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541-545 Rideau Street Transportation Impact Assessment

December 2017

CHENIER

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541-545 Rideau Street

Transportation Impact Assessment

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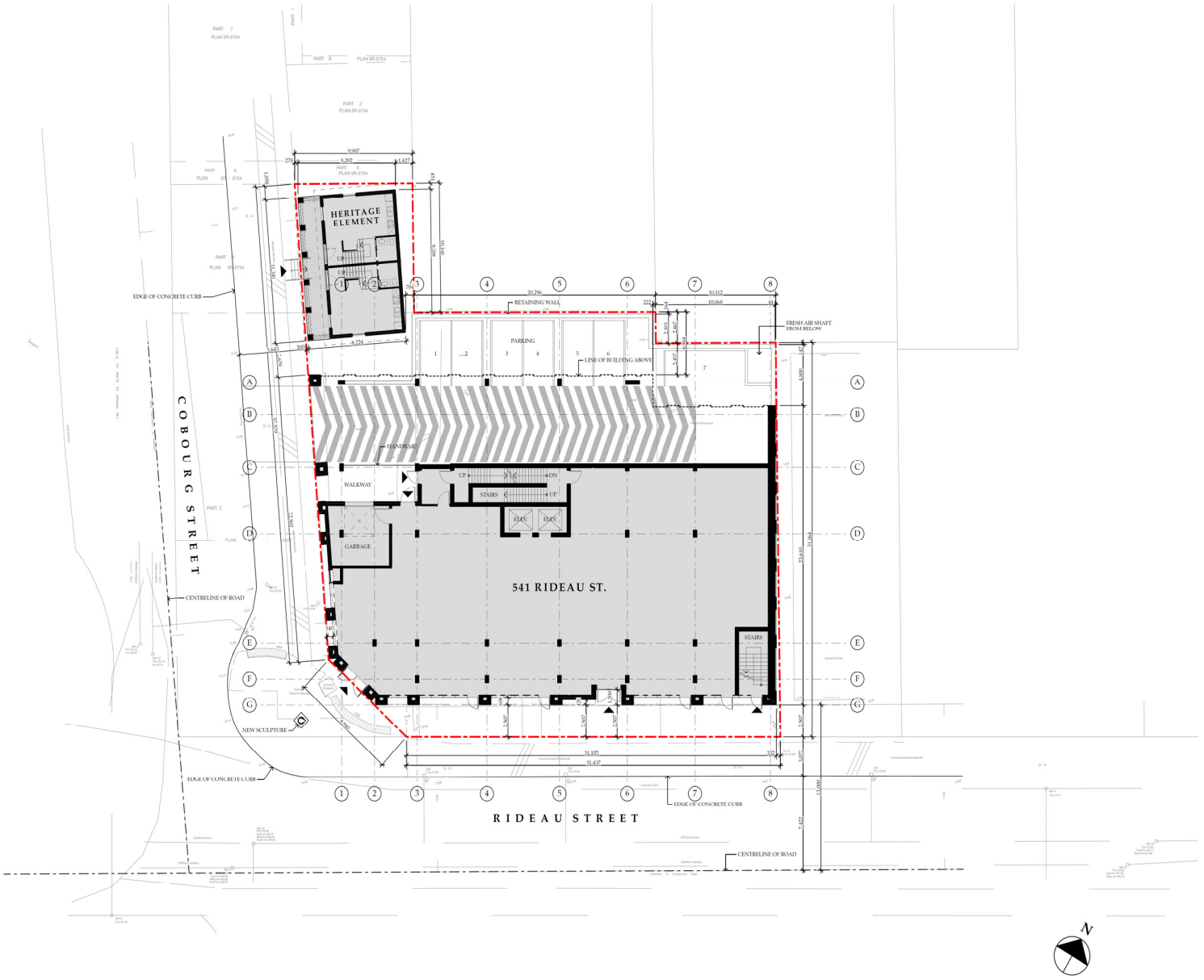
1. INTRODUCTION

From the information provided, it is our understanding that Chenier Developments Corp. is proposing the construction of a 102-unit residential building with ground floor retail, located at 541-545 Rideau Street. The site is currently occupied by a restaurant and an adjacent parking lot. A total of 53 parking spaces are proposed to serve the subject residential development. Vehicular access/egress is proposed via Cobourg Street, approximately 20 m north of Rideau Street. The local context of the site is provided as Figure 1 and the proposed Site Plan is provided as Figure 2.

Figure 1: Local Context

As part of the Site Plan Approval process, the City of Ottawa requires a submission of a formal Transportation Impact Assessment (TIA) consistent with their updated 2017 guidelines. With respect to these guidelines, the Screening, Scoping, Forecasting and Strategy Reports have been submitted and discussed with the City's Development Review Team. The discussion/review correspondence is provided as Appendix A for reference. The Transportation Impact Assessment provided herein incorporates the four previously submitted reports and the corresponding City review into one TIA final report.



SITE PLAN (PRELIMINARY) **SCALE 1:150** November 27, 2017 **A-0**

CHENIER **541-545 RIDEAU STREET REDEVELOPMENT PROJECT**

Chamberlain | BARRY PADOLSKY ASSOCIATES INC ARCHITECTS

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Figure 2: Proposed Site Plan

2. EXISTING CONDITIONS

Study area intersections to be assessed in the ensuing analysis include the signalized Rideau/Augusta, Rideau/Cobourg and Rideau/Charlotte intersections.

2.1. AREA ROAD NETWORK

Rideau Street, within the vicinity of the site, is an east-west arterial roadway with transit priority lanes adjacent to the curb. It is also a designated truck route. It extends from Sussex Drive in the west to North River Road in the east, where it continues as Wellington Street and Montreal Road, respectively. Along the site's frontage, Rideau Street has a 26 m right-of-way (ROW), consisting of two vehicle travel lanes in each direction. The speed limit within the study area is 50 km/h.

Rideau Street, from Dalhousie Street east to Charlotte Street, was recently redesigned/reconstructed. The intent of the redesign was to provide a more "complete street" with emphasis on wider sidewalks, improved streetscaping and better accommodation of pedestrian and cyclists. At the same time, the transit accessibility, which characterizes Rideau Street, remains. These changes assist with achieving all the benefits related to active transportation, complete streets and a rejuvenated neighbourhood, but they do have some effect on vehicle movement within the area.

Charlotte Street is a major north-south collector roadway that extends from Laurier Avenue in the south to Tormey Street in the north. Its cross-section consists of two travel lanes in each direction south of Rideau Street and north of Stewart Street, and one travel lane in each direction north of Rideau Street and south of Stewart Street. On-street parking is permitted along both sides of the roadway with peak hour restrictions. The unposted speed limit is understood to be 50 km/h.

Cobourg Street is a collector roadway north of Rideau Street (adjacent to the site) that extends from Wilbrod Street in the south to St. Patrick Street in the north. The cross-section of Cobourg Street consists of a single travel lane in each direction, and bike lanes and parking bays on both sides of the road. The unposted speed limit is understood to be 50 km/h.

Augusta Street is a local roadway that extends from Wilbrod Street in the south to Beausoleil Drive in the north. Augusta Street has a two-lane cross-section with on-street parking permitted along the east side of the street. The unposted speed limit is understood to be 50 km/h.

2.2. PEDESTRIAN/CYCLING NETWORK

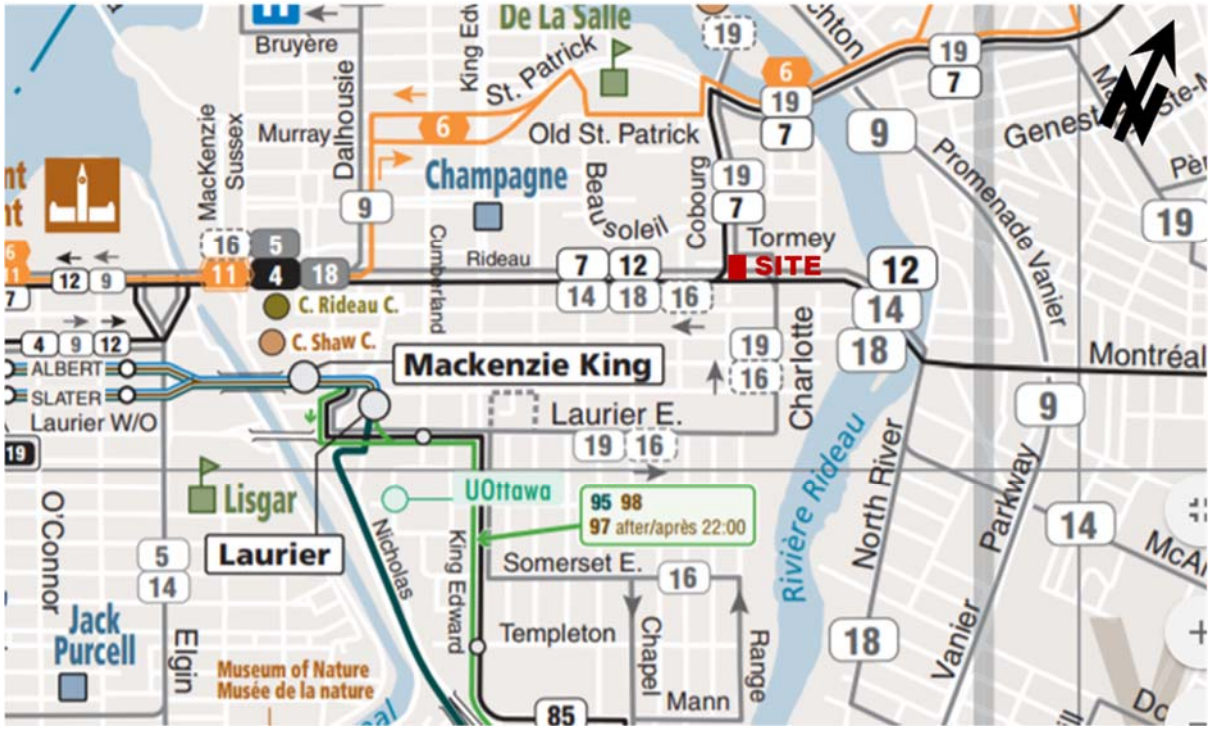
Sidewalk facilities within the vicinity of the site are provided along both sides of Rideau Street, Cobourg Street, Augusta Street and Charlotte Street and along the south side of Tormey Street. With respect to cycling, bike lanes are provided along both sides of Cobourg Street (north of Rideau Street) and along the north side of the Rideau Street bridge. 'Sharrows' are also provided along Rideau Street. The City's Cycling Plan indicates Rideau Street (east of Cobourg Street) and Cobourg Street as Spine Routes and Charlotte Street as a Local Route.

2.3. TRANSIT NETWORK

Transit service within the vicinity of the site is currently provided by OC Transpo Regular Routes #7, 12, 14, 16 18, and 19 which provide frequent all-day service. Bus stops for Routes #7, 12, 14, 16, and 18 are located at the Rideau/Charlotte and Rideau/Augusta intersections, approximately 125 m from the proposed development. Bus stops for Routes #7 and 19 are located along Cobourg Street, approximately 110 m north of the proposed development. Given the role of this section of Rideau Street as a transit priority corridor, and as it feeds directly to the downtown core and to the planned Rideau Centre LRT station, the number of peak period buses stopping at the bus stops adjacent to the subject site is significant.

The downtown area's LRT Confederation Line will be in operation in 2018, with a station at Rideau Centre (approximately 15 minute walking distance from the proposed site). In the interim, rapid transit service will continue to be provided via the Mackenzie King and Laurier Transitway Stations. Located approximately 1.5 kilometres west of the proposed development, the Mackenzie King and Laurier Transitway Stations provide convenient access to rapid transit routes along the Transitway.

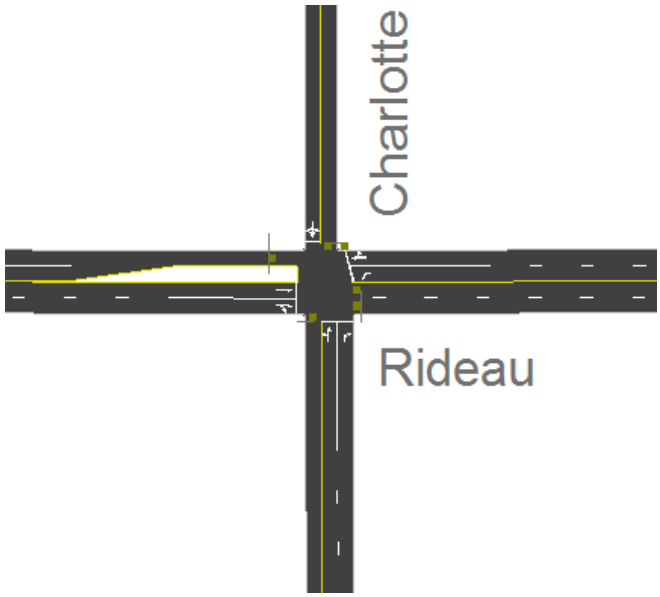
Figure 3: Area Transit Network



2.4. EXISTING STUDY AREA INTERSECTIONS

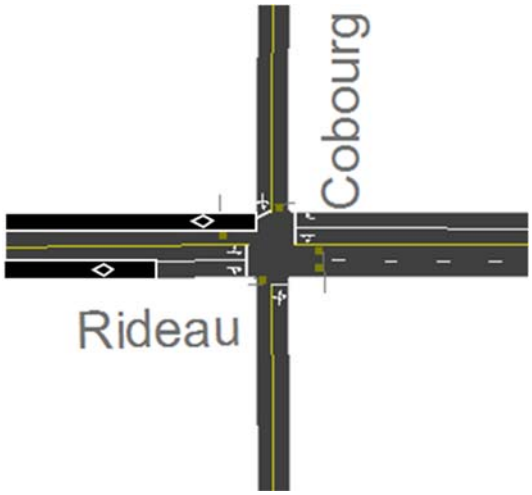
Rideau/Charlotte

The Rideau/Charlotte intersection is a signalized four-legged intersection. The eastbound approach consists of a through lane and a shared through/right-turn lane. The westbound approach consists of a single left-turn lane and a shared through/right-turn lane. The northbound approach consists of a shared through/left-turn lane and a single right-turn lane. The southbound approach consists of a single full-movement lane. A north and southbound advance pedestrian phase is provided at this location. The eastbound left-turn movement is prohibited at this intersection, and 'no-right-on-red' is signed for the northbound and eastbound right-turn movements (during the day 7AM – 7PM). All other movements are permitted.



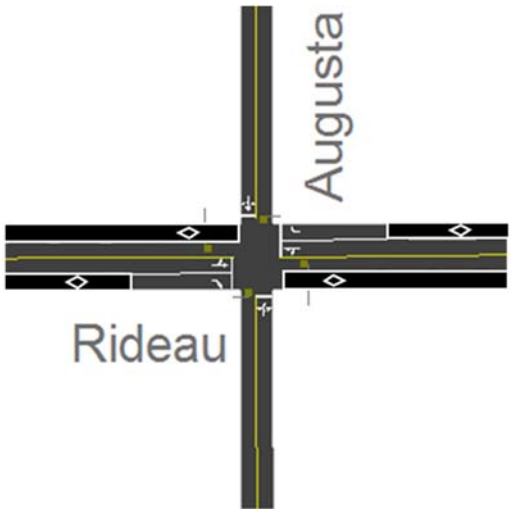
Rideau/Cobourg

The Rideau/Cobourg intersection is a signalized four-legged intersection. The eastbound approach consists of a shared through/left-turn lane and a shared through/right-turn lane. The westbound approach consists of a shared through/left-turn lane and a single right-turn lane. The south and northbound approaches consist of a single full-movement lane. All movements are permitted at this location. Transit only lanes are provided west of this intersection.



Rideau/Augusta

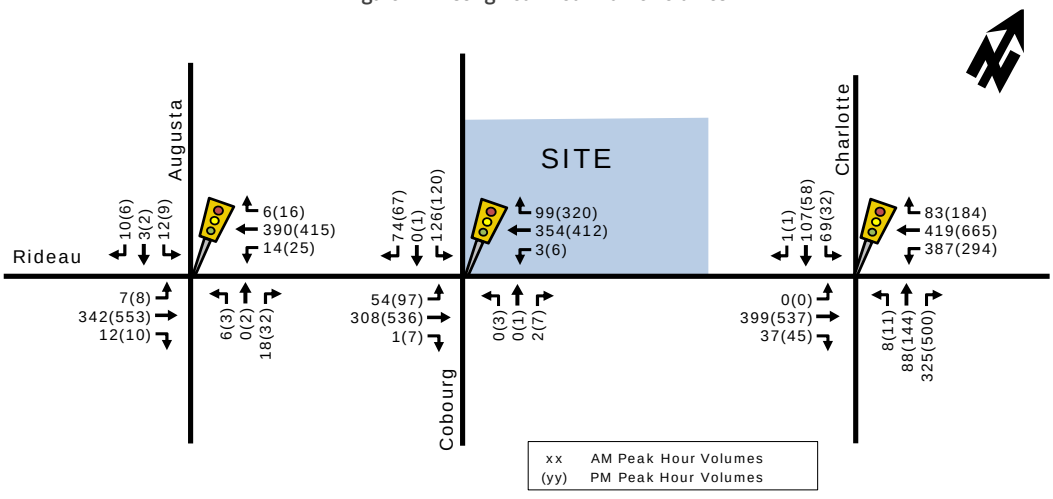
The Rideau/Augusta intersection is a signalized four-legged intersection. The west and eastbound approaches consist of a shared through/left-turn lane and a right-turn lane (temporary break in the transit lane). The south and northbound approaches consist of a single full-movement lane. The westbound left-turn movement is prohibited during the morning peak hour. All other movements are permitted at this location.



