TRAFFIC IMPACT ASSESSMENT
Update
Response to Comments on 2nd Submission

Proposed Housing Development,
6301 Campeau Drive
Kanata (Ottawa), ON

August 2021

Prepared for
Bayview Hospitality Holdings Ltd.

c/o
Momentum Planning and Communications

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August 18, 2021

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Re: Proposed Housing Development, 6301 Campeau Drive, Kanata (Ottawa), ON – Traffic Impact Assessment Update

TRANS-PLAN is pleased to submit this Traffic Impact Assessment Update in response to the City comments on 2nd submission for the proposed housing development to be located at 6301 Campeau Drive, Kanara, ON. The proposed development consists of two parcels, including 188 stacked dwelling units and three 10-storey apartment buildings with 614 units and a total GFA of 430.6 sq.m ground floor commercial.

Reviewing the City of Ottawa Zoning By-law, the proposed parking supply meets the requirements. A review of parking layout and access requirements and site circulation is also provided herein. Traffic and parking activity at the proposed development will function in an acceptable manner.

Our findings indicate that the proposed development would be accommodated by the existing road network and no future road improvements (other than construction of the site access) are necessary to accommodate the proposed development. Vehicles are expected to be able to access the site safely and efficiently from the proposed. All the site accesses are expected to operate well.

Sincerely,

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Partner, Engineer

Trans-Plan Transportation Inc.
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INSTRUCTION

Trans-Plan has been retained by Bayview Hospitality Holdings Ltd. to complete a Traffic Impact Assessment for a proposed housing development located at 6301 Campeau Drive, Kanata (Ottawa), Ontario. This assessment includes the following studies and tasks:

Screening & Scoping

- A review of the proposed development
- a review and assessment of the existing conditions, including roadway, pedestrian, cycling and transit network
- a review of planned conditions, including network improvements and background development
- a description of study area and time horizon for the project

Forecasting

- a generation, assignment, and distribution of site travel demand for all modes
- an assessment of boundary roadway operations under future background conditions, including a review of traffic growth, area developments and proposed transportation improvements in the study area

Analysis/strategy

- a review of the design for parking layout, pedestrian and transit facilities and proposed for the proposed land uses based on the City of Ottawa Zoning By-law
- a vehicle turning template review of passenger vehicles, loading / delivery truck, and waste collection vehicles, demonstrating proper circulation within the site
- a review of site parking supply and for parking requirements based on the City's Zoning By-law
- a Multi-Modal Level of Service (MMLOS) assessment for pedestrians, cyclists, transit, truck and autos
- an intersection control review of the site driveway at Campeau Drive, including traffic signalization warrants
- a review of TDM guidelines (from a comparable municipality) to determine TDM measures that would be appropriate for the planned development in terms of context, scale and land use
- an assessment of the impact of site-generated traffic on the study area intersections and proposed boundary roadway connections under future traffic conditions
- recommendations to mitigate any identified traffic impacts on the boundary roadways, resulting from the proposed development

Prior to conducting this study, the Planning department at the City of Ottawa were contacted and provided a study terms of reference to discuss the scope and methodology. This report adheres to the City of Ottawa's Traffic Impact Assessment Guidelines, dated June 2017.

To reflect the latest site statistics, the traffic analysis, parking analysis and vehicle turning movement diagrams in this study have been updated.

RESPONSE TO COMMENTS ON 2nd SUBMISSION

A Traffic Impact Assessment Update report was prepared by Trans-Plan was submitted on May 6, 2021. This response to comments and TIA update has been conducted to address the comments on the 2nd submission, received from the City of Ottawa, Development Review, dated July 9, 2021. The comments and our responses are summarized below:

***Comment 1*: The maximum width for a two way access is 9m at the property line. The southerly access width seems to be over 9m. Please reduce the access width. Tighten the curb radii as much as possible for all the accesses. while ensuring trucks can maneuver.**

Response: Both the access of Parcel 1 and the north access of Parcel 2 are less than 9m in width. The width of the south access of Parcel 2 is proposed to be 12m at the property line, including the two-way entrance of the parking garage and a loading space. As shown in Figure 14-17, the proposed access allows loading truck and waste collection truck to maneuver in a safe manner.

SCOPING REPORT

1. PROPOSED DEVELOPMENT & SCREEN FORM

The site, shown in Figure 1, is located on the southwest corner of Campeau Drive and Cordillera Street in the community of Kanata, City of Ottawa. It's located with the Mixed-Use Centre and is defied as Town Centre in the Official Plan. There would be two phases, Phase 1 contains development in Parcel 2 (the one on the east side). Phase 1 is proposed to start in 2021. The timeline for Phase 2 is to be determined.

The proposed development is comprised of two parcels with stacked dwelling units and apartment building units. Ground floor commercial area with a total GFA of approximately 430.6 sq.m is proposed at the easterly apartment building, facing Cordillera Street. The Table 1 below summarized the detailed statistics.

Table 1 – Proposed Site Statistics

	Parcel 1	Parcel 2	Total
Stacked Dwelling Units	104	84	188
Apartment Building Units	348	266	614
Total Units	452	350	**802 units**
Commercial Area (sq.m)		430.6	**430.6 sq.m**
Surface Parking spaces	114	93	207
Underground Parking spaces	359	282	641
Total Parking spaces	473	375	**848 spaces**

The site plan, prepared by Fabiani Architect, is shown in Figure 2. As shown in the site plan, a full-moves driveway off Campeau Drive is proposed to provide access to Parcel 1. Two more full-move accesses to parcel 2 are proposed off Cordillera Street.

Step 1 – Screening was completed and included in this report as Appendix A. It was determined through Step 1 that a complete Transportation Impact Assessment (TIA) would be required for the project. Several "triggers" were satisfied, resulting in the need to continue with the TIA process.

2. EXISTING CONDITIONS

2.1 Road Network

The boundary roadways located in the study area are described as follows and are provided in Figure 3: The boundary roadways located in the study are described as follows:

Campeau Drive is an arterial road under the jurisdiction of the City of Ottawa that runs in an east-west direction. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 60 km/h. Sidewalks are provided along both sides of Campeau Drive.

Kanata Avenue is an arterial road under the jurisdiction of the City of Ottawa that runs in a north-south direction. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 60 km/h. Sidewalks are provided along both sides of Kanata Avenue.

Knudson Drive is a collector road under the jurisdiction of the City of Ottawa that runs in a north-south direction. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 50 km/h. Sidewalks are provided along west side of Knudson Drive in the study area. Dedicated bike lanes along both sides of Knudson Drive.

Maritime Way y/Lord Byng Way is a local road under the jurisdiction of the City of Ottawa that runs in a north-south direction. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 50 km/h. Sidewalks are provided along both sides of Maritime Way.

Conacher Gate/ Great Lakes Avenue is a local road under the jurisdiction of the City of Ottawa that runs in a north-south direction. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 50 km/h. Sidewalks are provided along both sides of Great Lakes Avenue.

Conacher Gate is a private road opposing Great Lakes Avenue. It has two travel lanes: one in each direction and provides connections between the residential units in Country Club Estates and Campeau Drive.

Cordillera Street is a local road under the jurisdiction of the City of Ottawa that runs in a north-south direction. It has two travel lanes: one in each direction. The assumed speed limit on the roadway is 50 km/h. Sidewalks are provided along both sides of Cordillera Street.

Stonecroft Terrace is a local road under the jurisdiction of the City of Ottawa and is a "T-shape" residential driveway connecting to 54 residential houses. It has two travel lanes: one in each direction. The assumed speed limit on the roadway is 40 km/h.

2.2 Study Area Intersections & Driveways

The following intersections or driveways were analyzed in this report:

Campeau Drive at Kanata Avenue is a signalized intersection. Sidewalks are provided along both sides of Campeau Drive and Kanara Avenue at the intersection. There are currently on road bike lanes at both legs of Campeau Drive and the east leg of Kanata Avenue at the intersection.

Campeau Drive at Cordillera Street is a T-intersection (3 legs) with stop sign control at Cordillera Street. Sidewalks are provided along both sides of Campeau Drive and Cordillera Street at the intersection. There are currently on road bike lanes at both legs of Campeau Drive at the intersection.

Campeau Drive at Conacher Gate/ Great Lakes Avenue is a two-way stop sign control intersection with full moves. Sidewalks are provided along both sides of Campeau Drive and Great Lakes Avenue at the intersection. There are currently on road bike lanes at both legs of Campeau Drive at the intersection.

Campeau Drive at Maritime Way / Knudson Drive is a signalized intersection, and an extra left lane is provided at the north leg. Sidewalks are provided along both sides of Campeau Drive, Maritime Wany and the west side of Knudson Drive at the intersection. There are currently bike lanes at both legs of Campeau Drive and Knudson Drive at the intersection.

Campeau Drive at Stonecroft Terrace is a T-intersection with stop sign control at Stonecroft Terrace. Sidewalks are provided along both sides of Campeau Drive at the intersection. There are currently on road bike lanes at both legs of Campeau Drive at the intersection.

Kanata Avenue at Maritime Way/Lord Byng Way a signalized intersection, and three extra left lanes is provided at the west, east and south legs. Sidewalks are provided along both sides of Kanata Avenue (west leg only), Maritime Way and Lord Byng Way at the intersection.

The study area roadway characteristics, including lane configurations, control type and speed limit, are shown in Figure 3.

Three full-moves access are proposed for the site, two of which are off Cordillera Street and the other one is located off Campeau Drive. With limited roadway connection to the south, the majority of the site trips are expected to travel from / to the north (Campeau Drive). The site is expected to have negligible impact on the capacity of the intersections south the site. We believe the intersections above would be sufficient for traffic analysis.

2.3 Existing Cycling and Pedestrian Network

According to the cycle map of the City of Ottawa, there are currently bike lanes (on road) along Campeau Drive, Kanata Avenue and Knudson Drive Avenue in the study area. Sidewalks are currently provided along both sides of Campeau Drive, Cordillera Street, Great Lake Avenue, Maritime Way and west side of Knudson Drive in the study area.

2.4 Transit Service

The site is served by the OC Transpo bus network connecting transit riders to major locations throughout Ottawa. The bus routes described below stop at Campeau Drive and Stonecroft Terrace, the closest stop to the development site:

Route 62, Tunney's Pasture/Stittsville is a bus route that generally runs in the eastbound/westbound direction connecting Kanata to the Tunney's Pasture Rail Station in Ottawa. This route makes stops at the Canadian Tire Centre, the Bell Sensplex, and travels along Highway 417 for a bulk of the trip. The nearest bus stop for this route for both eastbound and westbound passengers is located at Campeau Drive and Stonecroft Terrace, directly in front of the proposed development location.

Route 161, Terry Fox/ Bridlewood is a bus route that generally runs in the northbound/southbound direction. This bus only stops in front of the proposed development twice a day: once in the morning heading towards Earl of March High School, and once in the afternoon in the southbound direction, away from the high school. This school route connects passengers to the Kanata Centrum Shopping Centre, Holy Trinity Catholic High School, Hazeldeans Woods Park, Hazeldeans Shopping Centre, AY Jackson Secondary School, and Deevy Pines Park. The nearest bus stop for this route for both northbound and southbound passengers is located at Campeau Drive and Stonecroft Terrace, directly in front of the proposed development location.

Route 164, Terry Fox/Hope Side is bus route that generally runs in the northbound/southbound direction and connects passengers from the Kanata Spectrum Shopping Centre to the south end of Kanata. The route makes stops at Beaverbrook Park and Hazeldean Mall, while making multiple stops along Eagleson Road. The nearest bus stop for this route for both northbound and southbound passengers is located at Campeau Drive and Stonecroft Terrace, directly in front of the proposed development location.

Route 268, Tunney's Pasture/Kanata Lakes is a predominately east-west bus route that connects Kanata to the Blair rail station in Tunney's Pasture. Along the way, the bus makes stops at the Kanata Centrum Shopping Centre, Beaverbrook Park, and travels along Highway 417 for a bulk of the trip. The nearest bus

stop for this route for both eastbound and westbound passengers is located at Campeau Drive and Stonecroft Terrace, directly in front of the proposed development location.

Figure 4 provides the local transit service map of the City of Ottawa within the study area. More details of transit in the study area are discussed in Section 4.1.

2.5 Existing Peak

To determine existing operating conditions in the study area, the most recent Turning Movement Counts (TMCs) available from the City and the report for 7000 Campeau Drive have been applied in the analysis (with annual growth). The existing traffic volumes have been balanced at all other intersections based on the available data and data collected by Trans-Plan to reflect the worst scenario. Additionally, Trans-Plan conducted a site visit and made traffic observations. Table 2 provides a summary, and the detailed TMC data included in Appendix B. The existing traffic volumes for the weekday AM and PM peak hours are shown in Figure 5.

Table 2 – Intersection Turning Movement Count Details

Intersection	Count Date	Count Hours	Source
Campeau Drive at Maritime Way / Knudson Drive	September, 2019	N/A	TIA report for 7000 Campeau Drive
Campeau Drive at Kanata Avenue	Tuesday, March 20, 2018	7:00am - 10:00am 3:00pm - 6:00pm	City of Ottawa
Kanata Avenue at Maritime Way/Lord Byng Way	Tuesday, March 10, 2020		
Campeau Drive & Cordillera Street	Tuesday September 22, 2020	7:00am – 10:00am 3:00pm - 6:00pm	Trans-Plan
Campeau Drive at Stonecroft Terrace			
Campeau Drive & Great Lakes Avenue			

2.6 Existing Mode Split

The City of Ottawa has provided an origin-destination (O-D) matrix for the area travel characteristic within different districts of Ottawa. The O-D matrix was developed based on a 2011 survey where it collects information on how members of households use the transportation system in Ottawa and divides the information into districts. For the purposes of this study, the district that the proposed development is located in is the area of Kanata / Stittsville. The area modal splits are summarized in Table 3. Source information is provided in Appendix C.

Based on the 2011 survey data, a total of approximately 60% to 75% of all home-based trips taken during the weekday peak periods were undertaken by auto drivers for the entire City of Ottawa, with the balance of the trips being undertaken by auto passengers, transit and other modes of transportation. Within the district of Kanata / Stittsville, approximately 45 to 55% of the total of all home-based trips taken during the weekday peak periods were undertaken by auto drivers, with the balance of trips being undertaken by auto passengers, transit, walk, bicycle and other modes of transportation.

Table 3 –Existing Mode Split

Travel Mode	AM Peak			PM Peak		
	In	Out	Within District	In	Out	Within District
Auto	74%	60%	44%	67%	67%	56%
Auto Passenger	7%	9%	17%	16%	16%	20%
Transit	8%	24%	4%	13%	13%	3%
Bicycle	1%	0	1%	0	0	1%
Walk	0	0	19%	0	0	13%
Other	10%	7%	15%	4%	4%	7%

2.7 Collision History

Current traffic safety issues within the study area were reviewed. The City of Ottawa provided a total of 5 years of collision data from 2014 to 2018 at the major intersections bounded within the study area. The collision data were summarized in Table 4 to identify higher incident locations and reviewed to provide a general determination of potential safety issues within the study area. For collisions at intersections, an average number of collisions were calculated. Source information is provided in Appendix D.

Table 4 – Collision History

Intersection/Segment	2014	2015	2016	2017	2018	Average
Campeau Drive at Cordillera Street	0	0	1	0	1	0.4
Campeau Drive at Great Lakes Avenue	1	1	0	0	1	0.6
Campeau Drive at Maritime Way / Knudson Drive	0	2	1	2	1	1.2
Campeau Drive at Stonecroft Terrace	0	0	0	0	2	0.4
Campeau Drive at Kanata Avenue	2	8	6	4	2	4.4
Campeau Drive between Stonecroft Terrace and Kanata Avenue	3	1	2	0	3	1.8
Campeau Drive between Conacher Gate & Knudson Drive	1	1	0	0	0	0.4
Campeau Drive between Stonecroft Terrace & Conacher Gate	0	1	0	0	0	0.2

Based on a review of area collision data, an average of 4.4 collisions (a total of 22 collisions) happened during the past five years at the intersection of Campeau Drive and Kanata Avenue. However, the number of accidents is getting smaller since 2015. All other the locations are considered fairly safe in the study area except for the intersection of Campeau Drive and Kanata Avenue.

3. PLANNED CONDITIONS

3.1 Planned Improvements

The Transportation Master Plan (TMP), November 2013 identifies two potential transportation infrastructure buildout scenarios for future rapid transit, transit priority, and road networks in Ottawa. They are the "2031 Network Concept" and the "2031 Affordable Network". The former has been designed to achieve the City's desired transportation mode share targets; the latter strategically selected aspects of the former with the intention of coming close to achieving mode share targets while remaining affordable. Funding has been allocated only towards projects identified as part of the "2031 Affordable Network" while maintaining flexibility to fund "2031 Network Concept" projects should they become pressing or if additional funding becomes available.

Roadway Network

Within the "2031 Network Concept," Campeau Drive is identified as a "Widened Arterial"; it is planned to be widened from two to four lanes within the vicinity of the site. An environmental assessment has been completed on the project. However, it is not included as part of the "2031 Affordable Network".

Within the "2031 Network Concept" and the "2031 Affordable Network," Kanata Avenue is identified as a "Widened Arterial"; it is planned to be widened from two to four lanes from Highway 417 to Campeau Drive. An environmental assessment is "in progress". It is included in Phase 2 (2020-2025) of the TMP.

Based on discussion with the City's Transportation Master Plan, dated November 2013, Campeau Drive is to be widened from two to four lanes between Didsbury Road and March Road to provides continuity in the north Kanata area, and addresses capacity and parking needs in the Kanata Town Centre. The improvement is expected to be conducted by 2031.

Canadian Shield Avenue is expected to be extended to Maritime Way in the future. Trees have started to be cleared within the future right of way in order to complete the extension of the Canadian Shield Avenue to connect to Maritime Way. No timelines are currently available for the actual construction of the road.

Transit Network

In addition to the "2031 Network Concept" and the "2031 Affordable Network," the TMP includes an "Ultimate Network". Within the "2031 Network Concept" and the "2031 Affordable Network," a Transitway bus rapid transit (BRT) segment – the "West Transitway Extension" – is planned between March Road and Terry Fox Station. An environmental assessment has been completed on the project. It is designated as part of a "2014-2031" phase.

Transit expansion projects include the West Transitway Extension (two phases), transit priority signal on Terry Fox Way, and the Kanata North Transitway (on March Road). Within the "Ultimate Network," the West Transitway is replaced by light rail transit (LRT). The planned rapid transit and transit priority network is illustrated in Figure 6.

3.2 Planned Background Developments

The City of Ottawa Development Application Map was reviewed to determine current planning applications in the surrounding area and is summarized in Table 5.

Table 5 – Study Area Background Development

Location	Proposed Land Use	Size
7000 Campeau Drive	Residential	1502 units
1250 Maritime Way	Residential & Commercial	151 units & 1200 sq.ft Retail
1088&1136 Maritime Way	Residential	298 units

4. STUDY AREA AND TIME PERIODS

4.1 Study Area

Transit

The site is served by OC Transpo and Greyhound (Temporarily closed), which connect transit riders to local and regional destinations. OC Transpo operates the following bus routes that serve the development property:

- Route 62, Tunney's Pasture/Stittsville
- Route 161, Terry Fox/ Bridlewood
- Route 164, Terry Fox/Hope Side
- Route 265, Tunney's Pasture/ Beaverbrook
- Route 268, Tunney's Pasture/Kanata Lakes
- Route 61, Tunney's Pasture- Stittsville & N Rideau & Gatineau
- Route 88, Hurdman - Terry Fox
- Route 162, Stittsville - Terry Fox
- Route 165, Innovation - Terry Fox
- Route 167, Terry Fox - Blackstone
- Route 168, Bridlewood -Terry Fox
- Route 264, Tunney's Pasture- Terry Fox
- Route 301, Bayshore/Carlingwood -Richmond/ Stittsville
- Route 303, Carlingwood Bayshore -Dunrobin Stittsville

The site is well served by transit. Transit service for most of the referenced routes is expected to increase and return to normal levels following the loosening of public health restrictions and a return to more typical conditions. Table 6 shows the details of transit routes in close proximity to the subject site, including route name, nearest transit stops to the site and service details.

The nearest bus stop of the four of the routes (62, 161,164 and 268) is located Campeau Drive at Stonecroft Terrace, which is just north of the site. The nearest bus stop for Route 265 is located at Knudson Drive and Campeau Drive, approximately 450m east of the site. For the rest of the routes, the nearest stop is located at Lord Byng Way at Kanata Avenue, approximately 300 m south of the site. All of the routes except for Route 265 can reach Terry Fox Station. The residents/visitors can easily access the bus stops through the concrete sidewalks along Campeau Drive, Cordillera Street and Maritime Way. The walking distance is expected to be shorter after the Canadian Shield Avenue extension. None of the three locations of the but stops have bus lanes, but all the intersections are expected to operate in an acceptable LOS within the capacity based on the capacity analysis. Based on the TLOS segment Evaluation Table from MMLOS Guidelines, the transit LOS for the Campeau Drive corridor and Knudson Drive are expected to be

LOS D to E (mixed traffic with limited to moderate parking/driveway friction). The intersection of Lord Byng Way and Kanata Avenue is expected to have a transit LOS of D with a delay of 27 seconds at northbound movement.

Table 6 – Transit Service in the Study Area

Route	No.	Nearest Stop to Site	Approximate Service Times		Approximate Peak Service Frequency (min)		
			Weekdays	Weekends	AM	PM	SAT
Tunney's Pasture - Stittsville	62	Campeau Drive at Stonecroft Terrace	06:49 – 23:49	06:49– 23:49	30		30
Terry Fox - Bridlewood	161		06:07 - 00:10	-	30		-
Terry Fox/Hope Side	164		06:28-09:40 14:50 – 19:20	-	30		-
Tunney's Pasture - Kanata Lakes	268		06:37-09:19 15:31-18:23	-	30	30	-
Tunney's Pasture/ Beaverbrook	265	Knudson and Campeau	06:01-07:50 16:23-18:23		42	57	-
Tunney's Pasture- Stittsville & N Rideau & Gatineau	61	Lord Byng/ Kanata	03:56-02:37	05:09-02:12	10	30	30
Hurdman - Terry Fox	88		04:34-0:33	05:35-02:20	20	15	20
Stittsville - Terry Fox	162		12:50-22:35	07:50-22:10	-	-	25-40
Innovation - Terry Fox	165		09:01-21:46		60	-	-
Terry Fox - Blackstone	167		06:14-21:22	-	30		-
Bridlewood -Terry Fox	168		05:32-23:40	06:30-23:35	30		30
Tunney's Pasture- Terry Fox	264		05:30-08:15 15:52-18:52	-	22		-
Bayshore/Carlingwood -Richmond/ Stittsville	301		05:30-08:15 15:31-18:31	-	30		-
Carlingwood Bayshore -Dunrobin Stittsville	303		09:29 &14:53*	-	-	-	-

Source: OC Transpo website
*(only one bus time per day in each direction)

Intersections

The traffic impact assessment (TIA) Study Area is proposed to comprise of the following intersections:

- Campeau Drive at Kanata Avenue (Signalized)
- Campeau Drive at Cordillera Street
- Campeau Drive at Great Lakes Avenue
- Campeau Drive at Maritime Way / Knudson Drive (Signalized)
- Campeau Drive at Stonecroft Terrace

- Kanata Avenue at Maritime Way / Lord Byng Way (Signalized)
- Proposed Driveways

4.2 Time Periods

Given that the proposed development will primarily consist of residential uses, the typical weekday morning and afternoon peak hours (7:00am – 10:00am &3:00pm - 6:00pm) on adjacent streets will be assessed for the purposes of this analysis.

4.3 Horizon Years

- Existing (2020) traffic conditions
- Built-out (2022) traffic conditions
- Future (2027) background and total traffic conditions

5. EXEMPTIONS REVIEW

As per the City of Ottawa TIA Guidelines, Trans-Plan has reviewed a list of potential exemptions in order to identify individual elements that will not inform decisions about development design, street design, and mitigation measures. In Table 7, elements are identified that can be exempted to reduce the scope of the TIA.

Table 7 – Exemptions Review

Module	Element	Exemption Considerations	Exempt
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Not Exempt
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
	4.2.1 Parking Supply	Only required for site plans	Not Exempt
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
4.5 Transportation Demand Management	All elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Not Exempt
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Not Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Exempt

FORECASTING REPORT

6. DEVELOPMENT-GENERATED TRAVEL DEMAND

6.1 Auto Trip Generation

Site trips for the proposed apartment buildings were generated using Ottawa's 2009 TRANS Trip Generation Study for residential uses and the Institute of Transportation Engineers (ITE) Trip Generation manuals, 10th Edition for non-residential uses. The Land Use Codes (LUC) 232 for High-rise Condominiums (3+floors), 223 for Mid-Rise Apartments (3-10 floors) and 820 for Shopping Centre were utilized for determining suitable trip rates. The site trip generation for the subject site is shown in Table 8.

Table 8 – Site Auto Trip Generation

Land Use	Size		AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
LUC 232 High-rise Condominiums (3+floors)	104 units	Dir. Distr.	27%	73%	100%	58%	42%	100%
		Rate	0.12	0.34	0.46	0.27	0.19	0.46
		Trips	12	36	48	28	20	48
LUC 223 Mid-Rise Apartments (3-10 floors)	348 units	Dir. Distr.	23%	77%	100%	61%	39%	100%
		Rate	0.07	0.22	0.29	0.23	0.14	0.37
		Trips	23	78	101	79	50	129
Parcel 1 Trips			35	114	149	107	70	177
LUC 232 High-rise Condominiums (3+floors)	84 units	Dir. Distr.	27%	73%	100%	58%	42%	100%
		Rate	0.12	0.34	0.46	0.27	0.19	0.46
		Trips	10	29	39	23	16	39
LUC 223 Mid-Rise Apartments (3-10 floors)	266 units	Dir. Distr.	24%	77%	101%	61%	39%	100%
		Rate	0.07	0.22	0.29	0.23	0.14	0.37
		Trips	17	60	77	60	38	98
LUC 820 Shopping Centre	4.63 (1,000 sq.ft. of GLA)	Dir. Distr.	62%	38%	100%	63%	27%	90%
		Equation		N/A			N/A	
		Rate	0.58	0.36	0.94	2.40	1.03	3.81
		Trips	2	2	4	13	5	18
Parcel 2 Trips			29	91	120	96	59	155
Total Trips			64	205	269	203	129	332

To be conservative, no reduction factor has been applied. The subject site is expected to generate 269 two-way auto trips (64 inbound and 205 outbound trips) in the weekday AM peak hour and 332 two-way auto trips (203 inbound and 129 outbound trips) in the weekday PM peak hour.

6.2 Trip Generation for All Modes

Using the TRANS Trip Generation Manual's reported mode shares for suburban, the auto trips generated were converted to person trips for residential uses. And for commercial uses, a default 10% non-auto mode share and average vehicle occupancy of 1.15 were applied to translate auto-trips to person-trips for commercial uses (i.e. multiply ITE vehicle-trip rates by 1.28 to convert to person-trip rates). The vehicle trips were converted to person trips and summarized in Table 9.

Table 9 – Site Person Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
High-rise Condominiums (Parcel 1+ Parcel 2)						
Auto Trips	22	65	87	51	36	87
Ratio	55%			61%		
Person Trips	40	118	158	83	59	142
Mid-Rise Apartments (Parcel 1+ Parcel 2)						
Auto Trips	40	138	178	139	88	227
Ratio	44%			44%		
Person Trips	91	314	405	316	200	516
Commercial (Parcel 2)						
Auto Trips	2	2	4	13	5	18
Ratio	1.28					
Person Trips	3	3	6	17	6	23
Total	**134**	**435**	**569**	**416**	**265**	**681**

The proposed development is anticipated to generate in the order of 569 and 681 two-way person trips in the weekday morning and afternoon peak hours, respectively.

6.3 Mode Split

The proposed development falls in the Kanata/Stittsville (Traffic Assessment Zone 500) zone according to the National Capital Region Origin-Destination survey. From this, the 2011 TRANS O-D Survey data for mode split for the region was collected (Source information is provided in Appendix C). In the AM Peak, it was assumed that the proposed development would primarily be external trips from the district while in the PM peak it was assumed that most trips would be going to the district therefore the appropriate mode splits from the TRANS report were collected. The mode split is summarized in Table 10.

Table 10 – Mode Split

Travel Mode	AM Peak	PM Peak	24 Hour
Auto Driver	52%	59%	63%
Auto Passenger	13%	19%	18%
Transit	13%	10%	8%
Bicycle	0%	1%	1%
Walk	10%	7%	5%
Other	12%	4%	5%
Total	100%	100%	100%

Notes:
1. AM Peak includes a blend of both from and within district in the AM Peak Hour for each mode choice.
2. PM Peak includes a blend of both to and within district in the PM Peak Hour for each mode choice.
3. 24 Hour includes a blend of to, from and within district in the 24-hour for each mode choice.
Source: TRANS 2011 O-D Data

From the above table, transit typically comprises between 8-13% of total trips during the peak hours in the Kanata/Stittsville area.

6.4 Future Mode Share Targets

In the future, it is expected that mode shares will stay generally the same. Even with the proposed residential units, efforts will be made to encourage continued transit use and to keep transit mode shares similar to what was observed during the TRANS 2011 study. With the City of Ottawa's continued efforts to move people via transit, it is expected that this project will keep in line with that vision. The proposed residences will be near the Terry Fox Park and Ride and will also be near the Terry Fox Terminal for local bus routes. This should encourage continued transit use and provide alternatives to private vehicle transportation. The future mode share targets are listed in Table 11.

Table 11 – Future Mode Share Targets

Travel Mode	Mode Share Target	Rationale
Transit	20%	With the existing transit infrastructure in the area and the proposed Confederation Line West Extension it is expected that many new residents will use the existing bus routes with the numerous stops in the area for their internal zone trips.
Walking	10%	The new residential units will be located centrally between various public parks and Kanata Centrum Shopping Centre and should therefore be encouraged to walk to these destinations.
Cycling	5%	The existing cycling context provides numerous bike lanes and bike trails to allow for safe and supported bicycling routes.
Auto Passenger	15%	This percentage is expected to be similar to the existing conditions.
Auto Driver	50%	With the proximity to the Trans-Canada Highway and people's need to make trips to the downtown centre of Ottawa, it is expected that the Auto Driver mode share will stay approximately the same.

Note: Other mode choice options has been included into the Auto Driver percentage.

The person trips generated by the proposed development for the base and sensitivity scenario based on the future mode share targets for each mode is summarized in Table 12.

Table 12 – Estimated Development Generated Person-trips

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto Driver	67	218	285	208	133	340
Auto Passenger	20	65	85	62	40	102
Transit	27	87	114	83	53	136
Bicycle	7	21	28	21	12	34
Walk	13	44	57	42	27	68
Total	**134**	**435**	**569**	**416**	**265**	**681**

6.5 Trip Distribution and Assignment

Site trips for the proposed development were distributed to / from the subject site and the boundary roadways (along Campeau Drive, Conacher Gate/ Great Lakes Avenue, Maritime Way/ Knudson Drive and Cordillera Street.) based on existing travel patterns obtained from the study area intersection counts and study area context, as well as Trans OD 2011 survey. The study area is located in Traffic Assessment Zone 500. The resulting trip distribution for all purposes, travelling to / from the study area from surrounding municipalities is shown below. Source information is provided in Appendix C.

N
12%
W **0%** **83%** **E**
5%
S

The site traffic volumes for the weekday AM and PM peak hours are shown in Figure 7.

7. BACKGROUND NETWORK TRAVEL DEMAND

7.1 Transportation Network Plan

According to the long-term financial planning meeting held on February 24, 2017, the stage 2 of the Ottawa LRT has been approved, the Confederation Line west extension has been funded, and construction has begun in 2019. This extension is planned to reach Moodie just west of Highway 416. This station will have bus rapid transit routes from Terry Fox to Moodie station. The construction of these expansions is expected to be completed by 2025 which is expected to be within the horizon years of the site.

Terry Fox station is approximately 500m south of the subject site, and the walking distance between the site and Terry Fox station is approximately 1.0 km before the future extension of Canadian Shield Avenue. The development of the LRT will likely encourage more people to take public transit and may encourage residents in the Kanata area to take the rapid bus routes to the LRT instead of using the Trans-Canada Highway. The plan for the proposed LRT expansion is illustrated in Figure 8.

7.2 Background Growth

BA has conservatively adopted a 2% per annum corridor growth factor for major arterial roads surrounding the proposed development area in the TIS report for 7000 Campeau Drive, Kanata, dated September 2019. The growth rate of 2% is applied in the study and is expected to accommodate for the general growth in population in the greater Ottawa-Gatineau area.

7.3 Other Developments

The City of Ottawa Development Application Map was reviewed to determine current planning applications in the surrounding area and is summarized in Table 13.

Table 13 – Study Area Background Development

Location	Proposed Land Use	Size
7000 Campeau Drive	Residential	1502 units
1250 Maritime Way	Residential & Commercial	151 units & 1200 sq.ft Retail
1088&1136 Maritime Way	Residential	298 units

The future background traffic volumes for the 2022 and 2027 horizon year, including background growth and future background developments, for the weekday AM and PM Peak hours, are shown in Figure 9 and Figure 10, respectively. Detailed site trip generation and assignment for the background development is provided in Appendix E.

The year 2022 and 2027 future total traffic volumes for the weekday AM and PM peak hours are shown in Figure 11 and Figure 12, respectively.

8. DEMAND RATIONALIZATION

A capacity analysis was performed for the study area intersection and site driveways using Synchro analysis software. The capacity analysis results of the weekday AM and PM peak hours are shown in Table 14 and Table 15, respectively. Level of Service (LOS) Definitions and Capacity Analysis Sheets are provided in Appendix F and Appendix G, respectively.

Based on preliminary intersection analysis, all signalized and unsignalized intersections in the study area are operating at acceptable level of service with the exception of the eastbound through movement at Campeau Drive / Kanata Avenue signalized intersection. The eastbound movements at the intersection of Campeau Drive and Kanata Avenue is expected to operate at a LOS of E, yet with acceptable v/c ratios approaching capacity of 1.00 under future conditions due to background growth.

Table 14 - Capacity Analysis Results, Horizon Year 2022

Intersection	Existing Traffic Conditions						2022 Background Traffic Conditions						2022 Total Traffic Conditions					
Movement	Weekday AM Peak			Weekday PM Peak			Weekday AM Peak			Weekday PM Peak			Weekday AM Peak			Weekday PM Peak		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Cordillera Street & Campeau Drive																		
Eastbound Through / Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through / Left		0	A		0	A		0	A		0	A		0	A		1	A
Northbound Left / Right		14	B		14	B		17	C		18	C		21	C		21	C
Great Lake Avenue/Conacher Gate & Campeau Drive																		
Eastbound Through / Left / Right		0	A		1	A		0	A		1	A		0	A		1	A
Westbound Through / Left / Right		1	A		1	A		1	A		1	A		1	A		1	A
Northbound Through / Left / Right		14	B		12	B		16	C		17	C		19	C		20	C
Southbound Through / Left / Right		13	B		12	B		15	C		18	C		17	C		22	C
Maritime Way/Knudson Drive & Campeau Drive	**0.36**	**15**	**B**	**0.40**	**16**	**B**	**0.57**	**19**	**B**	**0.54**	**18**	**B**	**0.61**	**21**	**C**	**0.59**	**19**	**B**
Eastbound Left	0.06	11	B	0.10	7	A	0.08	11	B	0.14	10	A	0.17	13	B	0.18	12	B
Eastbound Through / Right	0.42	15	B	0.22	6	A	0.70	21	C	0.35	7	A	0.78	24	C	0.40	8	A
Westbound Left	0.11	12	B	0.13	12	B	0.40	18	B	0.33	15	B	0.51	23	C	0.35	16	B
Westbound Through / Right	0.42	15	B	0.53	17	B	0.59	18	B	0.73	23	C	0.62	18	B	0.79	25	C
Northbound Left	0.00	16	B	0.01	29	C	0.04	17	B	0.05	29	C	0.04	17	B	0.05	29	C
Northbound Through / Right	0.09	17	B	0.07	30	C	0.13	18	B	0.09	30	C	0.13	18	B	0.09	30	C
Southbound Left	0.27	20	B	0.14	31	C	0.38	21	C	0.15	31	C	0.38	21	C	0.15	31	C
Southbound Through / Right	0.04	17	B	0.05	29	C	0.05	17	B	0.07	30	C	0.05	17	B	0.08	30	C
Campeau Drive & Kanata Avenue	**0.58**	**30**	**C**	**0.61**	**35**	**D**	**0.70**	**33**	**C**	**0.73**	**39**	**D**	**0.76**	**34**	**C**	**0.76**	**41**	**D**
Eastbound Left	0.38	30	C	0.12	24	C	0.44	32	C	0.15	26	C	0.45	32	C	0.20	26	C
Eastbound Through	0.69	41	D	0.39	37	D	0.82	47	D	0.48	39	D	0.82	47	D	0.48	39	D
Eastbound Right	0.16	31	C	0.12	33	C	0.19	31	C	0.14	34	C	0.19	31	C	0.14	34	C
Westbound Left	0.43	36	D	0.30	25	C	0.44	38	D	0.36	26	C	0.44	38	D	0.36	26	C
Westbound Through	0.30	33	C	0.65	44	D	0.40	34	C	0.78	50	D	0.40	34	C	0.78	50	D
Westbound Right	0.02	29	C	0.02	32	C	0.04	29	C	0.05	32	C	0.05	29	C	0.06	33	C
Northbound Left	0.22	17	B	0.61	28	C	0.38	21	C	0.76	36	D	0.48	25	C	0.76	36	D
Northbound Through / Right	0.40	19	B	0.51	26	C	0.44	19	B	0.58	28	C	0.47	20	B	0.67	31	C
Southbound Left	0.11	23	C	0.19	33	C	0.30	26	C	0.36	37	D	0.35	27	C	0.48	42	D
Southbound Through / Right	0.51	29	C	0.70	45	D	0.65	33	C	0.81	51	D	0.78	39	D	0.90	60	E
Long Byng Way/Maritime Way & Kanata Avenue	**0.52**	**17**	**B**	**0.69**	**20**	**C**	**0.61**	**20**	**B**	**0.82**	**23**	**C**	**0.63**	**21**	**C**	**0.86**	**24**	**C**
Eastbound Left	0.03	13	B	0.17	16	B	0.07	14	B	0.36	22	C	0.07	14	B	0.41	25	C
Eastbound Through / Right	0.58	21	C	0.66	23	C	0.60	21	C	0.69	24	C	0.60	21	C	0.69	24	C
Westbound Left	0.22	10	B	0.37	13	B	0.24	11	B	0.41	14	B	0.24	11	B	0.41	14	B
Westbound Through / Right	0.34	9	A	0.73	16	B	0.37	9	A	0.82	20	B	0.37	10	A	0.85	22	C
Northbound Left	0.04	26	C	0.11	27	C	0.04	27	C	0.12	28	C	0.04	27	C	0.12	28	C
Northbound Through / Right	0.03	26	C	0.06	27	C	0.03	26	C	0.06	27	C	0.03	26	C	0.06	27	C
Southbound Through / Left / Right	0.40	32	C	0.40	33	C	0.65	40	D	0.58	37	D	0.71	44	D	0.64	40	D
Proposed Access 1/Stonecroft Terrace & Campeau Drive																		
Eastbound Through / Left / Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through / Left / Right		0	A		0	A		0	A		0	A		1	A		1	A
Northbound Through / Left / Right														24	C		26	D
Southbound Through / Left / Right		13	B		13	B		15	B		15	C		20	C		21	C
Cordillera Street & Proposed Access 2																		
Eastbound Left / Right														9	A		9	A
Northbound Through / Left														0	A		1	A
Southbound Through / Right														0	A		0	A
Cordillera Street & Proposed Access 3																		
Eastbound Left / Right														9	A		9	A
Northbound Through / Left														2	A		5	A
Southbound Through / Right														0	A		0	A

Table 15 - Capacity Analysis Results, Horizon Year 2027

Intersection	Existing Traffic Conditions						2027 Background Traffic Conditions						2027 Total Traffic Conditions					
Movement	Weekday AM Peak			Weekday PM Peak			Weekday AM Peak			Weekday PM Peak			Weekday AM Peak			Weekday PM Peak		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Cordillera Street & Campeau Drive																		
Eastbound Through / Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through / Left		0	A		0	A		0	A		0	A		0	A		1	A
Northbound Left / Right		14	B		14	B		18	C		20	C		25	C		25	C
Great Lake Avenue/Conacher Gate & Campeau Drive																		
Eastbound Through / Left / Right		0	A		1	A		0	A		1	A		0	A		1	A
Westbound Through / Left / Right		1	A		1	A		1	A		1	A		1	A		1	A
Northbound Through / Left / Right		14	B		12	B		16	C		17	C		19	C		21	C
Southbound Through / Left / Right		13	B		12	B		15	C		17	C		17	C		22	C
Maritime Way/Knudson Drive & Campeau Drive	**0.36**	**15**	**B**	**0.40**	**16**	**B**	**0.61**	**20**	**C**	**0.59**	**19**	**B**	**0.65**	**23**	**C**	**0.63**	**21**	**C**
Eastbound Left	0.06	11	B	0.10	7	A	0.10	12	B	0.17	12	B	0.19	13	B	0.21	14	B
Eastbound Through / Right	0.42	15	B	0.22	6	A	0.75	22	C	0.38	8	A	0.83	26	C	0.42	8	A
Westbound Left	0.11	12	B	0.13	12	B	0.48	21	C	0.36	16	B	0.63	32	C	0.38	16	B
Westbound Through / Right	0.42	15	B	0.53	17	B	0.63	19	B	0.79	25	C	0.67	20	B	0.84	29	C
Northbound Left	0.00	16	B	0.01	29	C	0.04	17	B	0.05	30	C	0.04	17	B	0.05	30	C
Northbound Through / Right	0.09	17	B	0.07	30	C	0.14	18	B	0.10	30	C	0.15	18	B	0.10	30	C
Southbound Left	0.27	20	B	0.14	31	C	0.42	22	C	0.16	31	C	0.42	22	C	0.16	31	C
Southbound Through / Right	0.04	17	B	0.05	29	C	0.05	17	B	0.08	30	C	0.06	17	B	0.09	30	C
Campeau Drive & Kanata Avenue	**0.58**	**30**	**C**	**0.61**	**35**	**D**	**0.76**	**36**	**D**	**0.80**	**42**	**D**	**0.83**	**38**	**D**	**0.83**	**46**	**D**
Eastbound Left	0.38	30	C	0.12	24	C	0.50	34	C	0.17	27	C	0.52	35	C	0.22	27	C
Eastbound Through	0.69	41	D	0.39	37	D	0.90	54	D	0.52	40	D	0.90	54	D	0.52	40	D
Eastbound Right	0.16	31	C	0.12	33	C	0.24	32	C	0.15	34	C	0.24	32	C	0.15	34	C
Westbound Left	0.43	36	D	0.30	25	C	0.49	40	D	0.42	28	C	0.49	40	D	0.42	28	C
Westbound Through	0.30	33	C	0.65	44	D	0.43	35	D	0.85	55	D	0.43	35	D	0.85	55	D
Westbound Right	0.02	29	C	0.02	32	C	0.05	29	C	0.06	32	C	0.05	29	C	0.06	33	C
Northbound Left	0.22	17	B	0.61	28	C	0.45	23	C	0.83	41	D	0.57	30	C	0.83	41	D
Northbound Through / Right	0.40	19	B	0.51	26	C	0.48	20	B	0.63	30	C	0.51	20	C	0.72	33	C
Southbound Left	0.11	23	C	0.19	33	C	0.33	26	C	0.43	40	D	0.37	28	C	0.60	50	D
Southbound Through / Right	0.51	29	C	0.70	45	D	0.71	35	C	0.88	58	E	0.84	43	D	0.97	73	E
Long Byng Way/Maritime Way & Kanata Avenue	**0.52**	**17**	**B**	**0.69**	**20**	**C**	**0.67**	**21**	**C**	**0.89**	**27**	**C**	**0.69**	**22**	**C**	**0.93**	**30**	**C**
Eastbound Left	0.03	13	B	0.17	16	B	0.08	14	B	0.61	41	D	0.08	14	B	0.76	66	E
Eastbound Through / Right	0.58	21	C	0.66	23	C	0.67	23	C	0.76	27	C	0.67	23	C	0.76	27	C
Westbound Left	0.22	10	B	0.37	13	B	0.29	12	B	0.50	18	B	0.29	12	B	0.50	18	B
Westbound Through / Right	0.34	9	A	0.73	16	B	0.41	10	A	0.90	26	C	0.41	10	A	0.93	30	C
Northbound Left	0.04	26	C	0.11	27	C	0.05	27	C	0.13	28	C	0.05	27	C	0.13	28	C
Northbound Through / Right	0.03	26	C	0.06	27	C	0.03	26	C	0.07	27	C	0.03	26	C	0.07	27	C
Southbound Through / Left / Right	0.40	32	C	0.40	33	C	0.70	43	D	0.63	39	D	0.76	47	D	0.69	42	D
Proposed Access 1/Stonecroft Terrace & Campeau Drive																		
Eastbound Through / Left / Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through / Left / Right		0	A		0	A		0	A		0	A		1	A		1	A
Northbound Through / Left / Right														28	D		30	D
Southbound Through / Left / Right		13	B		13	B		16	C		16	C		22	C		24	C
Cordillera Street & Proposed Access 2																		
Eastbound Left / Right														9	A		9	A
Northbound Through / Left														0	A		1	A
Southbound Through / Right														0	A		0	A
Cordillera Street & Proposed Access 3																		
Eastbound Left / Right														9	A		9	A
Northbound Through / Left														5	A		6	A
Southbound Through / Right														0	A		0	A

ANALYSIS/STRATEGY REPORT

9. DEVELOPMENT DESIGN

9.1 Design for Sustainable Modes

Parking Dimensions

On-site parking is proposed on the ground floor and two underground garages. A total of four loading spaces are provided on the ground floor, two for each parcel. The parking layout/spaces have been designed with regard for the standards noted in the City of Ottawa's Zoning By-law 2008-250 (Source information provided in Appendix H). The dimension requirements and proposed design is shown in Table 16.

Table 16 – Parking Design Requirements and Proposed Design

Parking Stall Type		Width (m)	Length (m)	Aisle Width (m)
Regular Space	Minimum Requirement	2.6	5.2	6.7 for Parking Lot 6.0 for garage
	Proposed Dimensions	2.6	5.2 -5.28	6.7 for Parking Lot 6.0 for garage
Reduced Space	Minimum Requirement	2.4	4.6	6.0
	Proposed Dimensions	2.4	4.6	6.0
Loading Space	Minimum Requirement	3.5	9.0	-
	Proposed Dimensions	3.5	9.0	-
Bicycle Parking Space	Minimum Requirement	0.6	1.8	1.5
	Proposed Dimensions	0.6	1.8	1.5

Source: City of Ottawa Zoning By-law 2008-250

The proposed dimensions of parking spaces and loading spaces provided (on the ground floor and underground parking garages) meet the By-law requirement.

Pedestrian Routes

The existing 1.8m wide concreate sidewalks provided along Campeau Drive and Cordillera Street are proposed to remain in the study area, allowing pedestrians to access the existing sidewalks along the surrounding local streets and transit.

Transit Amenities

Bus routes are located along Kanata Avenue, Campeau Drive, and Knudson Drive. Based on the existing transit routes, all of the households proposed in the development area will be within 400 metres of a transit stop. Figure 13 illustrates the bus station locations.

9.2 Circulation and Access

Auto Vehicles

A site circulation review was completed using AutoTurn vehicle turning template software to simulate design vehicles expected to use the site, including a loading vehicle (for moving, delivery, etc.), a waste collection vehicle, a fire truck and a passenger vehicle. Details of the site circulation review for each vehicle type is provided in this section:

1) *Ground Floor*

Figure 14 and Figure 15 show a medium single unit (MSU) loading vehicle accessing the site via Campeau Drive and Cordillera Street, parking into the loading spaces, and exiting the site.

Figure 16 and Figure 17 show a 9m waste collection vehicle accessing the site via Campeau Drive and Cordillera Street, parking into the loading spaces, and exiting the site.

Figure 18 and Figure 19 show a fire truck accessing the site via Campeau Drive and Cordillera Street, circulating the site, and exiting the site from the same accesses.

Figure 20 and Figure 21 show a passenger vehicle accessing the surface parking lots via the driveway off Campeau Drive and Cordillera Street, parking into critical spaces, and then exiting via the same access.

2) *Underground Garage for Building A and B*

Figure 22 and Figure 23 show a passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

Figure 24 and Figure 25 show a small passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

3) *Underground Garage for Building C*

Figure 26 and Figure 27 show a passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

Figure 28 and Figure 29 show a small passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

The layout of two parking levels for Parcel 2 are identical, so the AutoTurn figures only show the movements on parking level 1.

In summary, loading vehicles would be able to access the site and the loading area in a safe manner. Passenger vehicles could enter both surface parking lots and underground garages via proposed two driveways and ramps, respectively.

Bicycles

Secured bicycle parking / storage areas are proposed both at grade and underground. Table summarized the locations of all the bike facilities.

Table 17 – Proposed Bicycle Parking

	Parcel 1 (spaces)	Parcel 2(spaces)	Total(spaces)
Surface	122	117	239
Underground	138	84	222
Total	260	201	461

In Parcel 1, surface bike spaces are proposed at the west side and south side of the surface parking area. Cyclists are able to access Campeau Drive along the internal pedestrian sidewalks (located along the edge of the parking area) from the site access. The underground storage facilities are located at the southwest and southeast corner of each parking level. Cyclists are able to reach the aforementioned surface pedestrian sidewalks through either the stair egress (located at the east side of the site) or the elevators of the apartment building.

In Parcel 2, surface bike spaces are proposed at the west side of the starched townhomes and north of the apartment building. Cyclists from the stacked units are able to access Cordillera Street along the internal pedestrian sidewalks (located along the edge of the parking area) from the northernly site access, and the cyclist from the apartment building can easily access the southernly site driveway off Cordillera Street along the 1.8m concrete sidewalk in front of the apartment building. The underground storage facilities are mostly located at the southwest corner and the south side of each parking level. Cyclists are able to reach the surface pedestrian sidewalks and the southernly site access off Cordillera Street through the elevators of the apartment building.

10. PARKING

This section includes a review of the proposed vehicle and bicycle parking supply and allocation for the site, the parking requirements as per the City of Ottawa Zoning By-law.

10.1 Auto Parking Requirements and Supply

The proposed parking supply is 848 spaces provided by surface parking lots and underground garages. A total of 473 spaces are proposed for Parcel 1, and a total of 375 spaces are proposed for Parcel 2. Parking requirements for the site were reviewed in accordance with the City of Ottawa Zoning By-law 2008-250 Consolidation. The site falls within Area C: Suburban boundaries according to Schedule 1A to Zoning By-law 2008-250. The site is located is located approximately 600m north of Terry Fox Station according to Schedule 2A. Both of the apartment buildings are completely located inside the 600m reduced rate zone. Although the mixed-use apartment building in Parcel 2 contains a small portion of commercial area, the requirements for residential buildings should be applicable due to the limited trips generated by the commercial area.

The stacked units on both parcels are proposed right at the boundary, so the reduced rates should be considered. TES has indicated the use of lower parking requirements as supported by Area X, per Section 101 (5) (d) is supported. Therefore, the auto parking requirements for both Area C and Area within 600m of a Rapid Transit Station are reviewed and compared with proposed supply for the site. A summary is provided below in Table 18 and Table 19. Source information is provided in **Appendix H**.

