Albert and Main Development Inc.
Main and Main

Aug 2019

TIA Strategy Report

400 Albert Street Residential Development

PARSONS

400 Albert Street
Residential Development

TIA Strategy Report

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TIA Strategy Report

1. SCREENING

It is our understanding that Main and Main has acquired the majority of the downtown city block bounded by Bay Street, Albert Street, Lyon Street and Slater Street from 25007701 Ontario Inc. A Community Transportation Study was previously prepared and submitted by Parsons (May 2017) for 25007701 Ontario Inc.'s proposed development/Site Plan.

Main and Main now have a revised redevelopment plan and a TIA consistent with the City's 2017 TIA Guidelines is required. The Screening Form was completed for submission to City of Ottawa staff in May 2019. All triggers were met based on the number of proposed dwelling units, the location within a Design Priority Area and the development's proximity to existing traffic signals. The estimated number of trips generated by the proposed development is greater than 60 persons per hour, which meets minimum requirements. The Screening Form is provided in Appendix A. 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

Figure 2: Proposed Site Plan

2. SCOPING REPORT

2.1. EXISTING AND PLANNED CONDITIONS

2.1.1. PROPOSED DEVELOPMENT

The revised Site Plan consists of three residential buildings; one 18 storey building fronting Albert Street (Tower A) and two buildings fronting Slater Street of 33 storeys (Tower B) and 38 storeys (Tower C). The total number of dwelling units proposed is 898 units; 140 dwelling units are planned for Tower A, 319 units are proposed to Tower B, and 439 units are proposed to Tower C. In the northeast corner of the land parcel a 21,132 ft^2 retail store is proposed and approximately 4,344 ft^2 of ground floor retail is proposed for Tower C in the southwest corner. At this stage of development there is approximately 32,024 ft^2 of retail proposed on the second floor. A three-level underground parking garage with 435 parking spaces is proposed with full-movement vehicle access to Bay Street. A drop-off/pick-up laneway is proposed to Slater Street and truck loading is proposed to Albert Street.

The land parcel is located in the central area and is zoned as residential fifth density. The estimated date of occupancy is 2025 to 2026. The previous land use was an office building which has since been demolished and pay-and-display parking lot in the north-east corner that generates approximately 30 to 45 two-way vehicle trips during the peak hours based on a recent count.

2.1.2. EXISTING CONDITIONS

Area Road Network

Slater Street is an arterial roadway, which operates one-way in the eastbound direction. Within the study area, the cross-section of Slater Street consists of two passenger vehicle travel lanes and a transit/taxi travel lane with on-street parking provided along the south side of the roadway. The unposted speed limit is understood to be 50 km/h.

Albert Street is an arterial roadway, which operates one-way in the westbound direction. Within the study area, the cross-section of Albert Street consists of two passenger vehicle travel lanes and a transit/taxi travel lane with on-street parking provided along the north side of the roadway. The unposted speed limit is understood to be 50 km/h.

Bay Street is a local roadway, which operates one-way in the northbound direction. Its cross-section consists of two travel lanes and the unposted speed limit is understood to be 50 km/h.

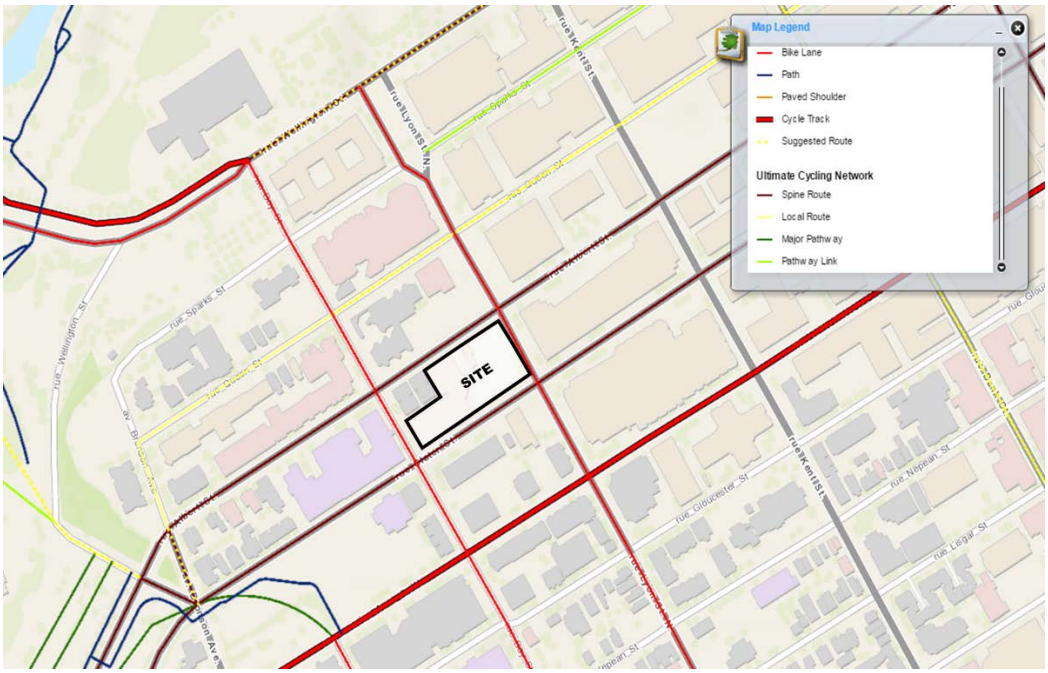
Lyon Street is an arterial roadway, which operates one-way in the southbound direction. Within the study area, the cross-section of Lyon Street consists of three lanes. The unposted speed limit is understood to be 50 km/h.

Queen Street is an east-west local roadway, which extends from Bronson Avenue in the west to Elgin Street in the east. Within the study area, Queen Street has a two-lane cross section with on-street parking provided along the south side of the roadways. The posted speed limit is 50 km/h.

Pedestrian/Cycling Network

With regard to non-auto modes, the subject site is very well serviced by cycling and pedestrian facilities. According to the City's Cycling Plan, Slater Street and Bay Street are classified as "spine" cycling routes. Bike lanes are currently provided along the east side of Bay Street, the west side of Lyon Street and segregated bike lanes are provided one block south of Slater Street along both sides of Laurier Avenue (cross-town bikeway). Sidewalks are currently provided along both sides of all study area roadways connecting pedestrians to transit service and other adjacent development/recreational facilities.

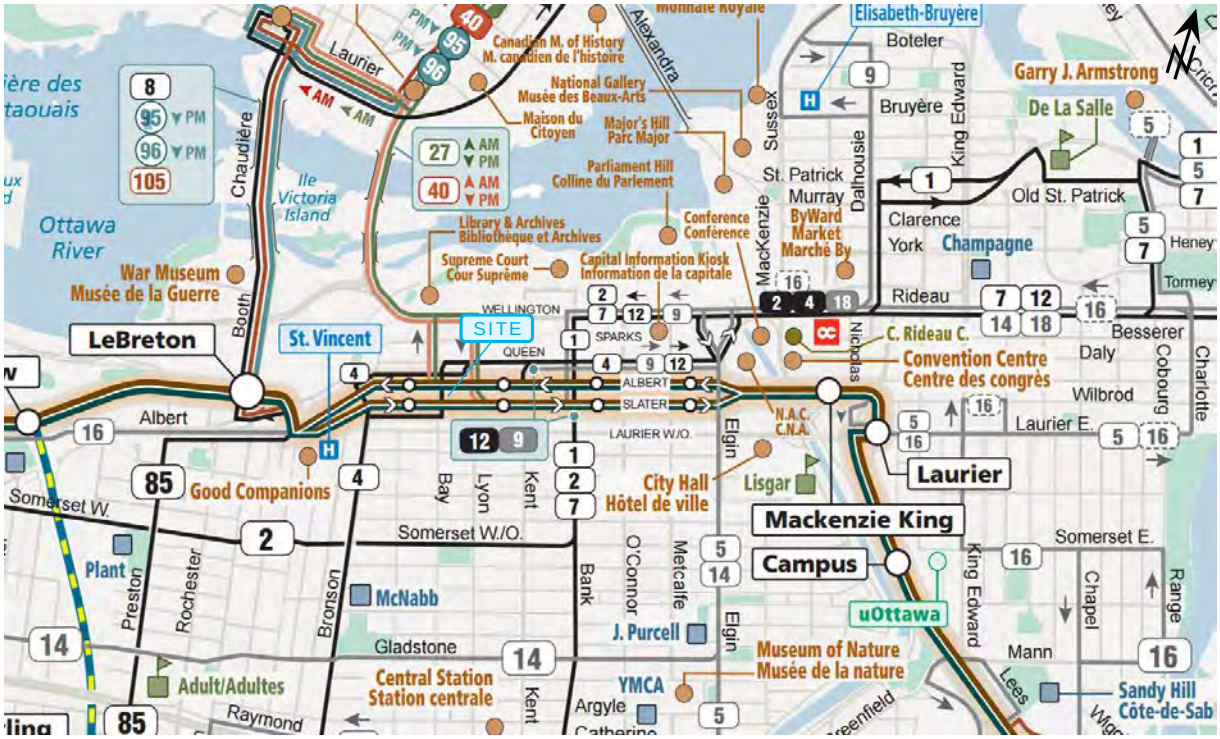
Figure 3: Ottawa Cycling Plan



Transit Network

The site is located adjacent to the existing Transitway, which operates along Slater Street and Albert Street. Bus stops are located approximately 60 m west of the site. With the implementation of the LRT, the Transitway will no longer operate along these roads and the nearest proposed LRT station will be the underground Lyon Station at Queen Street which is located approximately 150 to 200 m north of the subject site.

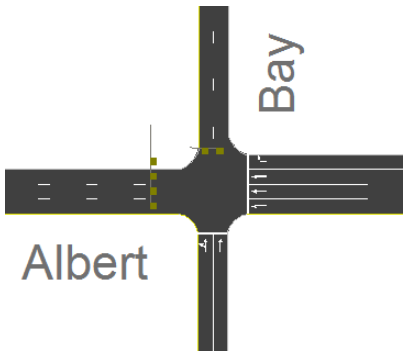
Figure 4: Area Transit Network



Existing Study Area Intersection

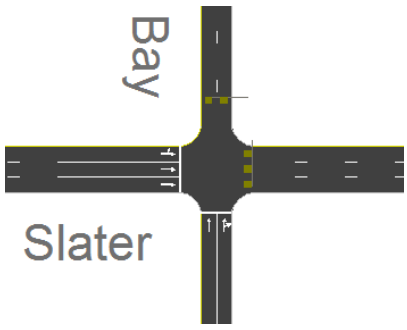
Bay/Albert

The Bay/Albert intersection is a signalized four-legged intersection. The westbound approach consists of three through lanes (one lane is transit/taxi only) and a right-turn lane. The northbound approach consists of a through lane and a shared through/left-turn lane. Bay Street and Albert Street both operate as one-way roadways in the north and westbound directions, respectively.



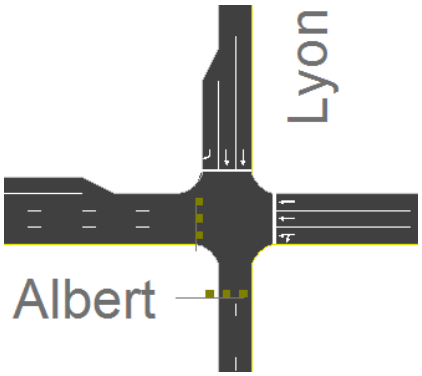
Bay/Slater

The Bay/Slater intersection is a signalized four-legged intersection. The eastbound approach consists of a shared through/left-turn lane and two trough lanes (one lane is transit/taxi only). The northbound approach consists of a through lane and a shared through/right-turn lane. Bay Street and Slater Street both operate as one-way roadways in the north and eastbound directions, respectively.



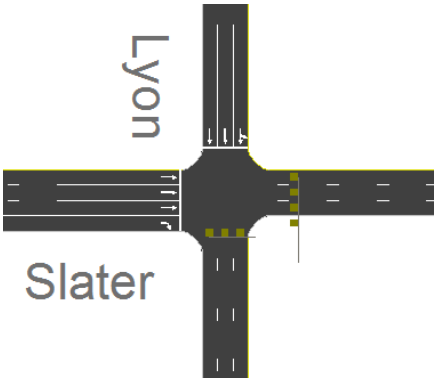
Lyon/Albert

The Lyon/Albert intersection is a signalized four-legged intersection. The westbound approach consists of two through lanes (one lane is transit/taxi only) and a shared through/left-turn lane. The southbound approach is currently under construction and consists of two through lanes and an auxiliary right-turn lane. Lyon Street and Albert Street operate as one-way roadways in the southbound and westbound directions, respectively.



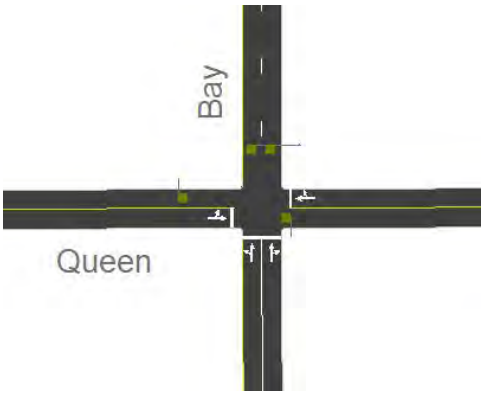
Lyon/Slater

The Lyon/Slater intersection is a signalized four-legged intersection. The eastbound approach consists of three through lanes (one lane is transit/taxi only) and a right-turn lane. The southbound approach consists of a shared through/left-turn lane and two through lane. Lyon Street and Slater Street operate as one-way roadways in the southbound and eastbound directions, respectively.



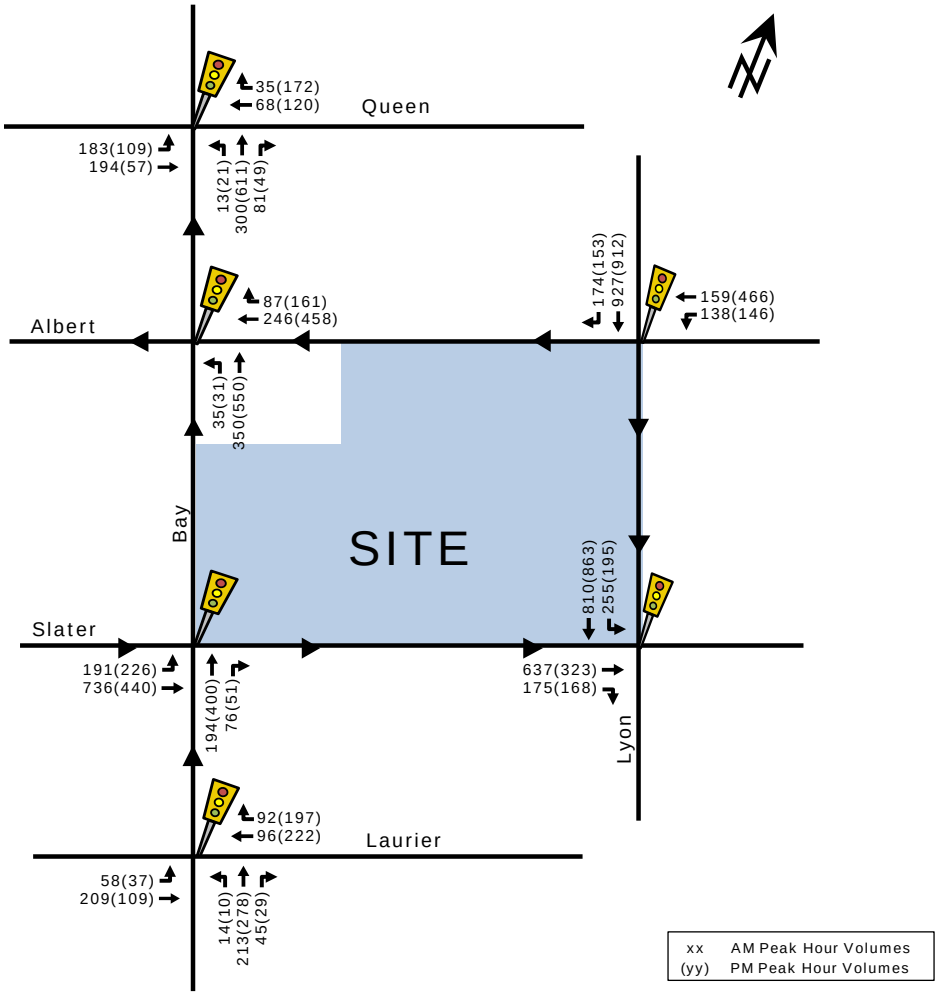
Bay/Queen

The Bay/Queen intersection is a signalized four-legged intersection. The westbound approach consists of a through/right-turn lane. The eastbound approach consists of a shared through/left-turn lane. The northbound approach consists of a shared through/left-turn lane and a shared through/right-turn lane. Southbound movements are prohibited at this location as Bay Street operates as a one-way in the northbound direction.



Illustrated as Figure 5, are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa at the Lyon/Albert, Lyon/Slater, Bay/Queen, Bay/Albert, Bay/Slater, and Bay/Laurier intersections. These peak hour traffic volumes are included as Appendix B and were balanced throughout the network based on the most recent 2019 and 2017 counts.

Figure 5: Existing Peak Hour Traffic Volumes*



*Heavy vehicle volumes along Slater and Albert Streets are not included in the figure as they represent mostly OC Transpo busses that travel in their own priority lane.

