TRAFFIC IMPACT ASSESSMENT

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

November 2020

Prepared for
Bayview Hospitality Holdings Ltd.

c/o
API Development Consultants

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November 30, 2020

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

TRANS-PLAN is pleased to submit this Traffic Impact Assessment report in support of the proposed housing development to be located at 6301 Campeau Drive, Kanara, ON. The proposed development consists of two parcels, including 184 units of townhouses 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,

Anil Seegobin, P.Eng.
Partner, Engineer

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Transportation Consultants

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1. INTRODUCTION

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.

2. SCREENING & SCOPING

2.1 Proposed Development

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 is 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 1 (the one on the west 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 townhouses and apartment buildings. 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
Townhouse Units	104	80	184
Apartment Building Units	348	266	614
Total Units	452	346	**798 units**
Commercial Area (sq.m)		430.6	**430.6 sq.m**
Surface Parking spaces	114	88	194
Underground Parking spaces	290	199	489
Total Parking spaces	404	287	**691 spaces**

The site plan, prepared by Fabiani Architect, is shown in Figure 2. As shown in the site plan, a 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.

2.2 Existing Conditions

2.2.1 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.

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.

Maritime Way/ Knudson Drive 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.

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

2.2.2 Study Area Intersections & Driveways

Campeau Drive at Cordillera Street is a T-intersection (3 legs) with stop sign control at Cordillera Street.

Campeau Drive at Conacher Gate/ Great Lakes is a two-way stop sign control intersection with full moves.

Campeau Drive at Maritime Way / Knudson Drive is a signalized intersection, and an extra left lane is provided at the north leg.

Campeau Drive at Stonecroft Terrace is a T-intersection with stop sign control at Stonecroft Terrace.

The Driveway of Kanata Lake Golf Club is located approximately 130m west of the prosed site access off Campeau Drive, accessing to the golf club.

The Driveway of Forest Hill is located approximately 190m west of the prosed site access off Campeau Drive, accessing to the nursing home.

The Driveway of Homewood Suites by Hilton is located opposing the prosed site access off Cordillera Street, accessing to the hotel.

The study area roadway characteristics are shown in Figure 3.

2.2.3 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.

2.2.4 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.

Table 2 shows the details of transit routes located near the subject site, including route name, nearest transit stops to the site and service details. Figure 4 provides the local transit service map of the City of Ottawa within the study area.

Table 2 – Transit Service in the Study Area

Route	No.	Nearest Bus Stop at Site	Approximate Service Times		Approximate Peak Service Frequency (min)		
			Weekdays	Weekends	AM	PM	SAT
Tunney's Pasture/ Stittsville	62	Campeau and Stonecroft (EB/WB)	07:10 – 23:43(EB) 07:35– 00:40 (WB)	07:00 – 22:30 (EB) 07:45 – 23:20 (WB)	30	30	30
Terry Fox/ Bridlewood	161	Campeau and Stonecroft (NB/SB)	08:18 (NB)* 15:07 (SB)*	-	-	-	-
Terry Fox/ Hope Side	164	Campeau and Stonecroft (NB/SB)	06:24 – 09:35(NB) 14:54 – 19:24 (SB)	-	30	30	-
Tunney's Pasture/ Kanata Lakes	268	Campeau and Stonecroft (EB/WB)	06:13 – 08:48 (EB) 16:00 – 18:42 (WB)	-	30	30	-

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

2.2.5 Existing Peak Hours

To determine existing operating conditions in the study area, Trans-Plan conducted intersection turning movement counts (TMCs), since the data was not available in City of Ottawa database. Additionally, Trans-Plan conducted a site visit and made traffic observations. Table 3 provides a summary of the count date, count hours and peak hours obtained with the detailed TMC data included in Appendix A. The existing traffic volumes for the weekday AM and PM peak hours are shown in Figure 5.

Table 3 – Intersection Turning Movement Count Details

Intersection	Count Date	Count Hours	Peak Hours
Campeau Drive & Cordillera Street	Tuesday September 22, 2020	7:00am - 9:30am 4:00pm - 6:30pm	8:00am - 9:00am 4:00pm - 5:00pm
Campeau Drive & Great Lakes Avenue			
Campeau Drive at Maritime Way / Knudson Drive			7:15am - 8:15am 4:15pm - 5:15pm
Campeau Drive at Stonecroft Terrace			8:00am - 9:00am 4:00pm - 5:00pm

2.2.6 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 proposed development is located in the Kanata / Stittsville district. The area modal splits are summarized in Table 4. Source information is provided in Appendix B.

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 4 –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%

2.2.7 Collision History

Both City of Ottawa's TIA guidelines and Ontario Traffic Manual (OTM) Book 12 Traffic Signals were reviewed, and the threshold for improvements are compared with the historic collisions near the subject site in Table 5.

Table 5 – Thresholds for Traffic Signal Improvements

Measures	Source	Threshold for improvements
To be identified in TIA	Ottawa TIA Guidelines	More than six collisions in five years
Collision Justification for Traffic Control Signals	OMT Book 12	5+ reportable collisions of types preventable by traffic control signals have occurred during each the three preceding 12-month periods
Left Turn Phase Justification		LT study period collisions total 6+ over the past 5 years or; LT 24-hour study period collisions total 20+ over the past 5 years or; LT study period collisions total 2+ in the most recent single year or; LT 24-hour study period collisions total 5+ in the most recent single year

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 6 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.

Table 6 – Collision History

Intersection	2014	2015	2016	2017	2018	Average
Campeau Drive at Cordillera Street	0	1	1	0	1	0.6
Campeau Drive at Great Lakes Avenue	2	2	0	0	1	1.0
Campeau Drive at Maritime Way / Knudson Drive	0	2	1	2	1	1.2
Campeau Drive at Stonecroft Terrace	1	0	1	0	2	0.8

Based on a review of area collision data, there's no intersection having more than six collisions in the past five years in the study area, and none of the about intersections / road segments meet any criteria in in Table 5. The study area is generally safe in terms of traffic safety.

2.3 Planned Conditions

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.

2.3.1 Planned Improvements

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.

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.

2.3.2 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 7. Detailed site trip generation and assignment for the background development is provided in Appendix C.

Table 7 – Study Area Background Development

Location	Proposed Land Use	Size
7000 Campeau Drive, Kanata, ON	Residential development, Houses, Townhouses and Medium Density	1502 units

2.4 Study Area and Time Periods

2.4.1 Study Area

Transit

Existing transit Routes that serve the development property:

- Route 62, Tunney's Pasture/Stittsville
- Route 161, Terry Fox/ Bridlewood
- Route 164, Terry Fox/Hope Side
- Route 268, Tunney's Pasture/Kanata Lakes

Intersections

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

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

2.4.2 Time Periods

Given that the proposed development will primarily consist of residential uses, the typical weekday morning and afternoon peak hours (7:00am - 9:30am &4:00pm - 6:30pm) on adjacent streets will be assessed for the purposes of this analysis.

2.4.3 Horizon Years

- Existing (2020) traffic conditions;
- Future (2027) background and total traffic conditions

2.5 Exemptions Review

As per the City of Ottawa TIA Guidelines, Trans-Plan has reviewed a list of potential exemptions to identify individual elements that will not inform decisions about development design, street design, and mitigation measures. In Table 8, elements are identified that can be exempted to reduce the scope of the TIA.

Table 8 – 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

3. FORCASTING

3.1 Development-generated Travel Demand

3.1.1 Auto Trip Generation

Site trips for the proposed apartment buildings were generated using the Institute of Transportation Engineers (ITE) Trip Generation manuals, 10th Edition. The ITE Land Use Codes (LUC) 220 for Multifamily

Housing (Low-Rise), 221 for Multifamily Housing (Mid-Rise) and 820 for Shopping Centre were utilized for determining suitable trip rates. The site trip generation for the subject site is shown in Table 9.

Table 9 – Site Auto Trip Generation

Land Use	Size		AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
LUC 220 Multifamily Housing (Low-Rise)	104 units	Dir. Distr.	23%	77%	100%	63%	37%	100%
		Equation	Ln(T)=0.95Ln(X) – 0.51			Ln(T)=0.89Ln(X) – 0.02		
		Rate	0.11	0.37	0.48	0.37	0.22	0.59
		Trips	11	39	50	38	23	61
LUC 221 Multifamily Housing (Mid-Rise)	348 units	Dir. Distr.	26%	74%	100%	61%	39%	100%
		Equation	Ln(T)=0.98Ln(X) – 0.98			Ln(T)=0.96Ln(X) – 0.63		
		Rate	0.08	0.25	0.33	0.26	0.16	0.42
		Trips	30	86	116	90	57	147
Parcel 1 Trips			41	125	166	128	80	208
LUC 220 Multifamily Housing (Low-Rise)	80 units	Dir. Distr.	23%	77%	100%	63%	37%	100%
		Equation	Ln(T)=0.95Ln(X) – 0.51			Ln(T)=0.89Ln(X) – 0.02		
		Rate	0.11	0.38	0.49	0.38	0.22	0.60
		Trips	8	31	39	30	18	48
LUC 221 Multifamily Housing (Mid-Rise)	266 units	Dir. Distr.	26%	74%	100%	61%	39%	100%
		Equation	Ln(T)=0.98Ln(X) – 0.98			Ln(T)=0.96Ln(X) – 0.63		
		Rate	0.08	0.25	0.34	0.26	0.17	0.43
		Trips	23	66	89	69	44	113
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			33	99	132	112	67	179
Total Trips			74	224	298	240	147	387

To be conservative, no reduction factor has been applied. The subject site is expected to generate 298 two-way auto trips (74 inbound and 224 outbound trips) in the weekday AM peak hour and 387 two-way auto trips (240 inbound and 147 outbound trips) in the weekday PM peak hour.

3.1.2 Trip Generation for Non-Auto Modes

Based on the City's TIA Guideline, a default 10% non-auto mode share and average vehicle occupancy of 1.15 were applied to translate auto-trips to person-trips (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 10.

Table 10 – Site Person Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto Trips	74	224	298	240	147	387
Ratio	1.28					
Person Trips	95	287	382	307	188	495

The proposed development is anticipated to generate in the order of 382 and 495 two-way person trips in the weekday morning and afternoon peak hours, respectively.

3.1.3 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. 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 11.

Table 11 – Mode Split

Travel Mode	AM Peak	PM Peak	24 Hour
Auto	52%	59%	63%
Auto Passenger	25%	24%	23%
Transit	13%	10%	8%
Bicycle	0%	0%	0%
Walk	10%	7%	6%

Notes:
1. Other mode choice options include taxi, school bus and motorcycle and has been included into the Auto Passenger percentage.
2. AM Peak includes a blend of both from and within district in the AM Peak Hour for each mode choice.
3. PM Peak includes a blend of both to and within district in the PM Peak Hour for each mode choice.
4. 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 20-25% of total trips during the peak hours in the Kanata/Stittsville area.

3.1.4 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 12.

Table 12 – Future Mode Share Targets

Travel Mode	Mode Share Target	Rationale
Transit	25%	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	5%	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	20%	This percentage is expected to be similar to the existing conditions.
Auto Driver	45%	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.

3.1.5 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 B.

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.

3.2 Background Network Travel Demand

3.2.1 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 only approximately 500m south of the subject site. 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.

3.2.2 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.

3.2.3 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 7 in Section 2.3.2. The future background traffic volumes for the 2027 horizon year, including background growth and future background developments, for the weekday AM, PM and Saturday Peak hours, are shown in Figure 9. Detailed site trip generation and assignment for the background development is provided in Appendix C.

3.3 Demand Rationalization

Based on preliminary intersection analysis, all signalized and unsignalized intersections in the study area are operating at acceptable level of service.

4. ANALYSIS/STRATEGY

4.1 Development Design

4.1.1 Design for Sustainable Modes

<u>Parking Dimensions</u>

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 D). The dimension requirements and proposed design is shown in Table 13.

Table 13 – 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	6.7 for Parking Lot 6.0 for garage
Parallel Space	Minimum Requirement	2.6	6.7	6.0 for garage
	Proposed Dimensions	2.6	6.7	6.0
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 10 illustrates the bus station locations.

4.1.2 Circulation and Access

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:

Ground Floor

Figure 11 and Figure 12 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 13 and Figure 14 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 15 and Figure 16 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 17 and Figure 18 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.

Underground Garage for Building A and B

Figure 19 and Figure 20 show a passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

Figure 21 and Figure 22 show a small passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

Underground Garage for Building C

Figure 23 and Figure 24 show a passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

Figure 25 and Figure 26 show a small passenger vehicle accessing the parking garage via the entrance ramp, parking into critical spaces, and then exiting via the same ramp.

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.

4.2 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.

4.2.1 Auto Parking Requirements and Supply

The proposed parking supply is 691 spaces provided by surface parking lots and underground garages. A total of 404 spaces are proposed for Parcel 1, and a total of 287 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 townhouses on both parcels are proposed right at the boundary, so the reduced rates should be considered. 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 14 and Table 15. Source information is provided in Appendix D.

Table 14 – 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, Townhouse	104	80	1 space/unit	184	404 (Parcel 1) +287 (Parcel 2)	
Dwelling, Mid-high-Rise Apartment (Reduced rate due to Rapid Transit)	348	0	0.5 space/unit	174		
Dwelling units in a mixed-use building	0	266	1.2 space/unit	319.2		
Dwelling, Visitor Parking	452	346	0.2 space/unit	159.6		
Retail Store		430.6 sq.m.	3.4 per 100 m2 of GLFA	14.6		
Total				852	691	-161

Source: City of Ottawa Zoning By-law 2008-250 Consolidation, enacted June 25, 2008

Table 15 – City of Ottawa Zoning By-Law, Comparison of Auto Parking Requirements and Supply, Within 600m of a Rapid Transit Station

Land Use	Unit Number		Minimum Parking Requirement		Parking Supply (spaces)	Surplus (spaces)
	Parcel 1	Parcel 2	Rate	Spaces		
Dwelling, Townhouse	104	80	0.75 space/unit	138	404 (Parcel 1) +287 (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	346	0.2 space/unit	160		
Retail Store		430.6 sq.m.	3.4 per 100 m2 of GLFA	15		
Total				620	691	71

Source: City of Ottawa Zoning By-law 2008-250 Consolidation, enacted June 25, 2008

The City's Zoning By-law's requirement is 852 spaces and 620 spaces for Area C and Area with in 600m of a Rapid Transit Station, respectively. A total supply of 691 spaces for both residents and visitors are proposed on site, which results in a shortfall for 161 spaces under Area C policy but exceeds the by-law requirements 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.

4.2.2 Bicycle Parking Requirements and Supply

The proposed bicycle parking supply number of spaces and rate is shown in Table 16.

Table 16 – 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	798 units	0.5	399	226 (Parcel 1) +177 (Parcel 2)
Commercial	430.6 sq.m	1 / 1500 sqm of GFA	0.3	
Total			399	403

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

As per the City's By-law, a minimum of 399 bicycle parking spaces are required to serve the development. The site plan includes 403 bicycle parking spaces provided on both ground floor and parking garages, which exceeds the minimum requirements.

4.3 Boundary Street Design

4.3.1 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 E.

Pedestrian LOS

The results of Pedestrian LOS are summarized in Table 17 and Table 18.

Table 17 - 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	More than 3000	Less than 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

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.

Table 18 - 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			

The pedestrian LOS for the signalized intersection LOS is C at Campeau Drive at Maritime Way / Knudson Drive.

Cycling LOS

The results of Cycling LOS are summarized in Table 19 and Table 20.

Table 19 - 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 (m)	>=1.8						>=1.8
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

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.

Table 20 - 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			

* 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.

Transit LOS

Based on the TLOS segment Evaluation Table from MMLOS Guidelines, the transit LOS for the Campeau Drive corridor is LOS E (mixed traffic with moderate parking/driveway friction), and Knudson Drive is estimated as LOS of D (mixed traffic with limited parking/driveway friction).

Truck LOS

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

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

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			

Table 22 - Truck Level of Service, Signalized Intersection

	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

The trucks LOS typically range between LOS C to LOS E.

Auto LOS

The trucks LOS typically range between LOS A to LOS C. The detailed results are provided in Section 4.8.

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.

4.3.2 Road Safety

Historical collision records have been reviewed in Table 6. Based on a review of area collision data, there's no intersection having more than six collisions in the past five years in the study area. The study area is generally safe in terms of traffic safety.

4.3.3 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.

4.4 Access Intersection Design

4.4.1 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 townhouses 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 23 summarized the spacing requirement and proposed spacing. The source information is provided in Appendix F.

Table 23 – Driveway Spacing

Driveway	Standard Spacing (m)	Proposed Spacing (m)
Proposed driveways off Cordillera Street	Minimum 1.0m between adjacent driveways	21m
The intersection of Campeau Drive and Cordillera Street	Minimum 2.0m from street corner	36m -116m
The street corner of Cordillera Street at Canadian Shield Avenue		22m

Sources: TAC Figure 8.9.2

The spacing between proposed accesses is 21m and spacing with street corners are from 22m to 116m, so the TAC guidelines have been met. And at the proposed driveway locations along Campeau Drive and Cordillera, there are no existing medians that will be affected.

4.4.2 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 2027 future total traffic volumes for the weekday AM, PM and Saturday peak hours are shown in Figure 27.

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 24.

Table 24 – 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	589	376	569	685	690	611	527
2027 Future Traffic Volumes	512	1144	712	1037	1204	1252	1097	967

Source: Intersection TMC by Trans-Plan, December 19, 2018

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 27.). The detailed signal warrant analysis is provided in Appendix G and the results are summarized below in Table 25.

Table 25 – 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%	92%	No
2 - Delay to Cross Traffic	100%	90%	No
Combination Warrant (1 & 2)	80%	59%	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.

4.4.3 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 4.8.

4.5 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.

4.5.1 Context for TDM

As is noted in Section 3.1.3, 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 26 based upon the mode share analysis provided in Table 11.

Table 26 – Existing and Proposed Mode Split

Travel Mode	Existing TAZ 500			Proposed Target Mode Share
	AM Peak	PM Peak	24 Hour	
Auto	52%	59%	63%	45%
Auto Passenger	25%	24%	23%	20%
Transit	13%	10%	8%	25%
Bicycle	0%	0%	0%	5%
Walk	10%	7%	6%	5%

Development Location and Involved Parties

The proposed development is not located in a Transit-oriented Development (TOD) zone. It is also 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 26. More details are provided in Site plan (Figure 2).

Table 27 – Proposed Unit Mix

	Townhouses	Apartment Buildings			Total
		1-bedroom	1-bedroom +Den	2-bedroom	
Parcel 1 (units)	104	104	104	140	452
Parcel 2 (units)	80	118	30	118	346
Total (units)	184	122	134	158	798

4.5.2 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 townhouses, 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.

4.5.3 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 28.

Table 28 – 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 consider providing purchasers with PRESTO cards preloaded with monthly pass.
4. CARSHARING & BIKESHARING		
4.1	Bikeshare stations & memberships	
4.1.1	Contract with provider to install on-site bikeshare station (multi-family)	✓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.

4.6 Neighbourhood Traffic Management

This section assesses the extent to which the proposed development will affect the character and function of any existing streets in the study area. A summary of the projected weekday peak hour traffic volumes, and corresponding road classifications for the adjacent road network, are summarized in Table 29.

Table 29 – 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	500 veh-3000veh	588 veh	1039 veh
Cordillera Street	Local	120 veh	26 veh	97 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.

4.7 Transit

The proposed development is well-situated relative to existing transit infrastructure with the Terry Fox Bus Terminal located within approximately 500 metres. 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 3.1 within this report. Transit trips to and from the site during the weekday morning and afternoon peak hours are summarized in Table 30.

Table 30 – Transit Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Transit Trips	10	29	39	24	15	39

It is anticipated that the proposed development will generate approximately 39 and 39 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.

4.8 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 31. Capacity Analysis Sheets and Level of Service (LOS) Definitions are provided in Appendix H and Appendix I, respectively. The results of the capacity analysis are discussed in this section for each intersection:

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 14 seconds and a v/c ratio of 0.37 and 0.29 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 21 seconds in the weekday AM and PM peak hour, respectively. All the movements are expected to operate at a LOS of C 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 13 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 D or better, similar to the existing conditions, but with an increase in delay (26 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 13 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 20 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 A, with minimal 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 27 seconds) in northbound movement.

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 B or better with a delay of up to 9 seconds.

All the proposed site accesses are expected to operate well, with a LOS of B or better during the weekday peaks. Delays of up to 20 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.

Table 31 - 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
Proposed Access 1/Stonecroft Terrace & Campeau Drive																		
Eastbound Through / Left		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through / Right		0	A		0	A		0	A		0	A		1	A		1	A
Northbound Through / Left / Right														25	D		27	D
Southbound Left / Right		12	B		12	B		15	B		16	C		19	C		21	C
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		13	B		13	B		19	C		19	C		24	C		26	D
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		13	B		12	B		18	C		17	C		23	C		21	C
Southbound Through / Left / Right		12	B		12	B		15	C		15	C		18	C		18	C
Maritime Way/Knudson Drive & Campeau Drive	**0.37**	**15**	**B**	**0.29**	**14**	**B**	**0.54**	**19**	**B**	**0.54**	**17**	**B**	**0.58**	**21**	**C**	**0.59**	**18**	**B**
Eastbound Left	0.08	11	B	0.06	6	A	0.14	12	B	0.10	8	A	0.28	15	B	0.13	10	A
Eastbound Through / Right	0.34	14	B	0.21	6	A	0.65	19	B	0.35	7	A	0.75	22	C	0.40	8	A
Westbound Left	0.06	11	B	0.08	12	B	0.12	12	B	0.11	12	B	0.16	13	B	0.11	12	B
Westbound Through / Right	0.49	16	B	0.35	15	B	0.68	20	C	0.65	20	C	0.73	22	C	0.71	22	C
Northbound Left	0.02	16	B	0.03	29	C	0.02	16	B	0.04	29	C	0.02	16	B	0.04	29	C
Northbound Through / Right	0.06	17	B	0.06	30	C	0.07	17	B	0.06	30	C	0.07	17	B	0.06	30	C
Southbound Left	0.20	19	B	0.15	31	C	0.36	21	C	0.31	34	C	0.36	21	C	0.31	34	C
Southbound Through / Right	0.05	17	B	0.03	29	C	0.05	17	B	0.04	29	C	0.05	17	B	0.05	29	C
Cordillera Street & Proposed Access 2																		
Eastbound Left / Right														9	A		9	A
Northbound Through / Left														0	A		2	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		5	A
Southbound Through / Right														0	A		0	A

5. 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 townhouses with 184 units and three 10-storey apartment buildings with 614 units. A total of 691 parking spaces and 403 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 298 and 387 two-way trips in the weekday AM and PM peak hours, respectively.
- The City's Zoning By-law's requirement is 852 spaces and 620 spaces for Area C and Area with in 600m of a Rapid Transit Station, respectively. A total supply of 691 spaces for both residents and visitors are proposed on site, which results in a shortfall for 161 spaces under Area C policy but exceeds the by-law requirements for Rapid Transit Area.
- The subject site provides 404 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.
- At proposed site access at Campeau Drive, our analysis indicates that a traffic signal would not be warranted for the horizon year.
- 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 27 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 2A - Site Plan Parcel 1

PROJECT INFORMATION - PARCEL 1			
ZONING STANDARD BASED ON MC5	REQUIRED	PROVIDED	
LOT AREA	-	19,644.4 m²	1.964 Ha
TOTAL ZONING GFA	-	32,535.4 m²	
FSI (MAX)	2.00	1.66	
BUILDING HEIGHT (MAX)	35.0 m	31.9 m	
Front Yard Setback (MAX)	3.5 m	3.0 m	
Interior Side Yard Setback (MIN)	3.5 m	5.7 m	
Rear Yard Setback (MIN)	6.0 m	17.8 m	
Surface Parking Front & Corner Yard Setback (Min)	10.0 m	20.2 m	
FSI Non-Residential (Min)	0.75	0.00	
GFA Non-Residential	-	0.00	
Apartment & Stacked Dwellings Amenity Space (Min 6m² per unit)	2,712.0 m²	2,715.0 m²	
Communal Amenity (Min 50%)	1,356.0 m²	1,360.0 m²	
Large Amenity (Min 1 space)	54.0 m²	145.0 m²	
LOT COVERAGE (MAX)	-	5,911.1 m²	30.1%
APARTMENT A,B FOOTPRINT	-	*3,837.5 m²*	*19.5%*
STACKED DW. BLOCKS FOOTPRINT	-	*2,073.6 m²*	*10.6%*
LANDSCAPE AREA	-	10,086.4 m²	51.3%
SOFT LANDSCAPING	-	*7,735.2 m²*	*39.4%*
HARD LANDSCAPING	-	*2,351.2 m²*	*12.0%*
ASPHALT AREA	-	3,569.9 m²	18.2%

APARTMENT A,B STATISTICS				
UNITS	1-BDRM	1-BD+DEN	2-BDRM	TOTAL
(53 BF UNITS)	104	104	140	348
FLOOR LEVEL	GFA (Zoning)		GFA (OBC)	
	ft²	m²	ft²	m²
TOTAL	251,204 ft²	23,337.6 m²	312,368 ft²	29,020.0 m²

STACKED DWELLING UNIT STATISTICS - BLOCKS 1,2,3,4,5				
UNITS	1-BDRM	2-BDRM	TOTAL	
Counts	52	52	104	
GFA	Zoning		OBC	
TOTAL	99,004 ft²	9,197.8 m²	106,182 ft²	9,864.6 m²

PARKING STATISTICS		
TYPE - DEDICATION (LOCATION)	RATE	SPACES
STACKED DW.- RESIDENTS (AT GRADE	1.00	104
STACKED DW. - VISITORS (AT GRADE)	0.10	10
APARTMENT - RESIDENTS (U/G)	0.73	255
APARTMENT - VISITORS (U/G)	0.10	35
NON-RESIDENTIAL SPACES (U/G)	*0.00 / 100m²*	0
TOTAL		404