Table 18 – City of Ottawa Zoning By-Law, Comparison of Auto Parking Requirements and Supply, Area C

Land Use	Unit Number		Minimum Parking Requirement		Parking Supply (spaces)	Surplus (spaces)
	Parcel 1	Parcel 2	Rate	Spaces		
Dwelling, Stacked	104	84	1.2 space/unit	225.6	473 (Parcel 1) +375 (Parcel 2)	
Dwelling, Mid-high-Rise Apartment	348	0	1.0 space/unit	348		
Dwelling units in a mixed-use building (Reduced rate due to Rapid Transit)	0	266	0.5 space/unit	133		
Dwelling, Visitor Parking	452	350	0.2 space/unit	160.4		
Retail Store		430.6 sq.m.	3.4 per 100 m2 of GLFA	14.6		
Accessible Parking (inclusive of total supply)			6 spaces (>500 spaces)		35	+29
Total				882	848	-34

Source: City of Ottawa Zoning By-law 2008-250 Consolidation & by-law 2017-301

Table 19 – City of Ottawa Zoning By-Law, Comparison of Auto Parking Requirements and Supply, Area X

Land Use	Unit Number		Minimum Parking Requirement		Parking Supply (spaces)	Surplus (spaces)
	Parcel 1	Parcel 2	Rate	Spaces		
Dwelling, Stacked	104	84	0.5 space/unit	94	473 (Parcel 1) +375 (Parcel 2)	
Dwelling, Mid-high-Rise Apartment	348	0	0.5 space/unit	174		
Dwelling units in a mixed-use building	0	266	0.5 space/unit	133		
Dwelling, Visitor Parking	452	350	0.2 space/unit	160.4		
Retail Store		430.6 sq.m.	3.4 per 100 m2 of GLFA	14.6		
Accessible Parking (inclusive of total supply)			6 spaces (>500 spaces)		35	+29
Total				576	848	+272

Source: City of Ottawa Zoning By-law 2008-250 Consolidation & by-law 2017-301

Area C requires 882 spaces, and 576 spaces are required for Area with in 600m of a Rapid Transit Station (Area X rates), respectively. A total supply of 848 spaces for both residents and visitors are proposed on site, which results in a shortfall for 34 spaces under Area C policy but exceeds the by-law requirements with a surplus of 272 spaces for Rapid Transit Area. Parking demands for commercial area along Cordillera

Street are expected to be minimal since it serves local area and generates mainly walk trips. Given the proximity to Rapid Transit, the parking demand on site can be fulfilled by the proposed parking supply.

According to City of Ottawa Traffic and Parking By-law 2017-301, 6 accessible parking spaces are required for the site (parking capacity larger than 500 spaces). A total of 37 accessible parking spaces are provided both at grade and underground, which meets the by-law requirements.

10.2 Bicycle Parking Requirements and Supply

The proposed bicycle parking supply number of spaces and rate is shown in Table 20.

Table 20 – City of Ottawa Zoning By-Law, Comparison of Bicycle Parking Requirements and Supply

Land Use Type	Size	Minimum Requirement		Parking Supply (spaces)
		Rate (Space/unit)	Spaces	
Residential Long-Term	802 units	0.5	401	260 (Parcel 1) +201 (Parcel 2)
Commercial	430.6 sq.m	1 / 1500 sqm of GFA	0.3	
Total			401	461

Source: City of Ottawa Zoning By-law 2008-250 Consolidation

As per the City's By-law, a minimum of 401 bicycle parking spaces are required to serve the development. The site plan includes 461 bicycle parking spaces provided on both ground floor and parking garages, which exceeds the minimum requirements, providing convenience of cycling to the future LRT station.

11. BOUNDARY STREET DESIGN

11.1 Mobility

Consistent with the City's TIA guidelines, a MMLOS) assessment was undertaken at area signalized intersections and at external street segments between signalized intersections for pedestrians, cyclists, transit, truck and autos. Source information is provided in **Appendix I**.

Pedestrian LOS

The results of Pedestrian LOS are summarized in Table 21 and Table 22.

Table 21 - Pedestrian Level of Service, Segments in the Study Area

	Campeau Drive	Cordillera Street	Great Lake Avenue	Maritime Way	Stonecroft Terrace	Conacher Gate	Knudson Drive
Sidewalk width	1.8m				No sidewalk		1.8m (West side only)
Boulevard Width	>2m						
AADT	> 3000	< 3000					
On-Street Parking	No	Yes	No	Yes	No		

Operating Speed	50-60			30-50			
Level of Service	D	A	A	A	F	F	F
Target LOS	C			-			

Based on a review of the MMLOS, the pedestrian network along the segments with sidewalks typically range between LOS A to LOS D. Along the portion of Campeau Drive where the development site is located, the pedestrian LOS is D. The pedestrian LOS of the segments along Stonecroft Terrace, Conacher Gate and Knudson Drive is F because of the lack of existing sidewalk. The target LOS C, and all the boundary roads of the site except for Campeau Drive are operating at a LOS of A. Campeau Drive has a LOS of D, which we still consider acceptable. However, to improve the PLOS, either widening the sidewalk into 2m or proposing on-street parking along Campeau Drive can be explored.

Table 22 - Pedestrian Level of Service, signalized intersection

Campeau Drive at Maritime Way / Knudson Drive	North	South	East	West
Lanes & Median	3 lanes with median (105)	3 lanes without median (105)	3 lanes with median (105)	
Island Refuge	No (-4)			
Conflicting Left Turns	Permissive (-8)	Protected/Permissive (-8)		
Conflicting Right Turns	Permissive (-5)			
RTOR	Allowed (-3)			
Ped Leading Interval	No (-2)			
Corner Radius (largest)	> 15m to 25m (-8)			
Crosswalk Type	Standard (-7)			
Level of Service	C (68)	C (68)	C (68)	C (68)
	C			
Target LOS	C			

The pedestrian LOS for the signalized intersection LOS is C at Campeau Drive at Maritime Way / Knudson Drive. The target LOS C, and the intersection is operating at a LOS of C. The residents/visitors can easily access the bus stops through the concrete sidewalks along Campeau Drive, Cordillera Street and Maritime Way. The walking distance is expected to be shorter after the Canadian Shield Avenue extension.

Cycling LOS

The results of Cycling LOS are summarized in Table 23 and Table 24.

Table 23 - Cycling Level of Service, Segments in the Study Area

	Campeau Drive	Cordillera Street	Great Lake Avenue	Maritime Way	Stonecroft Terrace	Conacher Gate	Knudson Drive
Number of Travel lanes per direction	1						
Type of Bikeway	Bike Lanes	Mixed Traffic					Bike Lanes
Bike Lane Width	>=1.8 M						>=1.8M
Operating Speed	60 km/h	50 km/h		40 km/h			
Bike Lane Blockage							
Unsignalized Lane Crossings	2	2	2	2	-	2	2
Side street Operating Speed	50 km/h	40 km/h					
Level of Service	C	B	B	A	A	A	A
Target LOS	D				-		

In the vicinity of the site frontage the cycling LOS along Campeau Drive corridor is C on account of the on-street painted cycling lanes that exist. is C. The cycling LOS along other boundary roads ranges between LOS A to LOS B. The target LOS is D, and all the boundary roads of the site are operating at a LOS of C or better.

Table 24 - Cycling Level of Service, Signalized Intersection

Campeau Drive at Maritime Way / Knudson Drive	North	South	East	West
Type of Bikeway	High Order Facility	Mixed Traffic	High Order Facility	
Dual Right Turn		No		
Shared Through-Right		Yes		
Bike Box	No			
Number of Lanes Crossed for Left Turns	Two Stage	1	Two Stage	Two Stage
Operating Speed on Approach	40 km/h		60 km/h	
Dual Left Lanes	No			
Level of Service	A	B*	C	C
	C			
Target LOS	D			

* cyclists will not turn right directly onto Campeau Drive given availability of protected, bi-directional multi-use trail on the north side of Campeau Drive.

The cycling LOS for the signalized intersection in the study area is LOS C. The target LOS is D, and the intersection is operating at a LOS of C or better.

Transit LOS

Based on the TLOS segment Evaluation Table from MMLOS Guidelines, the transit LOS for the Campeau Drive corridor and Knudson Drive are expected to be LOS D to E (mixed traffic with limited to moderate parking/driveway friction). The intersection of Lord Byng Way and Kanata Avenue is expected to have a transit LOS of D with a delay of 27 seconds at northbound movement. We consider a LOS of D or better is acceptable. To ensure the transit LOS for the Campeau Drive corridor and Knudson Drive to be a LOS D or better, bus lanes or bays can be explored.

Truck LOS

The results of Truck LOS are summarized in Table 25 and Table 26.

Table 25 - Truck Level of Service, Signalized Intersection

Campeau Drive at Maritime Way / Knudson Drive	North	South	East	West
Turning Radius	10-15m			
Number of Receiving Lanes	1			
Level of Service	E	E	E	E
	E			
Target LOS	E			

Table 26 - Truck Level of Service, Segments in the Study Area

	Campeau Drive	Cordillera Street	Great Lake Avenue	Maritime Way	Stonecroft Terrace	Conacher Gate	Knudson Drive
Lane Width	<=3.5m						
Travel Lanes per direction	<=2						
Level of Service	C	C	C	C	C	C	C
	E	No target					

The trucks LOS typically range between LOS C to LOS E. The target LOS is E for Arterial road only, and all the boundary routes and the intersection is operating at a LOS of E or better.

Auto LOS

The trucks LOS typically range between LOS A to LOS C. The detailed results are provided in Section 16. The target LOS is D or better.

Based on the MMLOS, the area street segments closest to the site have an acceptable MMLOS. Certain segments beyond the site on Campeau Road have pedestrian LOS of F due to the limited pedestrian facility available under existing conditions.

11.2 Road Safety

Historical collision records have been reviewed in Table 4. Generally, the locations with the higher occurrences of accidents are correlated to the intersections that carry higher traffic volumes. Moreover, based on the capacity analysis completed at the study area intersections, no physical improvements are required at external intersections to accommodate projected site traffic. As such, the site will not have any impact on the physical design of the external intersections and therefore the site will not impact the overall safety of these intersections.

11.3 Neighbourhood Traffic Management (NTM)

There are no existing neighborhood traffic management issues that we are aware of that will be exacerbated by the proposed development.

12. ACCESS INTERSECTION DESIGN

12.1 Location and Design of Access

The development concept features three proposed new access locations that will connect to existing streets. One full-moves driveway is proposed off Campeau Drive to provide connection to Parcel 1. Two full-moves access are proposed off Cordillera Street for the stacked dwelling units and the mixed-use building in Parcel 2, respectively. The location of the proposed access points was developed based on consideration of the proximity to adjacent intersections and driveways.

Based on projected operations at the future access points, all proposed access points will operate acceptably as unsignalized intersections with side-street stop control. No new signalized intersections are being proposed, or are required, as part of the development. With respect to proximity to existing signalized intersections, the nearest traffic signal to any proposed access point is Campeau Drive at Maritime Way / Knudson Drive traffic signal, which is approximately 500m east of the site accesses. Table 27 summarized the spacing requirement and proposed spacing. The source information is provided in Appendix J.

Table 27 – Driveway Spacing

Driveway	Minimum Standard Spacing (m)	Proposed Spacing of proposed driveway(m)
Proposed driveways off Cordillera Street	1.0m between adjacent driveways (TAC) 15m (20-99 spaces, City's Bylaw) 45m (200-299 spaces, City's Bylaw)	21m
The intersection of Campeau Drive and Cordillera Street	2.0m from street corner (TAC) 18m (20-99 spaces, City's Bylaw) 45m (200-299 spaces, City's Bylaw) 75m (>300 spaces, City's Bylaw)	116m (Parcel 1) 36m (Parcel 2, north) 75m (Parcel 2, south)
The street corner of Cordillera Street at Canadian Shield Avenue		68m (Parcel 2, north) 22m (Parcel 2,south)

Sources: TAC Figure 8.9.2, City of Ottawa By-law 2003-447 Section 25

The spacing between the two proposed accesses off Cordillera Street is 21m, which meets the TAC guidelines. The northerly access is required to have a minimum spacing of 15m based on the City's by-law 2003-447, which is fulfilled. However, the southernly access connects to a parking lot with 282 spaces, which requires 45m spacing based on the by-law requirements. Given both the traffic volume and speed

on Cordillera Street is fairly low, the proposed spacing of 21m is not expected to adverse impact on the traffic operation.

The proposed spacing between all three accesses and the intersection of Campeau Drive and Cordillera Street meet the minimum requirements in TAC and the City's by-law.

The proposed spacing between the southernly access of parcel 2 and the intersection of Cordillera Street at Canadian Shield Avenue is 22m, which meets the TAC standards but not the City's requirement (45m). Given the traffic volume in the area is fairly low, the proposed spacing of 22m is not expected to adverse impact on the traffic operation.

12.2 Intersection Control

A signal warrant analysis was completed based on the Ontario Traffic Manual, Book 12 – Traffic Signals guidelines for Campeau Drive at the proposed site access/Stonecroft Terrace. The signal warrant analysis reviews the intersection in the planning horizon years 2027. Eight-hour traffic volumes were obtained from the previously mentioned September 22, 2020 weekday TMC conducted by Trans-Plan. Site traffic volumes were added to the future background traffic volumes to obtain future total traffic volumes for the peak hours. The year 2022 and 2027 future total traffic volumes for the weekday AM, PM and Saturday peak hours are shown in Figure 11 and Figure 12, respectively.

The traffic volume percentage used in the analysis for each off-peak hour, in comparison to the weekday AM and PM peak hour volumes is shown in Table 28.

Table 28 – Weekday Hourly Volumes at Campeau Drive at the proposed site access/Stonecroft Terrace

		AM Peak				PM Peak		
Hour Ending	8:00	9:00	10:00	12:30	13:30	16:00	17:00	18:00
Existing Traffic Volumes	264	767	376	569	685	789	611	527
2027 Future Traffic Volumes	452	1260	642	1007	1185	1350	1065	937

The traffic signal warrant was completed using the future total traffic volumes, weekday AM and PM peak hours, planning horizon year 2027 (using traffic volumes from Figure 12). The detailed signal warrant analysis is provided in Appendix K and the results are summarized below in Table 29.

Table 29 – 2027 Signal Warrant Analysis Results, Campeau Drive at the proposed site access/Stonecroft Terrace

Signal Warrant Results	Future 2020 Weekday Total Conditions		
	Required	Satisfied	Warrant Met?
1 - Minimum Vehicular Volume	100%	90%	No
2 - Delay to Cross Traffic	100%	88%	No
Combination Warrant (1 & 2)	80%	50%	No
Overall Result			No

The warrant analysis results indicate that a traffic signal in the horizon year 2027 would not be warranted at Campeau Drive at the proposed site access/Stonecroft Terrace. The main entrance could be maintained as unsignalized.

Based on the traffic analysis conducted at the proposed site access intersections under future total conditions, all site accesses operate at an acceptable level of service. All proposed access intersections will operate with two-way stop control with STOP control on the minor side streets (i.e. proposed) street approaches.

No roundabouts are proposed within the development area. This is consistent with Ottawa's roundabout screening guidelines which indicate that roundabouts are best suited for 4 leg intersections with balanced traffic flows (i.e. where at least 10% of total traffic is generated from the minor road1). Moreover, given that a roundabout is typically considered as an alternative to a traffic signal and a traffic signal is not required or recommended for the proposed development, a roundabout is therefore not applicable for the development.

12.3 Intersection Design

Based on the analysis the proposed accesses will operate acceptably under two-way STOP control. Individual movements at the proposed site access locations will generally operate with good levels of service with LOS C or better. Detailed results of the capacity analysis are provided in Section 16.

13. TRANSPORTATION DEMAND MANAGEMENT

A Transportation Demand Management (TDM) plan is provided as part of this study in an effort to minimize traffic congestion, improve air quality, reduce greenhouse gas emissions, and improve public health in the long-term.

13.1 Context for TDM

As is noted in Section 6.3, existing mode share for Kanata/Stittsville (Traffic Assessment Zone Z500) was provided and future mode share targets for the development were identified. A summary of this analysis is provided in Table 30 based upon the mode share analysis provided in Table 10.

Table 30 – Existing and Proposed Mode Split

Travel Mode	Existing TAZ 500			Proposed Target Mode Share
	AM Peak	PM Peak	24 Hour	
Auto	65%	63%	68%	50%
Auto Passenger	13%	19%	18%	15%
Transit	13%	10%	8%	20%
Bicycle	0%	1%	1%	5%
Walk	10%	7%	5%	10%

<u>Development Location and Involved Parties</u>

The proposed development is not located in a Transit-oriented Development (TOD) zone. It is located within the Kanata Town Centre (TC) Site-Specific Policy Area. As per Schedule B of the Official Plan, the

Kanata TC is a "Mixed Use Centre" and as per Section 2.5.1 of the Official Plan, all Mixed-Use Centres are Design Priority Areas.

Residential Unit Mix

The proposed unit mix is summarized in Table 30. More details are provided in Site plan.

Table 31 – Proposed Unit Mix

	Stacked Dwelling	Apartment Buildings			Total
		1-bedroom	1-bedroom +Den	2-bedroom	
Parcel 1 (units)	104	104	104	140	452
Parcel 2 (units)	84	118	30	118	350
Total (units)	188	122	134	158	802

13.2 Need and Opportunities

If the proposed mode share targets are not met, there could be adverse effects on local and potential condominium corporation. For residents living in the area with stacked dwelling units, higher than expected auto driver mode share will result in increased vehicular traffic on local roads during peak periods. This result could negatively impact safety, particularly during periods when children are walking to school.

For the medium density residential uses, high auto driver mode share could result in higher than expected parking demand, which may not be accommodated onsite. It is important to facilitate TDM initiatives to keep parking demand within the site supply at these sites.

A post-occupancy TDM program is appropriate because it will help provide the public greater choice, incentives and opportunities to choose travel modes other than single-occupant vehicles. The site is located 500 metres from the Terry Fox Bus Terminal and, further, each surrounding road (i.e. Campeau Drive and Knudson Drive) is serviced by on-street bicycle lanes and OC Transport local bus service. These adjacent transits and cycling amenities are representative of an opportunity; a post-occupancy TDM program will leverage these amenities to ensure that the proposed development mode share targets are reached.

13.3 TDM Program

Based upon the context for the proposed development and the aforementioned need and opportunity for TDM, a comprehensive TDM program has been developed. Based upon the TDM Measures Checklist (Version 1.0, June 2017), the TDM program is outlined in Table 32.

Table 32 – TDM Measure Checklist, Residential

TDM measures: Residential developments		To be considered & Description
1. TDM PROGRAM MANAGEMENT		
1.2	Travel surveys	
1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	✔ Travel/commuting surveys will be conducted throughout the buildout period to assess evolving commuting behaviour

2.WALKING AND CYCLING		
2.1	Information on walking/cycling routes & destinations	
2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances (multi-family, condominium)	✔ Where applicable, the lobby areas will contain these materials.
3. TRANSIT		
3.1.1	Display relevant transit schedules and route maps at entrances (multi-family, condominium)	✔ Where applicable, the lobby areas will contain these materials.
3.2	Transit fare incentives	
3.2.1 /3.2.2	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	✔ The developer will provide each unit with PRESTO cards preloaded with a one-year transit pass unit upon first move-in.
4. CARSHARING & BIKESHARING		
4.1	Bikeshare stations & memberships	
4.1.1	Contract with provider to install on-site bikeshare station (multi-faP31 mily)	✔ Will be considered for medium density uses.
4.1.2	Provide residents with bikeshare memberships, either free or subsidized (multi-family)	✔ Will be considered for medium density uses
4.2	Carshare vehicles & memberships	
4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	✔ Will be considered for medium density uses.
4.2.2	Provide residents with carshare memberships, either free or subsidized	✔ Will be considered for medium density uses.
5. PARKING		
5.1	Priced parking	
5.1.1 /5.1.2	Unbundle parking cost from purchase price (condominium /multi-family)	✔ The provision of parking will be considered to be unbundled from the purchase of medium density units.
6. TDM MARKETING & COMMUNICATIONS		
6.1	Multimodal travel information	
6.1.1	Provide a multimodal travel option information package to new residents	✔ All available travel options and the TDM program, will be included in information packages to new residents.

Table 33 – Peak Hour Traffic Volumes on Roads Connected with Site Accesses

	Classification	Peak Hour Traffic Threshold	Existing Peak Hour Traffic	Projected Future Weekday ADT
Campeau Drive	Arterial	600 veh-3600veh	716 veh	1264 veh
Cordillera Street	Local	120 veh	26 veh	124 veh

Source: City of Ottawa's TIA Guidelines

Traffic generated by the proposed development will therefore not appreciably change the character and function of the existing minor collector roads in the study area compared to what exists currently.

15. TRANSIT

The proposed development is well-situated relative to existing transit infrastructure with the Terry Fox Bus Terminal located within approximately 500 metres (with a current walking distance of approximately 1.0 km). Furthermore, the site is located within close proximity to transit stops along the Campeau Drive corridor. The area transit network generally offers services with approximately 30 minutes headways.

Forecast transit trips for the proposed development were established based upon a review of TRANS 2011 study as outlined in Section 6.4 within this report. Transit trips to and from the site during the weekday morning and afternoon peak hours are summarized in Table 34.

Table 34 – Transit Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Transit Trips	26	87	113	82	53	136

It is anticipated that the proposed development will generate approximately 113 and 136 two-way transit trips during the weekday morning and afternoon peak hours, respectively. The existing transit capacity is expected to be sufficient with more than 10 bus routes provided at Terry Fox Bus Terminal and the Campeau Drive corridor.

16. INTERSECTION DESIGN

A capacity analysis was performed for the study area intersection and site driveways using Synchro analysis software. The capacity analysis results of the weekday AM and PM peak hours are shown in Table 14. Capacity Analysis Sheets and Level of Service (LOS) Definitions are provided in Appendix F and Appendix G, respectively. The results of the capacity analysis are discussed in this section for each intersection:

Kanata Avenue & Campeau Drive

Under existing conditions, the intersection operates at an acceptable LOS of D or better, with a delay of 30 seconds and 35 seconds and a v/c ratio of 0.58 and 0.61 in the weekday AM and PM peak hour, respectively. All the movements operate at an acceptable LOS of D or better.

Under future background and total conditions, the intersection is expected to operate similarly with existing conditions at an acceptable LOS of D with a delay up to 46 seconds in the weekday AM and PM

peak hour, respectively. Southbound movement is expected to operate in a LOS of E with a v/c ratio of 0.97 during weekday PM peak hour due to background traffic growth. All other movements are expected to operate at a LOS of D or better.

Campeau Drive at Maritime Way/ Knudson Drive

Under existing conditions, the intersection operates at a good LOS of B, with a delay of 15 seconds and 16 seconds and a v/c ratio of 0.36 and 0.40 in the weekday AM and PM peak hour, respectively. All the movements operate at an acceptable LOS of C or better.

Under future background and total conditions, the intersection is expected to operate similarly with existing conditions at a LOS of C and B with a delay up to 23 seconds in the weekday AM and PM peak hour, respectively. All the movements are expected to operate at a LOS of C or better.

Kanata Avenue & Maritime Way/ Lord Byng Way

Under existing conditions, the intersection operates at a good LOS of B, with a delay of 17 seconds and 20 seconds and a v/c ratio of 0.51 and 0.69 in the weekday AM and PM peak hour, respectively. All the movements operate at an acceptable LOS of C or better.

Under future background and total conditions, the intersection is expected to operate similarly with existing conditions at a LOS of C with a delay up to 30 seconds in the weekday AM and PM peak hour, respectively. Eastbound left movement is expected to operate at a LOS of E with a v/c ratio of 0.76 during weekday PM peak hour in 2027. All other movements are expected to operate at a LOS of D or better.

Campeau Drive at Cordillera Street

Under existing conditions, the intersection operates at a good LOS of B or better, with a delay of up to 14 seconds in the weekday AM and PM peak hours.

Under future background and total conditions, all the movements are expected to operate at an acceptable LOS of C or better, similar to the existing conditions, but with an increase in delay (25 seconds) in northbound movements.

Great Lake Avenue/Conacher Gate & Campeau Drive

Under existing conditions, the intersection operates at a good LOS of B or better, with a delay of up to 14 seconds in the weekday AM and PM peak hours.

Under future background and total conditions, all the movements are expected to operate at an acceptable LOS of C or better, similar to the existing conditions, but with an increase in delay (up to 22 seconds) in northbound and southbound movements due to background growth.

Proposed Access 1/Stonecroft Terrace & Campeau Drive

Under existing conditions, the intersection operates at a good LOS of B, with a delay of up to 13 seconds in the weekday AM and PM peak hours.

Under future background and total conditions, the intersection is expected to operate at an acceptable LOS of D or better, with an increase in delay (up to 30 seconds) in northbound movement.

Cordillera Street & Proposed Access 2

Cordillera Street & Proposed Access 2

Under future background and total conditions, the intersection is expected to operate at a good LOS of B or better with a delay of up to 9 seconds.

Cordillera Street & Proposed Access 3

Under future background and total conditions, the intersection is expected to operate at a good LOS of D or better with a delay of up to 9 seconds.

All the proposed site accesses are expected to operate well, with a LOS of D or better during the weekday peaks. Delays of up to 30 seconds are expected for vehicles exiting the subject site, which is typical for vehicles exiting from a minor road onto an arterial roadway. No further road improvements are required to support the proposed development, aside from construction of the site access.

17. CONCLUSIONS

This Traffic Impact Assessment for the proposed housing development, located at 6301 Campeau Drive, Kanata, ON is summarized as follows:

As per the site plan prepared by Fabiani Architect, the proposed development consists of 188 stacked dwelling units and three 10-storey apartment buildings with 614 units. A total of 848 parking spaces and 461 bicycle parking spaces are provided for the site. Ground floor commercial area with a total GFA of approximately 430.6 sq.m is proposed at the easterly apartment building, facing Cordillera Street. Two accesses are provided off Cordillera Street and one access off Campeau Drive.

- Trip rates were obtained based on information contained in the Trip Generation Manual, 10th Edition published by ITE. The site is expected to generate 269 and 332 two-way trips in the weekday AM and PM peak hours, respectively.
- The City's Zoning By-law's requirement is 882 spaces and 576 spaces for Area C and Rapid Transit Area (Area X rates), Respectively. A total supply of 848 spaces for both residents and visitors are proposed on site. Given the proximity to Rapid Transit, the parking demand on site can be fulfilled by the proposed parking supply.
- The subject site provides 461 bicycle parking spaces on site to encourage cycling for residents and visitors, which exceeds the by-law requirement.
- The City of Ottawa's Zoning By-law was reviewed to ensure proper parking layout design. The proposed parking stalls, aisles and access design meet the design requirements.
- Fire trucks, loading vehicles and waste collection vehicles are able to access the site and exit the loading area along the laneway in a safe manner. Passenger vehicles are able to enter and exit both the ground parking level and underground garages.
- Based on a review of the MMLOS, the pedestrian network along the segments with sidewalks typically range between LOS A to LOS D. In the vicinity of the site frontage, the cycling LOS along Campeau Drive corridor is C on account of the on-street painted cycling lanes that exist. is C. The cycling LOS along other boudrage roads ranges between LOS A to LOS B.The cycling LOS for the signalized intersection in the study area is LOS C. The trucks LOS typically range between LOS C to LOS E. The trucks LOS typically range between LOS A to LOS C.

- Site trips are not expected to cause any additional significant impacts at the intersection. The intersections in the study area is expected to operate acceptably at full build-out of the development and five years thereafter.
- The proposed site accesses are expected to operate well, with a LOS of D or better during the weekday peaks. Delays of up to 30 seconds are expected for vehicles exiting the subject site, which is typical for vehicles exiting from a minor road onto an arterial roadway.
- No further road improvements are required to support the proposed development, aside from construction of the site access.
- TDM Measures included as part of the preliminary TDM Plan are as follows:
  - travel/commuting surveys.
  - local area walking/cycling access route maps and transit schedules in the lobbies of buildings within the "medium density residential uses";
  - the possibility of a bikeshare station, car share vehicles.
  - the unbundling of parking from the purchase of medium density units; and
  - a multi-modal travel option information package for new residents.

Respectfully submitted,

Anil Seegobin, P.Eng.
Partner, Engineer

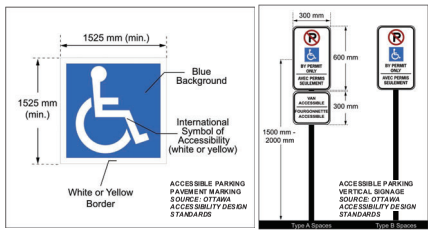
Jing Min, E.I.T.
Traffic Analyst

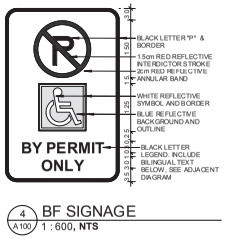
Trans-Plan Transportation Inc.
Transportation Consultants

Figure 1 – Site Location

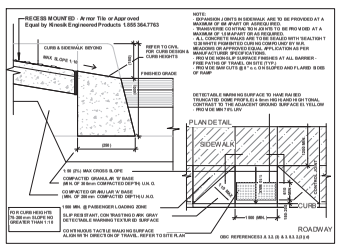
Source: Google Maps

Figure 2: Site Plan





4 A100 BF SIGNAGE 1 : 600, NTS



3 A100 BF CURB DEPRESSION DETAIL 1 : 10

SITE PLAN DRAWING LEGEND

- PROPERTY LINE
- FIRE ROUTE PATH
- SIAMESE CONNECTION
- LOCATION OF BLDG PRINCIPAL ENTRANCES FOR PUBLIC, FIRE FIGHTERS AND BF USE
- SERVICE EXITS / ENTRANCE POINTS
- OVERHEAD DOORS
- TRAFFIC FLOW
- PAINTED ISLAND - NO PARKING PAVEMENT MARKING
- HEAVY DUTY PAVING
- PARKING STALL COUNT PER ROW
- DESIGNATED ACCESSIBLE PARKING SPACE, REFER TO CITY STANDARD FOR PAINTED SYMBOL
- FREE-STANDING SIGN
- LIGHT STANDARD
- EX EXISTING ELEMENTS

CREDIT NOTES

THIS SITE PLAN IS BASED UPON AND MUST BE READ IN CONJUNCTION WITH FILE SURVEY_2019-1-20 Pt5,13Comp 1 D1 PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. DATED FEBRUARY 10, 2020. FABIANI ARCHITECTS LTD. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY, OR COMPLETENESS OF THE DATA SUPPLIED AND SUCH DATA IS NOT INCLUDED UNDER SEALS OF CERTIFICATION, IF ANY.

LEGAL LAND DESCRIPTION:

PART OF LOT 3 CONCESSION 2
PART OF LOT 3 CONCESSION 3
AND PART OF ROAD ALLOWANCE BETWEEN CONCESSION 2 AND 3
CLOSED BY INST. LT278680)
GEOGRAPHIC TOWNSHIP OF MARCH
CITY OF OTTAWA

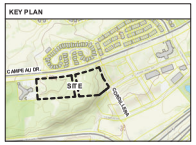
SURVEYOR'S INFO:

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500, Nepean, Ont. K2E 7S6
Phone:*(613) 727-0850 / Fax: (613) 727- 1079*
E-mail: *Nepean@aovltd.com*

GENERAL NOTES:

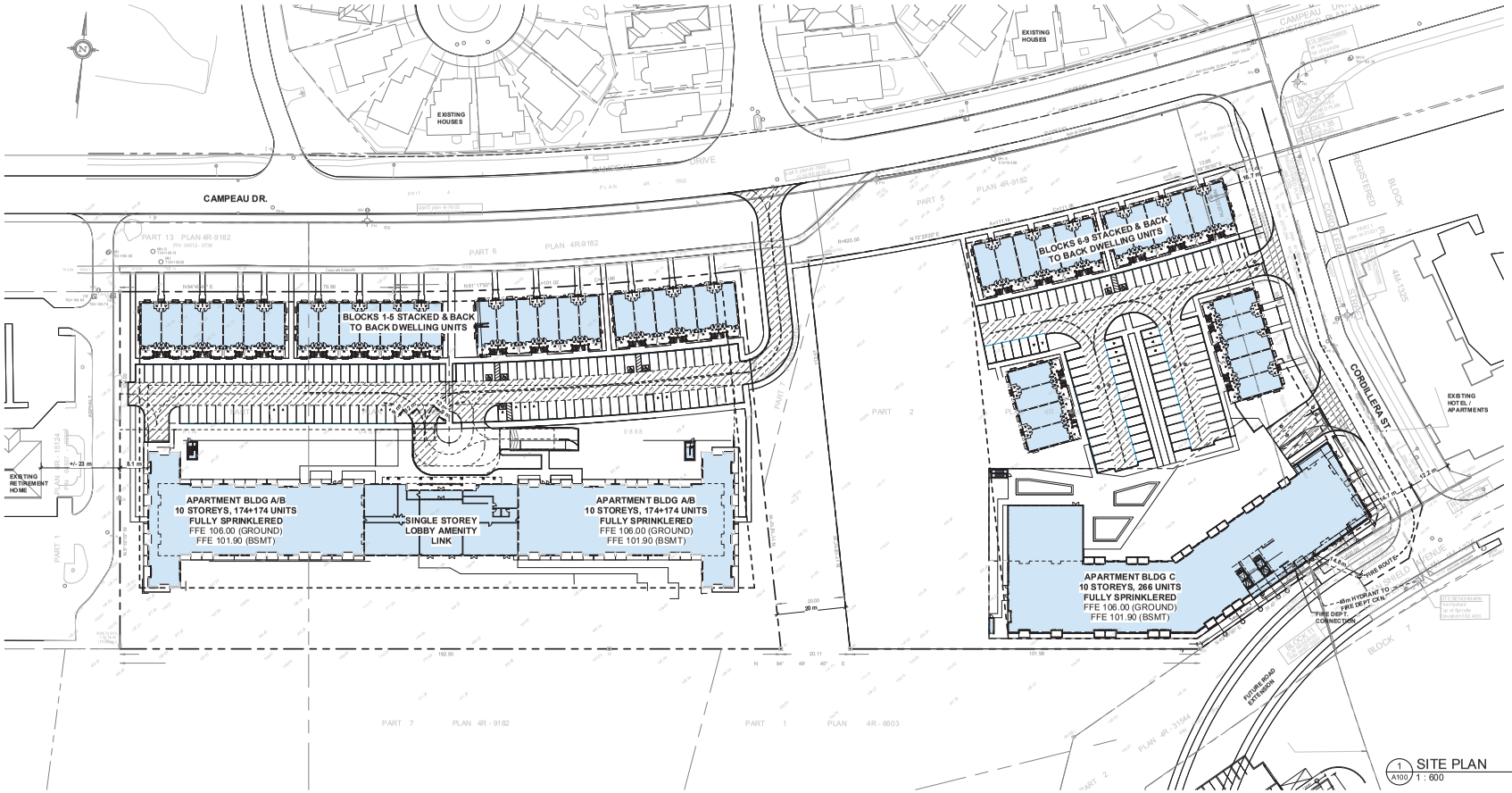
1. ALL EXISTING PAVEMENT, CURBS, SIDEWALKS, DRIVEWAYS AND BOULEVARD AREAS DISTURBED BY THE CONSTRUCTION MUST BE REINSTATED TO THE SATISFACTION OF THE TOWN
2. A MINIMUM SETBACK OF 1.0m FROM STREET FURNITURE TO PROPOSED DRIVEWAYS AND SIDEWALKS SHALL BE MAINTAINED. ALL EXISTING STREET FURNITURE TO BE RELOCATED BY THE CONTRACTOR/OWNER TO A SETBACK OF 1.0m. THE COST OF THE RELOCATION OF ANY UTILITY IS THE RESPONSIBILITY OF THE DEVELOPER/OWNER.
3. THE CONTRACTOR/OWNER IS RESPONSIBLE FOR ALL UTILITY LOCATES AND DAMAGE OR DISTURBANCE DURING CONSTRUCTION
4. ALL BARRIER FREE ENTRANCES AND BARRIER FREE PATHS OF TRAVEL MUST COMPLY WITH OB C. 3.8.
5. THE OWNER/CONTRACTOR SHALL SUPPLY ALL FIRE ROUTE AND HANDICAP SIGNS AS SET OUT IN THE TOWN BY-LAWS AND DESIGN CRITERIA.
6. ALL EXTERIOR ILLUMINATION TO BE DIRECTED DOWNWARD AS WELL AS INWARD AND DESIGNED TO MAINTAIN ZERO CUTOFF LIGHT DISTRIBUTION AS THE PROPERTY LINE.
7. ALL DOWNSPOUTS TO BE CONNECTED TO THE STORM DRAINAGE SYSTEM.
8. ALL CONDENSING UNITS TO BE SCREENED ON THE GROUND FLOOR
9. SEPARATE PERMITS ARE REQUIRED FOR ANY SIGNAGE ON THE PROPERTY
10. WHERE POSSIBLE TREES ARE TO BE PROTECTED FROM CONSTRUCTION.

KEY PLAN



ABBREVIATIONS

B	BOLLARD
BALC	BALCONY
BF	BARRIER FREE
BFFE	BASEMENT FFE
CD	CURB DEPRESSION
CSW	CONCRETE SIDEWALK
EX	EXISTING
PFH	PROPOSED FIRE HYDRANT
FFE	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
FRS	FIRE ROUTE SIGN
FYSB	FRONT YARD BUILDING SETBACK
GFA	GROSS FLOOR AREA
HDP	HEAVY DUTY PAVING
ISYSB	INTERIOR SIDE YARD SETBACK
LAND	LANDSCAPE
LDP	LIGHT DUTY PAVING
LB	LIGHT BOLLARD
LS	LIGHT STANDARD
PROV	PROVIDED
REQD	REQUIRED
RYSB	REAR YARD BUILDING SETBACK
SDWK	SIDEWALK
TBD	TO BE DETERMINED
TBR	TO BE REMOVED
UP	UTILITY POLE



1 A100 SITE PLAN 1 : 600

DEVELOPMENT CONSULTANT :
ARCHITECTURE & PLANNING INITIATIVES
1 MACDONNELL RD
OTTAWA, ON. K1J 7W1
T 613.317.1744
API

GENERAL NOTES:
1 TO THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS PRIOR TO ISSUANCE
2 VERIFY AND CHECK ALL DIMENSIONS PRIOR TO AND DURING CONSTRUCTION
3 DETERMINE LOCATIONS OF ALL EXISTING SERVICES
4 PLANS ARE IN CONFORMANCE WITH THE ONTARIO BUILDING CODE.
ANY CHANGES, DISCREPANCIES, OR SUBSTITUTIONS SHALL BE REPORTED TO AND REVIEW BY THE ARCHITECT BEFORE PROCEEDING.

PROJECT N. 17421

NO.	YY/MM/DD	ISSUE
1	20.01.30	SITE PLAN CONTROL
2	20.04.30	SITE PLAN CONTROL
3	20.07.30	SITE PLAN CONTROL

CODE REVIEW: SITE PLAN, TENDER, CONSTRUCTION, AS BUILT, OTHER

FABIANI ARCHITECT LTD.

ONTARIO ASSOCIATION OF ARCHITECTS
FERNANDO FABIANI LICENCE 3093
PROFESSIONAL CERTIFICATION

BHG BAYVIEW HOSPITALITY GROUP

PROJECT NAME: KANATA MIXED-USE RESIDENTIAL PROJECT
6391 CAMPEAU DR, KANATA, ON. K2K 2E9

DRAWING TITLE: MASTER SITE PLAN

DRAWN BY: ML
CHECKED BY: FF
DATE: 21-07-30
SCALE: As indicated
PROJECT No. F19-049
PARCEL #
DRAWING No. A100
SHEET ISSUE No. 3

7-1640 ORLEANS ROAD ORLEANS, ON. K4A 3W5
P. (905) 337-1248 E. annis@sprucedales.net

D07-12-17-0063
#17421

Figure 3: Existing Study Area Roadway Characteristics

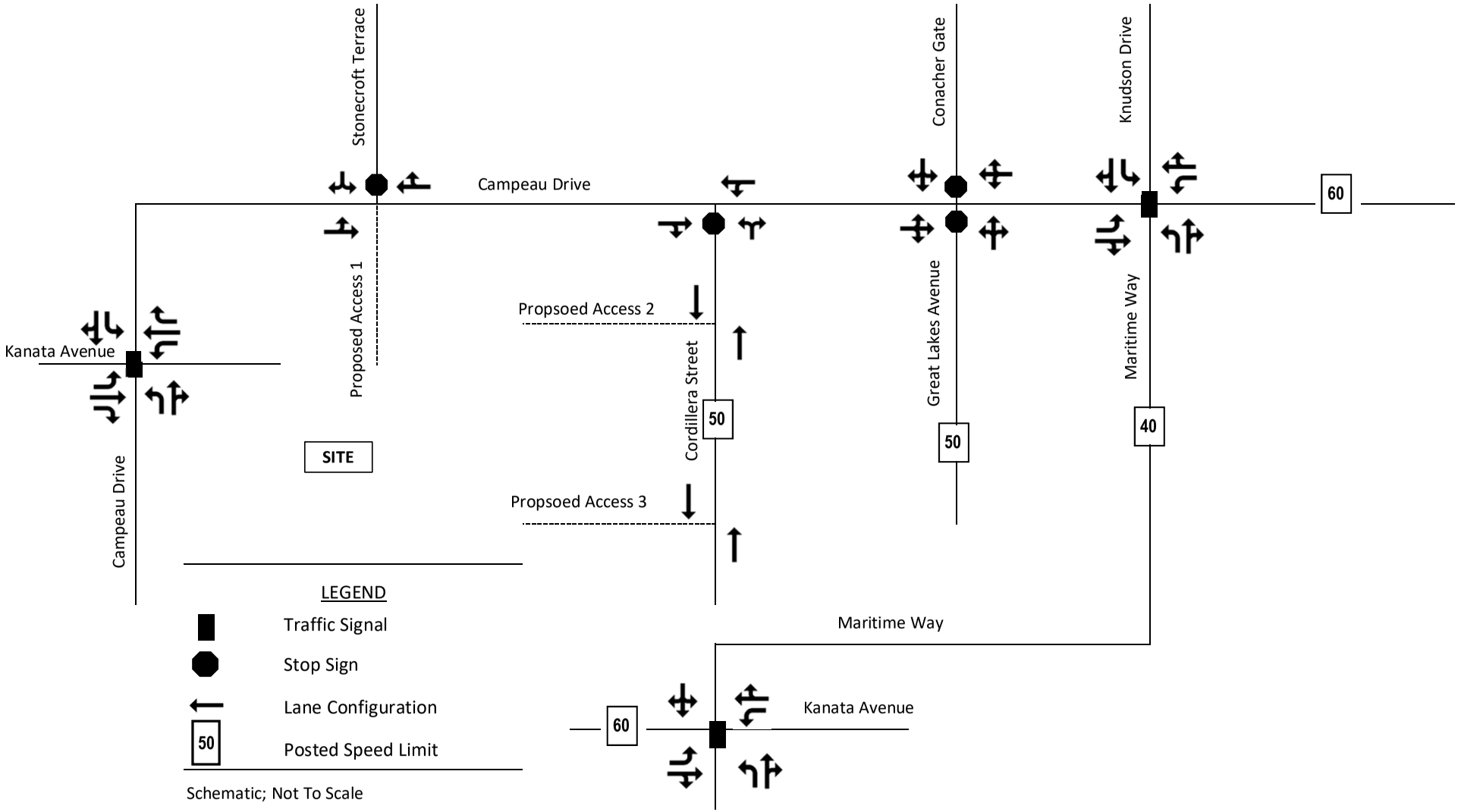
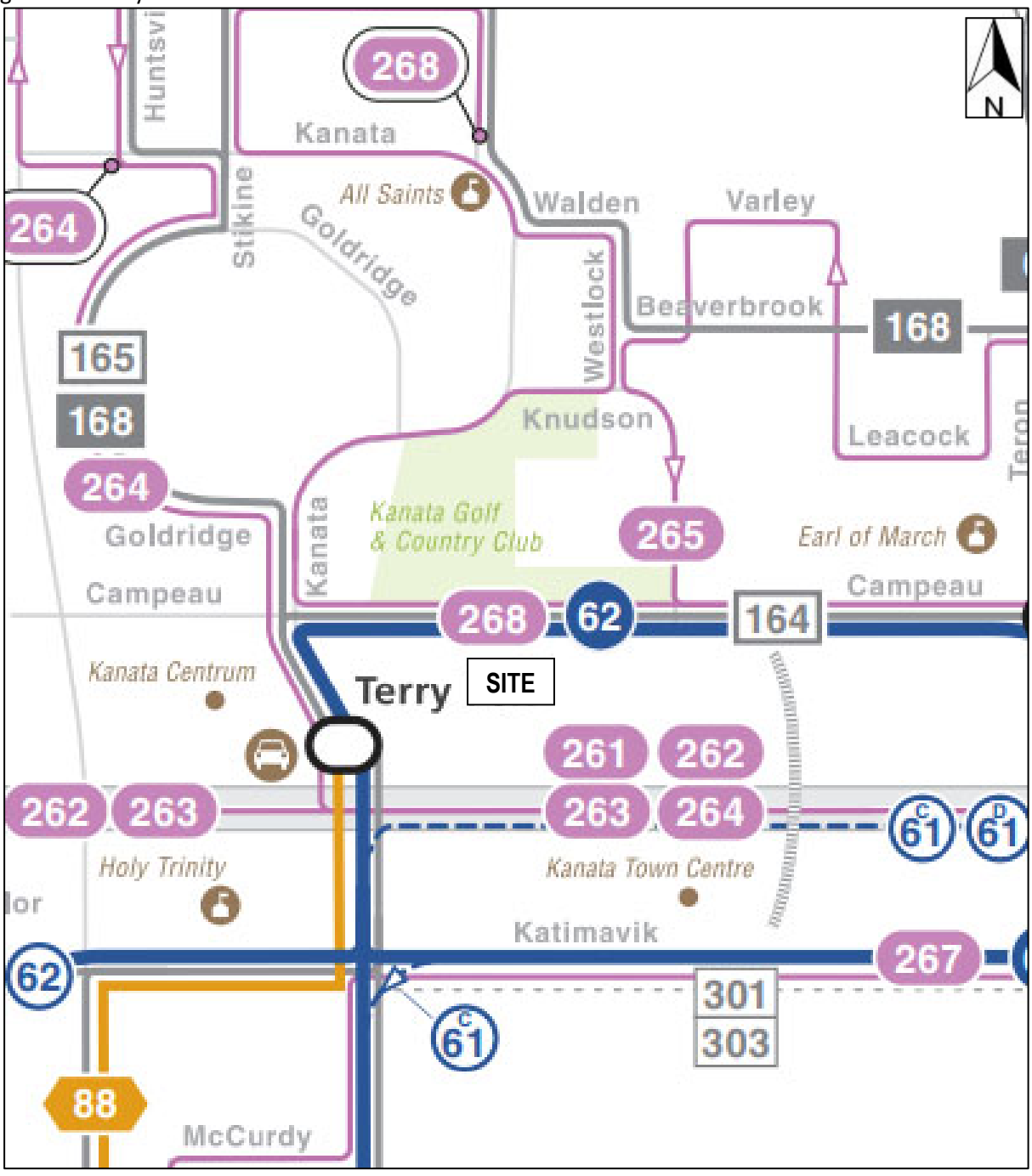