Existing Road Safety Conditions

Collision history for study area roads (2013 to 2017, inclusive) was obtained from the City of Ottawa and most collisions (74%) involved only property damage, indicating low impact speeds, and 26% involved personal injuries. The primary causes of collisions cited by police include; angle (30%), sideswipe (26%), turning movement (19%), and rear end (10%) 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:

- 0.65/MEV at the Albert/Bay intersection;
- 0.81/MEV at the Albert/Lyon intersection;
- 0.44/MEV at the Bay/Queen intersection;
- 0.39/MEV at the Bay/Laurier intersection;
- 0.57/MEV at the Slater/Lyon intersection; and
- 1.40/MEV at the Slater/Bay intersection.

Mid-block on Bay Street, between Albert and Slater, where the parking garage access is proposed, no collisions have occurred along this part of Bay Street in the most recent 5-years of data. With regard to active modes, 12 collisions involved pedestrians, all resulting in non-fatal injuries and three involved cyclists. The source collision data as provided by the City of Ottawa and related analysis is provided as Appendix C.

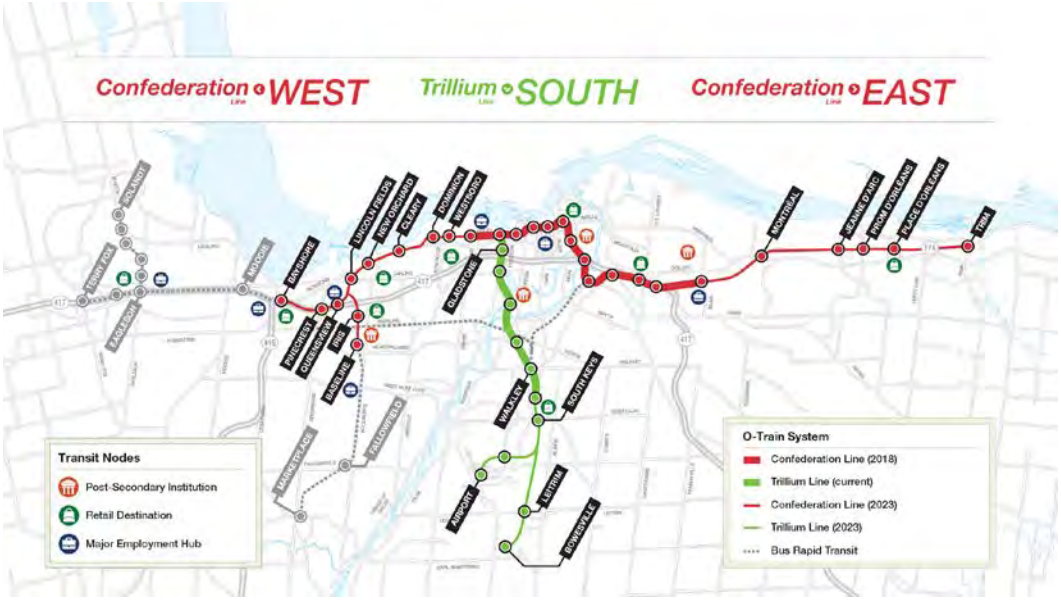
2.1.3. PLANNED CONDITIONS

Planned Study Area Transportation Network Changes

Phase 1 LRT

As previously mentioned, a notable transportation network change within the study area is the Phase 1 construction of the east-west Confederation LRT, which is the conversion of the City's existing BRT corridor to LRT between the current Blair transit station/the Campus station and between Lyon Street/the Tunney's Pasture station, connected via a tunnel through the City's Downtown. This phase of construction is underway and is expected to be completed in the fall of 2019. The following Figure 6 illustrates the planned Phases 1 and 2 of the future Confederation/Trillium Lines.

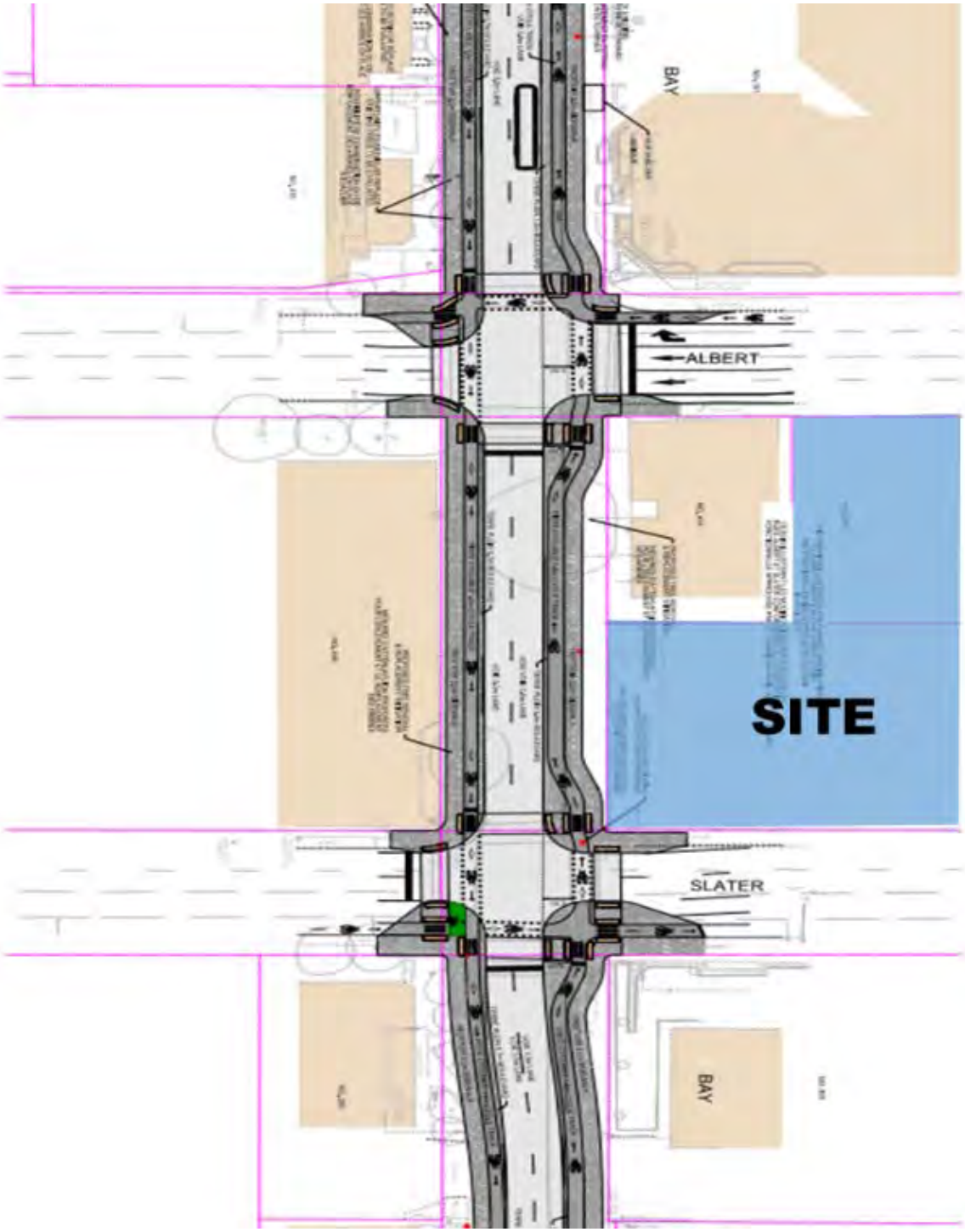
Figure 6: Planned LRT Phase 1 and 2



Bay Street Cycling Facility

The City of Ottawa is implementing a cycling facility along both sides of Bay Street between Wellington Street and Laurier Avenue, with the estimated time of completion being summer 2019. The preliminary design plan is provided as Figure 7. The design includes northbound and southbound segregated cycle tracks on either side of the roadway with two lanes of vehicle traffic.

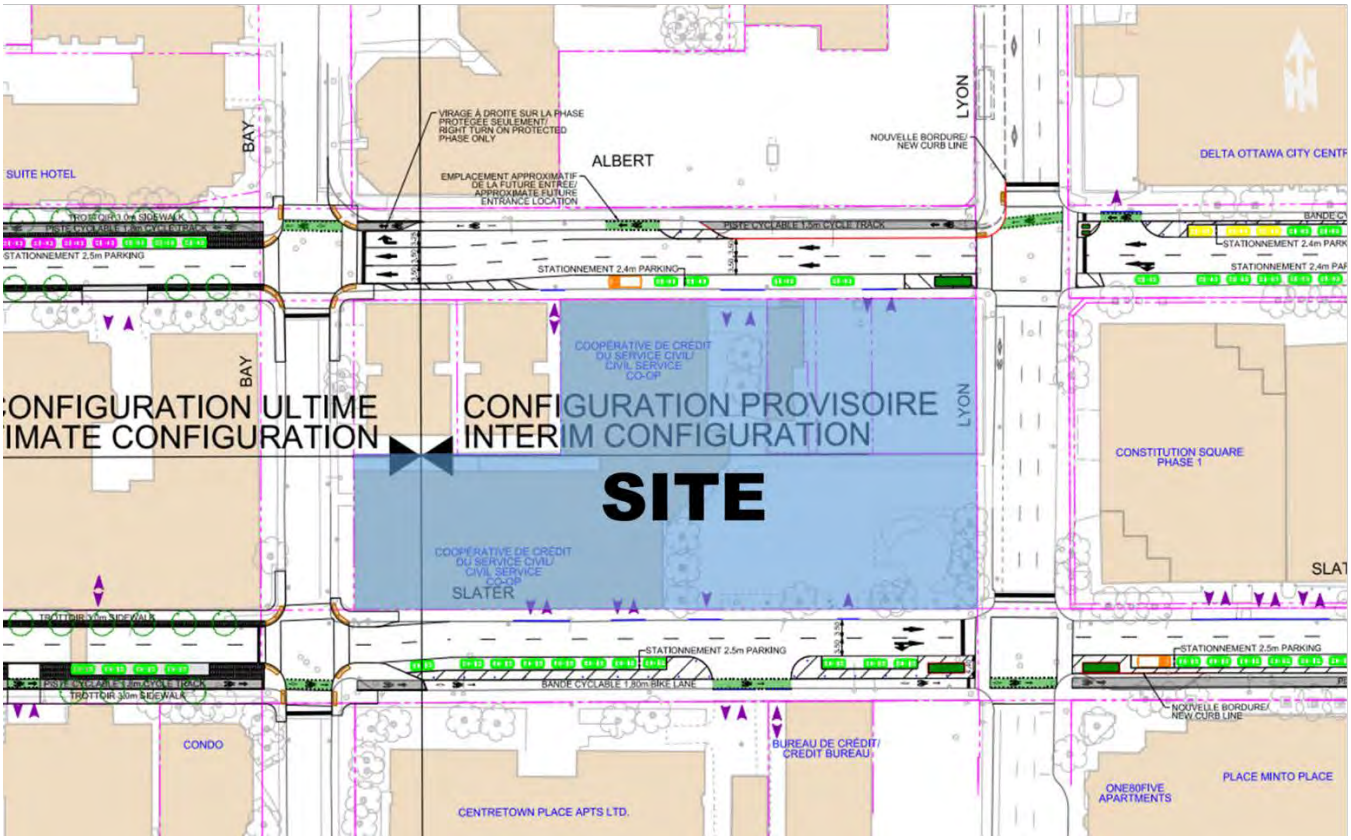
Figure 7: Preliminary Design for Bay Street Cycling Facility



Albert and Slater Streets

As part of the post LRT implementation, Albert Street and Slater Street are planned to be repurposed. The design will consist of cycling lanes and parking facilities along both sides of the roadway and a removal of the transit-only lanes. The resulting cross-section of the roadway will be two general purpose travel lanes with auxiliary turn lanes at key intersections. The functional design plan within the vicinity of the site is provided as Figure 8.

Figure 8: Albert and Slater Redesign



Other Area Development

With respect to other area developments, the following development applications have been prepared and/or submitted to the City of Ottawa in the vicinity of the proposed site:

383 Albert Street and 340 Queen Street

Claridge Homes is proposing the construction of a three-tower residential complex consisting of approximately 590 dwelling units, located at the above noted address. The Transportation Impact Study (prepared by Novatech) projected an increase in person trips of 350 to 540 persons per hour during the morning and afternoon peak hours, of which 40 to 70 are expected to be vehicle trips.

350 Sparks Street – Hotel and Residential Development

Morguard Real Estate Investment Trust is proposing the redevelopment of the above-noted address. The redevelopment will consist of demolishing the existing hotel and small residential buildings and constructing a new hotel and apartment building instead. The existing office building will remain as is. The Transportation Study projects an increase in two-way vehicle traffic of approximately 35 veh/h during the morning and afternoon peak hours.

412 Sparks

Cathedral Hill GP Inc. is proposing the construction of a retirement residential development at the above-noted address. The Transportation Impact Study (prepared by Parsons) projects a total of 40 to 50 persons per hour during the morning and afternoon peak hours, of which 15 to 20 are expected to be vehicle trips.

900 Albert Street – Trinity Development

Trinity is proposing to develop a mixed-use centre located at the above-noted address. The development is expected to consist of three towers of retail, office and residential land uses. Given the location of the development, in close proximity to the future LRT Pimisi station, the development will strive to achieve high transit and non-auto modes.

Given the downtown context of these developments and the high transit and non-auto modes projected for the mixed-use developments, the traffic volumes associated with these local area developments are not included in the ensuing analysis. Most trips to/from these developments, destined for the study area of 400 Albert, will be transit trips, given the existing Transitway is directly adjacent to the site, and the future LRT will have an LRT station in close proximity to the site. As such, it is not expected that vehicle trips to/from these developments will meaningfully impact the four study area intersections.

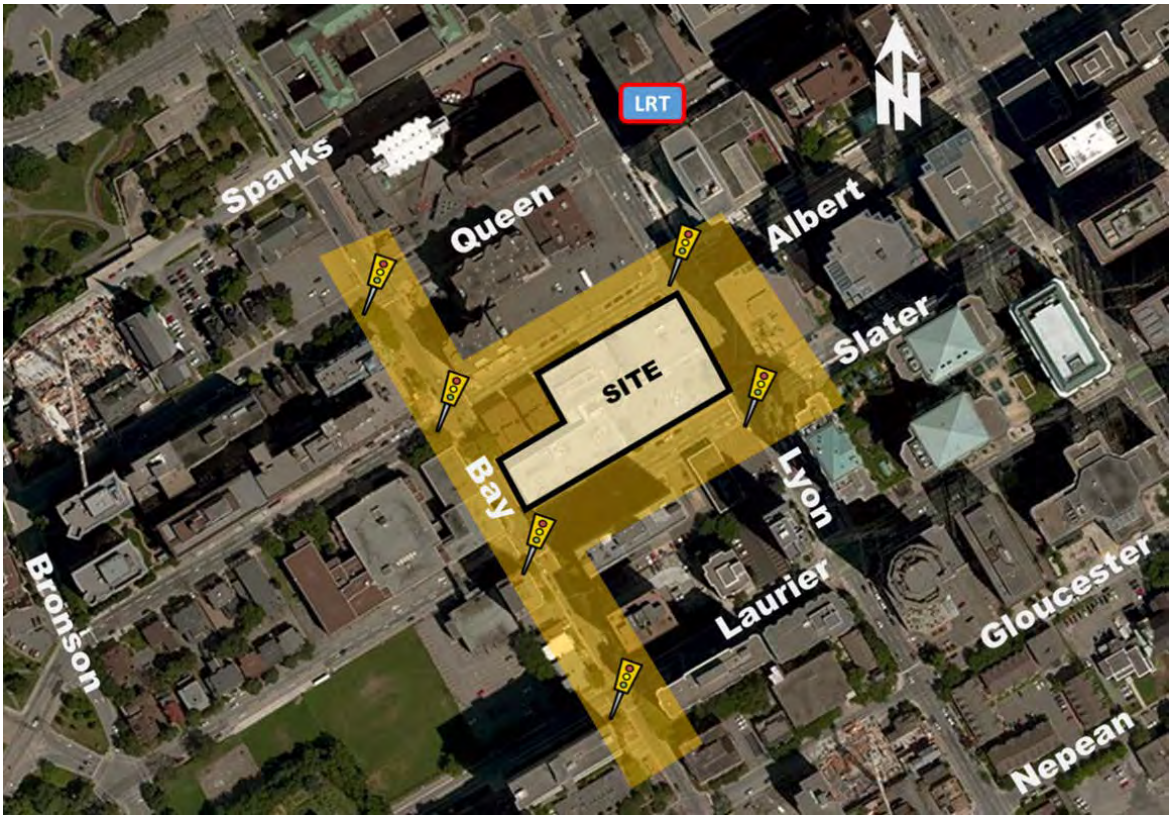
2.2. STUDY AREA AND TIME PERIODS

2.2.1. STUDY AREA

The proposed study area is outlined below and highlighted in Figure 9.

- Queen/Bay intersection;
- Albert/Bay intersection;
- Slater/Bay intersection;
- Laurier/Bay intersection;
- Albert/Lyon intersection;
- Slater/Lyon intersection;
- Albert Street, Lyon Street, Bay Street and Slater Street – adjacent to the site.