DRIVE AISLE & BICYCLE REQUIREMENTS		
TYPE	REQUIRED	COMPLIANCE
Drive Aisle - Two way at Grade	6.7 m	YES
Drive Aisle - Two way at Parking Garage	6.0 m	YES
Loading Space - Type A Standard	3.5 x 9.0 x 4.2(h)m	YES
BICYCLE PARKG, HORIZ - Table 111B	0.60 x 1.8m & *1.5m aisle*	YES
BICYCLE PARKG, VERT - Table 111B	0.50 x 1.5m & *1.5m aisle*	YES

CREDIT NOTES:

THIS SITE PLAN IS BASED UPON AND MUST BE READ IN CONJUNCTION WITH FILE SURVEY_20191-20 PrtLt3Con2 T 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. LT278660)
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:

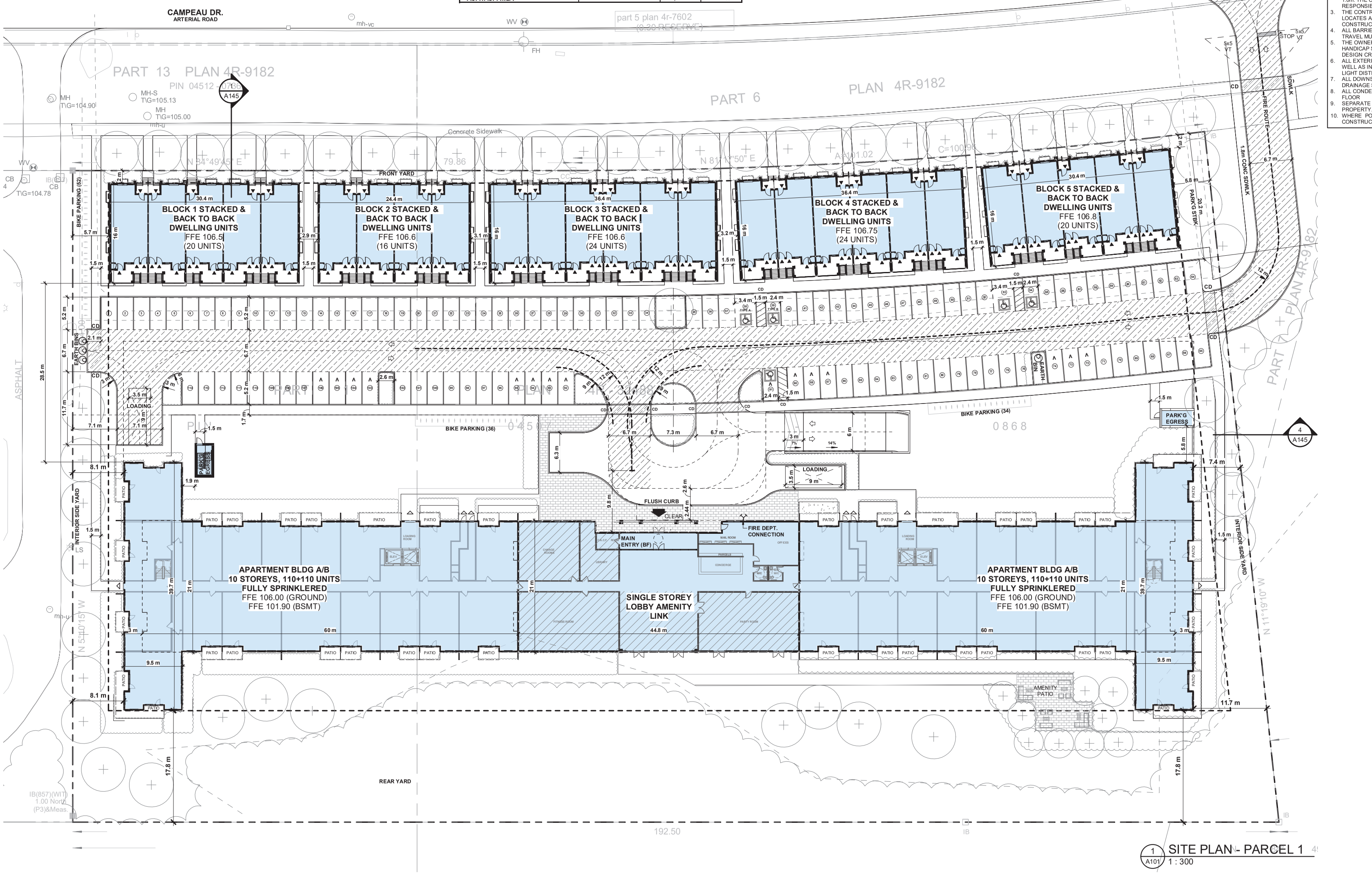
1. ALL EXISTING PAVEMENT, CURBS, SIDEWALKS, DRIVEWAYS AND BOULEVARD AREAS DISTURBED BY THE CONSTRUCTION MUST BE REINSTATED TO THE SATISFACTION OF THE TOWN.
2. A MINIMUM SETBACK OF 1.0m FROM STREET FURNITURE TO PROPOSED DRIVEWAYS AND SIDEWALKS SHALL BE MAINTAINED. ALL EXISTING STREET FURNITURE TO BE RELOCATED BY THE CONTRACTOR/OWNER TO A SETBACK OF 1.0m. THE COST OF THE RELOCATION OF ANY UTILITYIS 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 O.B.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.

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
- 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

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



SITE PLAN - PARCEL 1
1 : 300

DEVELOPMENT CONSULTANT:
ARCHITECTURE & PLANNING INITIATIVES
7-1464 CORNWALL RD
OAKVILLE, ON. L6J 7W5
P: 905.337.7249

GENERAL NOTES:
IT IS THE CONTRACTOR'S RESPONSIBILITY TO:
1. USE FIGURED DIMENSIONS IN PREFERENCE TO SCALING.
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 REVIEWED BY THE ARCHITECT BEFORE PROCEEDING.

TRUE N.
PROJECT N.

FABIANI ARCHITECT LTD.

PROFESSIONAL CERTIFICATION

BAYVIEW HOSPITALITY GROUP

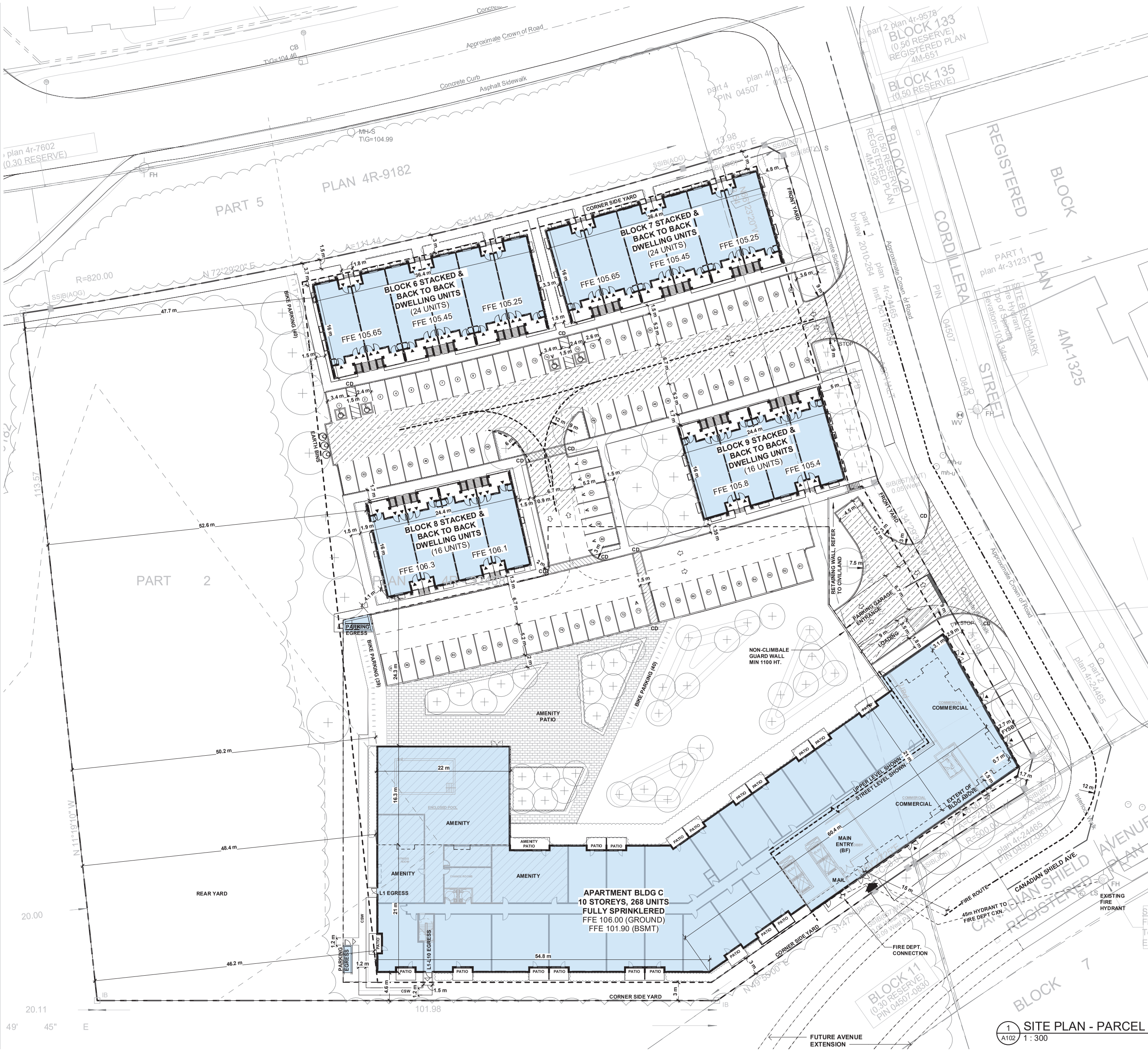
PROJECT NAME: KANATA MIXED-USE RESIDENTIAL PROJECT
6301 CAMPEAU DR. KANATA, ON. K2K 3E9

DRAWING TITLE: SITE PLAN - PARCEL 1

DRAWN BY: ML
DATE: 20-11-24
CHECKED BY: FF
SCALE: As indicated
PROJECT No. F19-049
SET No.
DRAWING No. A101
SHEET ISSUE No. 1

7-1464 CORNWALL ROAD OAKVILLE, ON. L6J 7W5 P: (905) 337-7249 E: admin@apiconsultants.net

Figure 2B- Site Plan Parcel 2



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

CREDIT NOTES:

THIS SITE PLAN IS BASED UPON AND MUST BE READ IN CONJUNCTION WITH FILE SURVEY_20191-20 PrtLt3Con2 T 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.

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PART OF LOT 3 CONCESSION 3
AND PART OF ROAD ALLOWANCE BETWEEN CONCESSION 2 AND 3 (CLOSED BY INST. LT278660)
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*

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- 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
- 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

PROJECT INFORMATION - PARCEL 2

ZONING STANDARD BASED ON MC5	REQUIRED	PROVIDED	
LOT AREA	-	17,410.8 m²	1.741 Ha
TOTAL ZONING GFA	-	25,661.2 m²	
FSI (MAX)	2.00	1.47	
BUILDING HEIGHT (MAX)	35.0 m	33.4 m	
Front Yard Setback (MAX)	3.5 m	2.7 m	
Corner Side Yard Setback (MIN)	-	1.7 m	
Rear Yard Setback (MIN)	6.0 m	46.2 m	
Surface Parking Front & Corner Yard Setback (Min)	10.0 m	3.6 m	
FSI Non-Residential (Min)	0.75	0.02	
GFA Non-Residential	-	430.6 m²	
Apartment & Stacked Dwellings Amenity Space (Min 6m² per unit)	2,076.0 m²	2,350.0 m²	
Communal Amenity (Min 50%)	1,038.0 m²	1,050.0 m²	
Large Amenity (Min 1 space)	54.0 m²	300.0 m²	
LOT COVERAGE (MAX)	-	4,146.7 m²	23.8%
APARTMENT C FOOTPRINT	-	*2,552.1 m²*	*14.7%*
STACKED DW. BLOCKS FOOTPRINT	-	*1,594.6 m²*	*9.2%*
LANDSCAPE AREA	-	10,368.6 m²	59.6%
SOFT LANDSCAPING	-	*8,339.7 m²*	*47.9%*
HARD LANDSCAPING	-	*2,028.9 m²*	*11.7%*
ASPHALT AREA	-	2,705.4 m²	15.5%

APARTMENT C STATISTICS

UNITS	1-BDRM	1-BD+DEN	2-BDRM	TOTAL
(40 BF UNITS)	118	30	118	266
FLOOR LEVEL	GFA (Zoning)		*GFA (OBC)*	
	ft²	m²	*ft²*	*m²*
TOTAL	200,075 ft²	18,587.6 m²	*241,538 ft²*	*22,439.6 m²*

STACKED DWELLING UNIT STATISTICS - BLOCKS 6,7,8,9

UNITS	1-BDRM	2-BDRM	TOTAL	
Counts	40	40	80	
GFA	Zoning		*OBC*	
TOTAL	76,140 ft²	7,073.6 m²	*81,668 ft²*	*7,587.2 m²*

PARKING STATISTICS

TYPE - DEDICATION (LOCATION)	RATE	SPACES
STACKED DW.- RESIDENTS (AT GRADE	1.00	80
STACKED DW. - VISITORS (AT GRADE)	0.10	8
APARTMENT - RESIDENTS (U/G)	0.68	181
APARTMENT - VISITORS (U/G)	0.04	10
NON-RESIDENTIAL SPACES (U/G)	*0.54 / 100m²*	8
TOTAL		287

DRIVE AISLE & BICYCLE REQUIREMENTS

TYPE	REQUIRED	COMPLIANCE
Drive Aisle - Two way at Grade	6.7 m	YES
Drive Aisle - Two way at Parking Garage	6.0 m	YES
Loading Space - Type A Standard	3.5 x 9.0 x 4.2(h)m	YES
BICYCLE PARKG, HORIZ - Table 111B	0.60 x 1.8m & *1.5m aisle*	YES
BICYCLE PARKG, VERT - Table 111B	0.50 x 1.5m & *1.5m aisle*	YES

DEVELOPMENT CONSULTANT: API
FABIANI ARCHITECT LTD.
PROFESSIONAL CERTIFICATION
BAYVIEW HOSPITALITY GROUP

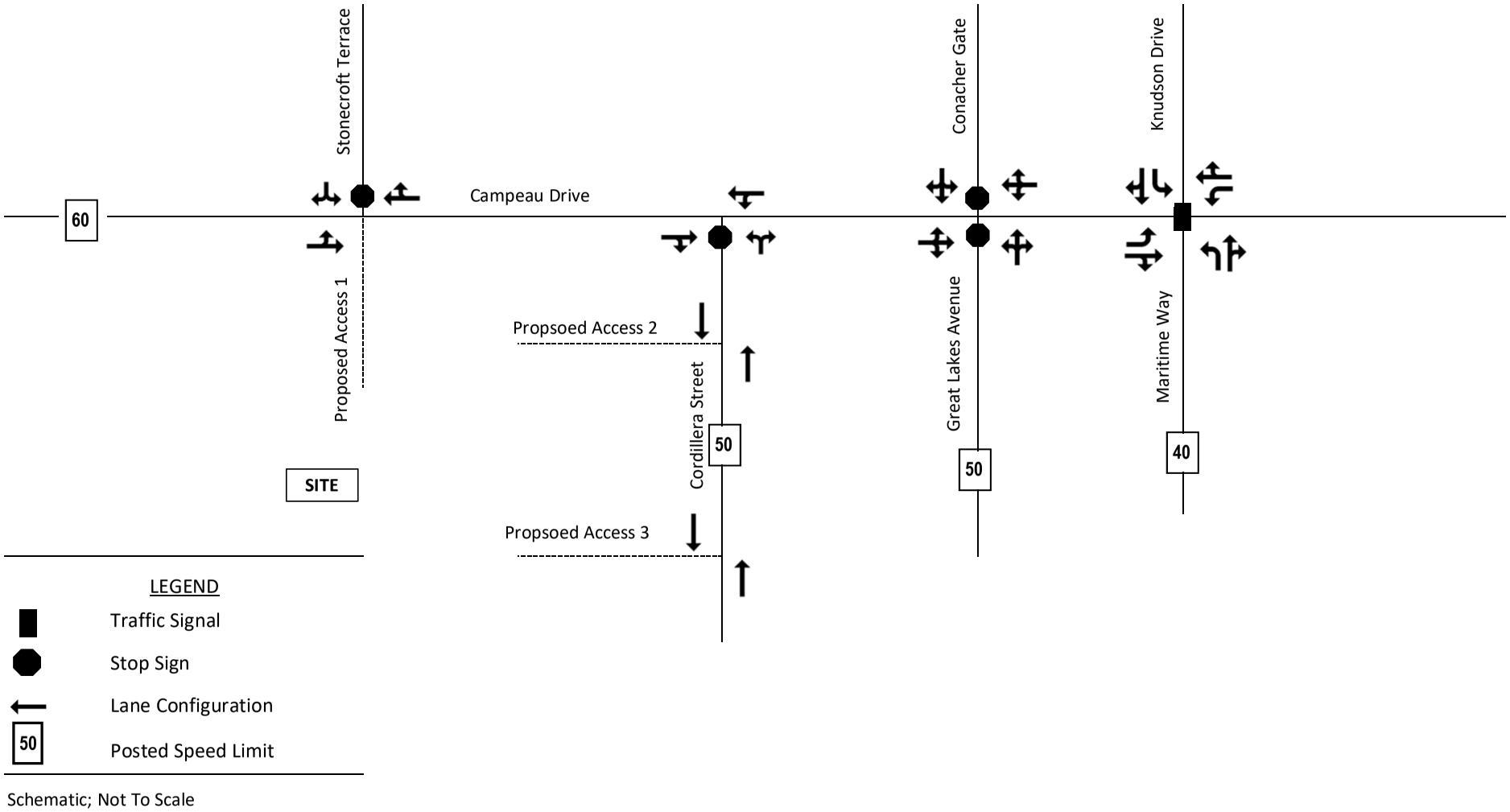
KANATA MIXED-USE RESIDENTIAL PROJECT
6301 CAMPEAU DR, KANATA, ON. K2K 3E9

SITE PLAN - PARCEL 2

DRAWN BY: ML | CHECKED BY: FF | DATE: 20-11-24 | SCALE: As indicated
PROJECT No. F19-049
DRAWING No. A102 | SHEET ISSUE No. 1

7-1464 CORNWALL ROAD OAKVILLE, ON. L6J 7W5 P: (905) 337-7249 E: admin@apiconsultants.net

Figure 3: Existing Study Area Roadway Characteristics



Schematic; Not To Scale

Figure 4 – Study Area Transit Service

Source: OC Transpo website

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

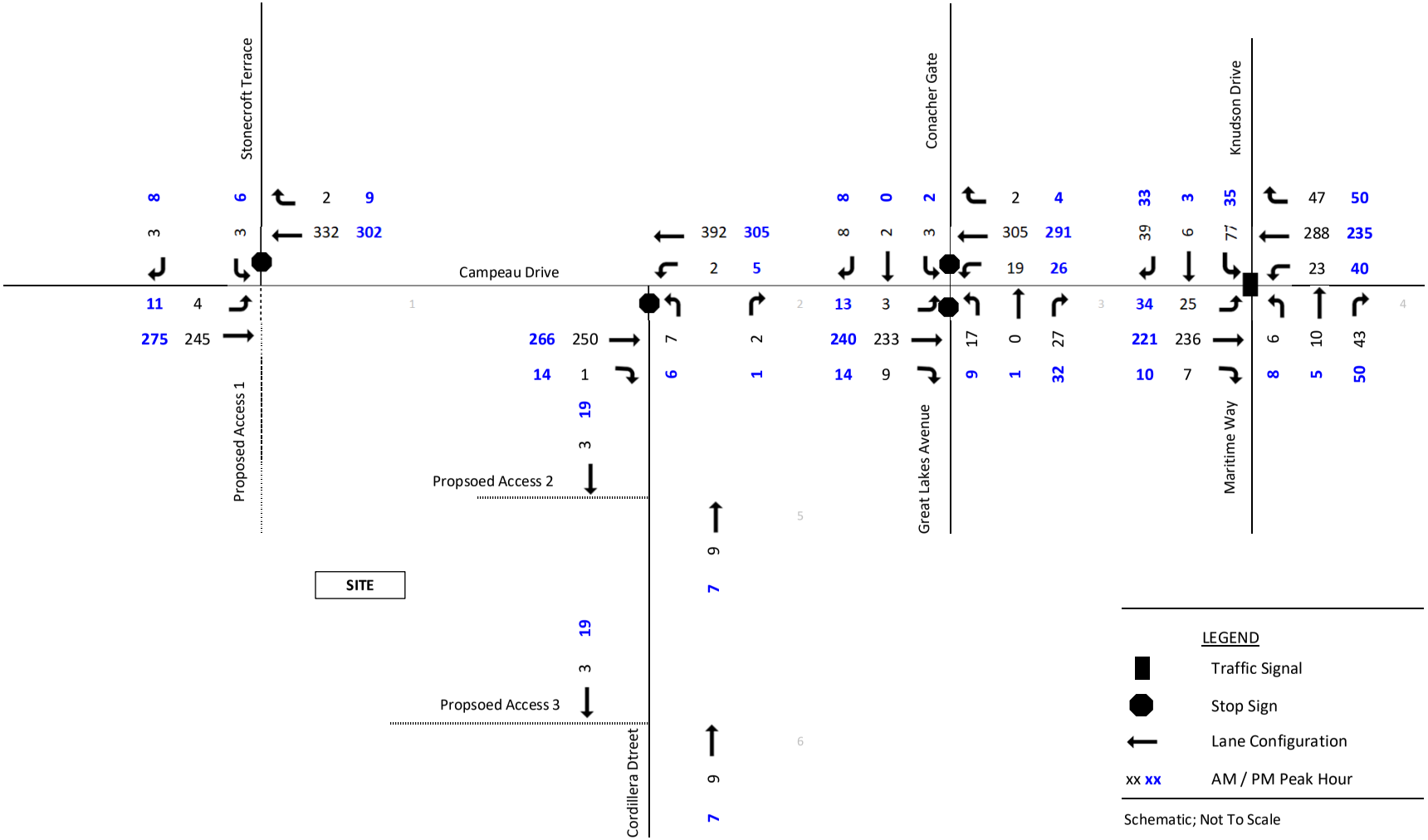
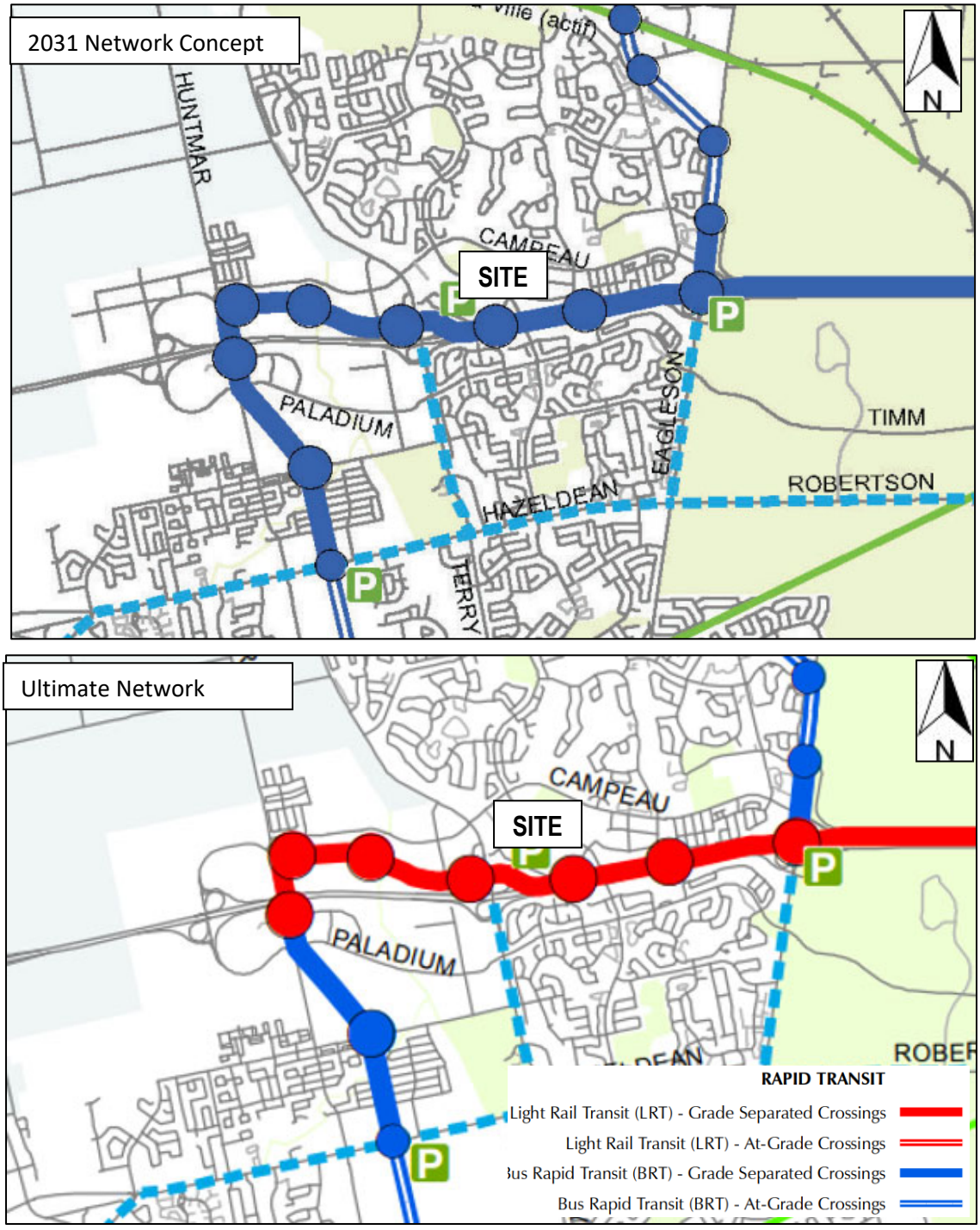


