAL PEAK PM HOUR ANALYSIS - Murray/King Edward

HCS7 Signalized Intersection Results Summary

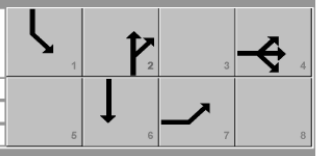
General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Murray/King Edward	File Name	737_2029_tot_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	452	622	88					1301	62	792	772	

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	16.4	29.5	31.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.3	0.0	0.0	0.0
Red	3.7	6.5	3.6	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		10.0				8.3	2.0	4.0
Phase Duration, s		37.9				39.0	23.1	62.1
Change Period, (*Y+R c*), s		6.9				9.5	6.7	9.5
Max Allow Headway (*MAH*), s		3.1				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		29.6					26.0	
Green Extension Time (*g e*), s		1.5				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.69					1.00	

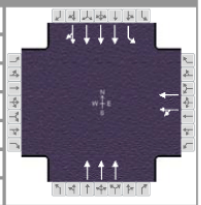
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h	491	397	375					998	484	861	839	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1701	1758	1657					1716	1664	1652	1580	
Queue Service Time (*g s*), s	27.6	19.8	19.9					28.4	28.5	24.0	16.8	
Cycle Queue Clearance Time (*g c*), s	27.6	19.8	19.9					28.4	28.5	24.0	16.8	
Green Ratio (*g/C*)	0.32	0.32	0.32					0.31	0.31	0.24	0.54	
Capacity (*c*), veh/h	545	563	531					1047	508	794	1692	
Volume-to-Capacity Ratio (*X*)	0.901	0.704	0.706					0.953	0.953	1.084	0.496	
Back of Queue (Q), ft/ln (95 th percentile)	482.3	339.4	317.6					530.1	541.2	585.2	264.7	
Back of Queue (Q), veh/ln (95 th percentile)	19.1	13.3	12.7					20.2	21.6	23.2	9.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00					0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh	32.5	29.8	29.8					34.0	34.0	38.0	14.9	
Incremental Delay (*d 2*), s/veh	15.2	2.6	2.8					18.6	29.9	57.0	1.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.6	32.4	32.6					52.6	63.9	95.0	16.0	
Level of Service (LOS)	D	C	C					D	E	F	B	
Approach Delay, s/veh / LOS	38.4	D		0.0			56.3	E		56.0	E	
Intersection Delay, s/veh / LOS	51.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.47	B	2.61	C	1.70	B	1.89	B
Bicycle LOS Score / LOS	1.53	B			1.30	A	1.89	B

EXHIBIT 4.24
2020 EXISTING PEAK AM HOUR ANALYSIS - St. Patrick/King Edward

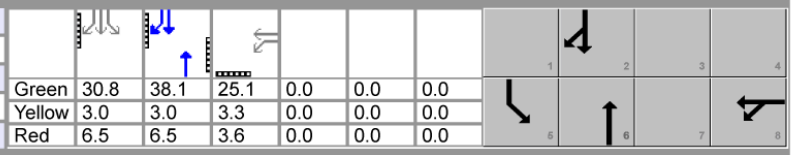
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2020_ex_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				100	508			617		400	1605	163

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	30.8	38.1	25.1	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				32.0		47.6	40.3	88.0
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.0		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				24.1			30.1	
Green Extension Time (*g e*), s				1.0		0.0	0.7	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.03			0.00	