Figure 4 – Study Area Transit Service



Source: OC Transpo website

Figure 5: Existing Traffic Volumes, Weekday AM and PM Peak Hours

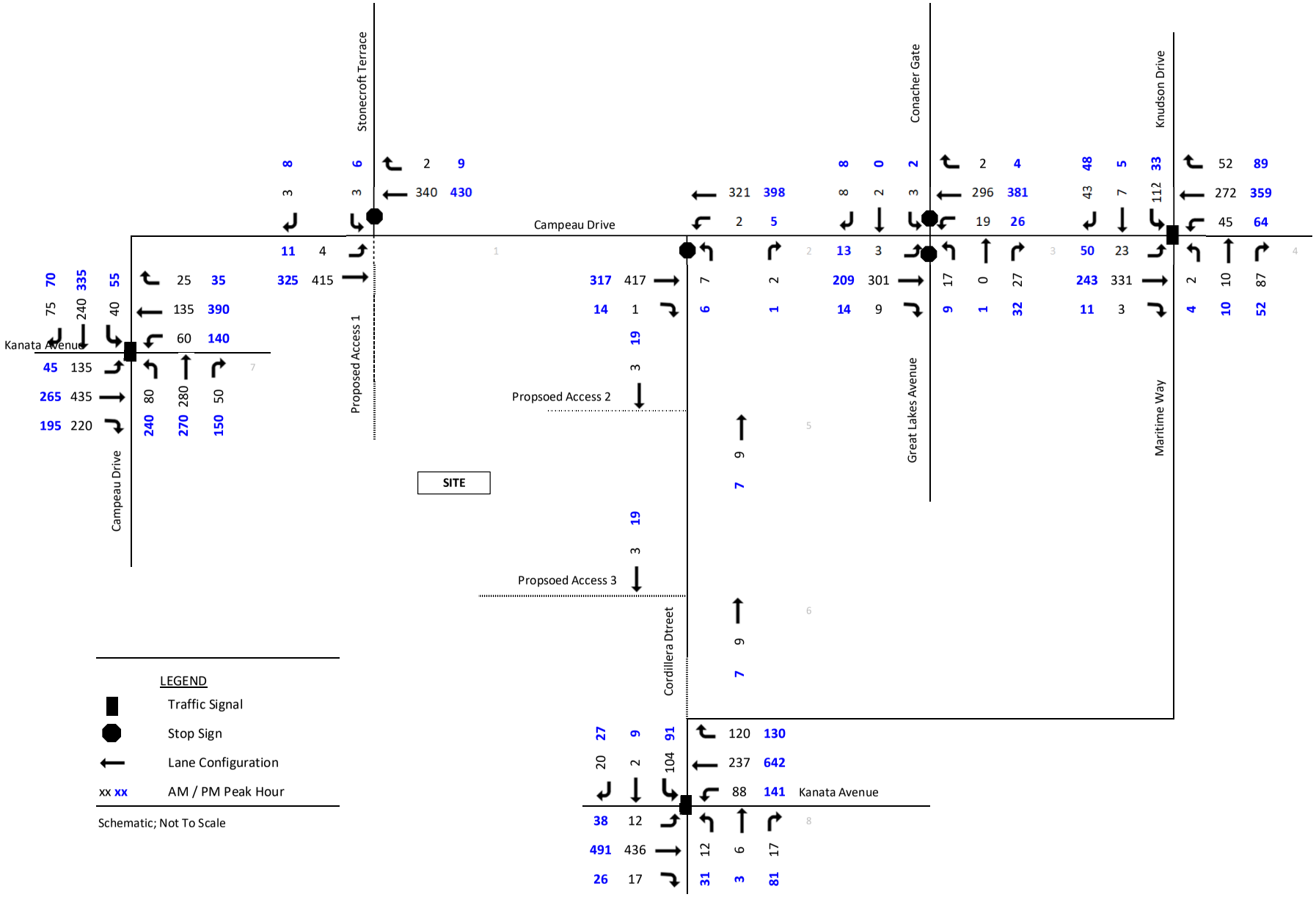


Figure 6 – Planned Rapid Transit Network

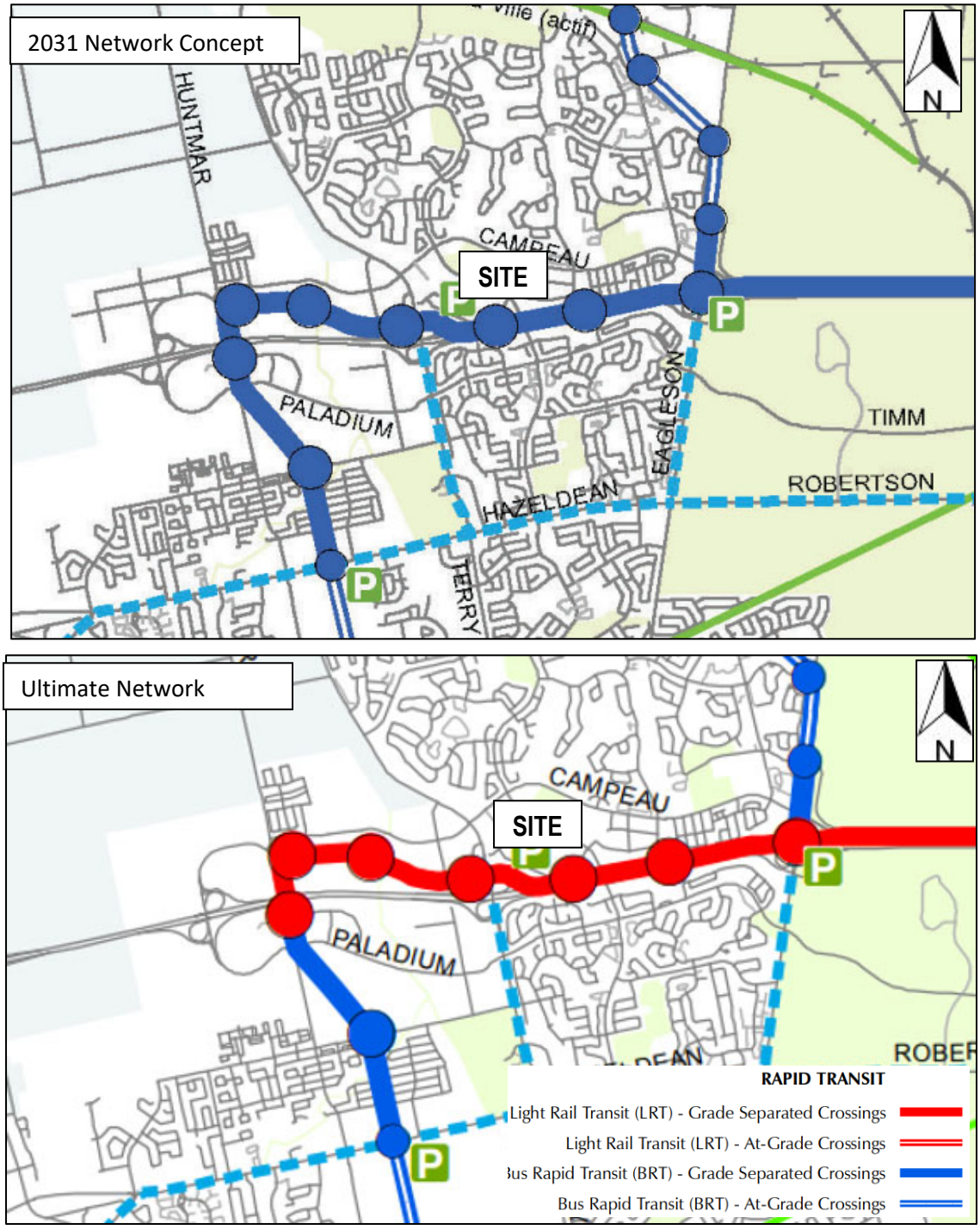


Figure 7: Site Traffic Assignment, Weekday AM and PM Peak Hours

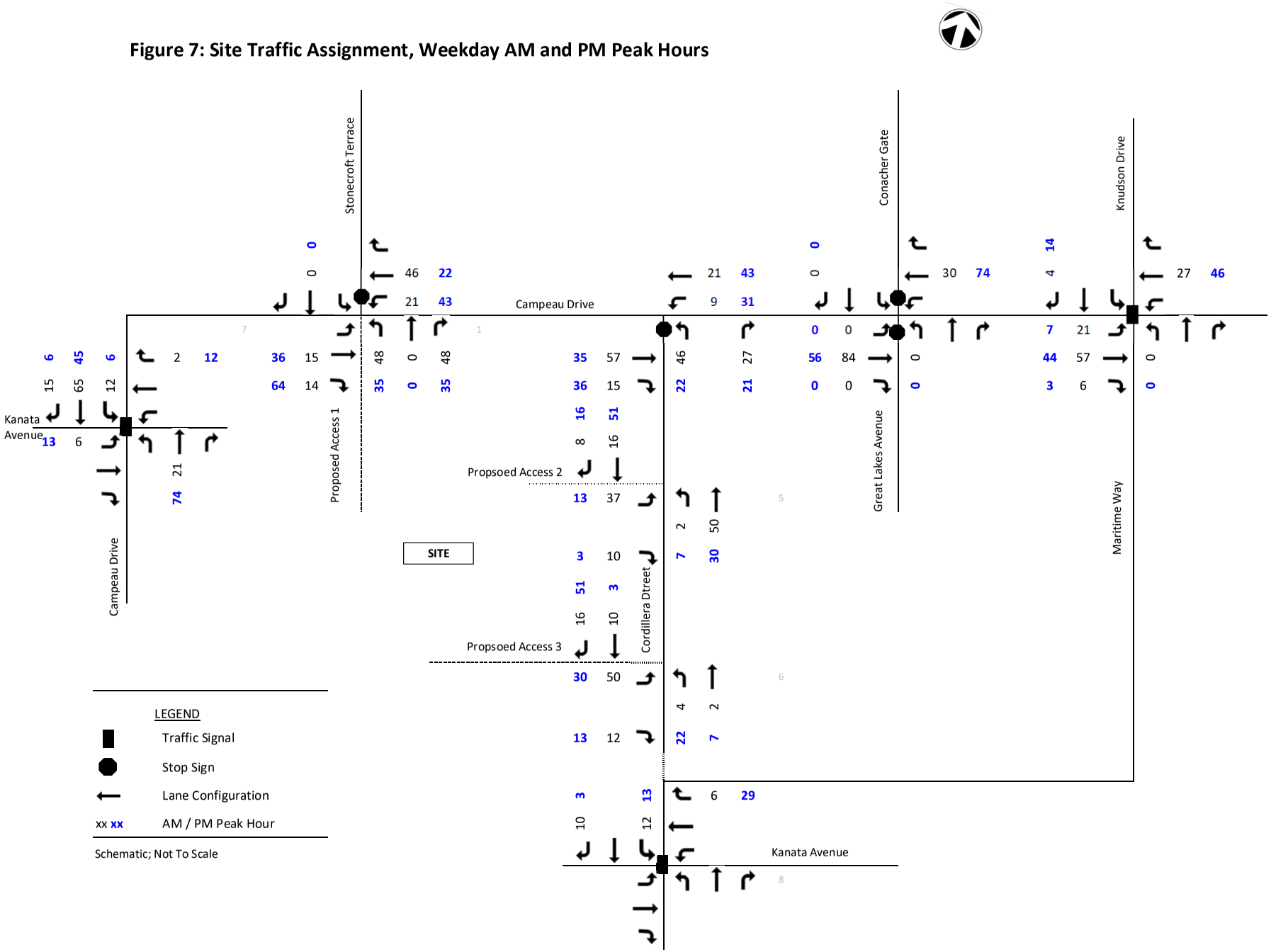
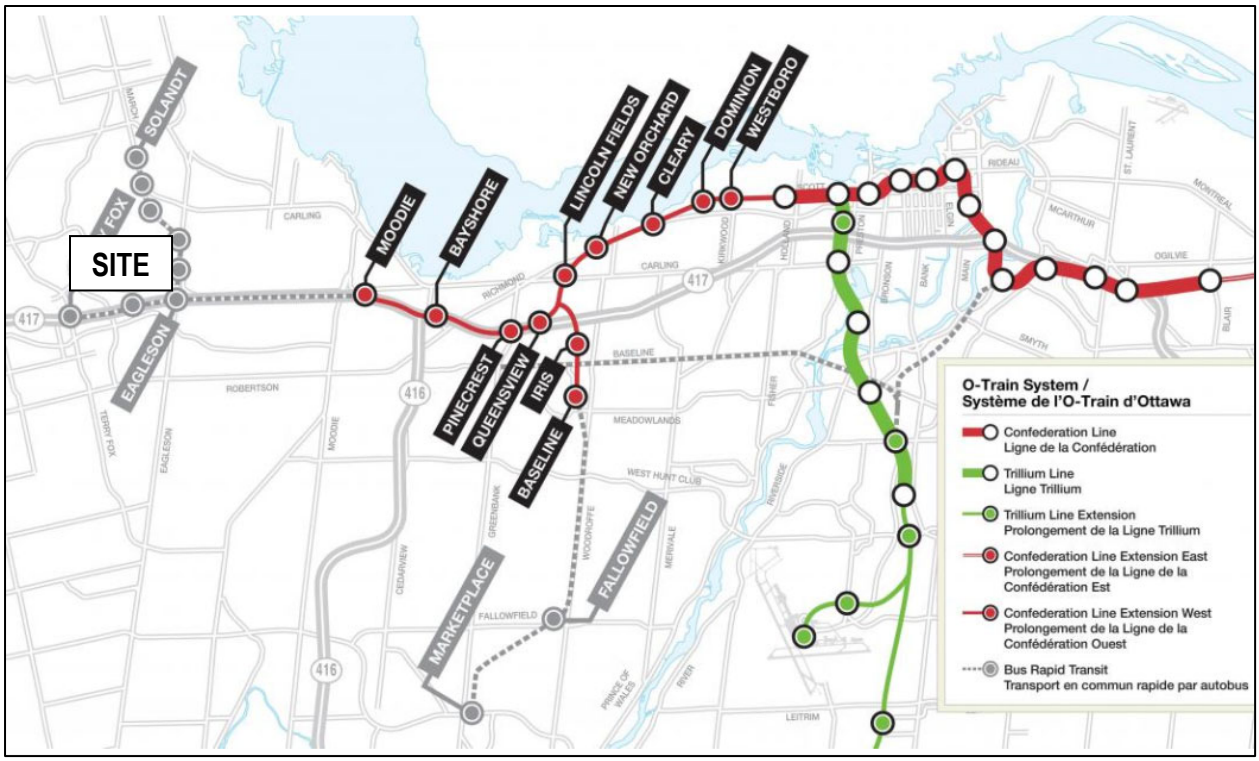


Figure 8 – Proposed Confederation Line West Extension



Source: City of Ottawa Website

Figure 9: Future Background 2022 Traffic Volumes, Weekday AM and PM Peak Hours

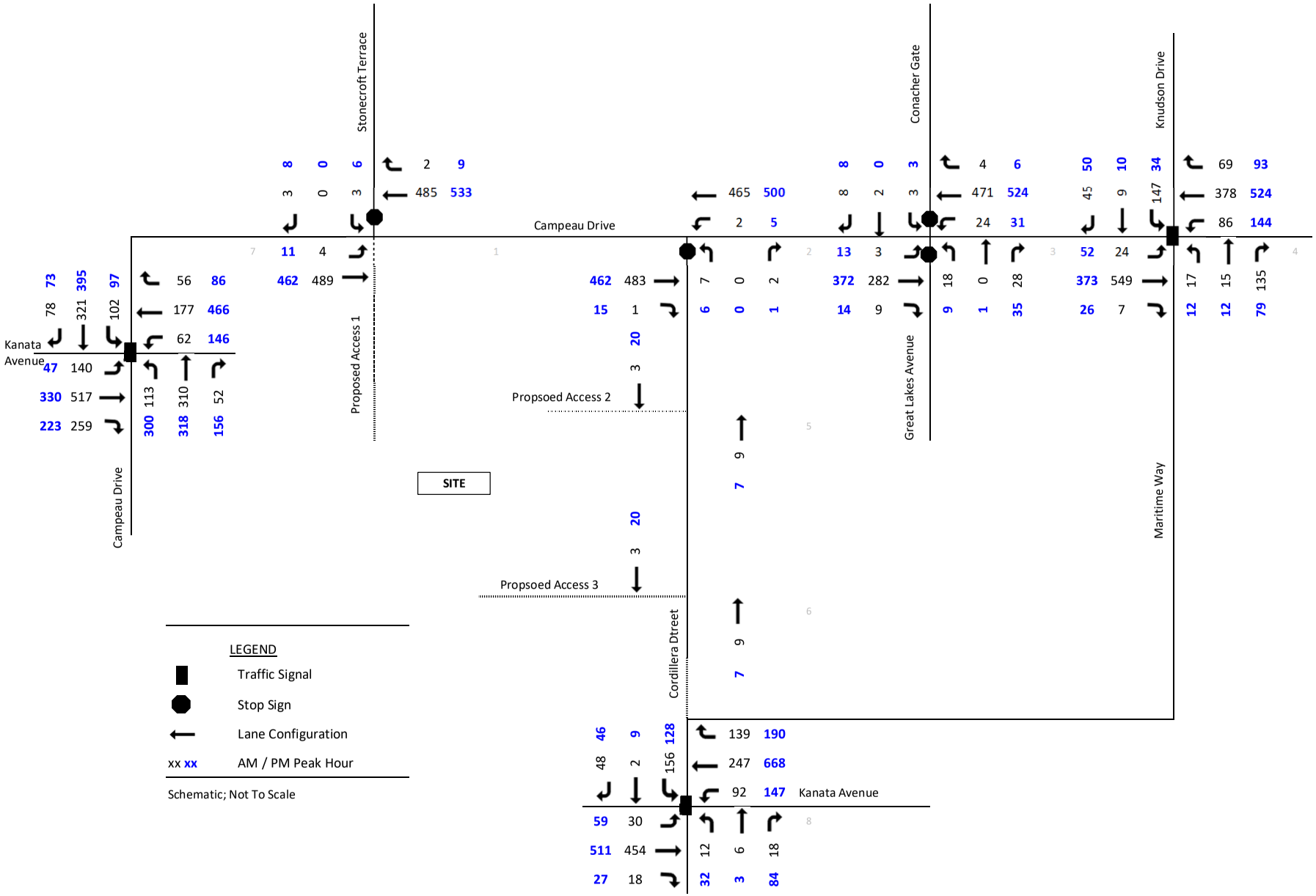


Figure 10: Future Background 2027 Traffic Volumes, Weekday AM and PM Peak Hours

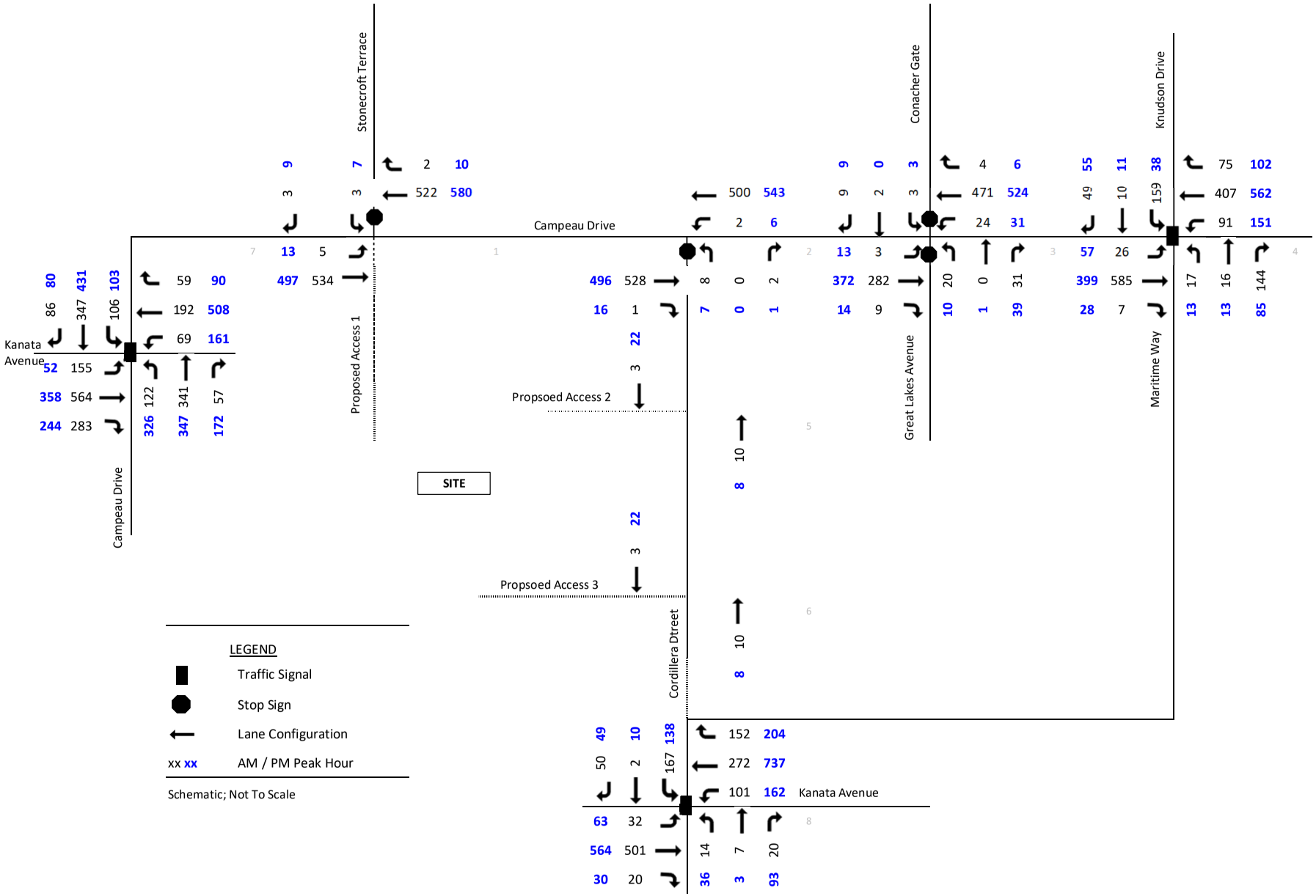


Figure 11: Future Total 2022 Traffic Volumes, Weekday AM and PM Peak Hours

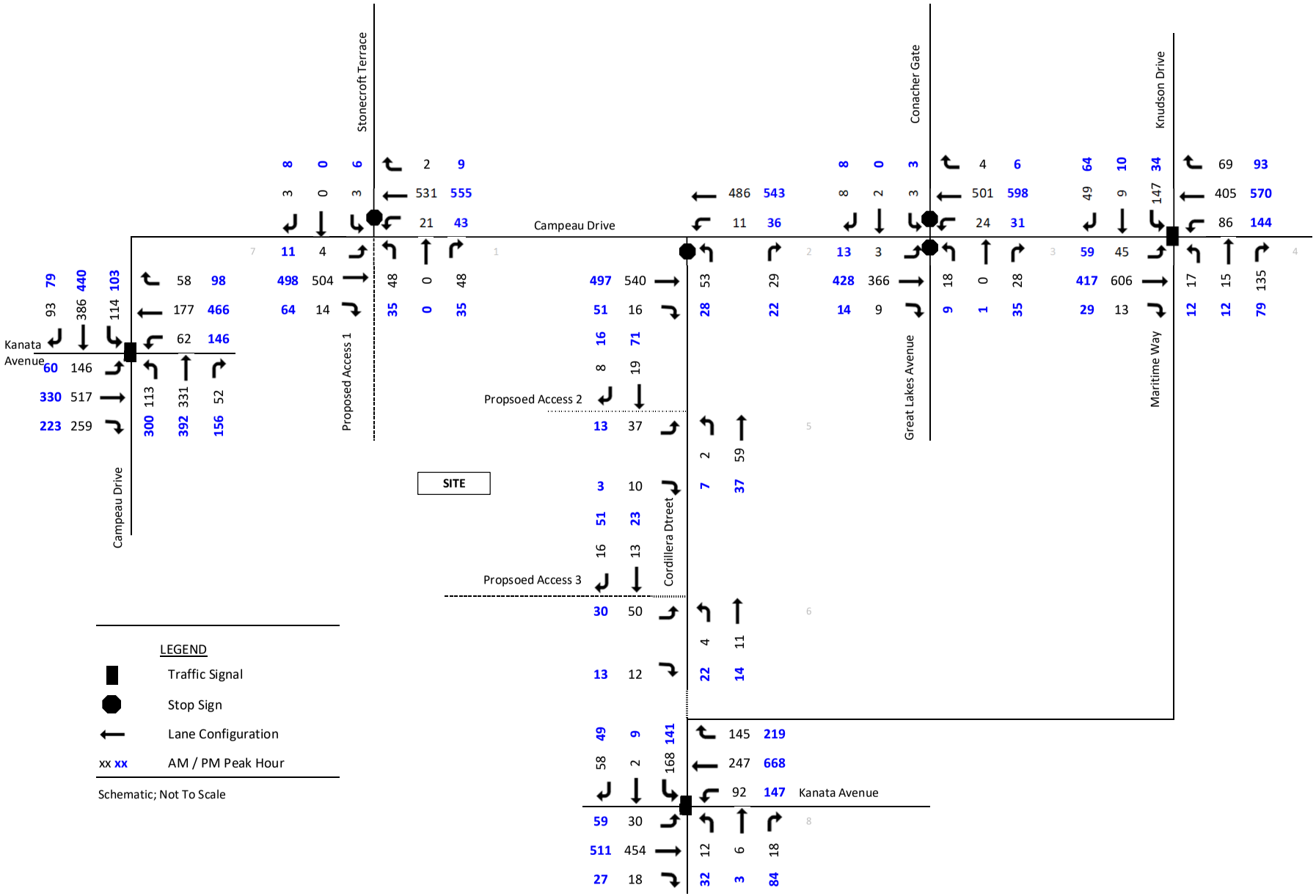


Figure 12: Future Total 2027 Traffic Volumes, Weekday AM and PM Peak Hours

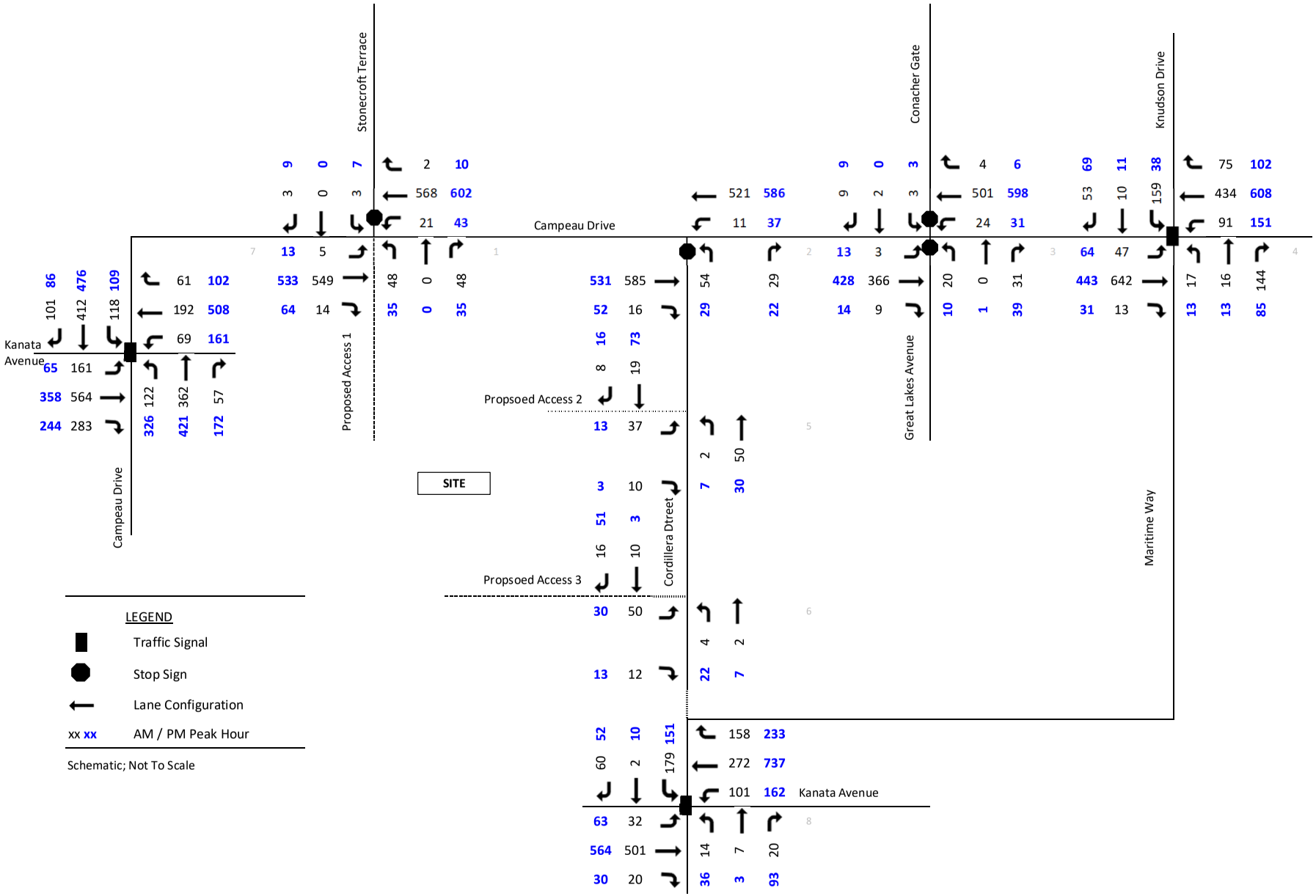


Figure 13 – Bus Stop Locations

Source: Google Maps

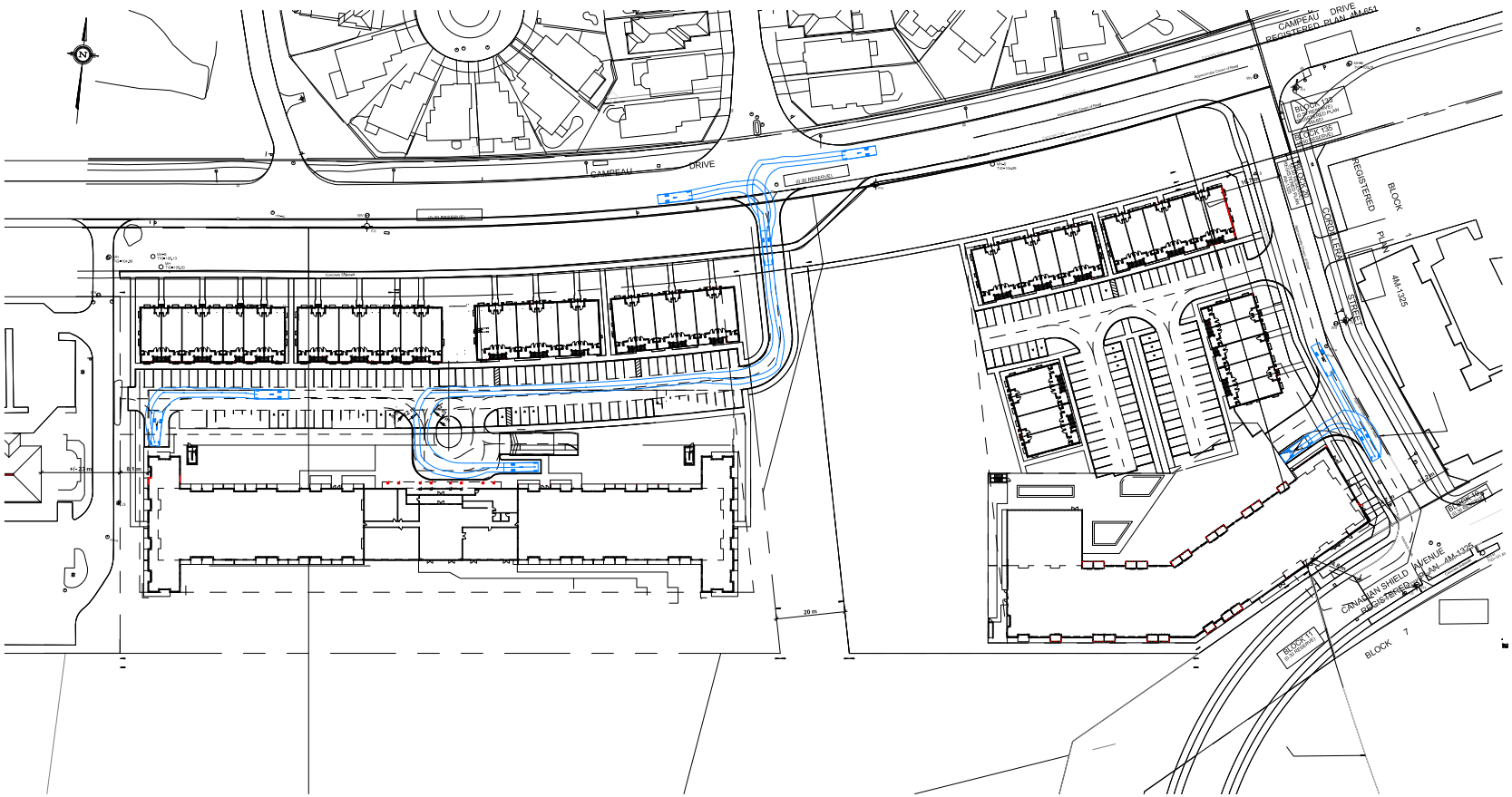
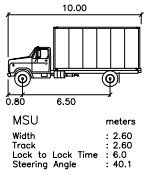


Figure 14 - Loading Vehicle Entering the Site and the Loading Area

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



MSU meters

Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.1

CONSTRUCTION NORTH
TRUE NORTH

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

SCALE: 1:2000 UNITS: m

TRANS-PLAN™
transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

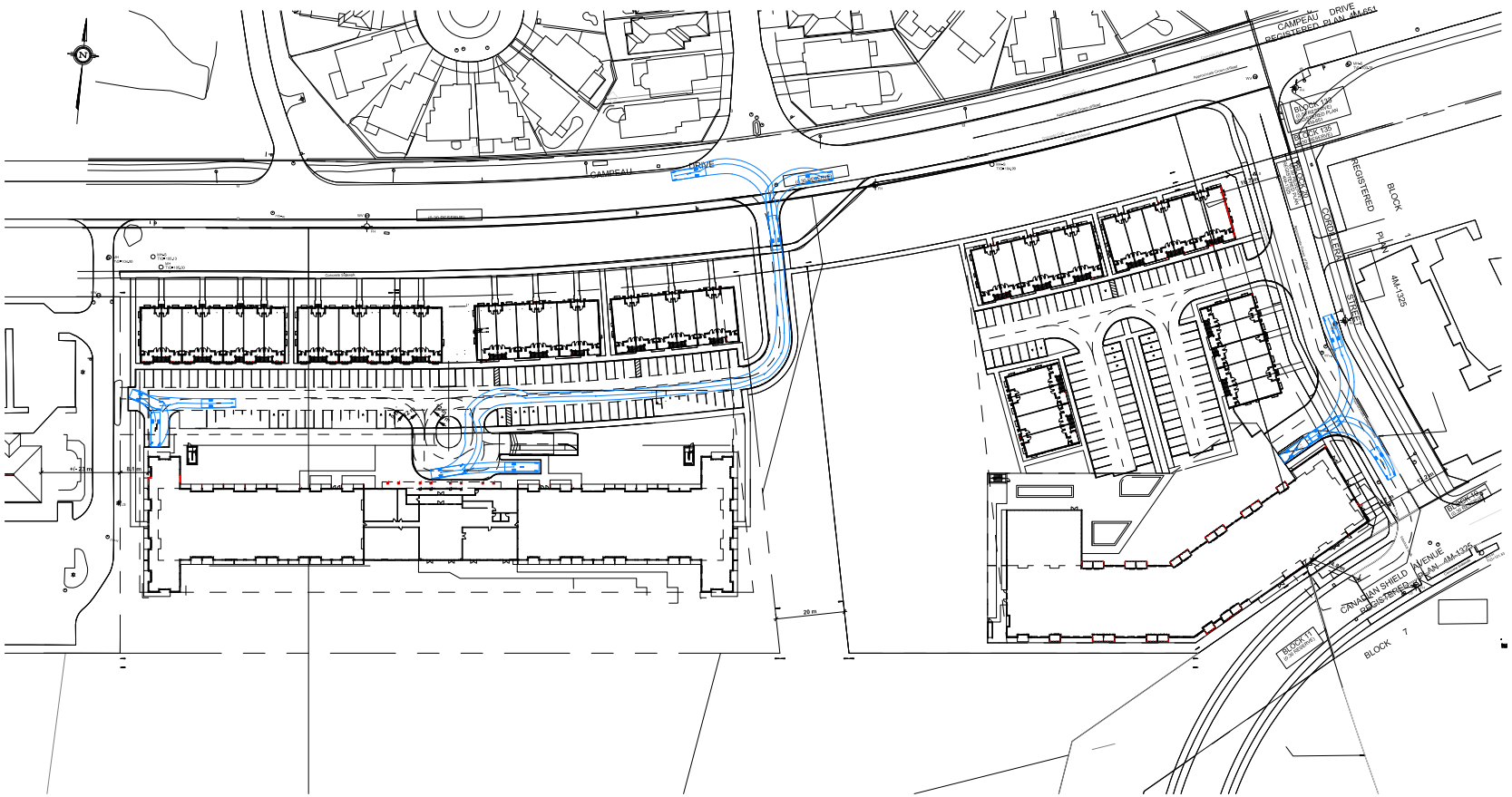
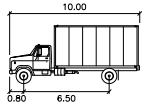


Figure 15 - Loading Vehicle Exiting Loading Area and the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



MSU	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.1

CONSTRUCTION NORTH
TRUE NORTH

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

SCALE: 1:2000 UNITS: m

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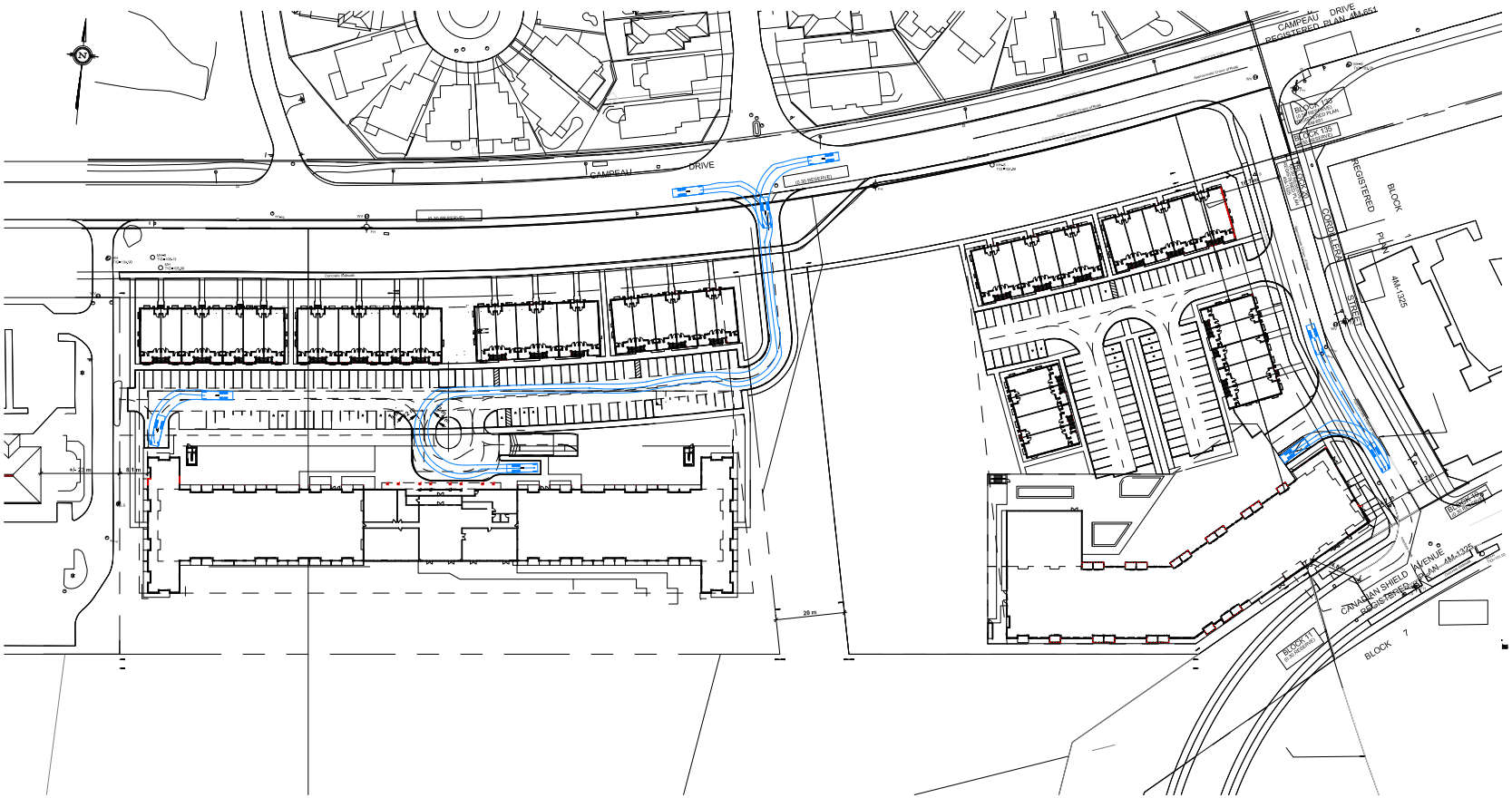
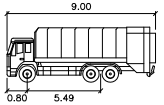


Figure 16 - 9m Waste Collection Vehicle Entering the Site and the Loading Area

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



9m Waste Vehicle Characteristics

Width	: 2.40
Track	: 2.40
Lock to Lock Time	: 6.0
Steering Angle	: 25.9

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:2000 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

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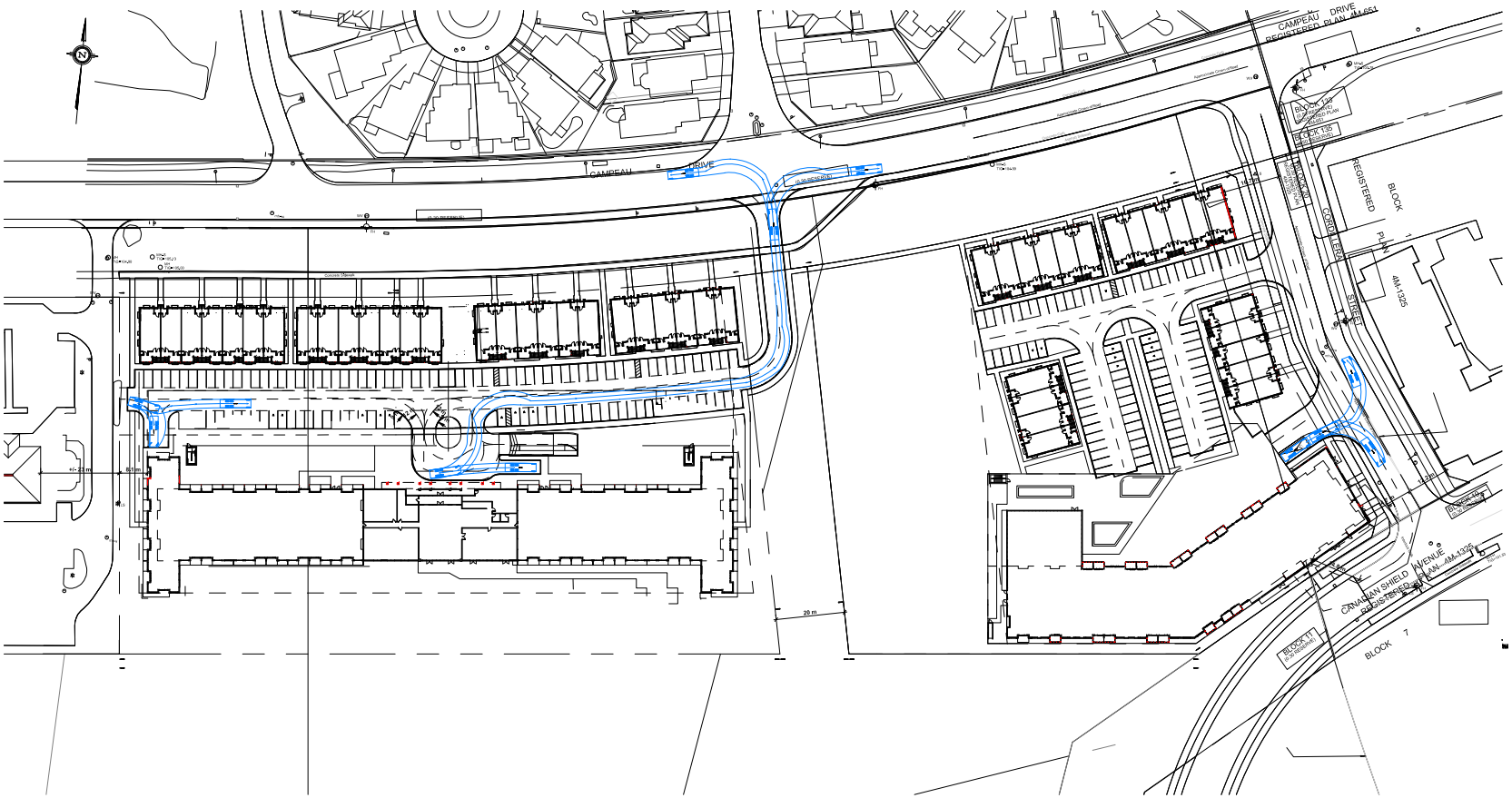
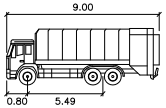


Figure 17 - Waste Collection Vehicle Exiting Loading Area and the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



9m Waste Vehicle

Width	: 2.40
Track	: 2.40
Lock to Lock Time	: 6.0
Steering Angle	: 25.9

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:2000 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

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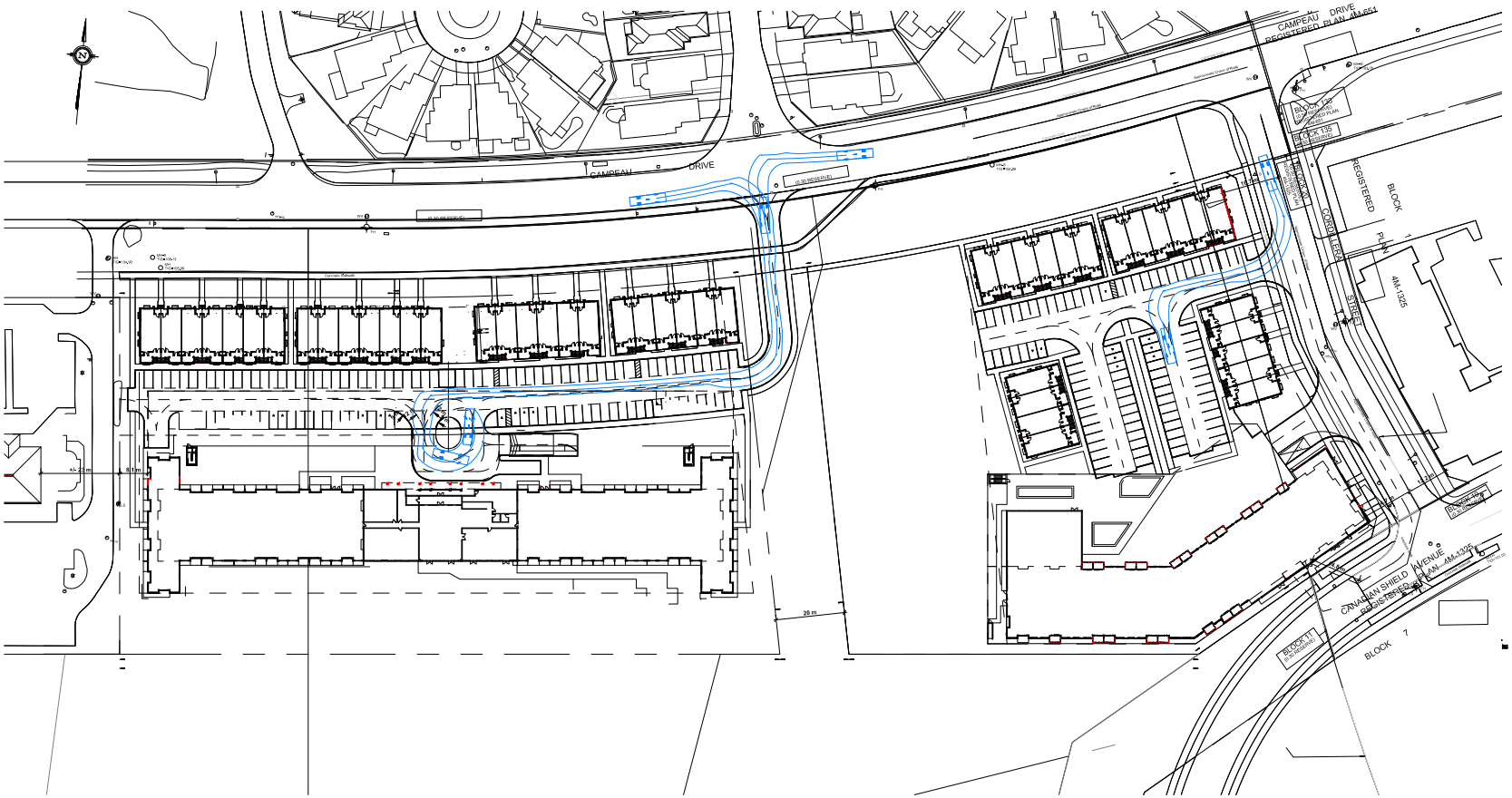
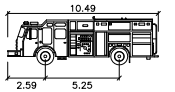


Figure 18 - Fire Truck Entering the Site and Circulating

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Fire Truck Type A	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

CONSTRUCTION NORTH
TRUE NORTH

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

SCALE: 1:2000 UNITS: m

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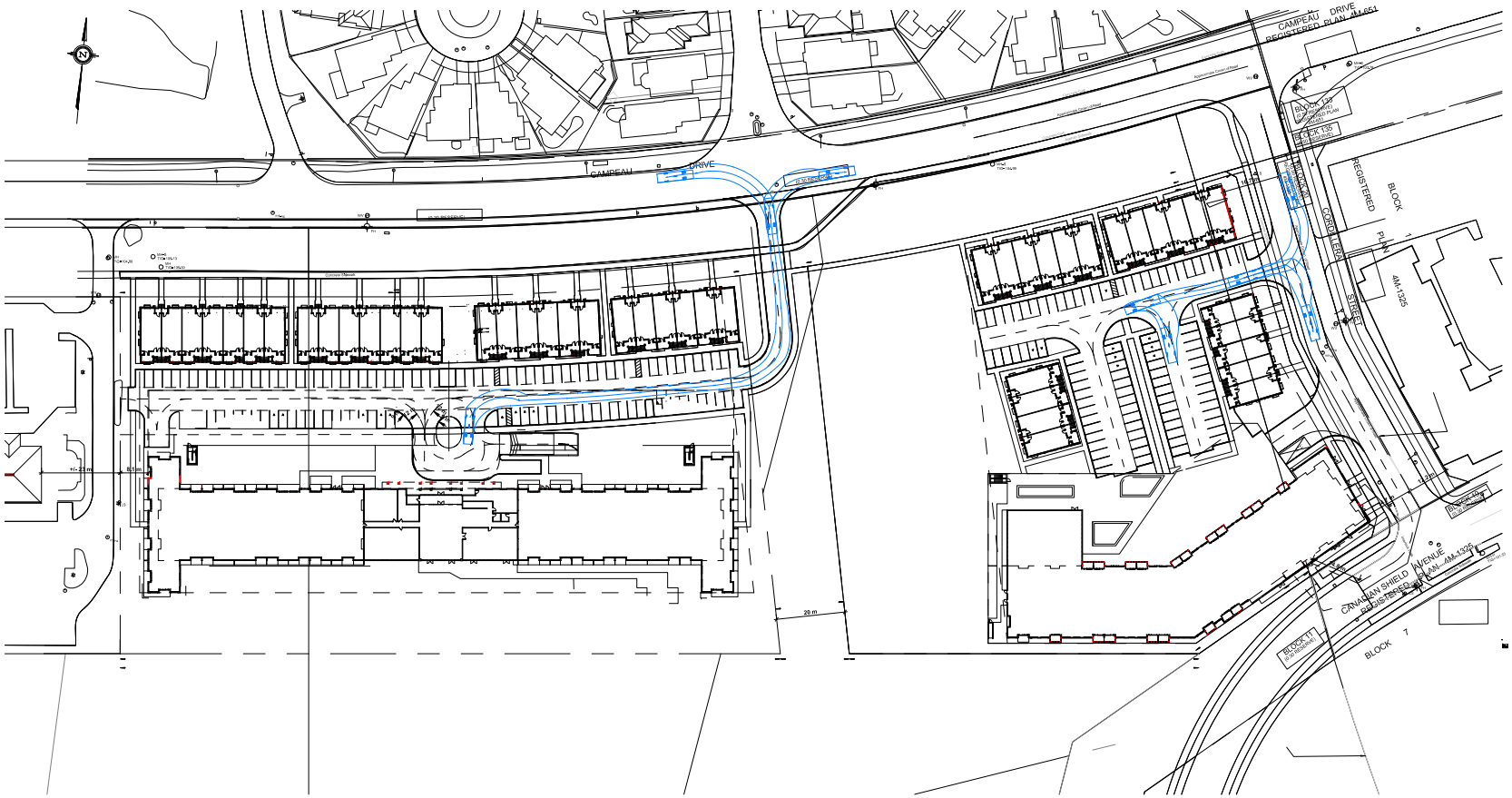
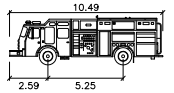


Figure 19 - Fire Truck Exiting the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Fire Truck Type A — meters

Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:2000 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

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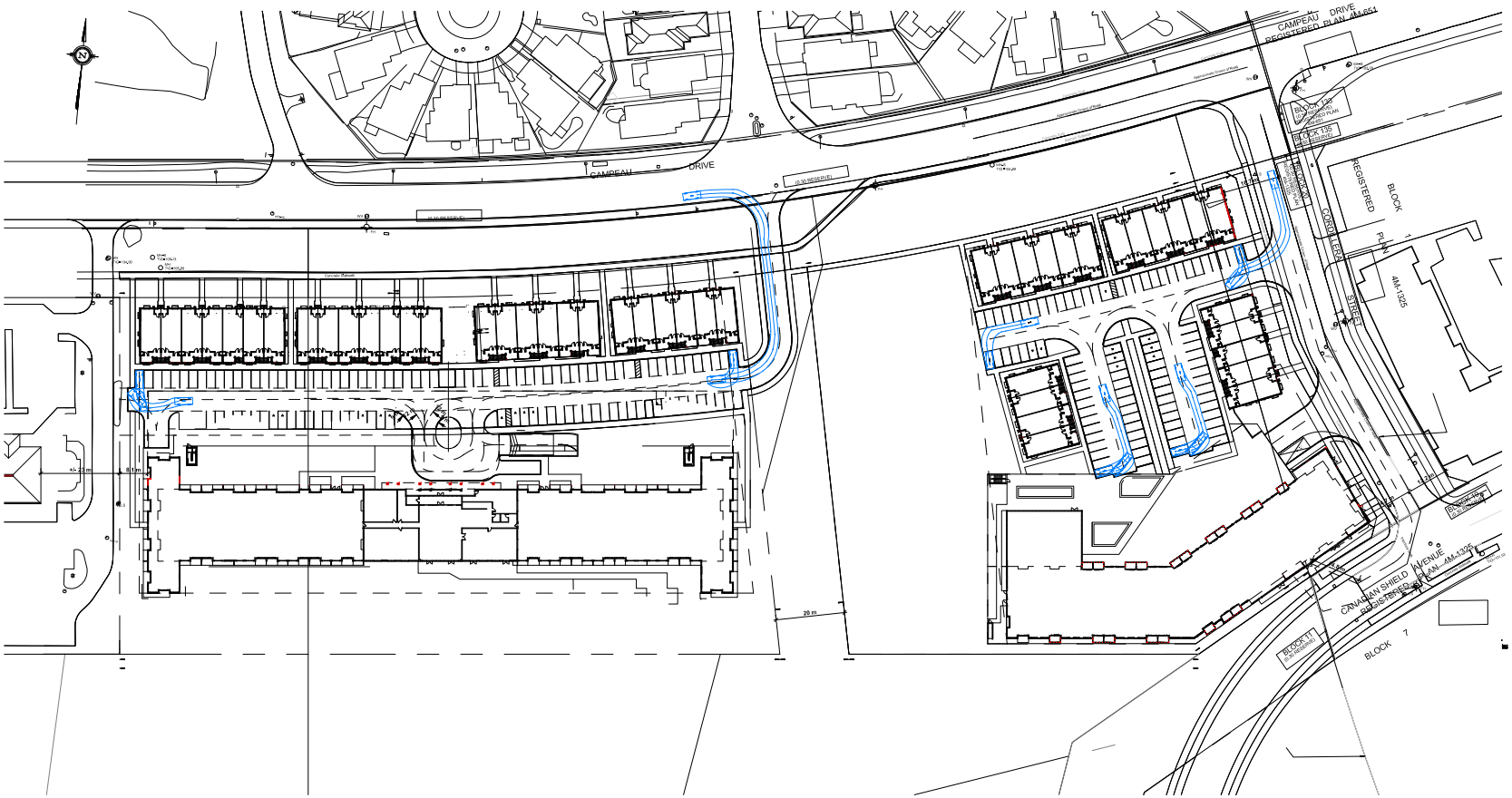
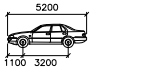


Figure 20 - Passenger Vehicle Entering the Site and the Parking Spaces

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH

TRUE NORTH

SCALE: 1:2000 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

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transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
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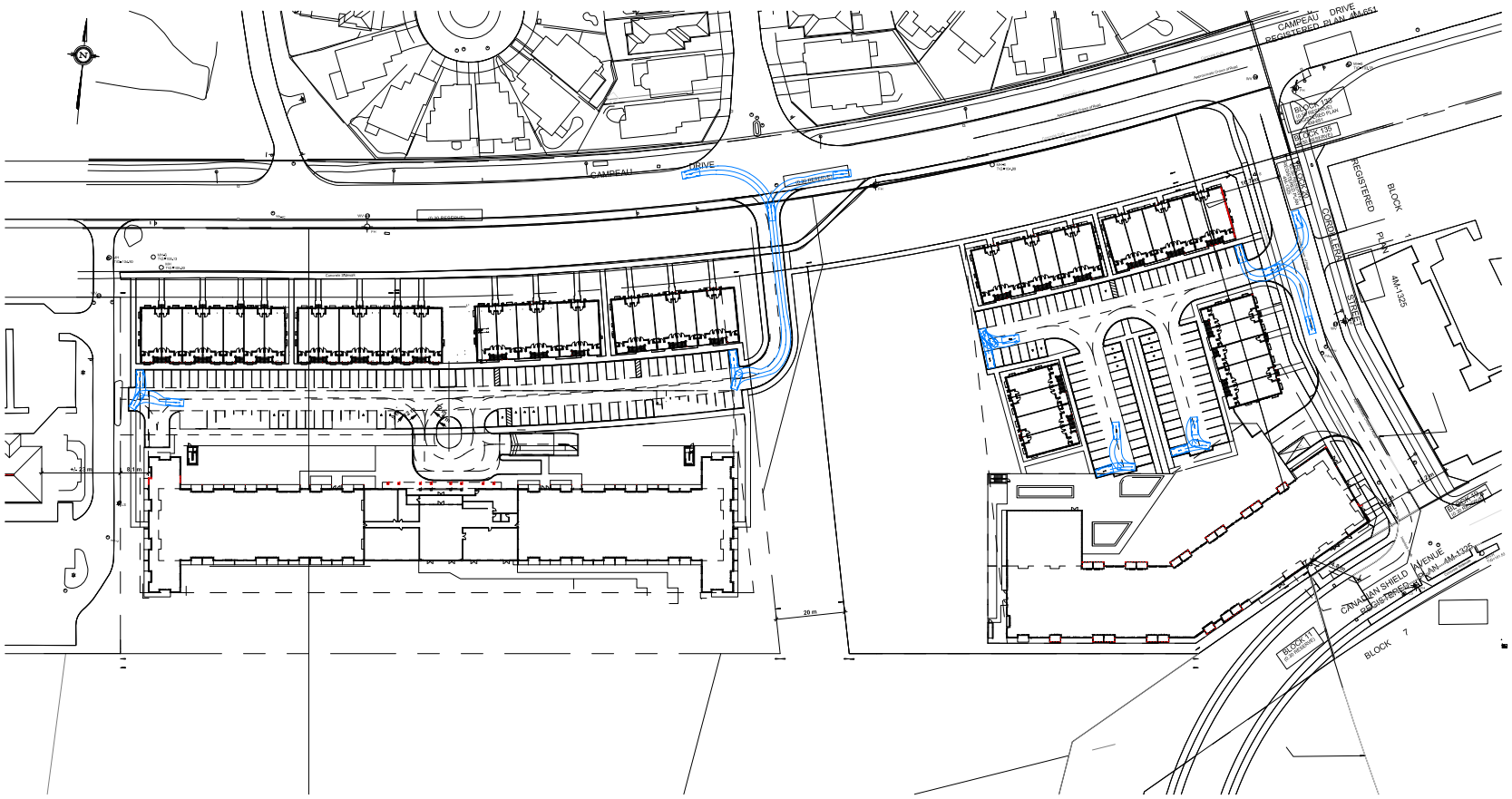
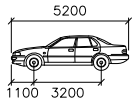


Figure 21 - Passenger Vehicle Exiting the Parking Spaces and the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:2000 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated July 23, 2021.