Figure 9: Study Area



2.2.2. TIME PERIODS

The time periods to be assessed are the weekday morning and afternoon commuter peak hours.

2.2.3. HORIZON YEARS

The expected build out date for the proposed development is year 2025. The horizon year 2030, representing 5-years beyond site build out will also be assessed.

2.3. EXEMPTION REVIEW

Based on the City's TIA guidelines and the subject site, the following sections of the TIA process will be exempt, unless otherwise directed.

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Streets Network	Not required for applications involving site plans.
4.2 Parking	4.2.2 Spill-over Parking	The proposed number of parking stalls is expected to meet the parking demand.
4.8 Review of Network Concept	All elements	This development is not expected to generate 200 person-trips more than the permitted zoning for the site.

3. FORECASTING REPORT

3.1. DEVELOPMENT-GENERATED TRAVEL DEMAND

3.1.1. TRIP GENERATION AND MODE SHARES

Residential Trip Generation

Appropriate trip generation rates for the proposed development consisting of approximately 898 high-rise dwelling units were obtained from the City's 2009 TRANS Trip Generation – Residential Trip Rates Report. These rates are summarized in Table 1.

Table 1: 2009 TRANS Residential Trip Generation Rates

Land Use	ITE Land Use Code	Trip Rates	
		AM Peak	PM Peak
High-Rise Apartments	ITE 222	T = 0.17(du)	T = 0.16(du)

Notes: T = Average Vehicle Trip Ends
du = Dwelling units

Using the TRANS Trip Generation rates, the total amount of vehicle trips generated by the proposed residential portion of the development (898 units) was calculated. The results are summarized in Table 2.

Table 2: Projected RESIDENTIAL Site Vehicle Trip Generation

Land Use	Area	AM Peak (Veh/h)			PM Peak (Veh/h)		
		In	Out	Total	In	Out	Total
High-Rise Apartments	898 units	42	111	153	83	61	144

As shown in Table 2, a total of 144 to 153 veh/h are projected to travel to/from the proposed development during the weekday morning and afternoon commuter peak hours according to the TRANS Trip Generation 2009 values. Using the TRANS auto trips projected in Table 2, the total person trips projected to travel to/from the proposed development can be calculated based on existing mode splits from the TRANS Trip Generation Report.

Table 3: RESIDENTIAL Person Trip Generation – Based on existing mode splits

Travel Mode	AM Mode Share	AM Peak (Person Trips/h)			PM Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	27%	42	111	153	23%	83	61	144
Auto Passenger	3%	5	12	17	6%	22	15	37
Transit	27%	42	111	153	29%	105	77	182
Non-motorized	43%	68	176	244	42%	152	111	263
Total Person Trips	**100%**	**157**	**410**	**567**	**100%**	**362**	**264**	**626**

As shown in Table 3, based on the TRANS Trip Generation method, the proposed 898 dwelling units are projected to generate approximately 570 and 625 person trips per hour during the weekday morning and afternoon commuter peak hours, respectively. However, these model splits are based on the existing transit system, which is an at-grade rapid transit system that travels adjacent to the site through the downtown core. The anticipated opening of the LRT in the Fall of 2019 is expected to increase the number of transit riders in the area with an ultimate goal of 65% transit riders for developments located within 600 m of LRT stations.

To account for this change in the transit system, revised 'future' modal splits are applied to the total person trips in Table 3 (567 and 626 persons/h). As this development is located in the downtown core, the number of non-motorized travelers is expected to remain similar to the existing splits outlined in Table 3, however an increased transit mode has been applied based on the City's projected targets for Transit-Oriented Developments (TODs), these are shown in Table 4.

Table 4: Projected RESIDENTIAL Person Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	15%	24	62	86	53	40	93
Auto Passenger	5%	8	20	28	18	14	32
Transit	38%	60	155	215	138	100	238
Non-motorized	42%	66	172	238	152	111	263
Total Person Trips	**100%**	**158**	**409**	**567**	**361**	**265**	**626**
Less Existing Auto Trips		*-25*	*-22*	*-47*	*-12*	*-18*	*-30*
Total 'New' Auto Trips		0	40	40	41	22	63

The existing peak hour vehicle trips to/from the parking lot were counted and are shown in Table 4. These were removed from the projected number of vehicle trips for the proposed development. The total net increase in two-way vehicle traffic is expected to be 40 and 63 veh/h during the morning and afternoon weekday peak hours, respectively. The increase in two-way transit person trips along the LRT are projected to be 215 and 240 persons/h and an increase in non-motorized trips of 240 to 265 persons/h is expected with the development of the residential towers.

To further break down the non-motorized or active mode trips, the City of Ottawa's Origin-Destination (OD) Survey was consulted for the Ottawa Centre area. The OD survey shows the majority (about 90% to 95%) of active mode trips traveling from the area in the morning and to the area in the afternoon are pedestrians. Using these values the proposed

development is projected to generate approximately 220 and 245 pedestrians/h during the morning and afternoon peak hours, respectively, and 18 cyclists/h during both the morning and afternoon peak hours.

Retail Trip Generation

Appropriate trip generation rates for the proposed retail grocery store (21,132 ft²) and 36,368 ft² ground floor and second floor retail were obtained from the ITE Trip Generation Manual (10th Edition). These rates are summarized in Table 5.

Table 5: ITE Trip Generation Rates

Land Use	ITE Land Use Code	Trip Rates	
		AM Peak	PM Peak
Supermarket	ITE 850	T = 3.82(X)	T = 9.24(X)
Shopping Centre	ITE 820	T = 0.94(X)	T = 3.81(X)
Notes: X = 1,000 ft² GFA *T = Average Vehicle Trip Ends* *Shopping centre is used as a generic shopping use as the tenant for the space has not been confirmed at this stage of development*			

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, the average vehicle occupancy factor is 1.15 and the default non-auto mode share is 10%. As such, a combined factor of approximately 1.28 can be used to convert ITE's vehicle trip rates to person-trip rates. The person-trip generation for the proposed retail developments is summarized in Table 6.

Table 6: Modified Person Trip Generation

Land Use	Area	AM Peak (Person Trip/h)			PM Peak (Person Trip/h)		
		In	Out	Total	In	Out	Total
Supermarket	21,132 ft²	61	42	103	127	123	250
Shopping Centre	36,368 ft²	27	17	44	84	93	177
Total Person Trips		**88**	**59**	**147**	**211**	**216**	**427**

Mode Shares Retail

Based on the City's targets for TOD areas and given the retail is expected to serve residents and employees in the area, the future mode splits for the proposed development are summarized in Table 7. The person trip generation for the retail components of the site (Table 6) were then reduced by these modal shares and are shown in Table 7. A pass-by rate of 35% was used based on the ITE Trip Generation Handbook, which indicates an average pass-by rate of 36% for the supermarket land use and 34% for the shopping centre land use.

Table 7: RETAIL Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	15%	14	9	23	32	33	65
Auto Passenger	5%	4	3	7	11	11	22
Transit	30%	26	18	44	63	64	127
Non-motorized	50%	44	29	73	105	108	213
Total Person Trips	100%	88	59	147	211	216	427
Less Pass-by (35%)		-4	-4	-8	-11	-11	-22
Total 'New' Auto Trips		**10**	**5**	**15**	**21**	**22**	**43**

As shown in Table 7, the resulting number of potential 'new' two-way vehicle trips for the proposed retail development is approximately 15 and 43 veh/h during the weekday morning and afternoon peak hours, respectively.

The number of pedestrian and cyclist trips travelling to/from the retail land use was estimated based on the OD Survey results for pedestrians and cyclists travelling to the area in the morning peak hour, from the area in the afternoon peak hour, and within the area during both peak hours. The retail land uses are projected to generate approximately 50 and 150 pedestrians/h during the morning and afternoon peak hours, respectively, and 23 and 63 cyclists/h during the morning and afternoon peak hours, respectively.

Total Trip Generation

The combined projected trips for the entire development (residential and commercial) are summarized in Table 8.

Table 8: Total Site Trip Generation

Travel Mode	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
	In	Out	Total	In	Out	Total
Auto Driver	38	71	109	85	73	158
Auto Passenger	12	23	35	29	25	54
Transit	86	173	259	201	164	365
Non-motorized	110	201	311	257	219	476
Total Person Trips	**246**	**468**	**714**	**572**	**481**	**1,053**
Less Retail Auto Pass-by (35%)	-4	-4	-8	-11	-11	-22
Less Existing Site Auto Trips	-25	-22	-47	-12	-18	-30
Total 'New' Auto Trips	**9**	**45**	**54**	**62**	**44**	**106**

As shown in Table 8, the total number of new person trips to the development is expected to be 715 and 1,050 persons/h during the morning and afternoon peak hours, respectively. The projected increase in vehicle traffic is expected to be 55 and 106 veh/h during the weekday morning and afternoon peak hours, respectively. This increase in vehicle traffic is the 'net' difference between the existing traffic traveling to/from the surface parking lot on the subject site and the proposed development projected peak hour vehicle trips.

The transit rider increase is estimated to be 260 and 365 persons/h during the peak hours. With regards to active modes, approximately 270 and 395 pedestrians per hour and 41 and 81 cyclists per hour are projected to travel to/from the proposed development.

3.1.2. TRIP DISTRIBUTION

The projected 'new' and 'pass-by' trips were distributed based on the site's connectivity to the existing road network and our knowledge of the surrounding area. The resultant distribution is assumed to be:

- 55% to/from the west via Slater Street. Albert Street, Kent Street, and Laurier Avenue; and
- 45% to/from the north via Lyon Street, Bay Street, and Queen Street.

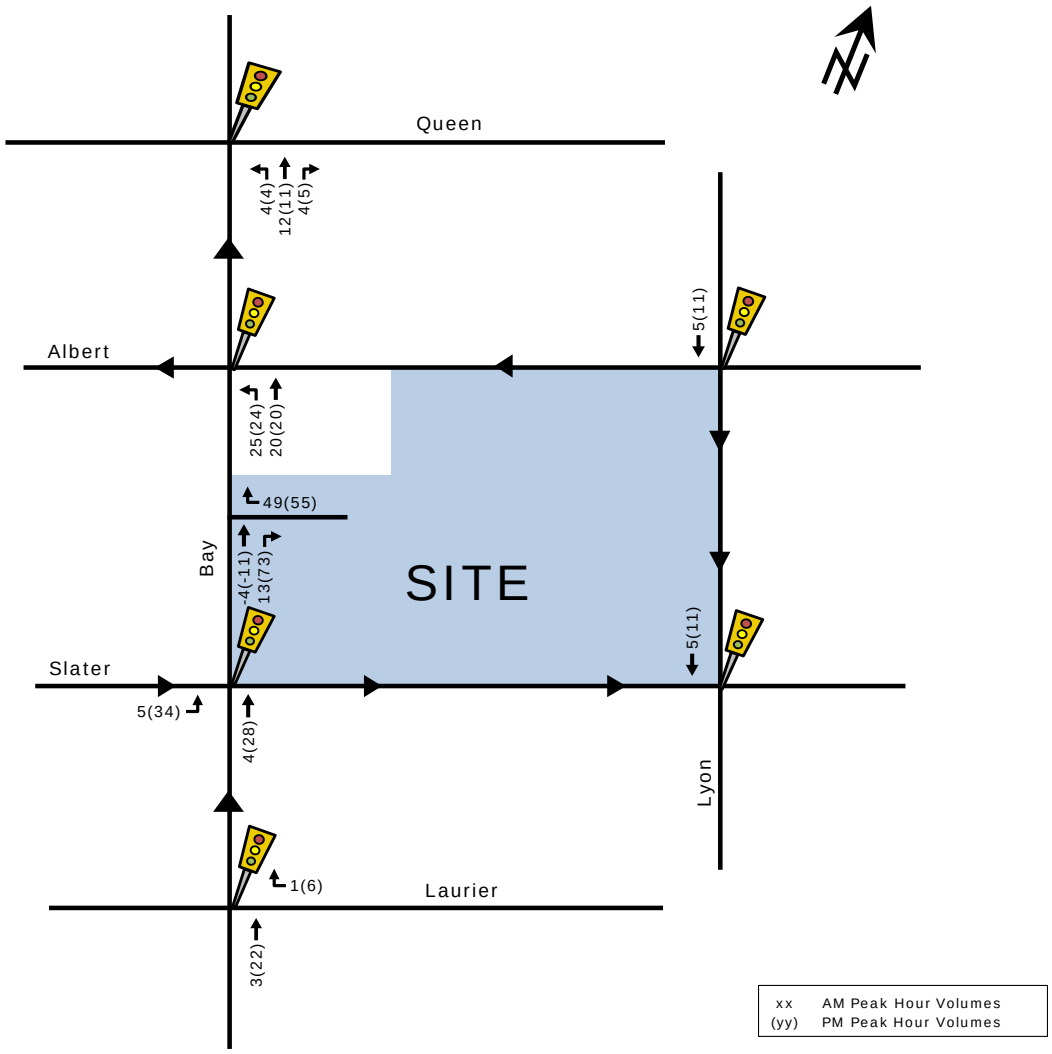
100%

3.1.3. TRIP ASSIGNMENT

A full movement driveway connection to Bay Street is proposed to serve the subject development's underground parking lot. There is a proposed pick-up/drop-off driveway connection to Slater Street and truck loading is proposed to Albert Street. For the purposes of this analysis, the vehicle trips are assigned to the Bay Street access only as the number of vehicle trips

to/from the Albert and Slater Street driveways are expected to be negligible in terms of capacity analysis. As 'pass-by' trips are trips that are already travelling along the roadway, they have not been added to the network, but they have they been added to the site's driveway. 'New' and 'Pass-by' site-generated vehicle trips are assigned to the study area network and illustrated as Figure 10.

Figure 10: 'New' and 'Pass-by' Site-Generated Traffic



3.2. BACKGROUND NETWORK TRAVEL DEMANDS

3.2.1. TRANSPORTATION NETWORK PLANS

Refer to Section 2.1.3 Planned Conditions – Planned Study Area Transportation Network Changes.

3.2.2. BACKGROUND GROWTH

The following background traffic growth (summarized in Table 9) was calculated based on historical traffic count data (years 2007, 2011 and 2015) provided by the City of Ottawa at the Bay/Slater intersection. Detailed background traffic growth analysis is included as Appendix D. Because of LRT construction, using more current data would not reflect actual growth conditions as there were many changes due to construction within the study area in the past four years.

Table 9: Bay/Slater Historical Background Growth (2007 – 2015)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-1.10%	-2.30%	-2.00%	-2.00%	-1.84%
AM Peak	-3.44%	-4.49%	-2.13%	-2.01%	-2.48%
PM Peak	-1.12%	-2.78%	-2.15%	-5.32%	-2.77%

As show in Table 9, the Bay/Slater intersection has experienced negative overall growth (calculated as weighted average) over an 8-year time period. As an average background traffic growth rate of -2% was calculated, and since the study area is located within the downtown core, directly adjacent to the existing Transitway and future LRT, no overall growth rate has been applied on forecasted background traffic volumes. This is consistent with the anticipated decline in vehicular traffic within this area outline in the TMP.

3.2.3. OTHER DEVELOPMENTS

Refer to Section 2.1.4 Planned Conditions – Other Area Developments.

3.3. DEMAND RATIONALIZATION

As part of the City's plans to increase density in areas located close to the LRT, this development is expected to increase people trips, however, the number of vehicle trips is not expected to significantly increase in the study area due to this development. In addition, vehicular traffic in the Central Area is also expected plateau or decrease over time when the Confederation Line LRT opens in the fall of 2019. Therefore, there are no anticipated concerns with network capacity and traffic demand related to or associated with the proposed development.

4. STRATEGY REPORT

4.1. DEVELOPMENT DESIGN

4.1.1. DESIGN FOR SUSTAINABLE MODES

Vehicle and Bicycle Parking

Approximately 435 vehicle parking spaces are proposed to serve the subject residential units within three levels of underground parking. As the site is located within Area Z, as identified in Schedule 1A of the City's Zoning By-Law, there is no required minimum parking supply for residents, however a minimum of 30 visitor parking spaces is required according to the City's By-Law requirements. No parking is required for the retail land uses and as such as long as 30 spaces are designated as visitor parking, the proposed amount of parking meets the City's requirements. It is noteworthy that the amount of parking also does not exceed the maximum amount of parking allowed for developments within 600 m of LRT stations. The parking spaces are noted as being 5.2 m in length and 2.6 m in width, which are the City's By-Law requirements.

With regard to bicycle parking, according to the City's By-Law requirements, bicycle parking should be provided at a rate of 0.5 per dwelling unit and at a rate of 1 per 250 m^2 for the retail land uses. Based on these rates a minimum of 449 bicycle parking spaces should be provided for the residential land uses and 22 spots should be provided for retail land uses. Bicycle parking should be located in well-lit areas and close to main entrances. At this stage of the development process, the number and location of bicycle parking spaces has not been identified, however, the minimum number of spaces identified herein should be met.

Transit and Pedestrians
To connect pedestrians to transit service and other nearby employment, shopping and recreation opportunities, sidewalks are currently provided along both sides of all study area roads. The site is located between Slater Street and Albert Street, which currently provides east/west access to the existing Transitway and is in close proximity to the future Lyon LRT Station.

An urban park is proposed in the northeast corner of the site and a mid-block connection is proposed to connect pedestrians, cyclists and drop-off/pick-up vehicles through the site from Albert Street to Slater Street. It is recommended that this connection be constructed as a woonerf to promote pedestrian activity and alert drivers to pedestrians and cyclists along the roadway connection.