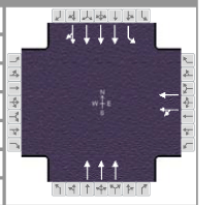
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				343	318			671		435	1469	452
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1721	1758			1379		1634	1716	1584
Queue Service Time (*g s*), s				23.1	20.5			15.4		29.1	13.0	13.9
Cycle Queue Clearance Time (*g c*), s				23.1	20.5			15.4		29.1	13.0	13.9
Green Ratio (*g/C*)				0.23	0.23			0.33		0.33	0.73	0.73
Capacity (*c*), veh/h				389	397			1385		541	3748	1063
Volume-to-Capacity Ratio (*X*)				0.881	0.800			0.484		0.804	0.392	0.426
Back of Queue (*Q*), ft/ln (95 th percentile)				413.1	366.6			260.9		463.3	197.6	202.9
Back of Queue (*Q*), veh/ln (95 th percentile)				16.5	14.3			9.0		17.7	7.5	8.1
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				44.9	43.9			31.7		36.6	7.5	6.9
Incremental Delay (*d 2*), s/veh				12.5	4.6			1.2		4.2	0.3	1.2
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				57.4	48.5			32.9		40.8	7.8	8.1
Level of Service (LOS)				E	D			C		D	A	A
Approach Delay, s/veh / LOS	0.0			53.1		D	32.9		C	14.0		B
Intersection Delay, s/veh / LOS	24.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.93	B	1.65	B
Bicycle LOS Score / LOS			1.03	A	0.86	A	1.46	A

EXHIBIT 4.25
2020 EXISTING PEAK PM HOUR ANALYSIS - St. Patrick/King Edward

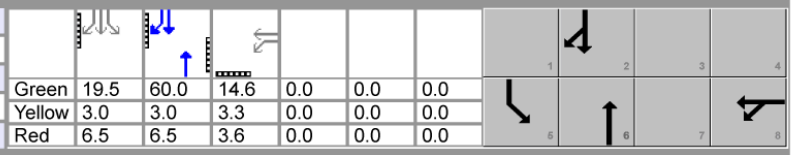
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2020_ex_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				48	285			1447		300	900	99

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	19.5	60.0	14.6	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				21.5		69.5	29.0	98.5
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.1		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				14.0			23.8	
Green Extension Time (*g e*), s				0.6		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

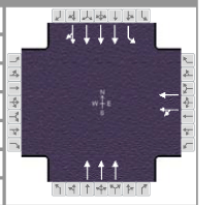
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				188	174			1573		326	828	258
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1688	1730			1583		1634	1716	1578
Queue Service Time (*g s*), s				13.0	11.6			28.7		22.8	4.2	4.8
Cycle Queue Clearance Time (*g c*), s				13.0	11.6			28.7		22.8	4.2	4.8
Green Ratio (*g/C*)				0.14	0.14			0.52		0.24	0.82	0.82
Capacity (*c*), veh/h				233	239			2455		387	4200	1197
Volume-to-Capacity Ratio (*X*)				0.807	0.727			0.641		0.843	0.197	0.215
Back of Queue (*Q*), ft/ln (95 th percentile)				236.6	227.4			407.2		420.4	48.6	54.6
Back of Queue (*Q*), veh/ln (95 th percentile)				9.5	8.7			15.8		16.0	1.9	2.2
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				50.2	49.5			20.9		43.7	3.2	2.8
Incremental Delay (*d 2*), s/veh				2.5	1.6			1.3		14.7	0.1	0.4
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				52.7	51.1			22.2		58.4	3.4	3.2
Level of Service (LOS)				D	D			C		E	A	A
Approach Delay, s/veh / LOS	0.0			51.9		D	22.2		C	16.0		B
Intersection Delay, s/veh / LOS	22.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.91	B	1.63	B
Bicycle LOS Score / LOS			0.79	A	1.35	A	1.07	A

EXHIBIT 4.26
2024 BACKGROUND PEAK AM HOUR ANALYSIS - St. Patrick/King Edward

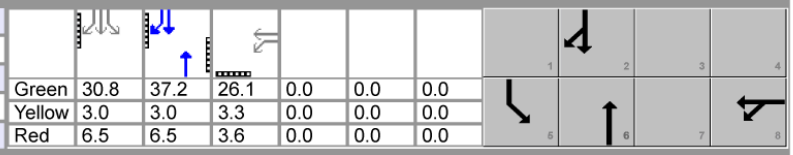
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2024_bak_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				104	529			642		400	1687	170

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	30.8	37.2	26.1	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				33.0		46.7	40.3	87.0
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.0		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				25.0			30.1	
Green Extension Time (*g e*), s				1.0		0.0	0.7	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.05			0.00	