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transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
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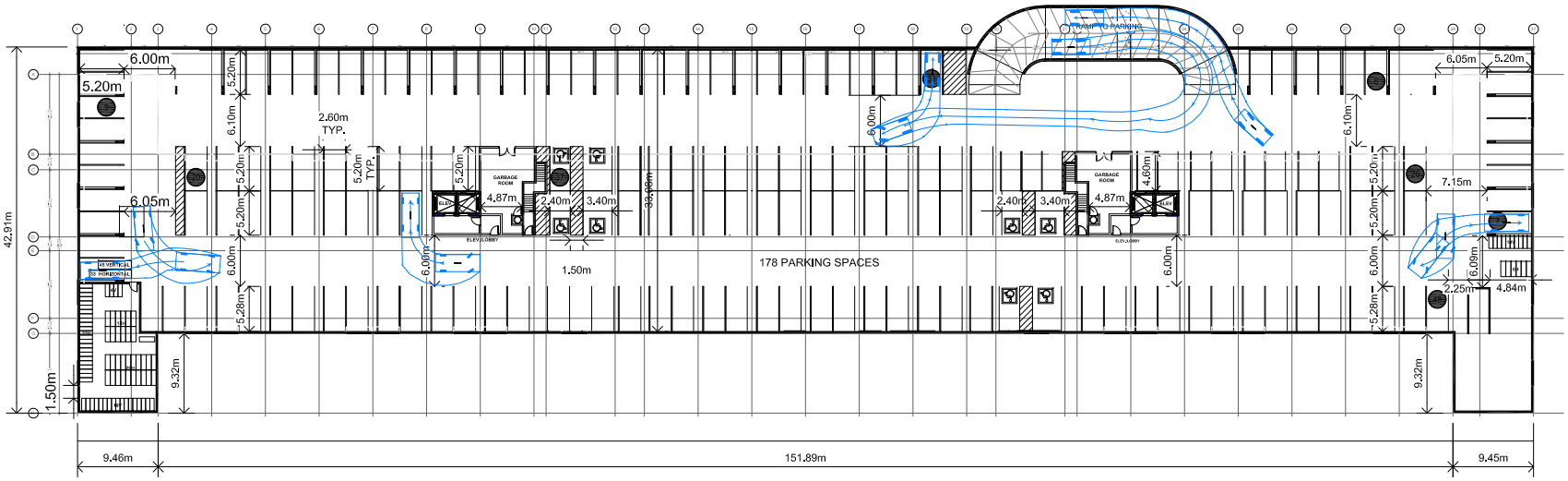


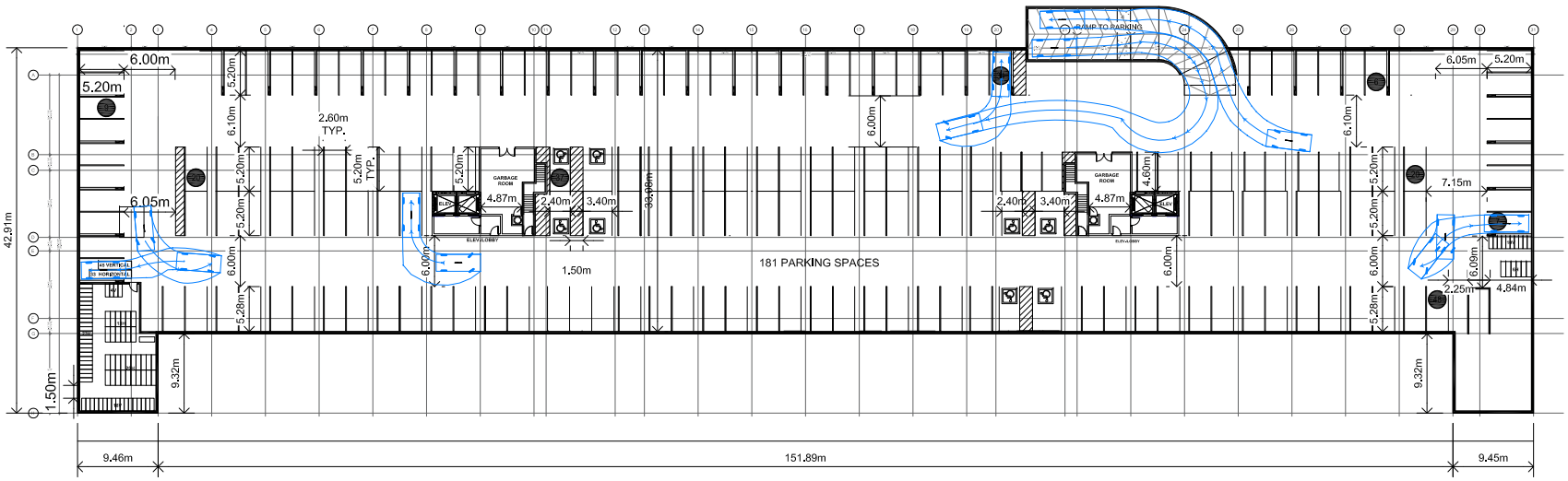
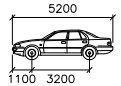


Figure 22 - Passenger Vehicle Entering the Underground Garage (Building A&B) and the Parking Spaces

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH
TRUE NORTH

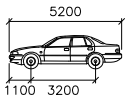
SCALE: 1:800 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated November 3, 2020

TRANS-PLAN™
transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

Figure 23 - Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building A&B)

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:800 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated November 3, 2020

TRANS-PLAN™
transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

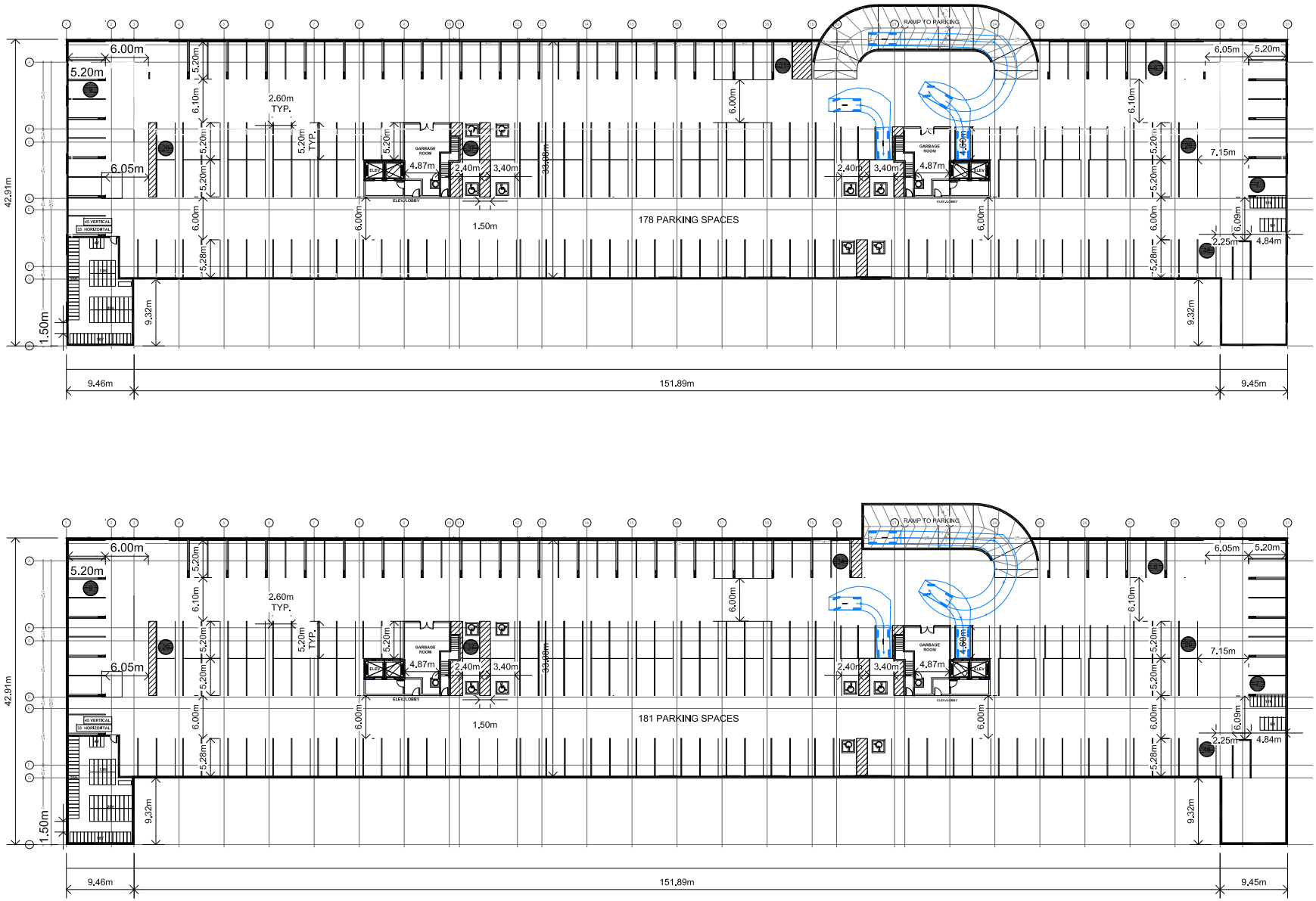
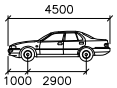


Figure 24 - Small Passenger Vehicle Entering the Underground Garage (Building A&B) and the Parking Spaces

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Test	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:800 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated November 3, 2020

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tel: (647) 931-7383
website: www.trans-plan.com

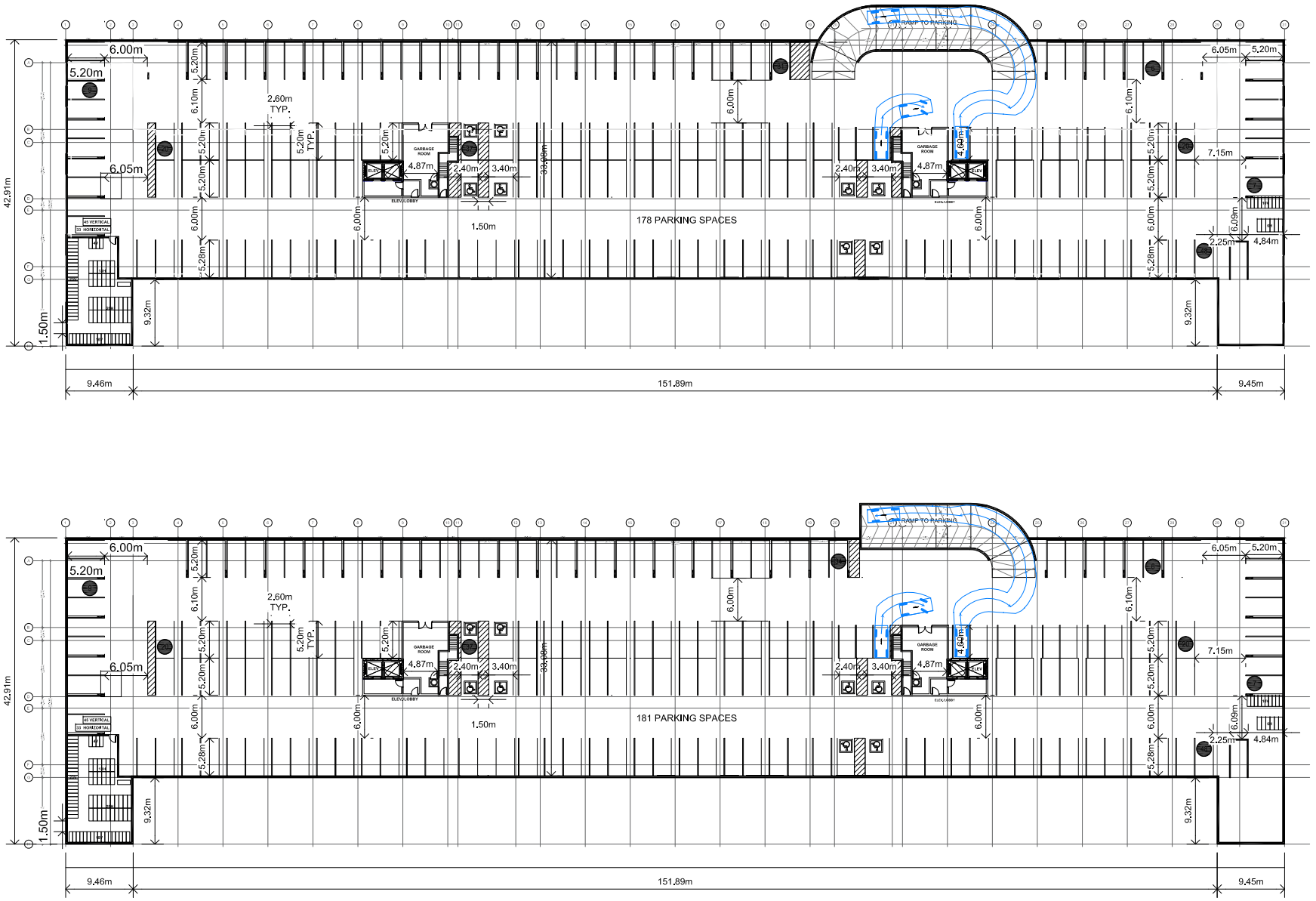
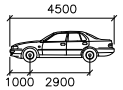
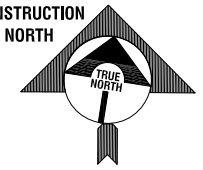


Figure 25 - Small Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building A&B)

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Test	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



Source: Site Plan by Fabiani Architects Ltd., dated November 3, 2020

SCALE: 1:800 UNITS: m

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transportation engineering consultants
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Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

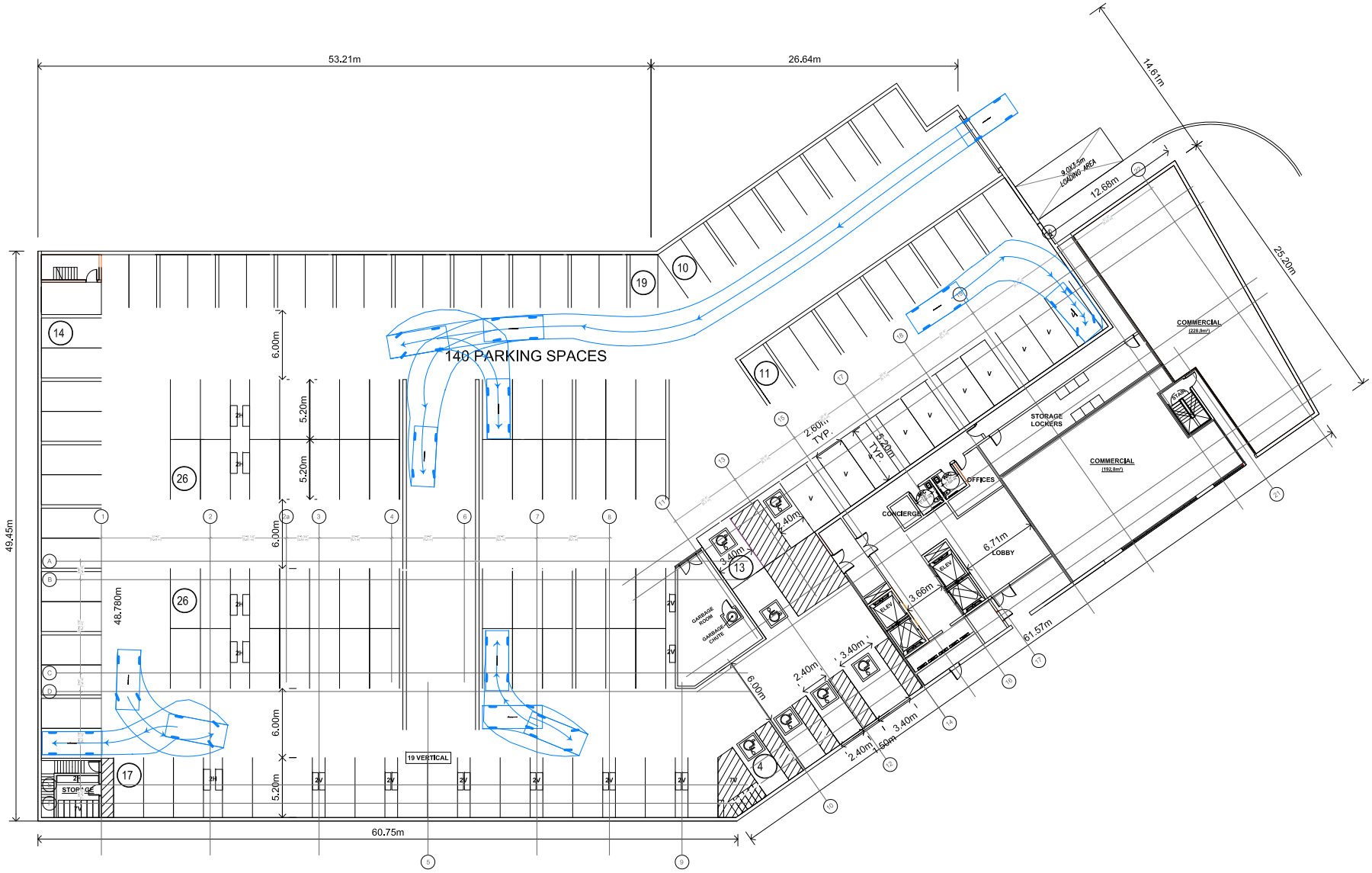
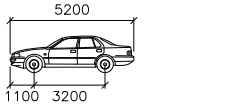


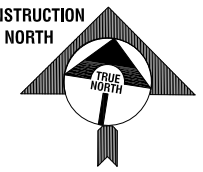
Figure 26 - Passenger Vehicle Entering the Underground Garage (Building C) and the Parking Spaces

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



Source: Site Plan by Fabiani Architects Ltd., dated April 21, 2021

SCALE: 1:500 UNITS: m

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transportation engineering consultants
785 Dundas Street West
Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

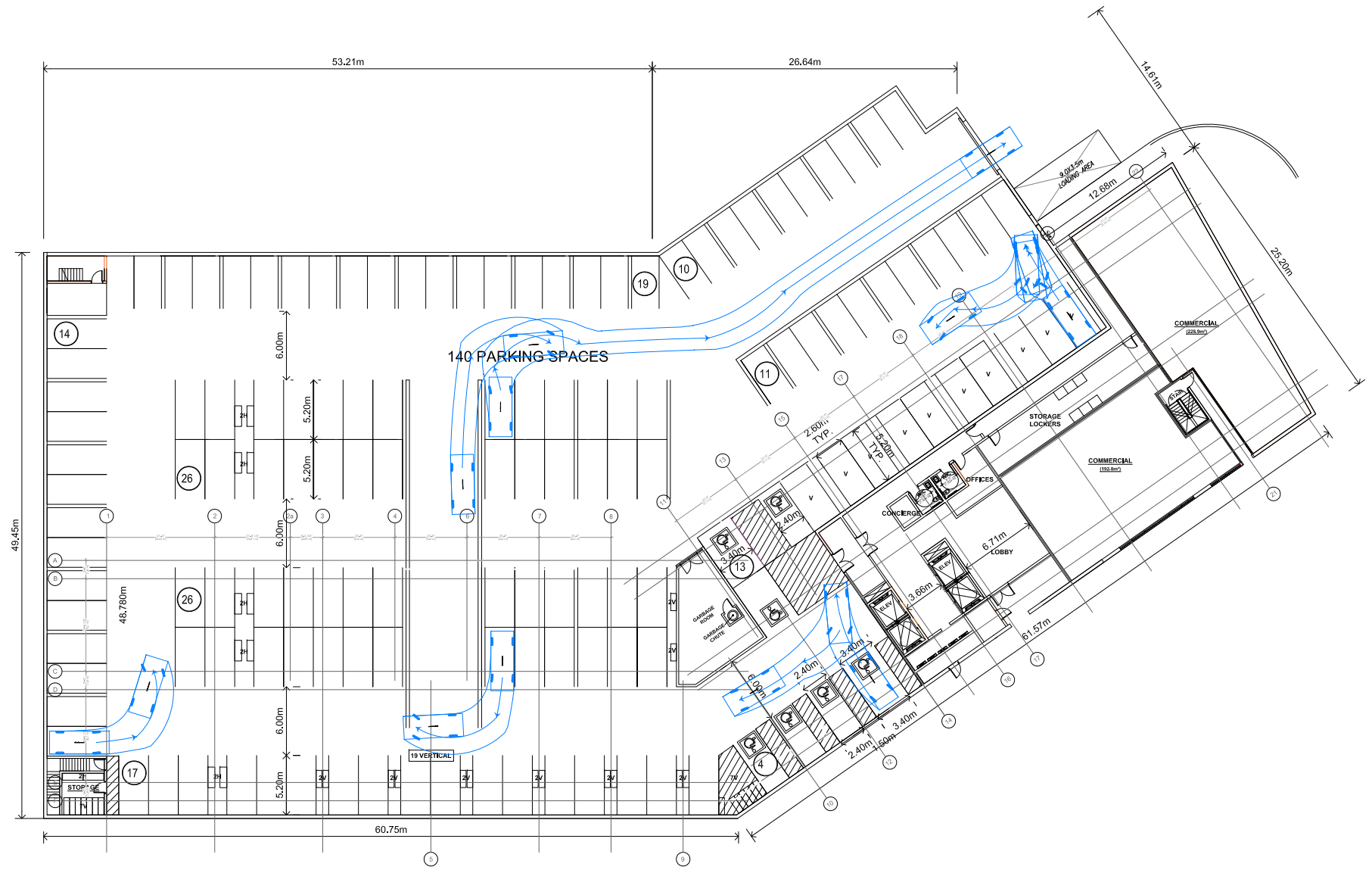
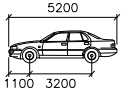


Figure 27 - Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building C)

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Passenger Vehicles, 5.2m

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH

TRUE NORTH

SCALE: 1:500 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated April 21, 2021

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transportation engineering consultants
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Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com

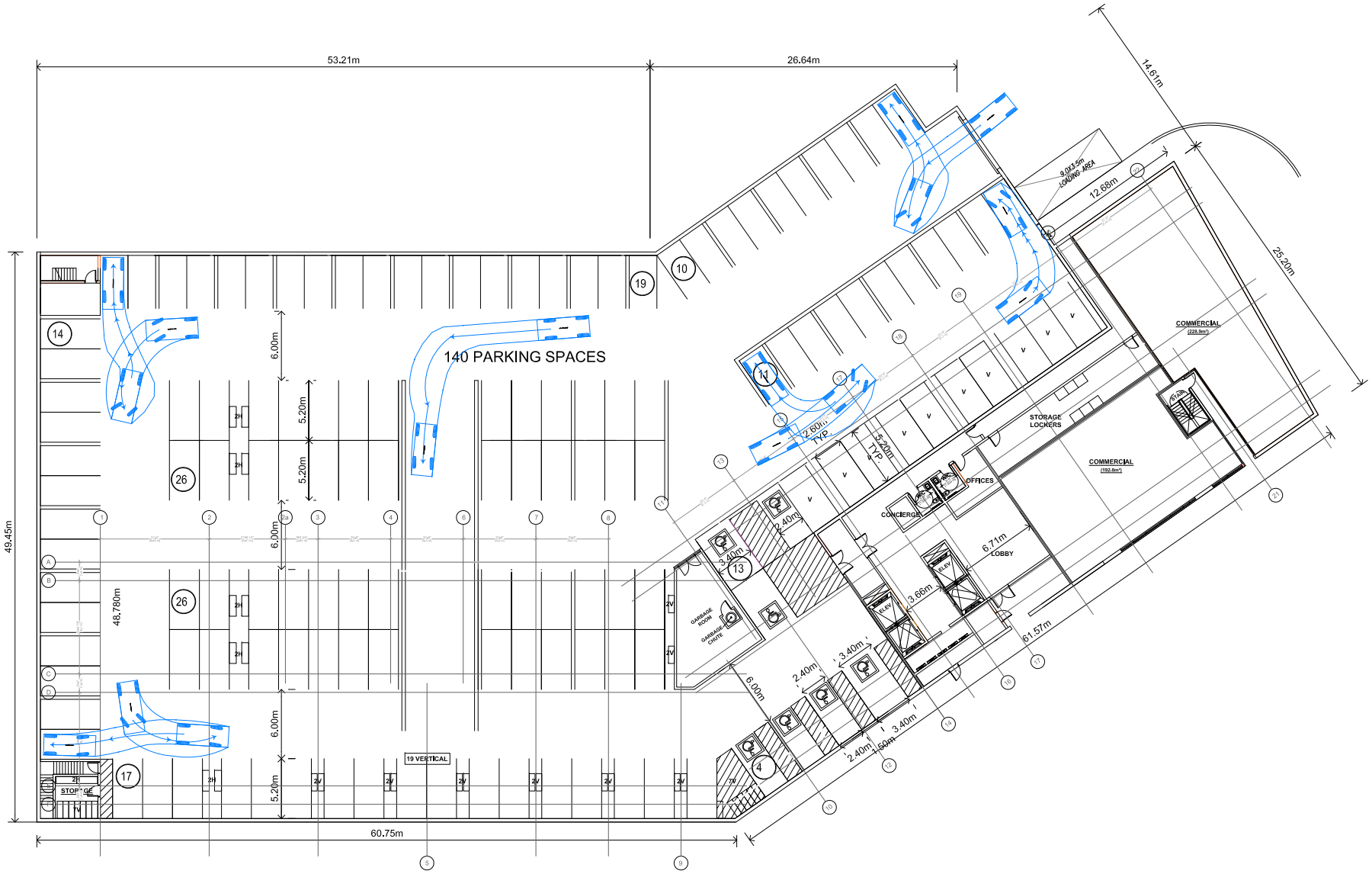
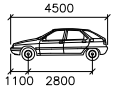


Figure 28 - Small Passenger Vehicle Entering the Underground Garage (Building C) and the Parking Spaces

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Small Car mm

Width	: 1800
Track	: 1750
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH

TRUE NORTH

SCALE: 1:500 UNITS: m

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tel: (647) 931-7383
website: www.trans-plan.com

Source: Site Plan by Fabiani Architects Ltd., dated April 21, 2021

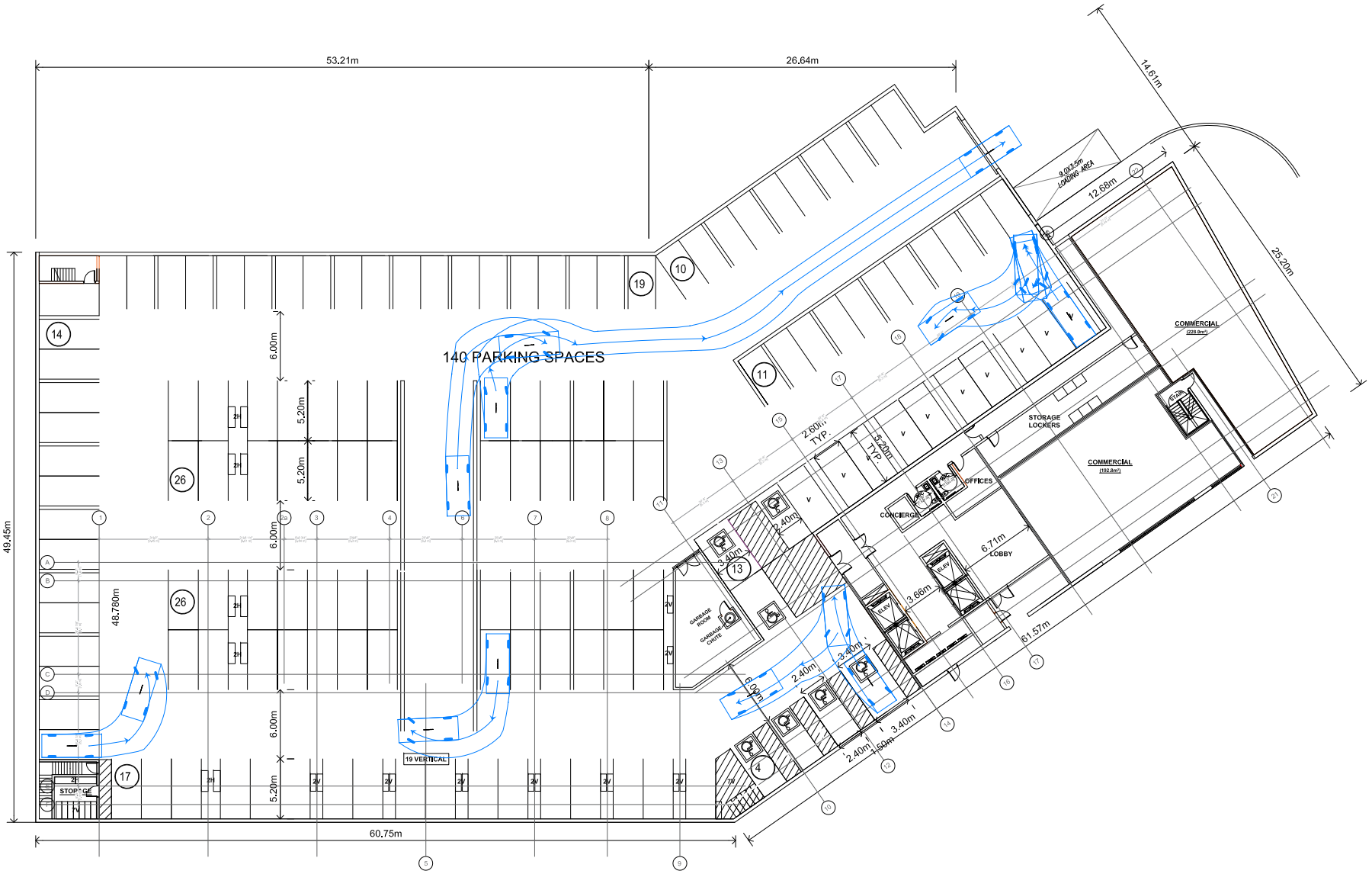
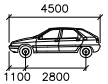


Figure 29 - Small Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building C)

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Small Car mm

Width	: 1800
Track	: 1750
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH

TRUE NORTH

SCALE: 1:500 UNITS: m

Source: Site Plan by Fabiani Architects Ltd., dated April 21, 2021

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tel: (647) 931-7383
website: www.trans-plan.com

APPENDICES

APPENDIX A
Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	6301 Campeau Drive
Description of Location	Part of PIN 0407-0868
Land Use Classification	Mixed Use Centre Zone - MC2
Development Size (units)	672 Residential Dwelling Units
Development Size (m^2)	
Number of Accesses and Locations	2
Phase of Development	2 phases
Buildout Year	2022

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

2. Trip Generation Trigger

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

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

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

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

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*	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 is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

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

5. Summary

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

APPENDIX B

Turning Movement Counts and Signal Timing Plans

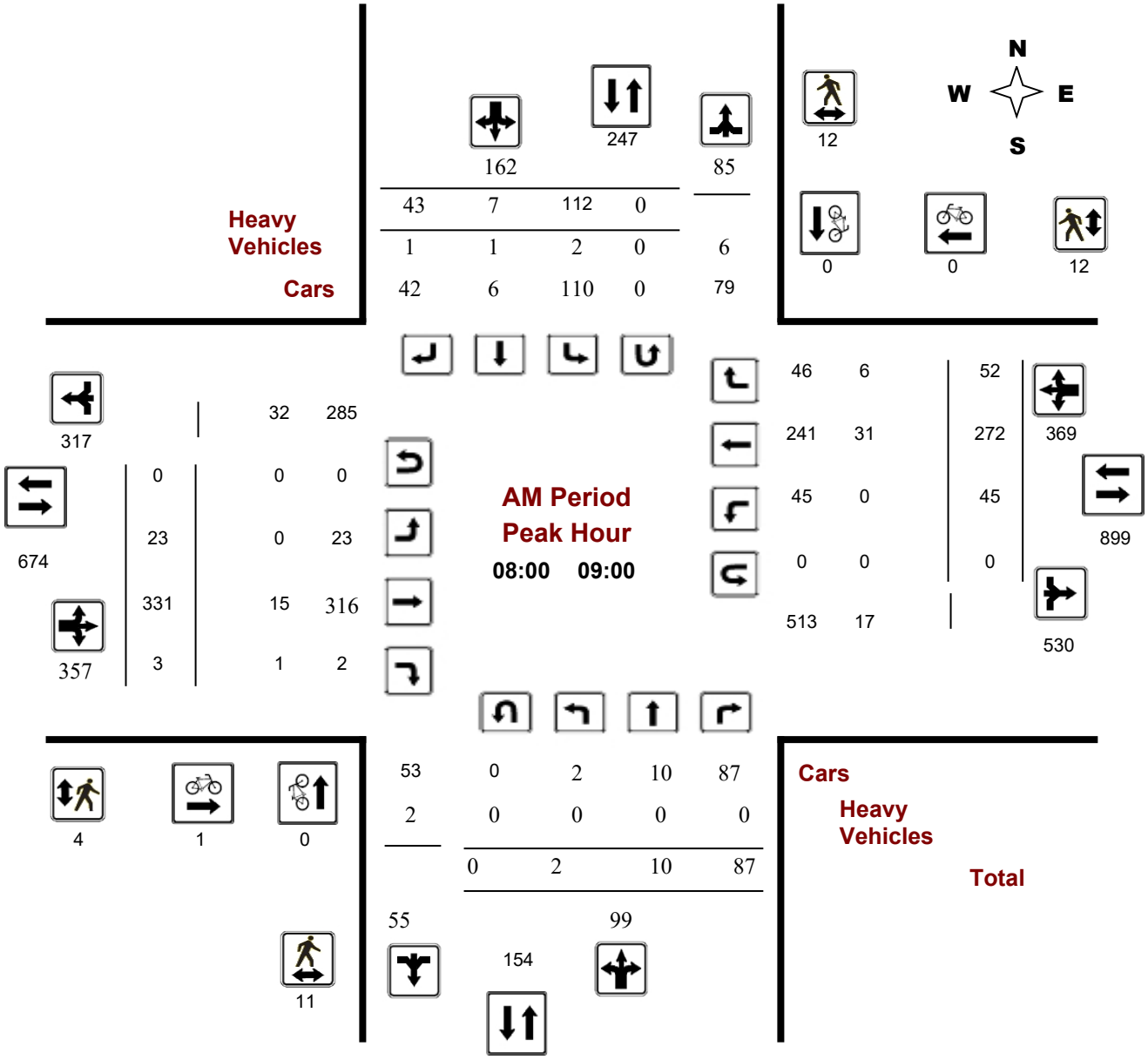
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CAMPEAU DR @ KNUDSON DR

Survey Date: Tuesday, March 10, 2020 **WO No:** 39594

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



Comments 5479344 - MAR 10 2020 - 8HRS - LORETTA

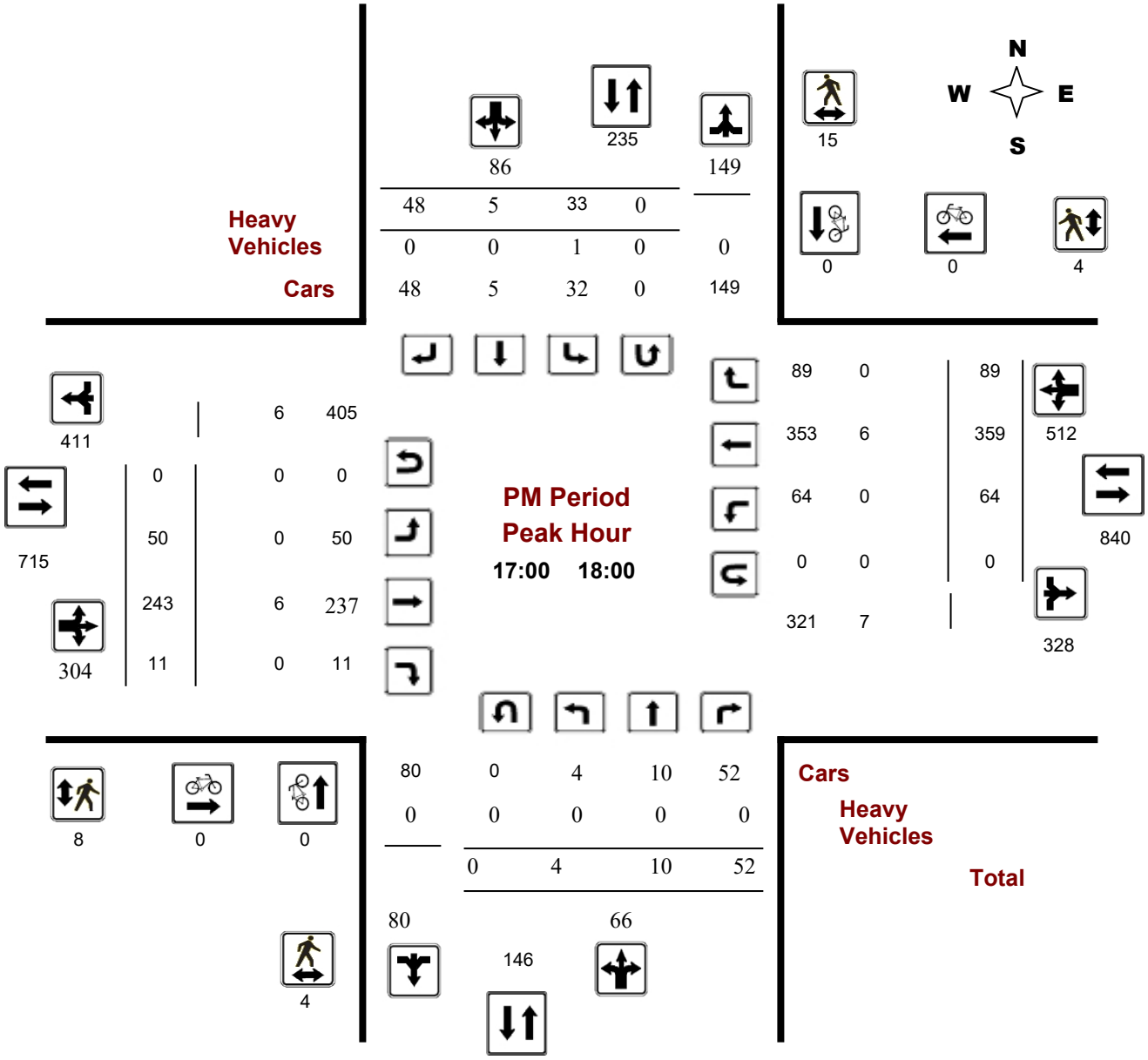
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CAMPEAU DR @ KNUDSON DR

Survey Date: Tuesday, March 10, 2020 **WO No:** 39594

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



Comments 5479344 - MAR 10 2020 - 8HRS - LORETTA

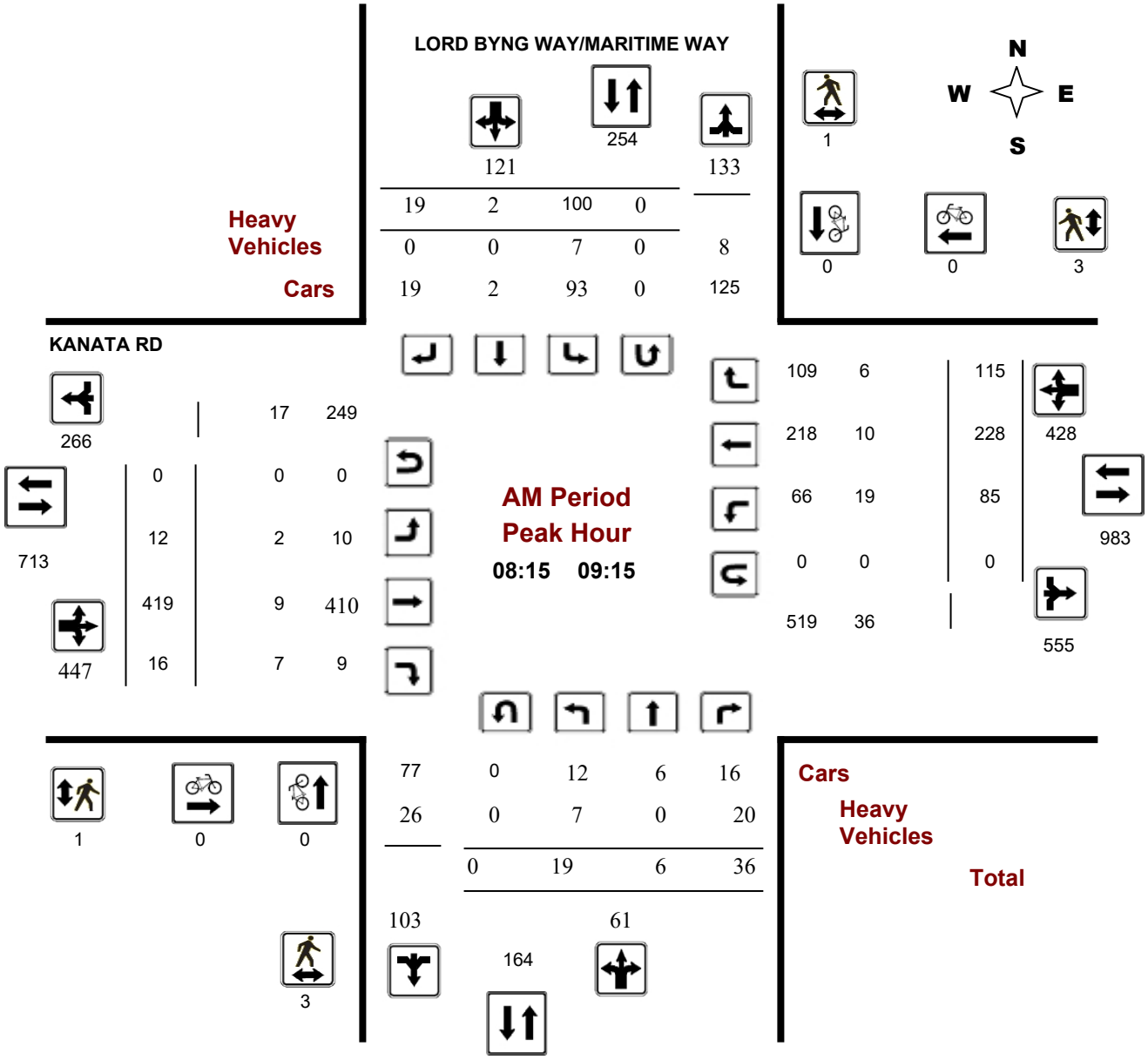
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KANATA RD @ LORD BYNG WAY/MARITIME WAY

Survey Date: Tuesday, March 20, 2018 **WO No:** 37606

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



Comments

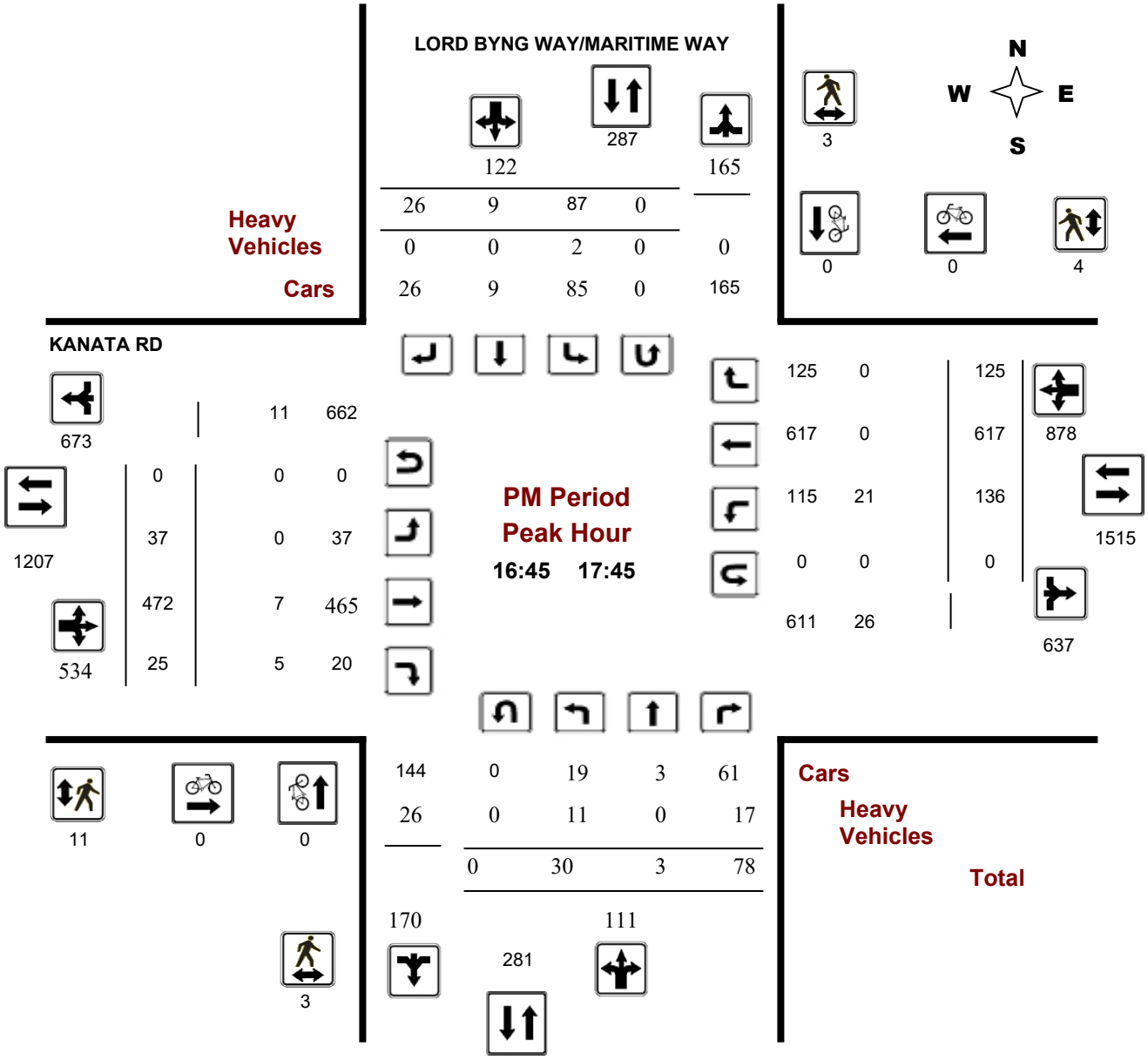
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KANATA RD @ LORD BYNG WAY/MARITIME WAY

Survey Date: Tuesday, March 20, 2018 **WO No:** 37606

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



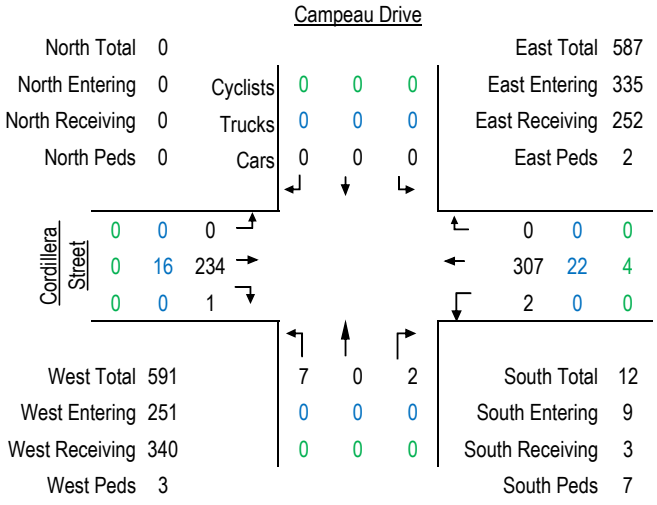
Comments

TRANS-PLAN
transportation engineering

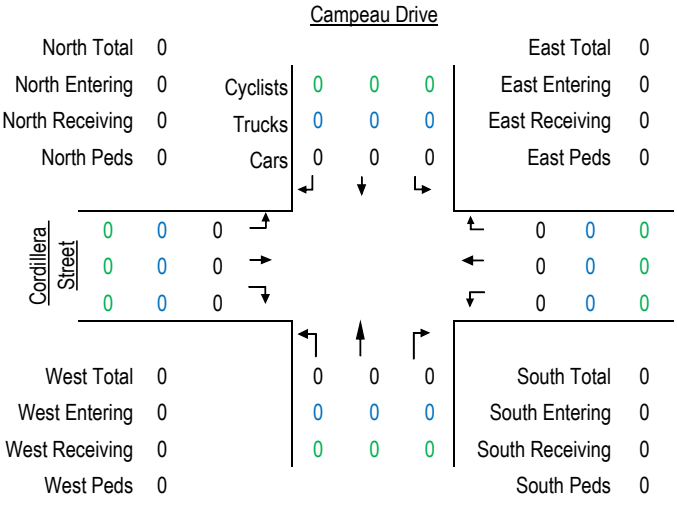
Turning Movement Count Diagram

Intersection: Campeau Dr at Cordillera St
Intersection ID:
Municipality: Kanata, Ontario
Date: Tuesday September 22, 2020

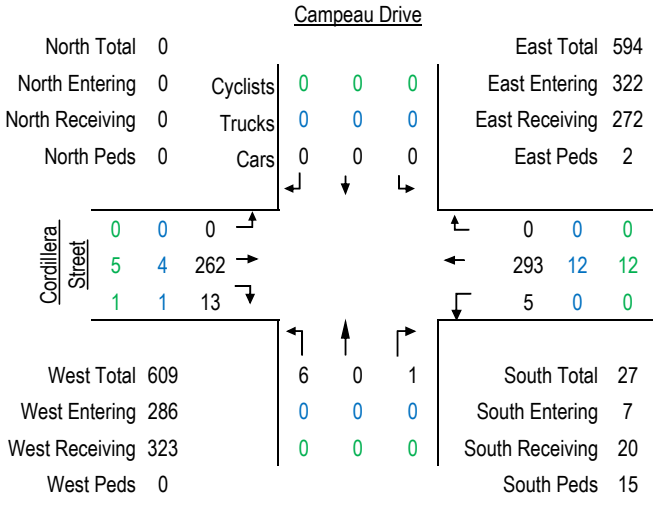
AM Peak Hour: 8:00 to 9:00



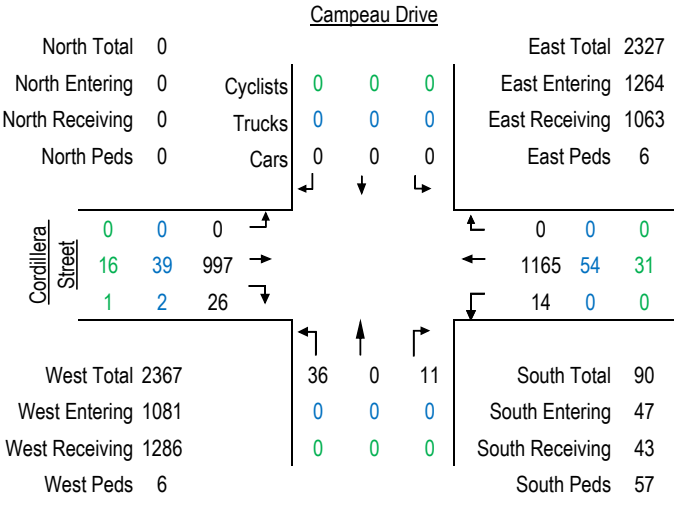
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 5-Hour Count