2.5. EXISTING INTERSECTION OPERATIONS

Illustrated as Figure 4, are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa at the Rideau/Cobourg, Rideau/Charlotte and Rideau/Augusta intersections. These peak hour traffic volumes are included as Appendix B.

Figure 4: Existing Peak Hour Traffic Volumes



The following Table 1 provides a summary of the existing traffic operations at study area intersections based on the SYNCHRO (V9) traffic analysis software. The subject signalized intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The subject signalized intersections 'as a whole' were assessed based on weighted v/c ratio. The SYNCHRO model output of existing conditions is provided within Appendix C.

Table 1: Existing Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Charlotte/Rideau	D(F)	0.85(1.02)	WBL(NBR)	23.6(35.7)	B(C)	0.61(0.75)
Cobourg/Rideau	B(C)	0.69(0.79)	SBT(SBT)	8.9(10.7)	A(A)	0.36(0.46)
Augusta/Rideau	A(A)	0.31(0.42)	WBT(EBT)	3.6(4.4)	A(A)	0.28(0.37)
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Table 1, all study area intersections 'as a whole' are currently operating at an acceptable LoS 'C' or better during peak hours. With regard to the 'critical movements' the northbound right-turn movement at the Rideau/Charlotte intersection is currently operating above capacity (LoS 'F') during the afternoon peak hour. Queues at this intersection have been observed spilling back significantly southward to Stewart Street. All other 'critical movements' are currently operating at acceptable levels of service of LoS 'D' or better.

2.6. EXISTING ROAD SAFETY CONDITIONS

Collision history for study area roads (2011 to 2015, inclusive) was obtained from the City of Ottawa and most collisions (78%) involved only property damage, indicating low impact speeds, and 18% involved personal injuries. 2% of accidents were identified as "non-reportable", indicating the total damage to a vehicle was less than $1,000. The primary causes of collisions cited by police include; turning movement (30%), rear end (28%), sideswipe (14%) and single vehicle/other (14%) type collisions.

A standard unit of measure for assessing collisions at an intersection is based on the number collisions per million entering vehicles (MEV). At intersections within the study area, reported collisions have historically take place at a rate of:

- 0.49/MEV at the Rideau/Charlotte intersection;
- 0.60/MEV at the Rideau/Cobourg intersection; and
- 0.38/MEV at the Rideau/Augusta intersection.

It is noteworthy that within the 5-years of recorded collision data there were five (5) collisions that involved pedestrians and eight (8) that involved cyclists. Most of the collisions involving pedestrians and cyclists were turning movement collisions that resulted in either non-fatal injuries or property damage only. The source collision data as provided by the City of Ottawa and related analysis, is provided as Appendix D.

3. PLANNED CONDITIONS

3.1. PLANNED STUDY AREA TRANSPORTATION NETWORK CHANGES

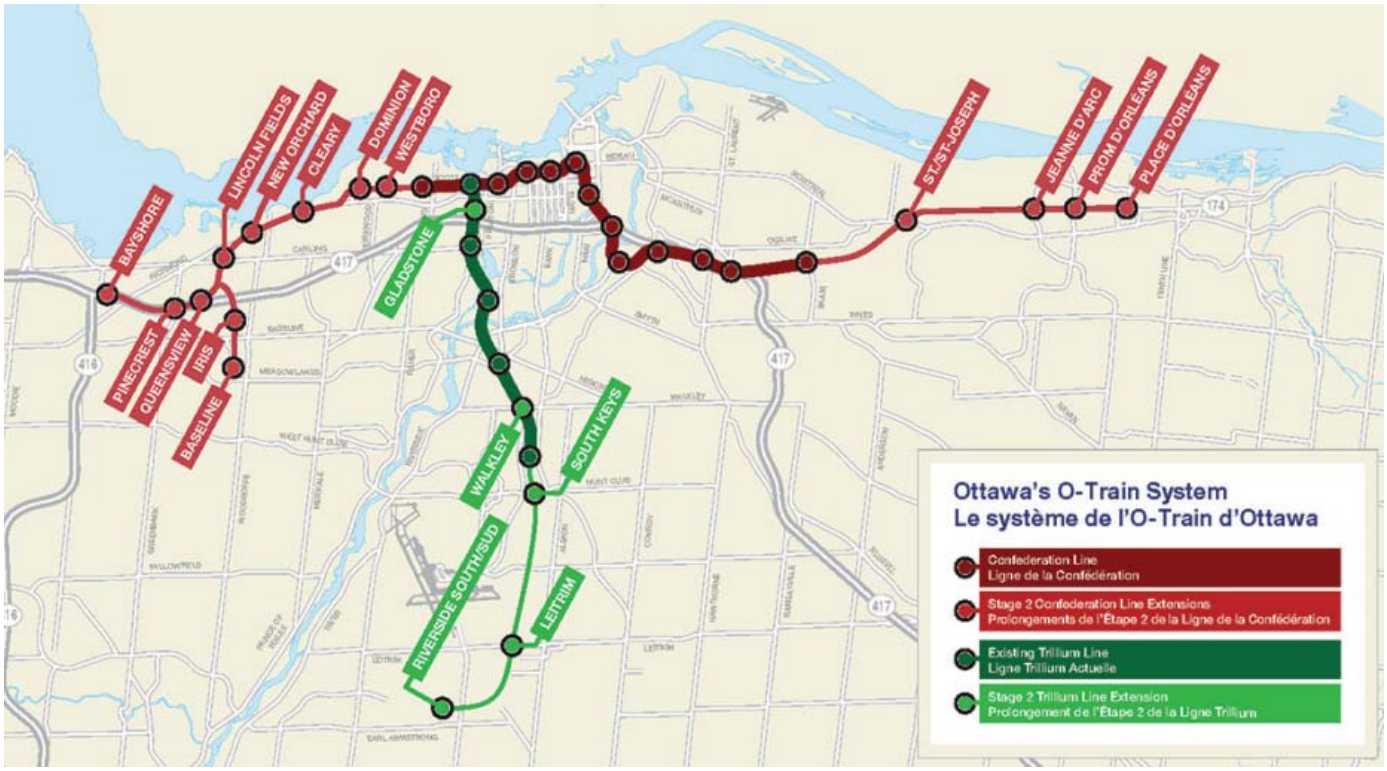
Transit

A notable transportation network change is the Phase I construction of the east-west LRT, which is the conversion of the City's existing BRT corridor to LRT between the current Blair transit station and the Tunney's Pasture station which includes

a tunnel through the City's Downtown. Currently, this phase of construction is underway and is expected to be completed by 2018.

Phase II of the LRT construction, which will extend the City's LRT further east, west and south (further improving transit within the vicinity of the site), is expected to begin by 2019 and be completed by 2023. The following Figure 5 illustrates the planned Phases I and II of the future Confederation/Trillium Lines. As mentioned previously, the subject development is located approximately 15 minutes walking distance (1.2 km) from the planned Rideau Street East Station.

Figure 5: Planned LRT Phase II



Roadways

As part of the development of the 151-153 Chapel development, it is our understanding that the cul-de-sac of Chapel Street at Beausoleil Drive is planned to be opened.

3.2. OTHER AREA DEVELOPMENT

With respect to other area development, the following developments are planned in the vicinity of the proposed site:

101 Wurtemburg Street

Claridge is proposing to replace the existing building with a 13-storey building consisting of 36 dwelling units and 18 parking spaces. No traffic study was submitted with the application, which is located approximately 400 northeast of the subject development.

560 Rideau Street

Richcraft is proposing the construction of a mixed-use development consisting of approximately 216 residential units, 8,825 ft^2 of retail/commercial, and 198 below-grade parking spaces at the above noted address. The Transportation Brief (prepared by Parsons) projected an increase in vehicle traffic of approximately 40 to 50 veh/h during the peak hours. The proposed development is located on the south side of Rideau Street, between Cobourg Street and Charlotte Street.

256 Rideau Street
Textbook Student Suites Inc. is proposing the construction of a student residence development at the above-noted address. The development is located approximately 850 m west of the subject site. The Parking Justification and Traffic Operations Study (prepared by Cole Engineering) projected "minimal impact on the operations of Rideau Street corridor and surrounding intersections".

245 Rideau Street
Claridge Homes is proposing to construct a mixed-use development consisting of 481 residential units, a 224 room hotel, 8,290 m^2 of commercial space and 471 below-grade parking spaces at the above noted address. The development is located approximately 850 m west of the subject site. The Transportation Impact Study (prepared by Parsons) projects a net increase in vehicle traffic of approximately 155 and 160 veh/h during the peak hours.

151-153 Chapel Street
Trinity Development Group plans to redevelop the site located at the above-noted address, to a mixed-use development consisting of approximately 71,400 ft^2 of retail, 785 residential units and 720 parking spaces. The proposed development is located approximately 250 m to the west of the subject site. The Transportation Impact Study (prepared by Parsons) projects an increase in vehicle traffic of approximately 140 and 185 veh/h during the peak hours.

594 Rideau Street
Richcraft is proposing to construct a residential development at the above-noted address, consisting of 68 residential units and approximately 3,700 ft^2 of retail. The development is located approximately 175 m east of the subject development. The Transportation Brief (prepared by Parsons) projected an increase in vehicle traffic of approximately 12 and 20 veh/h during the peak hours.

4. DEVELOPMENT-GENERATED TRAFFIC

4.1. TRIP GENERATION

Appropriate trip generation rates for the proposed development consisting of approximately 100 high-rise condominiums and approximately 6,000 ft^2 of ground floor retail were obtained from the City's 2009 TRANS Trip Generation – Residential Trip Rates and the ITE Trip Generation Manual (9th Edition). These rates are summarized in Table 2.

Table 2: 2009 TRANS and ITE Trip Generation Rates

Land Use	ITE Land Use Code	Trip Rates	
		AM Peak	PM Peak
Mid-Rise Apartments	ITE 223	T = 0.17(du)	T = 0.16(du)
Specialty Retail	ITE 826	T = 1.36(X) T = 1.20(X) + 10.74	T = 2.71(X) T = 2.40(X) + 21.48

Notes: *T = Average Vehicle Trip Ends*
du = Dwelling units
X = 1000 ft^2 Gross Floor Area
Specialty Retail AM Peak is assumed to be 50% of the PM Peak

4.1.1. RESIDENTIAL TRIPS

Using the TRANS Trip Generation rates for the residential component of the site, the total amount of vehicle trips generated by the proposed 100 residential units was projected. The results are summarized in Table 3.

Table 3: Projected Vehicle Trip Generation – TRANS Model

Land Use	Area	AM Peak (Veh/h)			PM Peak (Veh/h)		
		In	Out	Total	In	Out	Total
Mid-Rise Apartments	100 units	3	14	17	9	7	16

As shown in Table 3, a total of 16 and 17 veh/h are projected to travel to/from the proposed development during the weekday morning and afternoon commuter peak hours. Using the travel mode shares outlined in the OD Survey for the Inner Area, the person trips break down associated with the residential component of the site is summarized in Table 4.

Table 4: TRANS Model Site Trip Generation – Residential Use

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	35%	3	14	17	9	7	16
Auto Passenger	10%	2	3	5	3	1	4
Transit	25%	2	10	12	7	5	12
Non-motorized	30%	3	12	15	8	6	14
Total Person Trips	**100%**	**10**	**39**	**49**	**27**	**19**	**46**

As shown in Table 4, based on the TRANS Trip Generation method, the proposed site is projected to generate approximately 50 to 45 person trips per hour during the weekday commuter peak hours. The increase in two-way transit trips is estimated to be 12 persons per hour, and the increase in bike/walk trips is approximately 15 persons per hour.

4.1.2. RETAIL TRIPS

The retail trip generation is based on the ITE trip generation rates, outline in Table 5. As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more urban study area context were applied to attain estimates of person trips for the proposed development.

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Based on the TIA Guidelines and our review of available literature, a combined factor of approximately 1.28 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit/non-motorized modal shares of 10%. As such, the person trip generation for the proposed retail development is summarized in Table 5.

Table 5: Modified Person Trip Generation - Retail

Land Use	Area	AM Peak (Person Trip/h)			PM Peak (Person Trip/h)		
		In	Out	Total	In	Out	Total
Specialty Retail	6,000 ft^2	10	13	23	25	22	47

The person trips shown in Table 5 for the proposed retail development were then reduced by modal share values based on the site's location and proximity to adjacent communities, employment, shopping uses and transit availability. Modal share values for the retail component of the proposed development are summarized in Table 6.

Table 6: Retail Modal Site Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	35%	4	5	9	9	8	17
Auto Passenger	10%	1	2	3	3	3	6
Transit	25%	2	3	5	6	5	11
Non-motorized	30%	3	3	6	7	6	13
Total Person Trips	**100%**	**10**	**13**	**23**	**25**	**22**	**47**
Less Retail Pass-by (30%)		-1	-1	-2	-2	-2	-4
Total 'New' Auto Trips		**2**	**3**	**5**	**5**	**4**	**9**

The following Table 7 summarizes the foregoing people trip generations for the residential and retail components of the proposed development.

Table 7: Total Site Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	35%	7	19	26	18	15	33
Auto Passenger	10%	3	5	8	7	4	11
Transit	25%	4	13	17	13	10	23
Non-motorized	30%	6	15	21	15	12	27
Total Person Trips	**100%**	**20**	**52**	**72**	**53**	**41**	**93**
Less Retail Pass-by (30%)		-1	-1	-2	-3	-3	-6
Total 'New' Auto Trips		**6**	**18**	**24**	**15**	**12**	**27**

As shown in Table 7, the total number of person trips expected to be generated by this development is approximately 70 and 90 persons/h during the weekday commuter peak hours. The total amount of 'new' vehicle traffic to the study area is projected to be 25 to 27 veh/h during the peak hours. This amount of traffic equates to less than 1 new vehicle every 2 minutes and is not considered a significant increase in traffic. As such, no future vehicle capacity analysis related to the development's vehicle impact is expected to be required.

4.1.3. MODE SHARES

Given the existing modal share values reflect high non-motorized (~30%) and transit (~25%) mode splits that are appropriate for a site located in the Inner Area with good access to transit, the future mode shares for this development are assumed to be the same as existing.

4.2. TRIP DISTRIBUTION

Given the low projected number of vehicle trips projected to be generated by the proposed development, the future roadway network impact is considered negligible. As such, no further traffic assessment related to the subject development is included herein.

4.3. TRIP ASSIGNMENT

Given the low projected number of vehicle trips projected to be generated by the proposed development, the future roadway network impact is considered negligible. As such, no further traffic assessment related to the subject development is included herein.

5. BACKGROUND NETWORK TRAVEL DEMANDS

5.1. HISTORIC TRAFFIC GROWTH

The following background traffic growth through the immediate study area (summarized in Table 8) was calculated based on historical traffic count data (years 2007, 2008, 2011 and 2016) provided by the City of Ottawa at the Rideau/Cobourg intersection. Detailed background traffic growth analysis is included as Appendix E.

Table 8: Rideau/Cobourg Historical Background Growth (2007 – 2016)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	4.40%	-3.66%	0.36%	-0.87%	**0.49%**
AM Peak	6.23%	-7.78%	0.52%	-0.73%	**0.92%**
PM Peak	5.77%	-1.46%	1.33%	-1.06%	**1.30%**

As shown in Table 8, the Rideau/Cobourg intersection has experienced approximately 1% annual growth within recent years (calculated as a weighted average).

In addition to the foregoing, the future 2031 traffic growth projections were provided by the City of Ottawa in the form of link analysis of the TRANS Model – Morning Peak Hour. The link volumes for the 2011 and 2031 models, within the vicinity of the site, are provided in Table 9, and the percent growth per annum was calculated.

Table 9: Study Area Future Background Growth (AM TRANS Model 2011 – 2031)

Roadway	Direction	Location	2011 Volume	2031 Volume	Percent Growth per Annum
Rideau Street	Eastbound	Chapel -Cobourg	528	659	1.11%
		Cobourg – Charlotte	476	591	1.08%
		East of Charlotte	702	930	1.42%
	Westbound	Cobourg - Chapel	678	563	-0.93%
		Charlotte - Cobourg	525	383	-1.56%
		East of Charlotte	1209	950	-1.20%
Cobourg Street	Northbound	Rideau - Tormey	54	69	1.23%
	Southbound	Tormey-Rideau	153	181	0.84%
Charlotte Street	Northbound	Besserer - Rideau	171	267	2.25%
	Southbound	Rideau - Besserer	537	442	-0.97%

As shown in Table 9, Rideau Street, in the eastbound direction, is projected to experience a 1% growth rate per annum until 2031. In the westbound direction, negative growth is projected for the morning peak hour. Along Cobourg Street, an approximate 1% growth rate per annum is projected until 2031 in both directions. Along Charlotte Street, a 2% growth rate in the northbound direction is projected and a negative growth rate is projected in the southbound direction.