4.1.2. CIRCULATION AND ACCESS

A right-in/right-out driveway is proposed to Bay Street to connect to the underground parking garage. As Bay Street is a one-way roadway in the northbound direction, vehicles can turn northbound right into the driveway and must exit heading north as well. As mentioned in Section 2.1.3, a northbound cycle track is planned along the east side of Bay Street in front of the proposed driveway. As such, it is recommended to provide green thermoplastic across the driveway to alert drivers of the cycle track.

Based on projected volumes and proximity to adjacent intersections, additional traffic control/auxiliary turn lanes are not warranted nor required at the proposed driveway connection to Bay Street. The garage ramp is located mid-block on Bay Street and is offset as much as possible from both adjacent signalized intersections. The driveway is located adjacent to the property to the north and is offset by about 7 m from the adjacent property's driveway. Given the downtown context of the development, the one-way function of Bay Street and the 7 m offset, the location of this driveway to the adjacent driveway is considered acceptable. The width of the garage access driveway is noted as 6 m, which meets the City's By-Law requirements.

The ramp grade for the proposed parking garage access/egress starts 4.6 m from the property line and about 7 m from the edge of the side walk. The ramp grade is planned at 12% with transition grades at the top and bottom of the ramp.

Truck loading is proposed mid-block along Albert Street and a pick-up/drop-off area is provided along a multi-function connection located mid-block that extends through the site from Albert Street to Slater Street. As this connection/link is intended for multi-modal use, it is recommended that it be constructed as a woonerf to promote active modes and reduce vehicle speeds.

Both the Slater and Albert Street connections are proposed mid-block and located as far from the adjacent signalized intersections as possible. Further discussion is required with the City to confirm curb radii and driveway widths at the Albert Street and Slater Street connections.

Through consultation with the City, we are advised that Road Modification Applications (RMA) are not required for the site's proposed driveway connections.

4.2. PARKING

4.2.1. PARKING SUPPLY

Refer to Section 4.1.1

4.3. BOUNDARY STREET DESIGN

As shown in Section 2.1.3, the City of Ottawa is implementing a cycling facility along both sides of Bay Street between Wellington Street and Laurier Avenue, with the estimated time of completion being 2019. The design includes northbound and southbound segregated cycle tracks on either side of the roadway with two lanes of vehicle traffic.

In addition, as part of the LRT implementation, Albert Street and Slater Street are planned to be repurposed. The design will consist of cycling lanes and parking facilities along both sides of the roadway and a removal of the transit-only lanes. The resulting cross-section of the roadway will be two general purpose travel lanes with auxiliary turn lanes at key intersections. The design plans for all three boundary streets are shown as Figures 7 and 8 of this report.

The proposed development will have three driveways intersecting these three boundary roadways. The Bay Street driveway connection will be right-in/right-out only and may require utility pole relocation. The proponent will work with the City to address the design of the driveway during the construction of the Bay Street cycle lanes. With regard to the Albert Street and Slater Street driveways, they will not conflict with the City's plans to redesign these roadways. The sidewalks that cross the three proposed driveways are to be depressed concrete and 2.0m to 3.0m wide, with the final width/location to be determined by the City during the redesign of the adjacent streets.

4.4. ACCESS INTERSECTION DESIGN

4.4.1. LOCATION AND DESIGN OF ACCESS

The proposed access garage ramp is located along Bay Street approximately 0.5 m from the northern property line. It is mid-block between Slater and Albert Street, approximately 25 m north of Slater Street and approximately 30 m south of Albert Street. There is an existing alleyway located approximately 1 m to the north of this proposed driveway and the adjacent building's garage access is located approximately 7 m north of the proposed access. As mentioned previously, a utility pole will likely require relocation for the driveway implementation.

With regards to the Albert Street driveway, the proposed driveway will replace an existing driveway, which is located mid-block between Bay Street and Lyon Street. A truck loading bay is proposed to serve the grocery store along the eastern edge of the driveway. The Slater Street driveway is also located mid-block between Bay Street and Lyon Street and is approximately 9 m wide. These two driveways connect through the site and are intended for pedestrian and cycling activity and some drop-off/pick-up vehicle movements, there is no parking access to these driveways. As such, the vehicle volumes will be relatively low and the driveway should be constructed as a woonerf to indicate that the area is designed mainly for pedestrians and cyclists and vehicles should proceed with caution.

4.4.2. INTERSECTION CONTROL

Based on the location and operation of all three driveways, STOP control on the minor approach (site) only is recommended. No additional turn lanes or intersection control is warranted.

4.5. TRANSPORTATION DEMAND MANAGEMENT

Depending on the nature of a development, Transportation Demand Management (TDM) strategies have the potential to be an integral part of a planned development in order to address and support the City's policies with regard to TDM. For this particular site, its location within 600 m of the LRT Confederation Line and its location within the downtown core are considered very advantageous in lessening the reliance on the private automobile. The close proximity of significant employment and residential uses will also contribute to a high walk percentage. The proximity of dedicated on-road cycling facilities will contribute to maximizing the bicycle mode split.

As part of the development, a pathway for pedestrians, cyclists and pick-up/drop-off vehicles is proposed through the site to provide shorter walking and biking routes to local amenities and LRT stations. This pathway is proposed to be constructed as a woonerf to indicate it is a shared-use area and drivers should proceed with caution.

A number of other TDM measures could also be considered to reduce vehicle use, including:

- ride-sharing programs (e.g. community forum where residents can register/arrange carpooling or on-site parking can be reserved for VRTUCAR cars);
- carpool incentives (e.g. reserved preferred parking for carpooling residents and carpool drop-off areas);
- providing preferential parking for hybrid vehicles that are less harmful to the environment; and
- provide an on-site transit information booth to direct visitors and encourage residents to utilize transit.

The TDM strategy checklists are attached as Appendix E.

4.6. NEIGHBOURHOOD TRAFFIC MANAGEMENT

Exempt – See Section 2.3.

4.7. TRANSIT

Transit service within the vicinity of the site is currently provided by the transitway along Slater Street and Albert Street. However, the LRT is planned to be open in Fall 2019 and as such the site will be serviced by the LRT located underground through the downtown core. The closest LRT station is located near the Queen/Lyon intersection, which is an approximate 60 m to 200 m walk for residents and patrons of the proposed site.

Based on the trip generation analysis, an increase in transit ridership associated with the proposed development is estimated to be 260 to 365 two-way person trips per hour during the commuter peak hours. This increase in transit ridership is consistent with the City's goals in increasing density in areas around the future LRT.

4.8. REVIEW OF NETWORK CONCEPT

Exempt – See Section 2.3.

4.9. INTERSECTION DESIGN

4.9.1. EXISTING CONDITIONS

The following Table 10 provides a summary of existing traffic operations at study area intersections based on the SYNCHRO (V10) traffic analysis software. The subject 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 intersections 'as a whole' were assessed based on a weighted v/c ratio and the SYNCHRO model output of existing conditions is provided within Appendix F.

Table 10: 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
Bay/Slater	A(A)	0.53(0.52)	EBT(NBT)	9.4(11.2)	A(A)	0.50(0.47)
Bay/Albert	A(A)	0.40(0.50)	NBT(NBT)	12.0(10.1)	A(A)	0.31(0.45)
Lyon/Slater	B(A)	0.70(0.54)	EBT(SBT)	14.8(7.4)	B(A)	0.63(0.51)
Lyon/Albert	B(C)	0.70(0.75)	SBT(SBT)	13.8(18.7)	A(B)	0.60(0.64)
Bay/Queen	C(A)	0.74(0.60)	EBT(EBT)	13.3(8.7)	A(A)	0.53(0.48)
Bay/Laurier	A(B)	0.48(0.65)	EBT(WBT)	16.4(16.5)	A(A)	0.38(0.47)

Notes: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.
Study area located within Central Business District (CBD).

As shown in Table 10, SYNCHRO analysis indicates that study area intersections 'as a whole' are currently operating at LoS 'B' or better during both weekday commuter peak hours. With regard to 'critical movements' at study area intersections, they are currently operating at LoS 'C' or better during both peak hours.

Field observations at study area intersections confirm the above findings. However, minor delays to vehicles travelling along all study area roads were observed, caused by signalized intersections, loading and unloading vehicles, vehicles negotiating on-street parking, pedestrians, cyclists, etc. As the study area is located in the Downtown Core, these minor delays are considered acceptable.

Multi-Modal Level of Service – Existing Conditions

The MMLOS analysis for the signalized intersections within the study area is summarized in Table 11. The existing detailed MMLoS analysis is provided as Appendix F.

Table 11: Existing MMLOS – Signalized Study Area Intersections

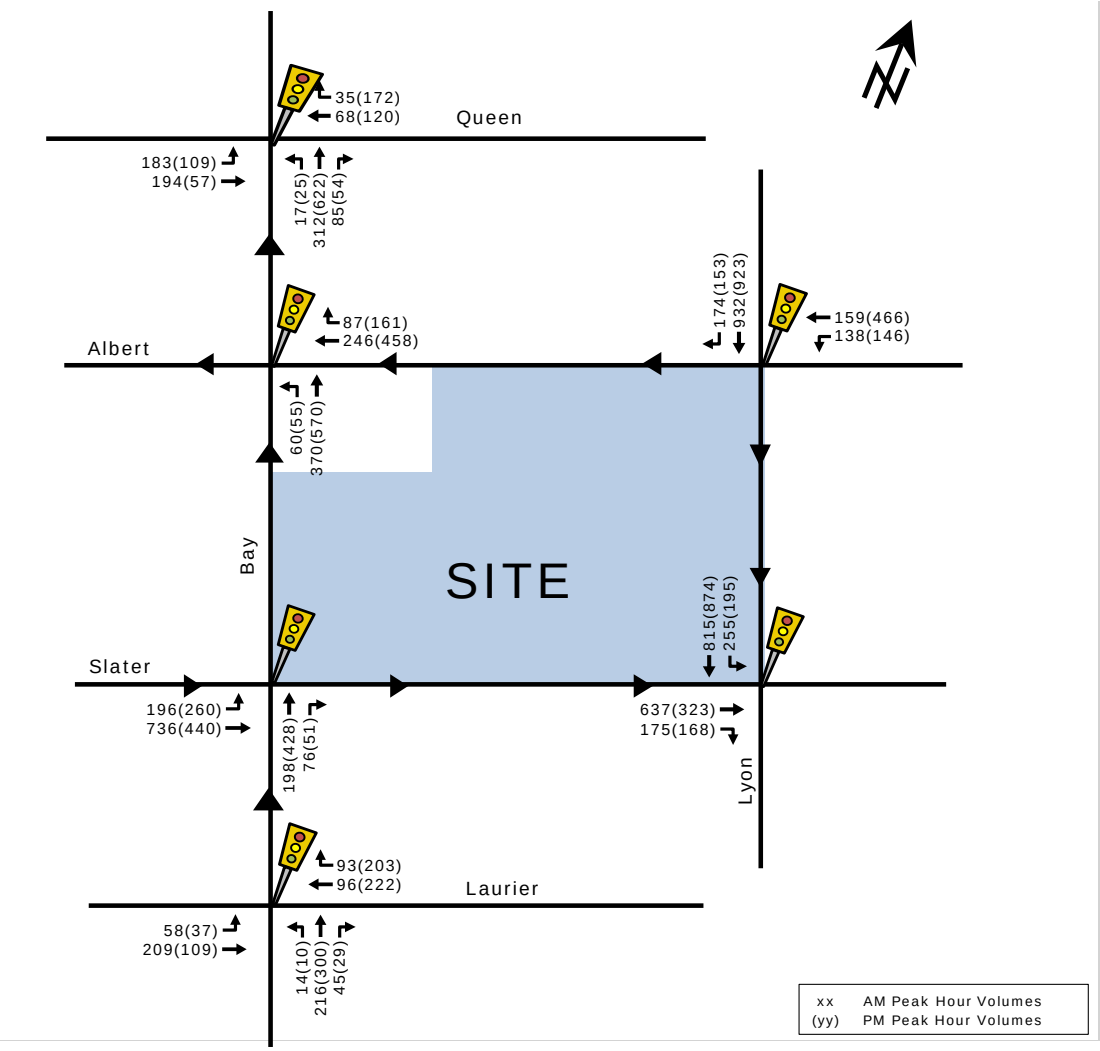
Intersection	Level of Service									
	Pedestrian (PLoS)		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)		Vehicle (LoS)	
	PLoS	Target	BLoS	Target	TLoS	TkLoS	TkLoS	Target	LoS	Target
Bay/Laurier	C	A	C	A	No bus routes		E	D	B	E
Bay/Slater	C	A	E	B	B	A	D	D	A	E
Bay/Albert	C	A	D	B	B	A	D	D	A	E
Bay/Queen	B	A	C	B	C	No target	E	No target	C	E
Albert/Lyon	C	A	E	C	B	A	D	D	C	E
Slater/Lyon	C	A	E	C	B	A	D	D	B	E

The letters identified in red text in Table 11 do not meet the MMLoS targets for their designated area (central area). However, the plans for Bay Street and Albert and Slater Streets will likely improve the bicycle and pedestrian levels of service (however the target PLOS of 'A' is impossible to achieve at signalized intersections). The grade separated LRT will improve the transit level of service along Albert and Slater to TLOS A.

4.9.2. TOTAL PROJECTED CONDITIONS – FULL BUILD OUT

The total projected traffic volumes at full site build-out were derived by superimposing the site-generated traffic volumes (Figure 10) onto existing traffic volumes (Figure 5). The resulting total projected traffic volumes are illustrated in Figure 11.

Figure 11: Total Projected Traffic Volumes



The following Table 12 provides a summary of the total projected operations at the study area intersection based on the SYNCHRO (V10) traffic analysis software. As the study area will have undergone significant redesign along Albert Street, Slater Street and Bay Street, some assumption in signal timing for the future condition were made, including no right-turn-on-right restrictions anywhere where cars would cross a cycle-track and advanced pedestrian/cycle phases at all cycle tracks. The SYNCHRO model output of total projected conditions is provided within Appendix G.

Table 12: Total Projected 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
Bay/Slater	B(B)	0.62(0.66)	EBT(NBT)	14.8(18.2)	A(A)	0.60(0.58)
Bay/Albert	A(A)	0.50(0.60)	NBT(NBT)	16.4(17.0)	A(A)	0.39(0.54)
Lyon/Slater	C(B)	0.79(0.62)	EBT(SBT)	15.6(11.1)	B(A)	0.70(0.57)
Lyon/Albert	C(D)	0.76(0.86)	SBT(SBT)	17.5(26.8)	B(C)	0.65(0.73)
Bay/Queen	C(C)	0.72(0.73)	EBT(EBT)	18.7(20.5)	A(A)	0.52(0.54)
Bay/Laurier	A(C)	0.47(0.72)	EBT(WBT)	18.5(20.6)	A(A)	0.37(0.52)
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Table 12, the study area intersections are projected to continue to operate at acceptable levels of service once the development is constructed.

Multi-Modal Level of Service – Projected Conditions

Based on the proposed changes to the study area roadways, the projected MMLoS results of the study area are summarized in Table 13. The detailed analysis is provided as Appendix G.

Table 13: Projected MMLOS – Signalized Study Area Intersections

Intersection	Level of Service									
	Pedestrian (PLoS)		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)		Vehicle (LoS)	
	PLoS	Target	BLoS	Target	TLoS	TkLoS	TkLoS	Target	LoS	Target
Bay/Laurier	C	A	A	A	No bus routes		E	D	C	E
Bay/Slater	C	A	A	B	A	A	D	D	B	E
Bay/Albert	C	A	A	B	B	A	D	D	A	E
Bay/Queen	B	A	B	B	C	No target	E	No target	C	E
Albert/Lyon	B	A	D	C	A	A	D	D	D	E
Slater/Lyon	B	A	A	C	A	A	D	D	C	E

As shown in Table 13, the majority of the bike, transit, truck and vehicle level of service targets are projected to be met with the proposed changes to the road network. The exceptions being BLOS at Albert/Lyon where no cycle lane is proposed north of Albert Street (which if implemented would meet the target for the entire intersection); the TLOS at the Bay/Albert intersection (which is a reflection of delay for busses on Bay Street, which cannot be better than a B unless it is grade separated); and the TkLOS for Bay/Laurier (which is related to trucks turning onto Bay Street, which is not a truck route, and trucks serving the subject site will not need to use Bay Street).

With regard to pedestrian level of service, as mentioned previously the target PLOS 'A' is impossible to achieve because of the calculation required for the delay score. The PETSI (Pedestrian Exposure at Traffic Signalized Intersections) scores at Bay/Laurier, Bay/Slater and Bay/Albert are projected to be PLOS 'A' in the future (the delay scores are PLOS 'C' because of signal timing). PETSI scores at Bay/Queen, Albert/Lyon and Slater/Lyon are PLOS 'B' due to longer crossing distances along Lyon Street and Queen Street.

The Bay Street intersections result in a PLOS 'C' because of the delay score. These scores are lower because the east-west arterials (Slater, Albert and Laurier) are given more green time and as such pedestrians crossing these arterials are delayed slightly longer. With the implementation of the LRT and the removal of the transit way from Slater and Albert Streets, the green times may be adjusted at the discretion of the City's Traffic Signals Group and the delay score may increase to a PLOS 'B' (PLOS 'A' for delay cannot be achieved).

5. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Existing Conditions

- The proposed development is located in the downtown core, directly adjacent to the existing Transitway and within close proximity of the future LRT Lyon Station;
- Bike lanes are currently provided along the east side of Bay Street and segregated bike lanes are provided one block south of Slater Street along both sides of Laurier Avenue. Sidewalks are currently provided along both sides of all study area roadways connecting pedestrians to transit service and other adjacent development/recreational facilities;
- Study area intersections 'as a whole' are currently operating at LoS 'B' during the morning and afternoon peak hours, with critical movements operating at LoS 'C' or better. These results meet the MMLoS guidelines minimum target level of operation for vehicles;
- Pedestrian, cyclist and transit level of service MMLoS target are not currently being met at the majority of study area intersection, however, with the construction of the LRT, the redesign of Albert and Slater Street and the implementation of cycle tracks on Bay Street, these MMLoS targets are expected to improve;

Projected Conditions

- Phase I of the LRT is expected to be completed by Fall of 2019. The Lyon LRT Station at the Queen/Lyon intersection is approximately 1½ blocks north of the subject site;
- With the implementation of the LRT, the City has plans to redesign the existing Transitway along Albert and Slater Streets. The plans include cycle tracks and reduced number of vehicle travel lanes;
- As part of a City project, cycle tracks are planned along Bay Street;
- Given the study area has experience negative traffic growth within the past few years and given the planned improvements for transit within the vicinity of the site, the future projected background traffic volumes are expected to be similar to the existing traffic volumes and no future background traffic growth was applied;
- The proposed development is projected to generate 'new' two-way vehicle volumes of approximately 55 and 106 veh/h during the weekday morning and afternoon peak hours, respectively. Transit ridership is projected to increase by 260 and 365 persons/h during the morning and afternoon peak hours, respectively. An estimated 270 to 395 additional pedestrians/h are expected to travel to/from the development during peak hours and approximately 41 to 81 cyclists/h are projected to be generated by the proposed development;
- At full site development of all three towers, study area intersections 'as a whole' are projected to operate similar to existing conditions, with acceptable levels of service of LoS 'C' or better during the peak hours and critical movements of LoS 'D' or better. These results meet the City's MMLoS targets for vehicle capacity performance;
- Given the proposed changes to Albert Street, Slater Street and Bay Street adjacent to the site, the MMLoS for pedestrians, cyclists and transit modes are expected to increase for the future condition;
    - The pedestrian levels of service at study area intersections are projected to range between PLOS 'B' to 'C'. As PLOS 'A' is impossible to achieve due to the delay score there are no further recommendations provided to improve the PLOS scores. It is noteworthy that the PETSI scores are 'A' for intersections along Bay Street (except Bay/Queen) and a PETSI score of 'B' is achieved at Bay/Queen, Albert/Lyon and Slater/Lyon;
    - The cycling level of service scores all meet the target MMLoS with the exception of the BLOS at the Albert/Lyon intersection. This is due to the lack of cycling facilities along the north leg of Lyon Street which was recently redesigned with larger sidewalks to accommodate the LRT Station;
    - The transit level of service is projected to meet MMLoS targets with the implementation of the LRT in Fall 2019. The only exception is the Albert/Bay intersection which is due to the transit delay of busses on Bay Street, which achieves the best possible TLOS score for at-grade transit;

- Given the site's close proximity to the future Lyon LRT Station, TDM measures should be implemented for the development to encourage the use of transit and non-auto modes. The development will have good connections to Albert Street, Slater Street, Bay Street and Lyon Street all with sidewalks and Albert Street, Slater Street and Bay Street will have cycle tracks. The Lyon LRT Station is located approximately 60 m from the proposed development and the downtown location of the site is ideal for active mode commuting;

Site Plan Review

- The proposed vehicle parking supply meets the City's by-law minimum and maximum requirements. Visitor and bicycle parking should be provided to meet City By-Law requirements;
- The parking garage driveway to Bay Street meets the City's By-Law requirements in terms of width and the driveway is offset as much as possible from the adjacent street's intersection;
    - The driveway is located approximately 7 m from the adjacent building's driveway, however due to the downtown context, the one-way operation of Bay Street and the relatively low number of vehicles using the driveway, its location is acceptable;
- The truck access/loading is proposed via a driveway connection from Albert Street that extends through the site to Slater Street. This connection is proposed for drop-off/pick-up activity as well as loading and garbage pick-up. Vehicles will be able to continue through the site to Slater Street instead of needing to turn around on site;
    - This connection will function as a public space and a pedestrian connection and should be designed as a woonerf to alert drivers that it is a multi-purpose space;
    - Further discussion with the City is required to determine appropriate curb radii and driveway widths;
- The sidewalks that cross the three proposed driveways are to be depressed concrete and 2.0m to 3.0m wide, with the final width/location to be determined by the City during the redesign of the adjacent streets.
- The ramp grade for the proposed parking garage access/egress starts 4.6 m from the property line and about 7 m from the edge of the side walk. The ramp grade is planned at 12% with transition grades at the top and bottom of the ramp.

Based on the foregoing, the proposed development fits well into the context of the surrounding area, and its location and design serves to promote use of walking, cycling, and transit modes, thus supporting City of Ottawa policies, goals and objectives with respect to redevelopment, intensification and modal share.

Therefore, the proposed 400 Albert development is recommended from a transportation perspective.

Prepared By:

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Transportation Engineer

Reviewed by:

Ronald Jack, P.Eng.
Senior Transportation Engineer

Appendix A

Screening Form

PARSONS

1223 Michael Street, Suite 100, Ottawa, Ontario, K1J 7T2
P: +1 613.738.4160 | F: +1 613.739.7105 | www.parsons.com

City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	23-May-19
Project	400 Albert Street
Project Number	908489-50053

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	Yes

Module 1.1 - Description of Proposed Development	
Municipal Address	400 Albert Street/393 Slater Street
Description of location	Bounded by Albert, Slater, Lyon and Bay
Land Use	Primarily residential units
Development Size	820 residential units with 3,000 sq. m of office and 5,320 sq. m of retail
Number of Accesses and Locations	Midlock on each of Albert, Slater, Bay
Development Phasing	3 phases
Buildout Year	2025/2026
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	820	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	Yes
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes
Location Trigger Met?	Yes

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	Yes	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	Yes	
The development includes a drive-thru facility	No	
Safety Trigger Met?	Yes	

Appendix B

Traffic Count Data

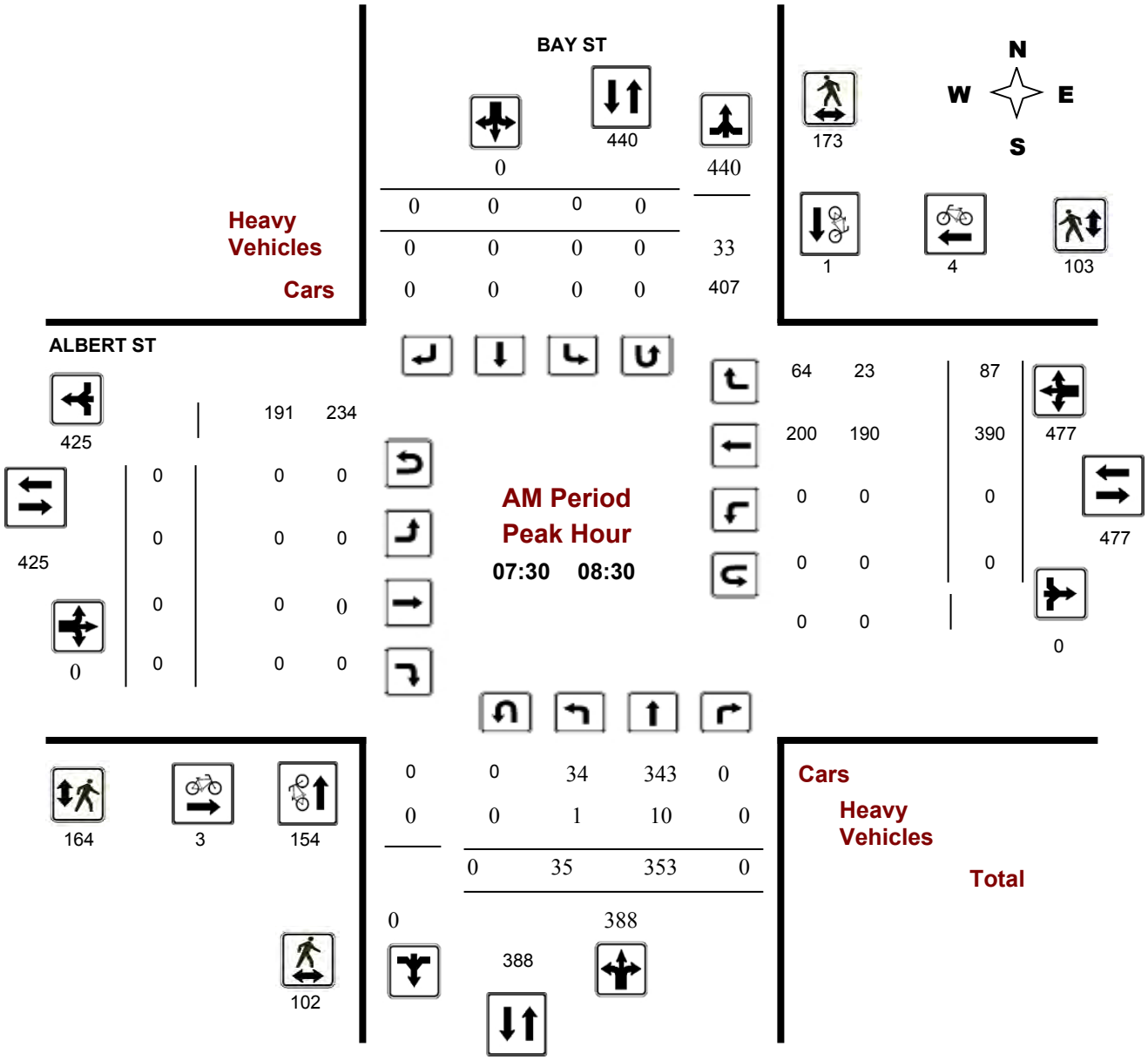
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBERT ST @ BAY ST

Survey Date: Thursday, June 18, 2015
Start Time: 07:00

WO No: 34725
Device: Jamar Technologies, Inc



Comments

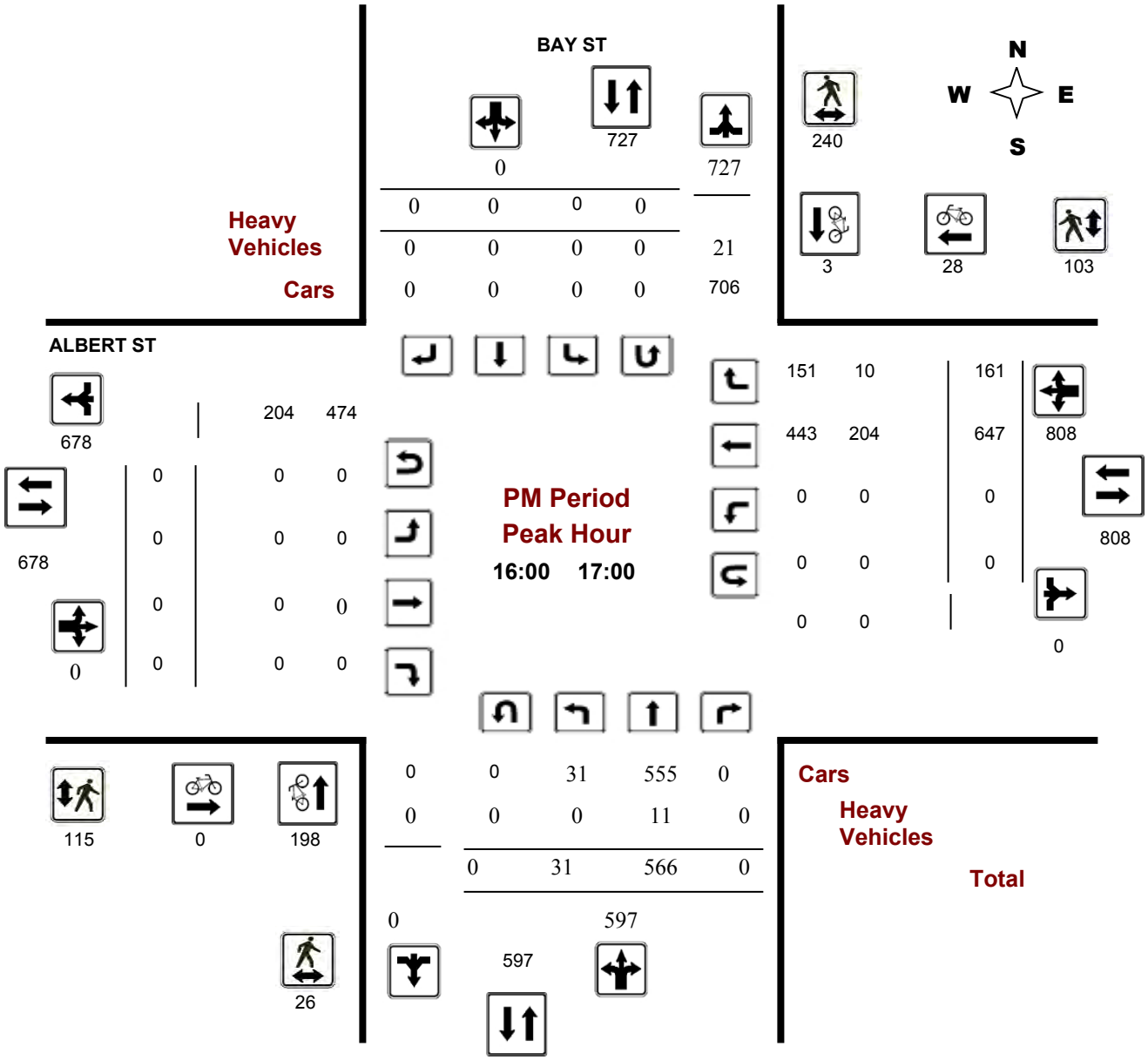
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBERT ST @ BAY ST

Survey Date: Thursday, June 18, 2015
Start Time: 07:00

WO No: 34725
Device: Jamar Technologies, Inc



Comments

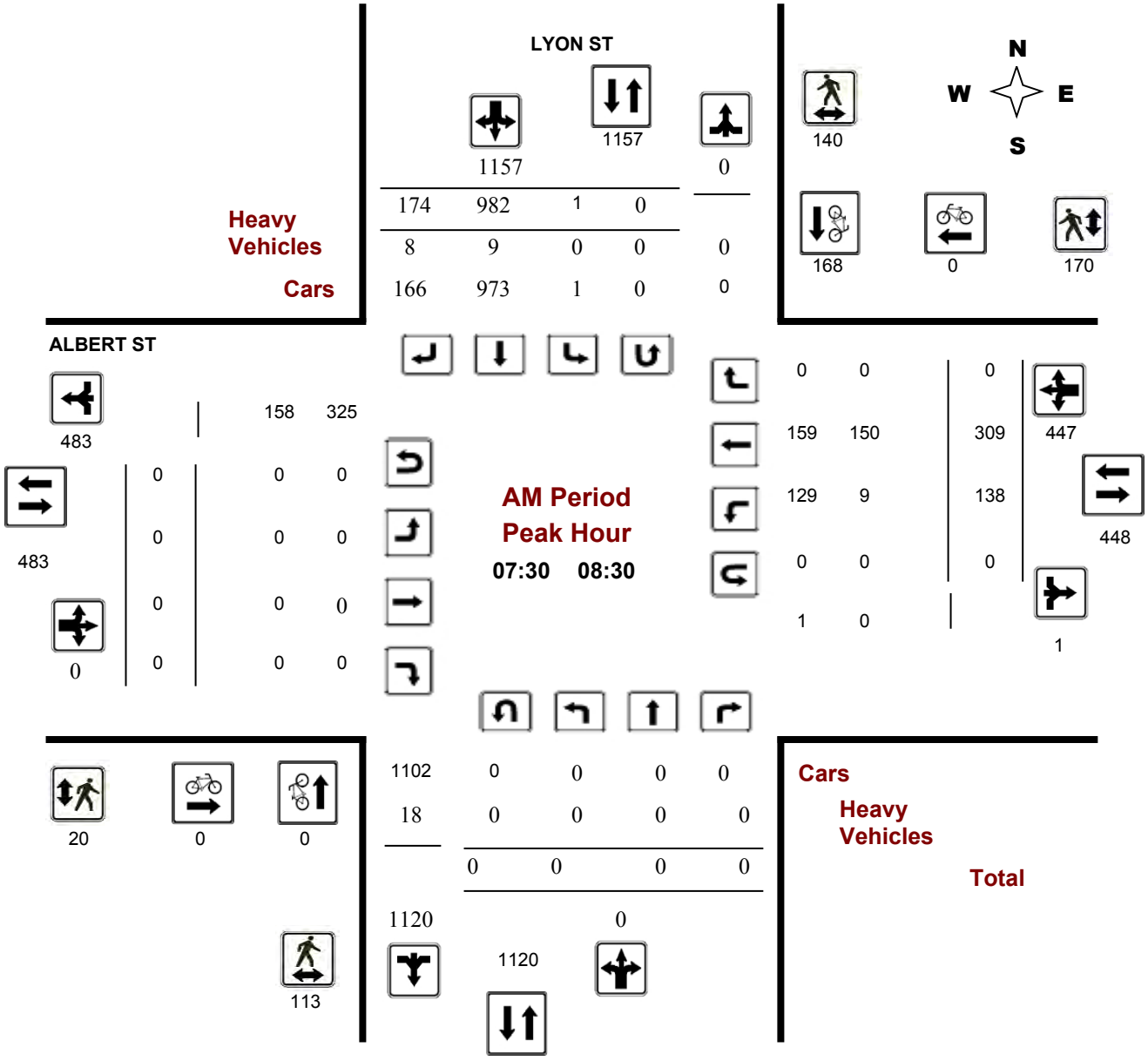
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBERT ST @ LYON ST