Turning Movement Count Diagram

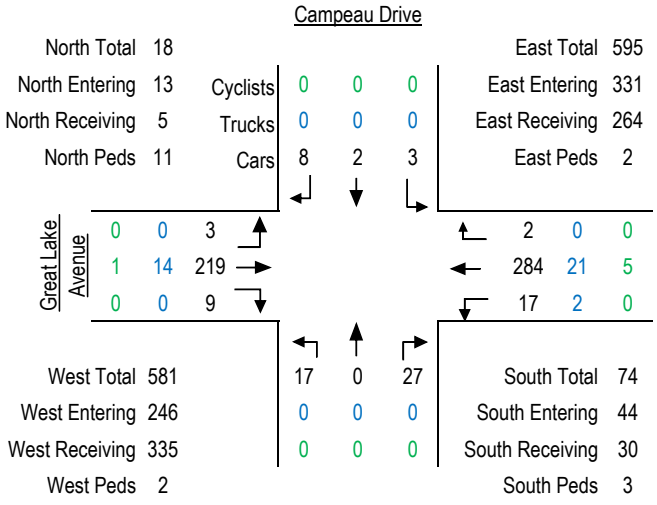
Intersection: Campeau Dr at Great Lakes Ave/Conacher Gate

Intersection ID:

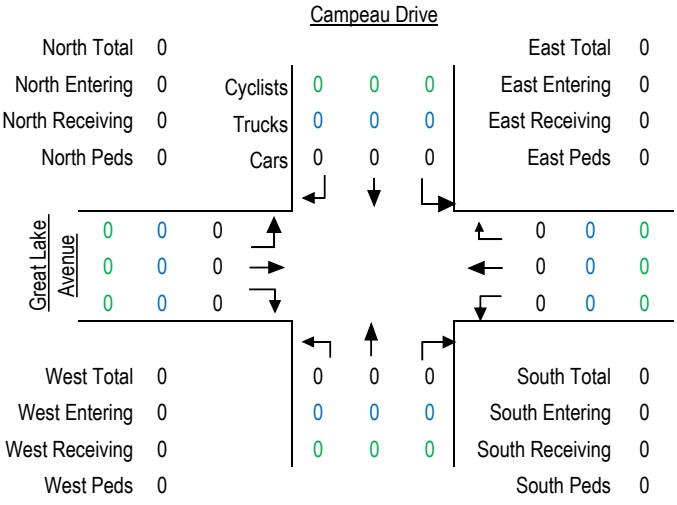
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

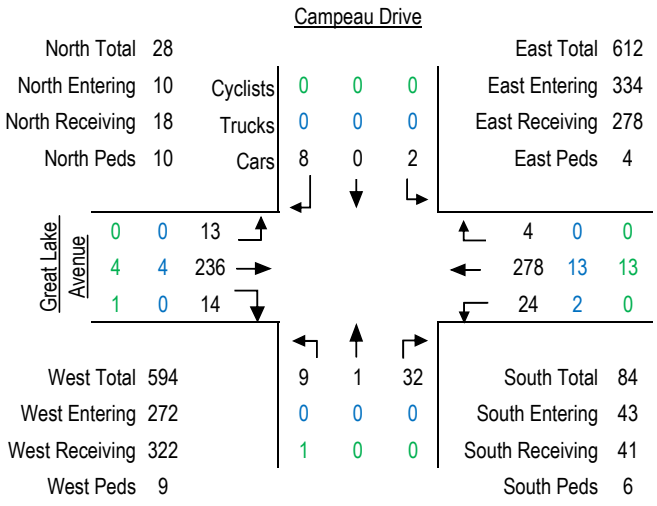
AM Peak Hour: 8:00 to 9:00



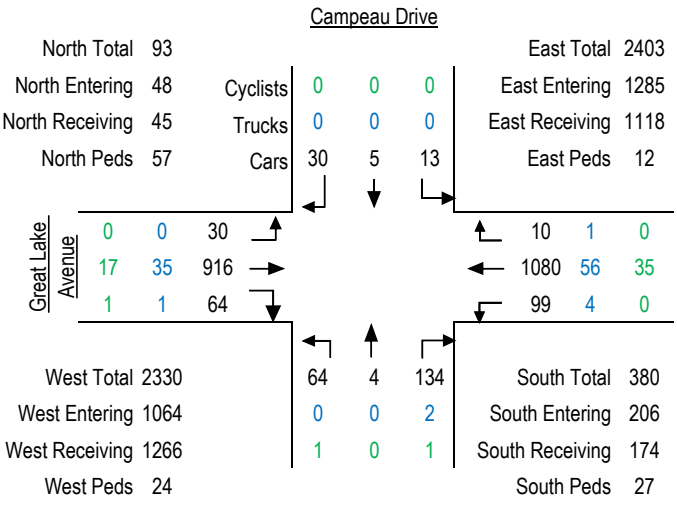
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 5-Hour Count



TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

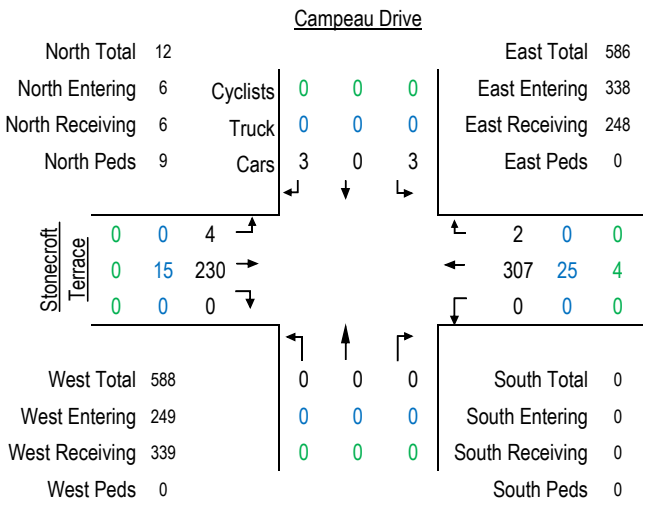
Intersection: Campeau Dr at Stonecroft Terrace

Intersection ID:

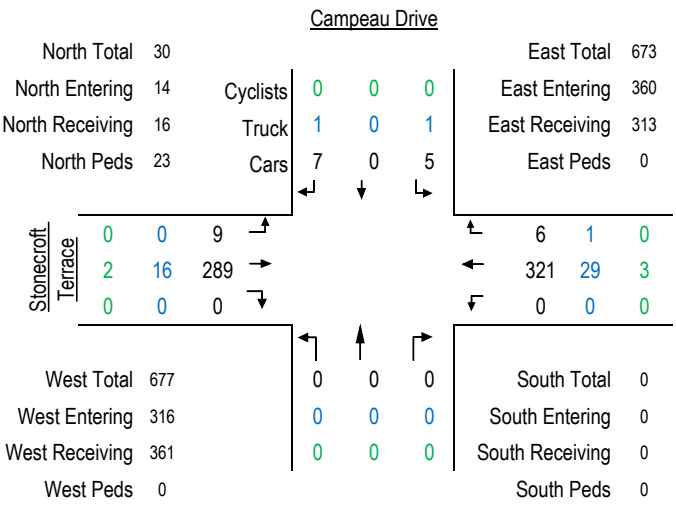
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

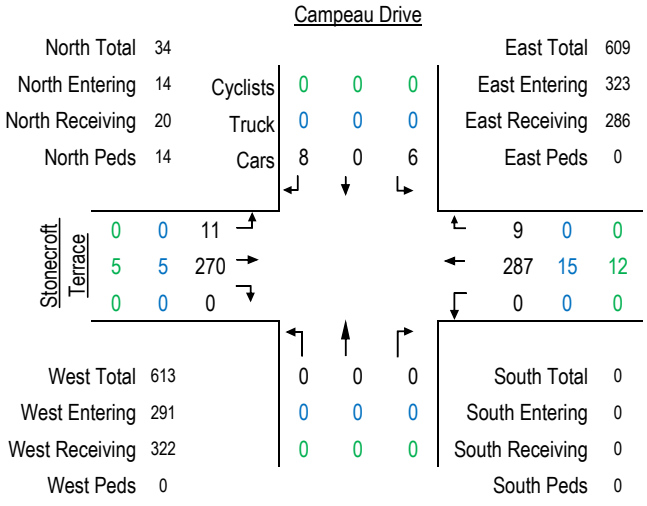
AM Peak Hour: 8:00 to 9:00



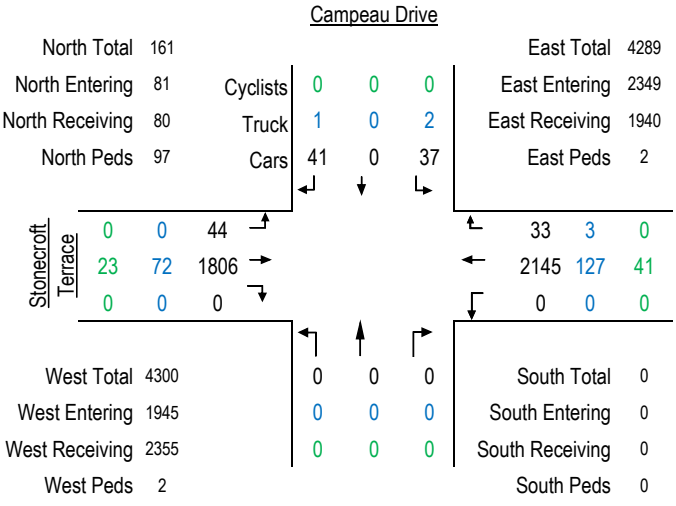
MD Peak Hour: 12:30 to 13:30



PM Peak Hour: 16:00 to 17:00



Total 8-Hour Count



Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

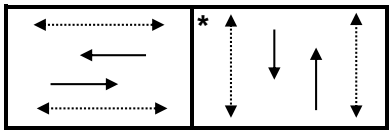
Intersection:	***Main:***	Campeau	***Side:***	Knudson / Maritime
Controller:	**MS 3200**		**TSD:**	**6548**
Author:	Matthew Anderson		**Date:**	23-Oct-2020

Existing Timing Plans†

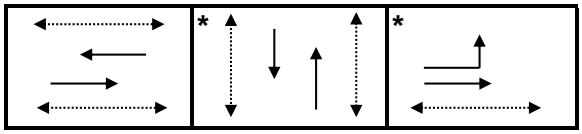
	Plan				**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	***Walk***	***DW***	***A+R***
Cycle	80	60	90	60			
Offset	0	0	0	x			
EB Thru	45	35	66	max=45.7	7	15	3.7+2.0
WB Thru	45	35	51	max=45.7	7	15	3.7+2.0
NB Thru	35	25	24	max=26	7	10	3.0+3.0
SB Thru	35	25	24	max=26	7	10	3.0+3.0
EB Left	-	-	15	-	-	-	3.7+2.0

Phasing Sequence‡

Plan: 1, 2, & 4



Plan: 3



Schedule

Weekday

Time	Plan
0:10	4
6:30	2
7:00	1
9:30	2
15:30	3
18:00	2
20:00	4

Weekend

Time	Plan
0:10	4
10:00	2
19:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $58.78 ($52.02 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

Intersection:	**Main:** Campeau	**Side:**	Kanata
Controller:	**MS-3200**	**TSD:**	**6035**
Author:	Matthew Anderson	**Date:**	23-Oct-2020

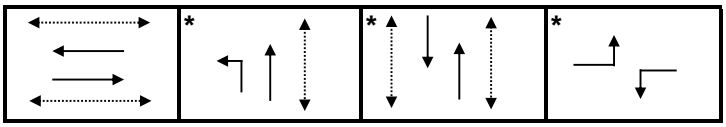
Existing Timing Plans†

	Plan					Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Afternoon** 13	***Walk***	***DW***	***A+R***
Cycle	110	115	120	85	115			
Offset	67	82	31	X	82			
EB Thru	37	42	39	37	42	9	22	3.7+2.5
WB Thru	37	42	39	37	42	9	22	3.7+2.5
NB Left	13	16	18	-	16	-	-	3.3+2.6
SB Thru	48	42	41	48	42	9	15	3.3+2.6
NB Thru	61	58	59	48	58	9	15	3.3+2.6
EB Left	12	15	22	-	15	-	-	3.7+2.5
WB Left	12	15	22	-	15	-	-	3.7+2.5

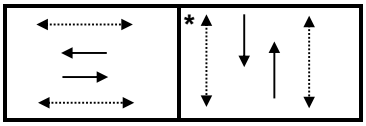
Note: Campeau Drive is considered the EW direction

Phasing Sequence‡

Plans: 1,2,3,13



Plans: 4



Schedule

Weekday

Time	Plan
0:10	4
6:45	1
9:30	2
12:00	13
15:00	3
19:00	2
23:00	4

Saturday

Time	Plan
0:10	4
8:45	1
9:45	2
22:30	4

Sunday

Time	Plan
0:10	4
8:00	2
22:30	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $58.78 ($52.02 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

Intersection:	**Main:**	Kanata	**Side:**	Lord Byng / Maritime Way	
Controller:	**MS-3200**			**TSD:**	6593
Author:	Matthew Anderson			**Date:**	11-Jan-2021

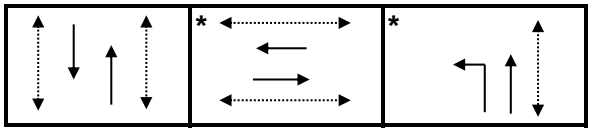
Existing Timing Plans†

	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	90	75	90	65	85			
Offset	40	14	31	X	9			
NB Thru	62	47	62	37	56	7	20	3.3+3.0
SB Thru	48	34	47	37	41	7	20	3.3+3.0
EB Thru	28	28	28	28	29	7	15	3.0+3.3
WB Thru	28	28	28	28	29	7	15	3.0+3.3
NB Left	14	13	15	-	15	-	-	3.3+3.0

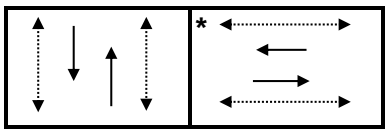
Note: Kanata is considered the NS movement

Phasing Sequence‡

Plan: 1,2,3,5



Plan: 4



Schedule

Weekday

Time	Plan
0:10	4
6:30	1
9:30	2
15:00	3
19:00	2
23:00	4

Saturday

Time	Plan
0:10	4
9:00	5
22:30	4

Sunday

Time	Plan
0:10	4
8:00	5
22:30	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $59.96 ($53.06 + HST)

APPENDIX C

2011 TRANS O-D Survey Report

Kanata - Stittsville

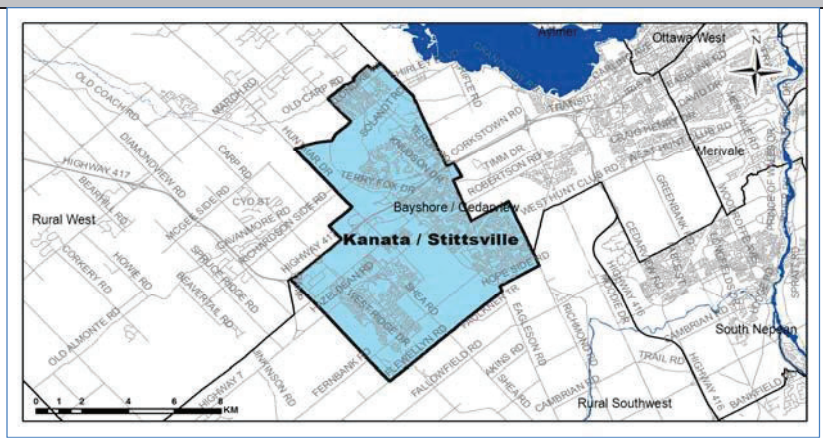
Demographic Characteristics

Population	105,210	Actively Travelled	83,460
Employed Population	49,640	Number of Vehicles	64,540
Households	38,010	Area (km^2)	82.6

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	24,670	19,590	44,260
Part Time Employed	1,540	3,840	5,380
Student	13,630	13,410	27,040
Retiree	6,480	8,350	14,820
Unemployed	850	940	1,790
Homemaker	160	3,310	3,470
Other	350	1,010	1,360
Total:	47,690	50,440	98,120

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	5,940	6,920	12,860
Licensed Drivers	36,280	36,790	73,070
Telecommuters	200	380	580
Trips made by residents	135,300	143,330	278,630

Selected Indicators	
Daily Trips per Person (age 5+)	2.84
Vehicles per Person	0.61
Number of Persons per Household	2.77
Daily Trips per Household	7.33
Vehicles per Household	1.70
Workers per Household	1.31
Population Density (Pop/km2)	1270

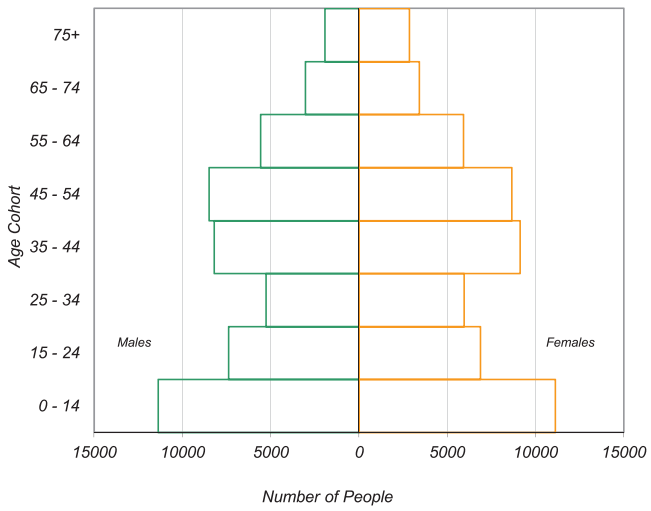


Household Size		
1 person	5,810	15%
2 persons	11,660	31%
3 persons	7,490	20%
4 persons	8,890	23%
5+ persons	4,160	11%
Total:	38,010	100%

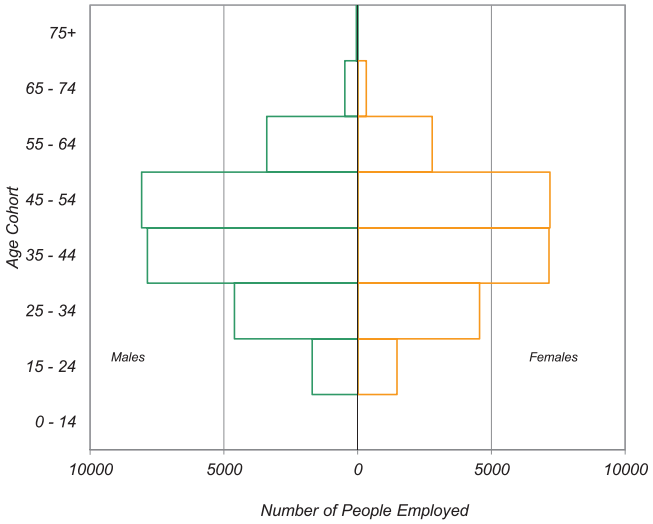
Households by Vehicle Availability		
0 vehicles	1,050	3%
1 vehicle	14,090	37%
2 vehicles	19,110	50%
3 vehicles	3,000	8%
4+ vehicles	770	2%
Total:	38,010	100%

Households by Dwelling Type		
Single-detached	21,610	57%
Semi-detached	3,890	10%
Townhouse	10,550	28%
Apartment/Condo	1,960	5%
Total:	38,010	100%

Population



Employed Population

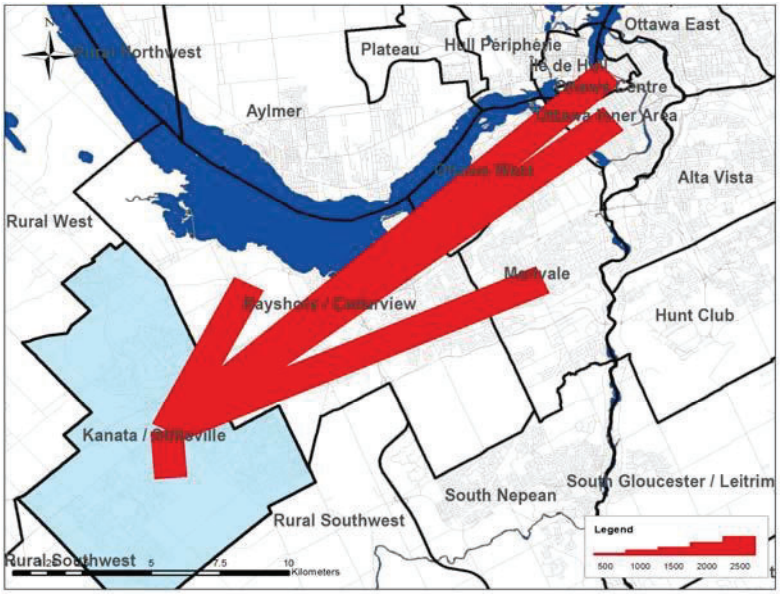


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from Kanata - Stittsville

AM Peak Period



Summary of Trips to and from Kanata - Stittsville

AM Peak Period (6:30 - 8:59)	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Ottawa Centre	4,560	8%	140	0%
Ottawa Inner Area	3,350	6%	970	2%
Ottawa East	660	1%	260	1%
Beacon Hill	280	0%	170	0%
Alta Vista	1,810	3%	660	1%
Hunt Club	490	1%	420	1%
Merivale	3,410	6%	1,200	3%
Ottawa West	2,020	4%	840	2%
Bayshore / Cedarview	5,010	9%	2,420	5%
Orléans	290	1%	500	1%
Rural East	100	0%	30	0%
Rural Southeast	50	0%	260	1%
South Gloucester / Leitrim	60	0%	140	0%
South Nepean	690	1%	1,800	4%
Rural Southwest	1,130	2%	1,850	4%
Kanata / Stittsvile	30,360	54%	30,360	66%
Rural West	1,050	2%	3,250	7%
Île de Hull	670	1%	30	0%
Hull Périphérie	160	0%	30	0%
Plateau	100	0%	230	0%
Aylmer	0	0%	190	0%
Rural Northwest	20	0%	60	0%
Pointe Gatineau	20	0%	80	0%
Gatineau Est	0	0%	60	0%
Rural Northeast	30	0%	50	0%
Buckingham / Masson-Angers	30	0%	10	0%
Ontario Sub-Total:	55,320	98%	45,270	98%
Québec Sub-Total:	1,030	2%	740	2%
Total:	56,350	100%	46,010	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	27,180	29%	17,020	18%	14,550	9%
School	7,070	7%	2,500	3%	15,110	9%
Shopping	6,070	6%	9,150	10%	22,480	14%
Leisure	8,450	9%	10,590	11%	17,090	11%
Medical	2,520	3%	1,170	1%	2,660	2%
Pick-up / drive passenger	6,570	7%	5,470	6%	15,190	9%
Return Home	33,610	35%	45,620	48%	65,770	41%
Other	3,560	4%	3,590	4%	8,440	5%
Total:	95,030	100%	95,110	100%	161,290	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	18,030	69%	11,020	70%	7,430	24%
School	4,890	19%	2,280	15%	11,740	39%
Shopping	170	1%	320	2%	760	3%
Leisure	340	1%	400	3%	780	3%
Medical	330	1%	230	1%	350	1%
Pick-up / drive passenger	1,260	5%	580	4%	4,760	16%
Return Home	290	1%	380	2%	1,980	7%
Other	670	3%	430	3%	2,560	8%
Total:	25,980	100%	15,640	100%	30,360	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	390	2%	350	1%	930	2%
School	370	2%	0	0%	90	0%
Shopping	1,030	5%	1,910	7%	5,100	14%
Leisure	2,140	11%	3,080	11%	4,130	11%
Medical	230	1%	180	1%	400	1%
Pick-up / drive passenger	1,980	10%	1,980	7%	3,410	9%
Return Home	12,130	64%	20,550	71%	21,560	58%
Other	680	4%	860	3%	1,850	5%
Total:	18,950	100%	28,910	100%	37,470	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	351,430		46%
AM Peak Period	71,980	20%	42%
PM Peak Period	85,330	24%	44%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	63,470	67%	63,830	67%	92,190	57%
Auto Passenger	15,220	16%	14,920	16%	31,880	20%
Transit	12,200	13%	12,270	13%	4,050	3%
Bicycle	360	0%	410	0%	960	1%
Walk	40	0%	50	0%	21,080	13%
Other	3,730	4%	3,660	4%	11,130	7%
Total:	95,020	100%	95,140	100%	161,290	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	15,360	59%	11,530	74%	13,630	45%
Auto Passenger	2,450	9%	1,160	7%	5,050	17%
Transit	6,230	24%	1,290	8%	1,210	4%
Bicycle	30	0%	80	1%	220	1%
Walk	0	0%	40	0%	5,730	19%
Other	1,900	7%	1,560	10%	4,510	15%
Total:	25,970	100%	15,660	100%	30,350	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	13,850	73%	17,660	61%	21,240	57%
Auto Passenger	3,240	17%	4,270	15%	8,570	23%
Transit	1,270	7%	5,980	21%	670	2%
Bicycle	40	0%	100	0%	260	1%
Walk	40	0%	0	0%	4,570	12%
Other	520	3%	910	3%	2,160	6%
Total:	18,960	100%	28,920	100%	37,470	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.24	1.23	1.35
AM Peak Period	1.16	1.10	1.37
PM Peak Period	1.23	1.24	1.40

Transit Modal Split	From District	To District	Within District
24 Hours	13%	13%	3%
AM Peak Period	26%	9%	6%
PM Peak Period	7%	21%	2%

APPENDIX D
Collision Data

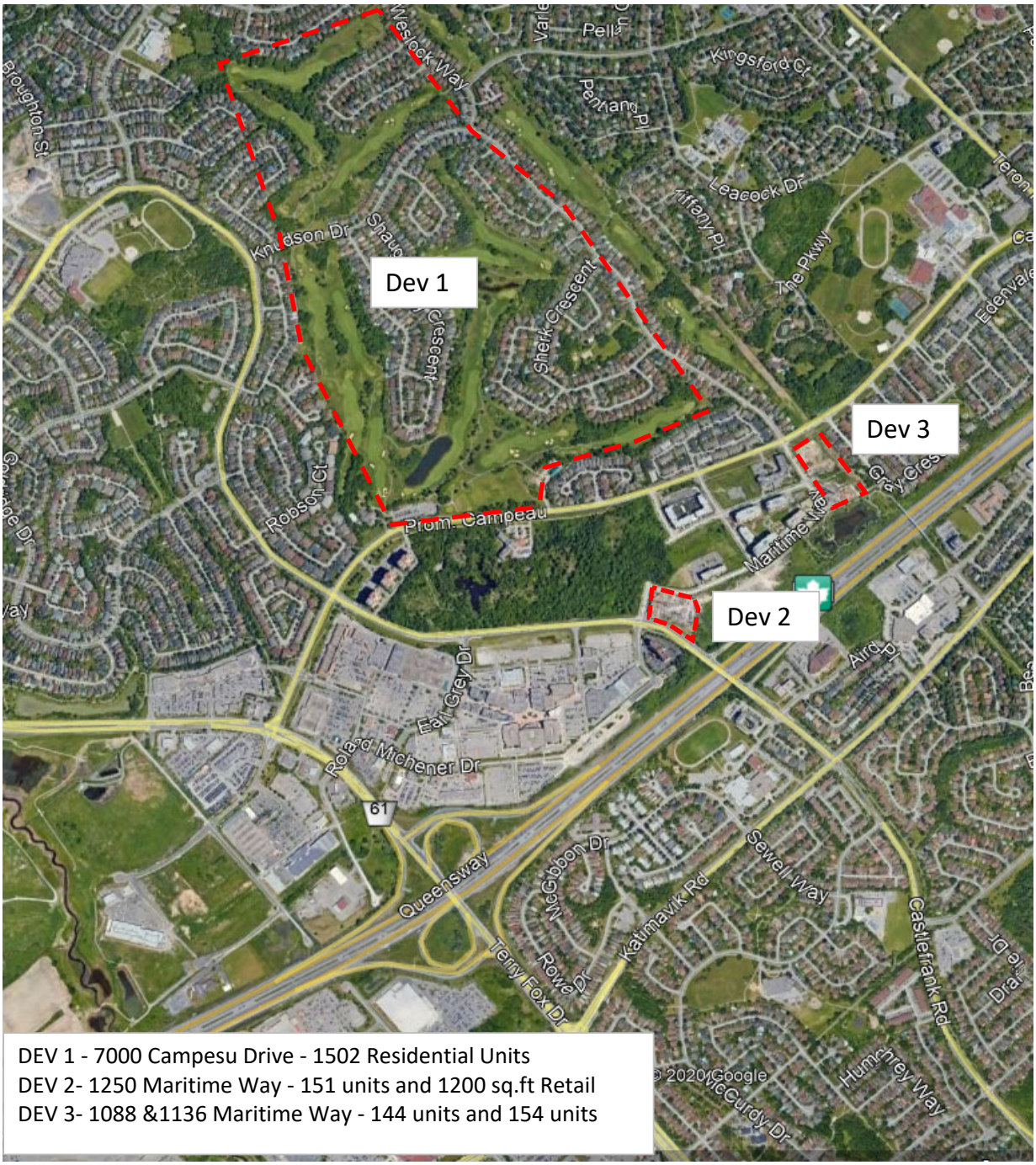
2018 Collision Data by Location									
LOCATION	GEO_ID	TOTAL_COLLISIONS	CYCLIST_COI	PEDESTRIAI	X	Y	LONGITUD	LATITUDE	FID
CAMPEAU DR @ CONACHER GT (0011761)	11761	1	0	0	351581.3	5019753	-75.9033	45.31617	1151
CAMPEAU DR @ KANATA AVE (0012003)	12003	2	0	0	350594.9	5019402	-75.9159	45.31308	1155
CAMPEAU DR btwn CONACHER GT & KNUDSON DR (__30QIX1)	__30QIX1	1	0	0	351694.8	5019799	-75.9019	45.31658	1159
CAMPEAU DR btwn KANATA AVE & STONECROFT TER (__3ZA5R3)	__3ZA5R3	3	0	0	350913.3	5019616	-75.9119	45.31498	1161
2017 Collision Data by Location									
CAMPEAU DR @ KANATA AVE (0012003)	12003	4	0	0	350594.9	5019402	-75.9159	45.31308	1548
CAMPEAU DR @ KNUDSON DR (0011764)	11764	2	1	0	351807.6	5019847	-75.9004	45.31699	1549
2016 Collision Data by Location									
CAMPEAU DR @ CORDILLERA ST (0013614)	13614	1	0	1	351451.9	5019703	-75.905	45.31573	1263
CAMPEAU DR @ KANATA AVE (0012003)	12003	6	1	0	350594.9	5019402	-75.9159	45.31308	1267
CAMPEAU DR @ KNUDSON DR (0011764)	11764	1	0	0	351807.6	5019847	-75.9004	45.31699	1268
CAMPEAU DR btwn KANATA AVE & STONECROFT TER (__3ZA5R3)	__3ZA5R3	2	0	0	350913.3	5019616	-75.9119	45.31498	1275
2015 Collision Data by Location									
CAMPEAU DR @ CONACHER GT (0011761)	11761	1	0	0	351581.3	5019753	-75.9033	45.31617	1030
CAMPEAU DR @ KANATA AVE (0012003)	12003	8	0	0	350594.9	5019402	-75.9159	45.31308	1035
CAMPEAU DR @ KNUDSON DR (0011764)	11764	2	0	0	351807.6	5019847	-75.9004	45.31699	1036
CAMPEAU DR btwn CONACHER GT & KNUDSON DR (__30QIX1)	__30QIX1	1	0	0	351694.8	5019799	-75.9019	45.31658	1040
CAMPEAU DR btwn KANATA AVE & STONECROFT TER (__3ZA5R3)	__3ZA5R3	1	0	0	350913.3	5019616	-75.9119	45.31498	1042
CAMPEAU DR btwn STONECROFT TER & CONACHER GT (__3ZA17Q)	__3ZA17Q	1	0	0	351449.7	5019702	-75.905	45.31572	1043
2014 Collision Data by Location									
CAMPEAU DR @ CONACHER GT (0011761)	11761	1	0	0	351581.3	5019753	-75.9033	45.31617	1151
CAMPEAU DR @ KANATA AVE (0012003)	12003	2	0	0	350594.9	5019402	-75.9159	45.31308	1155
CAMPEAU DR btwn CONACHER GT & KNUDSON DR (__30QIX1)	__30QIX1	1	0	0	351694.8	5019799	-75.9019	45.31658	1159
CAMPEAU DR btwn KANATA AVE & STONECROFT TER (__3ZA5R3)	__3ZA5R3	3	0	0	350913.3	5019616	-75.9119	45.31498	1161

APPENDIX E

Background Traffic Information

Project: 6301 Campesu Drive, Kanata Proposed Housing development

Background Development Map



DEV 1 - 7000 Campesu Drive - 1502 Residential Units
DEV 2- 1250 Maritime Way - 151 units and 1200 sq.ft Retail
DEV 3- 1088 &1136 Maritime Way - 144 units and 154 units

Background Site Trip Generation

6301 Campesu Drive, Kanata, ON

Dev 1 -7000 Campeau Drive

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Ottawa's 2009 TRANS Study Trip Rates						
LUC 224 – Semi-detached dwellings / townhouse / rowhouses Trip Rates	0.20	0.34	0.54	0.38	0.33	0.71
LUC 223 – Mid-Rise Apartments (3-10 floors) Trip Rate	0.07	0.22	0.29	0.23	0.14	0.37
Proxy Site Trip Rates						
Proposed Trip Rates (Single Detached Dwelling Units)	0.24	0.52	0.76	0.46	0.35	0.81
Total Site Trips (Sensitivity Analysis)	**270**	**565**	**835**	**555**	**435**	**990**

Source: TIS for 7000 Campesu Drive, Kanata, ON dated September 2019

DEV 2- 1250 Maritime Way

Land Use	Code	Units/ GFA	AM Peak (vph[1])			PM Peak (vph)		
			In	Out	Total	In	Out	Total
Congregate Care Facility	253	151	5	4	9	14	12	26
Specialty Retail	826	1,200 s.f.	0	1	1	1	2	3
Condominium	230	110	9	47	56	43	22	65
		Total	**14**	**52**	**66**	**58**	**36**	**94**

1. vph denotes vehicles per hour

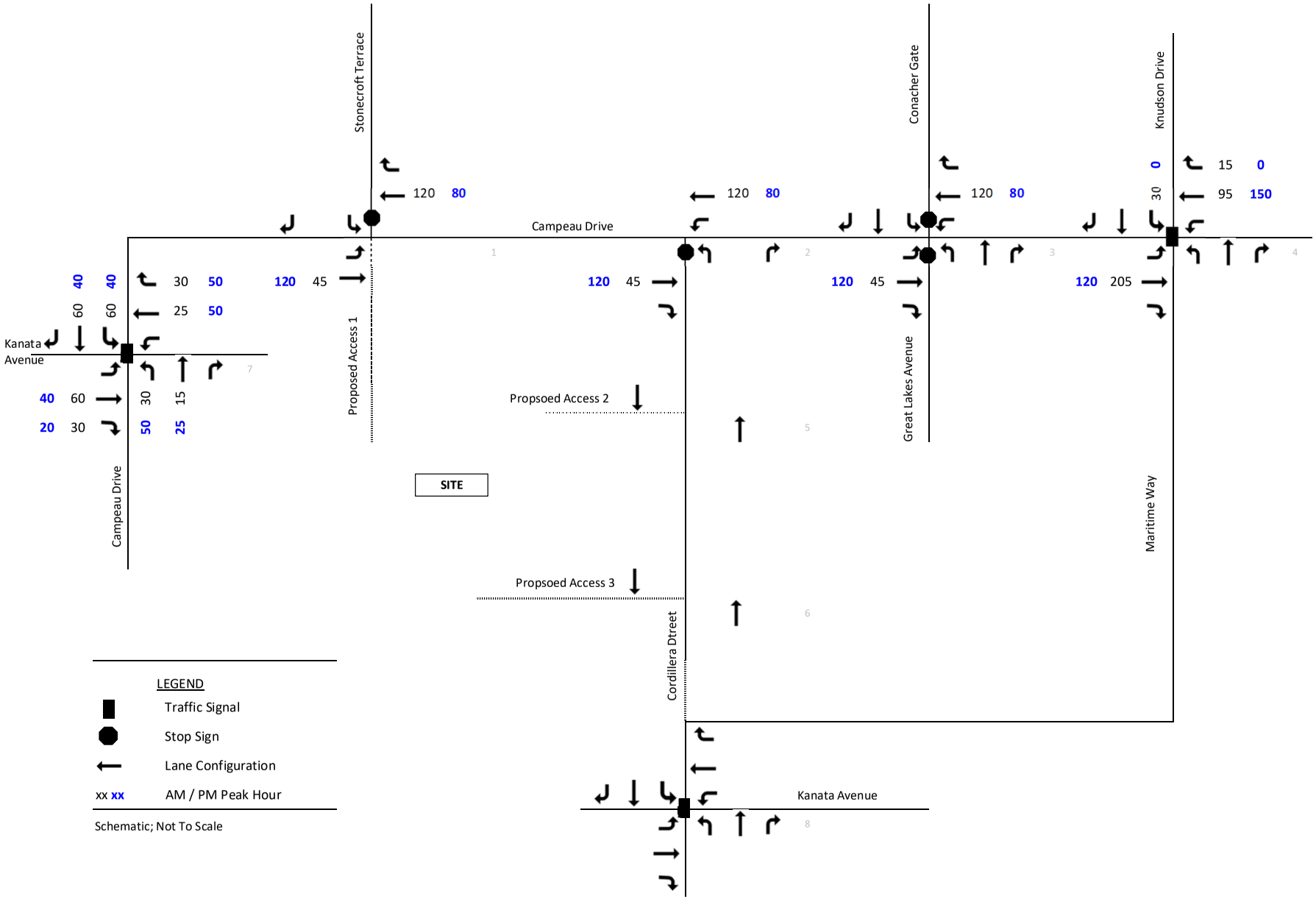
Source:Transportation Brief for 1250 Maritime Way, Kanata, ON dated October 2016

DEV 3- 1088 &1136 Maritime Way

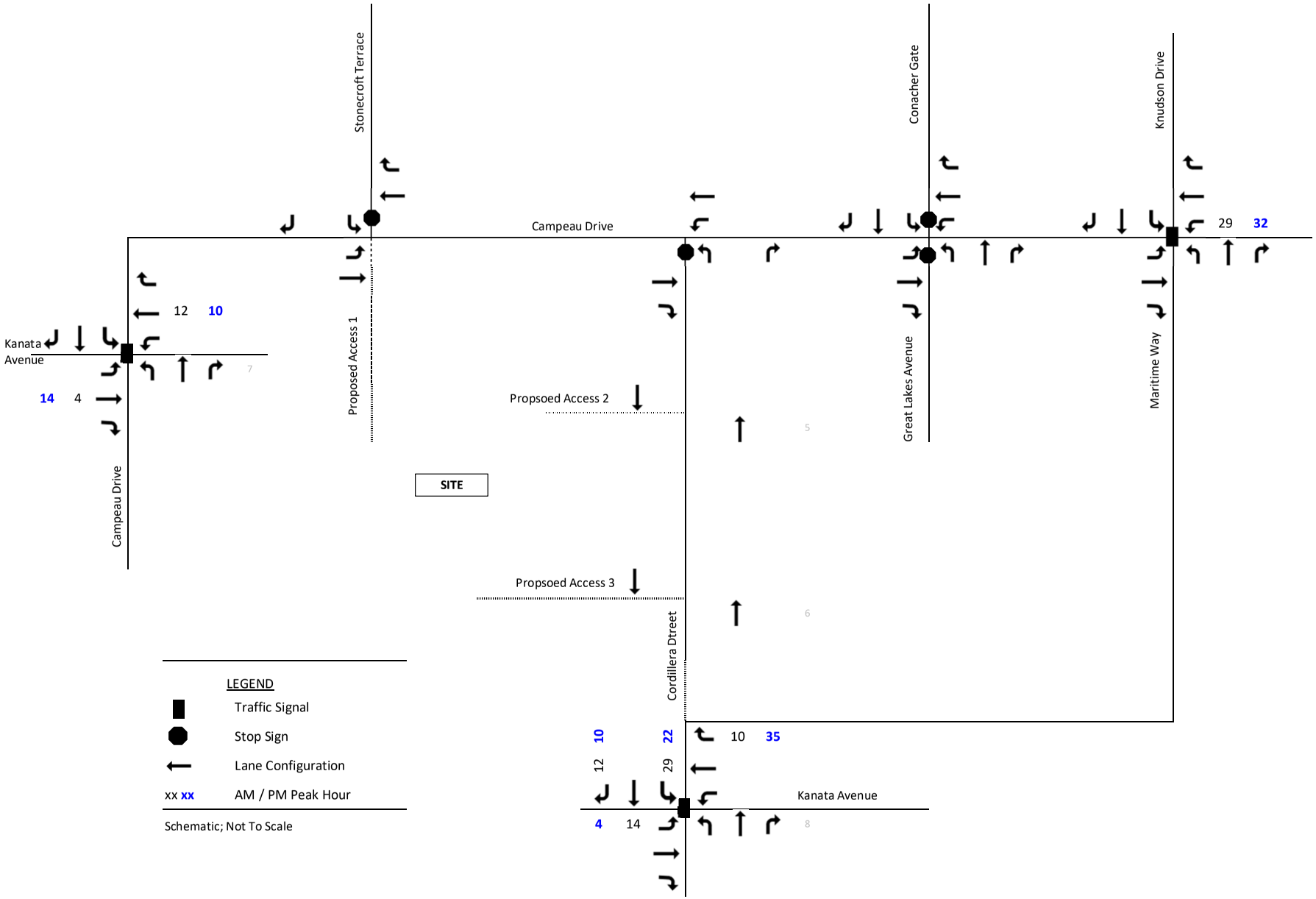
Land Use	Code	Units	AM Peak			PM Peak		
			IN	OUT	TOTAL	IN	OUT	TOTAL
1088 Maritime Way								
Apartment	220	144	14	60	74	63	34	97
1136 Maritime Way								
Apartment	220	154	15	64	79	66	36	102

Source: Transportation Brief for 1088&1136 Maritime Way, Kanata, ON dated March 2017

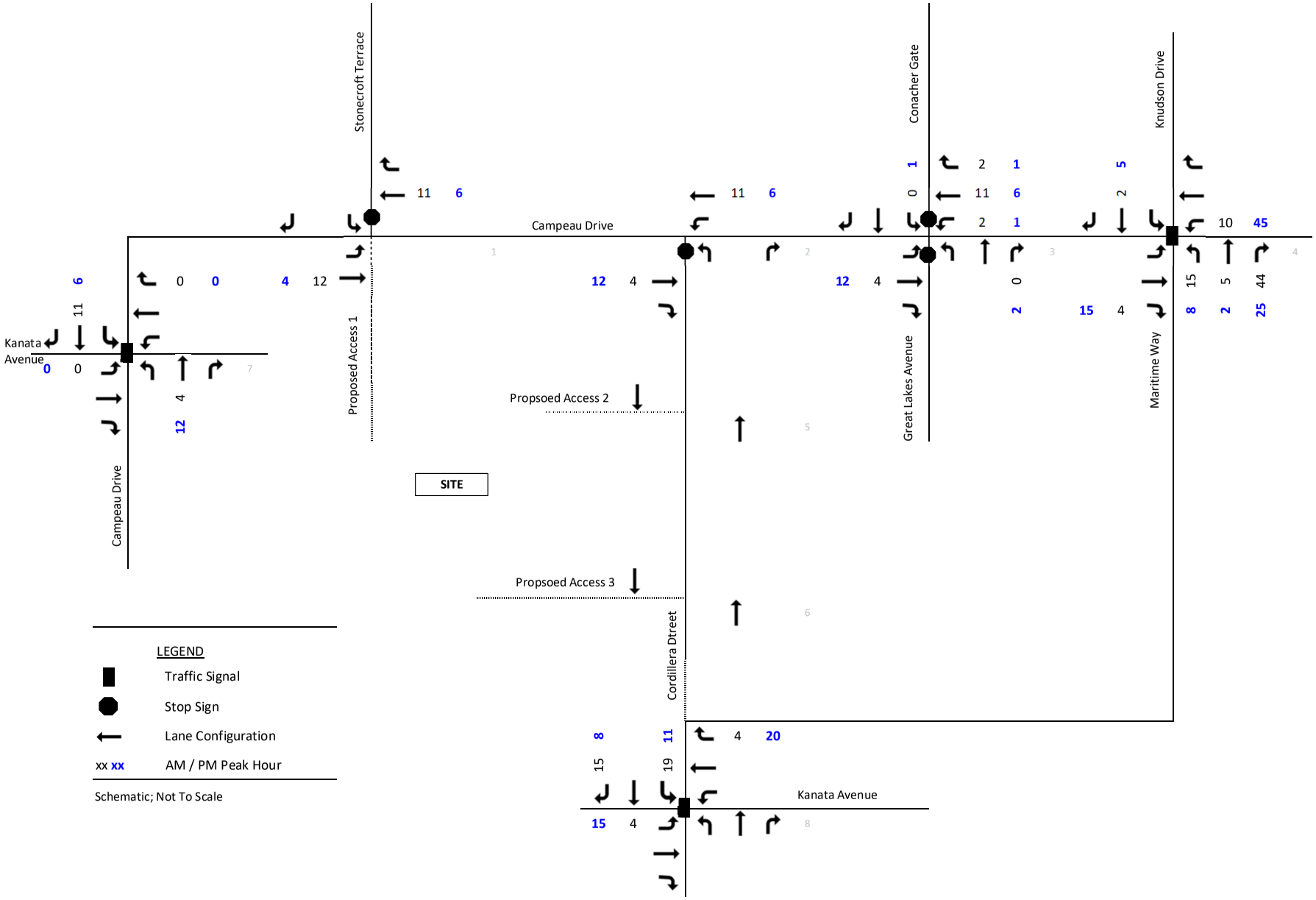
DEV 1: Traffic Volumes, Weekday AM and PM Peak Hours



DEV 2: Traffic Volumes, Weekday AM and PM Peak Hours



DEV 3: Traffic Volumes, Weekday AM and PM Peak Hours



APPENDIX F

LOS Of Service Definitions

LEVEL OF SERVICE ANALYSIS AT UNSIGNALIZED INTERSECTIONS[1]

The term "level of service" implies a qualitative measure of traffic flow at an intersection. It is dependent upon the vehicle delay and vehicle queue lengths at approaches. The level of service at unsignalized intersections is often related to the delay accumulated by flows on the minor streets, caused by all other conflicting movements. The following table describes the characteristics of each level.

Level of Service	Features
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.
E	Very long traffic delays occur. Operations approach the capacity of the intersection.
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.

---

(1) Highway Capacity Manual - Special Report No. 209, Transportation Research Board, 1985.