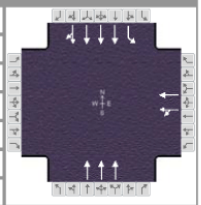
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				357	331			698		435	1543	475
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1722	1758			1379		1634	1716	1585
Queue Service Time (*g s*), s				24.0	21.3			16.4		29.1	14.4	15.3
Cycle Queue Clearance Time (*g c*), s				24.0	21.3			16.4		29.1	14.4	15.3
Green Ratio (*g/C*)				0.23	0.23			0.33		0.33	0.72	0.72
Capacity (*c*), veh/h				403	411			1352		541	3707	1050
Volume-to-Capacity Ratio (*X*)				0.886	0.805			0.516		0.804	0.416	0.452
Back of Queue (*Q*), ft/ln (95 th percentile)				431.1	381			274.6		463.3	215.5	221.1
Back of Queue (*Q*), veh/ln (95 th percentile)				17.2	14.9			9.5		17.7	8.2	8.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				44.4	43.4			32.7		36.6	8.1	7.4
Incremental Delay (*d 2*), s/veh				13.8	5.3			1.4		4.2	0.3	1.4
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				58.2	48.7			34.1		40.8	8.4	8.8
Level of Service (LOS)				E	D			C		D	A	A
Approach Delay, s/veh / LOS	0.0			53.6		D	34.1		C	14.2		B
Intersection Delay, s/veh / LOS	24.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.93	B	1.65	B
Bicycle LOS Score / LOS			1.06	A	0.87	A	1.50	A

EXHIBIT 4.27
2024 BACKGROUND PEAK PM HOUR ANALYSIS - St. Patrick/King Edward

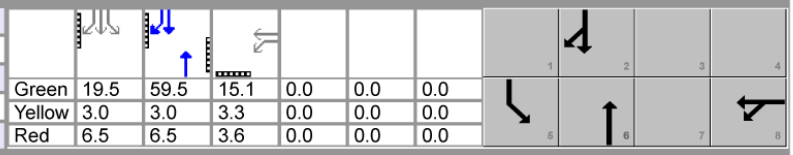
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2024_bak_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				50	297			1506		300	949	103

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	19.5	59.5	15.1	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				22.0		69.0	29.0	98.0
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.1		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				14.5			23.8	
Green Extension Time (*g e*), s				0.6		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

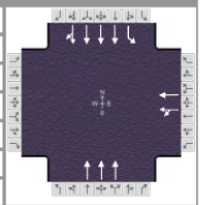
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				196	181			1637		326	872	271
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1688	1730			1583		1634	1716	1579
Queue Service Time (*g s*), s				13.5	12.0			30.8		22.8	4.6	5.3
Cycle Queue Clearance Time (*g c*), s				13.5	12.0			30.8		22.8	4.6	5.3
Green Ratio (*g/C*)				0.14	0.14			0.51		0.24	0.81	0.81
Capacity (*c*), veh/h				241	247			2433		387	4176	1191
Volume-to-Capacity Ratio (*X*)				0.813	0.733			0.673		0.843	0.209	0.228
Back of Queue (*Q*), ft/ln (95 th percentile)				244.3	234.6			433.7		420.4	54.6	60.8
Back of Queue (*Q*), veh/ln (95 th percentile)				9.8	9.0			16.8		16.0	2.1	2.4
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				49.9	49.2			21.8		43.7	3.4	3.0
Incremental Delay (*d 2*), s/veh				2.5	1.6			1.5		14.7	0.1	0.4
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				52.4	50.8			23.3		58.4	3.5	3.4
Level of Service (LOS)				D	D			C		E	A	A
Approach Delay, s/veh / LOS	0.0			51.6		D	23.3		C	15.7		B
Intersection Delay, s/veh / LOS	23.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.91	B	1.63	B
Bicycle LOS Score / LOS			0.80	A	1.39	A	1.09	A