Figure 6 – Planned Rapid Transit Network



Source: City of Ottawa Transportation Master Plan

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

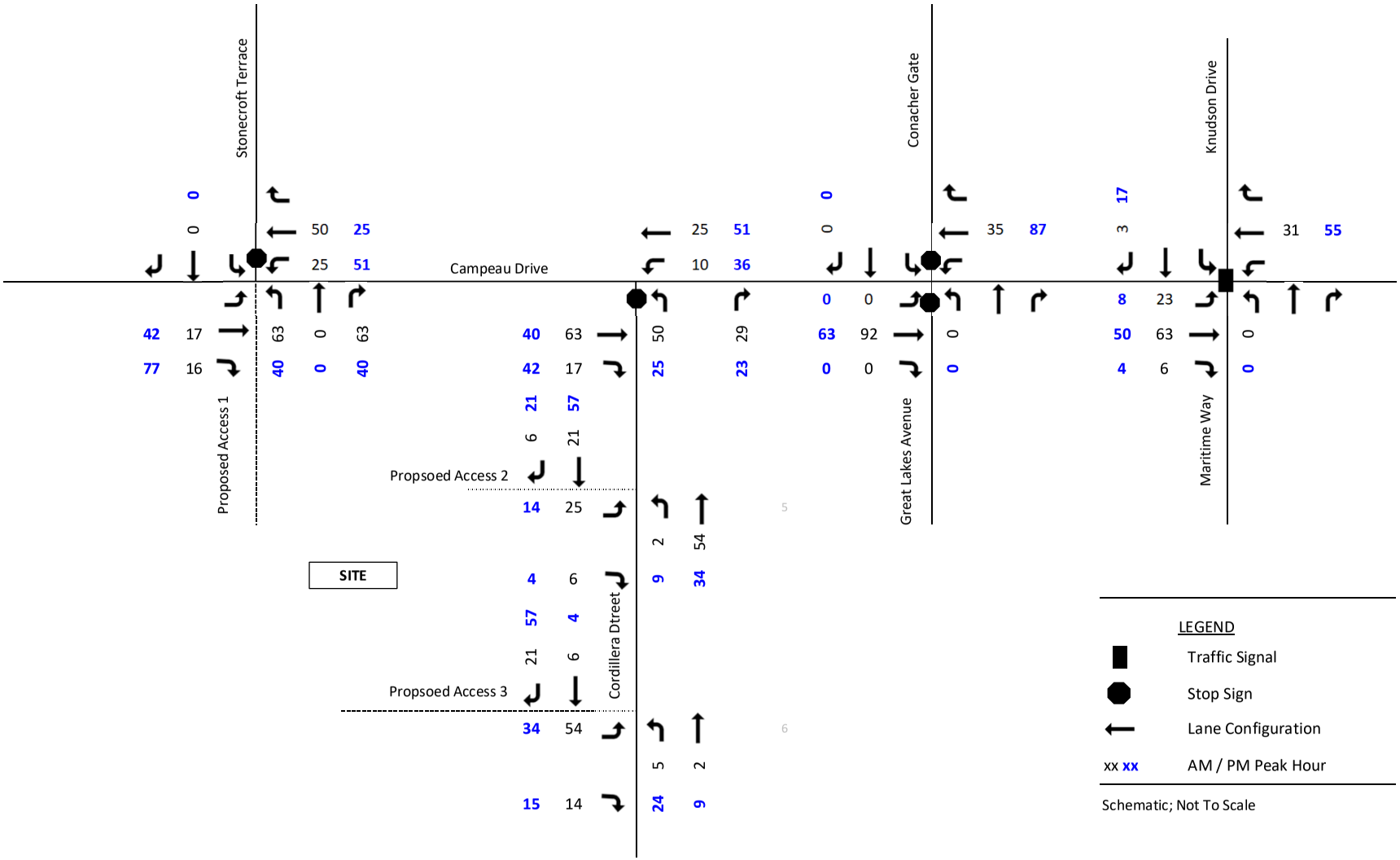
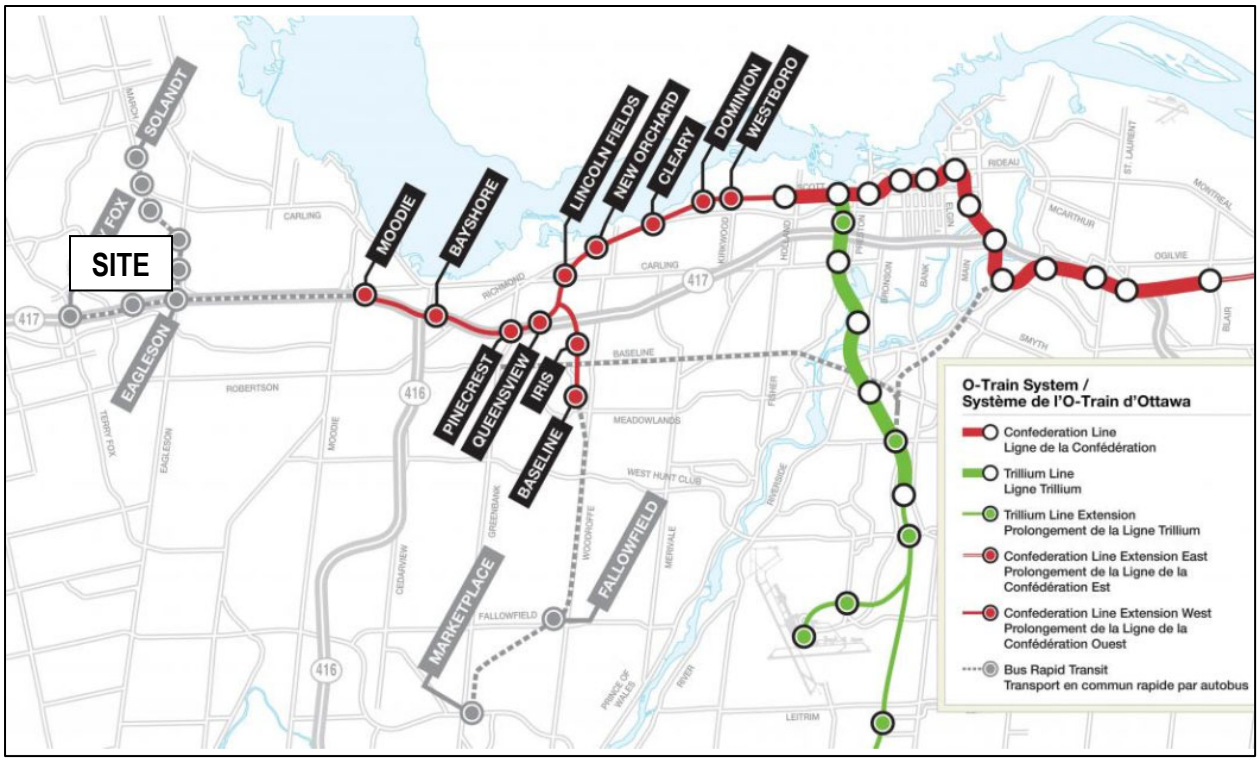


Figure 8 – Proposed Confederation Line West Extension



Source: City of Ottawa Website

Figure 9: Future Background 2027 Traffic Volumes, Weekday AM and PM Peak Hours

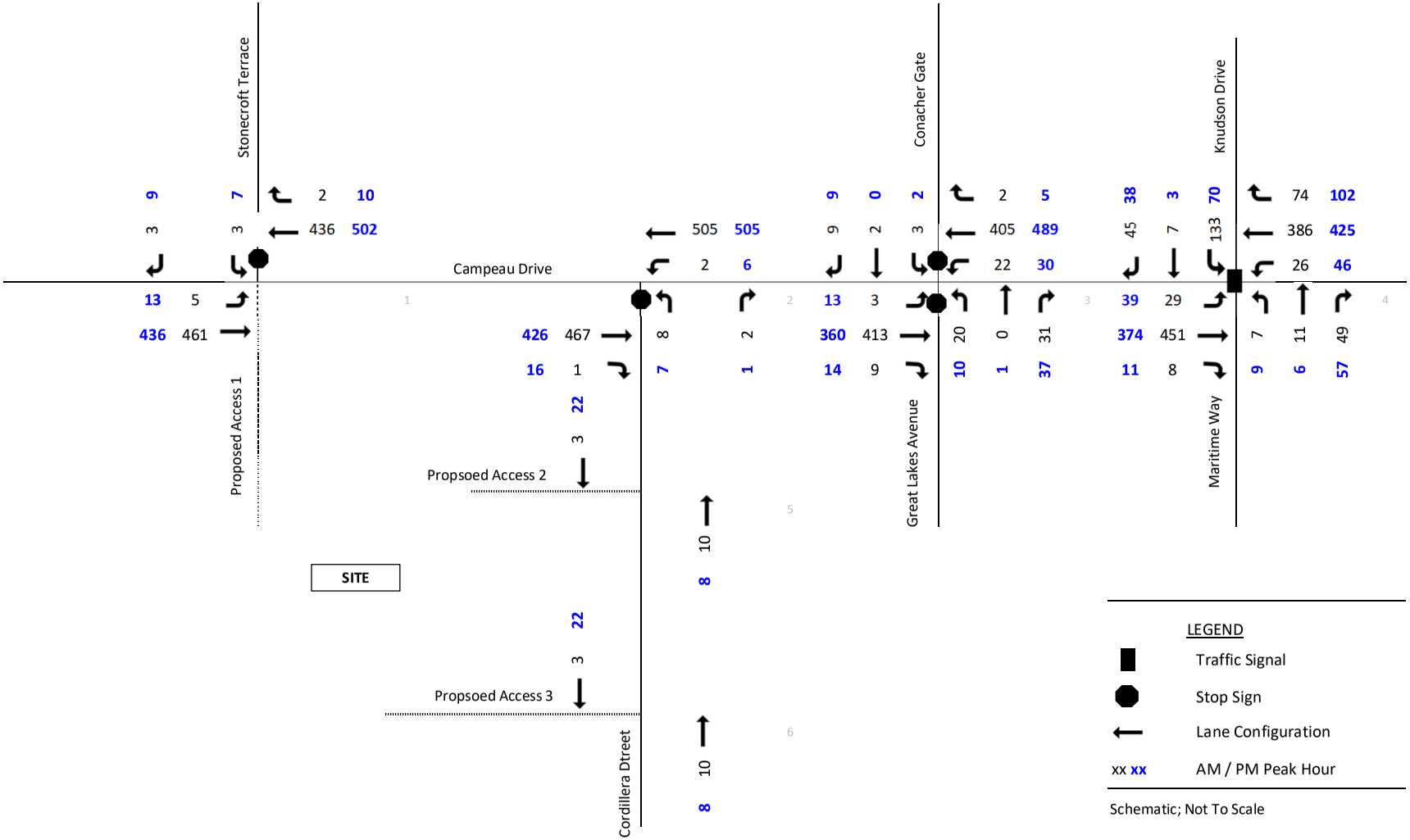


Figure 10 – Bus Stop Locations

Source: Google Maps

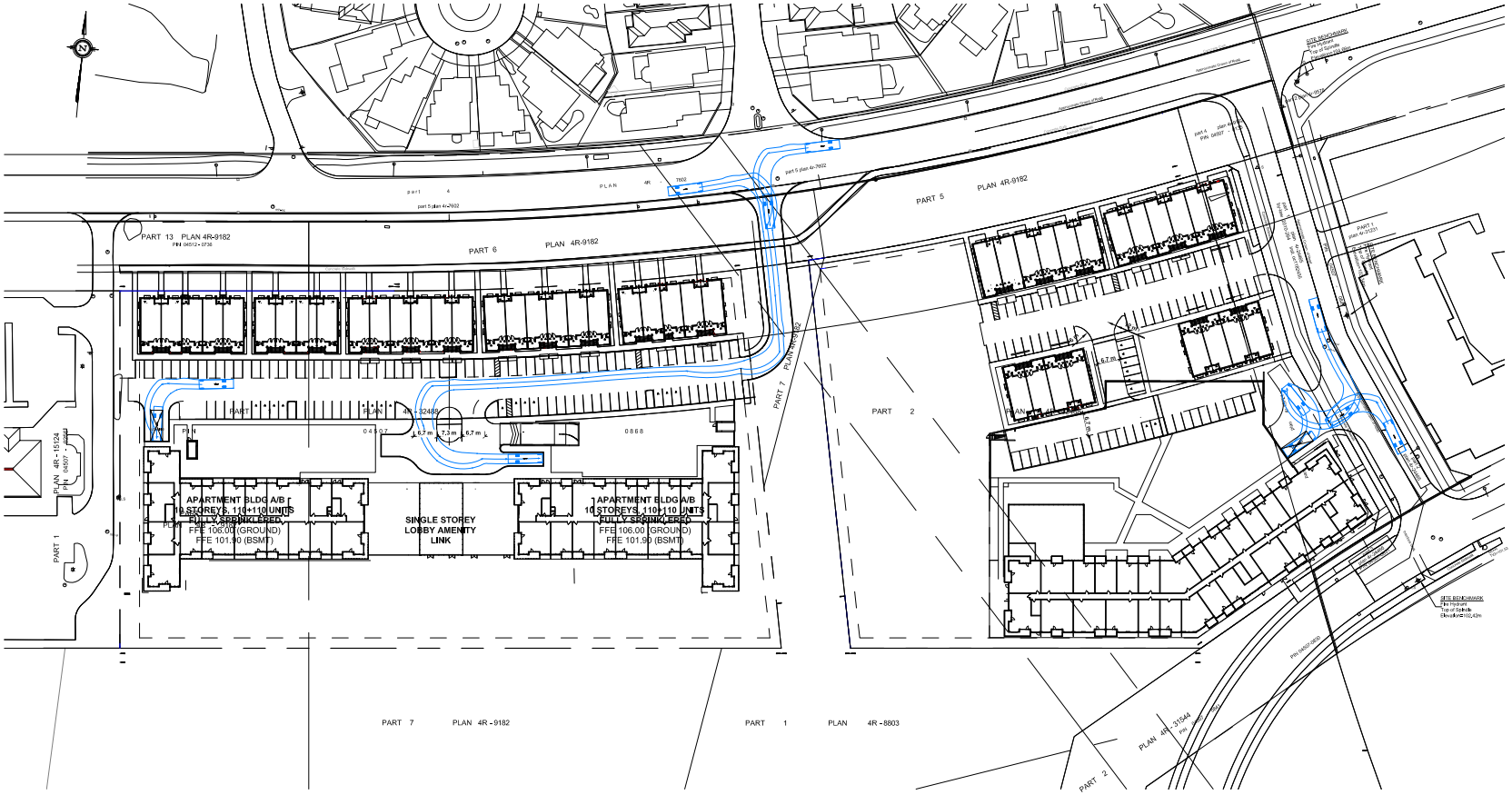
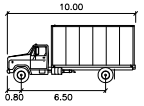
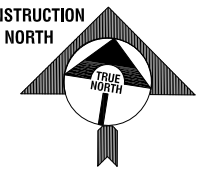


Figure 11 - Loading Vehicle Entering the Site and the Loading Area

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



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

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

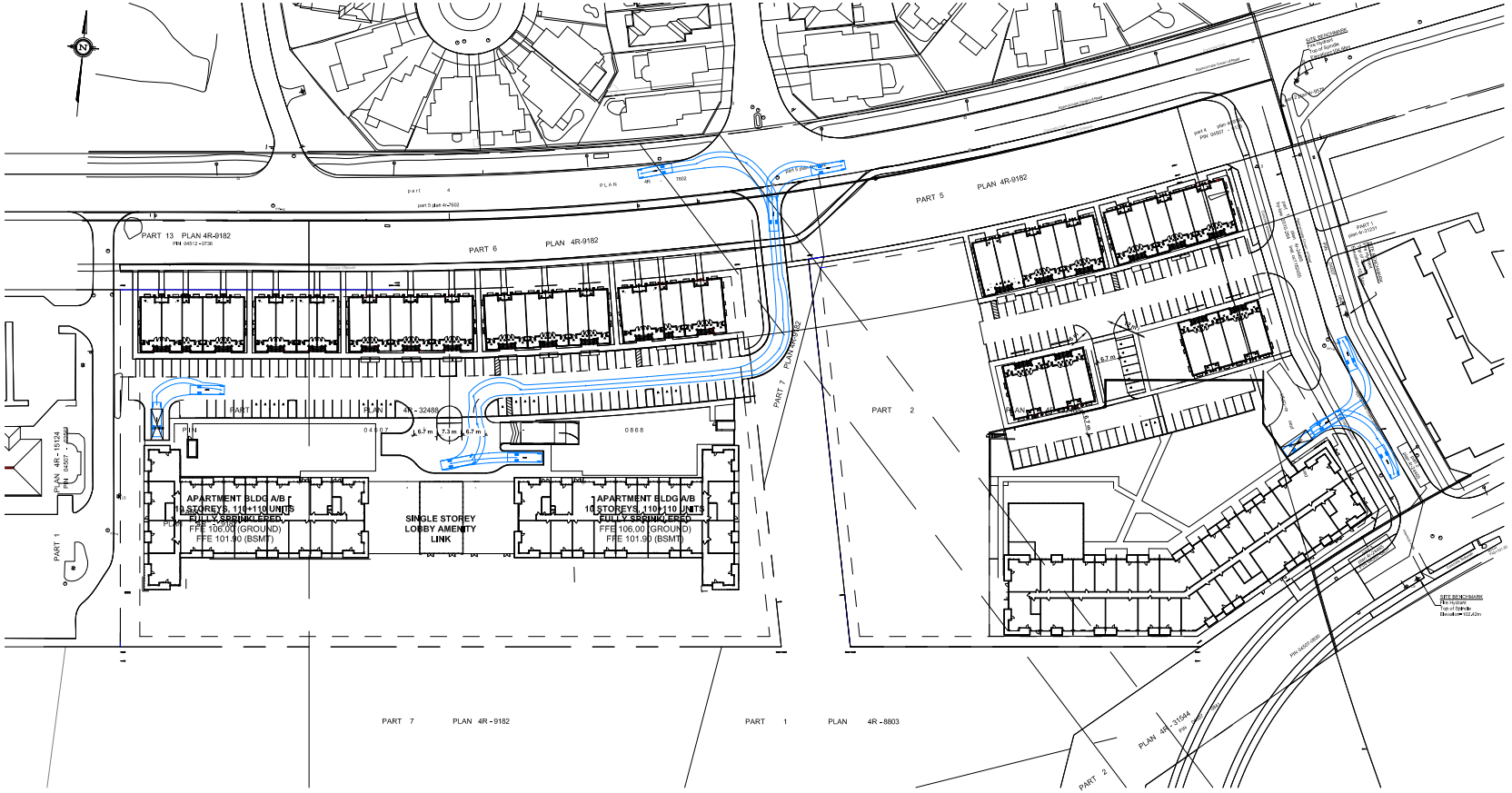
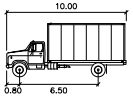
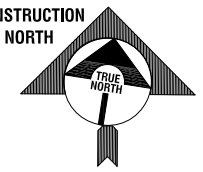


Figure 12 - Loading Vehicle Exiting Loading Area and the Site

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



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

SCALE: 1:2000 UNITS: m

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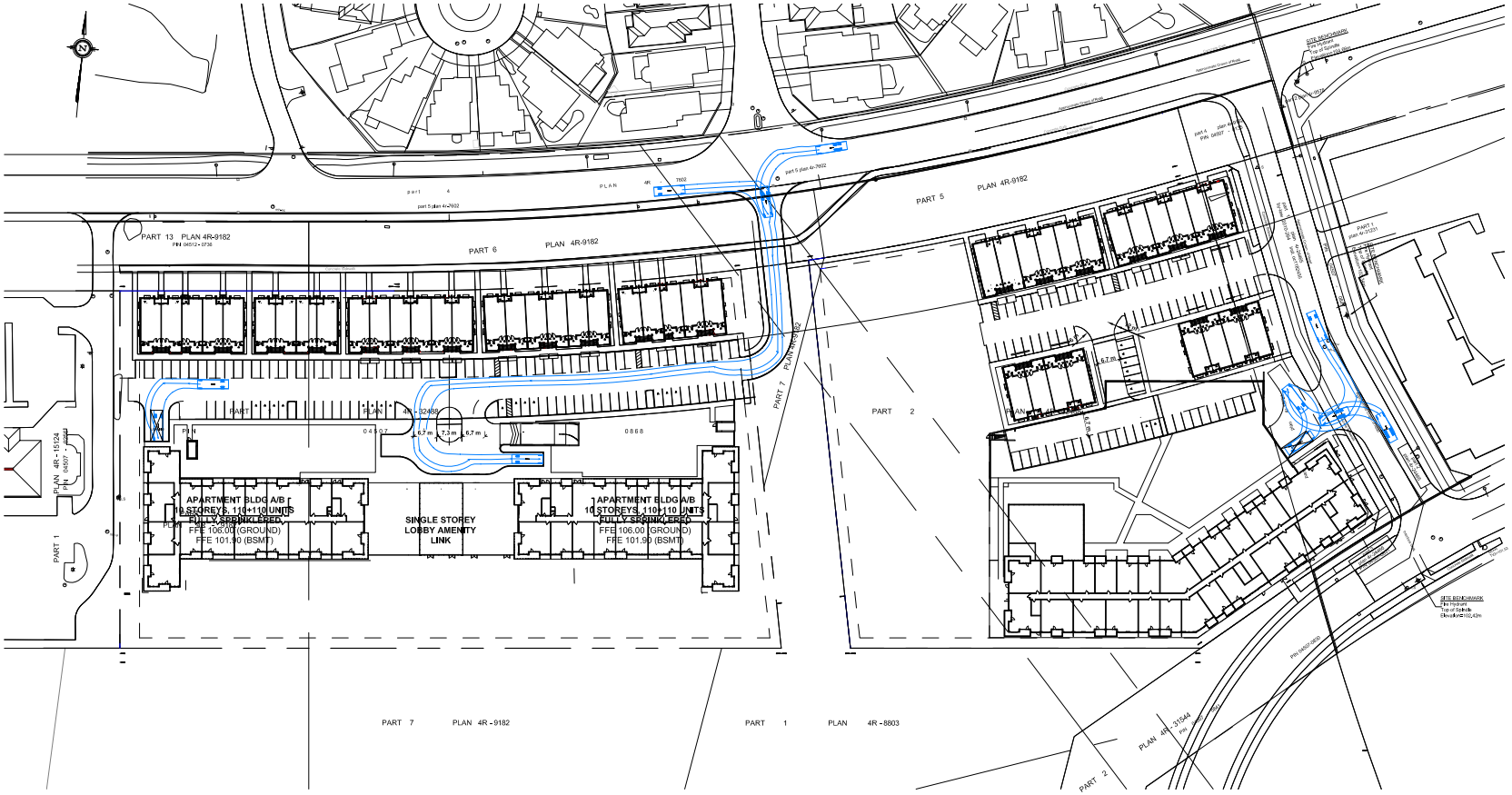
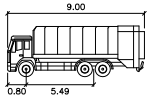


Figure 13 - 9m Waste Collection Vehicle Entering the Site and the Loading Area

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 November 3, 2020

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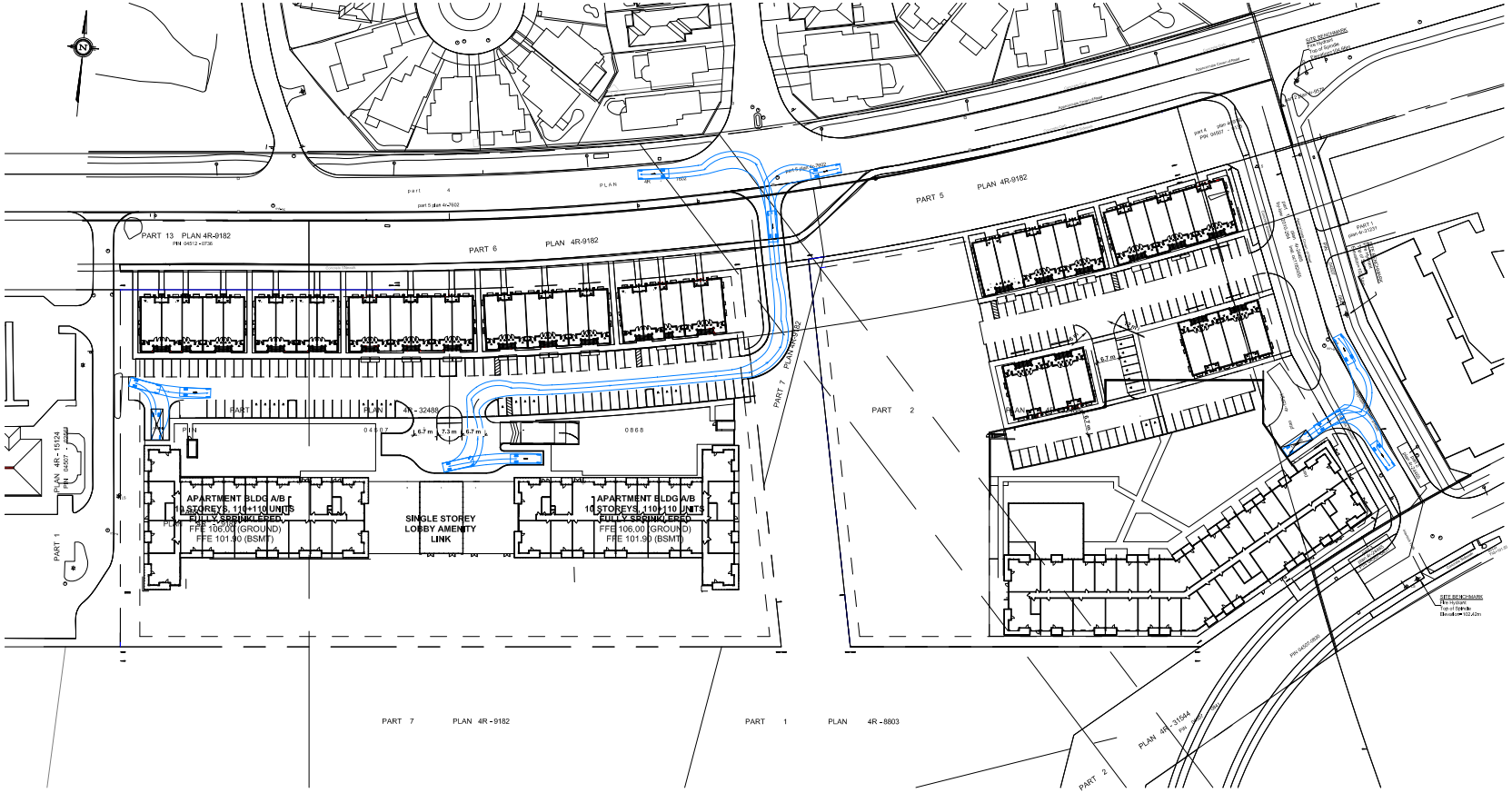
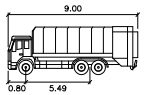