To account for the historic and future increases in traffic volumes and to account for the traffic generated by the previously identified area developments, a 1% per annum growth factor was applied to existing traffic volumes along Rideau Street in the eastbound direction and along the north leg of Cobourg Street and a 2% per annum growth rate was applied to Charlotte Street in the northbound direction to obtain background traffic volumes for the 2020 built-out horizon year and 2025 (5-years beyond site build-out). The resultant 2020 and 2025 background traffic volumes are depicted as Figures 6 and 7, respectively.

Figure 6: 2020 Background Traffic Volumes

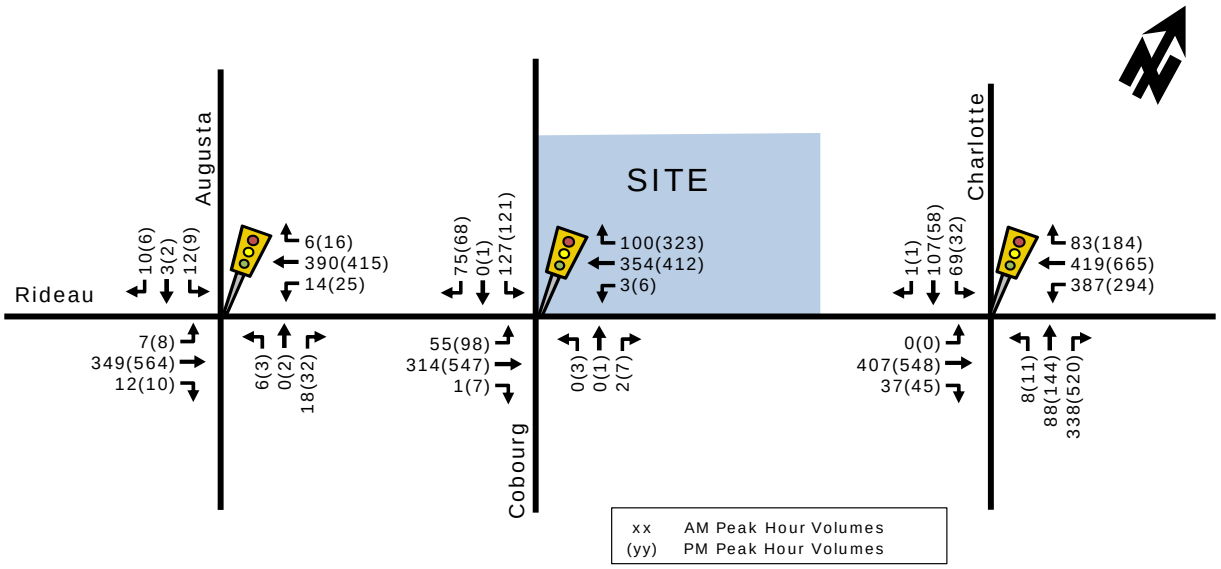
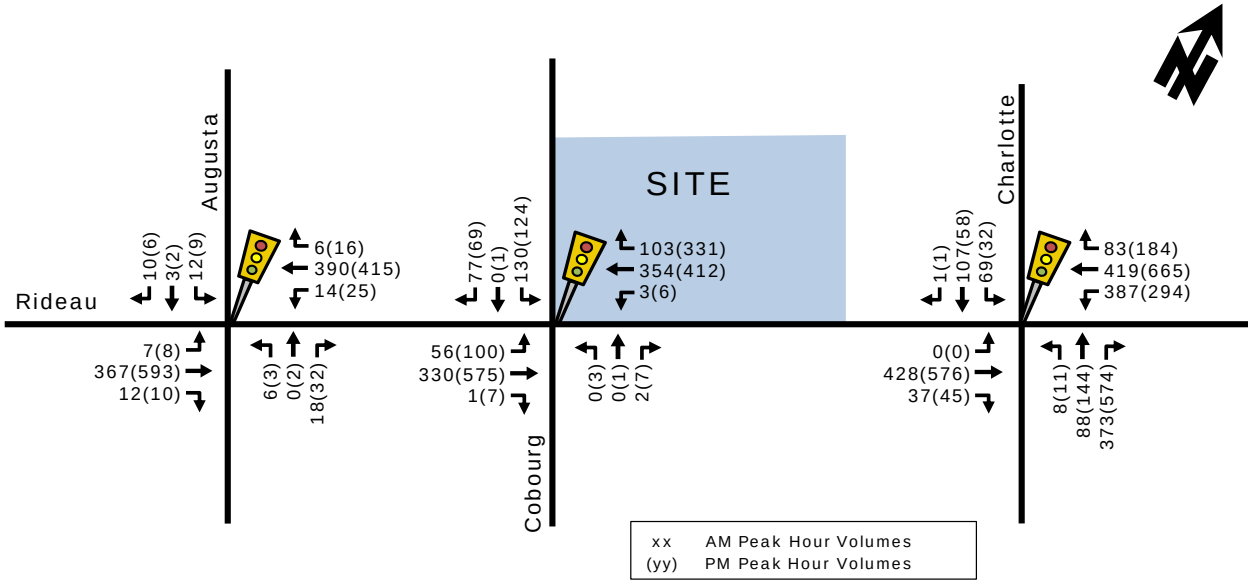


Figure 7: 2025 Background Traffic Volumes



6. DEMAND RATIONALIZATION

6.1. BACKGROUND TRAFFIC CAPACITY ASSESSMENT

Tables 10 and 11 provide a summary of projected 2020 and 2025 performances of study area intersections at full site build-out. Projected 2020 and 2025 volumes associated with the background traffic projected are illustrated as Figures 6 and 7. The SYNCHRO model output of projected conditions is provided within Appendix F.

Table 10: Projected 2020 Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Charlotte/Rideau	D(E)	0.82(0.97)	WBL(NBR)	24.4(30.3)	A(B)	0.59(0.70)
Cobourg/Rideau	C(C)	0.71(0.77)	SBT(SBT)	9.5(10.2)	A(A)	0.35(0.41)
Augusta/Rideau	A(A)	0.28(0.38)	WBT(EBT)	3.7(4.2)	A(A)	0.25(0.34)
Note: Analysis of signalized intersections assumes a PHF of 1.00 and a saturation flow rate of 1800 veh/h/lane.						

Table 11: Projected 2025 Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Charlotte/Rideau	D(F)	0.82(1.07)	WBL(NBR)	24.5(36.9)	A(C)	0.60(0.75)
Cobourg/Rideau	C(C)	0.72(0.77)	SBT(SBT)	9.8(10.3)	A(A)	0.35(0.42)
Augusta/Rideau	A(A)	0.28(0.40)	WBT(EBT)	3.8(4.3)	A(A)	0.26(0.35)
Note: Analysis of signalized intersections assumes a PHF of 1.00 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Tables 10 and 11, the future conditions at study area intersections are projected to be similar to the existing conditions. The northbound right-turn movement at the Rideau/Charlotte intersection is projected to continue to operate at or close to capacity during the afternoon peak hour. This is a result of the downtown traffic using Laurier Avenue and Charlotte Street to access the Cumming Bridge along Rideau Street. With the implementation of the LRT, a shift from vehicle drivers to transit riders is expected, particularly for commuters to/from the downtown core. This will likely lessen the demand on this right-turn movement.

6.2. MULTI-MODAL LEVEL OF SERVICE

The following Table 12 summarizes the MMLoS analysis at all study area intersections. These results represent existing and future levels of service as there are no proposed geometric changes and minimal increases of site-generated and background traffic resulting in negligible increases in delay. The detailed analysis is provided as Appendix G.

Table 12: MMLOS Analysis

Intersection	Level of Service									
	Pedestrian		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)		Vehicle (LoS)	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target	LoS	Target
Rideau/Charlotte	D	B	D	C	F	B	F	D	F	D
Rideau/Cobourg	D	B	F	C	C	B	F	D	C	D
Baseline/Prince of Wales	D	B	D	C	B	B	F	D	A	D

As shown in Table 12, some of the target level of service are not currently met and will not be met in the future. These are listed below:

- Pedestrians – High PLoS 'B' or 'C' is difficult to achieve at intersections that consists of an arterial (wide) roadway (PLoS 'A' is impossible to achieve at any intersection). This is because of the long crossing distance for pedestrians crossing Rideau Street. However, pedestrians travelling along Rideau Street, crossing minor street (i.e. Cobourg and Augusta) have PLoS scores of 'B', which meets the target.
- Bicycles – with mixed traffic conditions (i.e. sharrows or less) and right-turn lanes, the highest bicycle level of service that can be achieved is BLoS 'D'. The bike level of service along the minor north-south streets, with no right-turn lanes, is BLoS 'B', which meets the target.
- Transit – The level of service for transit along Rideau Street, which is the transit priority corridor, is TLoS 'C' at the Rideau/Charlotte intersection and TLoS 'B' at the Rideau/Cobourg and Rideau/Augusta intersections. As there are bus routes on Cobourg Street and Charlotte Street, these delays are higher and result in a lower level of service. As these streets are not transit priority streets, they have no target and as such the transit level of service for Rideau Street is met at all three study area intersections.
- Trucks – Rideau Street forms part of the truck route and as such has a target level of service TkLOS 'D', however the minor streets do not form part of the truck route and do not have target levels of service. As the TkLoS is based on truck turning movements, and trucks are not expected to turn onto these minor streets unless for deliveries, the TkLoS targets are met.
- Vehicles – Vehicle level of service is LoS 'F' for the northbound right-turn movement at the Charlotte/Rideau intersection. This is a result of the downtown traffic using Laurier Avenue and Charlotte Street to access the Cumming Bridge along Rideau Street. With the implementation of the LRT, a shift from vehicle drivers to transit riders is expected, particularly for commuters to/from the downtown core. This will likely lessen the demand on this right-turn movement and improve vehicle level of service at this location.

7. DEVELOPMENT DESIGN

7.1. DESIGN FOR SUSTAINABLE MODES

Vehicle Parking

A total of 53 vehicle parking spaces are proposed to serve the subject development on two floors of underground parking and on the upper level parking ramp (7 spaces). Given the site's location close to LRT access, no parking is required for the residential units according to By-Law. Visitor parking is required at a rate of 0.1 per unit, which equates to 10 visitor parking spaces. Parking space dimensions are noted to be approximately 5.2 m in length and 2.4 to 2.6 m in width. The narrow spots should be signed for 'small cars only'.

Bicycle Parking

With respect to bicycle parking, a total of 50 bicycle parking spaces should be provided to serve the residential units. Retail bicycle parking should be provided as well (minimum 2 spaces).

Transit
Transit service within the vicinity of the site is currently provided by OC Transpo Regular Routes #7, 12, 14, 16 18, and 19 which provide frequent all-day service. Bus stops for Routes #7, 12, 14, 16, and 18 are located at the Rideau/Charlotte and Rideau/Augusta intersections, approximately 125 m from the proposed development. Bus stops for Routes #7 and 19 are located along Cobourg Street, approximately 110 m north of the proposed development. Given the role of this section of Rideau Street as a transit priority corridor, and as it feeds directly to the downtown core and to the planned Rideau Centre LRT station, the number of peak period buses stopping at the bus stops adjacent to the subject site is significant.

Based on the above-noted transit stop locations, it is estimated that 100% of the residential units are within 400 m walking distance to a transit stop.

7.2. LOADING

Access for municipal vehicles and loading is assumed to be on-street. On-street loading should be performed on Cobourg Street. As Cobourg Street has a wide cross-section accommodating on-street parking, loading vehicles will not impede the circulation of traffic.

8. STREET/INTERSECTION DESIGN

8.1. BOUNDARY STREET DESIGN

The City has recently reconstructed Rideau Street as a complete street. The design features include:

- Transit priority lanes in both directions;
- Curb-bulb outs and narrowed pedestrian crossings at signalized intersections;
- Wider sidewalks were feasible;
- Sharrows for cyclists.

The proposed development's trip-generation projects an increase of 35 to 45 two-way non-motorized trips/hour and 20 to 30 new transit trips/h that will be accommodated by these existing features.

8.2. LOCATION AND DESIGN OF ACCESS

There is an existing site access located approximately 20 m from the Rideau/Cobourg intersection. The proposed site access is planned to be formalized and is planned to be approximately 24 m from the Rideau/Cobourg intersection. This distance from the intersection meets the City's Private Approach By-Law.

The grade of the ramp accessing the lower level parking garage is 5% with parking starting approximately 9 m from the property line.

8.3. INTERSECTION CONTROL AND DESIGN

Based on the projected vehicle volumes at the site driveway, STOP control on the minor approach (site) only is recommended. As the access intersection is unsignalized, no MMLoS analysis is provided.

9. TRANSPORTATION DEMAND MANAGEMENT

The TDM checklist is attached as Appendix H. Some of the TDM measures that the proponent is considering are as follows:

- OC Transpo display in lobby;
- Car-sharing parking spaces; and
- Plug-in parking spaces for electric vehicles.

Given the site's location on a transit priority corridor in the City's inner area, residents of the development will be attracted to transit and active modes. This is reflected in the OD Survey data and the trip-generation analysis, previously submitted in the TIA Forecasting report.

10. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Based on the results summarized herein the following conclusions are offered:

- The redevelopment of 541-545 Rideau Street is planned along a recently reconstructed Traditional Mainstreet, with improvements to pedestrian, cycling and transit facilities;
- The existing study area intersections are currently operating overall at an acceptable LoS 'C' or better during the peak hours. The northbound right-turn movement at the Rideau/Charlotte intersection is currently operating above capacity during the afternoon peak hour;
- The vehicle demand generated by the proposed development is approximately 25 to 27 veh/h, which does not represent a significant increase in vehicle traffic and the impact to the roadway network as a result of this development is considered negligible;
- The increase in transit ridership is projected to be approximately 25 persons/h during the peak hours. Given the transit priority corridor along Rideau Street and the future Rideau East LRT station, located approximately 1.5 km from the development, this increase in transit riders is expected to be easily accommodated;
- The increase in bike/walk traffic is projected to be approximately 30 persons/h during the peak hours. Given the downtown context of the site and the recent redevelopment of Rideau Street, this amount of non-motorized person traffic can be accommodated within the network;
- Based on historic traffic counts at the Rideau/Cobourg intersection, an overall 1% growth rate has been observed at study area intersections within recent years. The TRANS model projections indicate this 1% growth along Rideau Street eastbound, along Cobourg Street and a 2% growth along Charlotte Street northbound. Based on these growth rates and the local area developments within close proximity to the study area, a 1-2% growth rate per annum was applied to study area intersections for the horizon years 2020 and 2025;
- Based on the projected background traffic volumes and the SYNCHRO analysis, the study area intersections are projected to operate similar to existing conditions. The northbound right-turn movement at the Rideau/Charlotte intersection, which is currently operating above capacity (LoS 'F'), is projected to continue to fail. This is a result of the downtown traffic using Laurier Avenue and Charlotte Street to access the Cumming Bridge along Rideau Street. With the implementation of the LRT, a shift from vehicle drivers to transit riders is expected, particularly for commuters to/from the downtown core. This will likely lessen the demand on this right-turn movement;
- With regard to the MMLoS analysis, some of the targets are achieved at certain areas. Some targets are not met given the existing roadway geometry and signal timing, however, given Rideau Street was recently reconstructed to provide transit priority lanes, narrower crossing distances for pedestrians and sharrows for cyclists, there are limited improvements to be recommended for this area;
- A total of 53 parking spaces on two underground parking levels and along the parking access on the ground floor level are proposed to serve the subject development. Visitor parking spaces are required;

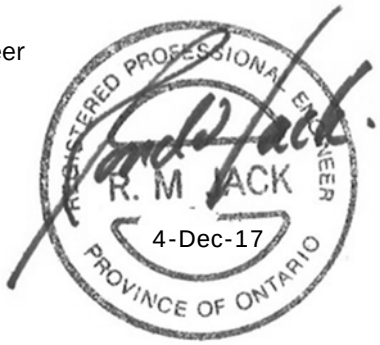
- The proposed vehicle access is located approximately 24 m from the Rideau/Cobourg intersection, which meets the City's Private Approach By-Law requirements; and
- Proposed TDM measures include OC Transpo display in the lobby of the building and possible car-sharing parking spaces. The existing transit priority corridor along Rideau Street and the redesign of Rideau Street to provide curb bulb-outs and sharrows will promote transit and active modes.

Prepared By:

André Sponder, B.A.Sc.
Transportation Analyst

Reviewed by:

Ronald Jack, P.Eng.
Senior Transportation Engineer



Appendix A

City Development Review Team Correspondence

Sponder, Andre

From: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Sent: Tuesday, November 21, 2017 8:17 AM
To: Sponder, Andre
Subject: RE: TIA Mode Shares

Follow Up Flag: Follow up
Flag Status: Flagged

Andre,

Please proceed as per Carol's email.