EXHIBIT 4.28
2029 BACKGROUND PEAK AM HOUR ANALYSIS - St. Patrick/King Edward

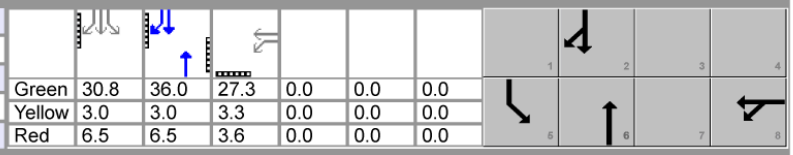
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2029_bak_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				109	556			675		400	1793	178

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	30.8	36.0	27.3	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				34.2		45.5	40.3	85.8
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.0		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				26.3			30.1	
Green Extension Time (*g e*), s				1.0		0.0	0.7	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.10			0.00	

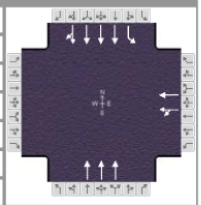
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				375	348			734		435	1637	505
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1722	1758			1379		1634	1716	1587
Queue Service Time (*g s*), s				25.3	22.4			17.7		29.1	16.2	17.2
Cycle Queue Clearance Time (*g c*), s				25.3	22.4			17.7		29.1	16.2	17.2
Green Ratio (*g/C*)				0.24	0.24			0.32		0.33	0.71	0.71
Capacity (*c*), veh/h				420	429			1310		541	3655	1036
Volume-to-Capacity Ratio (*X*)				0.892	0.811			0.560		0.804	0.448	0.488
Back of Queue (*Q*), ft/ln (95 th percentile)				454	399.2			292.8		463.3	240.6	245.8
Back of Queue (*Q*), veh/ln (95 th percentile)				18.2	15.6			10.1		17.7	9.2	9.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				43.8	42.8			34.1		36.6	8.8	8.1
Incremental Delay (*d 2*), s/veh				15.4	6.2			1.7		4.2	0.4	1.6
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				59.2	49.0			35.8		40.8	9.2	9.8
Level of Service (LOS)				E	D			D		D	A	A
Approach Delay, s/veh / LOS	0.0			54.3		D	35.8		D	14.7		B
Intersection Delay, s/veh / LOS	25.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.93	B	1.66	B
Bicycle LOS Score / LOS			1.08	A	0.89	A	1.55	B

EXHIBIT 4.29
2029 BACKGROUND PEAK PM HOUR ANALYSIS - St. Patrick/King Edward

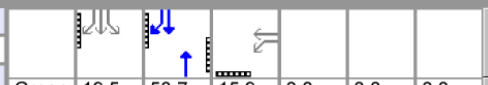
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2029_bak_PM.xus		
Project Description	Boutique Hotel				

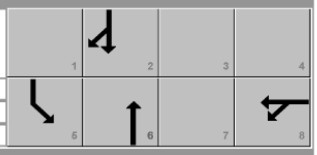


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				53	312			1583		300	1013	108

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	19.5	58.7	15.9	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				22.8		68.2	29.0	97.2
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.1		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				15.2			23.8	
Green Extension Time (*g e*), s				0.7		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

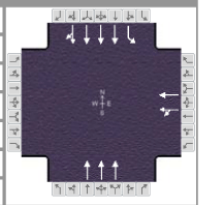
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				206	191			1721		326	930	289
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1689	1730			1583		1634	1716	1581
Queue Service Time (*g s*), s				14.2	12.6			33.7		22.8	5.2	5.8
Cycle Queue Clearance Time (*g c*), s				14.2	12.6			33.7		22.8	5.2	5.8
Green Ratio (*g/C*)				0.15	0.15			0.51		0.24	0.81	0.81
Capacity (*c*), veh/h				251	258			2404		387	4145	1182
Volume-to-Capacity Ratio (*X*)				0.820	0.740			0.716		0.843	0.224	0.244
Back of Queue (*Q*), ft/ln (95 th percentile)				254.1	243.8			469.8		420.4	62.4	69.1
Back of Queue (*Q*), veh/ln (95 th percentile)				10.2	9.4			18.2		16.0	2.4	2.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				49.5	48.8			22.9		43.7	3.7	3.2
Incremental Delay (*d 2*), s/veh				2.5	1.6			1.9		14.7	0.1	0.5
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				52.0	50.4			24.8		58.4	3.8	3.7
Level of Service (LOS)				D	D			C		E	A	A
Approach Delay, s/veh / LOS	0.0			51.3		D	24.8		C	15.3		B
Intersection Delay, s/veh / LOS	23.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.91	B	1.63	B
Bicycle LOS Score / LOS			0.81	A	1.43	A	1.12	A