Survey Date: Thursday, June 11, 2015
Start Time: 07:00

WO No: 34679
Device: Jamar Technologies, Inc



Comments

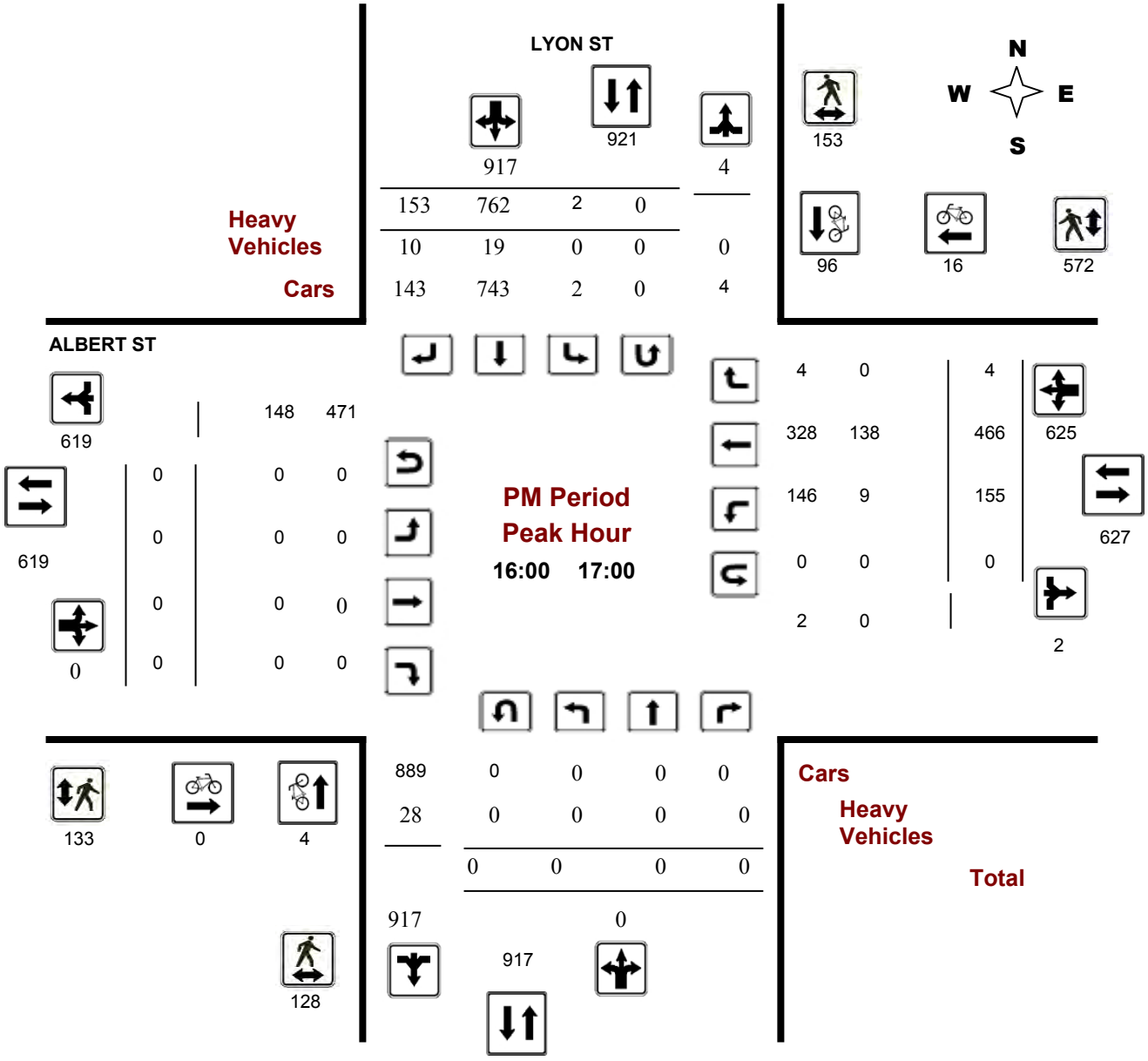
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBERT ST @ LYON ST

Survey Date: Thursday, June 11, 2015
Start Time: 07:00

WO No: 34679
Device: Jamar Technologies, Inc



Comments

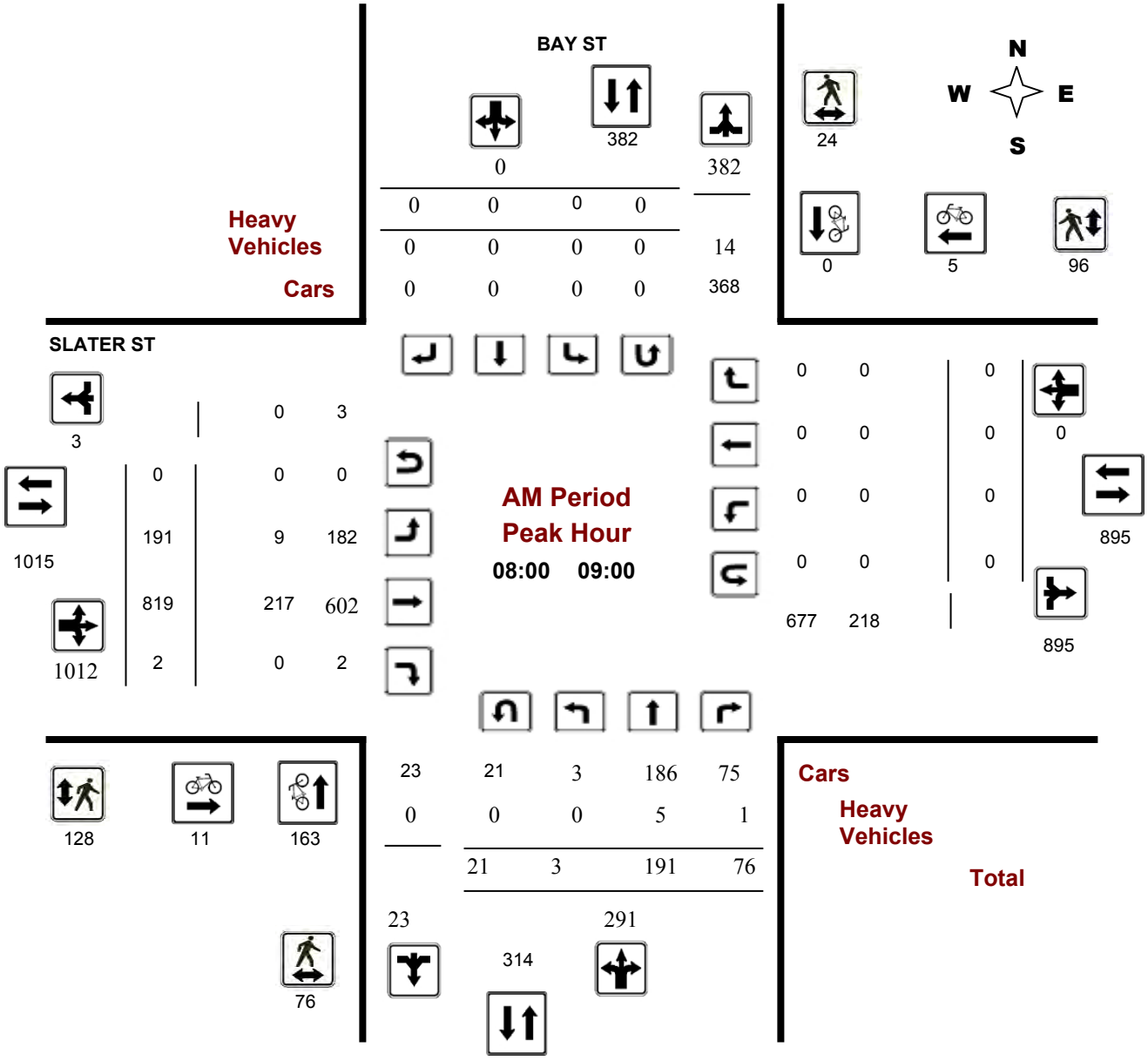
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAY ST @ SLATER ST

Survey Date: Thursday, June 25, 2015
Start Time: 07:00

WO No: 34784
Device: Jamar Technologies, Inc



Comments

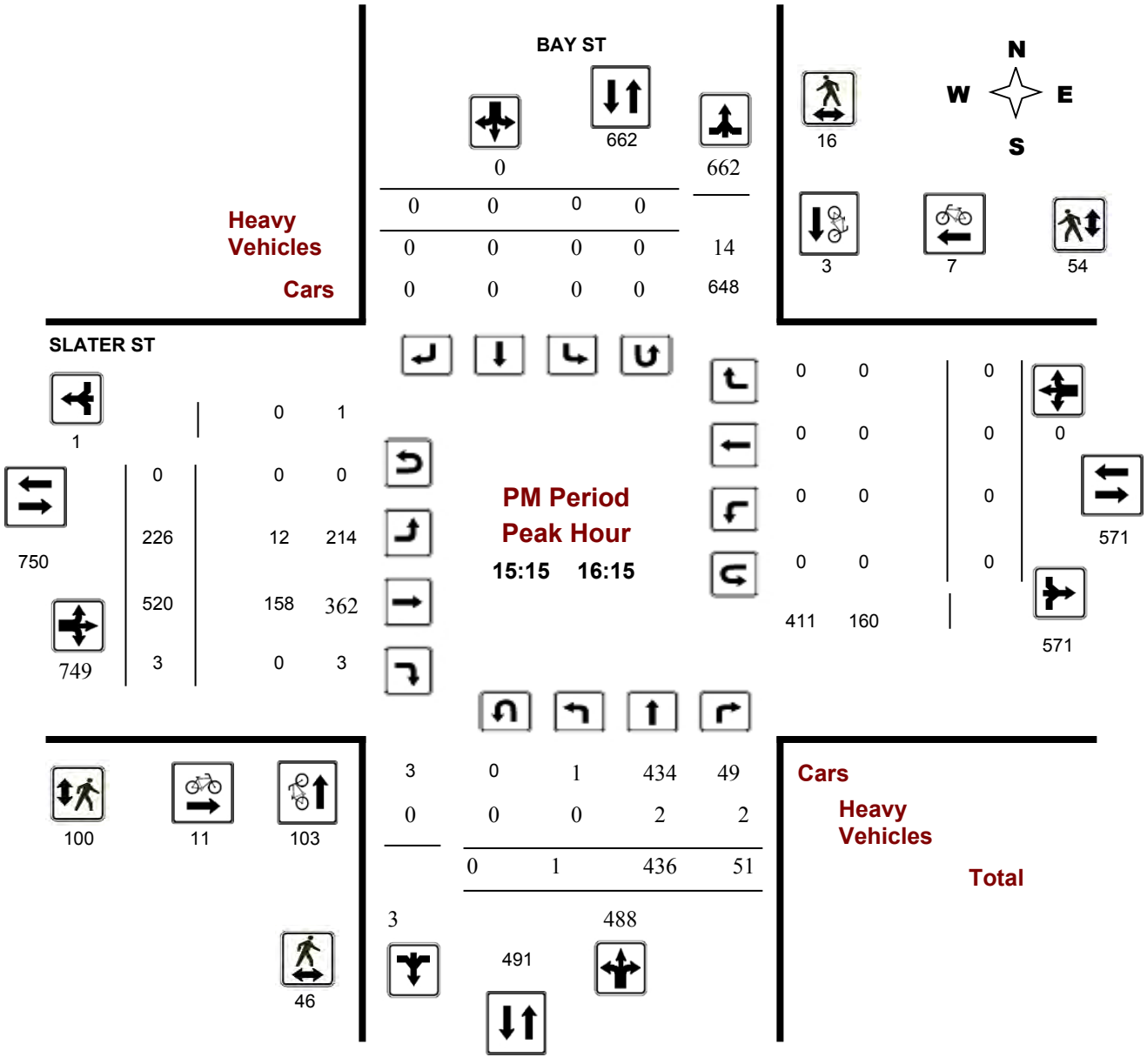
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAY ST @ SLATER ST

Survey Date: Thursday, June 25, 2015
Start Time: 07:00

WO No: 34784
Device: Jamar Technologies, Inc



Comments

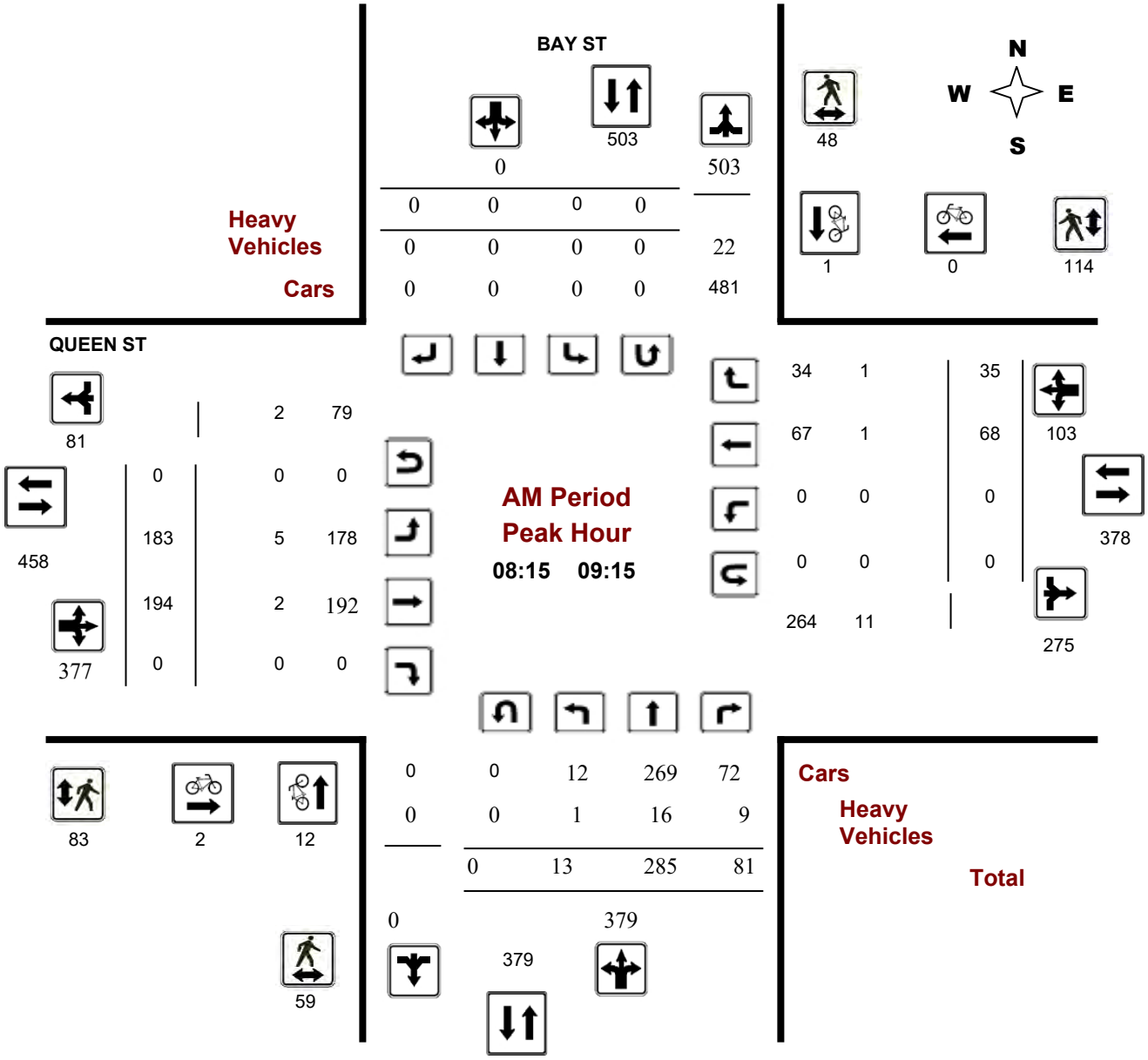
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAY ST @ QUEEN ST