Figure 14 - Waste Collection Vehicle Exiting Loading Area and the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



9m Waste Vehicle Parameters

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

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

SCALE: 1:2000 UNITS: m

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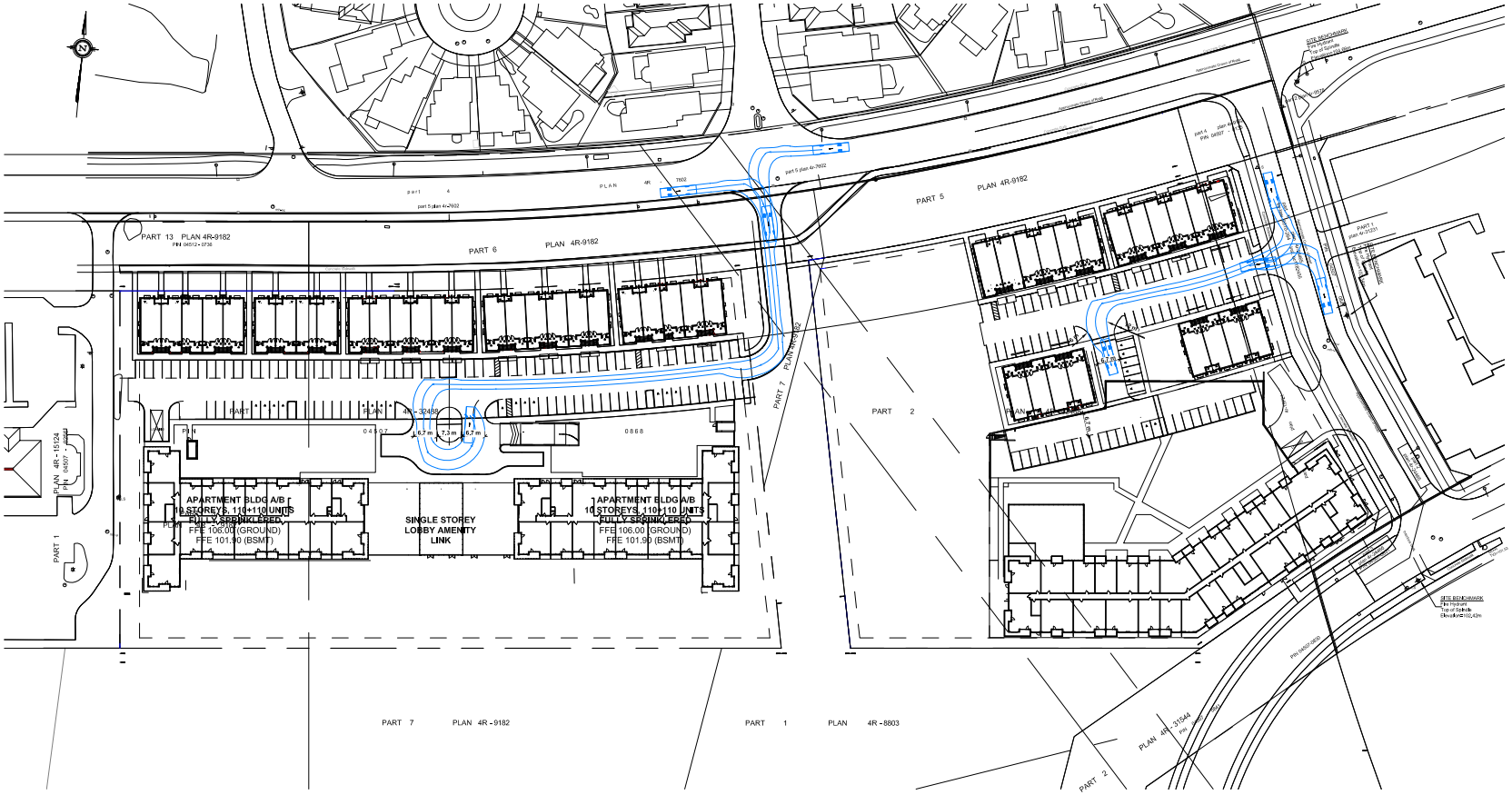
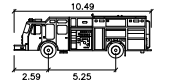


Figure 15 - Fire Truck Entering the Site and Circulating

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Fire Truck A

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

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

SCALE: 1:2000 UNITS: m

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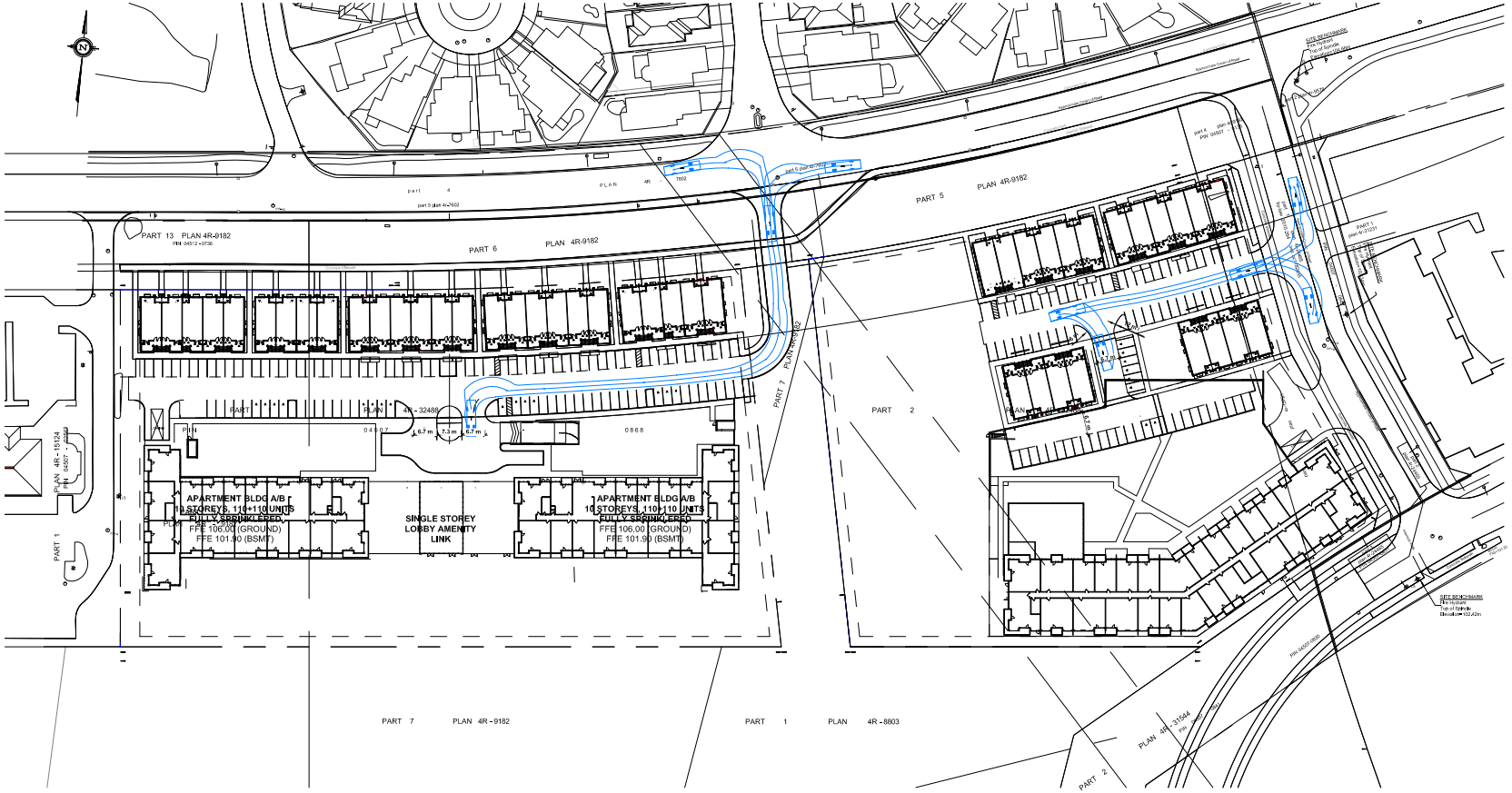
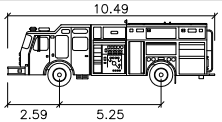


Figure 16 - Fire Truck Exiting the Site

PROPOSED HOUSING DEVELOPMENT
6301 CAMPEAU DRIVE,
KANATA, ON



Fire Truck 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 November 3, 2020

SCALE: 1:2000 UNITS: m

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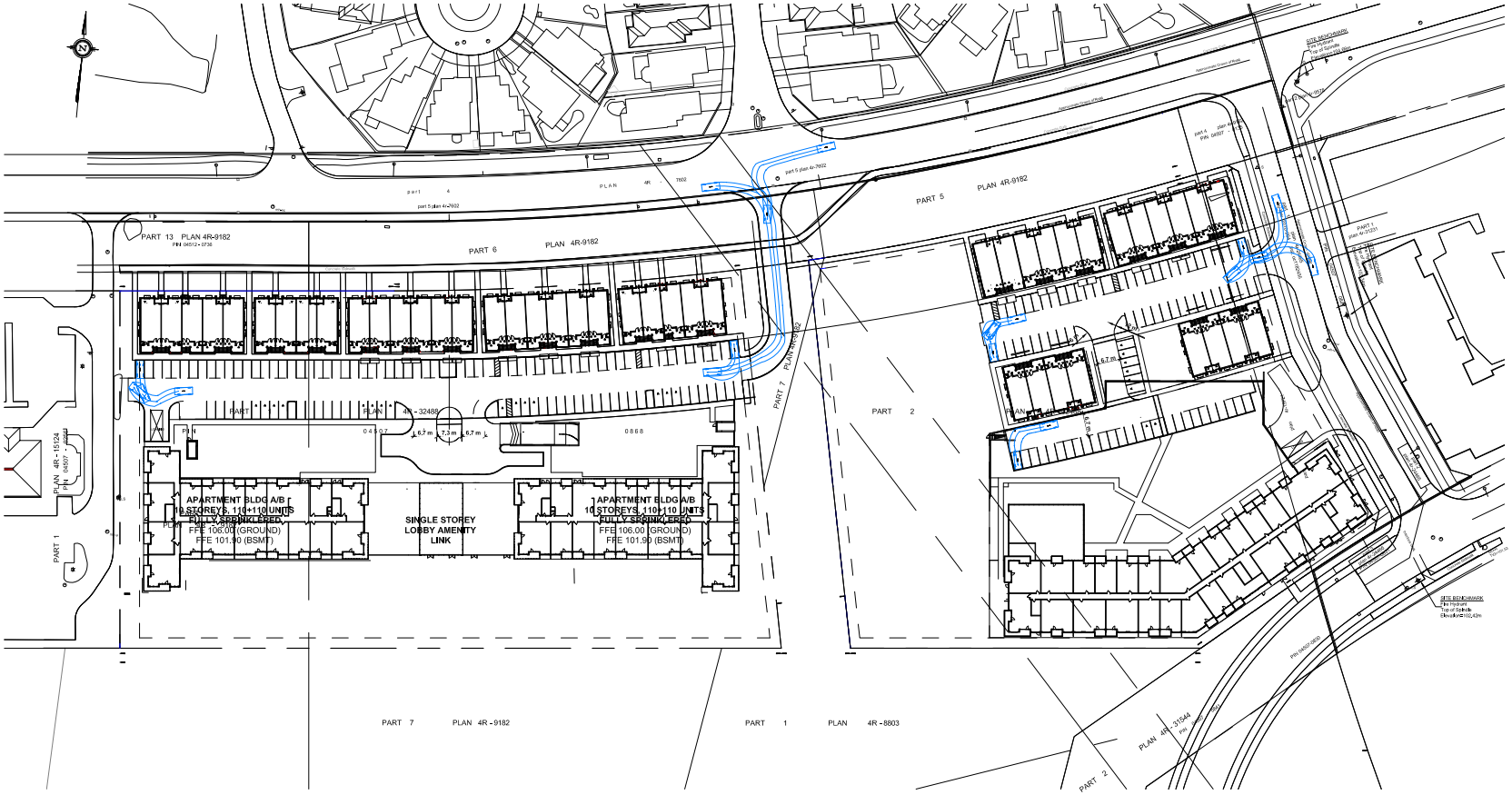
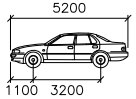


Figure 17 - Passenger Vehicle Entering the Site and the Parking Spaces

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

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

SCALE: 1:2000 UNITS: m

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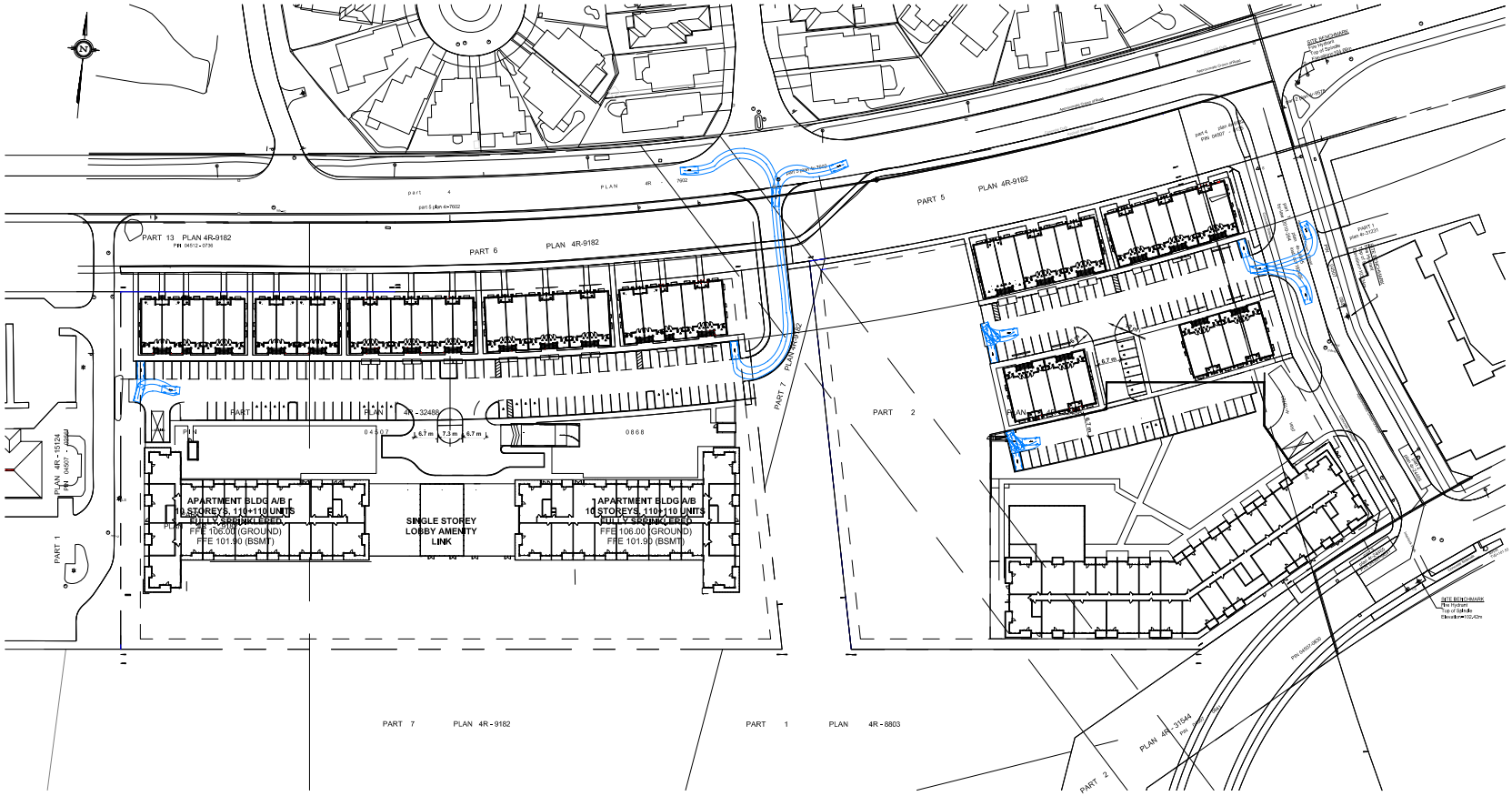
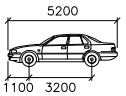


Figure 18 - Passenger Vehicle Exiting the Parking Spaces and the Site

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

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

SCALE: 1:2000 UNITS: m

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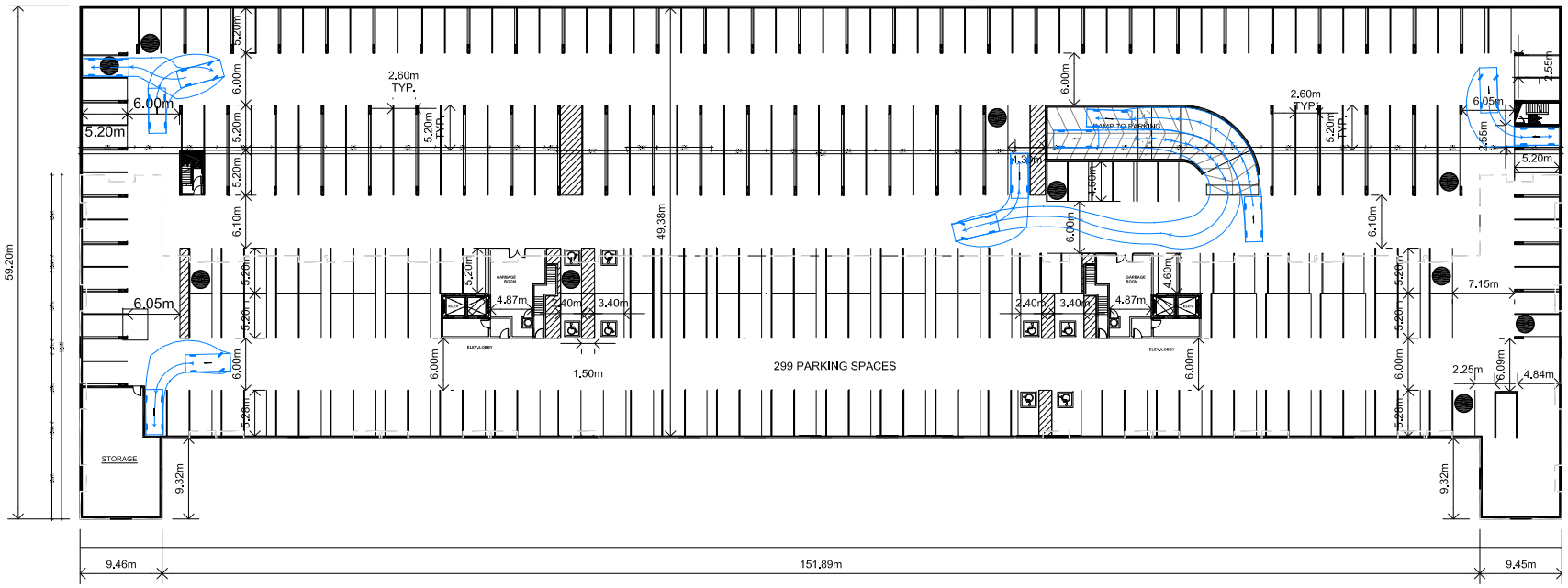
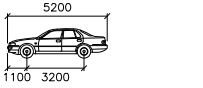


Figure 19 - Passenger Vehicle Entering the Underground Garage (Building A&B) and the Parking Spaces

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

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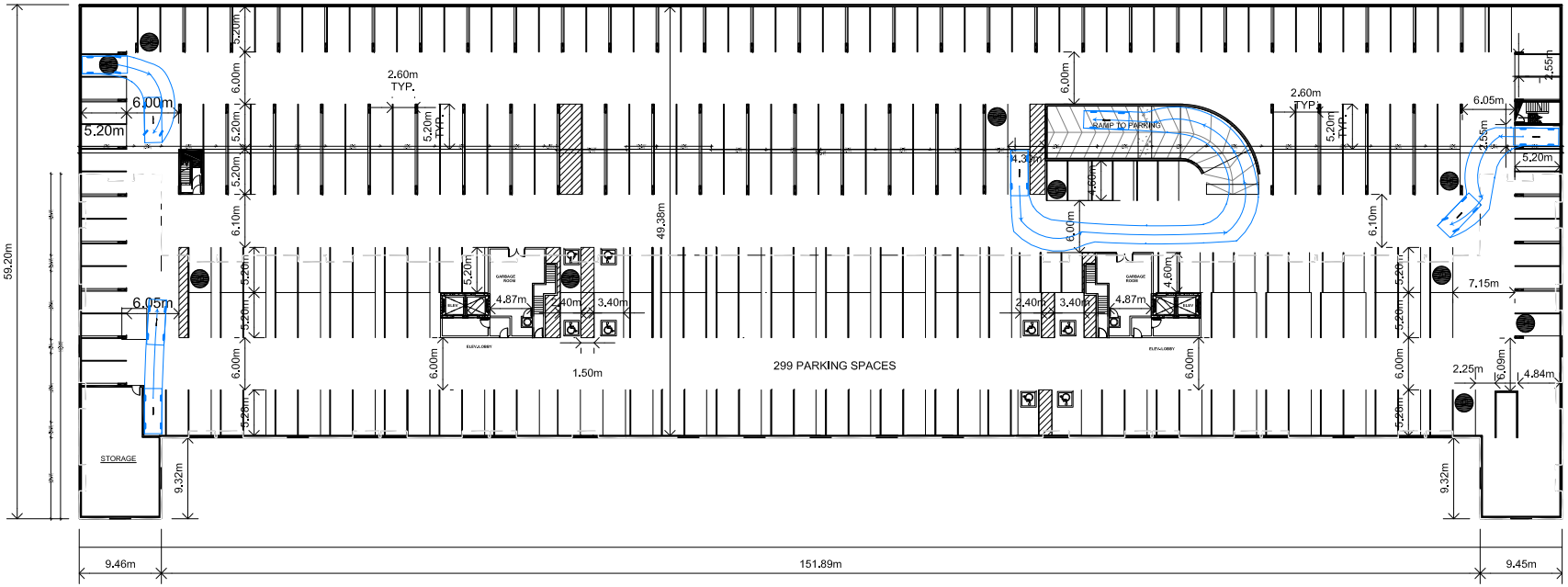
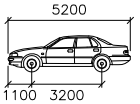


Figure 20 - Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building A&B)

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

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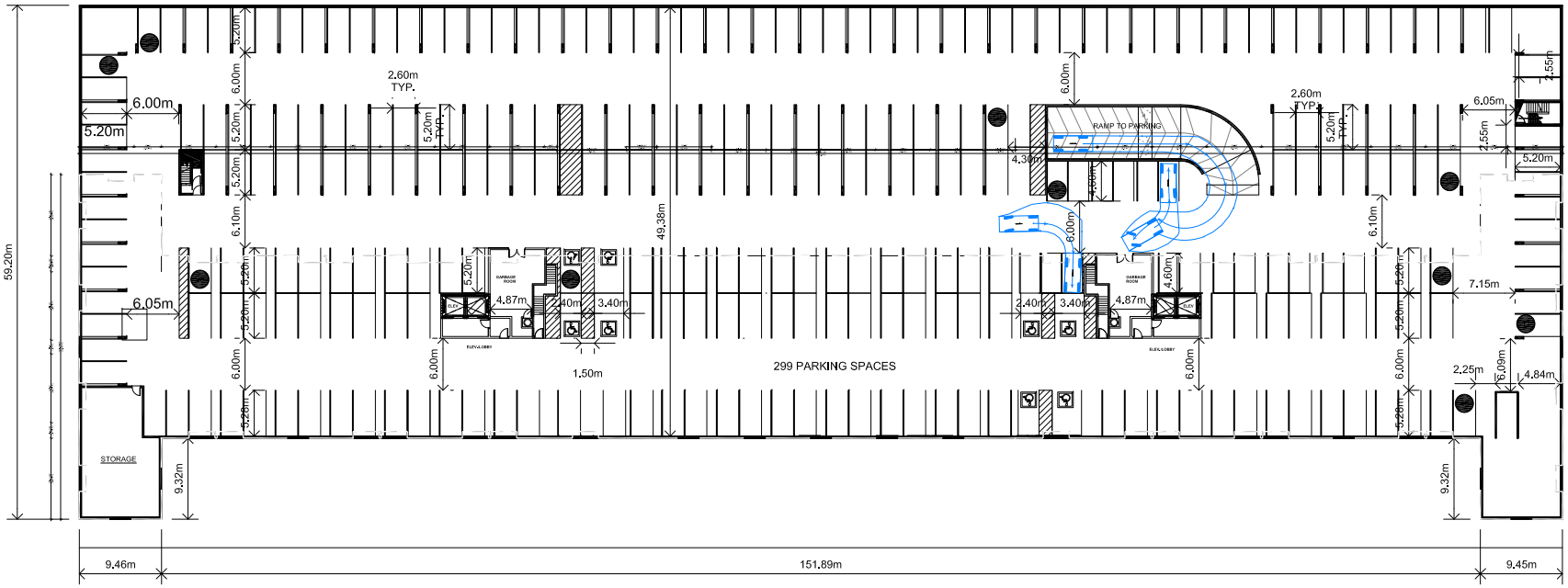
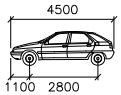