EXHIBIT 4.30
2024 TOTAL PEAK AM HOUR ANALYSIS - St. Patrick/King Edward

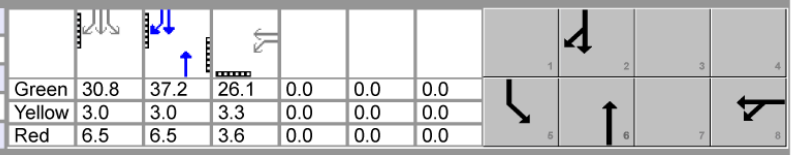
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2024_tot_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				104	529			643		400	1688	170

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	30.8	37.2	26.1	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				33.0		46.7	40.3	87.0
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.0		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				25.0			30.1	
Green Extension Time (*g e*), s				1.0		0.0	0.7	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.05			0.00	

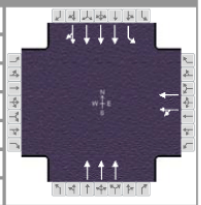
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				357	331			699		435	1544	476
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1722	1758			1379		1634	1716	1585
Queue Service Time (*g s*), s				24.0	21.3			16.4		29.1	14.4	15.3
Cycle Queue Clearance Time (*g c*), s				24.0	21.3			16.4		29.1	14.4	15.3
Green Ratio (*g/C*)				0.23	0.23			0.33		0.33	0.72	0.72
Capacity (*c*), veh/h				403	411			1352		541	3707	1051
Volume-to-Capacity Ratio (*X*)				0.886	0.805			0.517		0.804	0.416	0.453
Back of Queue (*Q*), ft/ln (95 th percentile)				431.1	381			275		463.3	215.5	221.2
Back of Queue (*Q*), veh/ln (95 th percentile)				17.2	14.9			9.5		17.7	8.2	8.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				44.4	43.4			32.7		36.6	8.1	7.4
Incremental Delay (*d 2*), s/veh				13.8	5.3			1.4		4.2	0.3	1.4
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				58.2	48.7			34.1		40.8	8.4	8.8
Level of Service (LOS)				E	D			C		D	A	A
Approach Delay, s/veh / LOS	0.0			53.6		D	34.1		C	14.2		B
Intersection Delay, s/veh / LOS	24.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.93	B	1.65	B
Bicycle LOS Score / LOS			1.06	A	0.87	A	1.50	B

EXHIBIT 4.31
2024 TOTAL PEAK PM HOUR ANALYSIS - St. Patrick/King Edward

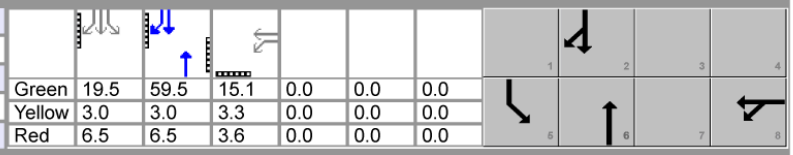
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2024_tot_PM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				50	297			1507		300	950	103

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	19.5	59.5	15.1	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				22.0		69.0	29.0	98.0
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.1		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				14.5			23.8	
Green Extension Time (*g e*), s				0.6		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