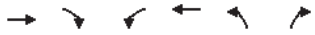
APPENDIX G

Capacity Analysis Sheets

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	415	340	2	3	3
Future Volume (Veh/h)	4	415	340	2	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	415	340	2	3	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	342				764	341
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342				764	341
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1217				371	701

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	419	342	6
Volume Left	4	0	3
Volume Right	0	2	3
cSH	1217	1700	485
Volume to Capacity	0.00	0.20	0.01
Queue Length 95th (m)	0.1	0.0	0.3
Control Delay (s)	0.1	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.5
Approach LOS			B

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		35.0%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	417	1	2	321	7	2
Future Volume (Veh/h)	417	1	2	321	7	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	417	1	2	321	7	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked						
vC, conflicting volume			418		742	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			418		742	418
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1141		382	635

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	418	323	9
Volume Left	0	2	7
Volume Right	1	0	2
cSH	1700	1141	419
Volume to Capacity	0.25	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.1	13.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	13.8
Approach LOS			B

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		32.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	301	9	19	296	2	17	0	27	3	2	8
Future Volume (Veh/h)	3	301	9	19	296	2	17	0	27	3	2	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	346	10	22	340	2	20	0	31	3	2	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	353			359			757	757	356	786	761	354
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			359			687	687	356	719	692	247
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			94	100	96	99	99	99
cM capacity (veh/h)	1207			1149			317	329	690	292	327	721

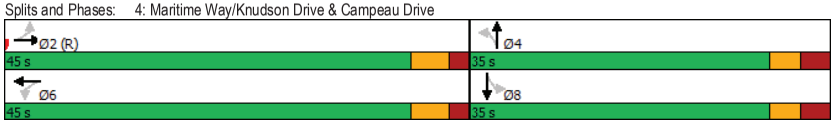
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	359	364	51	14
Volume Left	3	22	20	3
Volume Right	10	2	31	9
cSH	1207	1149	472	485
Volume to Capacity	0.00	0.02	0.11	0.03
Queue Length 95th (m)	0.1	0.5	2.9	0.7
Control Delay (s)	0.1	0.7	13.5	12.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.7	13.5	12.7
Approach LOS			B	B

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			39.7%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	23	331	45	272	2	10	112	7
Future Volume (vph)	23	331	45	272	2	10	112	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.7	23.7	23.7	23.7	28.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%	56.3%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.3	39.3	39.3	39.3	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.36	0.36	0.36	0.36
v/c Ratio	0.06	0.42	0.11	0.43	0.00	0.18	0.27	0.09
Control Delay	11.3	14.9	11.9	14.4	16.5	5.7	20.1	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	14.9	11.9	14.4	16.5	5.7	20.1	7.0
LOS	B	B	B	B	B	A	C	A
Approach Delay		14.7		14.1		5.9		16.1
Approach LOS		B		B		A		B

Intersection Summary			
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



HCM Signalized Intersection Capacity Analysis <Existing> Weekday AM Peak Hour
4: Maritime Way/Knudson Drive & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	331	3	45	272	52	2	10	87	112	7	43
Future Volume (vph)	23	331	3	45	272	52	2	10	87	112	7	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1791		1788	1693		1781	1486		1730	1567	
Flt Permitted	0.48	1.00		0.47	1.00		0.72	1.00		0.69	1.00	
Satd. Flow (perm)	861	1791		891	1693		1351	1486		1252	1567	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	368	3	50	302	58	2	11	97	124	8	48
RTOR Reduction (vph)	0	1	0	0	9	0	0	62	0	0	31	0
Lane Group Flow (vph)	26	370	0	50	351	0	2	46	0	124	25	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	4%	6%	0%	0%	7%	15%	0%	20%	7%	4%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Effective Green, g (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	422	879		437	831		489	538		453	568	
v/s Ratio Prot		0.21			c0.21			0.03			0.02	
v/s Ratio Perm	0.03			0.06			0.00			c0.10		
v/c Ratio	0.06	0.42		0.11	0.42		0.00	0.09		0.27	0.04	
Uniform Delay, d1	10.7	13.1		11.0	13.1		16.3	16.8		18.0	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.5		0.5	1.6		0.0	0.3		1.5	0.1	
Delay (s)	11.0	14.5		11.5	14.6		16.3	17.1		19.5	16.7	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		14.3			14.3			17.1			18.6	
Approach LOS		B			B			B			B	

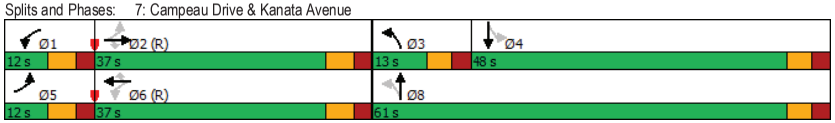
Intersection Summary				
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Timings <Existing> Weekday AM Peak Hour
7: Campeau Drive & Kanata Avenue 01-11-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	135	435	220	60	135	25	80	280	40	240
Future Volume (vph)	135	435	220	60	135	25	80	280	40	240
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	12.0	37.0	37.0	12.0	37.0	37.0	13.0	61.0	48.0	48.0
Total Split (%)	10.9%	33.6%	33.6%	10.9%	33.6%	33.6%	11.8%	55.5%	43.6%	43.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1	42.1	42.1
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50	0.38	0.38
v/c Ratio	0.38	0.69	0.40	0.43	0.30	0.06	0.22	0.40	0.11	0.52
Control Delay	27.5	41.4	6.0	30.2	33.2	0.2	15.9	18.2	23.1	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	41.4	6.0	30.2	33.2	0.2	15.9	18.2	23.1	28.2
LOS	C	D	A	C	C	A	B	B	C	C
Approach Delay		29.2			28.6			17.8		27.6
Approach LOS		C			C			B		C

Intersection Summary			
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	435	220	60	135	25	80	280	50	40	240	75
Future Volume (vph)	135	435	220	60	135	25	80	280	50	40	240	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	2500	1553	1736	1776	1380	1752	1802		1770	1742	
Flt Permitted	0.64	1.00	1.00	0.13	1.00	1.00	0.36	1.00		0.54	1.00	
Satd. Flow (perm)	1106	1900	1553	237	1776	1380	670	1802		1011	1742	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	483	244	67	150	28	89	311	56	44	267	83
RTOR Reduction (vph)	0	0	176	0	0	20	0	6	0	0	10	0
Lane Group Flow (vph)	150	483	68	67	150	8	89	361	0	44	340	0
Heavy Vehicles (%)	10%	0%	4%	4%	7%	17%	3%	3%	3%	2%	4%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Effective Green, g (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50		0.38	0.38	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	396	700	434	157	497	386	405	902		386	666	
v/s Ratio Prot	0.02	c0.19		c0.02	0.08		0.01	c0.20			c0.20	
v/s Ratio Perm	0.11		0.04	0.12		0.01	0.10			0.04		
v/c Ratio	0.38	0.69	0.16	0.43	0.30	0.02	0.22	0.40		0.11	0.51	
Uniform Delay, d1	27.2	35.3	29.8	28.0	31.1	28.7	15.8	17.1		21.9	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	5.5	0.8	8.3	1.6	0.1	1.2	1.3		0.6	2.8	
Delay (s)	29.9	40.8	30.6	36.3	32.7	28.8	17.0	18.5		22.5	28.8	
Level of Service	C	D	C	D	C	C	B	B		C	C	
Approach Delay (s)		36.1			33.2			18.2			28.1	
Approach LOS		D			C			B			C	

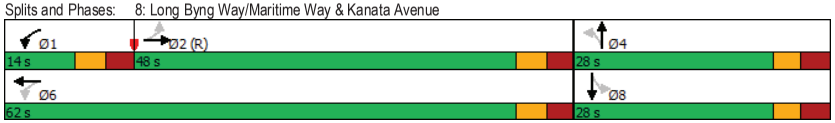
Intersection Summary				
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	12	436	88	237	12	6	104	2
Future Volume (vph)	12	436	88	237	12	6	104	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	48.0	48.0	14.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	15.6%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.7	41.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.46	0.46	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.03	0.58	0.22	0.35	0.04	0.06		0.41
Control Delay	13.5	21.0	8.2	8.1	26.8	14.7		31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	13.5	21.0	8.2	8.1	26.8	14.7		31.1
LOS	B	C	A	A	C	B		C
Approach Delay		20.8		8.1		18.7		31.1
Approach LOS		C		A		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 58.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



HCM Signalized Intersection Capacity Analysis <Existing> Weekday AM Peak Hour
8: Long Byng Way/Maritime Way & Kanata Avenue 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	436	17	88	237	120	12	6	17	104	2	20
Future Volume (vph)	12	436	17	88	237	120	12	6	17	104	2	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.89			0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1770	1852		1770	1769		1770	1659			1750	
Flt Permitted	0.53	1.00		0.30	1.00		0.70	1.00			0.75	
Satd. Flow (perm)	988	1852		551	1769		1304	1659			1358	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	13	479	19	97	260	132	13	7	19	114	2	22
RTOR Reduction (vph)	0	2	0	0	20	0	0	14	0	0	8	0
Lane Group Flow (vph)	13	496	0	97	372	0	13	12	0	0	130	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.46	0.46		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	457	858		445	1094		314	400			327	
v/s Ratio Prot		c0.27		0.02	c0.21			0.01				
v/s Ratio Perm	0.01			0.12			0.01				c0.10	
v/c Ratio	0.03	0.58		0.22	0.34		0.04	0.03			0.40	
Uniform Delay, d1	13.1	17.7		9.0	8.3		26.2	26.1			28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	2.8		1.1	0.8		0.2	0.1			3.6	
Delay (s)	13.2	20.5		10.2	9.1		26.4	26.2			32.3	
Level of Service	B	C		B	A		C	C			C	
Approach Delay (s)		20.4			9.3			26.3			32.3	
Approach LOS		C			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9	
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour
1: Campeau Drive & Stonecroft Terrace 01-11-2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	325	430	9	6	8
Future Volume (Veh/h)	11	325	430	9	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	325	430	9	6	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	439				782	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439				782	434
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1121				360	622

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	336	439	14
Volume Left	11	0	6
Volume Right	0	9	8
cSH	1121	1700	474
Volume to Capacity	0.01	0.26	0.03
Queue Length 95th (m)	0.2	0.0	0.7
Control Delay (s)	0.4	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	317	14	5	398	6	1
Future Volume (Veh/h)	317	14	5	398	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	317	14	5	398	6	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.95	
vC, conflicting volume			331		732	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			331		690	324
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1228		388	717

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	331	403	7
Volume Left	0	5	6
Volume Right	14	0	1
cSH	1700	1228	415
Volume to Capacity	0.19	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s)	0.0	0.1	13.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	13.8
Approach LOS			B

Intersection Summary				
Average Delay			0.2	
Intersection Capacity Utilization			34.9%	ICU Level of Service A
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	209	14	26	381	4	9	1	32	2	0	8
Future Volume (Veh/h)	13	209	14	26	381	4	9	1	32	2	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	240	16	30	438	5	10	1	37	2	0	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	454			259			792	795	253	829	800	454
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			259			664	667	253	707	673	263
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	100	95	99	100	99
cM capacity (veh/h)	1100			1252			302	308	787	270	305	653

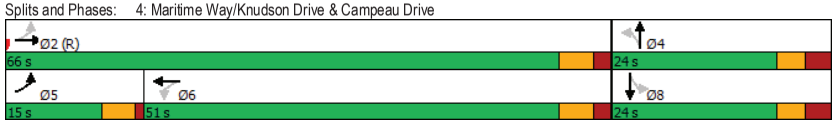
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	271	473	48	11
Volume Left	15	30	10	2
Volume Right	16	5	37	9
cSH	1100	1252	576	519
Volume to Capacity	0.01	0.02	0.08	0.02
Queue Length 95th (m)	0.3	0.6	2.2	0.5
Control Delay (s)	0.6	0.7	11.8	12.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.7	11.8	12.1
Approach LOS			B	B

Intersection Summary				
Average Delay			1.5	
Intersection Capacity Utilization			39.6%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	243	64	359	4	10	33	5
Future Volume (vph)	50	243	64	359	4	10	33	5
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.7	27.7	27.7	24.0	24.0	24.0	24.0
Total Split (s)	15.0	66.0	51.0	51.0	24.0	24.0	24.0	24.0
Total Split (%)	16.7%	73.3%	56.7%	56.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	61.5	60.3	45.3	45.3	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.68	0.67	0.50	0.50	0.20	0.20	0.20	0.20
v/c Ratio	0.10	0.22	0.13	0.54	0.01	0.19	0.14	0.16
Control Delay	5.1	6.2	12.7	17.2	29.2	12.2	31.2	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	6.2	12.7	17.2	29.2	12.2	31.2	11.6
LOS	A	A	B	B	C	B	C	B
Approach Delay		6.0		16.7		13.1		19.2
Approach LOS		A		B		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 56.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



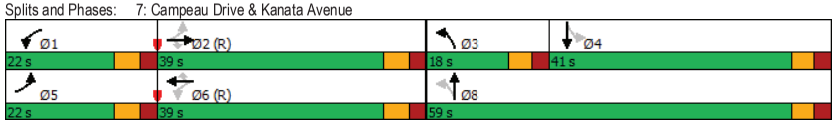
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	243	11	64	359	89	4	10	52	33	5	48
Future Volume (vph)	50	243	11	64	359	89	4	10	52	33	5	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1798	1869		1785	1821		1770	1625		1796	1584	
Flt Permitted	0.33	1.00		0.59	1.00		0.72	1.00		0.71	1.00	
Satd. Flow (perm)	620	1869		1102	1821		1339	1625		1346	1584	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	270	12	71	399	99	4	11	58	37	6	53
RTOR Reduction (vph)	0	2	0	0	10	0	0	46	0	0	42	0
Lane Group Flow (vph)	56	280	0	71	488	0	4	23	0	37	17	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.50	0.50		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	552	1252		554	916		267	325		269	316	
v/s Ratio Prot	0.01	c0.15			c0.27			0.01			0.01	
v/s Ratio Perm	0.06			0.06			0.00			c0.03		
v/c Ratio	0.10	0.22		0.13	0.53		0.01	0.07		0.14	0.05	
Uniform Delay, d1	6.6	5.8		11.9	15.2		28.9	29.2		29.6	29.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		0.5	2.2		0.1	0.4		1.1	0.3	
Delay (s)	6.9	6.2		12.3	17.4		29.0	29.6		30.7	29.4	
Level of Service	A	A		B	B		C	C		C	C	
Approach Delay (s)		6.3			16.8			29.6			29.9	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	56.5%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	45	265	195	140	390	35	240	270	55	335
Future Volume (vph)	45	265	195	140	390	35	240	270	55	335
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	22.0	39.0	39.0	22.0	39.0	39.0	18.0	59.0	41.0	41.0
Total Split (%)	18.3%	32.5%	32.5%	18.3%	32.5%	32.5%	15.0%	49.2%	34.2%	34.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1	35.1	35.1
Actuated g/C Ratio	0.40	0.27	0.27	0.40	0.27	0.27	0.44	0.44	0.29	0.29
v/c Ratio	0.12	0.39	0.33	0.30	0.65	0.06	0.61	0.52	0.19	0.70
Control Delay	19.3	37.5	6.3	21.3	44.5	0.2	29.1	25.1	34.1	44.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	37.5	6.3	21.3	44.5	0.2	29.1	25.1	34.1	44.5
LOS	B	D	A	C	D	A	C	C	C	D
Approach Delay		23.8			36.0			26.5		43.2
Approach LOS		C			D			C		D

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	265	195	140	390	35	240	270	150	55	335	70
Future Volume (vph)	45	265	195	140	390	35	240	270	150	55	335	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	2500	1615	1805	2200	1615	1805	1798		1805	1956	
Flt Permitted	0.24	1.00	1.00	0.43	1.00	1.00	0.33	1.00		0.52	1.00	
Satd. Flow (perm)	458	1900	1615	826	1900	1615	623	1798		982	1851	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	265	195	140	390	35	240	270	150	55	335	70
RTOR Reduction (vph)	0	0	142	0	0	25	0	17	0	0	6	0
Lane Group Flow (vph)	45	265	53	140	390	10	240	403	0	55	399	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Effective Green, g (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Actuated g/C Ratio	0.41	0.27	0.27	0.41	0.27	0.27	0.44	0.44		0.29	0.29	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	362	683	441	463	601	441	394	795		287	572	
v/s Ratio Prot	0.02	0.11		c0.04	c0.18		c0.06	0.22			c0.20	
v/s Ratio Perm	0.03		0.03	0.08		0.01	0.21			0.06		
v/c Ratio	0.12	0.39	0.12	0.30	0.65	0.02	0.61	0.51		0.19	0.70	
Uniform Delay, d1	23.2	35.4	32.8	23.4	38.5	31.9	21.5	24.0		31.8	37.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.7	0.6	1.7	5.4	0.1	6.9	2.3		1.5	6.9	
Delay (s)	23.9	37.1	33.3	25.1	43.9	32.0	28.4	26.4		33.3	44.6	
Level of Service	C	D	C	C	D	C	C	C		C	D	
Approach Delay (s)		34.5			38.5			27.1			43.3	
Approach LOS		C			D			C			D	

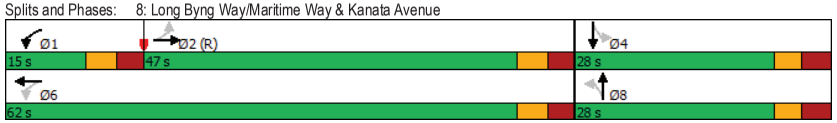
Intersection Summary					
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		24.2	
Intersection Capacity Utilization	80.0%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	38	491	141	642	31	3	91	9
Future Volume (vph)	38	491	141	642	31	3	91	9
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	47.0	47.0	15.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	52.2%	52.2%	16.7%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.45	0.45	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.17	0.66	0.37	0.73	0.11	0.20		0.42
Control Delay	17.1	23.9	9.9	16.5	27.8	8.0		30.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	17.1	23.9	9.9	16.5	27.8	8.0		30.4
LOS	B	C	A	B	C	A		C
Approach Delay		23.5		15.5		13.3		30.4
Approach LOS		C		B		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	491	26	141	642	130	31	3	81	91	9	27
Future Volume (vph)	38	491	26	141	642	130	31	3	81	91	9	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1849		1770	1816		1770	1593			1747	
Flt Permitted	0.28	1.00		0.24	1.00		0.69	1.00			0.73	
Satd. Flow (perm)	528	1849		451	1816		1291	1593			1323	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	528	28	152	690	140	33	3	87	98	10	29
RTOR Reduction (vph)	0	2	0	0	8	0	0	66	0	0	11	0
Lane Group Flow (vph)	41	554	0	152	822	0	33	24	0	0	126	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.45	0.45		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	238	836		406	1123		311	384			318	
v/s Ratio Prot		0.30		0.04	c0.45			0.02				
v/s Ratio Perm	0.08			0.20			0.03				c0.10	
v/c Ratio	0.17	0.66		0.37	0.73		0.11	0.06			0.40	
Uniform Delay, d1	14.6	19.3		10.4	11.9		26.6	26.3			28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.6	4.1		2.6	4.2		0.7	0.3			3.7	
Delay (s)	16.2	23.4		13.1	16.2		27.3	26.6			32.5	
Level of Service	B	C		B	B		C	C			C	
Approach Delay (s)		22.9			15.7			26.8			32.5	
Approach LOS		C			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.69				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	75.4%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

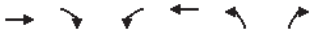
HCM Unsignalized Intersection Capacity Analysis<2022 Background> Weekday AM Peak Hour
1: Campeau Drive & Stonecroft Terrace 01-11-2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	489	485	2	3	3
Future Volume (Veh/h)	4	489	485	2	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	489	485	2	3	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	487				983	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	487				983	486
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1076				275	581

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	493	487	6
Volume Left	4	0	3
Volume Right	0	2	3
cSH	1076	1700	373
Volume to Capacity	0.00	0.29	0.02
Queue Length 95th (m)	0.1	0.0	0.4
Control Delay (s)	0.1	0.0	14.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	14.8
Approach LOS			B

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		38.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis<2022 Background> Weekday AM Peak Hour
2: Cordillera Street & Campeau Drive 01-11-2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	1	2	465	7	2
Future Volume (Veh/h)	483	1	2	465	7	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	483	1	2	465	7	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					1.00	
vC, conflicting volume			484		952	484
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			484		950	484
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1079		287	583

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	484	467	9
Volume Left	0	2	7
Volume Right	1	0	2
cSH	1700	1079	323
Volume to Capacity	0.28	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.1	16.5
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	16.5
Approach LOS			C

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		36.1%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	282	9	24	471	4	18	0	28	3	2	8
Future Volume (Veh/h)	3	282	9	24	471	4	18	0	28	3	2	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	324	10	28	541	5	21	0	32	3	2	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	557			337			950	951	334	980	954	556
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	363			337			836	838	334	872	841	362
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			91	100	95	99	99	98
cM capacity (veh/h)	992			1171			226	243	709	208	242	564

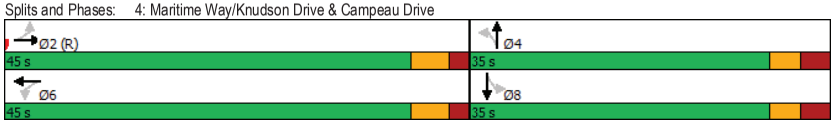
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	337	574	53	14
Volume Left	3	28	21	3
Volume Right	10	5	32	9
cSH	992	1171	385	362
Volume to Capacity	0.00	0.02	0.14	0.04
Queue Length 95th (m)	0.1	0.6	3.8	1.0
Control Delay (s)	0.1	0.7	15.9	15.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	15.9	15.3
Approach LOS			C	C

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			52.2%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	24	549	86	378	17	15	147	9
Future Volume (vph)	24	549	86	378	17	15	147	9
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.7	23.7	23.7	23.7	28.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%	56.3%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.3	39.3	39.3	39.3	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.36	0.36	0.36	0.36
v/c Ratio	0.08	0.70	0.40	0.59	0.04	0.26	0.38	0.10
Control Delay	11.8	21.2	19.2	17.7	16.9	5.4	22.1	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	21.2	19.2	17.7	16.9	5.4	22.1	7.2
LOS	B	C	B	B	B	A	C	A
Approach Delay		20.8		17.9		6.6		18.1
Approach LOS		C		B		A		B

Intersection Summary		
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 60		
Control Type: Pretimed		
Maximum v/c Ratio: 0.70		
Intersection Signal Delay: 17.8	Intersection LOS: B	
Intersection Capacity Utilization 80.1%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



HCM Signalized Intersection Capacity Analysis <2022 Background> Weekday AM Peak Hour
4: Maritime Way/Knudson Drive & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	549	7	86	378	69	17	15	135	147	9	45
Future Volume (vph)	24	549	7	86	378	69	17	15	135	147	9	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1705	1789		1797	1696		1781	1486		1731	1576	
Flt Permitted	0.36	1.00		0.26	1.00		0.72	1.00		0.65	1.00	
Satd. Flow (perm)	648	1789		492	1696		1346	1486		1187	1576	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	610	8	96	420	77	19	17	150	163	10	50
RTOR Reduction (vph)	0	1	0	0	8	0	0	96	0	0	32	0
Lane Group Flow (vph)	27	617	0	96	489	0	19	71	0	163	28	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	4%	6%	0%	0%	7%	15%	0%	20%	7%	4%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Effective Green, g (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	318	878		241	833		487	538		430	571	
v/s Ratio Prot		c0.35			0.29			0.05			0.02	
v/s Ratio Perm	0.04			0.20			0.01			c0.14		
v/c Ratio	0.08	0.70		0.40	0.59		0.04	0.13		0.38	0.05	
Uniform Delay, d1	10.8	15.8		12.9	14.5		16.5	17.1		18.8	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	4.7		4.9	3.0		0.2	0.5		2.5	0.2	
Delay (s)	11.3	20.5		17.7	17.6		16.6	17.6		21.4	16.7	
Level of Service	B	C		B	B		B	B		C	B	
Approach Delay (s)		20.1			17.6			17.5			20.1	
Approach LOS		C			B			B			C	

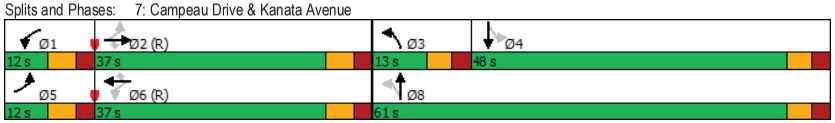
Intersection Summary				
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	80.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings <2022 Background> Weekday AM Peak Hour
7: Campeau Drive & Kanata Avenue 01-11-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	140	517	259	62	177	56	113	310	102	321
Future Volume (vph)	140	517	259	62	177	56	113	310	102	321
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	12.0	37.0	37.0	12.0	37.0	37.0	13.0	61.0	48.0	48.0
Total Split (%)	10.9%	33.6%	33.6%	10.9%	33.6%	33.6%	11.8%	55.5%	43.6%	43.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1	42.1	42.1
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50	0.38	0.38
v/c Ratio	0.44	0.82	0.45	0.44	0.40	0.13	0.38	0.44	0.30	0.65
Control Delay	29.0	48.1	6.0	30.7	35.0	0.5	18.3	19.0	26.5	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	48.1	6.0	30.7	35.0	0.5	18.3	19.0	26.5	32.6
LOS	C	D	A	C	C	A	B	B	C	C
Approach Delay		33.2			27.6			18.8		31.3
Approach LOS		C			C			B		C

Intersection Summary			
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 79.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	517	259	62	177	56	113	310	52	102	321	78
Future Volume (vph)	140	517	259	62	177	56	113	310	52	102	321	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	2500	1553	1736	1776	1380	1752	1805		1770	1757	
Flt Permitted	0.56	1.00	1.00	0.13	1.00	1.00	0.27	1.00		0.53	1.00	
Satd. Flow (perm)	969	1900	1553	237	1776	1380	501	1805		979	1757	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	574	288	69	197	62	126	344	58	113	357	87
RTOR Reduction (vph)	0	0	207	0	0	45	0	5	0	0	8	0
Lane Group Flow (vph)	156	574	81	69	197	17	126	397	0	113	436	0
Heavy Vehicles (%)	10%	0%	4%	4%	7%	17%	3%	3%	3%	2%	4%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Effective Green, g (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50		0.38	0.38	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	357	700	434	157	497	386	331	904		374	672	
v/s Ratio Prot	0.02	c0.23		c0.02	0.11		0.02	c0.22			c0.25	
v/s Ratio Perm	0.12		0.05	0.12		0.01	0.17			0.12		
v/c Ratio	0.44	0.82	0.19	0.44	0.40	0.04	0.38	0.44		0.30	0.65	
Uniform Delay, d1	27.9	37.0	30.1	28.9	32.1	28.9	17.4	17.6		23.7	27.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	10.4	0.9	8.7	2.4	0.2	3.3	1.5		2.1	4.8	
Delay (s)	31.8	47.4	31.0	37.6	34.4	29.1	20.7	19.1		25.8	32.7	
Level of Service	C	D	C	D	C	C	C	B		C	C	
Approach Delay (s)		40.4			34.1			19.5			31.3	
Approach LOS		D			C			B			C	

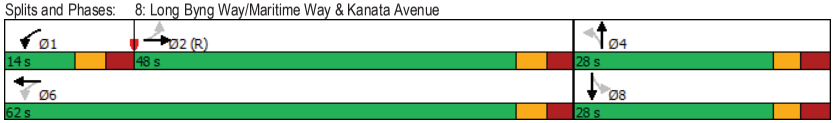
Intersection Summary				
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2	
Intersection Capacity Utilization	79.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	454	92	247	12	6	156	2
Future Volume (vph)	30	454	92	247	12	6	156	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	48.0	48.0	14.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	15.6%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.7	41.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.46	0.46	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.07	0.60	0.24	0.38	0.04	0.07		0.66
Control Delay	14.1	21.6	8.3	8.4	26.8	14.4		39.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	14.1	21.6	8.3	8.4	26.8	14.4		39.2
LOS	B	C	A	A	C	B		D
Approach Delay		21.1		8.4		18.5		39.2
Approach LOS		C		A		B		D

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 19.1 Intersection LOS: B
Intersection Capacity Utilization 64.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



HCM Signalized Intersection Capacity Analysis <2022 Background> Weekday AM Peak Hour
8: Long Byng Way/Maritime Way & Kanata Avenue 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	454	18	92	247	139	12	6	18	156	2	48
Future Volume (vph)	30	454	18	92	247	139	12	6	18	156	2	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.89			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1770	1852		1770	1762		1770	1656			1738	
Flt Permitted	0.51	1.00		0.28	1.00		0.67	1.00			0.76	
Satd. Flow (perm)	959	1852		521	1762		1242	1656			1372	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	499	20	101	271	153	13	7	20	171	2	53
RTOR Reduction (vph)	0	2	0	0	22	0	0	15	0	0	12	0
Lane Group Flow (vph)	33	517	0	101	402	0	13	12	0	0	214	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.46	0.46		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	444	858		429	1090		299	399			330	
v/s Ratio Prot		c0.28		0.02	c0.23			0.01				
v/s Ratio Perm	0.03			0.13			0.01				c0.16	
v/c Ratio	0.07	0.60		0.24	0.37		0.04	0.03			0.65	
Uniform Delay, d1	13.4	18.0		9.3	8.5		26.2	26.1			30.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	3.1		1.3	1.0		0.3	0.1			9.5	
Delay (s)	13.7	21.1		10.6	9.4		26.5	26.2			40.2	
Level of Service	B	C		B	A		C	C			D	
Approach Delay (s)		20.7			9.7			26.3			40.2	
Approach LOS		C			A			C			D	

Intersection Summary				
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis<2022 Background> Weekday PM Peak Hour
1: Campeau Drive & Stonecroft Terrace 01-11-2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	462	533	9	6	8
Future Volume (Veh/h)	11	462	533	9	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	462	533	9	6	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	542				1022	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542				1022	538
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1027				259	544

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	473	542	14
Volume Left	11	0	6
Volume Right	0	9	8
cSH	1027	1700	369
Volume to Capacity	0.01	0.32	0.04
Queue Length 95th (m)	0.3	0.0	0.9
Control Delay (s)	0.3	0.0	15.1
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	15.1
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	462	15	5	500	6	1
Future Volume (Veh/h)	462	15	5	500	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	462	15	5	500	6	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.84	
vC, conflicting volume			477		980	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			477		878	470
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1085		265	594

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	477	505	7
Volume Left	0	5	6
Volume Right	15	0	1
cSH	1700	1085	288
Volume to Capacity	0.28	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.6
Control Delay (s)	0.0	0.1	17.8
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	17.8
Approach LOS			C

Intersection Summary				
Average Delay			0.2	
Intersection Capacity Utilization			40.3%	ICU Level of Service A
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	372	14	31	524	6	9	1	35	3	0	8
Future Volume (Veh/h)	13	372	14	31	524	6	9	1	35	3	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	428	16	36	602	7	10	1	40	3	0	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.72						0.72	0.72		0.72	0.72	0.72
vC, conflicting volume	620			447			1158	1161	441	1197	1166	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272			447			1022	1027	441	1077	1033	269
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			93	99	94	98	100	98
cM capacity (veh/h)	925			1065			145	159	618	125	158	549

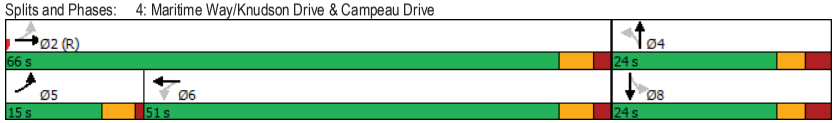
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	459	645	51	12
Volume Left	15	36	10	3
Volume Right	16	7	40	9
cSH	925	1065	364	297
Volume to Capacity	0.02	0.03	0.14	0.04
Queue Length 95th (m)	0.4	0.8	3.9	1.0
Control Delay (s)	0.5	0.9	16.5	17.6
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.9	16.5	17.6
Approach LOS			C	C

Intersection Summary				
Average Delay			1.6	
Intersection Capacity Utilization			51.9%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	52	373	144	524	12	12	34	10
Future Volume (vph)	52	373	144	524	12	12	34	10
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.7	27.7	27.7	24.0	24.0	24.0	24.0
Total Split (s)	15.0	66.0	51.0	51.0	24.0	24.0	24.0	24.0
Total Split (%)	16.7%	73.3%	56.7%	56.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	61.5	60.3	45.3	45.3	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.68	0.67	0.50	0.50	0.20	0.20	0.20	0.20
v/c Ratio	0.14	0.36	0.33	0.73	0.05	0.26	0.15	0.18
Control Delay	5.4	7.3	15.8	23.1	29.8	10.7	31.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	7.3	15.8	23.1	29.8	10.7	31.4	12.4
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.1		21.7		12.9		19.3
Approach LOS		A		C		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



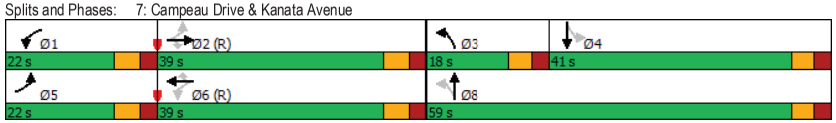
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	373	26	144	524	93	12	12	79	34	10	50
Future Volume (vph)	52	373	26	144	524	93	12	12	79	34	10	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1853		1789	1840		1770	1615		1797	1605	
Flt Permitted	0.19	1.00		0.51	1.00		0.71	1.00		0.69	1.00	
Satd. Flow (perm)	363	1853		953	1840		1329	1615		1308	1605	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	58	414	29	160	582	103	13	13	88	38	11	56
RTOR Reduction (vph)	0	3	0	0	7	0	0	70	0	0	45	0
Lane Group Flow (vph)	58	440	0	160	678	0	13	31	0	38	22	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.50	0.50		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	411	1241		479	926		265	323		261	321	
v/s Ratio Prot	0.02	c0.24			c0.37			0.02			0.01	
v/s Ratio Perm	0.08			0.17			0.01			c0.03		
v/c Ratio	0.14	0.35		0.33	0.73		0.05	0.09		0.15	0.07	
Uniform Delay, d1	9.2	6.4		13.3	17.6		29.1	29.4		29.7	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.8		1.9	5.1		0.4	0.6		1.2	0.4	
Delay (s)	9.9	7.2		15.2	22.7		29.4	29.9		30.8	29.6	
Level of Service	A	A		B	C		C	C		C	C	
Approach Delay (s)		7.5			21.3			29.9			30.1	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	65.4%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	47	330	223	146	466	86	300	318	97	395
Future Volume (vph)	47	330	223	146	466	86	300	318	97	395
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	22.0	39.0	39.0	22.0	39.0	39.0	18.0	59.0	41.0	41.0
Total Split (%)	18.3%	32.5%	32.5%	18.3%	32.5%	32.5%	15.0%	49.2%	34.2%	34.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1	35.1	35.1
Actuated g/C Ratio	0.40	0.27	0.27	0.40	0.27	0.27	0.44	0.44	0.29	0.29
v/c Ratio	0.15	0.48	0.37	0.36	0.78	0.16	0.76	0.58	0.36	0.81
Control Delay	19.7	39.4	6.2	22.2	50.3	1.7	37.5	27.2	38.1	51.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	39.4	6.2	22.2	50.3	1.7	37.5	27.2	38.1	51.2
LOS	B	D	A	C	D	A	D	C	D	D
Approach Delay		25.5			38.4			31.2		48.9
Approach LOS		C			D			C		D

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 35.6		Intersection LOS: D	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	330	223	146	466	86	300	318	156	97	395	73
Future Volume (vph)	47	330	223	146	466	86	300	318	156	97	395	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	2500	1615	1805	2200	1615	1805	1806		1805	1956	
Flt Permitted	0.13	1.00	1.00	0.33	1.00	1.00	0.33	1.00		0.49	1.00	
Satd. Flow (perm)	245	1900	1615	632	1900	1615	623	1806		934	1856	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	330	223	146	466	86	300	318	156	97	395	73
RTOR Reduction (vph)	0	0	162	0	0	62	0	14	0	0	6	0
Lane Group Flow (vph)	47	330	61	146	466	24	300	460	0	97	462	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Effective Green, g (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Actuated g/C Ratio	0.41	0.27	0.27	0.41	0.27	0.27	0.44	0.44		0.29	0.29	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	304	683	441	410	601	441	394	799		273	572	
v/s Ratio Prot	0.02	0.13		c0.05	c0.21		c0.08	0.25			0.24	
v/s Ratio Perm	0.04		0.04	0.10		0.01	c0.26			0.10		
v/c Ratio	0.15	0.48	0.14	0.36	0.78	0.05	0.76	0.58		0.36	0.81	
Uniform Delay, d1	24.4	36.5	32.9	24.0	40.2	32.2	22.5	25.0		33.5	39.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	2.4	0.7	2.4	9.5	0.2	13.0	3.0		3.6	11.7	
Delay (s)	25.5	38.9	33.6	26.4	49.7	32.4	35.5	28.0		37.1	51.0	
Level of Service	C	D	C	C	D	C	D	C		D	D	
Approach Delay (s)		35.9			42.7			30.9			48.6	
Approach LOS		D			D			C			D	

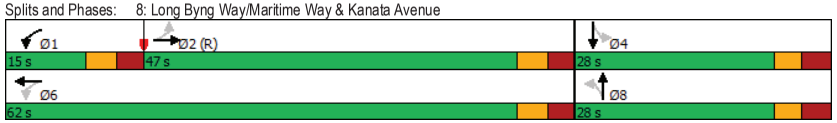
Intersection Summary					
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		24.2	
Intersection Capacity Utilization	90.7%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	59	511	147	668	32	3	128	9
Future Volume (vph)	59	511	147	668	32	3	128	9
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	47.0	47.0	15.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	52.2%	52.2%	16.7%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.45	0.45	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.36	0.69	0.41	0.82	0.12	0.21		0.60
Control Delay	23.7	24.8	10.4	20.5	28.0	8.0		35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	23.7	24.8	10.4	20.5	28.0	8.0		35.9
LOS	C	C	B	C	C	A		D
Approach Delay		24.7		19.0		13.3		35.9
Approach LOS		C		B		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Pretimed			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	511	27	147	668	190	32	3	84	128	9	46
Future Volume (vph)	59	511	27	147	668	190	32	3	84	128	9	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1849		1770	1801		1770	1592			1739	
Flt Permitted	0.21	1.00		0.23	1.00		0.66	1.00			0.73	
Satd. Flow (perm)	385	1849		419	1801		1225	1592			1321	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	63	549	29	158	718	204	34	3	90	138	10	49
RTOR Reduction (vph)	0	2	0	0	11	0	0	68	0	0	13	0
Lane Group Flow (vph)	63	576	0	158	911	0	34	25	0	0	184	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.45	0.45		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	174	836		389	1114		295	383			318	
v/s Ratio Prot		0.31		0.04	c0.51			0.02				
v/s Ratio Perm	0.16			0.21			0.03				c0.14	
v/c Ratio	0.36	0.69		0.41	0.82		0.12	0.06			0.58	
Uniform Delay, d1	16.1	19.6		10.9	13.2		26.7	26.3			30.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Incremental Delay, d2	5.8	4.6		3.1	6.7		0.8	0.3			7.5	
Delay (s)	21.9	24.2		14.0	19.9		27.5	26.6			37.4	
Level of Service	C	C		B	B		C	C			D	
Approach Delay (s)		24.0			19.1			26.9			37.4	
Approach LOS		C			B			C			D	

Intersection Summary					
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	83.7%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	504	14	21	530	2	48	0	48	3	0	3
Future Volume (Veh/h)	4	504	14	21	530	2	48	0	48	3	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	504	14	21	530	2	48	0	48	3	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	532			518			1095	1093	511	1140	1099	531
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	532			518			1095	1093	511	1140	1099	531
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			74	100	91	98	100	99
cM capacity (veh/h)	1036			1048			187	209	563	160	207	548

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	522	553	96	6
Volume Left	4	21	48	3
Volume Right	14	2	48	3
cSH	1036	1048	280	248
Volume to Capacity	0.00	0.02	0.34	0.02
Queue Length 95th (m)	0.1	0.5	11.8	0.6
Control Delay (s)	0.1	0.6	24.4	19.9
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.6	24.4	19.9
Approach LOS			C	C

Intersection Summary					
Average Delay	2.4				
Intersection Capacity Utilization	55.6%	ICU Level of Service		B	
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	540	16	11	486	52	29
Future Volume (Veh/h)	540	16	11	486	52	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	540	16	11	486	52	29
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.96	
vC, conflicting volume			556		1056	548
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			556		1037	548
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		79	95
cM capacity (veh/h)			1015		243	536

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	556	497	81
Volume Left	0	11	52
Volume Right	16	0	29
cSH	1700	1015	302
Volume to Capacity	0.33	0.01	0.27
Queue Length 95th (m)	0.0	0.3	8.5
Control Delay (s)	0.0	0.3	21.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	21.2
Approach LOS			C

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	45.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	366	9	24	501	4	18	0	28	3	2	8
Future Volume (Veh/h)	3	366	9	24	501	4	18	0	28	3	2	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	421	10	28	576	5	21	0	32	3	2	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	592			434			1082	1083	431	1112	1086	592
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			434			982	984	431	1019	987	375
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			88	100	95	98	99	98
cM capacity (veh/h)	955			1077			175	194	626	160	193	540

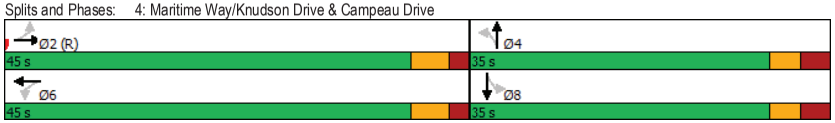
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	434	609	53	14
Volume Left	3	28	21	3
Volume Right	10	5	32	9
cSH	955	1077	310	306
Volume to Capacity	0.00	0.03	0.17	0.05
Queue Length 95th (m)	0.1	0.6	4.9	1.1
Control Delay (s)	0.1	0.7	19.0	17.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	19.0	17.3
Approach LOS			C	C

Intersection Summary					
Average Delay			1.6		
Intersection Capacity Utilization			54.5%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	606	86	404	17	15	147	9
Future Volume (vph)	45	606	86	404	17	15	147	9
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.7	23.7	23.7	23.7	28.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%	56.3%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.3	39.3	39.3	39.3	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.36	0.36	0.36	0.36
v/c Ratio	0.17	0.78	0.51	0.62	0.04	0.26	0.38	0.10
Control Delay	13.2	24.6	25.4	18.5	16.9	5.4	22.1	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	24.6	25.4	18.5	16.9	5.4	22.1	7.0
LOS	B	C	C	B	B	A	C	A
Approach Delay		23.9		19.6		6.6		17.9
Approach LOS		C		B		A		B

Intersection Summary			
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 83.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



HCM Signalized Intersection Capacity Analysis <2022 Total> Weekday AM Peak Hour
4: Maritime Way/Knudson Drive & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	606	13	86	404	69	17	15	135	147	9	48
Future Volume (vph)	45	606	13	86	404	69	17	15	135	147	9	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1708	1788		1805	1701		1781	1486		1731	1573	
Flt Permitted	0.34	1.00		0.20	1.00		0.72	1.00		0.65	1.00	
Satd. Flow (perm)	605	1788		388	1701		1342	1486		1187	1573	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	673	14	96	449	77	19	17	150	163	10	53
RTOR Reduction (vph)	0	1	0	0	8	0	0	96	0	0	34	0
Lane Group Flow (vph)	50	686	0	96	518	0	19	71	0	163	29	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	4%	6%	0%	0%	7%	15%	0%	20%	7%	4%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Effective Green, g (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	297	878		190	835		486	538		430	570	
v/s Ratio Prot		c0.38			0.30			0.05			0.02	
v/s Ratio Perm	0.08			0.25			0.01			c0.14		
v/c Ratio	0.17	0.78		0.51	0.62		0.04	0.13		0.38	0.05	
Uniform Delay, d1	11.3	16.8		13.8	14.9		16.5	17.1		18.8	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	6.8		9.3	3.5		0.2	0.5		2.5	0.2	
Delay (s)	12.5	23.6		23.1	18.4		16.6	17.6		21.4	16.7	
Level of Service	B	C		C	B		B	B		C	B	
Approach Delay (s)		22.9			19.1			17.5			20.1	
Approach LOS		C			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis <2022 Total> Weekday AM Peak Hour
5: Cordillera Street & Proposed Access 2 01-11-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	10	2	59	19	7
Future Volume (Veh/h)	36	10	2	59	19	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	36	10	2	59	19	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	86	22	26			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86	22	26			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	915	1054	1588			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	46	61	26
Volume Left	36	2	0
Volume Right	10	0	7
cSH	942	1588	1700
Volume to Capacity	0.05	0.00	0.02
Queue Length 95th (m)	1.2	0.0	0.0
Control Delay (s)	9.0	0.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	12	4	11	13	16
Future Volume (Veh/h)	50	12	4	11	13	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	50	12	4	11	13	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	40	21	29			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40	21	29			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	969	1056	1584			

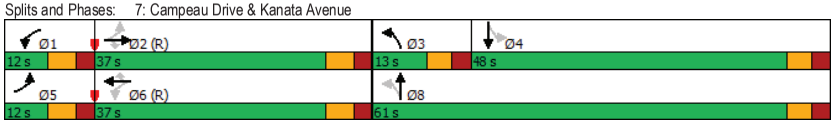
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	15	29
Volume Left	50	4	0
Volume Right	12	0	16
cSH	985	1584	1700
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	1.6	0.1	0.0
Control Delay (s)	8.9	2.0	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	2.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay			5.5	
Intersection Capacity Utilization			14.3%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	146	517	259	62	177	58	113	331	114	386
Future Volume (vph)	146	517	259	62	177	58	113	331	114	386
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	12.0	37.0	37.0	12.0	37.0	37.0	13.0	61.0	48.0	48.0
Total Split (%)	10.9%	33.6%	33.6%	10.9%	33.6%	33.6%	11.8%	55.5%	43.6%	43.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1	42.1	42.1
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50	0.38	0.38
v/c Ratio	0.45	0.82	0.45	0.44	0.40	0.13	0.48	0.47	0.35	0.78
Control Delay	29.4	48.1	6.0	30.7	35.0	0.6	21.0	19.5	27.6	38.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	48.1	6.0	30.7	35.0	0.6	21.0	19.5	27.6	38.7
LOS	C	D	A	C	C	A	C	B	C	D
Approach Delay		33.3			27.4			19.9		36.6
Approach LOS		C			C			B		D

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 110		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 90		
Control Type: Pretimed		
Maximum v/c Ratio: 0.82		
Intersection Signal Delay: 30.5	Intersection LOS: C	
Intersection Capacity Utilization 83.8%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	517	259	62	177	58	113	331	52	114	386	93
Future Volume (vph)	146	517	259	62	177	58	113	331	52	114	386	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	2500	1553	1736	1776	1380	1752	1807		1770	1758	
Flt Permitted	0.56	1.00	1.00	0.13	1.00	1.00	0.19	1.00		0.51	1.00	
Satd. Flow (perm)	969	1900	1553	237	1776	1380	350	1807		958	1758	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	162	574	288	69	197	64	126	368	58	127	429	103
RTOR Reduction (vph)	0	0	207	0	0	46	0	5	0	0	8	0
Lane Group Flow (vph)	162	574	81	69	197	18	126	421	0	127	524	0
Heavy Vehicles (%)	10%	0%	4%	4%	7%	17%	3%	3%	3%	2%	4%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Effective Green, g (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50		0.38	0.38	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	357	700	434	157	497	386	265	905		366	672	
v/s Ratio Prot	c0.02	c0.23		0.02	0.11		0.03	c0.23			c0.30	
v/s Ratio Perm	0.13		0.05	0.12		0.01	0.21			0.13		
v/c Ratio	0.45	0.82	0.19	0.44	0.40	0.05	0.48	0.47		0.35	0.78	
Uniform Delay, d1	28.1	37.0	30.1	28.9	32.1	28.9	19.1	17.9		24.2	29.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	10.4	0.9	8.7	2.4	0.2	6.0	1.7		2.6	8.7	
Delay (s)	32.3	47.4	31.0	37.6	34.4	29.1	25.1	19.6		26.8	38.6	
Level of Service	C	D	C	D	C	C	C	B		C	D	
Approach Delay (s)		40.4			34.1			20.8			36.3	
Approach LOS		D			C			C			D	

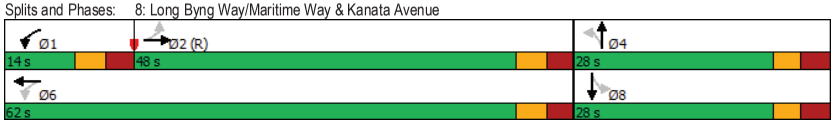
Intersection Summary				
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2	
Intersection Capacity Utilization	83.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	454	92	247	12	6	168	2
Future Volume (vph)	30	454	92	247	12	6	168	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	48.0	48.0	14.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	15.6%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.7	41.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.46	0.46	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.07	0.60	0.24	0.39	0.04	0.07		0.73
Control Delay	14.1	21.6	8.3	8.4	26.8	14.4		43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	14.1	21.6	8.3	8.4	26.8	14.4		43.1
LOS	B	C	A	A	C	B		D
Approach Delay		21.1		8.4		18.5		43.1
Approach LOS		C		A		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 65.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



HCM Signalized Intersection Capacity Analysis <2022 Total> Weekday AM Peak Hour
8: Long Byng Way/Maritime Way & Kanata Avenue 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	454	18	92	247	145	12	6	18	168	2	58
Future Volume (vph)	30	454	18	92	247	145	12	6	18	168	2	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.89			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1770	1852		1770	1759		1770	1656			1735	
Flt Permitted	0.51	1.00		0.28	1.00		0.66	1.00			0.77	
Satd. Flow (perm)	954	1852		521	1759		1225	1656			1377	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	499	20	101	271	159	13	7	20	185	2	64
RTOR Reduction (vph)	0	2	0	0	24	0	0	15	0	0	14	0
Lane Group Flow (vph)	33	517	0	101	406	0	13	12	0	0	237	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.46	0.46		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	442	858		429	1088		295	399			332	
v/s Ratio Prot		c0.28		0.02	c0.23			0.01				
v/s Ratio Perm	0.03			0.13			0.01				c0.17	
v/c Ratio	0.07	0.60		0.24	0.37		0.04	0.03			0.71	
Uniform Delay, d1	13.4	18.0		9.3	8.5		26.2	26.1			31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	3.1		1.3	1.0		0.3	0.1			12.4	
Delay (s)	13.8	21.1		10.6	9.5		26.5	26.2			43.7	
Level of Service	B	C		B	A		C	C			D	
Approach Delay (s)		20.7			9.7			26.3			43.7	
Approach LOS		C			A			C			D	

Intersection Summary					
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	65.5%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis <2022 Total> Weekday PM Peak Hour
1: Proposed Access 1/Stonecroft Terrace & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	497	64	43	555	9	35	0	35	6	0	8
Future Volume (Veh/h)	11	497	64	43	555	9	35	0	35	6	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	497	64	43	555	9	35	0	35	6	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	564			561			1204	1201	529	1232	1228	560
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564			561			1204	1201	529	1232	1228	560
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			77	100	94	96	100	98
cM capacity (veh/h)	1008			1010			152	175	550	138	168	528

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	572	607	70	14
Volume Left	11	43	35	6
Volume Right	64	9	35	8
cSH	1008	1010	238	239
Volume to Capacity	0.01	0.04	0.29	0.06
Queue Length 95th (m)	0.3	1.1	9.5	1.5
Control Delay (s)	0.3	1.1	26.3	21.0
Lane LOS	A	A	D	C
Approach Delay (s)	0.3	1.1	26.3	21.0
Approach LOS			D	C

Intersection Summary					
Average Delay	2.4				
Intersection Capacity Utilization	65.1%	ICU Level of Service		C	
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	497	50	35	543	28	22
Future Volume (Veh/h)	497	50	35	543	28	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	497	50	35	543	28	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.78	
vC, conflicting volume			547		1135	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			547		1030	522
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		86	96
cM capacity (veh/h)			1022		194	555

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	547	578	50
Volume Left	0	35	28
Volume Right	50	0	22
cSH	1700	1022	272
Volume to Capacity	0.32	0.03	0.18
Queue Length 95th (m)	0.0	0.9	5.3
Control Delay (s)	0.0	0.9	21.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.9	21.2
Approach LOS			C

Intersection Summary				
Average Delay			1.4	
Intersection Capacity Utilization			67.3%	ICU Level of Service C
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	428	14	31	597	6	9	1	35	3	0	8
Future Volume (Veh/h)	13	428	14	31	597	6	9	1	35	3	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	492	16	36	686	7	10	1	40	3	0	9
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.67						0.67	0.67		0.67	0.67	0.67
vC, conflicting volume	704			511			1306	1309	505	1345	1314	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316			511			1211	1216	505	1269	1223	314
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			90	99	93	96	100	98
cM capacity (veh/h)	836			1007			100	115	569	86	114	486

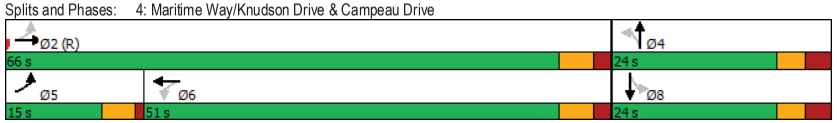
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	523	729	51	12
Volume Left	15	36	10	3
Volume Right	16	7	40	9
cSH	836	1007	286	224
Volume to Capacity	0.02	0.04	0.18	0.05
Queue Length 95th (m)	0.4	0.9	5.1	1.3
Control Delay (s)	0.5	0.9	20.3	22.0
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.9	20.3	22.0
Approach LOS			C	C

Intersection Summary				
Average Delay			1.7	
Intersection Capacity Utilization			56.5%	ICU Level of Service B
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	59	417	144	570	12	12	34	10
Future Volume (vph)	59	417	144	570	12	12	34	10
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.7	27.7	27.7	24.0	24.0	24.0	24.0
Total Split (s)	15.0	66.0	51.0	51.0	24.0	24.0	24.0	24.0
Total Split (%)	16.7%	73.3%	56.7%	56.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	61.5	60.3	45.3	45.3	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.68	0.67	0.50	0.50	0.20	0.20	0.20	0.20
v/c Ratio	0.17	0.40	0.35	0.79	0.05	0.26	0.15	0.22
Control Delay	5.8	7.7	16.3	25.7	29.8	10.7	31.4	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	7.7	16.3	25.7	29.8	10.7	31.4	11.3
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.5		24.0		12.9		17.7
Approach LOS		A		C		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 17.3		Intersection LOS: B	
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	417	29	144	570	93	12	12	79	34	10	64
Future Volume (vph)	59	417	29	144	570	93	12	12	79	34	10	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1853		1790	1844		1771	1615		1797	1595	
Flt Permitted	0.16	1.00		0.48	1.00		0.70	1.00		0.69	1.00	
Satd. Flow (perm)	296	1853		909	1844		1312	1615		1308	1595	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	66	463	32	160	633	103	13	13	88	38	11	71
RTOR Reduction (vph)	0	3	0	0	6	0	0	70	0	0	57	0
Lane Group Flow (vph)	66	492	0	160	730	0	13	31	0	38	25	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.50	0.50		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	374	1241		457	928		262	323		261	319	
v/s Ratio Prot	0.02	c0.27			c0.40			0.02			0.02	
v/s Ratio Perm	0.10			0.18			0.01			c0.03		
v/c Ratio	0.18	0.40		0.35	0.79		0.05	0.09		0.15	0.08	
Uniform Delay, d1	10.5	6.7		13.5	18.4		29.1	29.4		29.7	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.0		2.1	6.7		0.4	0.6		1.2	0.5	
Delay (s)	11.5	7.6		15.6	25.0		29.4	29.9		30.8	29.7	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		8.1			23.3			29.9			30.1	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	67.8%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	3	6	37	71	15
Future Volume (Veh/h)	13	3	6	37	71	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	3	6	37	71	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	128	78	86			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	78	86			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	864	982	1510			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	43	86
Volume Left	13	6	0
Volume Right	3	0	15
cSH	884	1510	1700
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (m)	0.4	0.1	0.0
Control Delay (s)	9.1	1.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	1.1	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		17.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	13	22	13	23	51
Future Volume (Veh/h)	30	13	22	13	23	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	13	22	13	23	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	106	48	74			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	106	48	74			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	879	1020	1526			

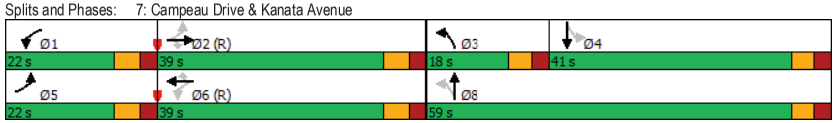
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	35	74
Volume Left	30	22	0
Volume Right	13	0	51
cSH	918	1526	1700
Volume to Capacity	0.05	0.01	0.04
Queue Length 95th (m)	1.2	0.4	0.0
Control Delay (s)	9.1	4.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	4.7	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		3.7		
Intersection Capacity Utilization		18.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	60	330	223	146	466	98	300	392	103	440
Future Volume (vph)	60	330	223	146	466	98	300	392	103	440
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	22.0	39.0	39.0	22.0	39.0	39.0	18.0	59.0	41.0	41.0
Total Split (%)	18.3%	32.5%	32.5%	18.3%	32.5%	32.5%	15.0%	49.2%	34.2%	34.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1	35.1	35.1
Actuated g/C Ratio	0.40	0.27	0.27	0.40	0.27	0.27	0.44	0.44	0.29	0.29
v/c Ratio	0.20	0.48	0.37	0.36	0.78	0.18	0.76	0.67	0.48	0.90
Control Delay	20.2	39.4	6.2	22.2	50.3	2.8	37.5	30.4	43.7	60.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	39.4	6.2	22.2	50.3	2.8	37.5	30.4	43.7	60.3
LOS	C	D	A	C	D	A	D	C	D	E
Approach Delay		25.4			38.0			32.9		57.5
Approach LOS		C			D			C		E