Figure 21 - Small Passenger Vehicle Entering the Underground Garage (Building A&B) and the Parking Spaces

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

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

SCALE: 1:800 UNITS: m

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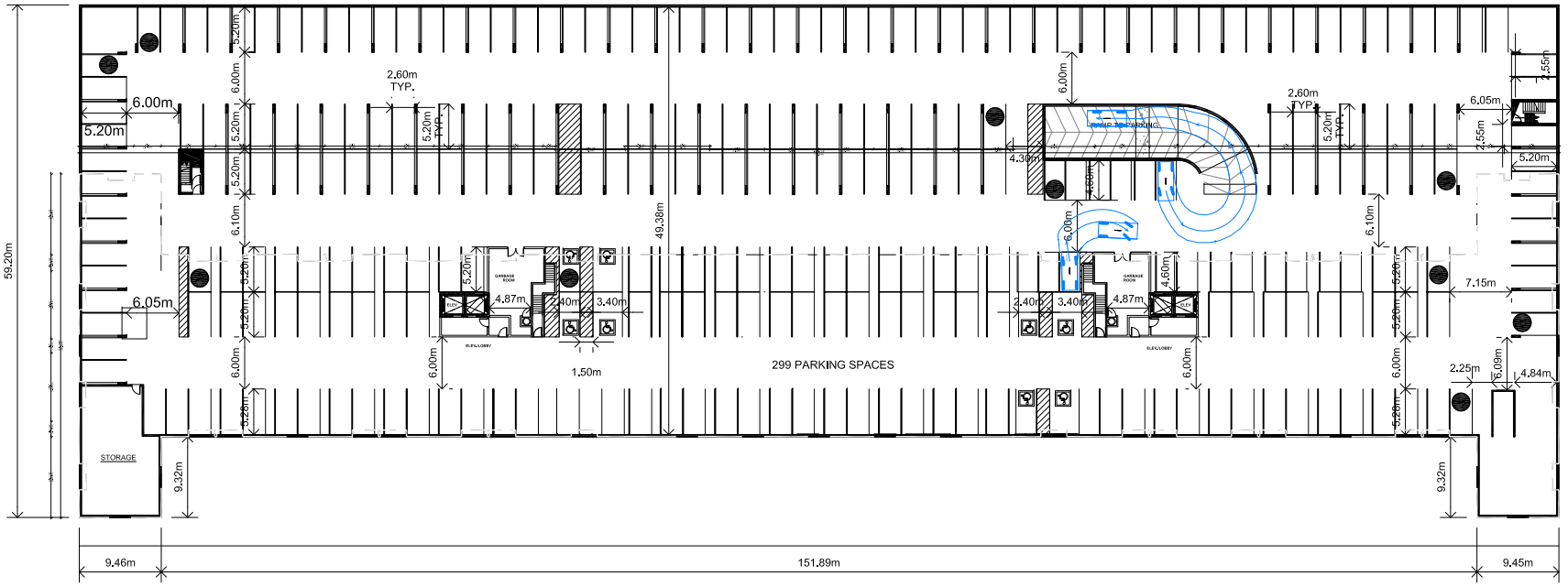
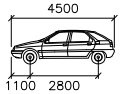


Figure 22 - Small Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building A&B)

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

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

SCALE: 1:800 UNITS: m

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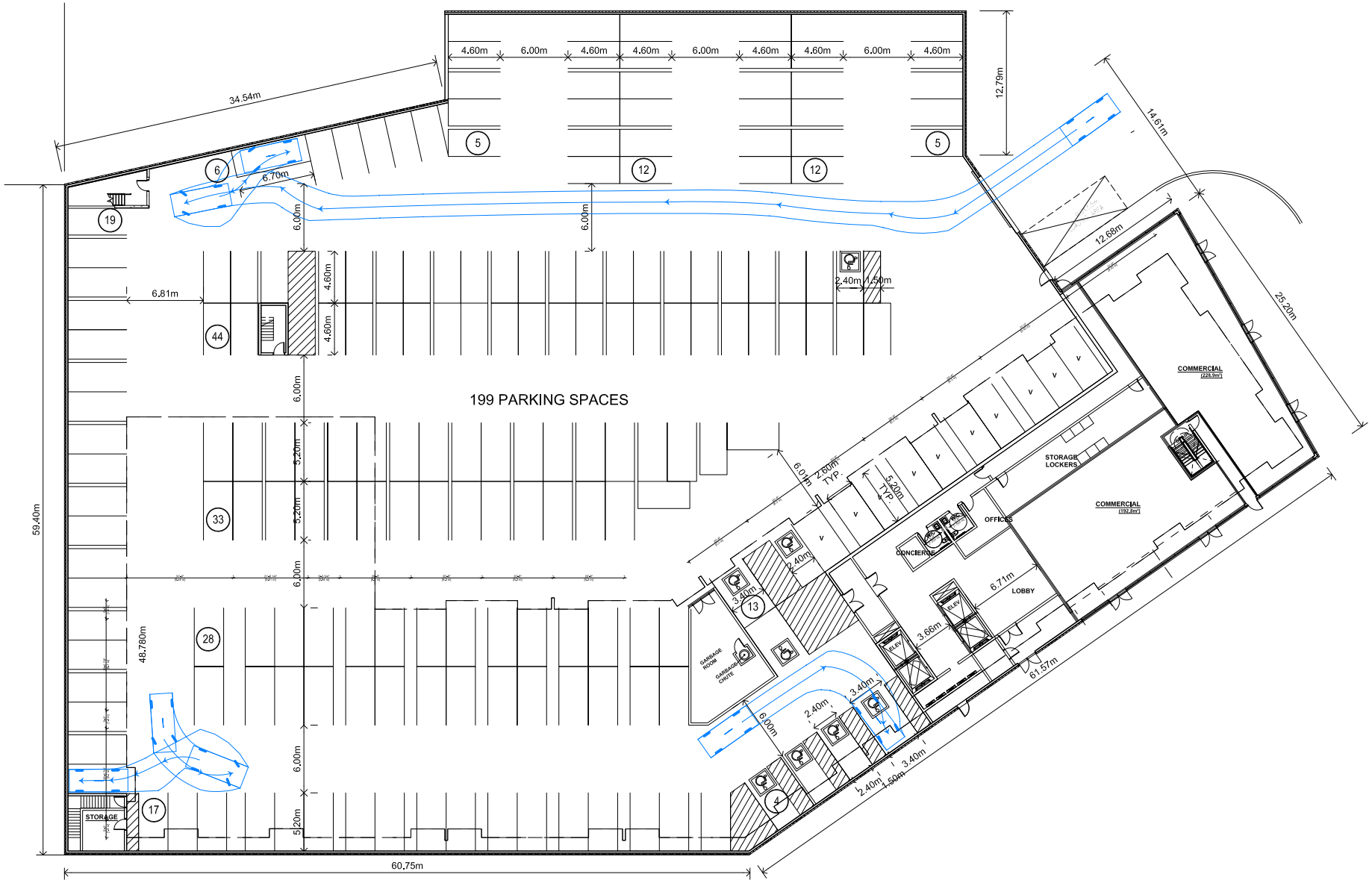
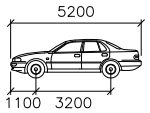


Figure 23 - Passenger Vehicle Entering the Underground Garage (Building C) and the Parking Spaces

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

CONSTRUCTION NORTH
TRUE NORTH

SCALE: 1:500 UNITS: m

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

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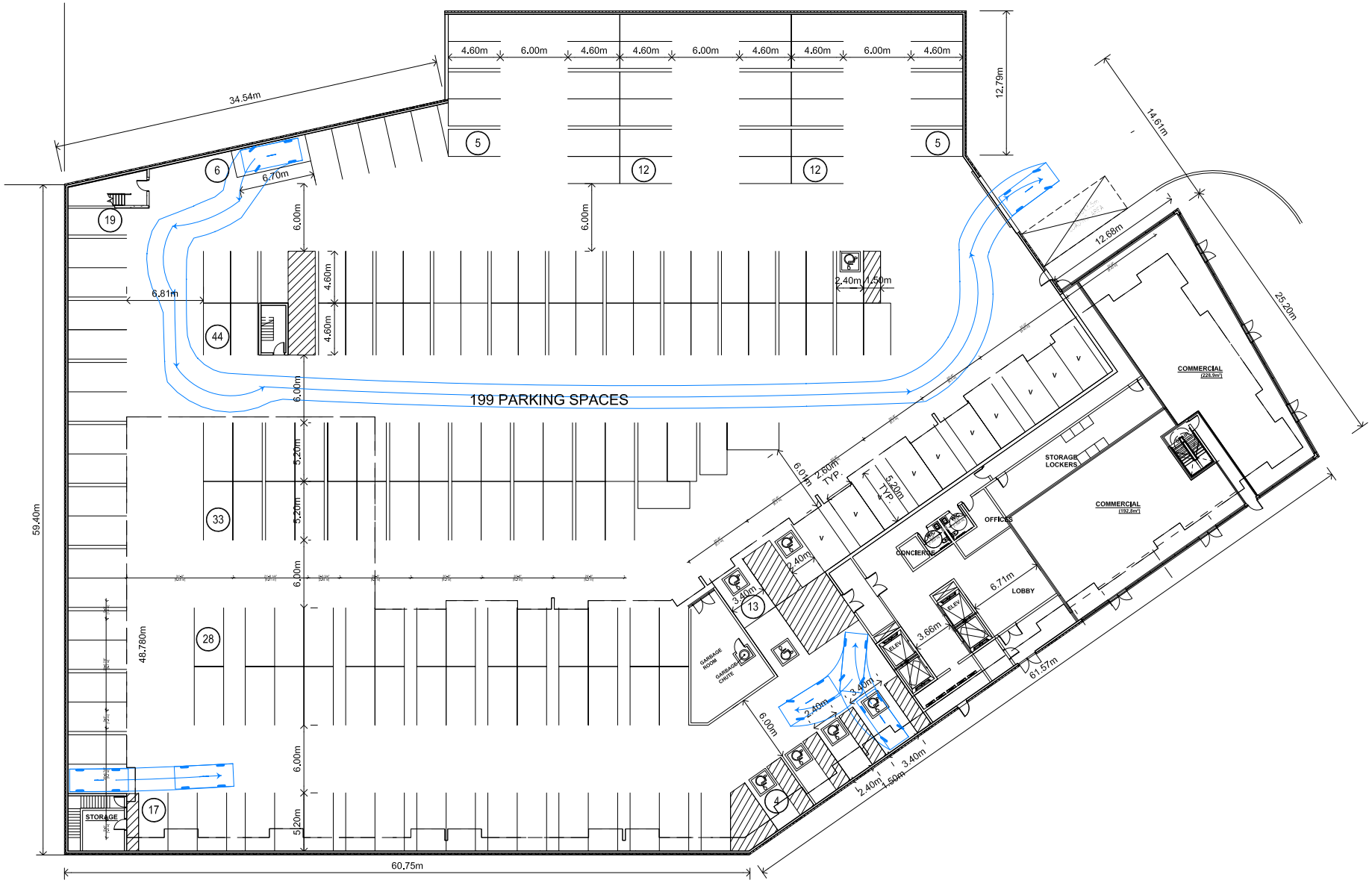
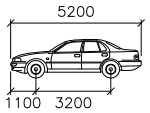


Figure 24 - Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building C)

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 November 3, 2020

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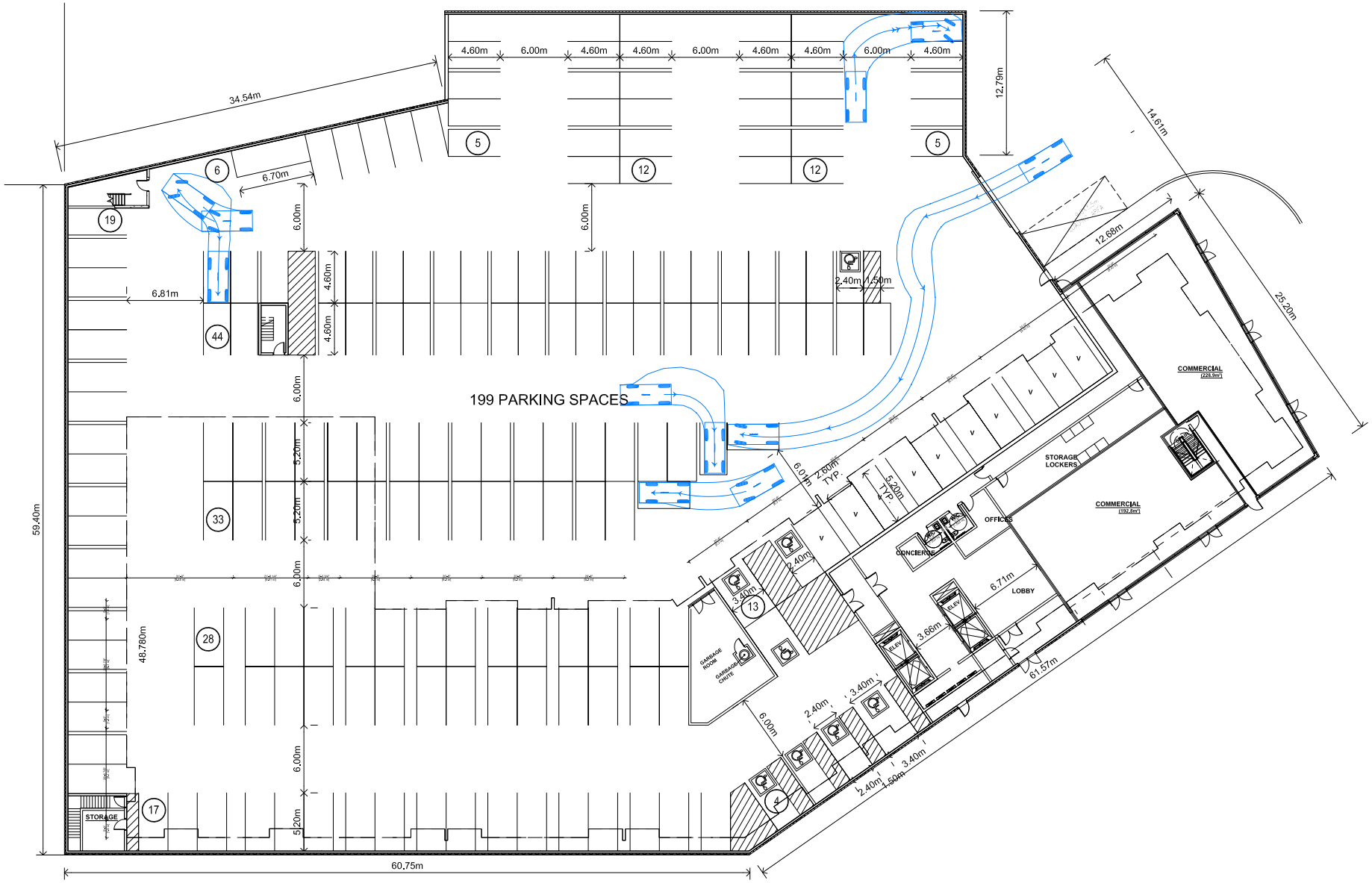
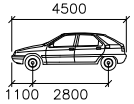


Figure 25 - Small Passenger Vehicle Entering the Underground Garage (Building C) and the Parking Spaces

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

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

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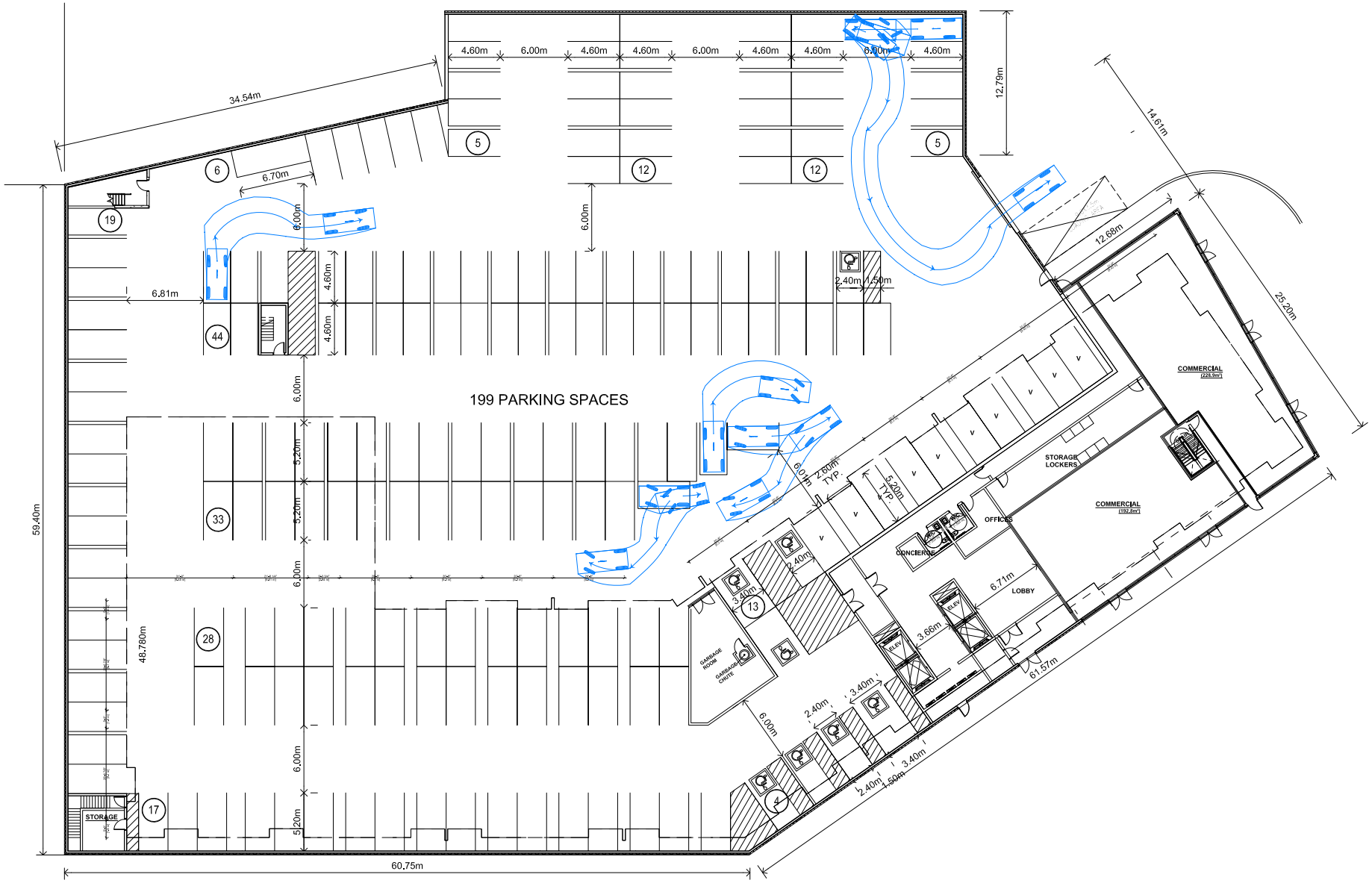
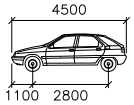


Figure 26 - Small Passenger Vehicle Exiting the Parking Spaces and the Underground Garage (Building C)

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 November 3, 2020

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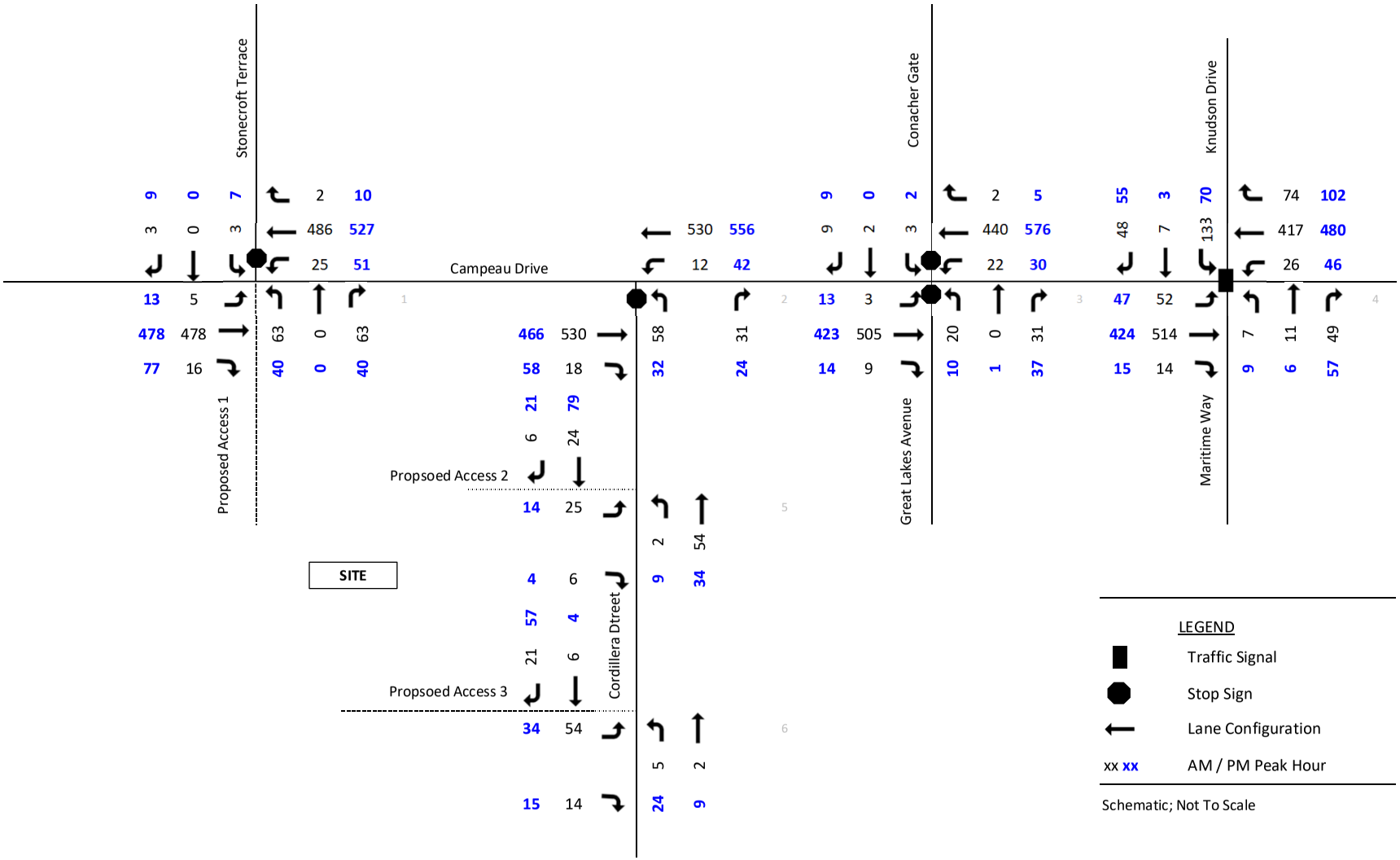
Figure 27: Future Total 2027 Traffic Volumes, Weekday AM and PM Peak Hours



APPENDICES

APPENDIX A

Turning Movement Counts & Signal Timing Plans

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Turning Movement Count Diagram

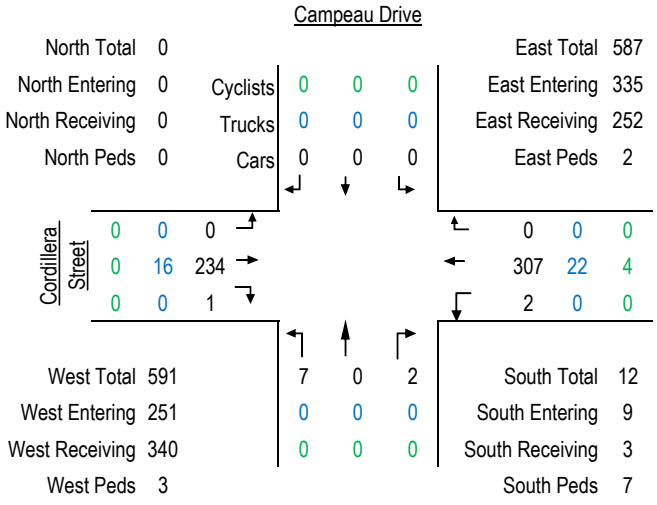
Intersection: Campeau Dr at Cordillera St

Intersection ID:

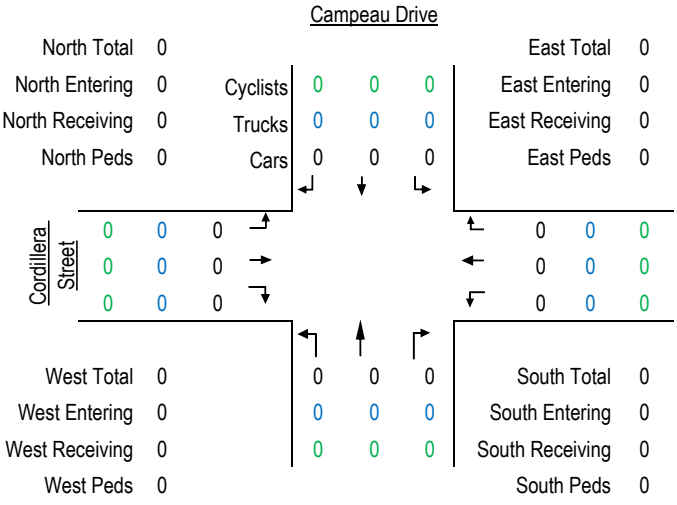
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