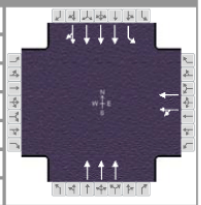
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				196	181			1638		326	873	272
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1688	1730			1583		1634	1716	1579
Queue Service Time (*g s*), s				13.5	12.0			30.8		22.8	4.6	5.3
Cycle Queue Clearance Time (*g c*), s				13.5	12.0			30.8		22.8	4.6	5.3
Green Ratio (*g/C*)				0.14	0.14			0.51		0.24	0.81	0.81
Capacity (*c*), veh/h				241	247			2433		387	4176	1191
Volume-to-Capacity Ratio (*X*)				0.813	0.733			0.673		0.843	0.209	0.228
Back of Queue (*Q*), ft/ln (95 th percentile)				244.3	234.6			434		420.4	54.7	60.9
Back of Queue (*Q*), veh/ln (95 th percentile)				9.8	9.0			16.8		16.0	2.1	2.4
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				49.9	49.2			21.8		43.7	3.4	3.0
Incremental Delay (*d 2*), s/veh				2.5	1.6			1.5		14.7	0.1	0.4
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				52.4	50.8			23.3		58.4	3.5	3.4
Level of Service (LOS)				D	D			C		E	A	A
Approach Delay, s/veh / LOS	0.0			51.6		D	23.3		C	15.7		B
Intersection Delay, s/veh / LOS	23.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.91	B	1.63	B
Bicycle LOS Score / LOS			0.80	A	1.39	A	1.09	A

EXHIBIT 4.32
2029 TOTAL PEAK AM HOUR ANALYSIS - St. Patrick/King Edward

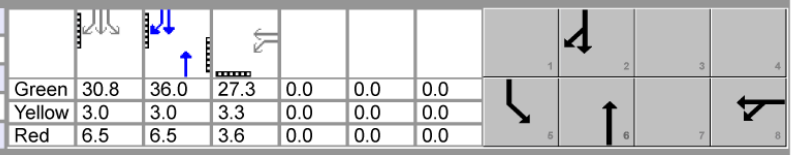
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2029_tot_AM.xus		
Project Description	Boutique Hotel				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				109	556			676		400	1794	178

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	30.8	36.0	27.3	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				34.2		45.5	40.3	85.8
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.0		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				26.3			30.1	
Green Extension Time (*g e*), s				1.0		0.0	0.7	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.10			0.00	

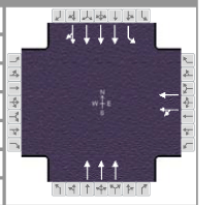
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				375	348			735		435	1638	505
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1722	1758			1379		1634	1716	1587
Queue Service Time (*g s*), s				25.3	22.4			17.7		29.1	16.2	17.2
Cycle Queue Clearance Time (*g c*), s				25.3	22.4			17.7		29.1	16.2	17.2
Green Ratio (*g/C*)				0.24	0.24			0.32		0.33	0.71	0.71
Capacity (*c*), veh/h				420	429			1310		541	3655	1036
Volume-to-Capacity Ratio (*X*)				0.892	0.811			0.561		0.804	0.448	0.488
Back of Queue (*Q*), ft/ln (95 th percentile)				454	399.2			293.4		463.3	240.7	245.9
Back of Queue (*Q*), veh/ln (95 th percentile)				18.2	15.6			10.1		17.7	9.2	9.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				43.8	42.8			34.1		36.6	8.8	8.1
Incremental Delay (*d 2*), s/veh				15.4	6.2			1.7		4.2	0.4	1.6
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				59.2	49.0			35.8		40.8	9.2	9.8
Level of Service (LOS)				E	D			D		D	A	A
Approach Delay, s/veh / LOS	0.0			54.3		D	35.8		D	14.7		B
Intersection Delay, s/veh / LOS	25.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.93	B	1.66	B
Bicycle LOS Score / LOS			1.08	A	0.89	A	1.55	B

EXHIBIT 4.33
2029 TOTAL PEAK PM HOUR ANALYSIS - St. Patrick/King Edward

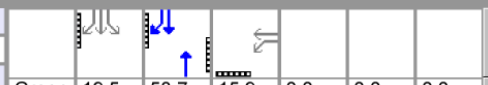
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Nov 16, 2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	King Edward Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	St. Patrick/King Edward	File Name	737_2029_tot_PM.xus		
Project Description	Boutique Hotel				

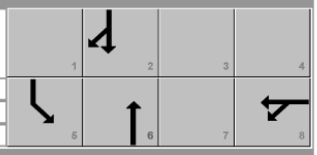


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				53	312			1584		300	1014	108