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Monday, November 20, 2017 3:53 PM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: TIA Mode Shares

Hi Wally,

Is this good with you? I will update the final TIA with the OD survey mode shares.

André

From: Franklin, Carol [mailto:carol.franklin@ottawa.ca]
Sent: Monday, November 20, 2017 3:30 PM
To: Sponder, Andre <Andre.Sponder@parsons.com>; Armstrong, Jennifer (Transportation) <jenniferm.armstrong@ottawa.ca>
Cc: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: TIA Mode Shares

Hi Andre,
Yes, we will be covering this issue at our presentation. Thanks for following up and Jennifer is helping to resolve how we will move forward.
Carol

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Monday, November 20, 2017 10:44 AM
To: Franklin, Carol <carol.franklin@ottawa.ca>; Armstrong, Jennifer (Transportation) <jenniferm.armstrong@ottawa.ca>
Cc: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: TIA Mode Shares

Thanks for the response Jennifer.

Hi Carol,

I don't believe the difference in mode shares for this project is a significant issue. Using the OD survey vs the TRANS Trip Generation Report yields similar results as shown below. In terms of vehicle trips, there is a negligible difference (25 veh/h vs 27 veh/h). In terms of people trips, the Trans Trip Generation Mode Share method yields more people trips, again, negligible difference for a site located on Rideau Street (93 vs 116 persons/hour).

I will update this report with the OD mode shares and in the future will use OD mode shares unless otherwise notified. I look forward to the training next Tuesday that may help us clarify this issue.

TRANS Trip Generation Mode Shares

Travel Mode	Approximate Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	25%	6	18	24	16	13	29
Auto Passenger	9%	1	2	3	4	3	7
Transit	30%	6	17	23	19	14	33
Non-motorized	40%	10	26	36	27	20	47
Total Person Trips	**100%**	**23**	**63**	**86**	**66**	**50**	**116**
Less Retail Pass-by (30%)		-1	-1	-2	-2	-2	-4
Total 'New' Auto Trips		**5**	**17**	**22**	**14**	**11**	**25**

OD- Survey Mode Shares

Travel Mode	Approximate Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	35%	7	19	26	18	15	33
Auto Passenger	10%	3	5	8	7	4	11
Transit	25%	4	13	17	13	10	23
Non-motorized	30%	6	15	21	15	12	27
Total Person Trips	**100%**	20	52	72	53	41	93
Less Retail Pass-by (30%)		-1	-1	-2	-3	-3	-6
Total 'New' Auto Trips		**6**	**18**	**24**	**16**	**12**	**27**

Regards,

André

From: Armstrong, Jennifer (Transportation) [mailto:jenniferm.armstrong@ottawa.ca]
Sent: Monday, November 20, 2017 9:10 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Cc: Dubyk, Wally <Wally.Dubyk@ottawa.ca>; Franklin, Carol <carol.franklin@ottawa.ca>
Subject: RE: TIA Mode Shares

Hi André,

As I noted last week, I play an advisory role on TIA's, but any "official" direction for future TIA's should come from the City's Development Review team. I have spoken with Carol Franklin and I understand that there is a training session for the new TIA guidelines coming up shortly, and this issue will be one of the items discussed. If you need guidance more urgently for any on-going studies, please let Carol & myself know, and we can advise.

Best Regards,
Jennifer

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Monday, November 20, 2017 8:25 AM
To: Armstrong, Jennifer (Transportation) <jenniferm.armstrong@ottawa.ca>
Cc: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: TIA Mode Shares

Hi Jennifer,

Just following up on the email below.

Thanks,

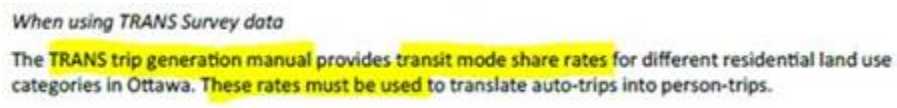
André

From: Sponder, Andre
Sent: Monday, November 13, 2017 9:50 AM
To: 'Armstrong, Jennifer (Transportation)' <jenniferm.armstrong@ottawa.ca>
Subject: TIA Mode Shares

Hi Jennifer,

I'm working on a number of TIAs for different developments within the City. Using the new TIA guidelines, we've been trying to sort out the proper way to calculate mode shares for different developments. The conversation below, between Wally Dubyk and myself, requests the use of the 2011 OD survey when calculating different modal splits. This is what we had been using prior to the 2017 TIA guideline update.

In the new guidelines, for residential developments, the guidelines indicate we should use the 2009 TRANS Trip Generation manual to derive transit trips and calculate the vehicle trips from there.


When using TRANS Survey data

The TRANS trip generation manual provides transit mode share rates for different residential land use categories in Ottawa. These rates must be used to translate auto-trips into person-trips.

Please let me know your thoughts and/or guidance on this and I will pass this along to my team for future studies.

Thanks,

André

André Sponder, B.A.Sc.
Transportation Analyst

1223 Michael St., Suite 100, Ottawa, ON K1J 7T2
andre.sponder@parsons.com - P: +1 613.691.1576

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From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Friday, November 10, 2017 8:28 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

This is Jennifer's area of expertise, please consult with her.

Thanks,

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Friday, November 10, 2017 8:23 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Hi Wally, Just to clarify, are you stating that for any development project we should use the 2011 OD survey, even if its residential?

I will pass this along to my team if this is the case as it states we should be using the TRANS trip generation manual for residential land use in the TIA guidelines:

When using TRANS Survey data

The TRANS trip generation manual provides transit mode share rates for different residential land use categories in Ottawa. These rates must be used to translate auto-trips into person-trips.

(Personally, I prefer the OD survey)

Thanks,

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Friday, November 10, 2017 7:30 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

Please use the attached for estimating the modal shares for inbound and outbound trips. Note that the “within” district trips should be added to the “from” and “to” district trips as appropriate to estimate the modal shares for all trips beginning and ending in the district, for further explanation contact Jennifer Armstrong jenniferm.armstrong@ottawa.ca

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Wednesday, November 08, 2017 9:36 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Hi Wally,

I believe this data was presented in the TRANS report to capture trips that occur primarily during the peak hours. As we generally only analyze conditions during the peak hour, this table seemed appropriate. When comparing these rates to the overall rates outlined in Table 3.6, the morning peak hour is essentially the same. During the afternoon peak hour, the transit rate is 10% higher in Table 3.6 and the non-motorized is significantly lower (approximately 30% lower). This could represent the influence of retirees that travel by vehicle during the afternoon peak hour, but not during the morning peak hour.

Please advise if Table 3.6 is more appropriate. As the transit ridership is higher in the afternoon peak hour, this is in line with the City’s goals, however, it is noteworthy that the vehicle mode share is also higher (13%) and the active mode is 30% lower, which is not in line with the City’s goals.

An effective means to differentiate between trip rates which may be highly influenced by existing or current household composition attributes compared against other possible influences related to geographical area types, i.e. core, urban, suburban and rural is to identify a uniform representative control sample. In this case, the uniform sample defined is based on the following attributes:

- Households with 3 members only: this was chosen to ensure that variations in household size within a specific sample size would not be responsible for unduly influencing the resulting trip rates and/or reported mode shares.
- Placing an age cut off for oldest member of the household at 50 years of age. This ensures more homogeneity in the households for the sample drawn. The selection of households with persons no older than 50 would minimize the possibility of a specific bias in the full sample relating to retirees and/or other location factors. As a result any reported differences noted in the trip rates across the various geographic areas could then be largely attributed to location factors directly, as the sample drawn was significantly more uniform in terms of life-cycle factors. Typical life-cycle factors (i.e. household size, employment status, income, health of household members) reflect the current household's position in the overall life-cycle spectrum. Age is often used as a proxy for the position of the household in the overall life-cycle.

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Wednesday, November 08, 2017 8:50 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

Please explain why the Mode Shares on Table 3, Pg. 4 of the Forecasting Report depicts the Mode Shares for “All Households with persons 55 years of age or less” as per the Trans Reported Mode Shares Table 3.13. My understanding is that this residential development will be available to the public with no age restrictions??

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Tuesday, November 07, 2017 11:41 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Hi Wally,

Please find the next step of the TIA for 545 Rideau Street development attached – TIA Strategy Report.

Thanks,

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Tuesday, October 24, 2017 11:57 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

Please proceed with the next step and follow the 2009 TRANS until further notice.

The City has been using the TRANS 2009 for residential developments and the o-d-survey-2011 for business and commercial developments.
We now looking into addressing mixed use developments.

Thank you,

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Monday, October 23, 2017 1:14 PM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

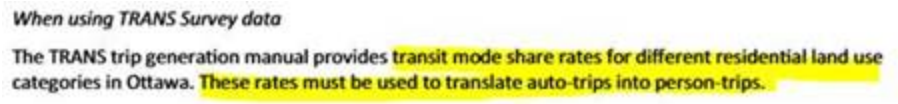
Hi Wally,

I've followed the TIA guidelines and used the 2009 TRANS Trip Generation Study.

A. Select Base Trip Generation Rate

Select a supported source for the base trip generation rate. In order of preference, they are:

1. The 2009 TRANS Trip Generation Study for residential rates (see TRANS Trip Generation Study 2009);
2. Trip generation surveys of similar developments in the City. Surveyed developments should have similar operating and market characteristics to the development proposal (supporting statistical analysis demonstrating the relevance of surveyed rate would be beneficial);



Please confirm which survey you like us to use?

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Monday, October 23, 2017 12:06 PM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

Please review the tables (see URL address) under Ottawa Inner Area and contact Mike Giampa for clarification (ext 23657)

http://www.ncr-trans-rcn.ca/surveys/o-d-survey/o-d-survey-2011/

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Monday, October 23, 2017 11:35 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Hi Wally,

I'm not sure where you found 25% for existing non-motorized. I used 40% throughout as the existing and future mode share for non-motorized, which I obtained from the TRANS Trip Generation Study (Table 3.13).

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Monday, October 23, 2017 11:25 AM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Andre,

The non-motorized mode share is a significant increase from the existing (25 to 40). What is this based on?

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Thursday, October 19, 2017 11:27 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Forecasting Report

Hi Wally,

Attached is the 541-545 Rideau Street Forecasting Report for your review and comment.

Regard,

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Wednesday, October 18, 2017 1:55 PM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Screening and Scoping Report

Andre,

We are still waiting for you to respond to our last email – see attached.

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Wednesday, October 18, 2017 1:36 PM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Screening and Scoping Report

Hi Wally,

I'm just following up on the Screening and Scoping Report I had sent for 541-545 Rideau Street. Would you be able to give me an estimated time as to when we might receive comments back and can move forward to Step 3?

Thanks,

André

From: Sponder, Andre
Sent: Tuesday, October 10, 2017 11:26 AM
To: 'Dubyk, Wally' <Wally.Dubyk@ottawa.ca>
Subject: RE: 541-545 Rideau Street - Screening and Scoping Report

Hi Wally,

I had previously sent you the Screening Form, see attached.

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Tuesday, October 10, 2017 11:22 AM

To: Sponder, Andre <Andre.Sponder@parsons.com>
Subject: RE: 541-545 Rideau Street - Screening and Scoping Report

Andre,

Please follow the Screening Form in Appendix B of the New TIA Guidelines (see attached) and address the Triggers.

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Friday, October 06, 2017 9:32 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Gordon, Christopher <Christopher.Gordon@parsons.com>
Subject: RE: 541-545 Rideau Street - Screening and Scoping Report

Hi Wally,

Attached is the Screening and Scoping Report for 541-545 Rideau Street for your review.

Thanks,

André

From: Dubyk, Wally [mailto:Wally.Dubyk@ottawa.ca]
Sent: Monday, October 02, 2017 12:55 PM
To: Sponder, Andre <Andre.Sponder@parsons.com>
Cc: Gordon, Christopher <Christopher.Gordon@parsons.com>
Subject: RE: 541-545 Rideau Street - Screening Form

Andre,

Please proceed with the Screening Form.

Thank you,

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

From: Sponder, Andre [mailto:Andre.Sponder@parsons.com]
Sent: Thursday, September 28, 2017 12:11 PM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Gordon, Christopher <Christopher.Gordon@parsons.com>
Subject: 541-545 Rideau Street - Screening Form

Hi Wally,

Attached is the TIS Screening Form for the 541-545 Rideau Street development.

Regards,

André

André Sponder, B.A.Sc.
Transportation Analyst
1223 Michael St., Suite 100, Ottawa, ON K1J 7T2
andre.sponder@parsons.com - P: +1 613.691.1576

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Appendix B

Existing Intersection Count Data

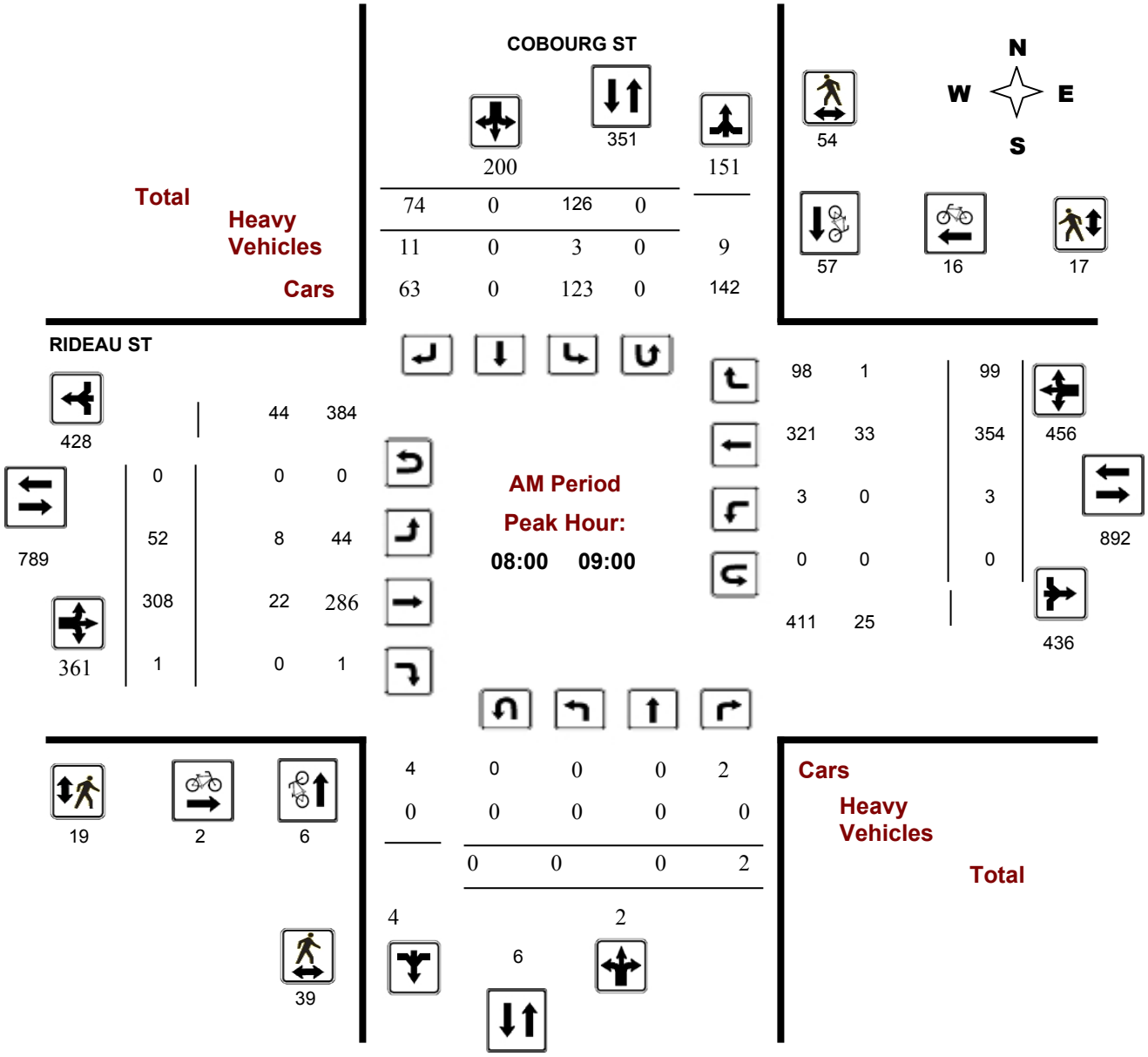
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