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 38.1		Intersection LOS: D	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	330	223	146	466	98	300	392	156	103	440	79
Future Volume (vph)	60	330	223	146	466	98	300	392	156	103	440	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	2500	1615	1805	2200	1615	1805	1819		1805	1956	
Flt Permitted	0.13	1.00	1.00	0.33	1.00	1.00	0.33	1.00		0.39	1.00	
Satd. Flow (perm)	245	1900	1615	632	1900	1615	623	1819		739	1857	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	330	223	146	466	98	300	392	156	103	440	79
RTOR Reduction (vph)	0	0	162	0	0	71	0	12	0	0	6	0
Lane Group Flow (vph)	60	330	61	146	466	27	300	536	0	103	513	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Effective Green, g (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Actuated g/C Ratio	0.41	0.27	0.27	0.41	0.27	0.27	0.44	0.44		0.29	0.29	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	304	683	441	410	601	441	394	804		216	572	
v/s Ratio Prot	0.03	0.13		c0.05	c0.21		0.08	c0.29			c0.26	
v/s Ratio Perm	0.05		0.04	0.10		0.02	0.26			0.14		
v/c Ratio	0.20	0.48	0.14	0.36	0.78	0.06	0.76	0.67		0.48	0.90	
Uniform Delay, d1	24.6	36.5	32.9	24.0	40.2	32.2	22.5	26.5		34.9	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	2.4	0.7	2.4	9.5	0.3	13.0	4.4		7.4	19.4	
Delay (s)	26.0	38.9	33.6	26.4	49.7	32.5	35.5	30.8		42.3	60.1	
Level of Service	C	D	C	C	D	C	D	C		D	E	
Approach Delay (s)		35.7			42.5			32.5			57.2	
Approach LOS		D			D			C			E	

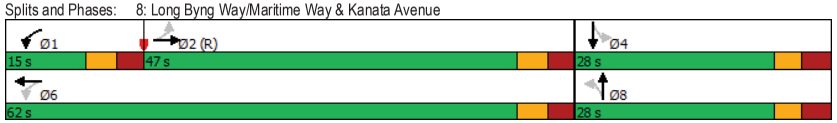
Intersection Summary					
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		24.2	
Intersection Capacity Utilization	93.4%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	59	511	147	668	32	3	141	9
Future Volume (vph)	59	511	147	668	32	3	141	9
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	47.0	47.0	15.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	52.2%	52.2%	16.7%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.45	0.45	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.41	0.69	0.41	0.85	0.12	0.21		0.65
Control Delay	26.9	24.8	10.4	22.4	28.0	8.0		38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	26.9	24.8	10.4	22.4	28.0	8.0		38.5
LOS	C	C	B	C	C	A		D
Approach Delay		25.0		20.7		13.3		38.5
Approach LOS		C		C		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Pretimed			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 23.4		Intersection LOS: C	
Intersection Capacity Utilization 86.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	511	27	147	668	218	32	3	84	141	9	49
Future Volume (vph)	59	511	27	147	668	218	32	3	84	141	9	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1849		1770	1794		1770	1592			1739	
Flt Permitted	0.18	1.00		0.23	1.00		0.65	1.00			0.73	
Satd. Flow (perm)	339	1849		419	1794		1218	1592			1318	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	63	549	29	158	718	234	34	3	90	152	10	53
RTOR Reduction (vph)	0	2	0	0	13	0	0	68	0	0	13	0
Lane Group Flow (vph)	63	576	0	158	939	0	34	25	0	0	202	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.45	0.45		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	153	836		389	1110		293	383			317	
v/s Ratio Prot		0.31		0.04	c0.52			0.02				
v/s Ratio Perm	0.19			0.21			0.03				c0.15	
v/c Ratio	0.41	0.69		0.41	0.85		0.12	0.06			0.64	
Uniform Delay, d1	16.6	19.6		10.9	13.7		26.7	26.3			30.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Incremental Delay, d2	8.0	4.6		3.1	8.0		0.8	0.3			9.4	
Delay (s)	24.6	24.2		14.0	21.7		27.5	26.6			39.7	
Level of Service	C	C		B	C		C	C			D	
Approach Delay (s)		24.3			20.6			26.9			39.7	
Approach LOS		C			C			C			D	

Intersection Summary					
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.86				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	86.3%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	534	522	2	3	3
Future Volume (Veh/h)	5	534	522	2	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	534	522	2	3	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	524				1067	523
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	524				1067	523
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1043				245	554

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	539	524	6
Volume Left	5	0	3
Volume Right	0	2	3
cSH	1043	1700	339
Volume to Capacity	0.00	0.31	0.02
Queue Length 95th (m)	0.1	0.0	0.4
Control Delay (s)	0.1	0.0	15.8
Lane LOS	A		C
Approach Delay (s)	0.1	0.0	15.8
Approach LOS			C

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		42.1%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	528	1	2	500	8	2
Future Volume (Veh/h)	528	1	2	500	8	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	528	1	2	500	8	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.92	
vC, conflicting volume			529		1032	528
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			529		991	528
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1038		250	550

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	529	502	10
Volume Left	0	2	8
Volume Right	1	0	2
cSH	1700	1038	281
Volume to Capacity	0.31	0.00	0.04
Queue Length 95th (m)	0.0	0.0	0.9
Control Delay (s)	0.0	0.1	18.3
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	18.3
Approach LOS			C

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		37.9%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	282	9	24	471	4	20	0	31	3	2	9
Future Volume (Veh/h)	3	282	9	24	471	4	20	0	31	3	2	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	324	10	28	541	5	23	0	36	3	2	10
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.80						0.80	0.80		0.80	0.80	0.80
vC, conflicting volume	557			337			950	951	334	984	954	556
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			337			816	817	334	857	820	326
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			90	100	95	99	99	98
cM capacity (veh/h)	991			1171			226	242	709	205	241	572

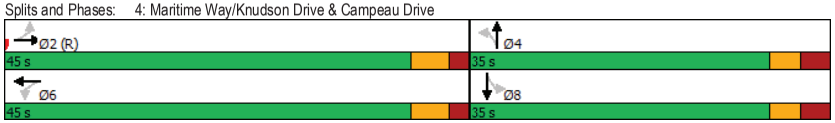
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	337	574	59	15
Volume Left	3	28	23	3
Volume Right	10	5	36	10
cSH	991	1171	387	371
Volume to Capacity	0.00	0.02	0.15	0.04
Queue Length 95th (m)	0.1	0.6	4.3	1.0
Control Delay (s)	0.1	0.7	16.0	15.1
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	16.0	15.1
Approach LOS			C	C

Intersection Summary					
Average Delay			1.6		
Intersection Capacity Utilization			52.8%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	585	91	407	17	16	159	10
Future Volume (vph)	26	585	91	407	17	16	159	10
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.7	23.7	23.7	23.7	28.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%	56.3%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.3	39.3	39.3	39.3	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.36	0.36	0.36	0.36
v/c Ratio	0.10	0.75	0.48	0.64	0.04	0.28	0.42	0.11
Control Delay	12.1	23.0	23.0	18.8	16.9	5.4	22.9	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	23.0	23.0	18.8	16.9	5.4	22.9	7.1
LOS	B	C	C	B	B	A	C	A
Approach Delay		22.5		19.5		6.5		18.6
Approach LOS		C		B		A		B

Intersection Summary			
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 82.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



HCM Signalized Intersection Capacity Analysis <2027 Background> Weekday AM Peak Hour
4: Maritime Way/Knudson Drive & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	585	7	91	407	75	17	16	144	159	10	49
Future Volume (vph)	26	585	7	91	407	75	17	16	144	159	10	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	1790		1805	1696		1781	1485		1731	1577	
Flt Permitted	0.33	1.00		0.23	1.00		0.71	1.00		0.64	1.00	
Satd. Flow (perm)	591	1790		432	1696		1340	1485		1175	1577	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	650	8	101	452	83	19	18	160	177	11	54
RTOR Reduction (vph)	0	1	0	0	8	0	0	102	0	0	34	0
Lane Group Flow (vph)	29	657	0	101	527	0	19	76	0	177	31	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	4%	6%	0%	0%	7%	15%	0%	20%	7%	4%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Effective Green, g (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	290	879		212	833		485	538		425	571	
v/s Ratio Prot		c0.37			0.31			0.05			0.02	
v/s Ratio Perm	0.05			0.23			0.01			c0.15		
v/c Ratio	0.10	0.75		0.48	0.63		0.04	0.14		0.42	0.05	
Uniform Delay, d1	10.9	16.4		13.5	15.0		16.5	17.1		19.1	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.8		7.5	3.6		0.2	0.5		3.0	0.2	
Delay (s)	11.6	22.2		21.0	18.7		16.6	17.7		22.1	16.8	
Level of Service	B	C		C	B		B	B		C	B	
Approach Delay (s)		21.7			19.0			17.6			20.7	
Approach LOS		C			B			B			C	

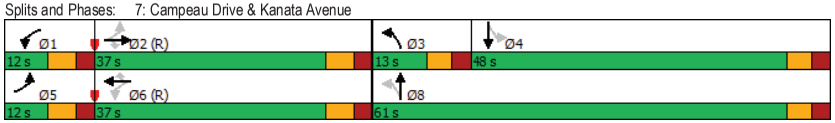
Intersection Summary				
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings <2027 Background> Weekday AM Peak Hour
7: Campeau Drive & Kanata Avenue 01-11-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	155	564	283	69	192	59	122	341	106	347
Future Volume (vph)	155	564	283	69	192	59	122	341	106	347
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	12.0	37.0	37.0	12.0	37.0	37.0	13.0	61.0	48.0	48.0
Total Split (%)	10.9%	33.6%	33.6%	10.9%	33.6%	33.6%	11.8%	55.5%	43.6%	43.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1	42.1	42.1
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50	0.38	0.38
v/c Ratio	0.50	0.90	0.49	0.49	0.43	0.13	0.45	0.49	0.33	0.71
Control Delay	30.9	55.2	7.5	32.8	35.7	0.6	19.9	19.9	27.2	34.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	55.2	7.5	32.8	35.7	0.6	19.9	19.9	27.2	34.9
LOS	C	E	A	C	D	A	B	B	C	C
Approach Delay		38.0			28.5			19.9		33.4
Approach LOS		D			C			B		C

Intersection Summary			
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 31.7		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	564	283	69	192	59	122	341	57	106	347	86
Future Volume (vph)	155	564	283	69	192	59	122	341	57	106	347	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	2500	1553	1736	1776	1380	1752	1805		1770	1756	
Flt Permitted	0.53	1.00	1.00	0.13	1.00	1.00	0.24	1.00		0.51	1.00	
Satd. Flow (perm)	924	1900	1553	237	1776	1380	435	1805		944	1756	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	172	627	314	77	213	66	136	379	63	118	386	96
RTOR Reduction (vph)	0	0	211	0	0	48	0	5	0	0	8	0
Lane Group Flow (vph)	172	627	103	77	213	18	136	437	0	118	474	0
Heavy Vehicles (%)	10%	0%	4%	4%	7%	17%	3%	3%	3%	2%	4%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Effective Green, g (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50		0.38	0.38	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	345	700	434	157	497	386	302	904		361	672	
v/s Ratio Prot	c0.03	c0.25		0.03	0.12		0.03	c0.24			c0.27	
v/s Ratio Perm	0.14		0.07	0.14		0.01	0.20			0.13		
v/c Ratio	0.50	0.90	0.24	0.49	0.43	0.05	0.45	0.48		0.33	0.71	
Uniform Delay, d1	28.8	38.1	30.5	29.0	32.4	28.9	18.2	18.1		24.0	28.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	16.4	1.3	10.5	2.7	0.2	4.8	1.8		2.4	6.1	
Delay (s)	33.9	54.4	31.8	39.6	35.1	29.1	22.9	19.9		26.4	34.8	
Level of Service	C	D	C	D	D	C	C	B		C	C	
Approach Delay (s)		44.9			35.0			20.6			33.2	
Approach LOS		D			C			C			C	

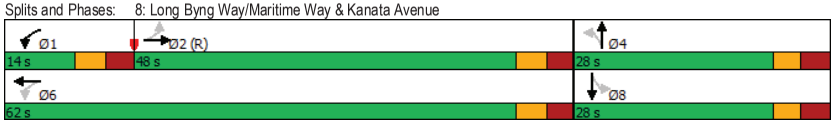
Intersection Summary				
HCM 2000 Control Delay	35.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2	
Intersection Capacity Utilization	84.3%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	501	101	272	14	7	167	2
Future Volume (vph)	32	501	101	272	14	7	167	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	48.0	48.0	14.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	15.6%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.7	41.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.46	0.46	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.08	0.67	0.29	0.42	0.05	0.07		0.71
Control Delay	14.2	23.4	9.0	8.9	27.0	14.3		42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	14.2	23.4	9.0	8.9	27.0	14.3		42.0
LOS	B	C	A	A	C	B		D
Approach Delay		22.9		8.9		18.5		42.0
Approach LOS		C		A		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 68.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



HCM Signalized Intersection Capacity Analysis <2027 Background> Weekday AM Peak Hour
8: Long Byng Way/Maritime Way & Kanata Avenue 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	501	20	101	272	152	14	7	20	167	2	50
Future Volume (vph)	32	501	20	101	272	152	14	7	20	167	2	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.89			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1770	1852		1770	1763		1770	1658			1739	
Flt Permitted	0.50	1.00		0.24	1.00		0.67	1.00			0.76	
Satd. Flow (perm)	923	1852		443	1763		1245	1658			1367	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	35	551	22	111	299	167	15	8	22	184	2	55
RTOR Reduction (vph)	0	2	0	0	22	0	0	17	0	0	12	0
Lane Group Flow (vph)	35	571	0	111	444	0	15	13	0	0	229	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.46	0.46		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	427	858		387	1091		300	399			329	
v/s Ratio Prot		c0.31		0.02	c0.25			0.01				
v/s Ratio Perm	0.04			0.15			0.01				c0.17	
v/c Ratio	0.08	0.67		0.29	0.41		0.05	0.03			0.70	
Uniform Delay, d1	13.5	18.7		10.2	8.7		26.2	26.1			31.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	4.1		1.9	1.1		0.3	0.2			11.5	
Delay (s)	13.8	22.8		12.1	9.9		26.5	26.3			42.7	
Level of Service	B	C		B	A		C	C			D	
Approach Delay (s)		22.3			10.3			26.4			42.7	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9	
Intersection Capacity Utilization	68.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis<2027 Background> Weekday PM Peak Hour
1: Campeau Drive & Stonecroft Terrace 01-11-2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	497	580	10	7	9
Future Volume (Veh/h)	13	497	580	10	7	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	497	580	10	7	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	590				1108	585
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590				1108	585
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	985				229	511

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	510	590	16
Volume Left	13	0	7
Volume Right	0	10	9
cSH	985	1700	332
Volume to Capacity	0.01	0.35	0.05
Queue Length 95th (m)	0.3	0.0	1.2
Control Delay (s)	0.4	0.0	16.4
Lane LOS	A		C
Approach Delay (s)	0.4	0.0	16.4
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	496	16	6	543	7	1
Future Volume (Veh/h)	496	16	6	543	7	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	496	16	6	543	7	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.79	
vC, conflicting volume			512		1059	504
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			512		944	504
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			1053		230	568

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	512	549	8
Volume Left	0	6	7
Volume Right	16	0	1
cSH	1700	1053	248
Volume to Capacity	0.30	0.01	0.03
Queue Length 95th (m)	0.0	0.1	0.8
Control Delay (s)	0.0	0.2	20.0
Lane LOS		A	C
Approach Delay (s)	0.0	0.2	20.0
Approach LOS			C

Intersection Summary				
Average Delay			0.2	
Intersection Capacity Utilization			43.4%	ICU Level of Service A
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	372	14	31	524	6	10	1	39	3	0	9
Future Volume (Veh/h)	13	372	14	31	524	6	10	1	39	3	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	428	16	36	602	7	11	1	45	3	0	10
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.69						0.69	0.69		0.69	0.69	0.69
vC, conflicting volume	620			447			1158	1161	441	1202	1166	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			447			1007	1011	441	1070	1018	228
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			92	99	93	98	100	98
cM capacity (veh/h)	927			1065			143	157	618	121	156	559

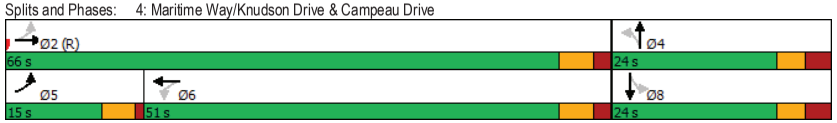
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	459	645	57	13
Volume Left	15	36	11	3
Volume Right	16	7	45	10
cSH	927	1065	365	305
Volume to Capacity	0.02	0.03	0.16	0.04
Queue Length 95th (m)	0.4	0.8	4.4	1.1
Control Delay (s)	0.5	0.9	16.7	17.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.9	16.7	17.3
Approach LOS			C	C

Intersection Summary				
Average Delay			1.7	
Intersection Capacity Utilization			52.4%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	57	399	151	562	13	13	38	11
Future Volume (vph)	57	399	151	562	13	13	38	11
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.7	27.7	27.7	24.0	24.0	24.0	24.0
Total Split (s)	15.0	66.0	51.0	51.0	24.0	24.0	24.0	24.0
Total Split (%)	16.7%	73.3%	56.7%	56.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	61.5	60.3	45.3	45.3	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.68	0.67	0.50	0.50	0.20	0.20	0.20	0.20
v/c Ratio	0.17	0.38	0.36	0.79	0.05	0.27	0.16	0.20
Control Delay	5.7	7.5	16.4	25.7	29.8	10.7	31.8	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.5	16.4	25.7	29.8	10.7	31.8	12.1
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.3		24.0		12.9		19.3
Approach LOS		A		C		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 67.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



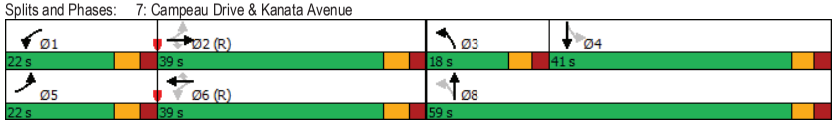
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	399	28	151	562	102	13	13	85	38	11	55
Future Volume (vph)	57	399	28	151	562	102	13	13	85	38	11	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1853		1790	1839		1770	1616		1797	1605	
Flt Permitted	0.15	1.00		0.49	1.00		0.71	1.00		0.69	1.00	
Satd. Flow (perm)	294	1853		927	1839		1322	1616		1300	1605	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	63	443	31	168	624	113	14	14	94	42	12	61
RTOR Reduction (vph)	0	3	0	0	7	0	0	75	0	0	49	0
Lane Group Flow (vph)	63	471	0	168	730	0	14	33	0	42	24	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.50	0.50		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	373	1241		466	925		264	323		260	321	
v/s Ratio Prot	0.02	c0.25			c0.40			0.02			0.02	
v/s Ratio Perm	0.09			0.18			0.01			c0.03		
v/c Ratio	0.17	0.38		0.36	0.79		0.05	0.10		0.16	0.08	
Uniform Delay, d1	10.5	6.6		13.6	18.4		29.1	29.4		29.8	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.9		2.2	6.8		0.4	0.6		1.3	0.5	
Delay (s)	11.5	7.5		15.7	25.2		29.5	30.0		31.1	29.7	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		7.9			23.4			30.0			30.2	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	67.9%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	52	358	244	161	508	90	326	347	103	431
Future Volume (vph)	52	358	244	161	508	90	326	347	103	431
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	22.0	39.0	39.0	22.0	39.0	39.0	18.0	59.0	41.0	41.0
Total Split (%)	18.3%	32.5%	32.5%	18.3%	32.5%	32.5%	15.0%	49.2%	34.2%	34.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1	35.1	35.1
Actuated g/C Ratio	0.40	0.27	0.27	0.40	0.27	0.27	0.44	0.44	0.29	0.29
v/c Ratio	0.17	0.52	0.39	0.42	0.85	0.17	0.83	0.64	0.43	0.89
Control Delay	20.0	40.3	6.2	23.2	55.5	2.2	43.5	28.9	41.3	58.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	40.3	6.2	23.2	55.5	2.2	43.5	28.9	41.3	58.5
LOS	B	D	A	C	E	A	D	C	D	E
Approach Delay		26.0			42.3			34.5		55.6
Approach LOS		C			D			C		E

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 39.1		Intersection LOS: D	
Intersection Capacity Utilization 96.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	358	244	161	508	90	326	347	172	103	431	80
Future Volume (vph)	52	358	244	161	508	90	326	347	172	103	431	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	2500	1615	1805	2200	1615	1805	1806		1805	1956	
Flt Permitted	0.12	1.00	1.00	0.29	1.00	1.00	0.33	1.00		0.43	1.00	
Satd. Flow (perm)	232	1900	1615	550	1900	1615	623	1806		815	1855	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	358	244	161	508	90	326	347	172	103	431	80
RTOR Reduction (vph)	0	0	177	0	0	65	0	15	0	0	6	0
Lane Group Flow (vph)	52	358	67	161	508	25	326	504	0	103	505	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Effective Green, g (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Actuated g/C Ratio	0.41	0.27	0.27	0.41	0.27	0.27	0.44	0.44		0.29	0.29	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	301	683	441	387	601	441	394	799		238	572	
v/s Ratio Prot	0.02	0.14		c0.05	c0.23		c0.08	0.28			0.26	
v/s Ratio Perm	0.05		0.04	0.11		0.02	c0.28			0.13		
v/c Ratio	0.17	0.52	0.15	0.42	0.85	0.06	0.83	0.63		0.43	0.88	
Uniform Delay, d1	25.3	37.0	33.0	24.5	41.2	32.2	23.3	25.9		34.4	40.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.9	0.7	3.3	13.7	0.2	17.8	3.8		5.6	17.8	
Delay (s)	26.5	39.8	33.8	27.8	54.9	32.4	41.1	29.6		40.0	58.3	
Level of Service	C	D	C	C	D	C	D	C		D	E	
Approach Delay (s)		36.5			46.5			34.1			55.2	
Approach LOS		D			D			C			E	

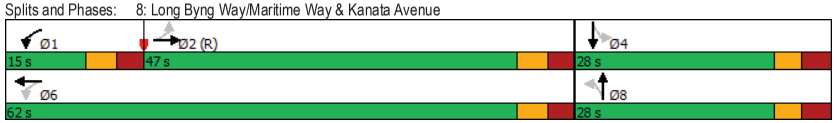
Intersection Summary					
HCM 2000 Control Delay	42.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		24.2	
Intersection Capacity Utilization	96.7%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	63	564	162	737	36	3	138	10
Future Volume (vph)	63	564	162	737	36	3	138	10
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	47.0	47.0	15.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	52.2%	52.2%	16.7%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.45	0.45	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.61	0.76	0.50	0.90	0.13	0.22		0.64
Control Delay	46.8	27.8	12.6	27.0	28.3	7.7		37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	46.8	27.8	12.6	27.0	28.3	7.7		37.9
LOS	D	C	B	C	C	A		D
Approach Delay		29.6		24.9		13.4		37.9
Approach LOS		C		C		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 26.9		Intersection LOS: C	
Intersection Capacity Utilization 88.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	564	30	162	737	204	36	3	93	138	10	49
Future Volume (vph)	63	564	30	162	737	204	36	3	93	138	10	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1849		1770	1802		1770	1591			1739	
Flt Permitted	0.13	1.00		0.18	1.00		0.65	1.00			0.73	
Satd. Flow (perm)	246	1849		334	1802		1214	1591			1311	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	68	606	32	174	792	219	39	3	100	148	11	53
RTOR Reduction (vph)	0	2	0	0	11	0	0	76	0	0	14	0
Lane Group Flow (vph)	68	636	0	174	1000	0	39	27	0	0	198	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.45	0.45		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	111	836		345	1115		292	383			316	
v/s Ratio Prot		0.34		0.05	c0.55			0.02				
v/s Ratio Perm	0.28			0.26			0.03				c0.15	
v/c Ratio	0.61	0.76		0.50	0.90		0.13	0.07			0.63	
Uniform Delay, d1	18.7	20.6		12.5	14.7		26.8	26.4			30.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Incremental Delay, d2	22.7	6.5		5.2	11.3		0.9	0.4			9.1	
Delay (s)	41.4	27.0		17.7	26.0		27.7	26.7			39.3	
Level of Service	D	C		B	C		C	C			D	
Approach Delay (s)		28.4			24.8			27.0			39.3	
Approach LOS		C			C			C			D	

Intersection Summary					
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	88.9%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	549	14	21	567	2	48	0	48	3	0	3
Future Volume (Veh/h)	5	549	14	21	567	2	48	0	48	3	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	549	14	21	567	2	48	0	48	3	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	569			563			1179	1177	556	1224	1183	568
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569			563			1179	1177	556	1224	1183	568
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			71	100	91	98	100	99
cM capacity (veh/h)	1003			1008			163	186	531	139	185	522

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	568	590	96	6
Volume Left	5	21	48	3
Volume Right	14	2	48	3
cSH	1003	1008	250	220
Volume to Capacity	0.00	0.02	0.38	0.03
Queue Length 95th (m)	0.1	0.5	13.8	0.7
Control Delay (s)	0.1	0.6	28.2	21.9
Lane LOS	A	A	D	C
Approach Delay (s)	0.1	0.6	28.2	21.9
Approach LOS			D	C

Intersection Summary				
Average Delay			2.6	
Intersection Capacity Utilization			57.2%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	585	16	11	521	53	29
Future Volume (Veh/h)	585	16	11	521	53	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	585	16	11	521	53	29
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.89	
vC, conflicting volume			601		1136	593
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			601		1091	593
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	94
cM capacity (veh/h)			976		209	506

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	601	532	82
Volume Left	0	11	53
Volume Right	16	0	29
cSH	1700	976	264
Volume to Capacity	0.35	0.01	0.31
Queue Length 95th (m)	0.0	0.3	10.2
Control Delay (s)	0.0	0.3	24.7
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	24.7
Approach LOS			C

Intersection Summary				
Average Delay			1.8	
Intersection Capacity Utilization			47.6%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	366	9	24	501	4	20	0	31	3	2	9
Future Volume (Veh/h)	3	366	9	24	501	4	20	0	31	3	2	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	421	10	28	576	5	23	0	36	3	2	10
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.78						0.78	0.78		0.78	0.78	0.78
vC, conflicting volume	592			434			1082	1083	431	1116	1086	592
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337			434			965	966	431	1008	969	336
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			87	100	94	98	99	98
cM capacity (veh/h)	954			1077			173	192	626	156	191	549

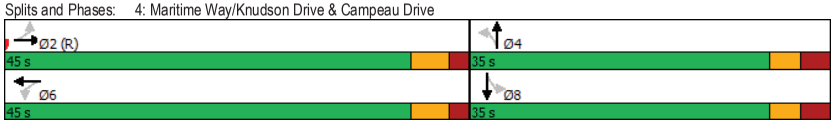
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	434	609	59	15
Volume Left	3	28	23	3
Volume Right	10	5	36	10
cSH	954	1077	310	313
Volume to Capacity	0.00	0.03	0.19	0.05
Queue Length 95th (m)	0.1	0.6	5.5	1.2
Control Delay (s)	0.1	0.7	19.3	17.1
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	19.3	17.1
Approach LOS			C	C

Intersection Summary					
Average Delay			1.7		
Intersection Capacity Utilization			55.2%	ICU Level of Service	B
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	47	642	91	433	17	16	159	10
Future Volume (vph)	47	642	91	433	17	16	159	10
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.7	23.7	23.7	23.7	28.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%	56.3%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.3	39.3	39.3	39.3	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.36	0.36	0.36	0.36
v/c Ratio	0.19	0.83	0.63	0.67	0.04	0.28	0.42	0.11
Control Delay	13.8	27.5	36.8	19.9	16.9	5.7	22.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	27.5	36.8	19.9	16.9	5.7	22.9	6.9
LOS	B	C	D	B	B	A	C	A
Approach Delay		26.6		22.4		6.8		18.4
Approach LOS		C		C		A		B

Intersection Summary		
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 65		
Control Type: Pretimed		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay: 22.0	Intersection LOS: C	
Intersection Capacity Utilization 86.3%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



HCM Signalized Intersection Capacity Analysis <2027 Total> Weekday AM Peak Hour
4: Maritime Way/Knudson Drive & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	642	13	91	433	75	17	16	144	159	10	52
Future Volume (vph)	47	642	13	91	433	75	17	16	144	159	10	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1788		1805	1700		1781	1485		1731	1573	
Flt Permitted	0.30	1.00		0.17	1.00		0.71	1.00		0.64	1.00	
Satd. Flow (perm)	548	1788		328	1700		1335	1485		1175	1573	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	52	713	14	101	481	83	19	18	160	177	11	58
RTOR Reduction (vph)	0	1	0	0	8	0	0	99	0	0	37	0
Lane Group Flow (vph)	52	726	0	101	556	0	19	79	0	177	32	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	4%	6%	0%	0%	7%	15%	0%	20%	7%	4%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Effective Green, g (s)	39.3	39.3		39.3	39.3		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	269	878		161	835		483	538		425	570	
v/s Ratio Prot		c0.41			0.33			0.05			0.02	
v/s Ratio Perm	0.09			0.31			0.01			c0.15		
v/c Ratio	0.19	0.83		0.63	0.67		0.04	0.15		0.42	0.06	
Uniform Delay, d1	11.4	17.4		15.0	15.4		16.5	17.2		19.1	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	8.8		17.1	4.2		0.2	0.6		3.0	0.2	
Delay (s)	13.0	26.2		32.0	19.6		16.6	17.7		22.1	16.8	
Level of Service	B	C		C	B		B	B		C	B	
Approach Delay (s)		25.4			21.5			17.6			20.6	
Approach LOS		C			C			B			C	

Intersection Summary				
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	86.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis <2027 Total> Weekday AM Peak Hour
5: Cordillera Street & Proposed Access 2 01-11-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	10	2	50	19	7
Future Volume (Veh/h)	36	10	2	50	19	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	36	10	2	50	19	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	76	22	26			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	76	22	26			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	925	1054	1588			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	46	52	26
Volume Left	36	2	0
Volume Right	10	0	7
cSH	951	1588	1700
Volume to Capacity	0.05	0.00	0.02
Queue Length 95th (m)	1.2	0.0	0.0
Control Delay (s)	9.0	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.3	0.0
Approach LOS	A		

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	14.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	12	4	2	10	16
Future Volume (Veh/h)	50	12	4	2	10	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	50	12	4	2	10	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	28	18	26			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28	18	26			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	984	1061	1588			

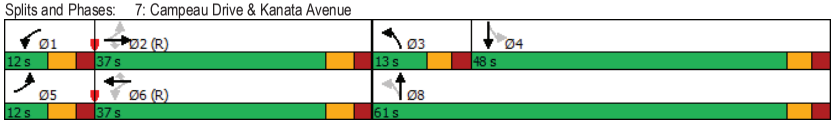
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	6	26
Volume Left	50	4	0
Volume Right	12	0	16
cSH	998	1588	1700
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	1.6	0.1	0.0
Control Delay (s)	8.8	4.9	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	4.9	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		6.1		
Intersection Capacity Utilization		13.8%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	161	564	283	69	192	61	122	362	118	412
Future Volume (vph)	161	564	283	69	192	61	122	362	118	412
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	12.0	37.0	37.0	12.0	37.0	37.0	13.0	61.0	48.0	48.0
Total Split (%)	10.9%	33.6%	33.6%	10.9%	33.6%	33.6%	11.8%	55.5%	43.6%	43.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1	42.1	42.1
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50	0.38	0.38
v/c Ratio	0.52	0.90	0.49	0.49	0.43	0.14	0.57	0.51	0.37	0.84
Control Delay	31.7	55.2	7.5	32.8	35.7	0.6	25.0	20.4	28.4	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	55.2	7.5	32.8	35.7	0.6	25.0	20.4	28.4	42.9
LOS	C	E	A	C	D	A	C	C	C	D
Approach Delay		38.1			28.4			21.5		40.2
Approach LOS		D			C			C		D

Intersection Summary			
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 33.8		Intersection LOS: C	
Intersection Capacity Utilization 88.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	564	283	69	192	61	122	362	57	118	412	101
Future Volume (vph)	161	564	283	69	192	61	122	362	57	118	412	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	2500	1553	1736	1776	1380	1752	1807		1770	1756	
Flt Permitted	0.53	1.00	1.00	0.13	1.00	1.00	0.16	1.00		0.49	1.00	
Satd. Flow (perm)	924	1900	1553	237	1776	1380	286	1807		919	1756	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	179	627	314	77	213	68	136	402	63	131	458	112
RTOR Reduction (vph)	0	0	211	0	0	49	0	5	0	0	8	0
Lane Group Flow (vph)	179	627	103	77	213	19	136	460	0	131	562	0
Heavy Vehicles (%)	10%	0%	4%	4%	7%	17%	3%	3%	3%	2%	4%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Effective Green, g (s)	36.6	30.8	30.8	36.6	30.8	30.8	55.1	55.1		42.1	42.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28	0.50	0.50		0.38	0.38	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	345	700	434	157	497	386	237	905		351	672	
v/s Ratio Prot	c0.03	c0.25		0.03	0.12		0.04	c0.25			c0.32	
v/s Ratio Perm	0.15		0.07	0.14		0.01	0.25			0.14		
v/c Ratio	0.52	0.90	0.24	0.49	0.43	0.05	0.57	0.51		0.37	0.84	
Uniform Delay, d1	29.1	38.1	30.5	29.0	32.4	28.9	20.2	18.4		24.4	30.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	16.4	1.3	10.5	2.7	0.2	9.7	2.0		3.0	11.8	
Delay (s)	34.6	54.4	31.8	39.6	35.1	29.2	30.0	20.4		27.5	42.6	
Level of Service	C	D	C	D	D	C	C	C		C	D	
Approach Delay (s)		44.9			34.9			22.6			39.8	
Approach LOS		D			C			C			D	

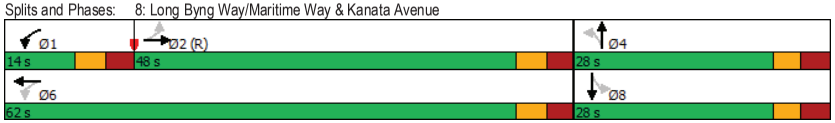
Intersection Summary				
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2	
Intersection Capacity Utilization	88.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	501	101	272	14	7	179	2
Future Volume (vph)	32	501	101	272	14	7	179	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	48.0	48.0	14.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	15.6%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.7	41.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.46	0.46	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.08	0.67	0.29	0.43	0.05	0.07		0.77
Control Delay	14.2	23.4	9.0	9.0	27.0	14.3		46.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	14.2	23.4	9.0	9.0	27.0	14.3		46.8
LOS	B	C	A	A	C	B		D
Approach Delay		22.9		9.0		18.5		46.8
Approach LOS		C		A		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 21.5		Intersection LOS: C	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



HCM Signalized Intersection Capacity Analysis <2027 Total> Weekday AM Peak Hour
8: Long Byng Way/Maritime Way & Kanata Avenue 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	501	20	101	272	158	14	7	20	179	2	60
Future Volume (vph)	32	501	20	101	272	158	14	7	20	179	2	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.89			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1770	1852		1770	1760		1770	1658			1736	
Flt Permitted	0.49	1.00		0.24	1.00		0.66	1.00			0.76	
Satd. Flow (perm)	917	1852		443	1760		1228	1658			1372	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	35	551	22	111	299	174	15	8	22	197	2	66
RTOR Reduction (vph)	0	2	0	0	23	0	0	17	0	0	13	0
Lane Group Flow (vph)	35	571	0	111	450	0	15	13	0	0	252	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	41.7	41.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.46	0.46		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	424	858		387	1089		296	399			330	
v/s Ratio Prot		c0.31		0.02	c0.26			0.01				
v/s Ratio Perm	0.04			0.15			0.01				c0.18	
v/c Ratio	0.08	0.67		0.29	0.41		0.05	0.03			0.76	
Uniform Delay, d1	13.5	18.7		10.2	8.8		26.2	26.1			31.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	4.1		1.9	1.2		0.3	0.2			15.4	
Delay (s)	13.9	22.8		12.1	9.9		26.6	26.3			47.2	
Level of Service	B	C		B	A		C	C			D	
Approach Delay (s)		22.3			10.3			26.4			47.2	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis <2027 Total> Weekday PM Peak Hour
1: Proposed Access 1/Stonecroft Terrace & Campeau Drive 01-11-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	532	64	43	602	10	35	0	35	7	0	9
Future Volume (Veh/h)	13	532	64	43	602	10	35	0	35	7	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	532	64	43	602	10	35	0	35	7	0	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	612			596			1292	1288	564	1318	1315	607
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	612			596			1292	1288	564	1318	1315	607
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			73	100	93	94	100	98
cM capacity (veh/h)	967			980			131	155	525	120	149	496

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	609	655	70	16
Volume Left	13	43	35	7
Volume Right	64	10	35	9
cSH	967	980	210	209
Volume to Capacity	0.01	0.04	0.33	0.08
Queue Length 95th (m)	0.3	1.1	11.1	2.0
Control Delay (s)	0.4	1.1	30.4	23.6
Lane LOS	A	A	D	C
Approach Delay (s)	0.4	1.1	30.4	23.6
Approach LOS			D	C

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	66.6%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	531	51	36	586	29	22
Future Volume (Veh/h)	531	51	36	586	29	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	531	51	36	586	29	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				384		
pX, platoon unblocked					0.72	
vC, conflicting volume			582		1214	556
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			582		1106	556
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		82	96
cM capacity (veh/h)			992		163	530

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	582	622	51
Volume Left	0	36	29
Volume Right	51	0	22
cSH	1700	992	232
Volume to Capacity	0.34	0.04	0.22
Queue Length 95th (m)	0.0	0.9	6.5
Control Delay (s)	0.0	1.0	24.8
Lane LOS		A	C
Approach Delay (s)	0.0	1.0	24.8
Approach LOS			C

Intersection Summary				
Average Delay			1.5	
Intersection Capacity Utilization			70.3%	ICU Level of Service C
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	428	14	31	597	6	10	1	39	3	0	9
Future Volume (Veh/h)	13	428	14	31	597	6	10	1	39	3	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	492	16	36	686	7	11	1	45	3	0	10
Pedestrians		2			2			3			11	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.64						0.64	0.64		0.64	0.64	0.64
vC, conflicting volume	704			511			1306	1309	505	1350	1314	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	256			511			1198	1202	505	1266	1209	254
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			89	99	92	96	100	98
cM capacity (veh/h)	837			1007			97	112	569	81	111	500

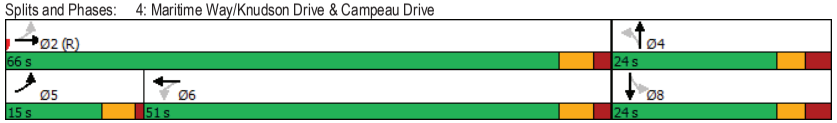
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	523	729	57	13
Volume Left	15	36	11	3
Volume Right	16	7	45	10
cSH	837	1007	284	228
Volume to Capacity	0.02	0.04	0.20	0.06
Queue Length 95th (m)	0.4	0.9	5.9	1.4
Control Delay (s)	0.5	0.9	20.9	21.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.9	20.9	21.7
Approach LOS			C	C

Intersection Summary				
Average Delay			1.8	
Intersection Capacity Utilization			56.9%	ICU Level of Service B
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	64	443	151	608	13	13	38	11
Future Volume (vph)	64	443	151	608	13	13	38	11
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.7	27.7	27.7	24.0	24.0	24.0	24.0
Total Split (s)	15.0	66.0	51.0	51.0	24.0	24.0	24.0	24.0
Total Split (%)	16.7%	73.3%	56.7%	56.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.7	5.7	5.7	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	61.5	60.3	45.3	45.3	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.68	0.67	0.50	0.50	0.20	0.20	0.20	0.20
v/c Ratio	0.21	0.42	0.38	0.84	0.05	0.27	0.16	0.23
Control Delay	6.2	8.0	16.9	29.4	29.9	10.7	31.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	8.0	16.9	29.4	29.9	10.7	31.8	11.1
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.8		27.2		12.9		17.7
Approach LOS		A		C		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Maritime Way/Knudson Drive & Campeau Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	443	31	151	608	102	13	13	85	38	11	69
Future Volume (vph)	64	443	31	151	608	102	13	13	85	38	11	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1853		1791	1843		1771	1616		1797	1595	
Flt Permitted	0.12	1.00		0.47	1.00		0.70	1.00		0.69	1.00	
Satd. Flow (perm)	226	1853		884	1843		1304	1616		1300	1595	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	71	492	34	168	676	113	14	14	94	42	12	77
RTOR Reduction (vph)	0	3	0	0	6	0	0	75	0	0	62	0
Lane Group Flow (vph)	71	523	0	168	783	0	14	33	0	42	27	0
Confl. Peds. (#/hr)	21		8	8		21	8		2	2		8
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.3	60.3		45.3	45.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.50	0.50		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	335	1241		444	927		260	323		260	319	
v/s Ratio Prot	0.02	c0.28			c0.42			0.02			0.02	
v/s Ratio Perm	0.12			0.19			0.01			c0.03		
v/c Ratio	0.21	0.42		0.38	0.84		0.05	0.10		0.16	0.09	
Uniform Delay, d1	12.1	6.8		13.7	19.3		29.1	29.4		29.8	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.1		2.4	9.3		0.4	0.6		1.3	0.5	
Delay (s)	13.6	7.9		16.2	28.6		29.5	30.0		31.1	29.8	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		8.6			26.4			30.0			30.2	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	70.3%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	3	6	30	73	15
Future Volume (Veh/h)	13	3	6	30	73	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	3	6	30	73	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	122	80	88			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	122	80	88			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	869	980	1508			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	36	88
Volume Left	13	6	0
Volume Right	3	0	15
cSH	888	1508	1700
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (m)	0.4	0.1	0.0
Control Delay (s)	9.1	1.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	1.3	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		16.7%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	13	22	6	3	51
Future Volume (Veh/h)	30	13	22	6	3	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	13	22	6	3	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	78	28	54			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78	28	54			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	911	1046	1551			

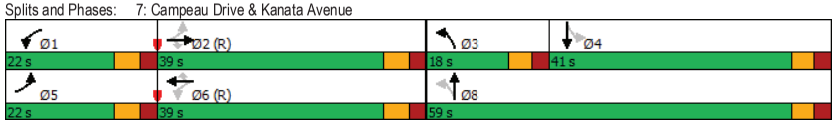
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	28	54
Volume Left	30	22	0
Volume Right	13	0	51
cSH	948	1551	1700
Volume to Capacity	0.05	0.01	0.03
Queue Length 95th (m)	1.1	0.3	0.0
Control Delay (s)	9.0	5.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	5.8	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization		18.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	65	358	244	161	508	102	326	421	109	476
Future Volume (vph)	65	358	244	161	508	102	326	421	109	476
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		3	8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	4	4
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	37.0	37.0	11.2	37.0	37.0	10.9	29.9	29.9	29.9
Total Split (s)	22.0	39.0	39.0	22.0	39.0	39.0	18.0	59.0	41.0	41.0
Total Split (%)	18.3%	32.5%	32.5%	18.3%	32.5%	32.5%	15.0%	49.2%	34.2%	34.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1	35.1	35.1
Actuated g/C Ratio	0.40	0.27	0.27	0.40	0.27	0.27	0.44	0.44	0.29	0.29
v/c Ratio	0.22	0.52	0.39	0.42	0.85	0.19	0.83	0.73	0.60	0.97
Control Delay	20.5	40.3	6.2	23.2	55.5	3.1	43.5	32.7	52.1	73.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	40.3	6.2	23.2	55.5	3.1	43.5	32.7	52.1	73.5
LOS	C	D	A	C	E	A	D	C	D	E
Approach Delay		25.9			41.8			36.5		70.0
Approach LOS		C			D			D		E

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 43.0		Intersection LOS: D	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 7: Campeau Drive & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	358	244	161	508	102	326	421	172	109	476	86
Future Volume (vph)	65	358	244	161	508	102	326	421	172	109	476	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	2500	1615	1805	2200	1615	1805	1817		1805	1956	
Flt Permitted	0.12	1.00	1.00	0.29	1.00	1.00	0.33	1.00		0.33	1.00	
Satd. Flow (perm)	232	1900	1615	550	1900	1615	623	1817		623	1856	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	358	244	161	508	102	326	421	172	109	476	86
RTOR Reduction (vph)	0	0	177	0	0	74	0	12	0	0	6	0
Lane Group Flow (vph)	65	358	67	161	508	28	326	581	0	109	556	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Effective Green, g (s)	48.6	32.8	32.8	48.6	32.8	32.8	53.1	53.1		35.1	35.1	
Actuated g/C Ratio	0.41	0.27	0.27	0.41	0.27	0.27	0.44	0.44		0.29	0.29	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.9		5.9	5.9	
Lane Grp Cap (vph)	301	683	441	387	601	441	394	804		182	572	
v/s Ratio Prot	0.03	0.14		c0.05	c0.23		0.08	c0.32			c0.28	
v/s Ratio Perm	0.06		0.04	0.11		0.02	0.28			0.17		
v/c Ratio	0.22	0.52	0.15	0.42	0.85	0.06	0.83	0.72		0.60	0.97	
Uniform Delay, d1	25.5	37.0	33.0	24.5	41.2	32.2	23.3	27.4		36.4	42.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	2.9	0.7	3.3	13.7	0.3	17.8	5.6		13.7	31.5	
Delay (s)	27.1	39.8	33.8	27.8	54.9	32.5	41.1	33.0		50.1	73.4	
Level of Service	C	D	C	C	D	C	D	C		D	E	
Approach Delay (s)		36.4			46.3			35.9			69.7	
Approach LOS		D			D			D			E	

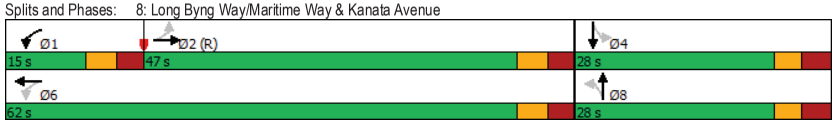
Intersection Summary					
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.83				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		24.2	
Intersection Capacity Utilization	99.4%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	63	564	162	737	36	3	151	10
Future Volume (vph)	63	564	162	737	36	3	151	10
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.3	33.3	11.3	33.3	28.0	28.0	28.0	28.0
Total Split (s)	47.0	47.0	15.0	62.0	28.0	28.0	28.0	28.0
Total Split (%)	52.2%	52.2%	16.7%	68.9%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3		6.3
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	55.7	55.7	21.7	21.7		21.7
Actuated g/C Ratio	0.45	0.45	0.62	0.62	0.24	0.24		0.24
v/c Ratio	0.76	0.76	0.50	0.93	0.13	0.22		0.70
Control Delay	74.0	27.8	12.6	30.5	28.3	7.7		41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	74.0	27.8	12.6	30.5	28.3	7.7		41.4
LOS	E	C	B	C	C	A		D
Approach Delay		32.2		27.9		13.4		41.4
Approach LOS		C		C		B		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 29.7		Intersection LOS: C	
Intersection Capacity Utilization 91.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 8: Long Byng Way/Maritime Way & Kanata Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	564	30	162	737	232	36	3	93	151	10	52
Future Volume (vph)	63	564	30	162	737	232	36	3	93	151	10	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1849		1770	1796		1770	1591			1740	
Flt Permitted	0.11	1.00		0.18	1.00		0.65	1.00			0.73	
Satd. Flow (perm)	198	1849		334	1796		1211	1591			1307	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	68	606	32	174	792	249	39	3	100	162	11	56
RTOR Reduction (vph)	0	2	0	0	13	0	0	76	0	0	13	0
Lane Group Flow (vph)	68	636	0	174	1028	0	39	27	0	0	216	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Effective Green, g (s)	40.7	40.7		55.7	55.7		21.7	21.7			21.7	
Actuated g/C Ratio	0.45	0.45		0.62	0.62		0.24	0.24			0.24	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.3	6.3			6.3	
Lane Grp Cap (vph)	89	836		345	1111		291	383			315	
v/s Ratio Prot		0.34		0.05	c0.57			0.02				
v/s Ratio Perm	0.34			0.26			0.03				c0.17	
v/c Ratio	0.76	0.76		0.50	0.93		0.13	0.07			0.69	
Uniform Delay, d1	20.6	20.6		12.5	15.3		26.8	26.4			31.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Incremental Delay, d2	45.8	6.5		5.2	14.2		1.0	0.4			11.5	
Delay (s)	66.4	27.0		17.7	29.5		27.7	26.7			42.2	
Level of Service	E	C		B	C		C	C			D	
Approach Delay (s)		30.8			27.8			27.0			42.2	
Approach LOS		C			C			C			D	

Intersection Summary					
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		18.9	
Intersection Capacity Utilization	91.5%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

APPENDIX H

City of Ottawa Zoning By-law, Excerpts

(d) where a residential use building has an active entrance located within 600 metres of a rapid-transit station shown on Schedule 2A or 2B, the minimum parking required by Table 101 for the residential use is calculated using the rates for Area X.

(e) despite (d), where the lot is separated from the rapid transit station by a highway, grade-separated arterial roadway, railway or railway yard, watercourse, private lands or any other major obstacle such that the walking distance from the nearest active entrance to the rapid transit station is increased to beyond 800 metres, the reduced minimum parking rate specified in (d) does not apply.

(f) despite Table 101, where a lot containing a hospital, office, shopping centre or training centre:

(i) is located within 600m of a rapid-transit station;

(ii) is located within 800m walking distance of a rapid-transit station along public streets and paths; and

(iii) where the hospital, office, shopping centre or training centre does not meet 5(a) and 5(b), above,

the minimum parking requirements of Table 101A apply. (By-law 2016-249)

TABLE 101A MINIMUM PARKING REQUIREMENTS 400-800 M WALK FROM RAPID TRANSIT, SELECTED USE (By-law 2016-249)

	I	II	III	IV
Row	**Land Use**	**Area B on Schedule 1A**	**Area C on Schedule 1A**	**Area D on Schedule 1A**
N43a	Hospital	1.2 per 100 m^2 of gross floor area	1.2 per 100 m^2 of gross floor area	1.2 per 100 m^2 of gross floor area
N59a	Office	1.8 per 100 m^2 of gross floor area	2.3 per 100 m^2 of gross floor area	2.3 per 100 m^2 of gross floor area
N83a	Shopping Centre	3 per 100 m^2 of gross leasable floor area	3.4 per 100 m^2 of gross leasable floor area	3.4 per 100 m^2 of gross leasable floor area
N92a	Training Centre	1.6 per 100 m^2 of gross floor area	2.3 per 100 m^2 of gross floor area	2.3 per 100 m^2 of gross floor area

(6) Despite Subsection (1):

(a) in the case of a shopping centre,

(i) where a shopping centre provides a dedicated bus loading area on the shopping centre site, the parking required by Table 101 may be reduced by 25 parking spaces for each bus loading area so provided.