Survey Date: Thursday, March 07, 2019 **WO No:** 38428

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



Comments

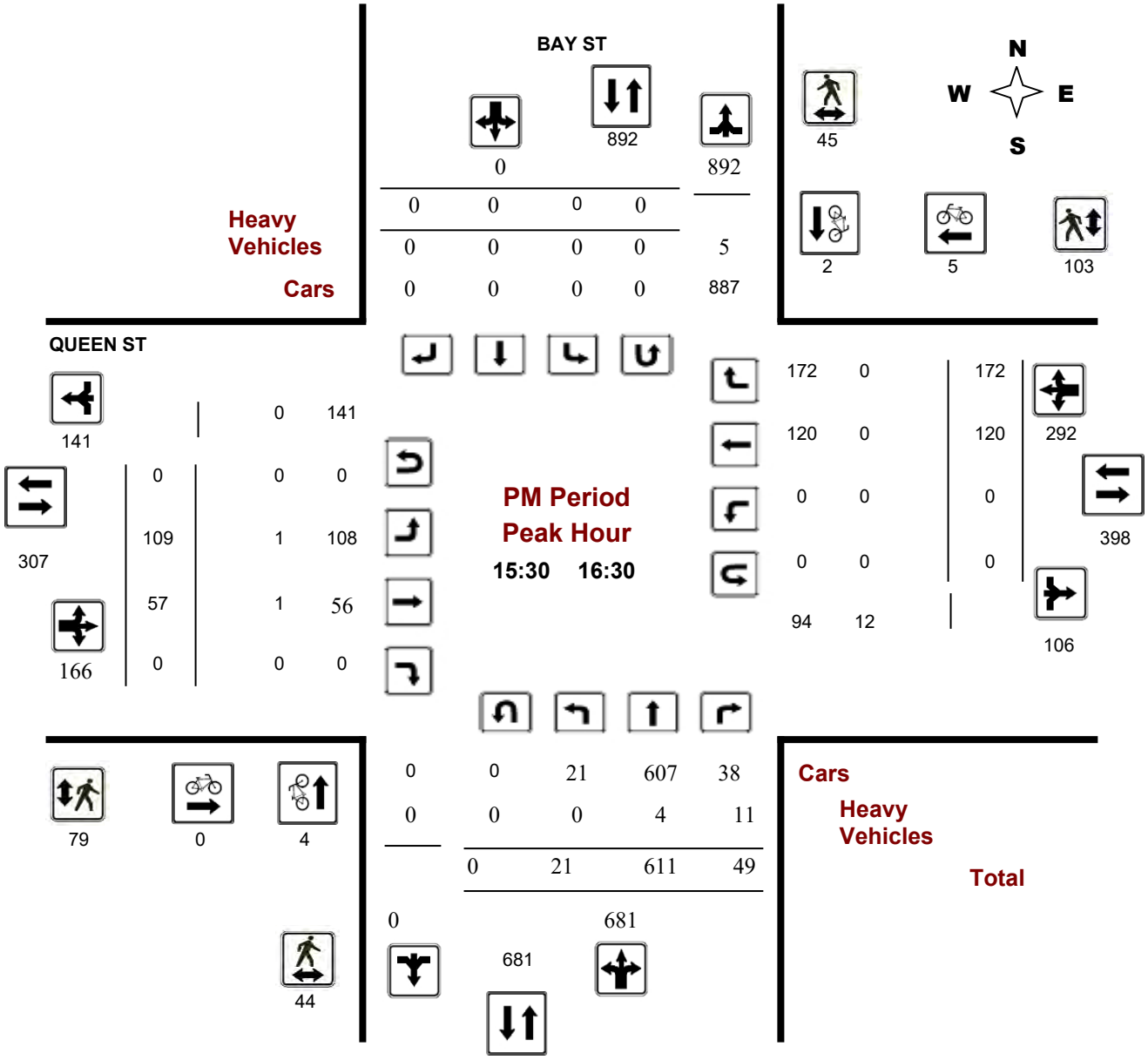
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAY ST @ QUEEN ST

Survey Date: Thursday, March 07, 2019 **WO No:** 38428

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



Comments

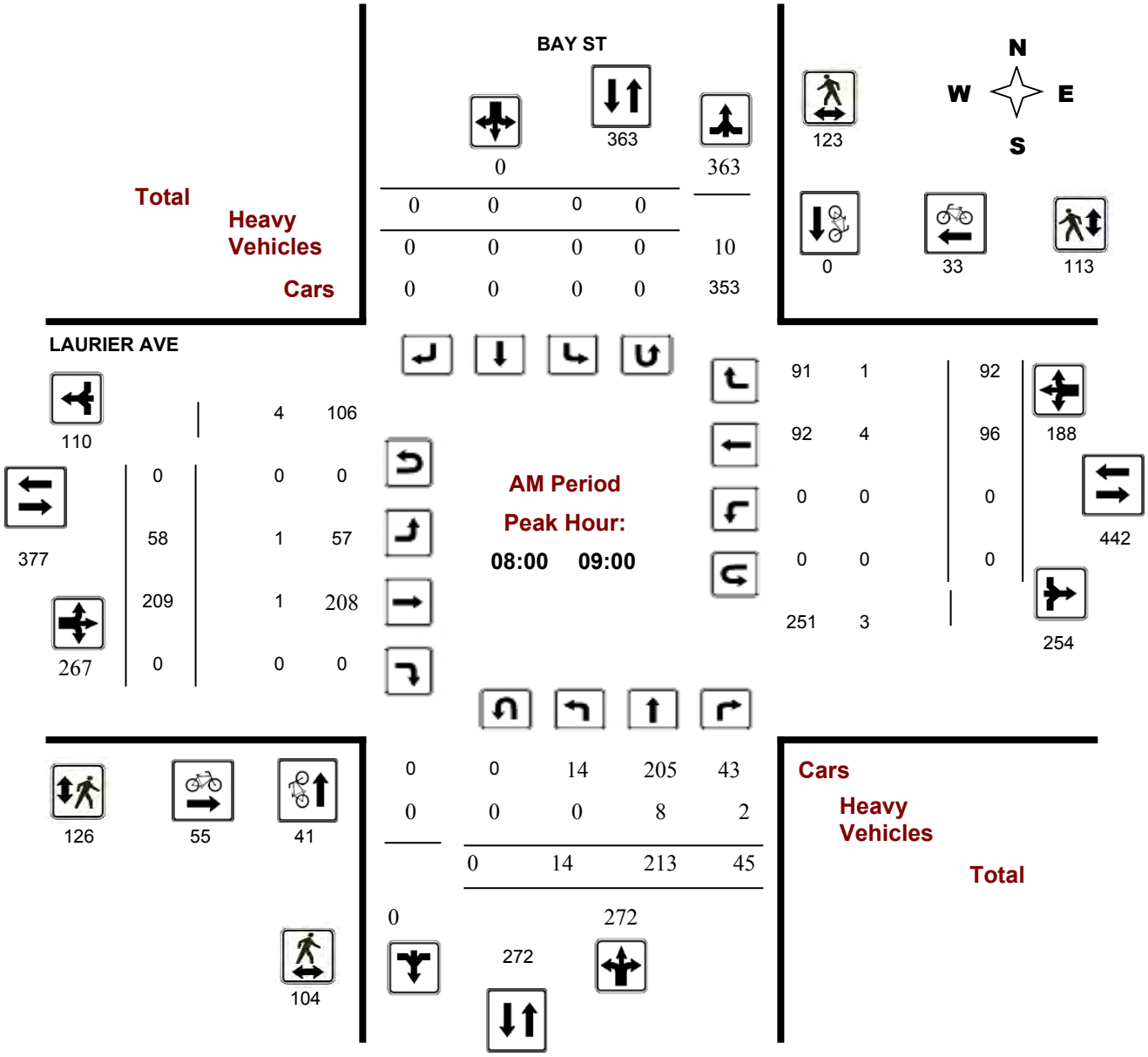
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BAY ST @ LAURIER AVE

Survey Date: Wednesday, April 05, 2017
Start Time: 07:00

WO No: 36858
Device: Miovision



Comments

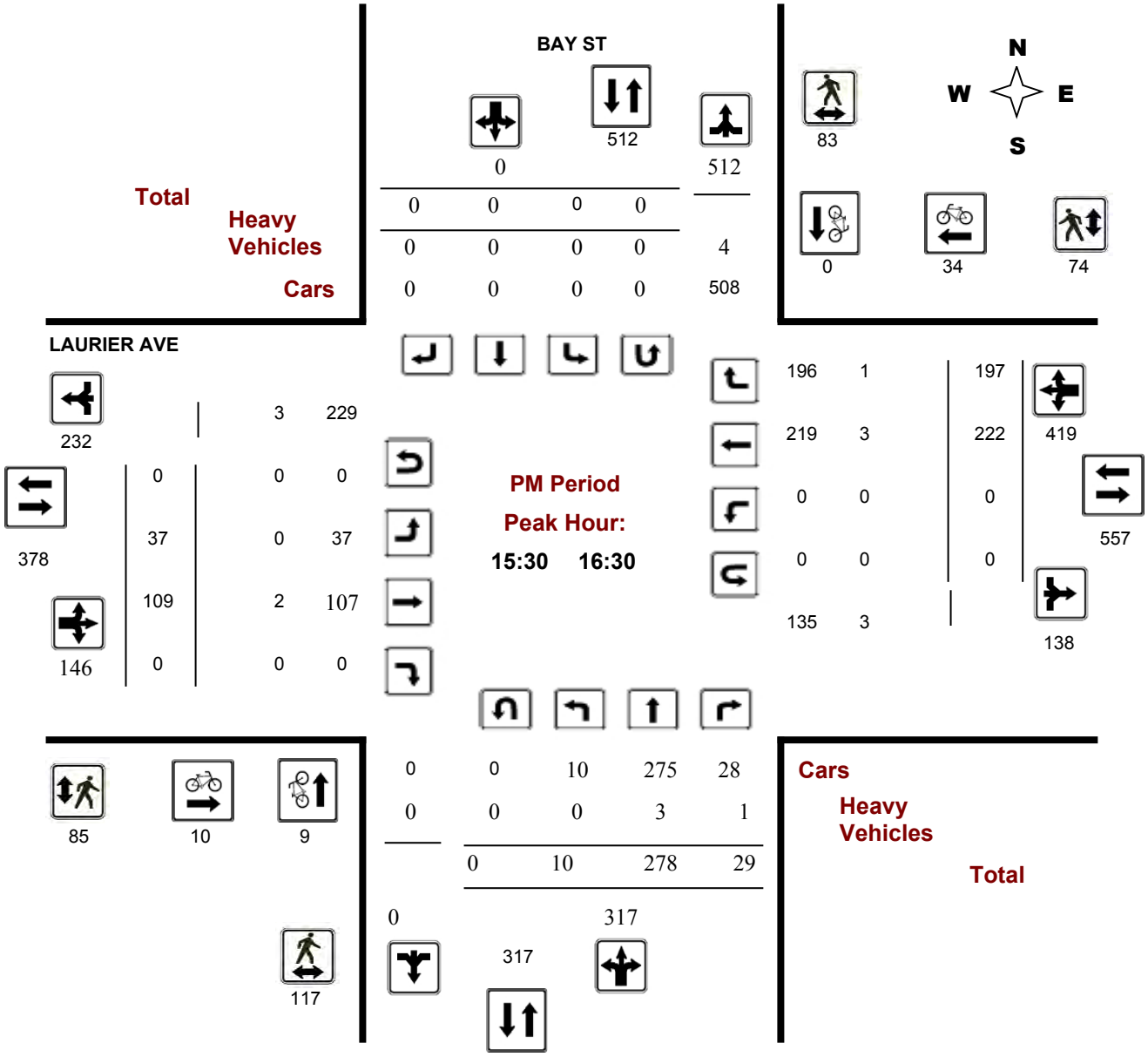
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BAY ST @ LAURIER AVE

Survey Date: Wednesday, April 05, 2017 **WO No:** 36858

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



Comments

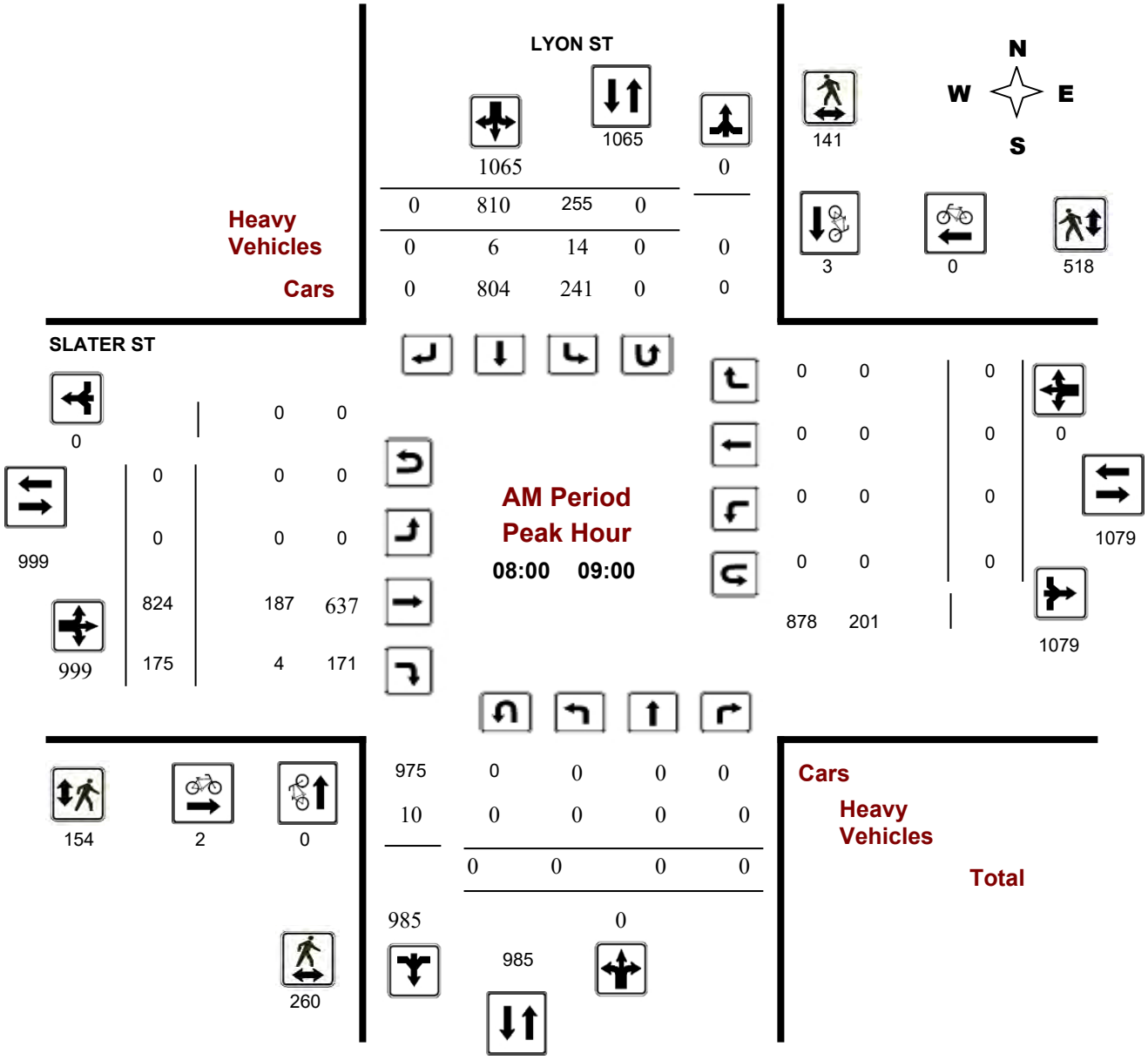
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

LYON ST @ SLATER ST

Survey Date: Thursday, March 07, 2019 **WO No:** 38427

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



Comments

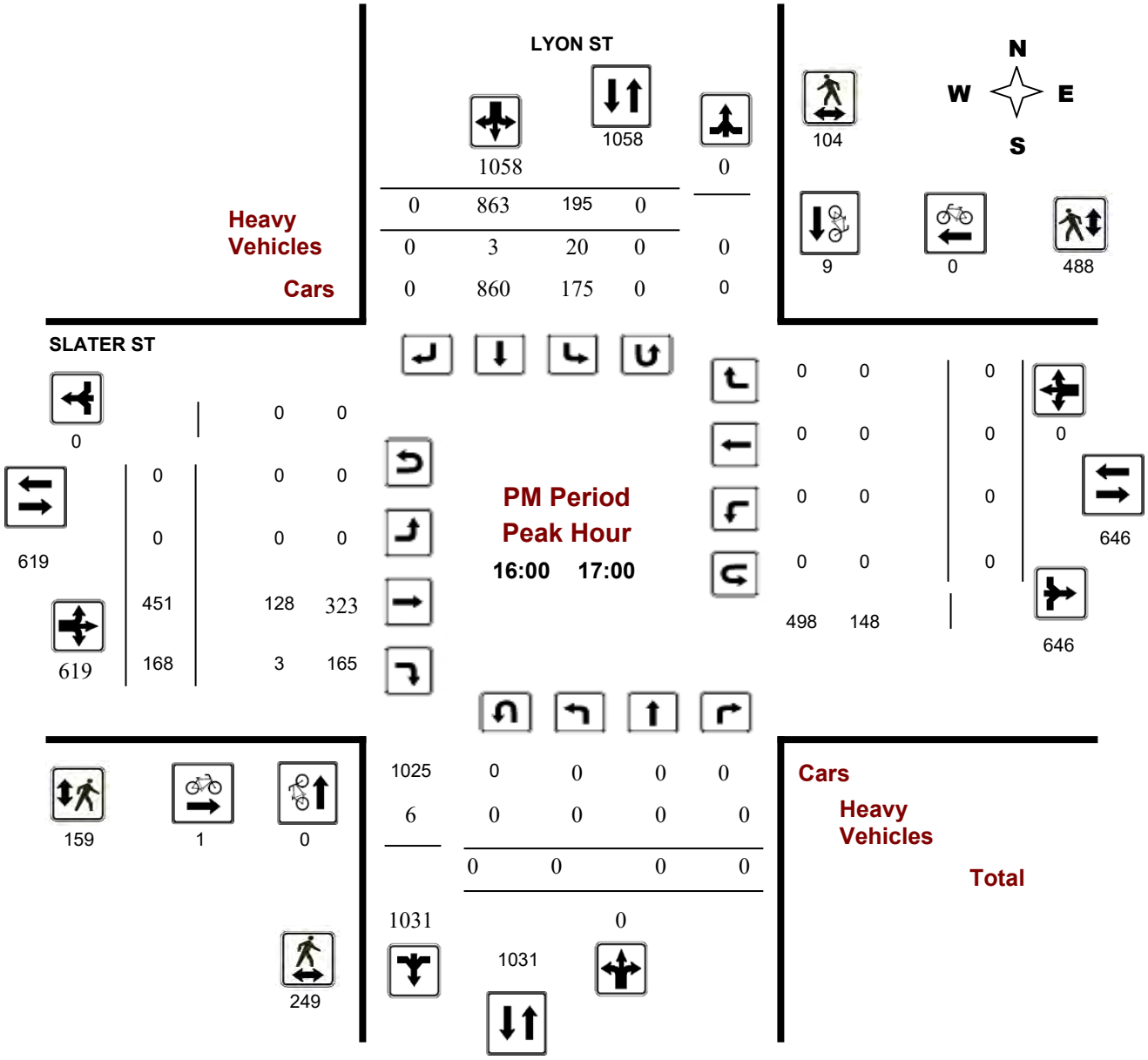
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