COBOURG ST @ RIDEAU ST

Survey Date: Wednesday, September 21, 2016 **WO No:** 36332

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



Comments

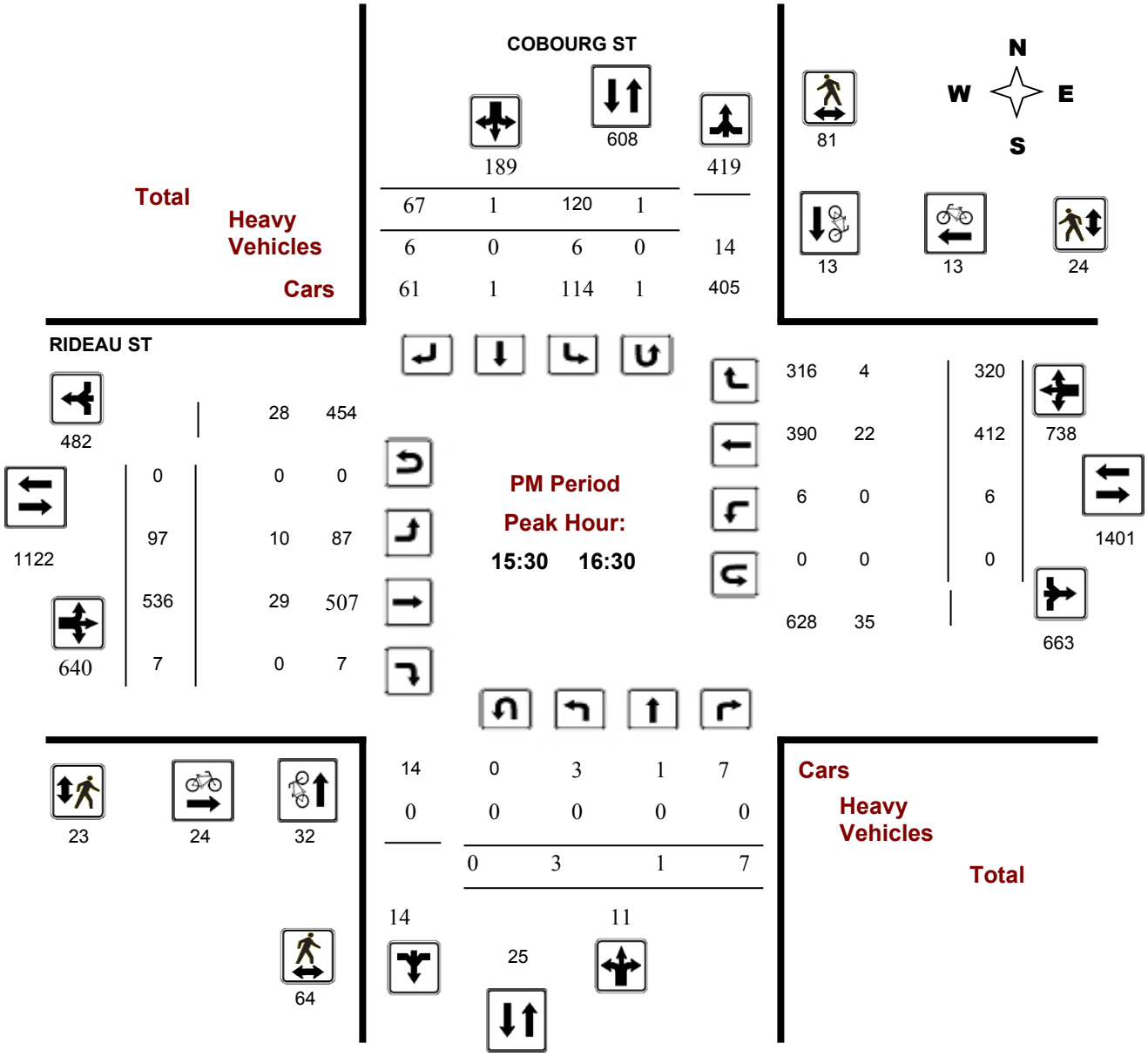
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

COBOURG ST @ RIDEAU ST

Survey Date: Wednesday, September 21, 2016 **WO No:** 36332

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



Comments

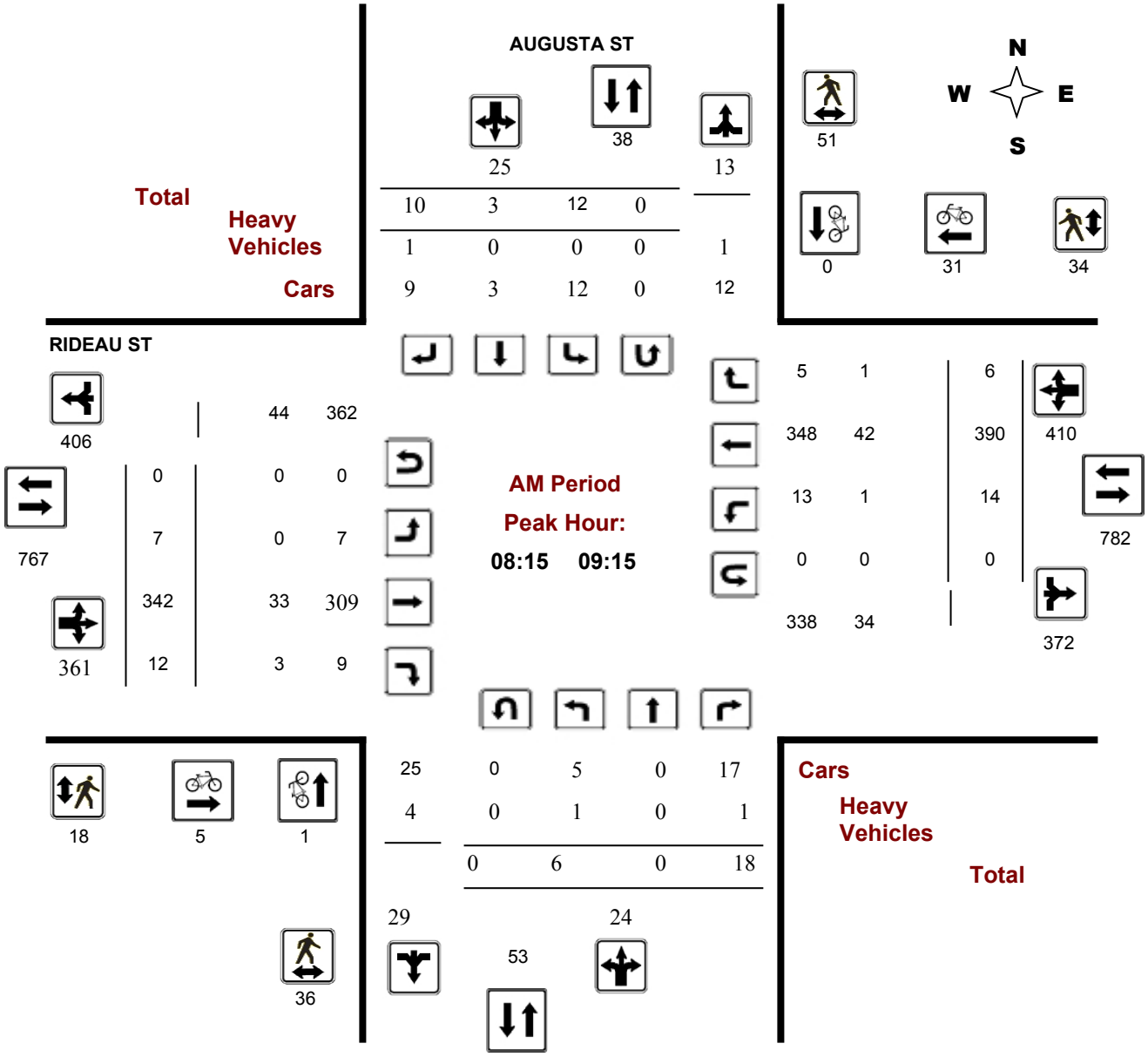
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

AUGUSTA ST @ RIDEAU ST

Survey Date: Thursday, August 06, 2015 **WO No:** 35209

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



Comments

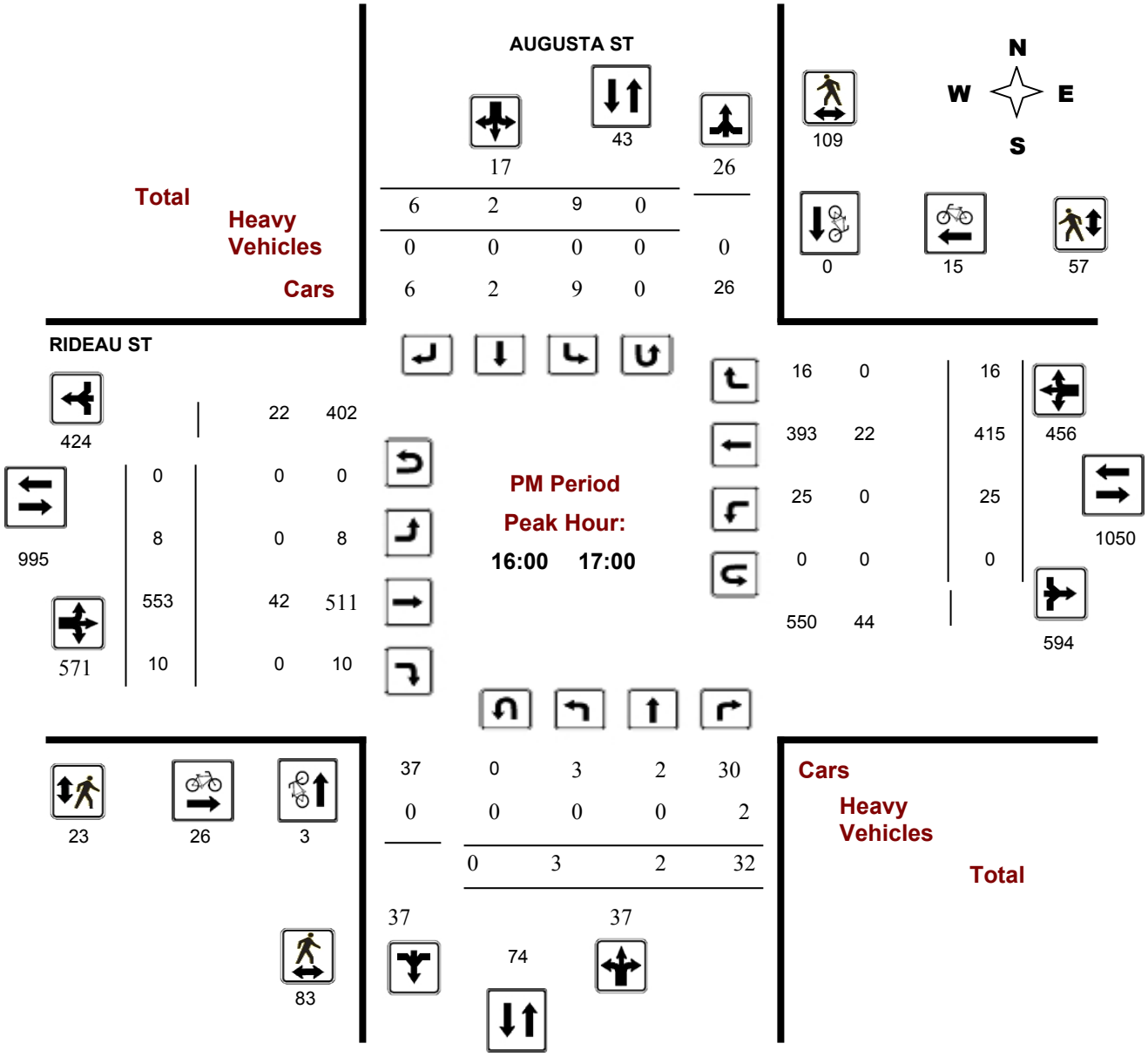
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

AUGUSTA ST @ RIDEAU ST

Survey Date: Thursday, August 06, 2015 **WO No:** 35209

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



Comments

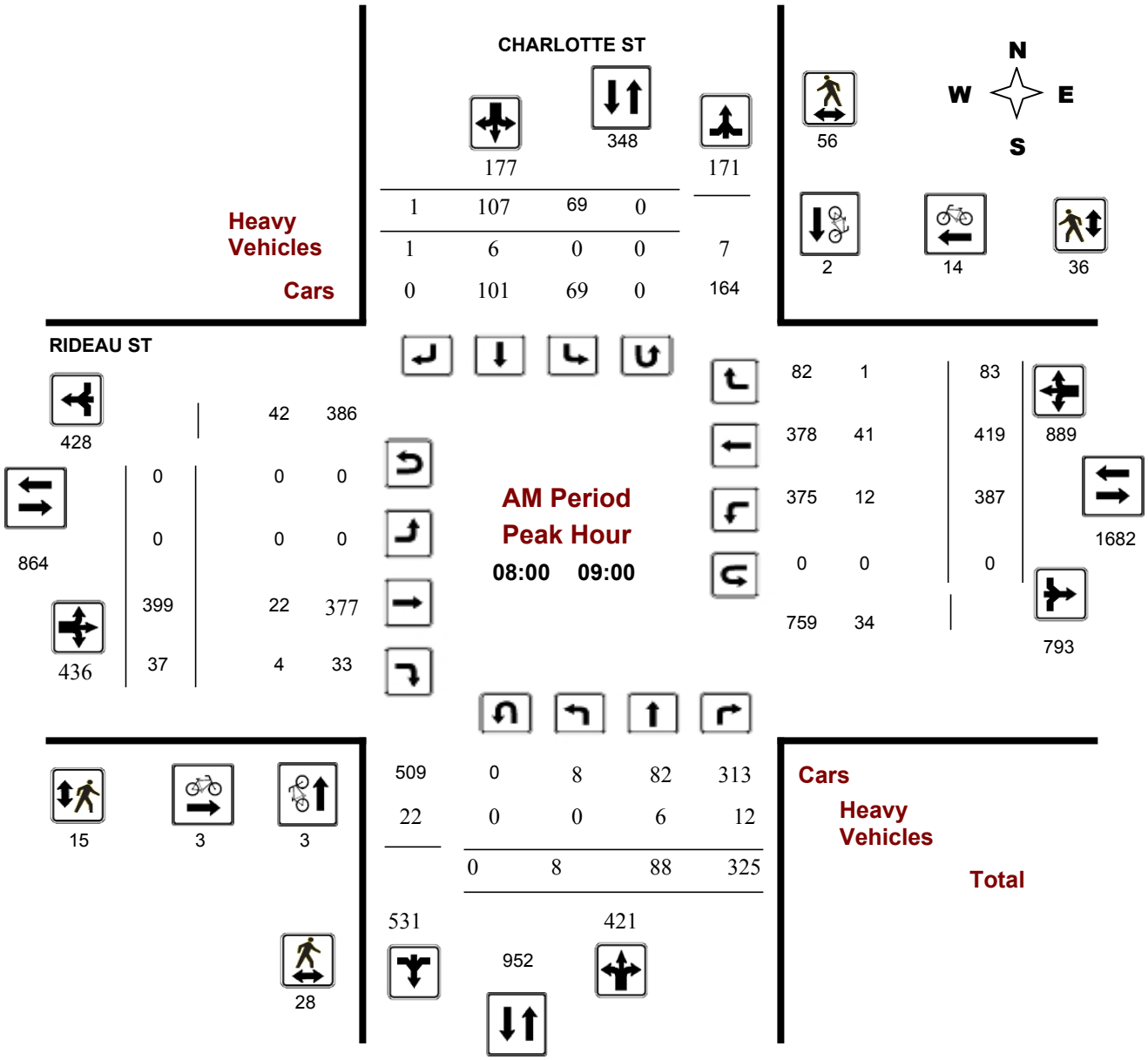
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHARLOTTE ST @ RIDEAU ST

Survey Date: Tuesday, December 01, 2015 **WO No:** 35847

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



Comments

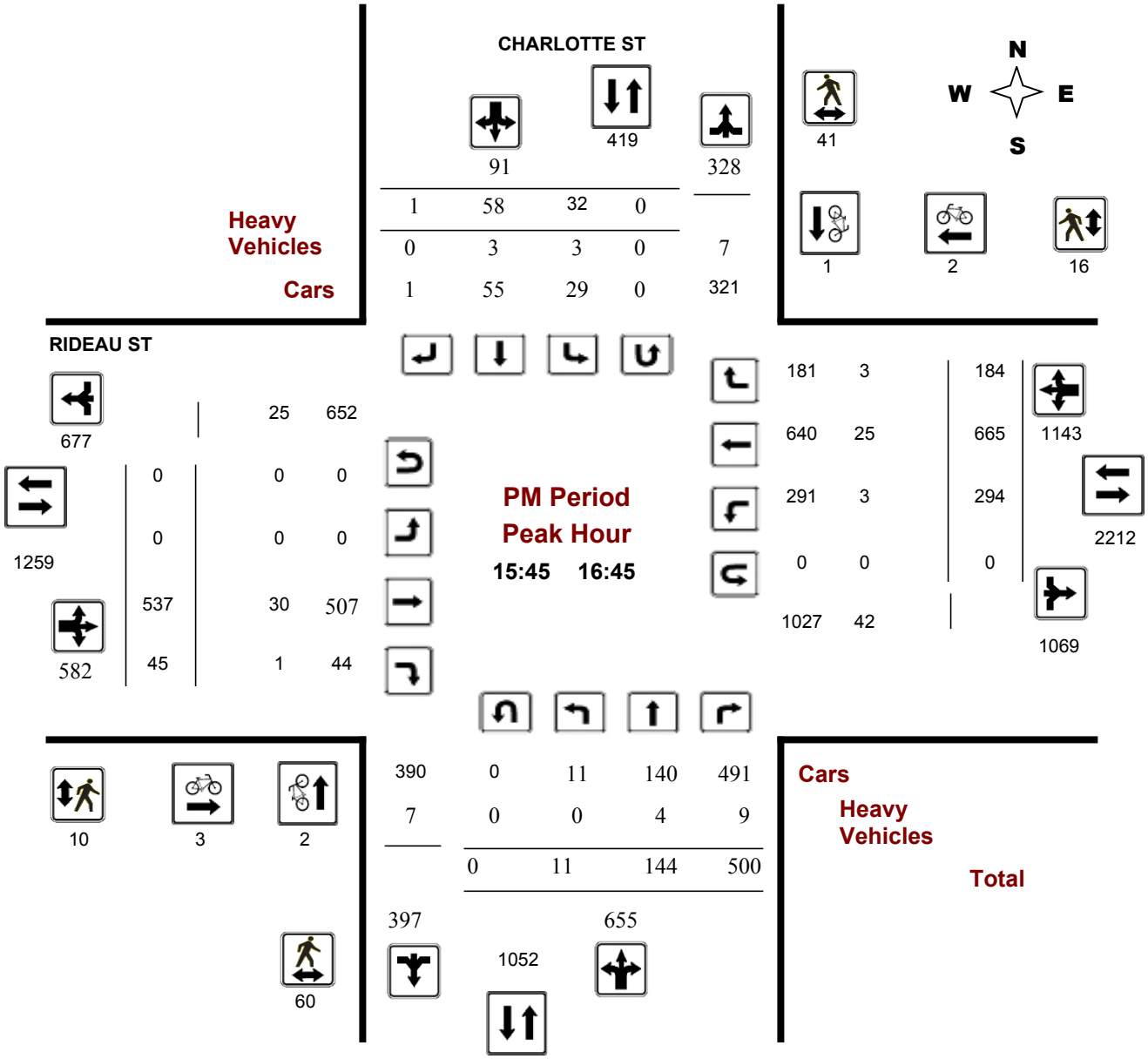
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHARLOTTE ST @ RIDEAU ST