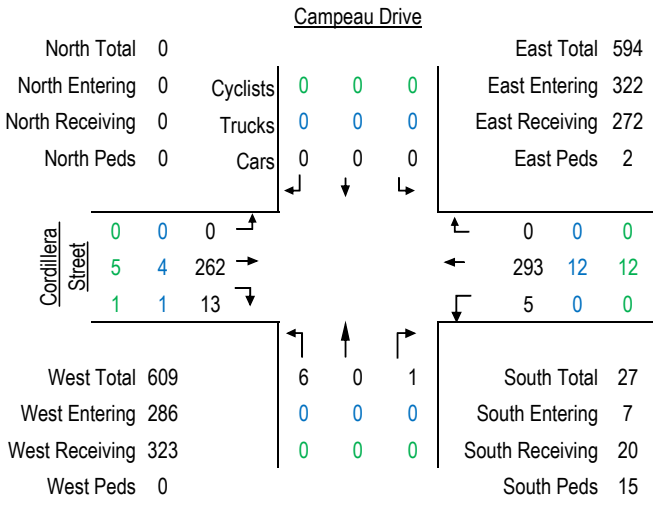
AM Peak Hour: 8:00 to 9:00



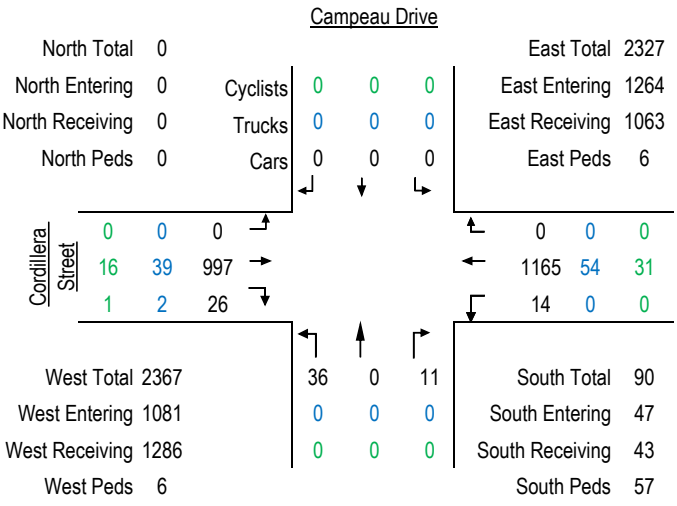
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 5-Hour Count



Turning Movement Count Diagram

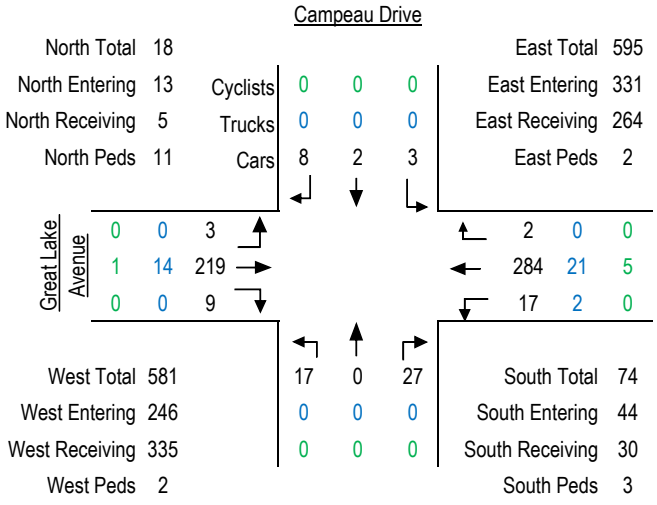
Intersection: Campeau Dr at Great Lakes Ave/Conacher Gate

Intersection ID:

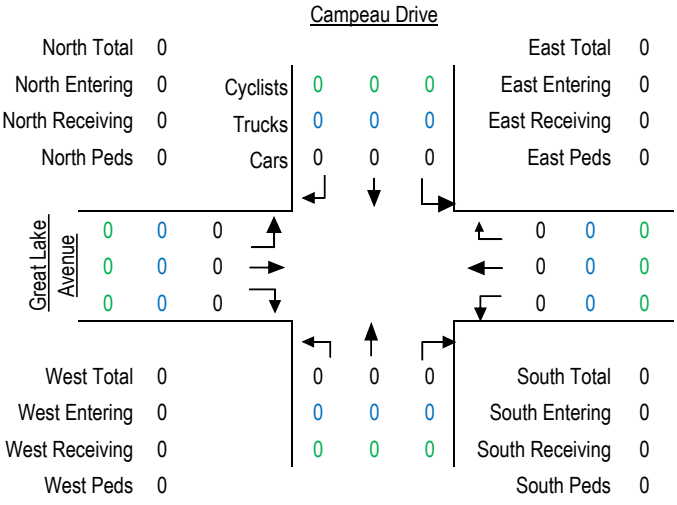
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

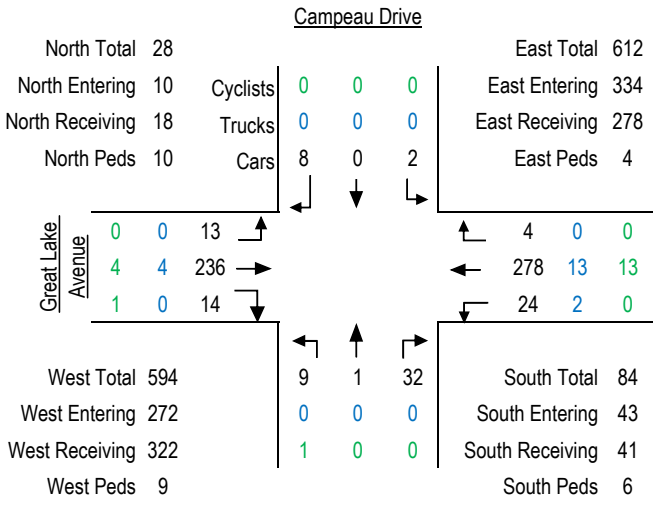
AM Peak Hour: 8:00 to 9:00



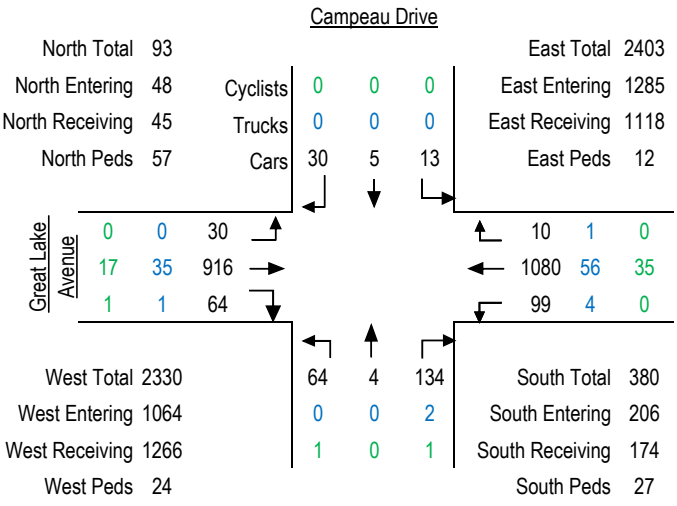
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 5-Hour Count



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Turning Movement Count Diagram

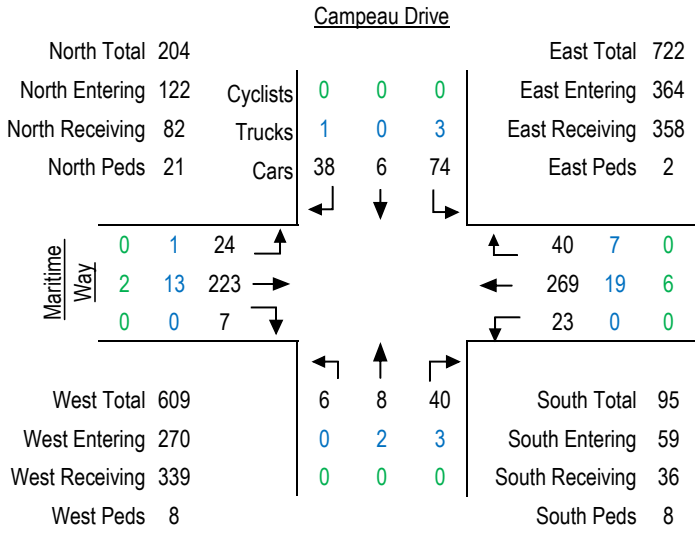
Intersection: Campeau Dr at Maritime Way/Knudsen Dr

Intersection ID:

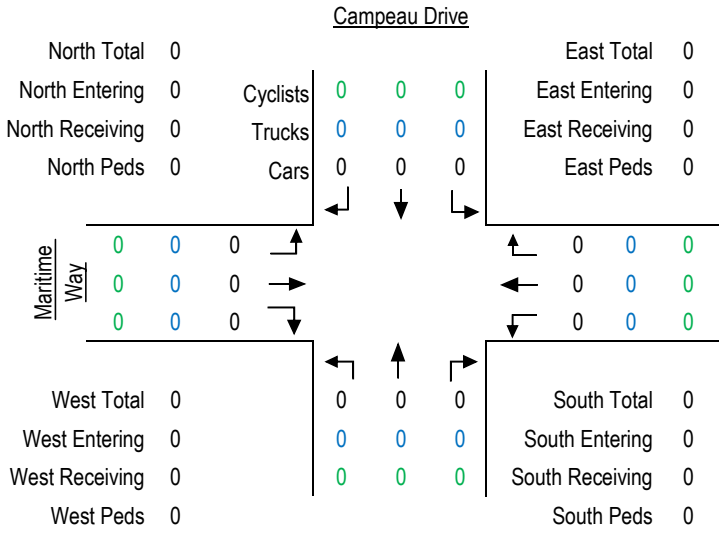
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

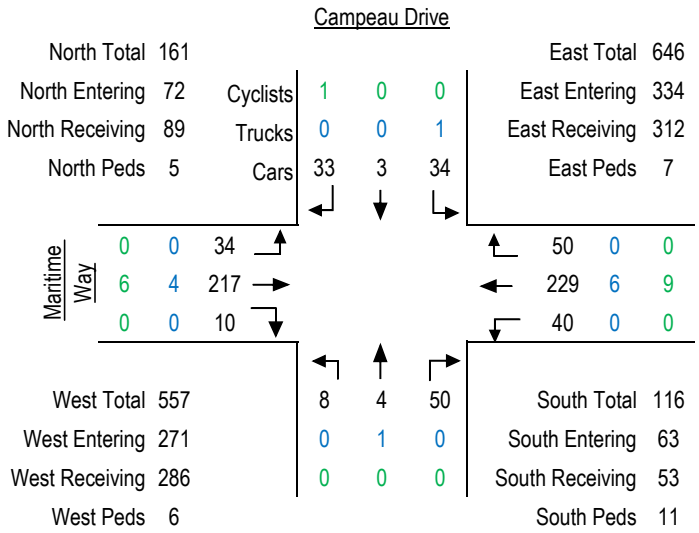
AM Peak Hour: 7:15 to 8:15



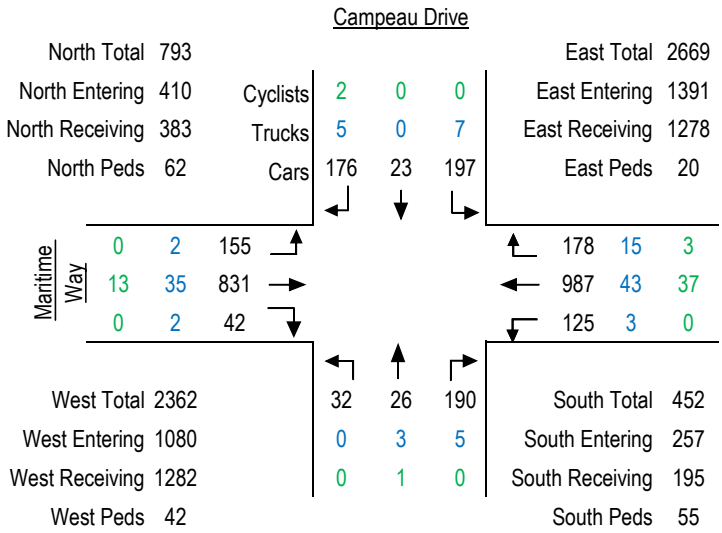
MD Peak Hour: - to -



PM Peak Hour: 16:15 to 17:15



Total 5-Hour Count



TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

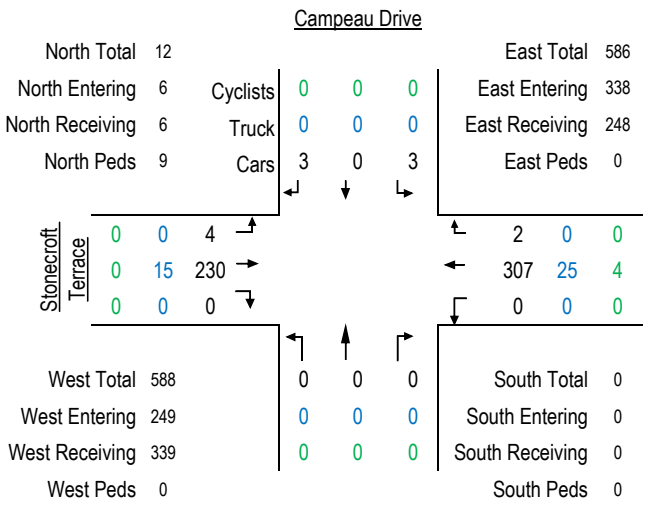
Intersection: Campeau Dr at Stonecroft Terrace

Intersection ID:

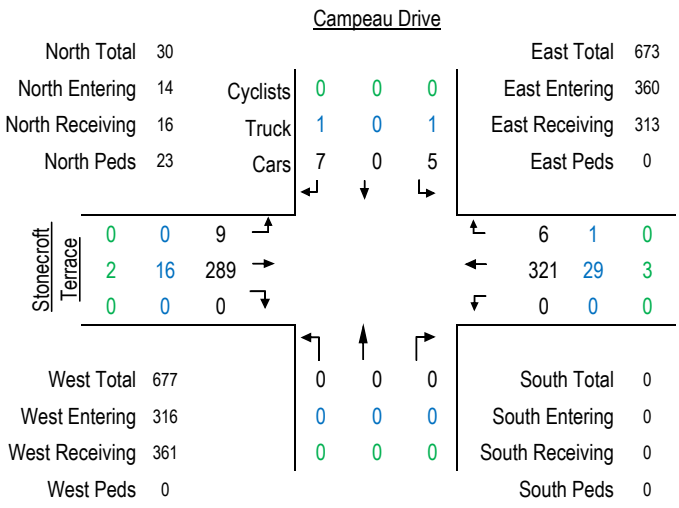
Municipality: Kanata, Ontario

Date: Tuesday September 22, 2020

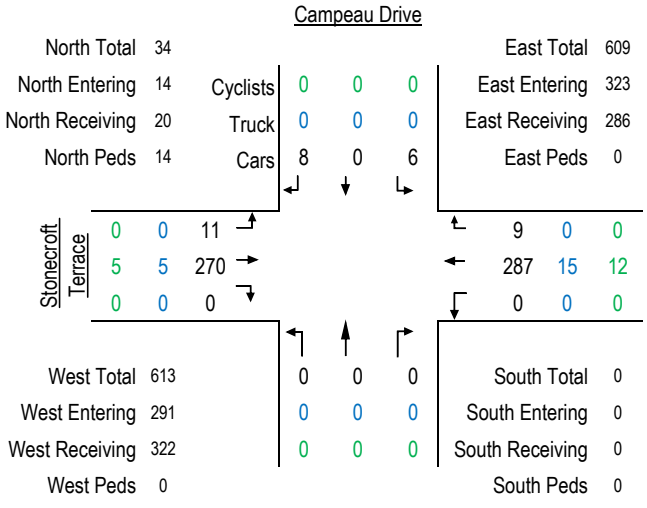
AM Peak Hour: 8:00 to 9:00



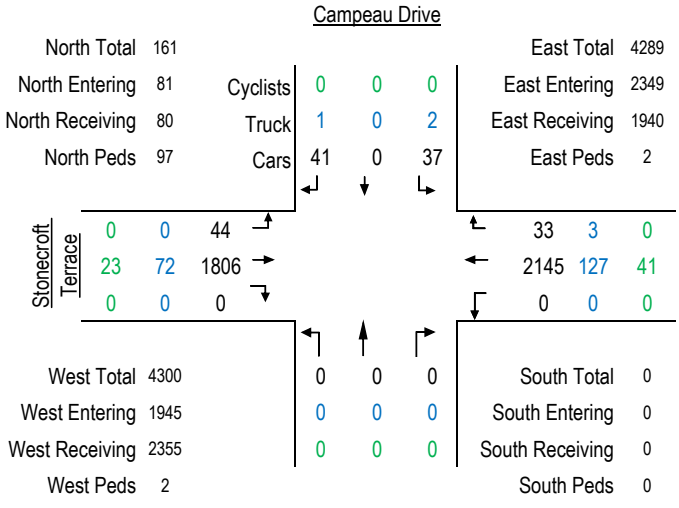
MD Peak Hour: 12:30 to 13:30



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

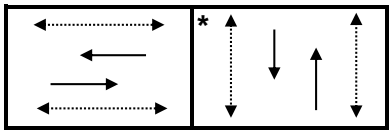
Intersection:	***Main:***	Campeau	***Side:***	Knudson / Maritime
Controller:	**MS 3200**		**TSD:**	**6548**
Author:	Matthew Anderson		**Date:**	23-Oct-2020

Existing Timing Plans†

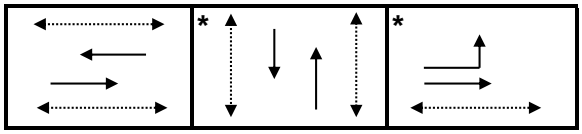
	Plan				**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	***Walk***	***DW***	***A+R***
Cycle	80	60	90	60			
Offset	0	0	0	x			
EB Thru	45	35	66	max=45.7	7	15	3.7+2.0
WB Thru	45	35	51	max=45.7	7	15	3.7+2.0
NB Thru	35	25	24	max=26	7	10	3.0+3.0
SB Thru	35	25	24	max=26	7	10	3.0+3.0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

APPENDIX B

2011 TRANS O-D Survey Report

Kanata - Stittsville

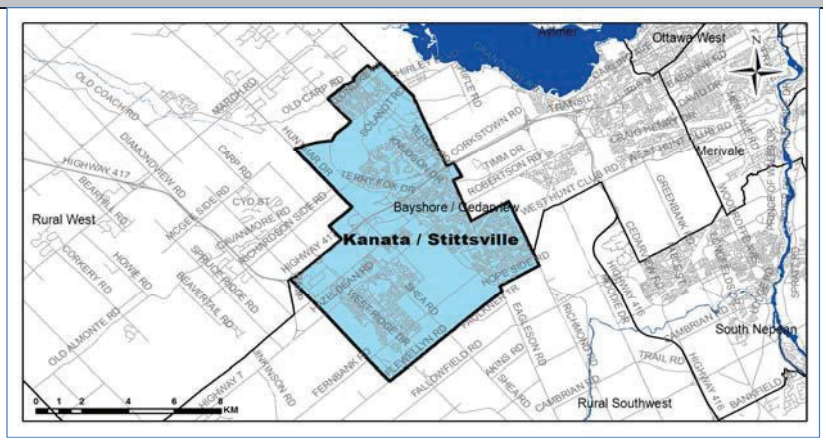
Demographic Characteristics

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

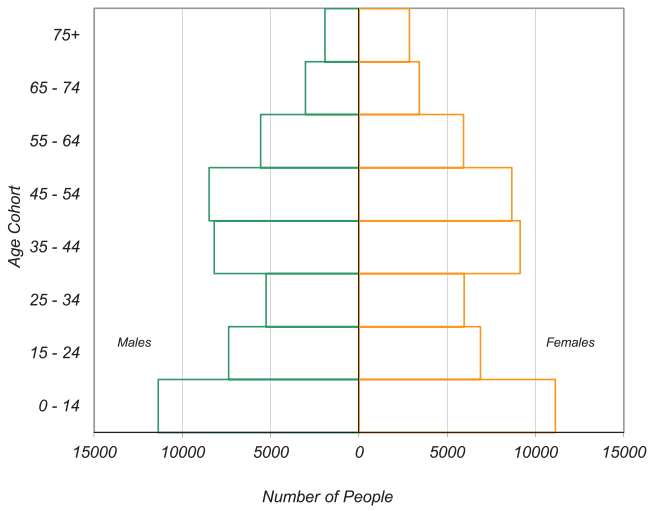


Household Size		
1 person	5,810	15%
2 persons	11,660	31%
3 persons	7,490	20%
4 persons	8,890	23%
5+ persons	4,160	11%
Total:	38,010	100%

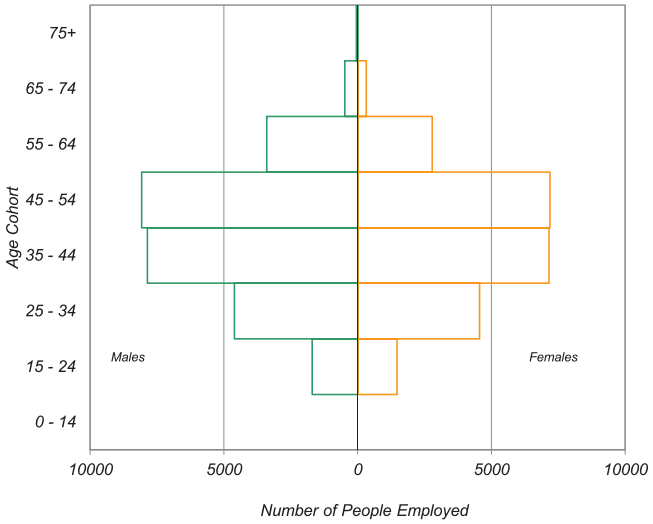
Households by Vehicle Availability		
0 vehicles	1,050	3%
1 vehicle	14,090	37%
2 vehicles	19,110	50%
3 vehicles	3,000	8%
4+ vehicles	770	2%
Total:	38,010	100%

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

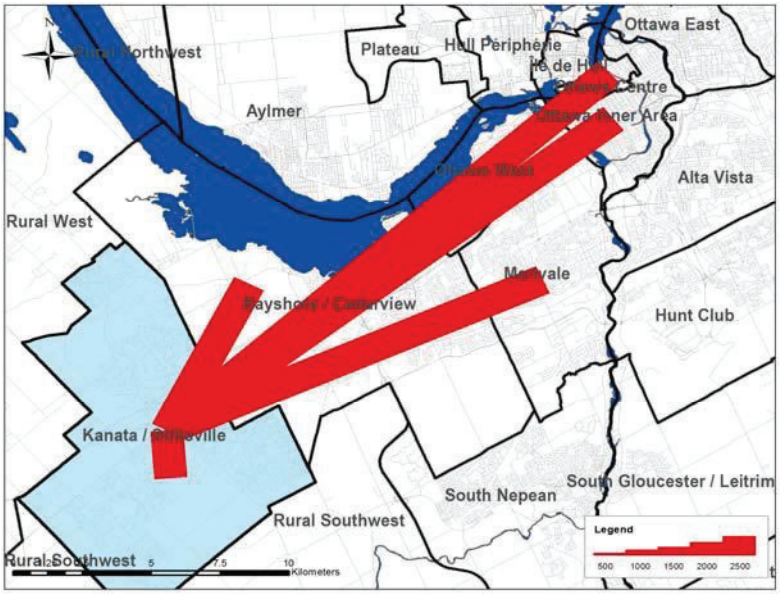


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

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		Origins of Trips To District	
Districts		% Total		% 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