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	19.5	58.7	15.9	0.0	0.0	0.0	
Yellow	3.0	3.0	3.3	0.0	0.0	0.0	
Red	6.5	6.5	3.6	0.0	0.0	0.0	



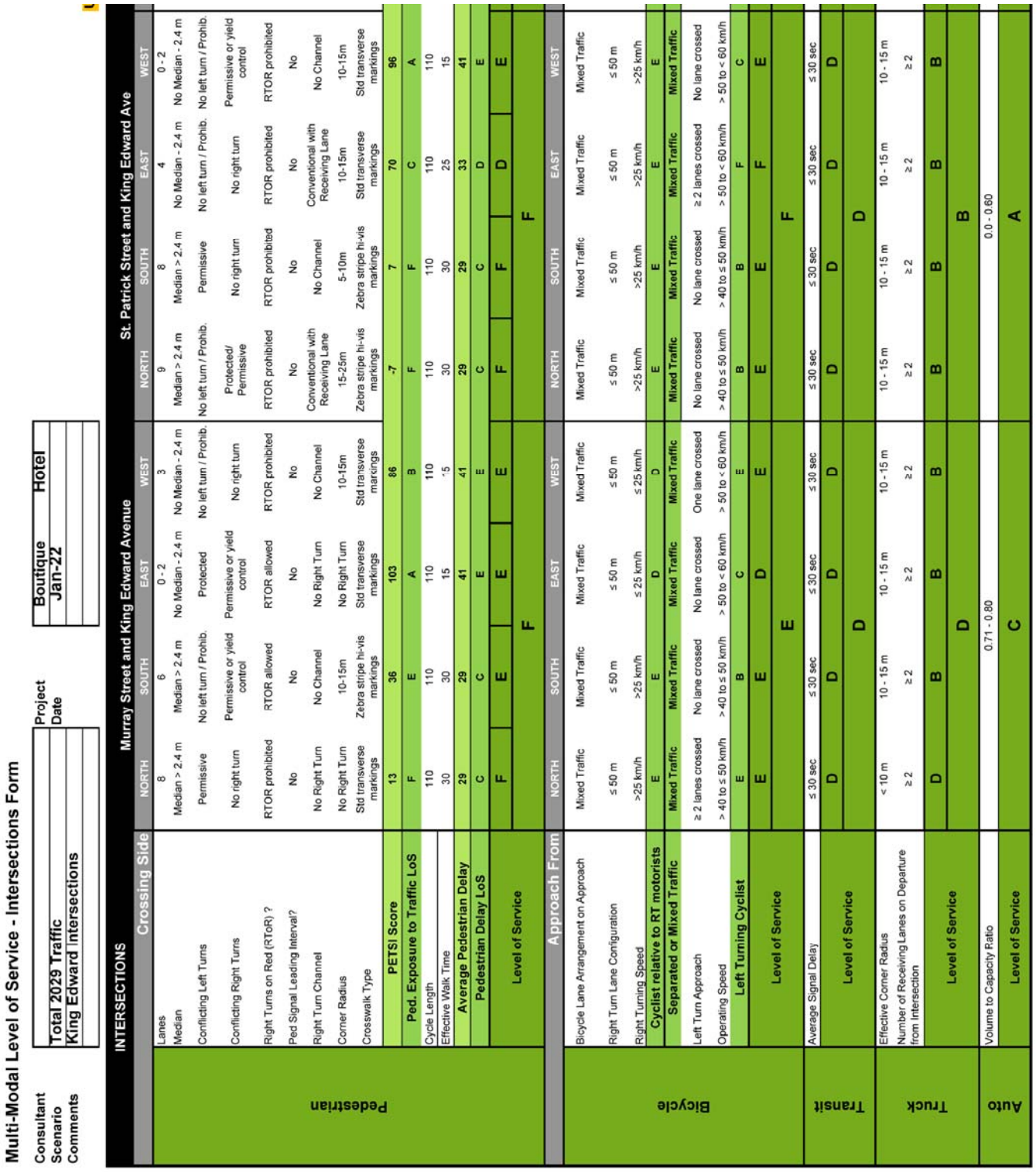
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		6	5	2
Case Number				12.0		8.3	2.0	4.0
Phase Duration, s				22.8		68.2	29.0	97.2
Change Period, (*Y+R c*), s				6.9		9.5	9.5	9.5
Max Allow Headway (*MAH*), s				3.1		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				15.2			23.8	
Green Extension Time (*g e*), s				0.7		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8			6		5	2	12
Adjusted Flow Rate (*v*), veh/h				206	191			1722		326	931	289
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1689	1730			1583		1634	1716	1581
Queue Service Time (*g s*), s				14.2	12.6			33.7		22.8	5.2	5.8
Cycle Queue Clearance Time (*g c*), s				14.2	12.6			33.7		22.8	5.2	5.8
Green Ratio (*g/C*)				0.15	0.15			0.51		0.24	0.81	0.81
Capacity (*c*), veh/h				251	258			2404		387	4145	1182
Volume-to-Capacity Ratio (*X*)				0.820	0.740			0.716		0.843	0.225	0.244
Back of Queue (*Q*), ft/ln (95 th percentile)				254.1	243.8			470		420.4	62.4	69.2
Back of Queue (*Q*), veh/ln (95 th percentile)				10.2	9.4			18.2		16.0	2.4	2.8
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00		0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh				49.5	48.8			23.0		43.7	3.7	3.2
Incremental Delay (*d 2*), s/veh				2.5	1.6			1.9		14.7	0.1	0.5
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh				52.0	50.4			24.8		58.4	3.8	3.7
Level of Service (LOS)				D	D			C		E	A	A
Approach Delay, s/veh / LOS	0.0			51.3		D	24.8		C	15.3		B
Intersection Delay, s/veh / LOS	23.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.48	B	2.75	C	1.91	B	1.63	B
Bicycle LOS Score / LOS			0.81	A	1.43	A	1.13	A