Survey Date: Tuesday, December 01, 2015 **WO No:** 35847

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



Comments

Appendix C

SYNCHRO Capacity Analysis: Existing Conditions

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	399	387	419	8	88	325	69	107		
Future Volume (vph)	399	387	419	8	88	325	69	107		
Lane Group Flow (vph)	484	430	558	0	107	361	0	197		
Turn Type	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA		
Protected Phases	2	1	6		8	1		4	3	7
Permitted Phases				8		8	4			
Detector Phase	2	1	6	8	8	1	4	4		
Switch Phase										
Minimum Initial (s)	10.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0	1.0	1.0
Minimum Split (s)	24.6	10.6	27.6	20.6	20.6	10.6	20.6	20.6	5.0	5.0
Total Split (s)	25.0	28.0	53.0	22.0	22.0	28.0	22.0	22.0	5.0	5.0
Total Split (%)	31.3%	35.0%	66.3%	27.5%	27.5%	35.0%	27.5%	27.5%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)	-1.6	-1.6	-1.6		-1.6	-1.6		-1.6		
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0		4.0		
Lead/Lag	Lead	Lag		Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	26.6	24.0	54.6		16.4	40.4		16.4		
Actuated g/C Ratio	0.33	0.30	0.68		0.20	0.50		0.20		
v/c Ratio	0.44	0.85	0.48		0.30	0.49		0.66		
Control Delay	24.1	43.9	8.2		28.5	12.0		40.3		
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		
Total Delay	24.1	43.9	8.2		28.5	12.0		40.3		
LOS	C	D	A		C	B		D		
Approach Delay	24.1		23.7		15.8			40.3		
Approach LOS	C		C		B			D		
Queue Length 50th (m)	30.0	60.9	32.4		13.6	28.6		27.2		
Queue Length 95th (m)	49.7	#108.8	66.1		26.6	37.7		48.0		
Internal Link Dist (m)	109.5		202.6		78.3			56.8		
Turn Bay Length (m)										
Base Capacity (vph)	1104	508	1169		398	744		333		
Starvation Cap Reductn	0	0	0		0	0		0		
Spillback Cap Reductn	0	0	0		0	0		0		
Storage Cap Reductn	0	0	0		0	0		0		
Reduced v/c Ratio	0.44	0.85	0.48		0.27	0.49		0.59		

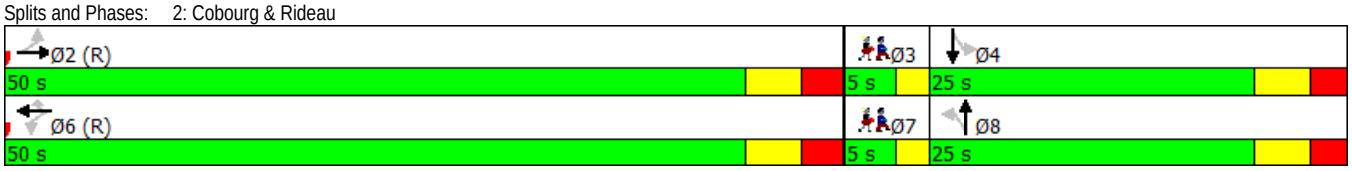
Intersection Summary		
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 28 (35%), Referenced to phase 2:EBTL and 6:WBT, Start of Green		
Natural Cycle: 75		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay: 23.6	Intersection LOS: C	
Intersection Capacity Utilization 71.9%	ICU Level of Service C	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Charlotte & Rideau

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	54	308	3	354	99	0	126	0		
Future Volume (vph)	54	308	3	354	99	0	126	0		
Lane Group Flow (vph)	0	403	0	396	110	2	0	222		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA		
Protected Phases		2		6		8		4	3	7
Permitted Phases	2		6		6		4			
Detector Phase	2	2	6	6	6	8	4	4		
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	1.0	1.0
Minimum Split (s)	33.9	33.9	33.9	33.9	33.9	22.6	22.6	22.6	5.0	5.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	25.0	25.0	25.0	5.0	5.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	62.5%	31.3%	31.3%	31.3%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)		-1.9		-1.9	-1.9	-1.6		-1.6		
Total Lost Time (s)		4.0		4.0	4.0	4.0		4.0		
Lead/Lag						Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)		54.3		54.3	54.3	16.7		16.7		
Actuated g/C Ratio		0.68		0.68	0.68	0.21		0.21		
v/c Ratio		0.21		0.33	0.12	0.00		0.69		
Control Delay		5.2		2.3	0.2	0.0		31.5		
Queue Delay		0.0		0.0	0.0	0.0		0.0		
Total Delay		5.2		2.3	0.2	0.0		31.5		
LOS		A		A	A	A		C		
Approach Delay		5.2		1.8				31.5		
Approach LOS		A		A				C		
Queue Length 50th (m)		9.6		4.7	0.0	0.0		21.6		
Queue Length 95th (m)		15.8		7.5	0.0	0.0		41.9		
Internal Link Dist (m)		110.6		109.5		51.6		63.4		
Turn Bay Length (m)					70.0					
Base Capacity (vph)		1932		1207	956	730		385		
Starvation Cap Reductn		0		0	0	0		0		
Spillback Cap Reductn		0		0	0	0		0		
Storage Cap Reductn		0		0	0	0		0		
Reduced v/c Ratio		0.21		0.33	0.12	0.00		0.58		

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 38 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 76.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Cobourg & Rideau



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	7	342	12	14	390	6	6	0	12	3
Future Volume (vph)	7	342	12	14	390	6	6	0	12	3
Lane Group Flow (vph)	0	388	13	0	449	7	0	27	0	27
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	27.4	23.7	23.7	23.7	23.7
Total Split (s)	56.0	56.0	56.0	56.0	56.0	56.0	24.0	24.0	24.0	24.0
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)		-1.4	-1.4		-1.4	-1.4		-1.7		-1.7
Total Lost Time (s)		4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		66.6	66.6		66.6	66.6		13.3		13.3
Actuated g/C Ratio		0.83	0.83		0.83	0.83		0.17		0.17
v/c Ratio		0.26	0.01		0.31	0.01		0.11		0.12
Control Delay		3.8	0.4		2.1	0.0		9.1		20.2
Queue Delay		0.0	0.0		0.1	0.0		0.0		0.0
Total Delay		3.8	0.4		2.2	0.0		9.1		20.2
LOS		A	A		A	A		A		C
Approach Delay		3.7			2.2			9.1		20.2
Approach LOS		A			A			A		C
Queue Length 50th (m)		14.4	0.0		9.8	0.0		0.0		2.1
Queue Length 95th (m)		36.1	0.5		15.5	m0.0		5.1		7.8
Internal Link Dist (m)		79.5			110.6			56.3		85.4
Turn Bay Length (m)			25.0			25.0				
Base Capacity (vph)		1470	1159		1460	1108		365		346
Starvation Cap Reductn		0	0		263	0		0		0
Spillback Cap Reductn		0	0		0	0		0		0
Storage Cap Reductn		0	0		0	0		0		0
Reduced v/c Ratio		0.26	0.01		0.38	0.01		0.07		0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 45 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.31	
Intersection Signal Delay: 3.6	Intersection LOS: A
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

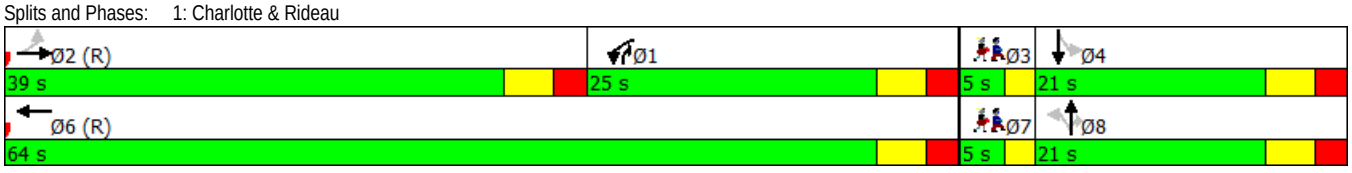
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Augusta & Rideau

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	537	294	665	11	144	500	32	58		
Future Volume (vph)	537	294	665	11	144	500	32	58		
Lane Group Flow (vph)	647	327	943	0	172	556	0	101		
Turn Type	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA		
Protected Phases	2	1	6		8	1		4	3	7
Permitted Phases				8		8	4			
Detector Phase	2	1	6	8	8	1	4	4		
Switch Phase										
Minimum Initial (s)	10.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0	1.0	1.0
Minimum Split (s)	24.6	10.6	27.6	20.6	20.6	10.6	20.6	20.6	5.0	5.0
Total Split (s)	39.0	25.0	64.0	21.0	21.0	25.0	21.0	21.0	5.0	5.0
Total Split (%)	43.3%	27.8%	71.1%	23.3%	23.3%	27.8%	23.3%	23.3%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)	-1.6	-1.6	-1.6		-1.6	-1.6		-1.6		
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0		4.0		
Lead/Lag	Lead	Lag		Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	40.9	21.0	65.9		15.1	36.1		15.1		
Actuated g/C Ratio	0.45	0.23	0.73		0.17	0.40		0.17		
v/c Ratio	0.43	0.83	0.76		0.59	0.93		0.47		
Control Delay	16.2	52.1	13.3		43.0	46.8		40.6		
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		
Total Delay	16.2	52.1	13.3		43.0	46.8		40.6		
LOS	B	D	B		D	D		D		
Approach Delay	16.2		23.3		45.9			40.6		
Approach LOS	B		C		D			D		
Queue Length 50th (m)	29.5	53.9	75.9		27.6	80.6		15.8		
Queue Length 95th (m)	50.8	#96.7	169.8		46.6	#96.0		30.5		
Internal Link Dist (m)	109.5		202.6		78.3			56.8		
Turn Bay Length (m)										
Base Capacity (vph)	1503	395	1246		331	597		247		
Starvation Cap Reductn	0	0	0		0	0		0		
Spillback Cap Reductn	0	0	0		0	0		0		
Storage Cap Reductn	0	0	0		0	0		0		
Reduced v/c Ratio	0.43	0.83	0.76		0.52	0.93		0.41		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 100.1%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Charlotte & Rideau



Existing PM
2: Cobourg & Rideau

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	Ø3	Ø7
Lane Configurations											
Traffic Volume (vph)	97	536	6	412	320	3	1	120	1		
Future Volume (vph)	97	536	6	412	320	3	1	120	1		
Lane Group Flow (vph)	0	712	0	465	356	0	12	0	208		
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA		
Protected Phases		2		6			8		4	3	7
Permitted Phases	2		6		6	8		4			
Detector Phase	2	2	6	6	6	8	8	4	4		
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	1.0	1.0
Minimum Split (s)	33.9	33.9	33.9	33.9	33.9	22.6	22.6	22.6	22.6	5.0	5.0
Total Split (s)	62.0	62.0	62.0	62.0	62.0	23.0	23.0	23.0	23.0	5.0	5.0
Total Split (%)	68.9%	68.9%	68.9%	68.9%	68.9%	25.6%	25.6%	25.6%	25.6%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)		-1.9		-1.9	-1.9		-1.6		-1.6		
Total Lost Time (s)		4.0		4.0	4.0		4.0		4.0		
Lead/Lag						Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		62.7		62.7	62.7		18.3		18.3		
Actuated g/C Ratio		0.70		0.70	0.70		0.20		0.20		
v/c Ratio		0.39		0.38	0.36		0.04		0.74		
Control Delay		5.9		4.7	1.1		19.0		45.2		
Queue Delay		0.0		0.4	0.0		0.0		0.0		
Total Delay		5.9		5.1	1.1		19.0		45.2		
LOS		A		A	A		B		D		
Approach Delay		5.9		3.3			19.0		45.2		
Approach LOS		A		A			B		D		
Queue Length 50th (m)		19.2		14.1	0.0		0.5		28.6		
Queue Length 95th (m)		25.9		m25.9	m5.0		4.9		#60.1		
Internal Link Dist (m)		110.6		109.5			51.6		63.4		
Turn Bay Length (m)					70.0						
Base Capacity (vph)		1847		1229	1001		321		307		
Starvation Cap Reductn		0		338	0		0		0		
Spillback Cap Reductn		0		0	0		0		0		
Storage Cap Reductn		0		0	0		0		0		
Reduced v/c Ratio		0.39		0.52	0.36		0.04		0.68		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Cobourg & Rideau

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	8	553	10	25	415	16	3	2	9	2
Future Volume (vph)	8	553	10	25	415	16	3	2	9	2
Lane Group Flow (vph)	0	623	11	0	489	18	0	41	0	19
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	27.4	23.7	23.7	23.7	23.7
Total Split (s)	66.0	66.0	66.0	66.0	66.0	66.0	24.0	24.0	24.0	24.0
Total Split (%)	73.3%	73.3%	73.3%	73.3%	73.3%	73.3%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)		-1.4	-1.4		-1.4	-1.4		-1.7		-1.7
Total Lost Time (s)		4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		76.6	76.6		76.6	76.6		13.3		13.3
Actuated g/C Ratio		0.85	0.85		0.85	0.85		0.15		0.15
v/c Ratio		0.41	0.01		0.34	0.02		0.18		0.10
Control Delay		4.4	0.3		2.0	0.1		14.4		24.9
Queue Delay		0.0	0.0		0.1	0.0		0.0		0.0
Total Delay		4.4	0.3		2.1	0.1		14.4		24.9
LOS		A	A		A	A		B		C
Approach Delay		4.4			2.1			14.4		24.9
Approach LOS		A			A			B		C
Queue Length 50th (m)		27.9	0.0		11.1	0.0		0.8		1.9
Queue Length 95th (m)		66.2	0.4		16.1	m0.0		8.7		7.2
Internal Link Dist (m)		79.5			110.6			56.3		85.4
Turn Bay Length (m)			25.0			25.0				
Base Capacity (vph)		1504	1039		1442	979		319		290
Starvation Cap Reductn		0	0		232	0		0		0
Spillback Cap Reductn		0	0		0	0		0		0
Storage Cap Reductn		0	0		0	0		0		0
Reduced v/c Ratio		0.41	0.01		0.40	0.02		0.13		0.07

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 54 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 4.1	Intersection LOS: A
Intersection Capacity Utilization 73.5%	ICU Level of Service D
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Augusta & Rideau

Appendix D

Collision Data and Analysis

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	18	13	8	6	1	3	1	0	50	78%
Non-fatal injury	0	5	1	1	0	6	0	0	13	20%
Non reportable	0	1	0	0	0	0	0	0	1	2%
Total	**18**	**19**	**9**	**7**	**1**	**9**	**1**	**0**	**64**	100%
	#2 or 28%	#1 or 30%	#3 or 14%	#5 or 11%	#6 or 2%	#3 or 14%	#6 or 2%	#8 or 0%		

AUGUSTA ST / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2011-2015	8	11,547	1825	**0.38**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	1	2	1	0	0	1	0	0	5	63%
Non-fatal injury	0	2	0	0	0	1	0	0	3	38%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**1**	**4**	**1**	**0**	**0**	**2**	**0**	**0**	**8**	100%
	13%	50%	13%	0%	0%	25%	0%	0%		

COBOURG ST / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2011-2015	18	16,316	1825	**0.60**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	6	5	0	2	1	0	0	0	14	78%
Non-fatal injury	0	1	0	0	0	2	0	0	3	17%
Non reportable	0	1	0	0	0	0	0	0	1	6%
Total	**6**	**7**	**0**	**2**	**1**	**2**	**0**	**0**	**18**	100%
	33%	39%	0%	11%	6%	11%	0%	0%		