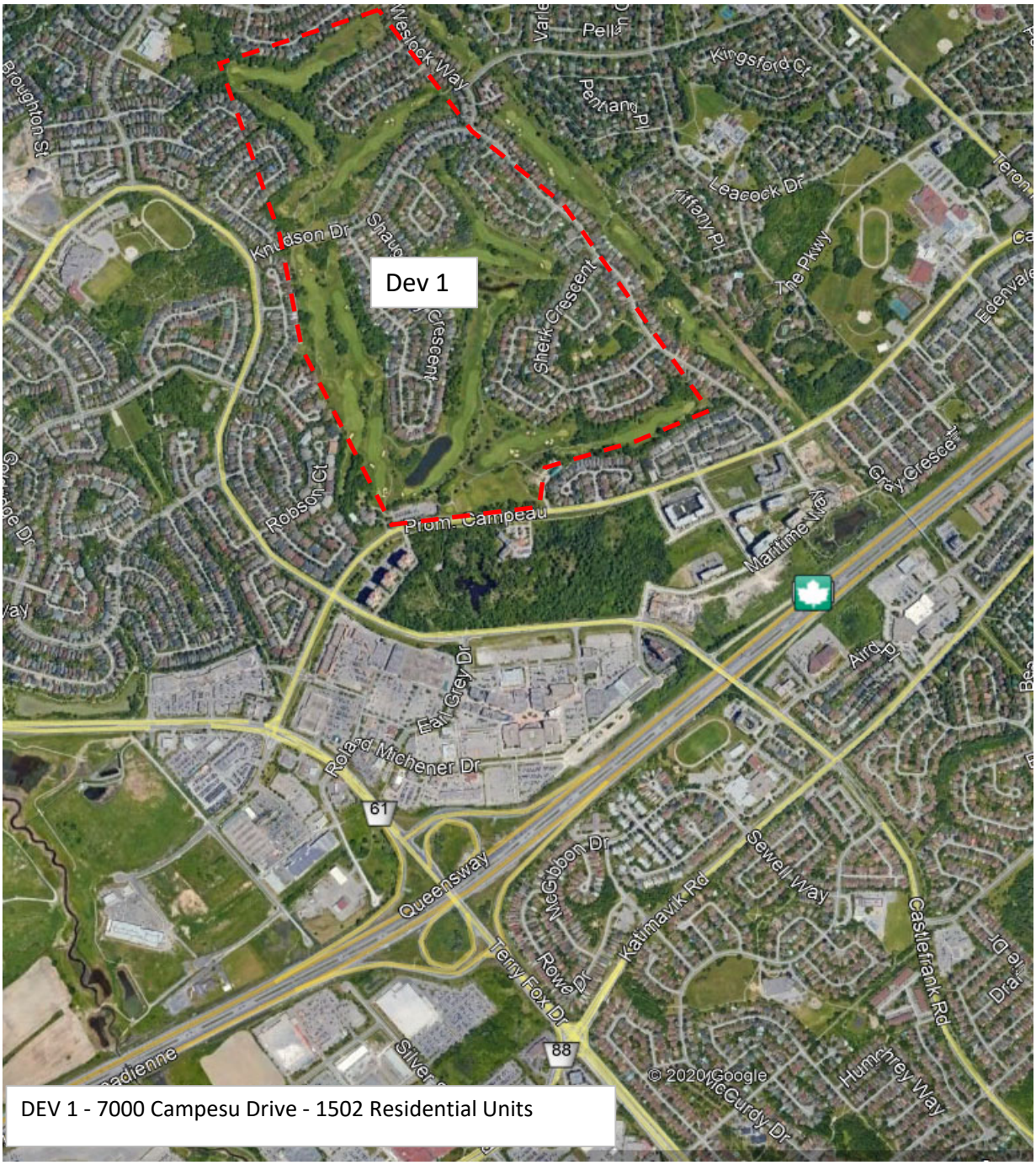
Transit Modal Split	From District	To District	Within District
24 Hours	13%	13%	3%
AM Peak Period	26%	9%	6%
PM Peak Period	7%	21%	2%

APPENDIX C

Background Traffic Information

Project: 6301 Campesu Drive, Kanata Proposed Housing development

Background Development Map



Background Site Trip Generation

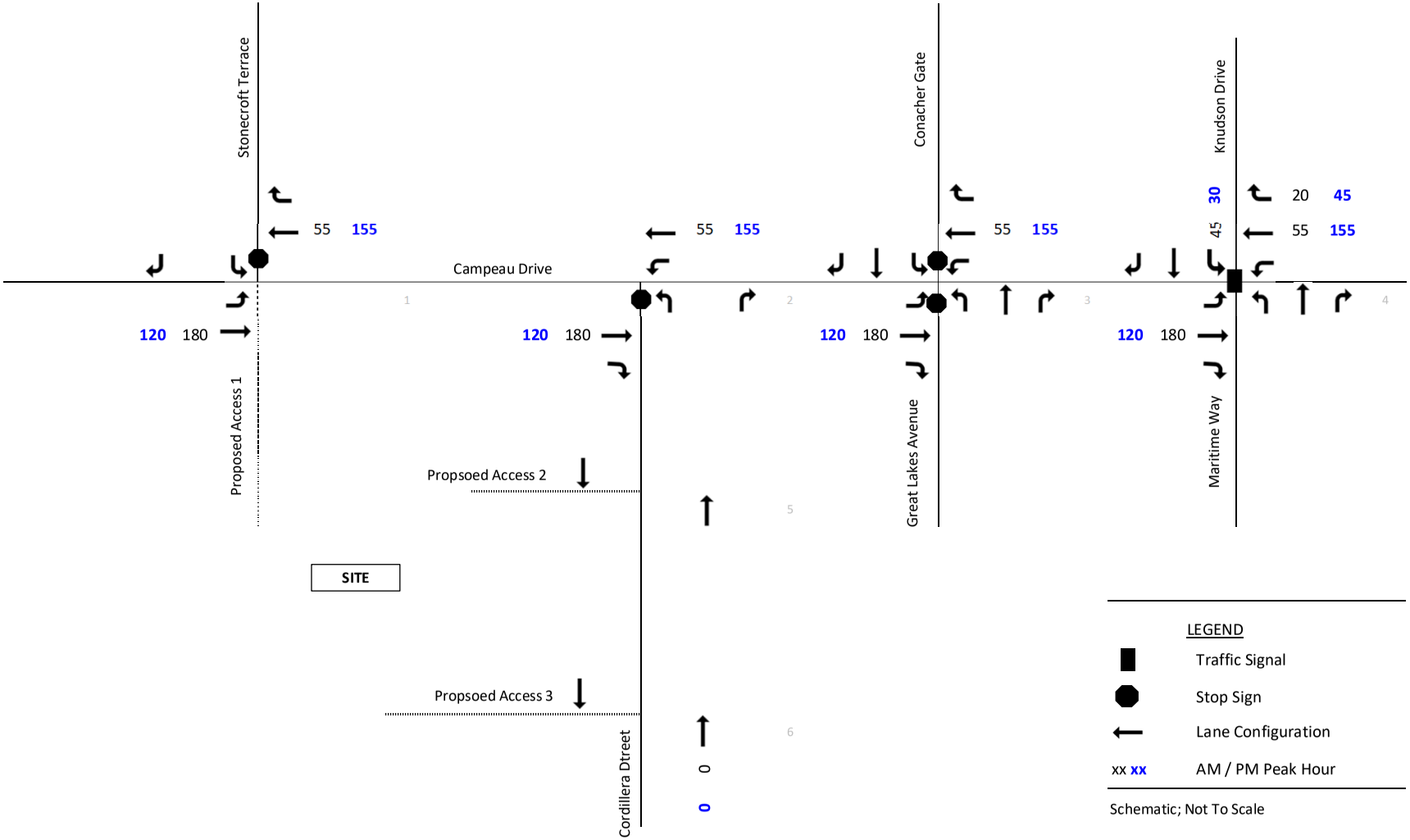
6301 Campesu Drive, Kanata, ON

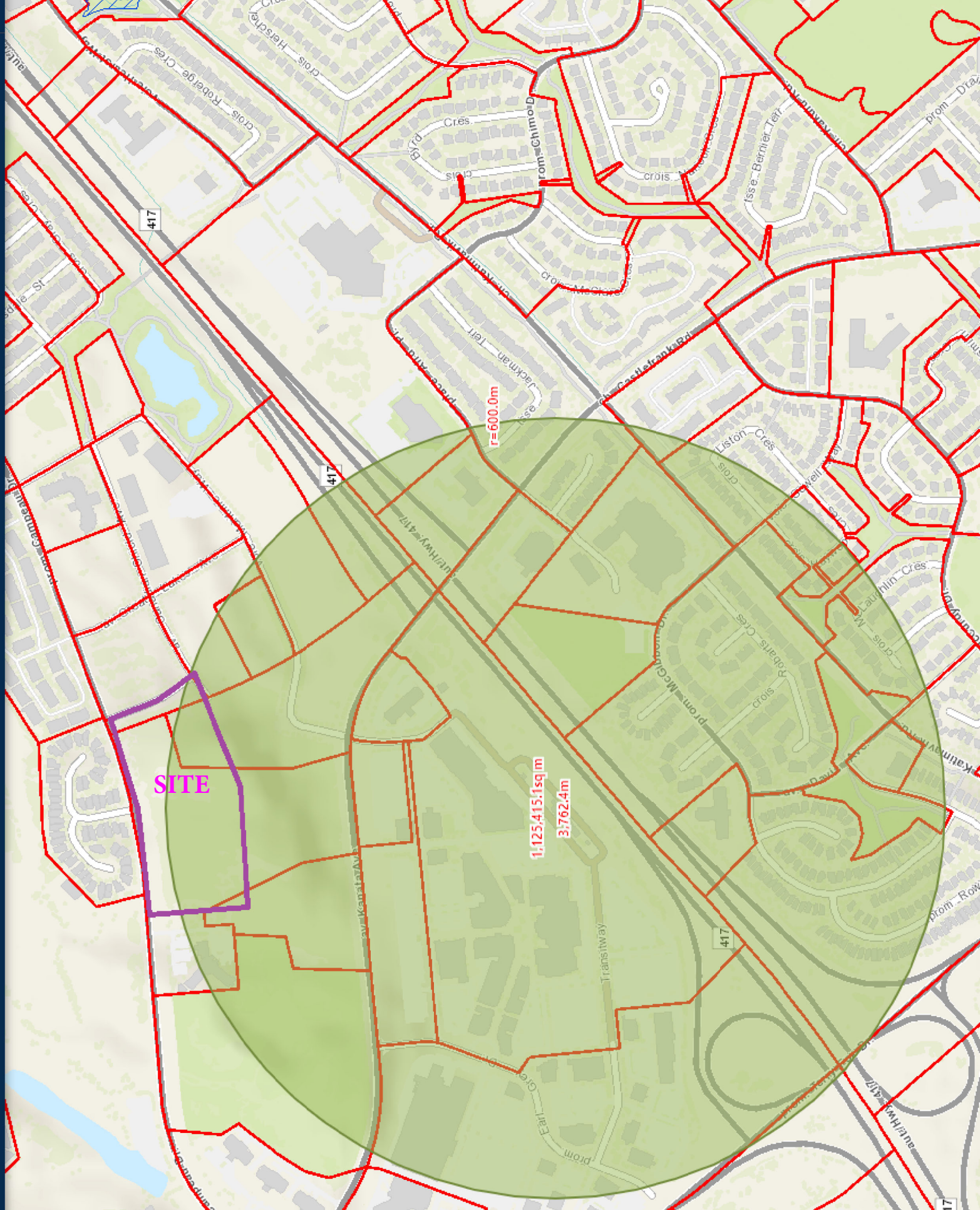
Dev 1 -7000 Campeau Drive

	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 1: Traffic Volumes, Weekday AM and PM Peak Hours





The Area within 600m of Terry Fox Rapid Transit Station

APPENDIX D

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

T

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

APPENDIX E

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.

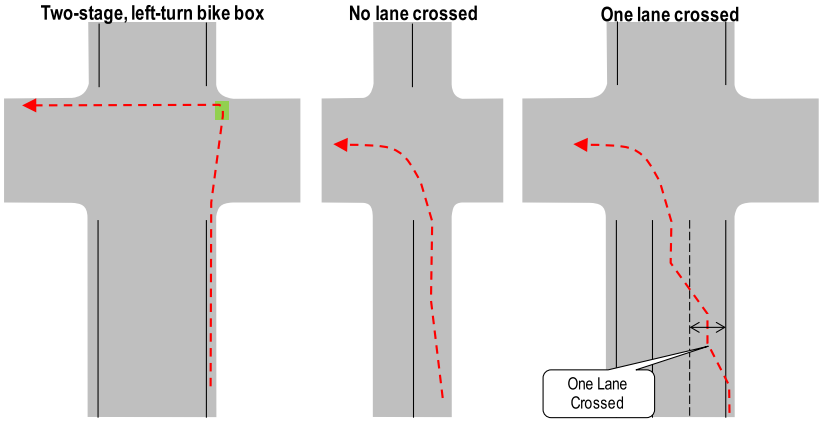
Exhibit 11 – BLOS Segment Evaluation Table

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

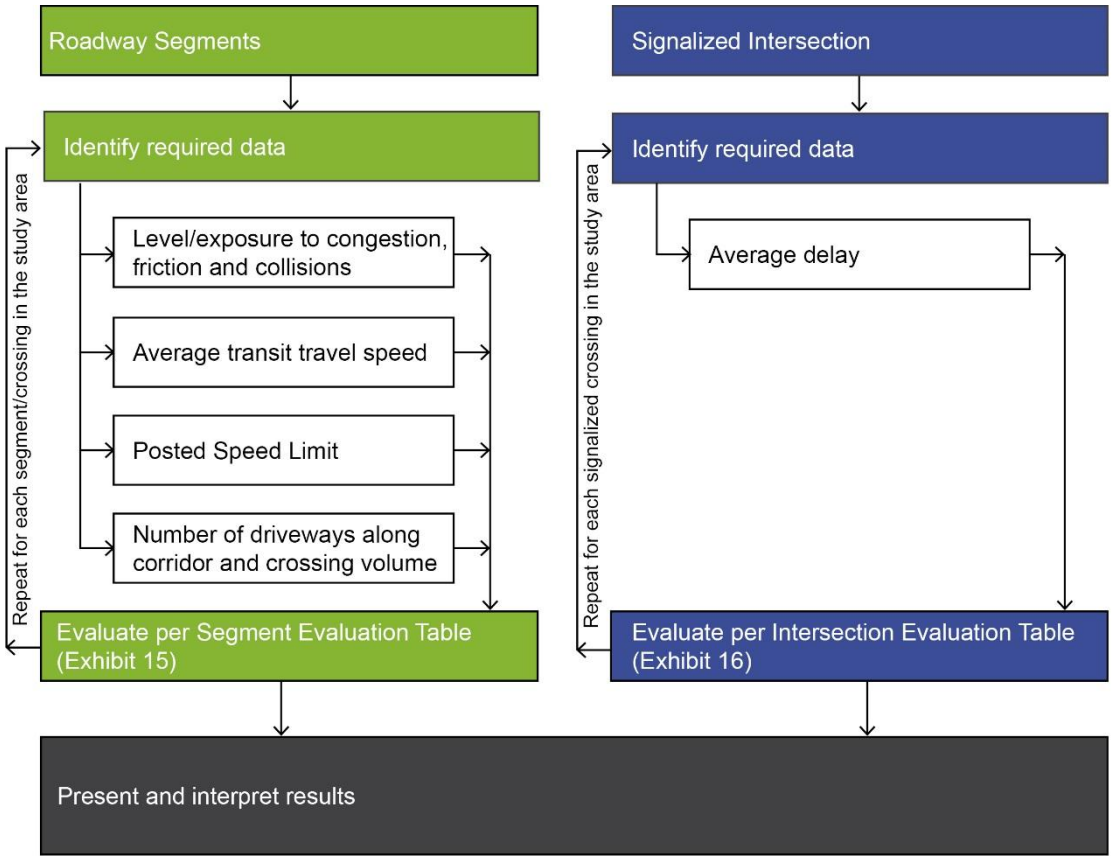


Exhibit 15 - TLOS Segment Evaluation Table

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

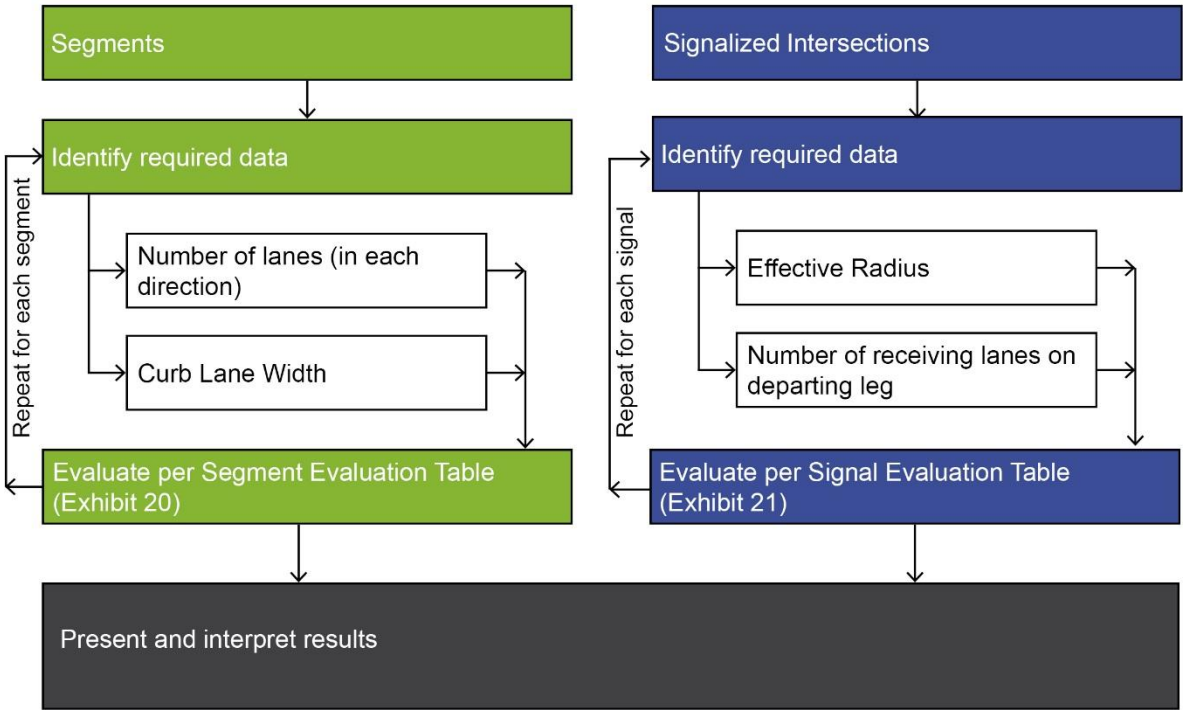


Exhibit 20 – TkLOS Segment Evaluation Table

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 F

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.

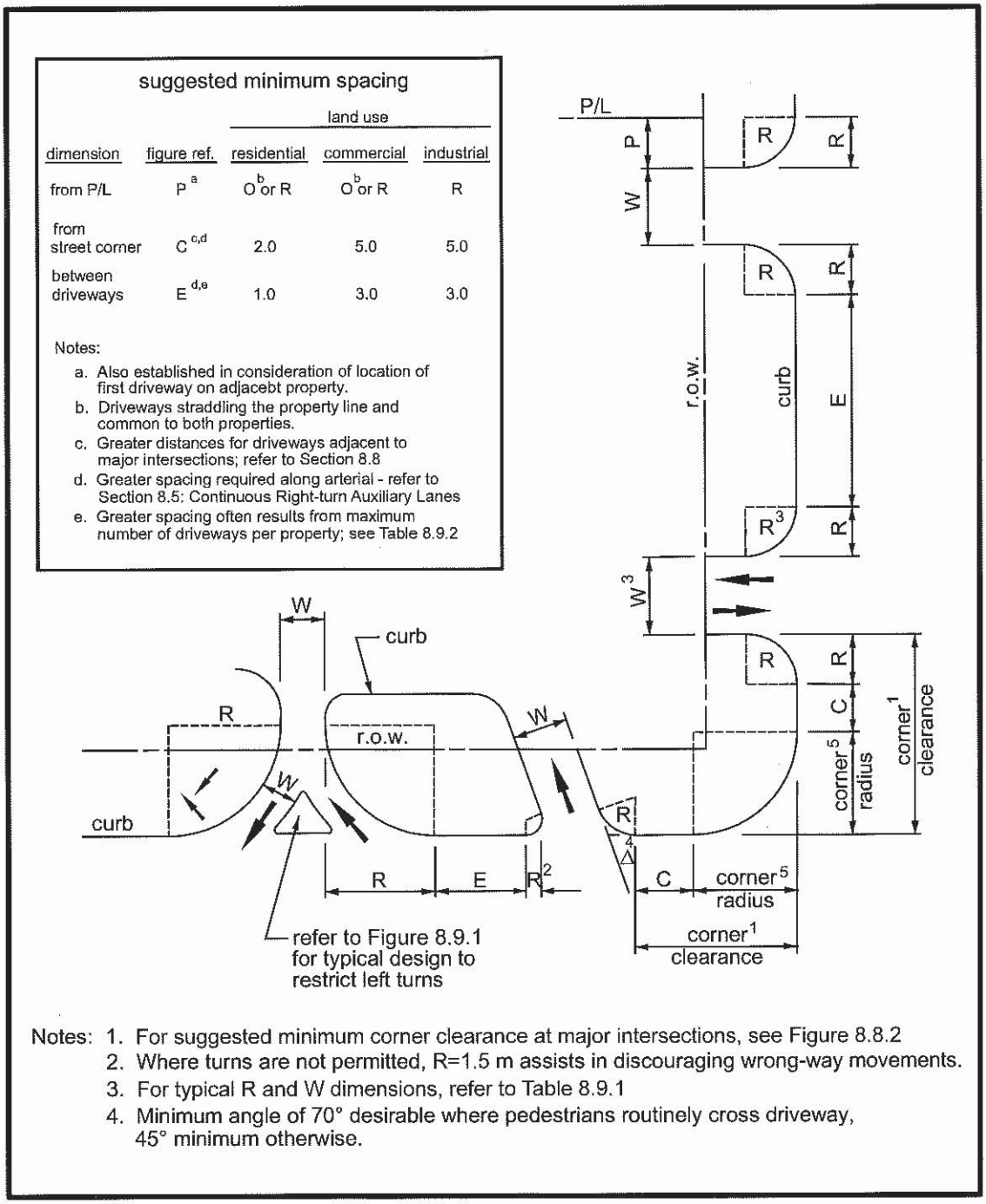


Figure 8.9.2: Driveway Spacing Guidelines – Locals and Collectors

APPENDIX G

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	8	204	1	1	0	1	2	230	5	21	0	21	0
9:00	18	487	2	3	0	3	5	478	12	47	0	47	0
10:00	11	314	1	2	0	2	3	285	8	30	0	30	2
12:30	31	402	8	6	0	7	11	433	47	25	0	25	2
13:30	38	479	10	7	0	9	13	479	57	30	0	30	0
16:00	38	527	10	7	0	9	13	479	57	30	0	30	0
17:00	34	413	9	6	0	8	12	467	50	27	0	27	0
18:00	29	350	8	5	0	7	10	428	44	23	0	23	0
Total	**207**	**3,176**	**49**	**37**	**0**	**46**	**69**	**3,279**	**280**	**233**	**0**	**233**	**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	494	1,102	686	995	1,152	1,200	1,053	927		
	COMPLIANCE %				55	100	76	100	100	100	100	100	731	91
1B	120	170	120	170	44	100	64	63	76	76	68	58		
	COMPLIANCE %				26	59	38	37	45	45	40	34	323	40

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	450	1,002	622	932	1,076	1,124	985	869		
	COMPLIANCE %				50	100	69	100	100	100	100	97	716	89
2B	50	75	50	75	22	50	34	33	37	37	33	28		
	COMPLIANCE %				29	67	45	44	49	49	44	37	365	46

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	1,002	94	194	49 %	37 %
	13:30	1,076	60	170	35 %	
	16:00	1,124	60	156	38 %	
	17:00	985	54	200	27 %	

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	91	%	☐	☑
	B	Crossing Volume	40	%		
2. Delay to Cross Traffic	A	Main Road	89	%	☐	☑
	B	Crossing Road	46	%		
3. Combination	A	Justificaton 1	40	%	☐	☑
	B	Justification 2	46	%		
4. 4-Hr Volume			37	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

APPENDIX H

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.