TABLE 101 – MINIMUM PARKING SPACE RATES

	I	II	III	IV	V
Row	**Land Use**	**Area X and Y on Schedule 1A**	**Area B on Schedule 1A**	**Area C on Schedule 1A**	**Area D on Schedule 1A**
N75	Restaurant- Fast Food (By-law 2011-124)	5 per 100 m^2 of gross floor area	3 for first 50 m^2 of gross floor area plus 10 per 100 m^2 of gross floor area over 50 m^2 of gross floor area	10 per 100 m^2 of gross floor area	10 per 100 m^2 of gross floor area
N76	Restaurant- Full Service	5 per 100 m^2 of gross floor area	3 for first 50 m^2 of gross floor area plus 10 per 100 m^2 of gross floor area over 50 m^2 of gross floor area	10 per 100 m^2 of gross floor area	10 per 100 m^2 of gross floor area
N77	Restaurant- Take Out	2.5 per 100 m^2 of gross floor area	1.5 for first 50 m^2 of gross floor area plus 5 per 100 m^2 of gross floor area over 50 m^2 of gross floor area	5 per 100 m^2 of gross floor area	5 per 100 m^2 of gross floor area
N78	Retail Food Store	1.25 per 100 m^2 of gross floor area	2.5 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area
N78a (By-law 2016-336)	Retail Food Store, limited to a farmers' market (By-law 2016-131)	None	None	None	None
N79	Retail Store	1.25 per 100 m^2 of gross floor area	2.5 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area
N80 (By-law 2017-303)	School, secondary	1.25 per classroom (includes portables)	2 per classroom (includes portables)	2 per classroom (includes portables)	3 per classroom (includes portables)
N81	School, other	0.75 per classroom (includes portables)	1.5 per classroom (includes portables)	1.5 per classroom (includes portables)	1.5 per classroom (includes portables)
N82	Service and Repair Shop	1.25 per 100 m^2 of gross floor area	2.5 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area	3.4 per 100 m^2 of gross floor area

TABLE 101 – MINIMUM PARKING SPACE RATES (By-law 2018-206) (By-law 2016-249)

	I	II	III	IV	V
Row	**Land Use**	**Area X and Y on Schedule 1A**	**Area B on Schedule 1A**	**Area C on Schedule 1A**	**Area D on Schedule 1A**
R1	Bed and Breakfast	1 per dwelling unit plus 1 for the first four guest rooms plus 0.45 for each additional guest room over 4	1 per dwelling unit plus 1 for the first four guest rooms plus 0.45 for each additional guest room over 4	1 per dwelling unit plus 1 per guest room	1 per dwelling unit plus 1 per guest room
R2 (By-law 2016-356)	Coach house	None	None	None	None
R3	Diplomatic Mission	2 per dwelling unit	2 per dwelling unit	2 per dwelling unit	2 per dwelling unit
R4 (By-law 2016-336)	Dwelling, Detached	1 per dwelling unit or oversize dwelling unit (By-law 2018-206)	1 per dwelling unit or oversize dwelling unit (By-law 2018-206)	1 per dwelling unit or oversize dwelling unit (By-law 2018-206)	1 per dwelling unit or oversize dwelling unit (By-law 2018-206)
R5 (By-law 2016-336)	Dwelling, Duplex	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit
R6 (By-law 2016-336)	Dwelling, Linked-detached	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit
R7 (By-law 2016-336)	Dwelling, Semi-detached	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit
R8 (By-law 2016-336)	Dwelling, Three-unit	0.5 per dwelling unit	0.5 per dwelling unit	1.2 per dwelling unit	1 per dwelling unit
R9	Dwelling, Townhouse	0.75 per dwelling unit	0.75 per dwelling unit	1 per dwelling unit	1 per dwelling unit
R10	Dwelling, Stacked	0.5 per dwelling unit	0.5 per dwelling unit	1.2 per dwelling unit	1 per dwelling unit
R11	Dwelling, Low-rise Apartment	0.5 per dwelling unit	0.5 per dwelling unit	1.2 per dwelling unit	1 per dwelling unit

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TABLE 101 – MINIMUM PARKING SPACE RATES

	I	II	III	IV	V
Row	**Land Use**	**Area X and Y on Schedule 1A**	**Area B on Schedule 1A**	**Area C on Schedule 1A**	**Area D on Schedule 1A**
R12	Dwelling, Mid-high Rise Apartment	0.5 per dwelling unit	0.5 per dwelling unit	1.2 per dwelling unit	1 per dwelling unit
R13	[reserved]				
R14	Dwelling units in a mixed-use building, on lots abutting Bank Street, Bronson Avenue, Elgin Street and Somerset Street West, north of the Queensway	None	N/A	N/A	N/A
R15	Dwelling units in a mixed-use building, all other cases	0.5 per dwelling unit	0.5 per dwelling unit	1 per dwelling unit	1 per dwelling unit
R16	Garden Suite	None	None	None	None
R17	Group Home	1 per 100 m^2 of gross floor area, minimum of 1	1 per 100 m^2 of gross floor area, minimum of 1	1 per 100 m^2 of gross floor area, minimum of 1	1 per 100 m^2 of gross floor area, minimum of 1
R18	Home-based Business	None	None	1 per home-based business	1 per home-based business
R19	Planned Unit Development	As per dwelling type	As per dwelling type	As per dwelling type	As per dwelling type
R20	Retirement Home	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services
R21	Retirement Home, converted	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services	0.25 per dwelling unit or rooming unit plus 1 per 100 m^2 of gross floor area used for medical, health or personal services

Table 102- MINIMUM VISITOR PARKING SPACE RATES (By-law 2016-249)

COLUMN 1	COLUMN II	COLUMN III
Land Use	**Area X, Area Y and Area Z on Schedule 1A**	**Area B, Area C and Area D on Schedule 1A**
Apartment dwelling, low-rise or mid-high-rise	0.1 per dwelling unit	0.2 per dwelling unit
Dwelling units in a mixed-use building	0.1 per dwelling unit	0.2 per dwelling unit
Stacked dwelling	0.1 per dwelling unit	0.2 per dwelling unit
Townhouse dwelling	0.1 per dwelling unit	0.2 per dwelling unit

(7) Despite this section, within the area shown as Area A on Schedule 361, being the Centrepointe Community, subsections 102(2), 102(3) and 102(5) do not apply. (By-law 2016-249)

Maximum Limit on Number of Parking Spaces Near Rapid Transit Stations (Section 103)

103. (1) Where a lot is located within 600 metres of a rapid transit station shown on Schedule 2A or Schedule 2B of this by-law, the number of motor vehicle parking spaces provided for a use on that lot must not exceed the maximum limits specified in Table 103. The 600 metre distance is measured as the shortest perpendicular distance between the lot lines of the lot containing the use and the centre of the rapid transit station platform. (By-law 2015-190)

(2) Despite subsection (1), where the lot is separated from the rapid transit station by a highway, grade-separated arterial roadway, railway yard, watercourse, private lands or any other major obstacle such that the actual walking distance to the rapid transit station is increased to beyond 800 metres, the maximum limit on the number of parking spaces specified in Table 103 does not apply.

(3) Despite subsection (1), where parking spaces in excess of the maximum parking limit result solely from a change of use, these excess parking spaces may be retained.

(4) Where the parking currently provided for a use exceeds the maximum parking limits specified in Table 103, the parking spaces provided in excess of the maximum parking limit may be eliminated. However, in no case may the number of parking spaces provided be less than that specified for that use in Table 101.

(5) Despite subsection (1), the provisions of this section do not apply to a rapid-transit network park and ride facility.

Table 103 - MAXIMUM NUMBER OF PARKING SPACES PERMITTED

I	Maximum Number of Parking Spaces Permitted

Land Use	II Area A, Schedule 1 and MC Zone at Tunney's Pasture (Central Area)	III Area B, Schedule 1 other than MC Zone at Tunney's Pasture (Inner City Area)	IV Areas C and D, Schedule 1 (Suburban and Rural Area)
(a) Apartment Dwelling; Mid Rise, Apartment Dwelling, High Rise, and Apartment Dwelling, Low Rise (By-law 2014-292)	1.5 per dwelling unit (combined total of resident and visitor parking)	1.75 per dwelling unit (combined total of resident and visitor parking)	
(b) Dwelling Units, in the same building as a non-residential use			
(c) Hospital	1.6 per 100m^2 of gross floor area		
(d) Medical Facility	5.0 per 100m^2 of gross floor area		
(e) Office	1.0 per 100 m^2 of gross floor area	2.2 per 100m^2 of gross floor area	2.7 per 100m^2 of gross floor area
(f) Post Secondary Educational Institution	1.2 per 100m^2 of gross floor area		1.5 per 100m^2 of gross floor area
(g) Research And Development Centre; Technology Industry	1.0 per 100m^2 of gross floor area		
(h) Retail Store; Retail Food Store	1.0 per 100m^2 of gross floor area	3.6 per 100m^2 of gross floor area	4.0 per 100m^2 of gross floor area
(i) Shopping Centre	1.0 per 100m^2 of gross leasable floor area	3.6 per 100m^2 of gross leasable floor area	4.0 per 100m^2 of gross leasable floor area

Shared Parking Provisions (Section 104)

104. (1) Where more than one of the uses listed in Table 104 are located on the same lot, parking spaces may be shared between the uses, and the cumulative total of parking spaces required for all the uses on the lot may be reduced from that required in Section 101 to the amount calculated using Table 104.

(2) The number of parking spaces required for the lot under this section is calculated as follows:

(a) multiply the number of parking spaces required for the land use in Section 101 by the percentages shown in Table 104 for that use in each of the eight time periods;

(b) repeat (a) for each of the uses on the lot;

(c) for each time period add the parking space calculations for all the uses to arrive at a cumulative total; and

(d) the largest cumulative total for all the uses in any time period is the number of parking spaces required for the lot.

(3) Despite Subsection (1), this section does not apply to a shopping centre.

(d) In the case of a Duplex Dwelling, Three-unit Dwelling or Low-rise Apartment Dwelling located within the area shown as Area A on Schedule 321, where two parking spaces are required under this By-law , one of the required parking spaces may be parked in tandem on a driveway that leads to a required parking space. (By-law 2014-189)

(e) 25% of the required motor vehicle parking spaces for an automobile service station need not have direct, unobstructed access to a public street.

(2) Despite Section 100(5), attendant parking is permitted in the Area A on Schedule 1 (Central Area) for a hotel, or in a principal use or accessory use parking garage or parking lot, provided: (By-law 2011-124)

(a) the regulations with respect to minimum parking space dimensions and aisle widths do not apply and no minimum dimensions are required, except that at least one aisle is required, extending from the parking garage driveway to within the length of a parking space of either the rear lot line or side lot line; and

(b) the regulations with respect to tandem parking do not apply, and tandem parking is permitted without any restrictions as to the percentage of tandem-parked vehicles that is permitted or to the number of parked vehicles which obstruct other parked vehicles.

(3) In the case of an apartment building, mid – high rise and low rise and stacked dwelling, where a dwelling unit has a driveway accessing its own required parking space, additional required parking may be located in tandem in the driveway.(By-law 2016-249)

Parking Space Provisions (Section 106)

106. (1) A motor vehicle parking space must have:

(a) a minimum width of 2.6 metres and a maximum width of 3.1 metres; and (By-law 2018-155)

(b) a minimum length of 5.2 metres, except for parallel parking where a minimum length of 6.7 metres is required.

(2) Despite subsection (1), disabled parking spaces must comply with the provisions of the City of Ottawa Traffic and Parking By-law.

(3) Despite subsection (1), parking spaces, other than a visitor and parallel parking spaces, may be reduced in size for the following cases:

(a) up to 40% of the required parking spaces may be reduced to a minimum width of 2.4 metres and a minimum length of 4.6 metres;

(i) where the parking spaces are located in a parking lot or parking garage containing more than 20 spaces, and

(ii) provided any reduced length space is clearly identified for small cars only;

(b) up to 50% of the required and provided parking spaces may be reduced to a minimum width of 2.4 metres:

(i) where 50 or more spaces are required for a broadcasting studio, heavy industrial use, light industrial use, office, post secondary educational institution, production studio, research and development centre and technology industry; and

(ii) for an apartment dwelling, low rise, an apartment dwelling, mid rise, apartment dwelling, high rise or a mixed use building containing up to 20 dwelling units; (By-law 2014-292)

(c) up to 100% of the provided parking spaces for a rapid transit network, including a park and ride facility may be reduced to a minimum width of 2.4 metres. (By-law 2012-334)

(4) Despite subsection (3), where a parking space is located abutting or near a wall, column or other similar surface that obstructs the opening of the doors of a parked vehicle or limits access to a parking space, that parking space must have a minimum width of 2.6 metres.

(5) Despite subsection (1), a parking space complying with the provisions of the section may be divided into two spaces for small vehicles provided:

(a) the parking space is not parking required by this by-law;

(b) each of the two small vehicle spaces created has direct access to an aisle or a driveway, and

(c) no more than 5% of total number of parking spaces are divided into spaces for small vehicles.

(d) the parking space must be located in a parking lot. (By-law 2008-462)

Aisle and Driveway Provisions (Section 107)

107. (1) The following regulations apply to parking lots and parking garages, whether as principal or accessory uses:

(a) A driveway providing access to a parking lot or parking garage must have a minimum width of;

(i) three metres for a single traffic lane, and

(ii) in the case of a parking lot, 6.7 metres for a double traffic lane; and (By-law 2016-249)

(iii) in the case of a parking garage, 6.0 metres for a double traffic lane. (By-law 2016-249)

(aa) Despite clause 107(1)(a), in the case of an apartment dwelling, low-rise, stacked dwelling, or an apartment mid-rise, or apartment high-rise, the maximum permitted width for a double traffic lane that leads to:

(i) Less than 20 parking spaces: 3.6m

(ii) 20 or more parking spaces: 6.7m (By-law 2014-289)

(b) All driveways and aisles providing access to or located within a parking lot or parking garage must have a minimum vertical clearance clear of obstructions such as signs and other structures of;

(i) for a parking lot - two metres, and

(ii) for a parking garage - in accordance with the *Building Code*, as amended .

(c) An aisle providing access to parking spaces in a parking lot or parking garage:

(i) must comply with the minimum required width specified in Table 107;

Bicycle Parking Space Rates and Provisions (Section 111)

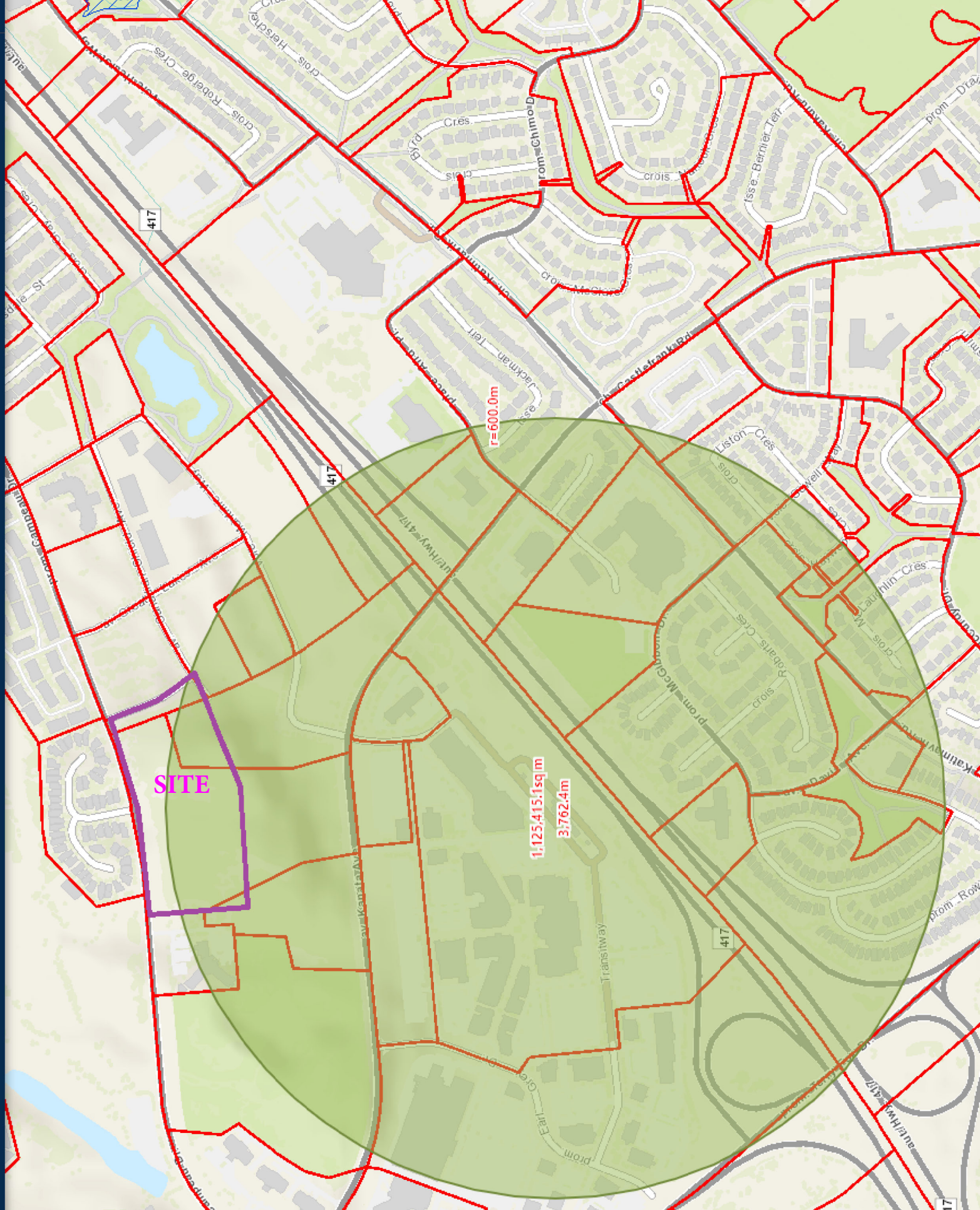
111. Minimum Parking Rates

(1) Bicycle parking must be provided for the land uses and at the rate set out in Table 111A for lands located in Areas A (Central Area), B (Inner City Area) and C (Suburban Area) on Schedule 1 and in the villages of Ashton, Burritt's Rapids, Carlsbad Springs, Carp, Constance Bay, Cumberland, Dunrobin, Fallowfield, Fitzroy Harbour, Galetta, Greely, Kars, Kenmore, Kinburn, Manotick, Marionville, Metcalfe, Munster, Navan, North Gower, Notre Dame des Champs, Osgoode, Richmond, Sarsfield, Vars and Vernon located in Area D on Schedule 1.

(2) Where a building contains more than one use, bicycle parking must be provided for that building in accordance with the proportion of the building occupied by each use and the rate set out in Table 111A for each use.

TABLE 111A - BICYCLE PARKING SPACE RATES

I LAND USE	II MINIMUM NUMBER OF SPACES REQUIRED
(a) retirement home; retirement home, converted; rooming house; rooming unit other than within a post secondary educational facility (By-law 2018-206)	0.25 per dwelling unit or rooming unit
(b) (i) apartment building, low rise; apartment dwelling, mid rise; apartment dwelling, high rise, dwelling unit in the same building as a non-residential use; stacked dwelling without a garage or carport for each dwelling unit (By-law 2014-292) (ii) stacked dwellings with a garage or carport for each dwelling unit (OMB File #PL080959 issued November 5, 2009)	0.50 per dwelling unit no bicycle parking required (OMB File #PL080959 issued November 9, 2009)
(c) rooming unit or dwelling unit within a post secondary educational facility	0.75 per dwelling unit or rooming unit
(d) school	1 per 100 m^2 of gross floor area
(e) bank; convenience store; day care; office; post office; post secondary educational institution; restaurant; retail food store; retail store	1 per 250 m^2 of gross floor area
(f) library; municipal service centre; personal service business; retail food store 8,000 m^2 of gross floor area or greater; retail store 8,000 m^2 of gross floor area or greater; service or repair shop; shopping centre	1 per 500 m^2 of gross floor area
(g) airport; bus station; hospital; hotel; light industrial use; medical facility; technology industry; train station	1 per 1000 m^2 of gross floor area
(h) animal hospital; storage yard; truck transport terminal; warehouse	1 per 2000 m^2 of gross floor area



The Area within 600m of Terry Fox Rapid Transit Station

private approach.

Section 20

Where a private approach has been approved for the exclusive use for vehicles of the Ottawa Fire Department, such private approach shall be constructed according to City standards for access to fire routes.

Section 21

Every subsurface melting device installed under a private approach shall be maintained at the expense of the owner of the property adjoining or connected with the private approach.

Section 22 to 24 - Design, construction and location of private approaches

Section 22

Every subsurface melting device installed under a private approach shall be maintained at the expense of the owner of the property adjoining or connected with the private approach.

Section 23

Where the owner employs a contractor, the owner shall be liable for the costs and expenses of all work done by the contractor on his or her behalf.

Section 24

1. Despite any other provisions of this by-law, no person shall construct a private approach that, in the opinion of the General Manager, will create hazardous conditions due to inadequate sight distance, horizontal or vertical alignments or other considerations.
2. The General Manager may specify a location and design for a private approach that, in the General Manager's opinion, will eliminate or minimize such hazardous condition.
3. Despite any other provisions of this by-law, the General Manager may alter the direction of the grade and horizontal distances on which the direction of the grade applies, provided such alterations do not create any drainage issues or hazardous conditions.

Section 25 - Private approaches for public and institutional purposes, commercial and industrial properties and multiple residential dwellings

1. The design, construction and location of private approaches for properties used for public purposes, institutional purposes, commercial purposes, industrial purposes or multiple residential dwellings shall be in accordance with the following:
    1. The maximum number of private approaches permitted shall be as follows:
        1. less than 20 metres of frontage, one (1) two-way private approach;
        2. 20 metres to 34 metres of frontage, one (1) two-way private approach or two (2) one-way private approaches;
        3. 35 metres to 45 metres of frontage, two (2) two-way private approaches or two (2) one-way private approaches;
        4. 46 metres to 150 metres of frontage, one two-way private approach and two one-way private approaches or two two-way private approaches; and
        5. for each additional 90 metres of frontage in excess of 150 metres, one two-way private approach or two one-way private approaches.

2. On a corner lot or a lot abutting on more than one highway, the provisions of paragraph (a) hereof shall apply to each frontage separately.
3. No private approach intended for two-way vehicular traffic shall exceed 9 metres in width at the street line, and at the curb line or roadway edge.
4. No private approach intended for one-way vehicular traffic shall exceed 7.5 metres in width at the street (2015-207) line, and at the curb line or roadway edge.
5. Despite the provisions of paragraphs (c) and (d) hereof, private approaches in excess of 9 metres in width at the street line, and at the curb line or edge of roadway, may be permitted for off-street bus loading areas, transport loading areas and stations operated by the Ottawa Fire Department.
6. Despite clauses (a), (c) and (d), in the Mature Neighbourhoods the maximum widths of a private approach shall be determined in accordance with Section 139(10) of the Zoning By-law.
7. The distance between the nearest limits of a private approach intended for two-way vehicular traffic and any other private approach to the same property shall be a minimum of 9 metres measured at the street line, and at the curb line or roadway edge.
8. The minimum distance between the nearest limits of any two private approaches intended for one-way vehicular traffic to or from to the same property must not be less than 2 metres, measured at the street line, and at the curb line or roadway edge.
9. Where, in the opinion of the General Manager, it is desirable to provide a median between two private approaches intended for one-way operation, such median shall have a minimum width of 2 metres.
10. Where a median is provided pursuant to paragraph (i), the length of the median on private property shall be determined by the General Manager.
11. All one-way private approaches shall be designated with suitable signs erected in a conspicuous location adjacent to the highway to indicate the direction of traffic for which the private approach is intended, and all signs shall be erected and maintained by the owner to the satisfaction of the General Manager.
12. Despite the provisions of paragraphs (h) and (i) hereof, there shall be no more than two one-way private approaches on any given 35 metres of frontage.
13. Despite the provisions of paragraphs (a) and (g), where a property abuts on or is within 46 metres of an arterial or major collector highway as designated on the City of Ottawa Official Plan:
    1. in the case of a shopping centre, a public parking lot, a parking lot for the use of customers of a retail or wholesale business, a public garage, a personal service establishment or an eating establishment, any of which has a parking area which can accommodate the number of parking spaces set out in Column 1 of the following Table, the distances are calculated in accordance with Columns 1,3 and 4 of the following Table; and
    2. in the case of a hotel, an office building, an apartment building, a property used for public purposes, or an industrial development, any one of which has a parking area which can accommodate the number of parking spaces set out in Column 2 of the following table, the distances are calculated in accordance with Columns 2, 3 and 4 of the following Table;
    no private approach shall be constructed so that the distance between the nearest limit of a private approach and the nearest intersecting street line or its extension is less than the distance set out in Column 3 of the said table, or so that the distance between the nearest limit of a private approach intended for two-way vehicular traffic and any other private approach to the same property is less than the distance set out in Column 4 of the said table and all distances so referred to shall be measured at the street line:

COLUMN 1 NUMBER OF PARKING SPACES	COLUMN 2 NUMBER OF PARKING SPACES	COLUMN 3 DISTANCE BETWEEN THE PRIVATE APPROACH AND NEAREST INTERSECTING STREET LINE	COLUMN 4 DISTANCE BETWEEN A TWO-WAY PRIVATE APPROACH AND ANY OTHER PRIVATE APPROACH
Up to 49	20 to 99	18 metres	15 metres
50 to 99	100 to 199	30 metres	30 metres
100 to 199	200 to 299	45 metres	45 metres

200 to 299	300 or more	60 metres	60 metres
300 or more		75 metres	75 metres

14. Where an owner whose property abuts two or more highways is unable to comply with the provisions of paragraph (m) of this section, a private approach shall be permitted only on the highway carrying the lesser volume of vehicular traffic and the private approach shall be located as far from the nearest intersections as possible, provided that in cases where the vehicular traffic volumes on the abutting highway are essentially equal, a private approach shall be permitted only on the highway which allows the private approach to be located as far from the nearest intersection as possible.
15. No person shall construct a private approach within an intersection or on the corner radius of an intersection or within 1.5 metres of the point of tangency of such radius or so that the distance between the nearest limit of a private approach and the intersecting street line or its extension is less than 6 metres.
16. No person shall construct a private approach within 3 metres of any property line measured at the highway line and at the curb or the edge of the roadway unless the property abuts only one public highway and the width of the frontage does not allow a private approach width as required by this by-law in addition to the 3 metres offset from the adjoining property lines in which case the General Manager may reduce the off-set to a minimum of 0.3 metres provided that the proposed access is located,
    1. a safe distance from the access serving the adjacent property,
    2. in such a manner that there are adequate sight lines for vehicles exiting from the property, and
    3. in such a manner that it does not create a traffic hazard.
17. Subject to paragraph (p), in the case of a private approach including a culvert, the 3 metre setback from the adjacent property line shall be from the end of the culvert, headwall or closest part of the private approach to the adjacent property line.
18. Despite paragraph (p), a private approach may be constructed in such a manner that it is less than 3 metres from an adjoining property measured at the highway line and at the curb line or edge of the roadway if it is approved through Site Plan Control in accordance with the provision of the Planning Act and the City's Site Plan Control By-law.
19. No person shall construct a private approach serving any parking area with a grade exceeding 2% and the grade on the private approach shall descend in the direction of the roadway.
20. No person shall construct a private approach serving a parking area with less than 50 parking spaces, with a grade exceeding 2% within the private property for a distance of 6 metres from the highway line or future highway line.
21. No person shall construct a private approach serving a parking area with more than 50 parking spaces, with a grade exceeding 2% within the private property for a distance of 9 metres from the highway line or future highway line.
22. Despite paragraphs (t) and (u), the General Manager may issue a permit for a private approach subject to such conditions and restrictions as the General Manager may deem necessary provided that the proposed access is located;
    1. a safe distance from the access serving the adjacent
    2. in such a manner that there are adequate sight lines for vehicles exiting the property; and
    3. in such a manner that it does not create a traffic hazard. (all of (f) to (v) herein 2015-107)

Section 26 - Private approaches for single dwelling units

1. The design, construction and location of a private approach to a single dwelling unit shall comply with the following provisions:
    1. no private approach shall be in excess of 9 metres in width measured at the street line, and at the curb line or roadway edge.
    2. the distance between the nearest limits of two private approaches to the same property shall be a minimum of 9 metres measured at the street line, and at the curb line or roadway edge.

APPENDIX I

MMLOS Guidelines, Excerpts

6 Vehicular Level of Service (LOS)

The following details outlining the evaluation of Vehicular Level of Service are extracted from the 2009 Transportation Impact Assessment Guidelines. As the TIA update is carried out, these parameters may be updated.

6.1 Intersection Capacity Analysis

An evaluation is required of any critical intersection within the study area that will potentially be affected by site generated traffic volumes during any or all of the relevant time periods and scenarios. Summaries are to be provided in tabular format clearly identifying intersection performance under existing and future traffic conditions. Where development is anticipated to proceed in phases or stages, projected performance for all intersections must be documented for the end of each phase.

Detailed output from analysis software is to be provided in an appendix to the report and copies of the electronic files should be provided on CD. Appendix B outlines parameters to be used in operational analysis of signalized intersections.

All volume to capacity (V/C) calculations relating to future conditions should be determined using signal timing optimized for the volume conditions being studied. The V/C ratio for an intersection is defined as the sum of equivalent volumes for all critical movements divided by the sum of capacities for all critical movements assuming that the V/C ratios for critical movements can be equalized. In cases where minimum pedestrian phase times prevent equalizing the level of service for critical movements, then the V/C ratio for the most heavily saturated critical movement should be considered as the V/C ratio for the intersection. Adjustment for the impact of pedestrian activated control is permitted provided detailed supporting analysis including projected pedestrian volumes is provided and discussed in advance with traffic engineering staff.

In the case of planning level or functional design projects, practitioners should undertake a two and a half hour peak period observation of volumes (typically 6:30 – 9:00 AM) to verify that the traffic volumes through the intersections reflect existing demands and to identify unusual operating conditions. For operational studies, peak hour observations are acceptable. Timing of observations and conditions observed should be documented in writing in the report.

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

Intersection evaluations should identify:

- Signalized Intersections – V/C ratios for the overall intersection, as defined above, and individual movements; and
- Unsignalized Intersections - Level of service (LOS) where the LOS is between A and E; V/C where capacity is based on gap analysis if intersection LOS is F.

Existing signal timing information such as phasing, pedestrian minimums and clearance intervals must be used as a base to analyze the existing capacity of signalized intersections. This signal timing data should be obtained from the City of Ottawa Traffic Operations Division. Operational design of the signals analyzed should be in accordance with City of Ottawa signal operation practices.

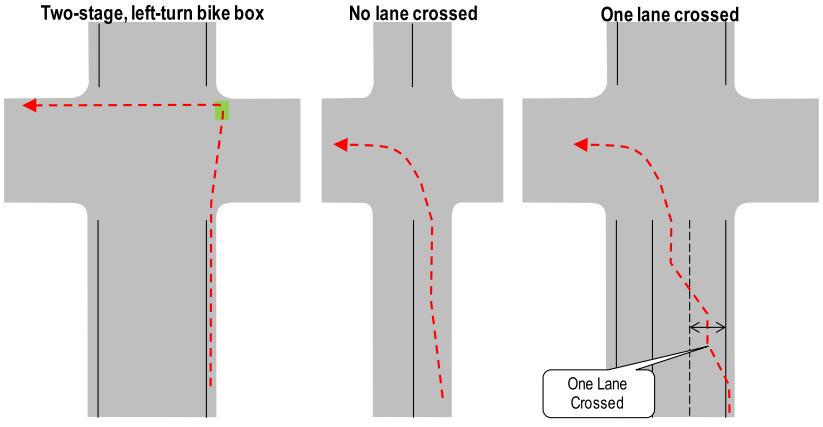
Exhibit 11 – BLOS Segment Evaluation Table

Type of Bikeway		LOS
Physically Separated Bikeway (cycle tracks, protected bike lanes and multi-use paths). Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes (adjacent to the bike lane along the travelled way i.e. not curbside).		**A**
Bike Lanes Not Adjacent Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 travel lanes in each direction separated by a raised median	B
	2 travel lanes in each direction without a separating median	C
	More than 2 travel lanes in each direction	D
Bike Lane Width	≥ 1.8 m wide bike lane (includes marked buffer and paved gutter width)	A
	≥1.5 m to <1.8 m wide bike lane (includes marked buffer and paved gutter width)	B
	≥1.2 m to <1.5 m wide bike lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 50 km/h operating speed	A
	60 km/h operating speed	C
	≥ 70 km/h operating speed	E
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Bike Lanes Adjacent to curbside Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 or more travel lanes in each direction	C
Bike Lane and Parking Lane Width	4.5 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	A
	4.25 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	B
	≤ 4.0 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 40 km/h operating speed	A
	50 km/h operating speed	B
	60 km/h operating speed	D
	≥ 70 km/h operating speed	F
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Mixed Traffic		
No. of Travel Lanes and Operating Speed	2 travel lanes; ≤ 40 km/h; no marked centerline or classified as residential	A
	2 to 3 travel lanes; ≤ 40 km/h	B
	2 travel lanes; 50 km/h; no marked centerline or classified as residential	B
	2 to 3 travel lanes; 50 km/h	D
	4 to 5 travel lanes; ≤ 40 km/h	D
	4 to 5 travel lanes; ≥ 50 km/h	E
	6 or more travel lanes; ≤ 40 km/h	E
	≥ 60 km/h	F
Unsignalized Crossing along Route: no median refuge		
No. of Travel Lanes on Side Street and Operating Speed	3 or less lanes being crossed; ≤ 40 km/h	A
	4 to 5 lanes being crossed; ≤ 40 km/h	B
	3 or less lanes being crossed; 50 km/h	B
	4 to 5 lanes being crossed; 50 km/h	C
	3 or less lanes being crossed; 60 km/h	C
	4 to 5 lanes being crossed; 60 km/h	D
	6 or more lanes being crossed; ≤ 40 km/h	E
	3 or less lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 50 km/h	F
	4 to 5 lanes being crossed; ≥ 65 km/h	F
Unsignalized Crossing along Route: with median refuge (≥ 1.8 m wide)		
No. of Travel Lanes on Side Street and Operating Speed	5 or less lanes being crossed; ≤ 40 km/h	A
	3 or less lanes being crossed; 50 km/h	A
	6 or more lanes being crossed; ≤ 40 km/h	B
	4 to 5 lanes being crossed; 50 km/h	B
	3 or less lanes being crossed; 60 km/h	B
	6 or more lanes being crossed; 50 km/h	C
	4 to 5 lanes being crossed; 60 km/h	C
	3 or less lanes being crossed; ≥ 65 km/h	D
	6 or more lanes being crossed; 60 km/h	E
	4 to 5 lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 65 km/h	F

Exhibit 12 – BLOS Signalized Intersection Evaluation Table

Bikeway and Intersection Type		LOS
Bike Lanes or higher order facility on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below)	
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Pocket Bike Lanes on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	B
	Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection)	D
	Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane with any other configurations	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Mixed Traffic on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection)	E
	Right-turn lane longer than 50 m	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	D
	1 lane crossed, 50 km/h	D
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	F
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F

Left-turn Configurations



Notes:
1. Pocket bike lanes are defined as bike lanes that develop near intersections between vehicular right turn lanes on the right side and vehicular through or left lanes on the left side. All other configurations of bike lanes or separated facility that remain against the edge of the curb/parking lane and require right turning vehicles to yield to through cyclists will not impact the level of traffic stress (i.e. are considered to be LOS A).

Exhibit 4 – PLOS Segment Evaluation Table

Sidewalk Width (m)	Boulevard Width (m)	Motor Vehicle Traffic Volume (AADT)	Presence of On-street Parking	Segment PLOS			
				Operating Speed (km/h)			
				≤30	>30 or 50	>50 or 60	>60 [1]
2.0 or more	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	B	N/A
			No	A	B	C	D
	0.5 to 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0	≤ 3000	NA	A	B	C	D
		> 3000	Yes	B	B	D	N/A
			No	B	C	E	F
1.8	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0.5 to 2	≤ 3000	N/A	A	B	B	D
		> 3000	Yes	A	C	C	N/A
			No	B	C	E	E
	0	≤ 3000	N/A	A	B	C	D
		> 3000	Yes	B	C	D	N/A
			No	C	D	F	F
1.5	> 2	≤ 3000	N/A	C	C	C	C
		> 3000	Yes	C	C	D	N/A
			No	C	D	E	E
	0.5 to 2	≤ 3000	N/A	C	C	C	D
		> 3000	Yes	C	C	D	N/A
			No	D	E	E	E
	0	N/A		D	E	F [2]	F [2]
<1.5	N/A			F [3]	F [3]	F [3]	F [3]
No sidewalk	N/A			C [4]	F [3]	F [3]	F [3]

Notes:
1. On-street parking not provided on roadways with posted speed of 70 km/h or more
2. Sidewalk must be 1.8 m wide if no separation is provided (curb-face sidewalk) where speeds are high
3. Sidewalk must be 1.5 m wide to meet Provincial accessiblity standards
4. Ottawa Pedestrian Plan, 2014: “all new and reconstructed urban local roads where pedestrian facilities are required in accordance with these policies but no dedicated pedestrian facility is provided, require that roads be designed for a speed of 30 km/h or lower (pending development of a new 30 km/h roadway design standard).” Where a roadway is specifically designed as 'shared space', with appropriate design controls and features, it can achieve LOS A.
5. Where a multi-use path is provided in lieu of sidewalks, the MUP can be evaluated using the same methodology.

Exhibit 5 – PETSI Point Tables

5.1 Crossing Distance & Conditions		
Total travel lanes crossed	**No median**	**With Median (>2.4m)**
2	120	120
3	105	105
4	88	90
5	72	75
6	55	60
7	39	45
8	23	30
9	6	15
10	-10	0

Island Refuge	**Points**
No	-4
Yes	0

5.2 Signal Phasing & Timing Features	
Left turn conflict ("Left_turns")	**Points**
Permissive	-8
Protected/permissive	-8
Protected	0
No left turn/prohibited	0
Right turn conflict ("Right_turns")	**Points**
Permissive or yield control	-5
Protected/permissive	-5
Protected	0
No right turn	0
Right turns on red ("RTOR")	**Points**
RTOR allowed	-3
RTOR prohibited at certain time(s)	-2
RTOR prohibited	0
Leading ped interval? ("LPI")	**Points**
No	-2
Yes	0

5.3 Corner Radius	
Corner radius	**Points**
Greater than 25m	-9
> 15m to 25m	-8
> 10m to 15m	-6
> 5m to 10m	-5
> 3m to 5m	-4
Less than/equal to 3m	-3
No right turn	0
Right turn channel with receiving	-3
Right turn "smart channel"	2

5.4 Crosswalk Treatment	
Crosswalk treatment ("Crosswalk")	**Points**
Standard transverse markings	-7
Textured/coloured pavement	-4
Zebra stripe hi-vis markings	-4
Raised crosswalk	0

Exhibit 6 – PETSI Evaluation Table

Pedestrian Exposure to Traffic LOS	
Points threshold	**LOS**
≥90	A
≥75	B
≥60	C
≥45	D
≥30	E
<30	F

Exhibit 7 – Pedestrian Delay Evaluation Table

Average Pedestrian Crossing Delay Component	
$\text{Delay} = 0.5 \times \frac{(\text{Cycle Length} - \text{Pedestrian Effective Walk Time})^2}{\text{Cycle Length}}$	
< 10 s per intersection leg	LOS A
≥10 to 20 sec	LOS B
>20 to 30 sec	LOS C
>30 to 40 sec	LOS D
>40 to 60 sec	LOS E
> 60 sec	LOS F

Exhibit 14 – TLOS Evaluation Methodology

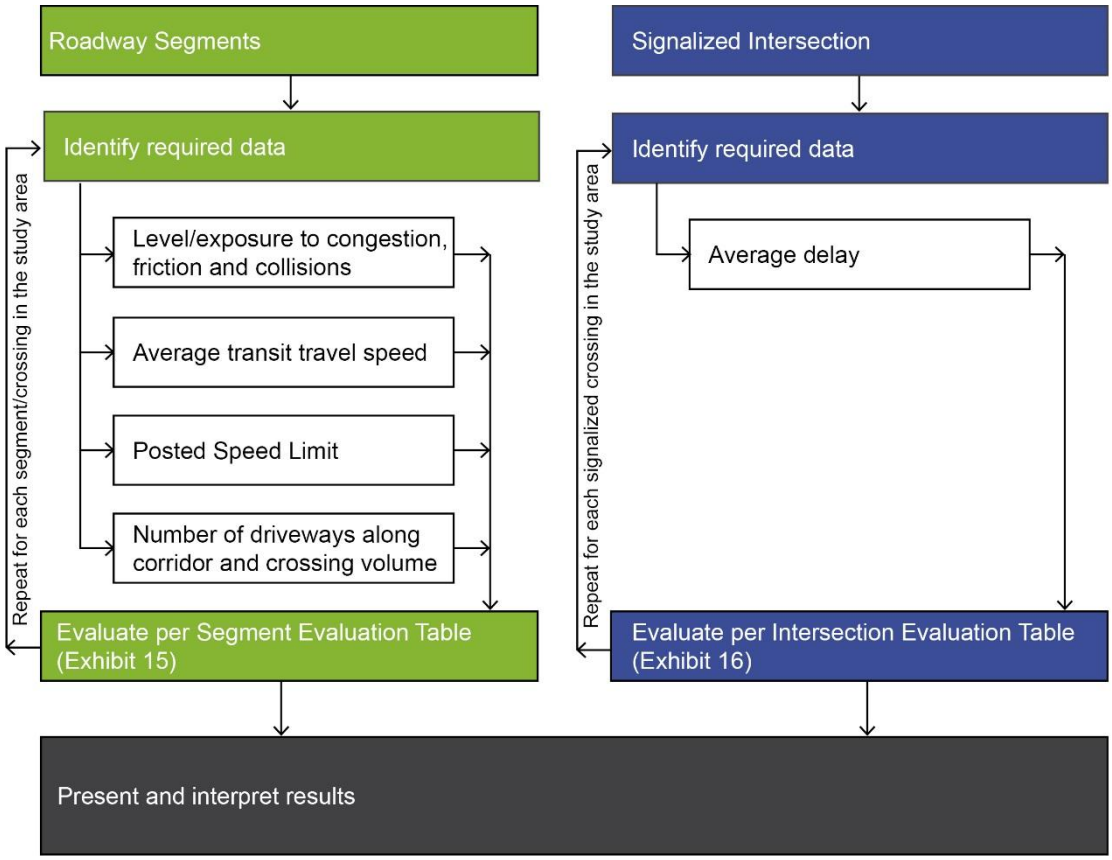


Exhibit 15 - TLOS Segment Evaluation Table

Facility Type		Level/exposure to congestion delay, friction and incidents			Quantitative Measurement	LOS
		Congestion	Friction	Incident Potential		
Segregated ROW		No	No	No	N/A	A
Bus lane	No/limited parking/driveway friction	No	Low	Low	$C_f \leq 60$	B
	Frequent parking/driveway friction	No	Medium	Medium	$C_f > 60$	C
Mixed Traffic	Limited parking/driveway friction	Yes	Low	Medium	$Vt/Vp \geq 0.8$	D
	Moderate parking/driveway friction	Yes	Medium	Medium	$Vt/Vp \leq 0.6$	E
	Frequent parking/driveway friction	Yes	High	High	$Vt/Vp < 0.4$	F

Notes:

Cf, Conflict Factor = = (Number of driveways x crossing volume) / 1 km

Vt/Vp is the ratio of average transit travel speed to posted speed limit

Exhibit 19 – TkLOS Evaluation Methodology

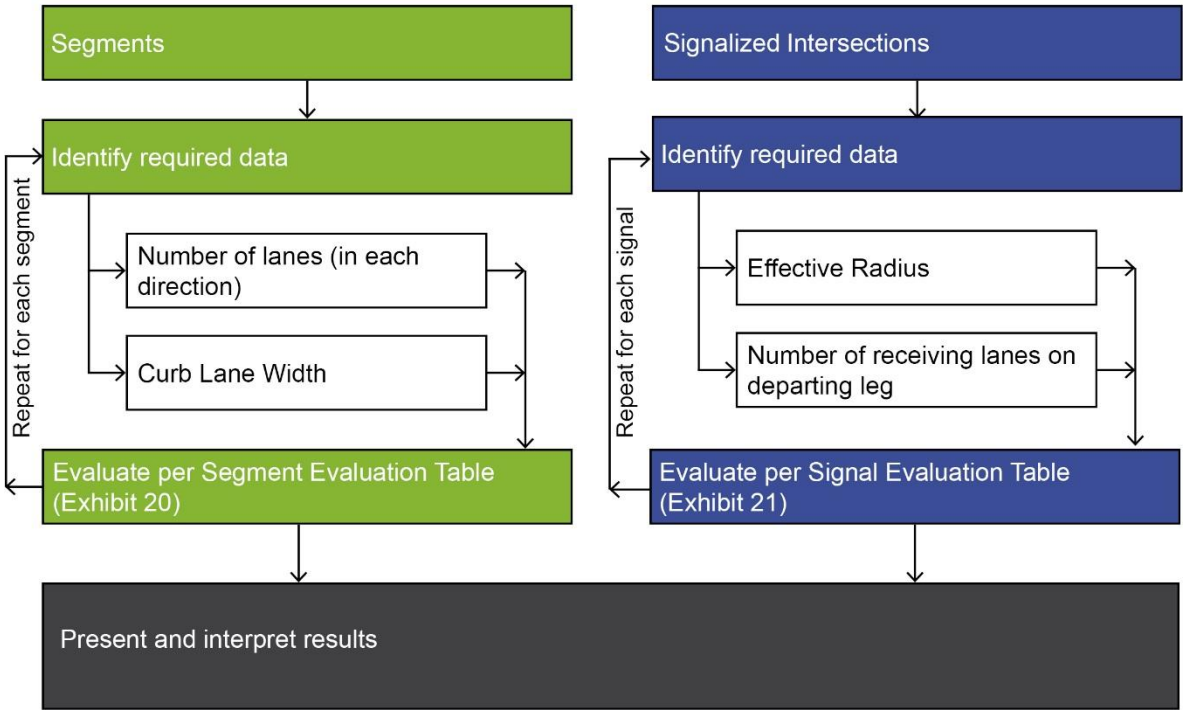


Exhibit 20 – TkLOS Segment Evaluation Table

Curb Lane Width (m)	Only two travel lanes (one in each direction)	More than two travel lanes
>3.7	B	A
≤3.5	C	A
≤3.3	D	C
≤3.2	E	D
≤3	F	E

Exhibit 21 – TkLOS Signalized Intersection Evaluation Table

Effective Corner Radius	One receiving lane on departure from intersection	More than one receiving lane on departure from intersection
< 10m	F	D
10 to 15m	E	B
> 15m	C	A

APPENDIX J

TAC 2017 Guidelines, Excerpts

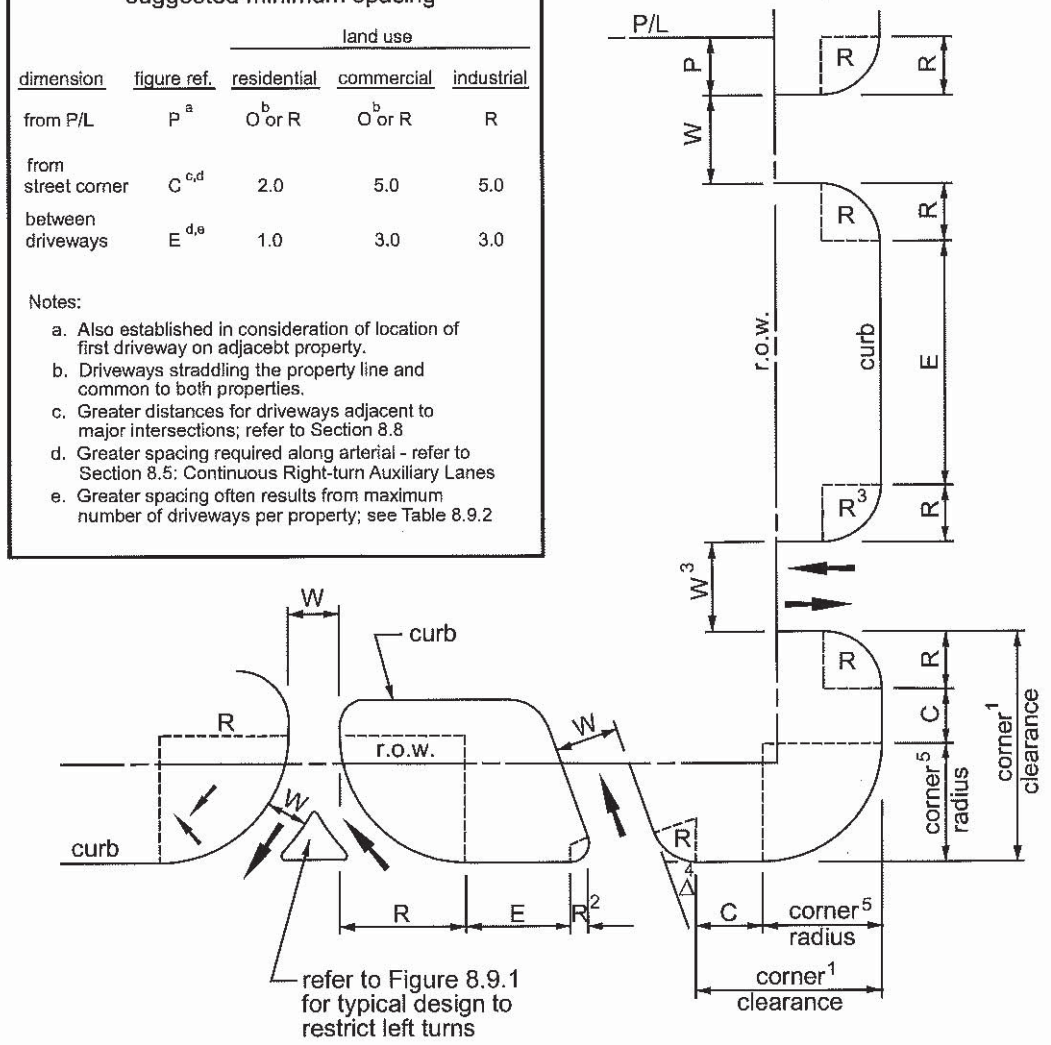
collector roadways, while a 3.0 m minimum is the suggested dimension for both commercial and industrial land uses. If there is a need to provide parallel parking between driveways along the roadway, a spacing of 6.0 to 7.5 m is suitable. If the spacing provided is in the range of 3.0 to 5.0 m, the space may appear inviting to a driver wishing to park, but if used, severely hampers the operation of the driveways by reducing sight lines and interfering with the turning paths of the vehicles.

suggested minimum spacing

dimension	figure ref.	land use: residential	land use: commercial	land use: industrial
from P/L	P [a]	O [b] or R	O [b] or R	R
from street corner	C [c,d]	2.0	5.0	5.0
between driveways	E [d,e]	1.0	3.0	3.0

Notes:

a. Also established in consideration of location of first driveway on adjacebt property.
b. Driveways straddling the property line and common to both properties.
c. Greater distances for driveways adjacent to major intersections; refer to Section 8.8
d. Greater spacing required along arterial - refer to Section 8.5: Continuous Right-turn Auxiliary Lanes
e. Greater spacing often results from maximum number of driveways per property; see Table 8.9.2



Notes:
1. For suggested minimum corner clearance at major intersections, see Figure 8.8.2
2. Where turns are not permitted, R=1.5 m assists in discouraging wrong-way movements.
3. For typical R and W dimensions, refer to Table 8.9.1
4. Minimum angle of 70° desirable where pedestrians routinely cross driveway, 45° minimum otherwise.

Figure 8.9.2: Driveway Spacing Guidelines – Locals and Collectors

APPENDIX K

Signal Warrant Analysis Sheets

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Campeau Drive & Stonecroft Terrace/Site Access

What is the direction of the Main Road street? East-West

When was the data collected?

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 2 or more

b.- Number of lanes on the Minor Road? 2 or more

c.- How many approaches? 4

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
8:00	9	232	1	1	0	1	2	156	6	22	0	22	0
9:00	21	567	2	3	0	3	5	549	14	48	0	48	0
10:00	13	357	1	2	0	2	3	193	9	31	0	31	2
12:30	35	412	8	6	0	7	11	417	53	29	0	29	2
13:30	43	490	10	7	0	9	13	479	64	35	0	35	0
16:00	43	602	10	7	0	9	13	532	64	35	0	35	0
17:00	38	423	9	6	0	8	12	450	57	31	0	31	0
18:00	33	358	8	5	0	7	10	413	49	27	0	27	0
Total	**235**	**3,441**	**49**	**37**	**0**	**46**	**69**	**3,189**	**316**	**258**	**0**	**258**	**4**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	0%		0%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	0%		0%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Campeau Drive & Stonecroft Terrace/Site Access Count Date:

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☑	8:00	9:00	10:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	452	1,260	642	1,007	1,185	1,350	1,065	937		
	COMPLIANCE %				50	100	71	100	100	100	100	100	722	90
1B	120	170	120	170	46	102	66	71	86	86	76	66		
	COMPLIANCE %				27	60	39	42	51	51	45	39	352	44
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑									
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑									

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☑	8:00	9:00	10:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	406	1,158	576	936	1,099	1,264	989	871		
	COMPLIANCE %				45	100	64	100	100	100	100	97	706	88
2B	50	75	50	75	23	51	35	37	42	42	37	32		
	COMPLIANCE %				31	68	47	49	56	56	49	43	399	50
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑									
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑									

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	1,158	96	147	65 %	49 %
	13:30	1,099	70	163	43 %	
	16:00	1,264	70	124	56 %	
	17:00	989	62	198	31 %	

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Campeau Drive & Stonecroft Terrace/Site Access Count Date:

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	90	%	☐	☑
	B	Crossing Volume	44	%		
2. Delay to Cross Traffic	A	Main Road	88	%	☐	☑
	B	Crossing Road	50	%		
3. Combination	A	Justificaton 1	44	%	☐	☑
	B	Justification 2	50	%		
4. 4-Hr Volume			49	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			