CHARLOTTE ST / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2011-2015	31	34,911	1825	**0.49**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	8	5	6	3	0	2	0	0	24	77%
Non-fatal injury	0	2	1	1	0	3	0	0	7	23%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**8**	**7**	**7**	**4**	**0**	**5**	**0**	**0**	**31**	100%
	26%	23%	23%	13%	0%	16%	0%	0%		

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** January 1, 2016

Location: COBOURG ST @ RIDEAU ST

Traffic Control: Traffic signal **Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-10, Mon,09:30	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	
					East	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Mar-19, Wed,07:54	Clear	Turning movement	Non-reportable	Dry	South	Turning left	School bus	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Mar-10, Mon,13:32	Clear	Turning movement	P.D. only	Dry	North	Turning right	Municipal transit bus	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Aug-19, Tue,22:09	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	
2014-Dec-12, Fri,19:06	Clear	Turning movement	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Pick-up truck	Other motor vehicle	
2014-Oct-18, Sat,14:29	Rain	Rear end	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle	

					East	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Aug-06, Thu,17:34	Clear	Turning movement	P.D. only	Dry	West	Turning left	Pick-up truck	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: COBOURG ST @ TORMEY ST

Traffic Control: Stop sign

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jul-30, Wed,18:00	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2014-Nov-04, Tue,11:24	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	

Location: COBOURG ST btwn TORMEY ST & PRUDHOMME PRIV

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Nov-20, Fri,00:07	Clear	Rear end	P.D. only	Dry	North	Going ahead	Unknown	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** January 1, 2016

Location: AUGUSTA ST @ RIDEAU ST

Traffic Control: Traffic signal

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Apr-20, Mon,03:34	Clear	Turning movement	P.D. only	Dry	East	Making "U" turn	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Passenger van	Other motor vehicle	
2015-Aug-09, Sun,13:21	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-29, Wed,14:43	Clear	SMV other	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Pedestrian	1

Location: CHARLOTTE ST @ RIDEAU ST

Traffic Control: Traffic signal

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-20, Thu,12:00	Clear	Rear end	P.D. only	Slush	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Truck - closed	Other motor vehicle	
2014-Mar-28, Fri,16:30	Rain	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

2014-Feb-02, Sun,09:04	Clear	Angle	P.D. only	Loose snow	East	Reversing	Construction equipment	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Apr-02, Wed,14:45	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-May-03, Sat,05:57	Rain	SMV other	P.D. only	Wet	East	Going ahead	Passenger van	Pole (utility, power)
2014-Aug-20, Wed,17:43	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2014-Dec-12, Fri,23:14	Clear	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2015-Jan-26, Mon,08:40	Clear	Turning movement	P.D. only	Dry	North	Turning left	Truck and trailer	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jun-08, Mon,18:20	Clear	Sideswipe	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle
2015-Aug-14, Fri,05:47	Rain	SMV other	P.D. only	Wet	North	Turning left	Police vehicle	Pole (sign, parking meter)

2015-Aug-18, Tue,19:55	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Pedestrian	1
2015-Nov-17, Tue,11:25	Clear	Turning movement	P.D. only	Dry	South	Turning left	Passenger van	Other motor vehicle	
					North	Turning right	Passenger van	Other motor vehicle	

Location: COBOURG ST @ RIDEAU ST

Traffic Control: Traffic signal **Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-10, Mon,09:30	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	
					East	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Mar-19, Wed,07:54	Clear	Turning movement	Non-reportable	Dry	South	Turning left	School bus	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Mar-10, Mon,13:32	Clear	Turning movement	P.D. only	Dry	North	Turning right	Municipal transit bus	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Aug-19, Tue,22:09	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	
2014-Dec-12, Fri,19:06	Clear	Turning movement	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Pick-up truck	Other motor vehicle	

2014-Oct-18, Sat,14:29	Rain	Rear end	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Aug-06, Thu,17:34	Clear	Turning movement	P.D. only	Dry	West	Turning left	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

AUGUSTA ST & RIDEAU ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **5**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2011-01-17	Mo	15:46	Clear	Daylight	Sideswipe	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Changing lanes	Automobile, station	Other motor vehicle	
2	2011-01-18	Tue	17:05	Snow	Dusk	Rear end	P.D. only	V1 W	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
3	2013-04-30	Tue	09:00	Rain	Daylight	Turning	P.D. only	V1 N	Wet	Turning right	Automobile, station	Other motor vehicle	0
								V2 N	Wet	Stopped	Pick-up truck	Other motor vehicle	
4	2013-04-30	Tue	10:13	Rain	Daylight	Single vehicle	P.D. only	V1 S	Wet	Turning left	Municipal transit bus	Fire hydrant	0
5	2013-09-06	Fri	09:23	Clear	Daylight	Turning	Non-fatal	V1 W	Dry	Turning left	Automobile, station	Cyclist	0
								V2 W	Dry	Going ahead	Bicycle	Other motor vehicle	

BEAUSOLEIL DR & COBOURG ST

Former Municipality: **Ottawa** Traffic Control: **Stop sign** Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
6	2011-01-07	Fri	17:11	Drifting	Dusk	Angle	P.D. only	V1 S	Slush	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Slush	Turning left	Automobile, station	Other motor vehicle	

CHARLOTTE ST & RIDEAU ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **19**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
7	2011-03-17	Thu	14:00	Clear	Daylight	Turning	P.D. only	V1 N	Dry	Turning right	Passenger van	Other motor vehicle	0
								V2 N	Dry	Stopped	Delivery van	Other motor vehicle	
8	2011-07-20	We	16:40	Clear	Daylight	Angle	Non-fatal	V1 N	Dry	Turning right	Unknown	Cyclist	0
								V2 E	Dry	Going ahead	Bicycle	Other motor vehicle	
9	2011-08-02	Tue	17:00	Clear	Daylight	Turning	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Turning left	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

10	2011-08-17	We	16:15	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle		
11	2011-09-26	Mo	21:16	Clear	Dark	Single vehicle	Non-fatal	V1	S	Dry	Turning right	Automobile, station	Pedestrian		1
12	2011-11-13	Sun	21:18	Clear	Dark	Angle	P.D. only	V1	E	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle		
13	2012-01-25	We	07:59	Clear	Daylight	Sideswipe	P.D. only	V1	W	Wet	Changing lanes	Automobile, station	Other motor vehicle		0
								V2	W	Wet	Turning left	Automobile, station	Other motor vehicle		
14	2012-01-25	We	11:50	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Turning left	Pick-up truck	Other motor vehicle		0
								V2	W	Dry	Turning left	Automobile, station	Other motor vehicle		
15	2012-02-17	Fri	18:30	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle		
								V3	E	Dry	Going ahead	Automobile, station	Other motor vehicle		
16	2012-03-02	Fri	01:00	Clear	Dark	Sideswipe	P.D. only	V1	W	Dry	Making U-Turn	Automobile, station	Other motor vehicle		0
								V2	W	Dry	Going ahead	Automobile, station	Other motor vehicle		
17	2012-07-10	Tue	12:53	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle		
18	2012-11-16	Fri	16:15	Clear	Daylight	Single vehicle	Non-fatal	V1	E	Dry	Slowing or	Motorcycle	Other Events		0
19	2012-12-19	We	23:22	Clear	Dark	Sideswipe	P.D. only	V1	N	Loose snow	Changing lanes	Pick-up truck	Other motor vehicle		0
								V2	N	Loose snow	Turning right	Automobile, station	Other motor vehicle		
20	2013-02-07	Thu	22:20	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Slowing or	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle		
21	2013-03-28	Thu	22:42	Clear	Dark	Sideswipe	P.D. only	V1	W	Dry	Going ahead	Unknown	Other motor vehicle		0
								V2	W	Dry	Stopped	Delivery van	Other motor vehicle		
22	2013-05-13	Mo	12:15	Clear	Daylight	Turning	P.D. only	V1	N	Dry	Overtaking	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Turning right	Automobile, station	Other motor vehicle		
23	2013-08-09	Fri	12:02	Clear	Daylight	Turning	Non-fatal	V1	W	Dry	Going ahead	Pick-up truck	Cyclist		0
								V2	W	Dry	Turning left	Bicycle	Other motor vehicle		
24	2013-08-29	Thu	18:27	Clear	Daylight	Turning	Non-fatal	V1	N	Dry	Turning right	Unknown	Other motor vehicle		0
								V2	N	Dry	Going ahead	Municipal transit bus	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

25	2013-09-01	Sun	16:06	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Turning left	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Turning left	Pick-up truck	Other motor vehicle	

COBOURG ST & PRUDHOMME PRIV

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
26	2012-07-04	We	17:31	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Making U-Turn	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle	

COBOURG ST, PRUDHOMME PRIV to TORMEY ST

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
27	2012-08-24	Fri	14:00	Clear	Daylight	Single vehicle	P.D. only	V1	U	Dry	Unknown	Unknown	Unattended vehicle	0

COBOURG ST & RIDEAU ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **11**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
28	2011-03-18	Fri	01:45	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Unknown	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle	
29	2011-06-08	We	12:00	Clear	Daylight	Turning	Non-fatal	V1	W	Dry	Going ahead	Bicycle	Other motor vehicle	0
								V2	E	Dry	Turning left	Automobile, station	Cyclist	
30	2011-09-20	Tue	06:35	Clear	Dawn	Single vehicle	Non-fatal	V1	S	Dry	Turning left	Pick-up truck	Pedestrian	1
31	2011-12-22	Thu	19:00	Clear	Dark	Angle	P.D. only	V1	N	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle	
32	2012-01-13	Fri	03:27	Snow	Dark	Approaching	P.D. only	V1	E	Loose snow	Unknown	Automobile, station	Other motor vehicle	0
								V2	W	Loose snow	Going ahead	Pick-up truck	Other motor vehicle	
33	2012-03-13	Tue	11:05	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
34	2012-06-30	Sat	11:00	Clear	Daylight	Single vehicle	Non-fatal	V1	S	Dry	Turning right	Pick-up truck	Pedestrian	1

(Note: Time of Day = "00:00" represents unknown collision time

35	2012-07-19	Thu	10:36	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Slowing or	Pick-up truck	Other motor vehicle	
36	2012-07-22	Sun	17:03	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Changing lanes	Motorcycle	Other motor vehicle	
37	2012-08-30	Thu	15:59	Clear	Daylight	Angle	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	S	Dry	Turning left	Automobile, station	Other motor vehicle	
38	2013-07-12	Fri	10:31	Clear	Daylight	Turning	P.D. only	V1	N	Dry	Going ahead	Bicycle	Other motor vehicle	0
								V2	S	Dry	Turning left	Automobile, station	Cyclist	
								V3	S	Dry	Turning left	Automobile, station	Other motor vehicle	

COBOURG ST & TORMEY ST

Former Municipality: **Ottawa** Traffic Control: **Stop sign** Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
39	2011-05-11	We	17:43	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Turning left	Police vehicle	Other motor vehicle	0
								V2	W	Dry	Turning right	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

Appendix E

Traffic Growth Analysis

Rideau / Cobourg
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday 26 July	860	1002	80	65	3792	4058	4185	3792	17834
2008	Wednesday 9 July	1051	1102	67	88	3715	3730	3737	3650	17140
2011	Wednesday 22 June	1003	1560	58	92	3895	4507	4770	3567	19452
2016	Wednesday 21 Sept	1192	1672	52	53	3887	3981	3829	3254	17920

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	1002	860	1862	17834				
2008	1102	1051	2153	17140	10.0%	22.2%	15.6%	-3.9%
2011	1560	1003	2563	19452	41.6%	-4.6%	19.0%	13.5%
2016	1672	1192	2864	17920	7.2%	18.8%	11.7%	-7.9%

Regression Estimate	2007	1069	925	1994
Regression Estimate	2016	1751	1186	2937
Average Annual Change		**5.64%**	**2.80%**	**4.40%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	4185	3792	7977	17834				
2008	3737	3650	7387	17140	-10.7%	-3.7%	-7.4%	-3.9%
2011	4770	3567	8337	19452	27.6%	-2.3%	12.9%	13.5%
2016	3829	3254	7083	17920	-19.7%	-8.8%	-15.0%	-7.9%

Regression Estimate	2007	4169	3760	7929
Regression Estimate	2016	4069	3261	7330
Average Annual Change		**-0.27%**	**-1.57%**	**-0.87%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	4058	3792	7850	17834				
2008	3730	3715	7445	17140	-8.1%	-2.0%	-5.2%	-3.9%
2011	4507	3895	8402	19452	20.8%	4.8%	12.9%	13.5%
2016	3981	3887	7868	17920	-11.7%	-0.2%	-6.4%	-7.9%

Regression Estimate	2007	4025	3768	7792
Regression Estimate	2016	4139	3908	8047
Average Annual Change		**0.31%**	**0.41%**	**0.36%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	80	65	145	17834				
2008	67	88	155	17140	-16.3%	35.4%	6.9%	-3.9%
2011	58	92	150	19452	-13.4%	4.5%	-3.2%	13.5%
2016	52	53	105	17920	-10.3%	-42.4%	-30.0%	-7.9%

Regression Estimate	2007	74	82	156
Regression Estimate	2016	49	62	112
Average Annual Change		**-4.35%**	**-3.08%**	**-3.66%**

Rideau / Cobourg
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday 26 July	106	93	10	6	424	445	445	441	1970
2008	Wednesday 9 July	130	98	3	11	441	411	382	436	1912
2011	Wednesday 22 June	136	113	3	16	407	582	577	412	2246
2016	Wednesday 21 Sept	200	151	2	4	456	436	361	428	2038

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	93	106	199	1970				
2008	98	130	228	1912	5.4%	22.6%	14.6%	-2.9%
2011	113	136	249	2246	15.3%	4.6%	9.2%	17.5%
2016	151	200	351	2038	33.6%	47.1%	41.0%	-9.3%

Regression Estimate	2007	91	109	200
Regression Estimate	2016	149	196	345
Average Annual Change		**5.63%**	**6.70%**	**6.23%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	445	441	886	1970				
2008	382	436	818	1912	-14.2%	-1.1%	-7.7%	-2.9%
2011	577	412	989	2246	51.0%	-5.5%	20.9%	17.5%
2016	361	428	789	2038	-37.4%	3.9%	-20.2%	-9.3%

Regression Estimate	2007	458	435	893
Regression Estimate	2016	414	421	835
Average Annual Change		**-1.11%**	**-0.35%**	**-0.73%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	445	424	869	1970				
2008	411	441	852	1912	-7.6%	4.0%	-2.0%	-2.9%
2011	582	407	989	2246	41.6%	-7.7%	16.1%	17.5%
2016	436	456	892	2038	-25.1%	12.0%	-9.8%	-9.3%

Regression Estimate	2007	461	423	884
Regression Estimate	2016	480	446	926
Average Annual Change		**0.45%**	**0.59%**	**0.52%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	10	6	16	1970				
2008	3	11	14	1912	-70.0%	83.3%	-12.5%	-2.9%
2011	3	16	19	2246	0.0%	45.5%	35.7%	17.5%
2016	2	4	6	2038	-33.3%	-75.0%	-68.4%	-9.3%

Regression Estimate	2007	7	11	17
Regression Estimate	2016	1	7	8
Average Annual Change		**-17.84%**	**-4.22%**	**-7.78%**

Rideau / Cobourg
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday 26 July	151	182	12	15	582	670	696	564	2872
2008	Wednesday 9 July	176	259	17	11	614	653	679	563	2972
2011	Wednesday 22 June	133	386	8	11	726	729	827	568	3388
2016	Wednesday 21 Sept	189	419	11	14	738	663	640	482	3156

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	182	151	333	2872				
2008	259	176	435	2972	42.3%	16.6%	30.6%	3.5%
2011	386	133	519	3388	49.0%	-24.4%	19.3%	14.0%
2016	419	189	608	3156	8.5%	42.1%	17.1%	-6.8%

Regression Estimate	2007	225	152	377
Regression Estimate	2016	448	178	625
Average Annual Change		**7.95%**	**1.72%**	**5.77%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	696	564	1260	2872				
2008	679	563	1242	2972	-2.4%	-0.2%	-1.4%	3.5%
2011	827	568	1395	3388	21.8%	0.9%	12.3%	14.0%
2016	640	482	1122	3156	-22.6%	-15.1%	-19.6%	-6.8%

Regression Estimate	2007	725	576	1301
Regression Estimate	2016	688	494	1182
Average Annual Change		**-0.58%**	**-1.69%**	**-1.06%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	670	582	1252	2872				
2008	653	614	1267	2972	-2.5%	5.5%	1.2%	3.5%
2011	729	726	1455	3388	11.6%	18.2%	14.8%	14.0%
2016	663	738	1401	3156	-9.1%	1.7%	-3.7%	-6.8%

Regression Estimate	2007	676	604	1281
Regression Estimate	2016	683	760	1443
Average Annual Change		**0.10%**	**2.59%**	**1.33%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	12	15	27	2872				
2008	17	11	28	2972	41.7%	-26.7%	3.7%	3.5%
2011	8	11	19	3388	-52.9%	0.0%	-32.1%	14.0%
2016	11	14	25	3156	37.5%	27.3%	31.6%	-6.8%