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

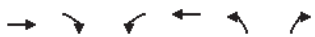
APPENDIX I

Capacity Analysis Sheets

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	245	332	2	3	3
Future Volume (Veh/h)	4	245	332	2	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	266	361	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	363				636	362
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363				636	362
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)	1196				441	683

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	270	363	6
Volume Left	4	0	3
Volume Right	0	2	3
cSH	1196	1700	536
Volume to Capacity	0.00	0.21	0.01
Queue Length 95th (m)	0.1	0.0	0.3
Control Delay (s)	0.2	0.0	11.8
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	11.8
Approach LOS			B

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		27.6%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	250	1	2	392	7	2
Future Volume (Veh/h)	250	1	2	392	7	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	1	2	426	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					0.98	
vC, conflicting volume			273		702	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			273		683	272
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)			1290		404	766

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	273	428	10
Volume Left	0	2	8
Volume Right	1	0	2
cSH	1700	1290	447
Volume to Capacity	0.16	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.1	13.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	13.2
Approach LOS			B

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		32.2%	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	233	9	19	305	2	17	0	27	3	2	8
Future Volume (Veh/h)	3	233	9	19	305	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	268	10	22	351	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	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	364			281			690	690	278	719	694	365
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238			281			600	600	278	632	605	239
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)	1196			1228			357	364	762	330	362	717

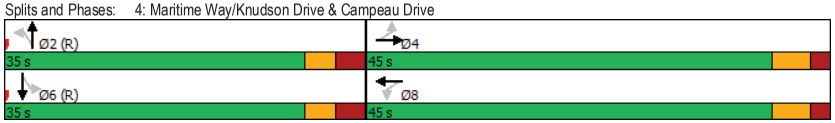
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	281	375	51	14
Volume Left	3	22	20	3
Volume Right	10	2	31	9
cSH	1196	1228	528	515
Volume to Capacity	0.00	0.02	0.10	0.03
Queue Length 95th (m)	0.1	0.4	2.6	0.7
Control Delay (s)	0.1	0.6	12.5	12.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.6	12.5	12.2
Approach LOS			B	B

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			39.5%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	25	236	23	288	6	10	77	6
Future Volume (vph)	25	236	23	288	6	10	77	6
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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	0.35	0.06	0.50	0.02	0.12	0.20	0.10
Control Delay	11.6	13.7	11.2	15.7	16.7	7.4	19.1	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	13.7	11.2	15.7	16.7	7.4	19.1	7.0
LOS	B	B	B	B	B	A	B	A
Approach Delay		13.6		15.4		8.3		14.6
Approach LOS		B		B		A		B

Intersection Summary		
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 55		
Control Type: Pretimed		
Maximum v/c Ratio: 0.50		
Intersection Signal Delay: 14.1	Intersection LOS: B	
Intersection Capacity Utilization 44.7%	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 11-13-2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	236	7	23	288	47	6	10	43	77	6	39
Future Volume (vph)	25	236	7	23	288	47	6	10	43	77	6	39
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		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.88		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)	1704	1786		1789	1706		1774	1495		1728	1560	
Flt Permitted	0.43	1.00		0.54	1.00		0.72	1.00		0.71	1.00	
Satd. Flow (perm)	771	1786		1012	1706		1344	1495		1298	1560	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	31	295	9	29	360	59	8	12	54	96	8	49
RTOR Reduction (vph)	0	2	0	0	7	0	0	34	0	0	31	0
Lane Group Flow (vph)	31	302	0	29	412	0	8	33	0	96	26	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		4			8			2			6	
Permitted Phases	4			8			2			6		
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)	378	877		497	838		487	541		470	565	
v/s Ratio Prot		0.17			c0.24			0.02			0.02	
v/s Ratio Perm	0.04			0.03			0.01			c0.07		
v/c Ratio	0.08	0.34		0.06	0.49		0.02	0.06		0.20	0.05	
Uniform Delay, d1	10.8	12.5		10.7	13.6		16.4	16.6		17.6	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1		0.2	2.1		0.1	0.2		1.0	0.2	
Delay (s)	11.2	13.5		10.9	15.7		16.4	16.8		18.5	16.7	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		13.3			15.4			16.8			17.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	44.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour
1: Campeau Drive & Stonecroft Terrace 11-13-2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	275	302	9	6	8
Future Volume (Veh/h)	11	275	302	9	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	299	328	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	338				656	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	338				656	333
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)	1232				429	713

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	311	338	16
Volume Left	12	0	7
Volume Right	0	10	9
cSH	1232	1700	553
Volume to Capacity	0.01	0.20	0.03
Queue Length 95th (m)	0.2	0.0	0.7
Control Delay (s)	0.4	0.0	11.7
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	11.7
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	266	14	5	305	6	1
Future Volume (Veh/h)	266	14	5	305	6	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	289	15	5	332	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						
vC, conflicting volume			304		638	296
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			304		638	296
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)			1268		442	748

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	304	337	8
Volume Left	0	5	7
Volume Right	15	0	1
cSH	1700	1268	466
Volume to Capacity	0.18	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s)	0.0	0.2	12.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	12.9
Approach LOS			B

Intersection Summary				
Average Delay			0.2	
Intersection Capacity Utilization			30.1%	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)	13	240	14	26	291	4	9	1	32	2	0	8
Future Volume (Veh/h)	13	240	14	26	291	4	9	1	32	2	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	15	279	16	30	338	5	10	1	37	2	0	9
Pedestrians		9			4			6			10	
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		1			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	353			301			742	736	297	769	742	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			301			688	682	297	717	688	278
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			98			97	100	95	99	100	99
cM capacity (veh/h)	1207			1265			318	333	741	292	330	703

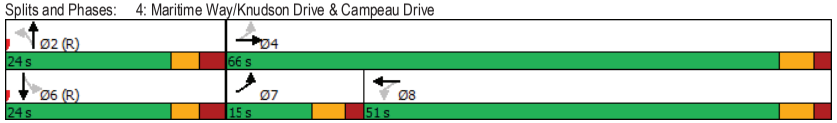
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	310	373	48	11
Volume Left	15	30	10	2
Volume Right	16	5	37	9
cSH	1207	1265	569	560
Volume to Capacity	0.01	0.02	0.08	0.02
Queue Length 95th (m)	0.3	0.6	2.2	0.5
Control Delay (s)	0.5	0.9	11.9	11.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	0.9	11.9	11.6
Approach LOS			B	B

Intersection Summary				
Average Delay			1.6	
Intersection Capacity Utilization			37.4%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	34	221	40	235	8	5	35	3
Future Volume (vph)	34	221	40	235	8	5	35	3
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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)	3.7	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	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (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
v/c Ratio	0.06	0.21	0.08	0.35	0.03	0.17	0.15	0.12
Control Delay	5.2	6.1	12.1	14.1	29.5	11.4	31.5	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	6.1	12.1	14.1	29.5	11.4	31.5	12.1
LOS	A	A	B	B	C	B	C	B
Approach Delay		6.0		13.8		13.7		21.7
Approach LOS		A		B		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 51.2%		ICU Level of Service A	
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)	34	221	10	40	235	50	8	5	50	35	3	33
Future Volume (vph)	34	221	10	40	235	50	8	5	50	35	3	33
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	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1801	1849		1777	1796		1778	1556		1723	1583	
Flt Permitted	0.46	1.00		0.60	1.00		0.73	1.00		0.72	1.00	
Satd. Flow (perm)	871	1849		1120	1796		1368	1556		1299	1583	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	248	11	45	264	56	9	6	56	39	3	37
RTOR Reduction (vph)	0	2	0	0	8	0	0	45	0	0	30	0
Lane Group Flow (vph)	38	257	0	45	312	0	9	17	0	39	10	0
Confl. Peds. (#/hr)	5		11	11		5	6		7	7		6
Heavy Vehicles (%)	0%	2%	0%	0%	3%	0%	0%	20%	0%	3%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
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)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	679	1238		563	903		273	311		259	316	
v/s Ratio Prot	0.01	c0.14			c0.17			0.01			0.01	
v/s Ratio Perm	0.03			0.04			0.01			c0.03		
v/c Ratio	0.06	0.21		0.08	0.35		0.03	0.06		0.15	0.03	
Uniform Delay, d1	5.5	5.7		11.6	13.4		29.0	29.1		29.7	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.3	1.0		0.2	0.3		1.2	0.2	
Delay (s)	5.7	6.1		11.8	14.5		29.2	29.5		30.9	29.2	
Level of Service	A	A		B	B		C	C		C	C	
Approach Delay (s)		6.0			14.2			29.4			30.0	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.29				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		17.4	
Intersection Capacity Utilization	51.2%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis<2027 Background> Weekday AM Peak Hour
1: Campeau Drive & Stonecroft Terrace 11-13-2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	461	436	2	3	3
Future Volume (Veh/h)	5	461	436	2	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	501	474	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	476				986	475
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476				986	475
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)	1086				273	590

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	506	476	6
Volume Left	5	0	3
Volume Right	0	2	3
cSH	1086	1700	374
Volume to Capacity	0.00	0.28	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		0.2	
Intersection Capacity Utilization		38.3%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis<2027 Background> Weekday AM Peak Hour
2: Cordillera Street & Campeau Drive 11-13-2020

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	467	1	2	505	8	2
Future Volume (Veh/h)	467	1	2	505	8	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	508	1	2	549	9	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					0.87	
vC, conflicting volume			509		1062	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			509		997	508
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		96	100
cM capacity (veh/h)			1056		236	565

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	509	551	11
Volume Left	0	2	9
Volume Right	1	0	2
cSH	1700	1056	263
Volume to Capacity	0.30	0.00	0.04
Queue Length 95th (m)	0.0	0.0	1.0
Control Delay (s)	0.0	0.1	19.3
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	19.3
Approach LOS			C

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		38.2%	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	413	9	22	405	2	20	0	31	3	2	9
Future Volume (Veh/h)	3	413	9	22	405	2	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	475	10	25	466	2	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	479			488			1019	1018	485	1052	1022	480
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			488			902	901	485	943	906	233
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			88	100	94	98	99	98
cM capacity (veh/h)	1075			1027			198	217	584	177	215	646

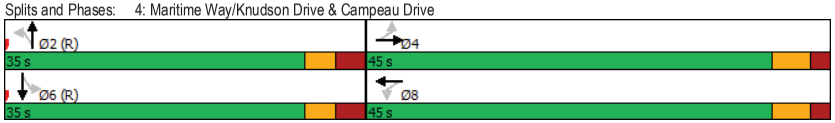
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	488	493	59	15
Volume Left	3	25	23	3
Volume Right	10	2	36	10
cSH	1075	1027	332	360
Volume to Capacity	0.00	0.02	0.18	0.04
Queue Length 95th (m)	0.1	0.6	5.1	1.0
Control Delay (s)	0.1	0.7	18.2	15.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	18.2	15.4
Approach LOS			C	C

Intersection Summary					
Average Delay			1.6		
Intersection Capacity Utilization			49.0%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	29	451	26	386	7	11	133	7
Future Volume (vph)	29	451	26	386	7	11	133	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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	0.14	0.65	0.12	0.68	0.02	0.13	0.36	0.11
Control Delay	12.9	19.6	12.5	20.3	16.6	7.1	21.4	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	19.6	12.5	20.3	16.6	7.1	21.4	6.7
LOS	B	B	B	C	B	A	C	A
Approach Delay		19.2		19.9		8.1		17.3
Approach LOS		B		B		A		B

Intersection Summary		
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 55		
Control Type: Pretimed		
Maximum v/c Ratio: 0.68		
Intersection Signal Delay: 18.6	Intersection LOS: B	
Intersection Capacity Utilization 49.0%	ICU Level of Service A	
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 11-13-2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	451	8	26	386	74	7	11	49	133	7	45
Future Volume (vph)	29	451	8	26	386	74	7	11	49	133	7	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	0.99	1.00		1.00	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.88		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)	1715	1788		1797	1696		1774	1494		1728	1559	
Flt Permitted	0.29	1.00		0.30	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	531	1788		560	1696		1334	1494		1288	1559	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	36	564	10	32	482	92	9	14	61	166	9	56
RTOR Reduction (vph)	0	1	0	0	9	0	0	39	0	0	36	0
Lane Group Flow (vph)	36	573	0	33	567	0	9	36	0	166	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		4			8			2			6	
Permitted Phases	4			8			2			6		
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)	260	878		275	833		483	541		466	565	
v/s Ratio Prot		0.32			c0.33			0.02			0.02	
v/s Ratio Perm	0.07			0.06			0.01			c0.13		
v/c Ratio	0.14	0.65		0.12	0.68		0.02	0.07		0.36	0.05	
Uniform Delay, d1	11.1	15.2		11.0	15.6		16.4	16.7		18.7	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	3.8		0.9	4.5		0.1	0.2		2.1	0.2	
Delay (s)	12.2	19.0		11.9	20.0		16.4	16.9		20.8	16.7	
Level of Service	B	B		B	C		B	B		C	B	
Approach Delay (s)		18.6			19.6			16.8			19.6	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	49.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis<2027 Background> Weekday PM Peak Hour
1: Campeau Drive & Stonecroft Terrace 11-13-2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	436	502	10	7	9
Future Volume (Veh/h)	13	436	502	10	7	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	474	546	11	8	10
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	557				1054	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	557				1054	552
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)	1024				249	538

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	488	557	18
Volume Left	14	0	8
Volume Right	0	11	10
cSH	1024	1700	355
Volume to Capacity	0.01	0.33	0.05
Queue Length 95th (m)	0.3	0.0	1.3
Control Delay (s)	0.4	0.0	15.7
Lane LOS	A		C
Approach Delay (s)	0.4	0.0	15.7
Approach LOS			C

Intersection Summary					
Average Delay	0.5				
Intersection Capacity Utilization	43.4%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	426	16	6	505	7	1
Future Volume (Veh/h)	426	16	6	505	7	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	463	17	7	549	8	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					0.85	
vC, conflicting volume			480		1034	472
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			480		954	472
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			1093		245	596

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	480	556	9
Volume Left	0	7	8
Volume Right	17	0	1
cSH	1700	1093	262
Volume to Capacity	0.28	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.8
Control Delay (s)	0.0	0.2	19.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.2	19.2
Approach LOS			C

Intersection Summary				
Average Delay			0.3	
Intersection Capacity Utilization			41.4%	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	360	14	30	489	5	10	1	37	2	0	9
Future Volume (Veh/h)	13	360	14	30	489	5	10	1	37	2	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	15	419	16	35	569	6	12	1	43	2	0	10
Pedestrians		9			4			6			10	
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		1			0			1			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	585			441			1124	1118	437	1156	1123	591
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	334			441			1021	1013	437	1062	1019	341
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			92	99	93	99	100	98
cM capacity (veh/h)	962			1124			157	178	619	139	176	545

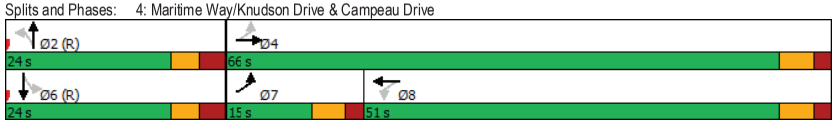
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	450	610	56	12
Volume Left	15	35	12	2
Volume Right	16	6	43	10
cSH	962	1124	370	367
Volume to Capacity	0.02	0.03	0.15	0.03
Queue Length 95th (m)	0.4	0.8	4.2	0.8
Control Delay (s)	0.5	0.8	16.5	15.1
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.8	16.5	15.1
Approach LOS			C	C

Intersection Summary				
Average Delay			1.6	
Intersection Capacity Utilization			51.3%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	39	374	46	425	9	6	70	3
Future Volume (vph)	39	374	46	425	9	6	70	3
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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)	3.7	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	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (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
v/c Ratio	0.10	0.35	0.11	0.65	0.04	0.20	0.31	0.13
Control Delay	5.5	7.3	12.6	20.1	29.7	11.1	34.5	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	7.3	12.6	20.1	29.7	11.1	34.5	11.6
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.1		19.5		13.4		26.1
Approach LOS		A		B		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 61.5%		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)	39	374	11	46	425	102	9	6	57	70	3	38
Future Volume (vph)	39	374	11	46	425	102	9	6	57	70	3	38
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	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	1854		1783	1791		1778	1556		1723	1579	
Flt Permitted	0.25	1.00		0.51	1.00		0.73	1.00		0.71	1.00	
Satd. Flow (perm)	476	1854		959	1791		1361	1556		1289	1579	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	44	420	12	52	478	115	10	7	64	79	3	43
RTOR Reduction (vph)	0	1	0	0	9	0	0	51	0	0	34	0
Lane Group Flow (vph)	44	431	0	52	584	0	10	20	0	79	12	0
Confl. Peds. (#/hr)	5		11	11		5	6		7	7		6
Heavy Vehicles (%)	0%	2%	0%	0%	3%	0%	0%	20%	0%	3%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
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)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	456	1242		482	901		272	311		257	315	
v/s Ratio Prot	0.01	c0.23			c0.33			0.01			0.01	
v/s Ratio Perm	0.05			0.05			0.01			c0.06		
v/c Ratio	0.10	0.35		0.11	0.65		0.04	0.06		0.31	0.04	
Uniform Delay, d1	7.9	6.4		11.7	16.5		29.0	29.2		30.7	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.8		0.5	3.6		0.3	0.4		3.1	0.2	
Delay (s)	8.3	7.2		12.2	20.1		29.3	29.6		33.8	29.2	
Level of Service	A	A		B	C		C	C		C	C	
Approach Delay (s)		7.3			19.4			29.5			32.1	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	16.9	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)		17.4	
Intersection Capacity Utilization	61.5%	ICU Level of Service		B	
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	478	16	25	486	2	63	0	63	3	0	3
Future Volume (Veh/h)	5	478	16	25	486	2	63	0	63	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	478	16	25	486	2	63	0	63	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	488			494			1036	1034	486	1096	1041	487
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	488			494			1036	1034	486	1096	1041	487
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			69	100	89	98	100	99
cM capacity (veh/h)	1075			1070			204	226	581	167	224	581

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	499	513	126	6
Volume Left	5	25	63	3
Volume Right	16	2	63	3
cSH	1075	1070	302	259
Volume to Capacity	0.00	0.02	0.42	0.02
Queue Length 95th (m)	0.1	0.6	15.8	0.6
Control Delay (s)	0.1	0.7	25.2	19.2
Lane LOS	A	A	D	C
Approach Delay (s)	0.1	0.7	25.2	19.2
Approach LOS			D	C

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	530	18	12	530	58	31
Future Volume (Veh/h)	530	18	12	530	58	31
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)	530	18	12	530	58	31
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					0.83	
vC, conflicting volume			548		1093	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			548		1011	539
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		73	94
cM capacity (veh/h)			1021		218	542

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	548	542	89
Volume Left	0	12	58
Volume Right	18	0	31
cSH	1700	1021	276
Volume to Capacity	0.32	0.01	0.32
Queue Length 95th (m)	0.0	0.3	10.8
Control Delay (s)	0.0	0.3	24.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	24.2
Approach LOS			C

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	49.3%	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)	3	505	9	22	440	2	20	0	31	3	2	9
Future Volume (Veh/h)	3	505	9	22	440	2	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	580	10	25	506	2	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	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	519			593			1164	1163	590	1197	1167	520
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230			593			1065	1064	590	1108	1069	231
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			84	100	93	98	99	98
cM capacity (veh/h)	1033			938			147	167	509	130	165	621

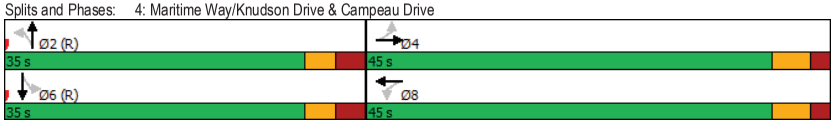
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	593	533	59	15
Volume Left	3	25	23	3
Volume Right	10	2	36	10
cSH	1033	938	260	293
Volume to Capacity	0.00	0.03	0.23	0.05
Queue Length 95th (m)	0.1	0.7	6.8	1.3
Control Delay (s)	0.1	0.7	22.9	18.0
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.7	22.9	18.0
Approach LOS			C	C

Intersection Summary					
Average Delay			1.7		
Intersection Capacity Utilization			51.3%	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	514	26	417	7	11	133	7
Future Volume (vph)	52	514	26	417	7	11	133	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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	0.28	0.75	0.16	0.73	0.02	0.13	0.36	0.11
Control Delay	16.1	23.1	13.7	21.9	16.6	7.1	21.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	23.1	13.7	21.9	16.6	7.1	21.4	6.6
LOS	B	C	B	C	B	A	C	A
Approach Delay		22.5		21.5		8.1		17.1
Approach LOS		C		C		A		B

Intersection Summary			
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 60.8%		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)	52	514	14	26	417	74	7	11	49	133	7	48
Future Volume (vph)	52	514	14	26	417	74	7	11	49	133	7	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	0.99	1.00		1.00	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.88		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)	1717	1786		1799	1701		1774	1494		1728	1556	
Flt Permitted	0.26	1.00		0.23	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	476	1786		426	1701		1330	1494		1288	1556	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	65	642	18	32	521	92	9	14	61	166	9	60
RTOR Reduction (vph)	0	1	0	0	8	0	0	39	0	0	38	0
Lane Group Flow (vph)	65	660	0	33	606	0	9	36	0	166	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		4			8			2			6	
Permitted Phases	4			8			2			6		
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)	233	877		209	835		482	541		466	564	
v/s Ratio Prot		c0.37			0.36			0.02			0.02	
v/s Ratio Perm	0.14			0.08			0.01			c0.13		
v/c Ratio	0.28	0.75		0.16	0.73		0.02	0.07		0.36	0.05	
Uniform Delay, d1	12.0	16.4		11.2	16.1		16.4	16.7		18.7	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	5.9		1.6	5.5		0.1	0.2		2.1	0.2	
Delay (s)	15.0	22.4		12.8	21.5		16.4	16.9		20.8	16.8	
Level of Service	B	C		B	C		B	B		C	B	
Approach Delay (s)		21.7			21.1			16.8			19.6	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.7	
Intersection Capacity Utilization	60.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	6	2	54	24	6
Future Volume (Veh/h)	25	6	2	54	24	6
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)	25	6	2	54	24	6
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	85	27	30			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85	27	30			
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	100			
cM capacity (veh/h)	920	1054	1583			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	31	56	30
Volume Left	25	2	0
Volume Right	6	0	6
cSH	943	1583	1700
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	8.9	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	0.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	14	5	2	6	21
Future Volume (Veh/h)	54	14	5	2	6	21
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)	54	14	5	2	6	21
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	16	27			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28	16	27			
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)	988	1068	1587			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	68	7	27
Volume Left	54	5	0
Volume Right	14	0	21
cSH	1004	1587	1700
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (m)	1.7	0.1	0.0
Control Delay (s)	8.8	5.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	5.2	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		6.3		
Intersection Capacity Utilization	15.0%	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)	13	478	77	51	527	10	40	0	40	7	0	9
Future Volume (Veh/h)	13	478	77	51	527	10	40	0	40	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	478	77	51	527	10	40	0	40	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	537			555			1186	1182	516	1216	1215	532
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537			555			1186	1182	516	1216	1215	532
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			95			74	100	93	95	100	98
cM capacity (veh/h)	1041			1026			157	180	563	141	172	551

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	568	588	80	16
Volume Left	13	51	40	7
Volume Right	77	10	40	9
cSH	1041	1026	245	242
Volume to Capacity	0.01	0.05	0.33	0.07
Queue Length 95th (m)	0.3	1.3	10.9	1.7
Control Delay (s)	0.3	1.3	26.6	20.9
Lane LOS	A	A	D	C
Approach Delay (s)	0.3	1.3	26.6	20.9
Approach LOS			D	C

Intersection Summary				
Average Delay		2.8		
Intersection Capacity Utilization	67.3%	ICU Level of Service		C
Analysis Period (min)		15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	466	58	42	556	32	24
Future Volume (Veh/h)	466	58	42	556	32	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	507	63	46	604	35	26
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					0.80	
vC, conflicting volume			570		1234	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			570		1166	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 %			95		79	95
cM capacity (veh/h)			1013		164	547

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	570	650	61
Volume Left	0	46	35
Volume Right	63	0	26
cSH	1700	1013	234
Volume to Capacity	0.34	0.05	0.26
Queue Length 95th (m)	0.0	1.1	8.1
Control Delay (s)	0.0	1.2	25.7
Lane LOS		A	D
Approach Delay (s)	0.0	1.2	25.7
Approach LOS			D

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization	73.0%	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	423	14	30	576	5	10	1	37	2	0	9
Future Volume (Veh/h)	13	423	14	30	576	5	10	1	37	2	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	15	492	16	35	670	6	12	1	43	2	0	10
Pedestrians		9			4			6			10	
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		1			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					247							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	686			514			1298	1292	510	1330	1297	692
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396			514			1226	1218	510	1270	1225	404
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			89	99	92	98	100	98
cM capacity (veh/h)	858			1057			106	126	563	93	125	472

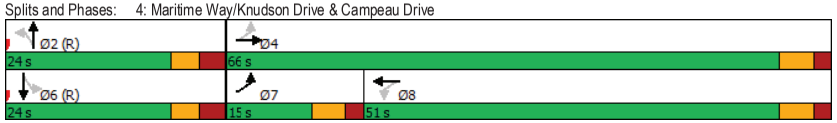
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	523	711	56	12
Volume Left	15	35	12	2
Volume Right	16	6	43	10
cSH	858	1057	284	281
Volume to Capacity	0.02	0.03	0.20	0.04
Queue Length 95th (m)	0.4	0.8	5.7	1.1
Control Delay (s)	0.5	0.9	20.8	18.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.9	20.8	18.4
Approach LOS			C	C

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization	56.7%	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	424	46	480	9	6	70	3
Future Volume (vph)	47	424	46	480	9	6	70	3
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.7	27.7	27.7	27.7	23.0	23.0	23.0	23.0
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)	3.7	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	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (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
v/c Ratio	0.13	0.40	0.11	0.72	0.04	0.20	0.31	0.18
Control Delay	5.8	7.8	12.7	22.4	29.7	11.1	34.5	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	7.8	12.7	22.4	29.7	11.1	34.5	10.3
LOS	A	A	B	C	C	B	C	B
Approach Delay		7.6		21.7		13.4		23.6
Approach LOS		A		C		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 63.0%		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)	47	424	15	46	480	102	9	6	57	70	3	55
Future Volume (vph)	47	424	15	46	480	102	9	6	57	70	3	55
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	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1852		1785	1796		1779	1556		1723	1573	
Flt Permitted	0.21	1.00		0.48	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	395	1852		908	1796		1338	1556		1289	1573	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	53	476	17	52	539	115	10	7	64	79	3	62
RTOR Reduction (vph)	0	1	0	0	8	0	0	51	0	0	50	0
Lane Group Flow (vph)	53	492	0	52	646	0	10	20	0	79	15	0
Confl. Peds. (#/hr)	5		11	11		5	6		7	7		6
Heavy Vehicles (%)	0%	2%	0%	0%	3%	0%	0%	20%	0%	3%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
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)	5.7	5.7		5.7	5.7		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	410	1240		457	903		267	311		257	314	
v/s Ratio Prot	0.01	c0.27			c0.36			0.01			0.01	
v/s Ratio Perm	0.07			0.06			0.01			c0.06		
v/c Ratio	0.13	0.40		0.11	0.71		0.04	0.06		0.31	0.05	
Uniform Delay, d1	8.9	6.7		11.8	17.3		29.0	29.2		30.7	29.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.0		0.5	4.8		0.3	0.4		3.1	0.3	
Delay (s)	9.6	7.6		12.3	22.2		29.3	29.6		33.8	29.4	
Level of Service	A	A		B	C		C	C		C	C	
Approach Delay (s)		7.8			21.4			29.5			31.8	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	17.9	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)		17.4	
Intersection Capacity Utilization	63.0%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	4	9	34	79	21
Future Volume (Veh/h)	14	4	9	34	79	21
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)	14	4	9	34	79	21
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	142	90	100			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142	90	100			
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	99			
cM capacity (veh/h)	851	974	1493			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	18	43	100
Volume Left	14	9	0
Volume Right	4	0	21
cSH	875	1493	1700
Volume to Capacity	0.02	0.01	0.06
Queue Length 95th (m)	0.5	0.1	0.0
Control Delay (s)	9.2	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	1.6	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		19.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	15	24	9	4	57
Future Volume (Veh/h)	34	15	24	9	4	57
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)	34	15	24	9	4	57
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	90	32	61			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	32	61			
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	98			
cM capacity (veh/h)	902	1047	1542			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	33	61
Volume Left	34	24	0
Volume Right	15	0	57
cSH	942	1542	1700
Volume to Capacity	0.05	0.02	0.04
Queue Length 95th (m)	1.3	0.4	0.0
Control Delay (s)	9.0	5.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	5.4	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		18.5%	ICU Level of Service	A
Analysis Period (min)		15		