EXHIBIT 4.34

2029 MMLOS INTERSECTIONS - Murray/King Edward & St. Patrick/King Edward



Multi-Modal Level of Service - Intersections Form

Consultant: Total 2029 Traffic
Scenario: King Edward Intersections
Comments:

Project: Boutique Hotel
Date: Jan-22

INTERSECTIONS		Murray Street and King Edward Avenue				St. Patrick Street and King Edward Ave			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	8	6	0 - 2	3	9	8	4	0 - 2
	Median	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	No left turn / Prohib.	Protected	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.
	Conflicting Right Turns	No right turn	Permissive or yield control	Permissive or yield control	No right turn	Protected/ Permissive	No right turn	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No
	Right Turn Channel	No Right Turn	No Channel	No Right Turn	No Channel	Conventional with Receiving Lane	No Channel	Conventional with Receiving Lane	No Channel
	Corner Radius	No Right Turn	10-15m	No Right Turn	10-15m	15-25m	5-10m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Zebra stripe hi-vis markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings	Std transverse markings
	PETSI Score	13	36	103	86	-7	7	70	96
	Ped. Exposure to Traffic LoS	F	E	A	B	F	F	C	A
	Cycle Length	110	110	110	110	110	110	110	110
	Effective Walk Time	30	30	15	15	30	30	25	15
	Average Pedestrian Delay	29	29	41	41	29	29	33	41
	Pedestrian Delay LoS	C	C	E	E	C	C	D	E
	Level of Service	F	E	E	E	F	F	D	E
		F				F			
Bicycle	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	>25 km/h	>25 km/h	≤ 25 km/h	≤ 25 km/h	>25 km/h	>25 km/h	>25 km/h	>25 km/h
	Cyclist relative to RT motorists	E	E	D	D	E	E	E	E
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	≥ 2 lanes crossed	No lane crossed	No lane crossed	One lane crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	E	B	C	E	B	B	F	C
	Level of Service	E	E	D	E	E	E	F	E
		E				E			
Transit	Average Signal Delay	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec
	Level of Service	D	D	D	D	D	D	D	D
		D				D			
Truck	Effective Corner Radius	< 10 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2
	Level of Service	D	B	B	B	B	B	B	B
		D				B			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60			
	Level of Service	C				A			