Regression Estimate	2007	13	13	26
Regression Estimate	2016	10	13	23
Average Annual Change		**-3.49%**	**0.40%**	**-1.46%**

Appendix F

SYNCHRO Capacity Analysis – Background Conditions

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	407	387	419	8	88	338	69	107		
Future Volume (vph)	407	387	419	8	88	338	69	107		
Lane Group Flow (vph)	444	387	502	0	96	338	0	177		
Turn Type	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA		
Protected Phases	2	1	6		8	1		4	3	7
Permitted Phases				8		8	4			
Detector Phase	2	1	6	8	8	1	4	4		
Switch Phase										
Minimum Initial (s)	10.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0	1.0	1.0
Minimum Split (s)	24.6	10.6	27.6	20.6	20.6	10.6	20.6	20.6	5.0	5.0
Total Split (s)	25.0	28.0	53.0	22.0	22.0	28.0	22.0	22.0	5.0	5.0
Total Split (%)	31.3%	35.0%	66.3%	27.5%	27.5%	35.0%	27.5%	27.5%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	5.6	5.6	5.6		5.6	5.6		5.6		
Lead/Lag	Lead	Lag		Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	25.6	22.4	53.6		14.2	36.6		14.2		
Actuated g/C Ratio	0.32	0.28	0.67		0.18	0.46		0.18		
v/c Ratio	0.42	0.82	0.44		0.31	0.50		0.69		
Control Delay	25.7	42.9	8.1		30.6	13.6		44.7		
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		
Total Delay	25.7	42.9	8.1		30.6	13.6		44.7		
LOS	C	D	A		C	B		D		
Approach Delay	25.7		23.3		17.4			44.7		
Approach LOS	C		C		B			D		
Queue Length 50th (m)	26.4	54.7	28.5		12.7	28.6		25.2		
Queue Length 95th (m)	50.9	#98.5	60.2		25.0	37.3		44.5		
Internal Link Dist (m)	109.5		202.6		78.3			56.8		
Turn Bay Length (m)										
Base Capacity (vph)	1063	474	1148		358	675		300		
Starvation Cap Reductn	0	0	0		0	0		0		
Spillback Cap Reductn	0	0	0		0	0		0		
Storage Cap Reductn	0	0	0		0	0		0		
Reduced v/c Ratio	0.42	0.82	0.44		0.27	0.50		0.59		

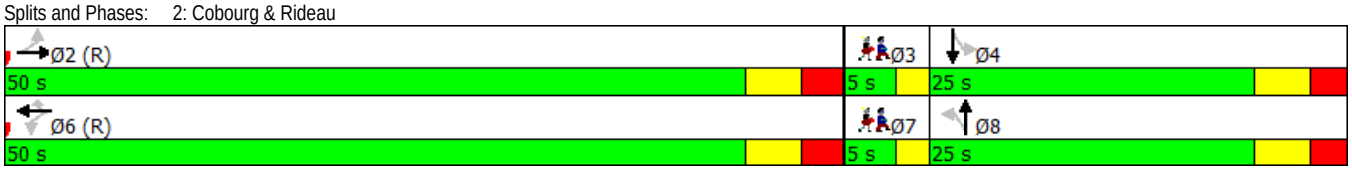
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 28 (35%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Charlotte & Rideau

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	55	314	3	354	100	0	127	0		
Future Volume (vph)	55	314	3	354	100	0	127	0		
Lane Group Flow (vph)	0	370	0	357	100	2	0	202		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA		
Protected Phases		2		6		8		4	3	7
Permitted Phases	2		6		6		4			
Detector Phase	2	2	6	6	6	8	4	4		
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	1.0	1.0
Minimum Split (s)	33.9	33.9	33.9	33.9	33.9	22.6	22.6	22.6	5.0	5.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	25.0	25.0	25.0	5.0	5.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	62.5%	31.3%	31.3%	31.3%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0		
Total Lost Time (s)		5.9		5.9	5.9	5.6		5.6		
Lead/Lag						Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)		53.2		53.2	53.2	14.3		14.3		
Actuated g/C Ratio		0.66		0.66	0.66	0.18		0.18		
v/c Ratio		0.19		0.30	0.11	0.00		0.71		
Control Delay		5.5		2.4	0.2	0.0		34.2		
Queue Delay		0.0		0.0	0.0	0.0		0.0		
Total Delay		5.5		2.4	0.2	0.0		34.2		
LOS		A		A	A	A		C		
Approach Delay		5.5		1.9				34.2		
Approach LOS		A		A				C		
Queue Length 50th (m)		9.1		4.6	0.0	0.0		19.3		
Queue Length 95th (m)		15.0		7.5	0.0	0.0		38.4		
Internal Link Dist (m)		110.6		109.5		51.6		63.4		
Turn Bay Length (m)					70.0					
Base Capacity (vph)		1915		1182	935	720		359		
Starvation Cap Reductn		0		0	0	0		0		
Spillback Cap Reductn		0		0	0	0		0		
Storage Cap Reductn		0		0	0	0		0		
Reduced v/c Ratio		0.19		0.30	0.11	0.00		0.56		

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 38 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 80.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Cobourg & Rideau



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	7	349	12	14	390	6	6	0	12	3
Future Volume (vph)	7	349	12	14	390	6	6	0	12	3
Lane Group Flow (vph)	0	356	12	0	404	6	0	24	0	25
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	27.4	23.7	23.7	23.7	23.7
Total Split (s)	56.0	56.0	56.0	56.0	56.0	56.0	24.0	24.0	24.0	24.0
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)		5.4	5.4		5.4	5.4		5.7		5.7
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		65.7	65.7		65.7	65.7		11.6		11.6
Actuated g/C Ratio		0.82	0.82		0.82	0.82		0.14		0.14
v/c Ratio		0.24	0.01		0.28	0.01		0.11		0.12
Control Delay		4.1	0.3		2.1	0.0		8.7		22.0
Queue Delay		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay		4.1	0.3		2.1	0.0		8.7		22.0
LOS		A	A		A	A		A		C
Approach Delay		4.0			2.1			8.7		22.0
Approach LOS		A			A			A		C
Queue Length 50th (m)		14.2	0.0		8.9	0.0		0.0		2.1
Queue Length 95th (m)		34.8	0.4		14.3	m0.0		4.5		7.7
Internal Link Dist (m)		79.5			110.6			56.3		85.4
Turn Bay Length (m)			25.0			25.0				
Base Capacity (vph)		1454	1144		1443	1094		332		311
Starvation Cap Reductn		0	0		0	0		0		0
Spillback Cap Reductn		0	0		0	0		0		0
Storage Cap Reductn		0	0		0	0		0		0
Reduced v/c Ratio		0.24	0.01		0.28	0.01		0.07		0.08

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 45 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.28	
Intersection Signal Delay: 3.7	Intersection LOS: A
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

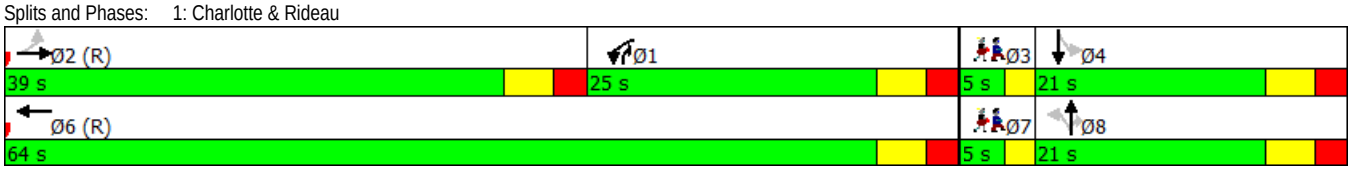
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Augusta & Rideau

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Lane Configurations										
Traffic Volume (vph)	548	294	665	11	144	520	32	58		
Future Volume (vph)	548	294	665	11	144	520	32	58		
Lane Group Flow (vph)	593	294	849	0	155	520	0	91		
Turn Type	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA		
Protected Phases	2	1	6		8	1		4	3	7
Permitted Phases				8		8	4			
Detector Phase	2	1	6	8	8	1	4	4		
Switch Phase										
Minimum Initial (s)	10.0	5.0	10.0	10.0	10.0	5.0	10.0	10.0	1.0	1.0
Minimum Split (s)	24.6	10.6	27.6	20.6	20.6	10.6	20.6	20.6	5.0	5.0
Total Split (s)	39.0	25.0	64.0	21.0	21.0	25.0	21.0	21.0	5.0	5.0
Total Split (%)	43.3%	27.8%	71.1%	23.3%	23.3%	27.8%	23.3%	23.3%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	5.6	5.6	5.6		5.6	5.6		5.6		
Lead/Lag	Lead	Lag		Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	39.8	19.4	64.8		13.0	32.4		13.0		
Actuated g/C Ratio	0.44	0.22	0.72		0.14	0.36		0.14		
v/c Ratio	0.41	0.81	0.69		0.62	0.97		0.47		
Control Delay	16.7	52.1	11.5		47.0	57.1		42.5		
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		
Total Delay	16.7	52.1	11.5		47.0	57.1		42.5		
LOS	B	D	B		D	E		D		
Approach Delay	16.7		22.0		54.8			42.5		
Approach LOS	B		C		D			D		
Queue Length 50th (m)	27.0	48.6	63.2		25.5	76.6		14.4		
Queue Length 95th (m)	48.2	#88.0	140.1		43.7	#95.8		28.2		
Internal Link Dist (m)	109.5		202.6		78.3			56.8		
Turn Bay Length (m)										
Base Capacity (vph)	1463	365	1223		296	537		230		
Starvation Cap Reductn	0	0	0		0	0		0		
Spillback Cap Reductn	0	0	0		0	0		0		
Storage Cap Reductn	0	0	0		0	0		0		
Reduced v/c Ratio	0.41	0.81	0.69		0.52	0.97		0.40		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 30.3	Intersection LOS: C
Intersection Capacity Utilization 105.8%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Charlotte & Rideau



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	Ø3	Ø7
Lane Configurations											
Traffic Volume (vph)	98	547	6	412	323	3	1	121	1		
Future Volume (vph)	98	547	6	412	323	3	1	121	1		
Lane Group Flow (vph)	0	652	0	418	323	0	11	0	190		
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA		
Protected Phases		2		6			8		4	3	7
Permitted Phases	2		6		6	8		4			
Detector Phase	2	2	6	6	6	8	8	4	4		
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	1.0	1.0
Minimum Split (s)	33.9	33.9	33.9	33.9	33.9	22.6	22.6	22.6	22.6	5.0	5.0
Total Split (s)	62.0	62.0	62.0	62.0	62.0	23.0	23.0	23.0	23.0	5.0	5.0
Total Split (%)	68.9%	68.9%	68.9%	68.9%	68.9%	25.6%	25.6%	25.6%	25.6%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.3	2.3	2.3	2.3	0.0	0.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0		0.0		
Total Lost Time (s)		5.9		5.9	5.9		5.6		5.6		
Lead/Lag						Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		61.6		61.6	61.6		15.9		15.9		
Actuated g/C Ratio		0.68		0.68	0.68		0.18		0.18		
v/c Ratio		0.35		0.35	0.33		0.04		0.77		
Control Delay		6.0		4.8	1.1		20.8		50.4		
Queue Delay		0.0		0.3	0.0		0.0		0.0		
Total Delay		6.0		5.1	1.1		20.8		50.4		
LOS		A		A	A		C		D		
Approach Delay		6.0		3.4			20.8		50.4		
Approach LOS		A		A			C		D		
Queue Length 50th (m)		16.9		13.1	0.0		0.6		26.4		
Queue Length 95th (m)		24.5		23.7	6.2		4.9		#56.0		
Internal Link Dist (m)		110.6		109.5			51.6		63.4		
Turn Bay Length (m)					70.0						
Base Capacity (vph)		1862		1211	980		286		277		
Starvation Cap Reductn		0		331	0		0		0		
Spillback Cap Reductn		0		0	0		0		0		
Storage Cap Reductn		0		0	0		0		0		
Reduced v/c Ratio		0.35		0.47	0.33		0.04		0.69		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 10.2	Intersection LOS: B
Intersection Capacity Utilization 80.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Cobourg & Rideau

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	8	564	10	25	415	16	3	2	9	2
Future Volume (vph)	8	564	10	25	415	16	3	2	9	2
Lane Group Flow (vph)	0	572	10	0	440	16	0	37	0	17
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	27.4	23.7	23.7	23.7	23.7
Total Split (s)	66.0	66.0	66.0	66.0	66.0	66.0	24.0	24.0	24.0	24.0
Total Split (%)	73.3%	73.3%	73.3%	73.3%	73.3%	73.3%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)		5.4	5.4		5.4	5.4		5.7		5.7
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		75.7	75.7		75.7	75.7		11.6		11.6
Actuated g/C Ratio		0.84	0.84		0.84	0.84		0.13		0.13
v/c Ratio		0.38	0.01		0.31	0.02		0.19		0.10
Control Delay		4.6	0.2		2.0	0.0		15.9		27.1
Queue Delay		0.0	0.0		0.1	0.0		0.0		0.0
Total Delay		4.6	0.2		2.1	0.0		15.9		27.1
LOS		A	A		A	A		B		C
Approach Delay		4.5			2.1			15.9		27.1
Approach LOS		A			A			B		C
Queue Length 50th (m)		27.0	0.0		10.4	0.0		0.8		1.8
Queue Length 95th (m)		61.9	0.3		15.0	m0.0		8.5		7.0
Internal Link Dist (m)		79.5			110.6			56.3		85.4
Turn Bay Length (m)			25.0			25.0				
Base Capacity (vph)		1490	1028		1433	969		291		258
Starvation Cap Reductn		0	0		276	0		0		0
Spillback Cap Reductn		0	0		0	0		0		0
Storage Cap Reductn		0	0		0	0		0		0
Reduced v/c Ratio		0.38	0.01		0.38	0.02		0.13		0.07

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 54 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 4.2	Intersection LOS: A
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Augusta & Rideau

Appendix G

MMLoS Analysis

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons**	**Project**	**454 Rideau Street**
Scenario	**Projected**	**Date**	**Oct-17**
Comments			

INTERSECTIONS		Rideau/Charlotte				Rideau/Cobourg				Rideau/Augusta			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	4	4	3	0 - 2	0 - 2	4	4	0 - 2	0 - 2	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Protected/ Permissive	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m	3-5m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**95**	**58**	**57**	**77**	**87**	**87**	**57**	**57**	**87**	**87**	**55**	**55**
	Ped. Exposure to Traffic LoS	**A**	**D**	**D**	**B**	**B**	**B**	**D**	**D**	**B**	**B**	**D**	**D**
	Cycle Length	90	90	90	90	90	90	90	90	90	90	90	90
	Effective Walk Time	43	21	7	7	46	46	7	7	53	53	7	7
	Average Pedestrian Delay	**12**	**26**	**38**	**38**	**11**	**11**	**38**	**38**	**8**	**8**	**38**	**38**
	Pedestrian Delay LoS	**B**	**C**	**D**	**D**	**B**	**B**	**D**	**D**	**A**	**A**	**D**	**D**
	Level of Service	**B**	**D**	**D**	**D**	**B**	**B**	**D**	**D**	**B**	**B**	**D**	**D**
		D				**D**				**D**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration		≤ 50 m					> 50 m	≤ 50 m			≤ 50 m	≤ 50 m
	Right Turning Speed		≤ 25 km/h					≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**#N/A**	**D**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**F**	**D**	**#N/A**	**#N/A**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	No lane crossed	One lane crossed	One lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	**B**	**D**	**D**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service	**#N/A**	**D**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**F**	**D**	**#N/A**	**#N/A**	**D**	**D**
		#N/A				**#N/A**				**#N/A**			
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec		≤ 10 sec	≤ 10 sec			≤ 10 sec	≤ 10 sec
	Level of Service	**F**	**F**	**C**	**C**	**C**	**-**	**B**	**B**	**-**	**-**	**B**	**B**
		F				**C**				**B**			
Truck	Effective Corner Radius	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	≥ 2	≥ 2	≥ 2	1	1	≥ 2	≥ 2	1	1
	Level of Service	**F**	**D**	**F**	**D**	**D**	**D**	**F**	**F**	**D**	**D**	**F**	**F**
		F				**F**				**F**			
Auto	Volume to Capacity Ratio	> 1.00				0.71 - 0.80				0.0 - 0.60			
	Level of Service	**F**				**C**				**A**			

Appendix H

Transportation Demand Management Checklist

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑ Proponent plans to
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☑ provide video display in lobby
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐ N/A
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐ N/A
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station *(multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☑ Possible consideration
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐ unknown
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

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

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

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

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☐ possible consideration
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	6.	**TDM MARKETING & COMMUNICATIONS**	
	6.1	**Multimodal travel information**	
BASIC ★	6.1.1	Provide a multimodal travel option information package to new residents	☐
	6.2	**Personalized trip planning**	
BETTER ★	6.2.1	Offer personalized trip planning to new residents	☐