LYON ST @ SLATER ST

Survey Date: Thursday, March 07, 2019 **WO No:** 38427

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



Comments

Appendix C

Collision Data and Analysis

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2013 **To:** December 31, 2017

Location: ALBERT ST @ BAY 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
2013-Feb-14, Thu,20:11	Clear	Rear end	P.D. only	Dry	West	Pulling away from shoulder or curb	Unknown	Other motor vehicle	
					West	Turning right	Passenger van	Other motor vehicle	
2013-Mar-08, Fri,18:53	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2013-May-02, Thu,21:41	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Jan-03, Fri,15:30	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Nov-17, Mon,15:40	Snow	Angle	P.D. only	Wet	North	Going ahead	Unknown	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Apr-16, Thu,19:50	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Pick-up truck	Other motor vehicle	

					West	Unknown	Pick-up truck	Other motor vehicle	
2015-Apr-27, Mon,07:50	Clear	Turning movement	P.D. only	Dry	West	Turning right	Bus (other)	Other motor vehicle	
					West	Stopped	Delivery van	Other motor vehicle	
2015-Jun-21, Sun,10:30	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2016-Mar-15, Tue,21:13	Rain	SMV other	Non-fatal injury	Wet	North	Turning left	Automobile, station wagon	Pedestrian	1
2016-May-23, Mon,15:58	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2017-Jan-23, Mon,21:30	Clear	SMV other	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Pedestrian	1
2017-Sep-21, Thu,22:48	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Police vehicle	Other motor vehicle	

Location: ALBERT ST @ LYON ST

Traffic Control: Traffic signal

Total Collisions: 26

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Jun-01, Sat,15:05	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Pedestrian	1

2013-Jun-11, Tue,13:05	Clear	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Jul-17, Wed,07:43	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Jul-24, Wed,11:15	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2013-Jul-24, Wed,11:20	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Ambulance	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2013-Aug-08, Thu,07:59	Clear	Turning movement	P.D. only	Dry	West	Turning left	Passenger van	Other motor vehicle
					West	Going ahead	Truck - dump	Other motor vehicle
2013-Oct-15, Tue,19:38	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Municipal transit bus	Other motor vehicle
2013-Nov-10, Sun,12:12	Rain	Angle	Non-fatal injury	Wet	West	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Delivery van	Other motor vehicle

2013-Dec-13, Fri,14:34	Clear	Other	P.D. only	Dry	East	Pulling onto shoulder or toward curb	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Mar-21, Fri,22:18	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Other	Pedestrian	1
2014-Sep-16, Tue,09:00	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Oct-16, Thu,12:16	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Passenger van	Pedestrian	1
2014-Oct-20, Mon,21:40	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Nov-05, Wed,16:25	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-16, Tue,11:20	Clear	Angle	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Feb-20, Fri,15:13	Clear	Sideswipe	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	

					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Mar-10, Tue,16:17	Clear	Angle	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle
					West	Going ahead	Municipal transit bus	Other motor vehicle
2015-Mar-16, Mon,15:13	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Aug-26, Wed,11:24	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Unknown	Other motor vehicle
2015-Sep-06, Sun,17:27	Clear	Rear end	P.D. only	Dry	South	Changing lanes	Passenger van	Other motor vehicle
					South	Slowing or stopping	Pick-up truck	Other motor vehicle
2015-Nov-02, Mon,11:15	Clear	Sideswipe	Non-fatal injury	Dry	South	Changing lanes	Tow truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2016-Mar-09, Wed,14:05	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Municipal transit bus	Other motor vehicle
2016-Jun-18, Sat,18:30	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle

					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jul-27, Wed,07:15	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Pedestrian	1
2017-Apr-21, Fri,19:16	Clear	Sideswipe	P.D. only	Dry	West	Pulling onto shoulder or toward curb	Fire vehicle	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-12, Tue,07:47	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Municipal transit bus	Pedestrian	1

Location: ALBERT ST btwn BAY ST & LYON ST N

Traffic Control: No control **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Mar-03, Sun,13:00	Snow	SMV unattended vehicle	P.D. only	Loose snow	Unknown	Unknown	Unknown	Unattended vehicle	
2013-Oct-03, Thu,17:37	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2014-Jan-24, Fri,21:31	Clear	Sideswipe	P.D. only	Dry	West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Unknown	Other motor vehicle	
2014-May-22, Thu,10:33	Clear	Sideswipe	P.D. only	Dry	West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	

2015-Feb-12, Thu,09:58	Snow	Turning movement	P.D. only	Loose snow	West	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2016-Jun-11, Sat,04:30	Clear	SMV other	Non-fatal injury	Dry	West	Pulling away from shoulder or curb	Automobile, station wagon	Pedestrian	1
2017-May-25, Thu,16:00	Rain	Angle	P.D. only	Wet	South	Turning right	Pick-up truck	Other motor vehicle	
					West	Changing lanes	Automobile, station wagon	Other motor vehicle	
2017-Dec-28, Thu,08:55	Clear	Rear end	Non-fatal injury	Ice	West	Slowing or stopping	Municipal transit bus	Other motor vehicle	
					West	Stopped	Municipal transit bus	Other motor vehicle	

Location: BAY ST @ LAURIER AVE

Traffic Control: Traffic signal **Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Oct-16, Thu,16:49	Rain	Rear end	P.D. only	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Oct-20, Mon,07:35	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Construction equipment	Other motor vehicle	
2014-Dec-01, Mon,22:00	Clear	Rear end	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	

					West	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jan-08, Thu,10:01	Snow	Turning movement	P.D. only	Ice	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Aug-17, Mon,13:08	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Mar-28, Tue,15:24	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Pedestrian	1

Location: BAY ST @ QUEEN ST

Traffic Control: Traffic signal **Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Feb-14, Thu,10:21	Clear	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jul-17, Thu,09:33	Clear	Turning movement	P.D. only	Dry	North	Turning left	Passenger van	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jan-13, Tue,10:21	Clear	Turning movement	P.D. only	Ice	East	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

2015-Feb-04, Wed,12:53	Snow	Sideswipe	P.D. only	Packed snow	North	Turning left	Pick-up truck	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2015-Jun-15, Mon,07:33	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jun-18, Thu,07:05	Clear	Other	P.D. only	Dry	East	Reversing	Unknown	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Mar-16, Wed,15:30	Clear	Rear end	P.D. only	Wet	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2016-Apr-14, Thu,06:33	Clear	Sideswipe	Non-fatal injury	Dry	East	Pulling away from shoulder or curb	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-11, Sat,22:45	Clear	Sideswipe	P.D. only	Dry	North	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

Location: BAY ST @ SLATER ST

Traffic Control: Traffic signal

Total Collisions: 33

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Jan-23, Wed,07:31	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	

					East	Going ahead	Municipal transit bus	Other motor vehicle
2013-Jan-28, Mon,10:50	Snow	Turning movement	P.D. only	Loose snow	North	Overtaking	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2013-May-31, Fri,22:35	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2013-Jun-17, Mon,14:59	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Jun-25, Tue,16:15	Clear	Sideswipe	Non-fatal injury	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Motorcycle	Other motor vehicle
2013-Jul-10, Wed,08:00	Clear	Turning movement	Non-fatal injury	Dry	North	Turning right	Pick-up truck	Cyclist
					North	Going ahead	Bicycle	Other motor vehicle
2013-Aug-20, Tue,18:42	Clear	Turning movement	P.D. only	Dry	North	Turning right	Pick-up truck	Cyclist
					North	Going ahead	Bicycle	Other motor vehicle
2013-Aug-29, Thu,08:35	Clear	Angle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Nov-14, Thu,16:31	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Going ahead	Municipal transit bus	Other motor vehicle
2013-Nov-22, Fri,17:12	Rain	Sideswipe	P.D. only	Wet	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Dec-12, Thu,07:50	Clear	Turning movement	P.D. only	Dry	East	Turning left	Tow truck	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2014-Feb-08, Sat,18:46	Clear	Turning movement	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2014-Mar-10, Mon,16:48	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2014-Mar-22, Sat,09:55	Snow	Angle	P.D. only	Packed snow	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2014-Sep-25, Thu,15:14	Clear	Angle	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-11, Tue,10:48	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jan-29, Thu,17:40	Snow	Rear end	P.D. only	Loose snow	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Feb-06, Fri,17:00	Clear	Turning movement	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2015-Feb-13, Fri,18:58	Clear	Sideswipe	Non-fatal injury	Slush	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Police vehicle	Other motor vehicle
2015-Mar-06, Fri,13:07	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Passenger van	Other motor vehicle
2015-Mar-11, Wed,19:05	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Apr-12, Sun,21:39	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle

					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Apr-13, Mon,07:20	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Pedestrian	1
2015-Apr-15, Wed,17:09	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Aug-07, Fri,23:25	Clear	Turning movement	P.D. only	Dry	East	Turning left	Municipal transit bus	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	
2015-Aug-15, Sat,18:55	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-12, Sat,10:35	Clear	Turning movement	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					North	Turning right	Truck - closed	Other motor vehicle	
2016-Apr-26, Tue,01:51	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jul-01, Fri,20:06	Rain	Turning movement	Non-fatal injury	Wet	East	Turning left	Pick-up truck	Other motor vehicle	
					East	Going ahead	Municipal transit bus	Other motor vehicle	

2017-Jul-11, Tue,23:24	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-07, Thu,16:28	Rain	Angle	P.D. only	Wet	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-10, Fri,11:13	Clear	Turning movement	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2017-Dec-05, Tue,14:43	Clear	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Municipal transit bus	Other motor vehicle

Location: LYON ST @ SLATER ST

Traffic Control: Traffic signal **Total Collisions:** 23

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Jan-12, Sat,23:04	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Passenger van	Other motor vehicle	
					East	Going ahead	Municipal transit bus	Other motor vehicle	
2013-Jan-28, Mon,14:44	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Automobile, station wagon	Cyclist	
					South	Slowing or stopping	Bicycle	Other motor vehicle	
2013-May-17, Fri,08:13	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Unknown	Other motor vehicle	

					East	Stopped	Municipal transit bus	Other motor vehicle
2013-Jun-20, Thu,17:54	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2013-Sep-12, Thu,06:15	Rain	Angle	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2014-Apr-09, Wed,20:42	Clear	Rear end	P.D. only	Dry	South	Going ahead	Unknown	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jun-18, Wed,18:33	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Sep-17, Wed,17:13	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Unknown	Other motor vehicle
					East	Stopped	Municipal transit bus	Other motor vehicle
2014-Oct-12, Sun,13:51	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-06, Thu,22:58	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-14, Fri,20:33	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2014-Nov-23, Sun,18:20	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-14, Sun,15:51	Clear	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-20, Sat,10:50	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2015-Jan-13, Tue,10:26	Clear	Turning movement	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2015-Feb-03, Tue,11:50	Snow	Angle	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2015-Feb-14, Sat,15:09	Snow	Angle	Non-fatal injury	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Municipal transit bus	Other motor vehicle	
2015-May-28, Thu,17:41	Clear	Turning movement	P.D. only	Dry	South	Turning left	Municipal transit bus	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-24, Tue,21:53	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jul-16, Sat,11:13	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Aug-29, Mon,21:45	Clear	SMV other	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Pedestrian	1
2016-Nov-05, Sat,01:38	Rain	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-May-19, Fri,14:34	Clear	SMV other	Non-fatal injury	Dry	East	Turning right	Passenger van	Pedestrian	1

Location: SLATER ST btwn BAY ST & LYON ST N

Traffic Control: No control

Total Collisions: 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Feb-16, Sat,10:47	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	

					East	Going ahead	Pick-up truck	Other motor vehicle
2014-Jul-15, Tue,08:00	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2014-Sep-01, Mon,18:30	Clear	SMV unattended vehicle	P.D. only	Dry	East	Unknown	Unknown	Unattended vehicle
2015-Jun-25, Thu,07:39	Clear	Sideswipe	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Pick-up truck	Other motor vehicle
2015-Jul-23, Thu,16:16	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Municipal transit bus	Other motor vehicle
2016-Feb-29, Mon,17:15	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Apr-13, Wed,10:35	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Mar-16, Thu,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle

Appendix D

Traffic Growth Analysis

Bay / Slater
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday, 5th July	0	3580	2453	0	0	5319	4820	0	16172
2011	Thursday, 9th August	0	2718	1940	0	0	4966	5311	0	14935
2015	Thursday, 25th June	0	3297	2054	0	0	4524	4058	0	13933

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	3580			16172				
2011	2718			14935	-24.1%			-7.6%
2015	3297			13933	21.3%			-6.7%

Regression Estimate 2007 3340
Regression Estimate 2015 3057
Average Annual Change **-1.10%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	4820			16172				
2011	5311			14935	10.2%			-7.6%
2015	4058			13933	-23.6%			-6.7%

Regression Estimate 2007 5111
Regression Estimate 2015 4349
Average Annual Change **-2.00%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	5319			16172				
2011	4966			14935	-6.6%			-7.6%
2015	4524			13933	-8.9%			-6.7%

Regression Estimate 2007 5334
Regression Estimate 2015 4539
Average Annual Change **-2.00%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	2453			16172				
2011	1940			14935	-20.9%			-7.6%
2015	2054			13933	5.9%			-6.7%

Regression Estimate 2007 2349
Regression Estimate 2015 1950
Average Annual Change **-2.30%**

Bay / Slater
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday, 5th July	0	492	271	0	0	1057	960	0	2780
2011	Thursday, 9th August	0	312	198	0	0	883	836	0	2229
2015	Thursday, 25th June	0	382	191	0	0	895	819	0	2287

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	492			2780				
2011	312			2229	-36.6%			-19.8%
2015	382			2287	22.4%			2.6%

Regression Estimate 2007 450
Regression Estimate 2015 340
Average Annual Change **-3.44%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	960			2780				
2011	836			2229	-12.9%			-19.8%
2015	819			2287	-2.0%			2.6%

Regression Estimate 2007 942
Regression Estimate 2015 801
Average Annual Change **-2.01%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	1057			2780				
2011	883			2229	-16.5%			-19.8%
2015	895			2287	1.4%			2.6%

Regression Estimate 2007 1026
Regression Estimate 2015 864
Average Annual Change **-2.13%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	271			2780				
2011	198			2229	-26.9%			-19.8%
2015	191			2287	-3.5%			2.6%

Regression Estimate 2007 260
Regression Estimate 2015 180
Average Annual Change **-4.49%**

Bay / Slater
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2007	Thursday, 5th July	0	716	531	0	0	684	803	0	2734
2011	Thursday, 9th August	0	423	303	0	0	704	650	0	2080
2015	Thursday, 25th June	0	662	436	0	0	571	520	0	2189

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	716			2734				
2011	423			2080	-40.9%			-23.9%
2015	662			2189	56.5%			5.2%

Regression Estimate 2007 627
Regression Estimate 2015 573
Average Annual Change **-1.12%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	803			2734				
2011	650			2080	-19.1%			-23.9%
2015	520			2189	-20.0%			5.2%

Regression Estimate 2007 799
Regression Estimate 2015 516
Average Annual Change **-5.32%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2007	684			2734				
2011	704			2080	2.9%			-23.9%
2015	571			2189	-18.9%			5.2%

Regression Estimate 2007 710
Regression Estimate 2015 597
Average Annual Change **-2.15%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2007	531			2734				
2011	303			2080	-42.9%			-23.9%
2015	436			2189	43.9%			5.2%

Regression Estimate 2007 471
Regression Estimate 2015 376
Average Annual Change **-2.78%**

Appendix E

TDM Checklists

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

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

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

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

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ n/a
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ n/a
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ n/a
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

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

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

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

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ Will provide
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑ Will provide
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑ Will provide
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐ Likely will provide, to be refined at Site Plan
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ n/a
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ n/a
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ n/a

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

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

Legend

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

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

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

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

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

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

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

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)*	☐
		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
		3.	**TRANSIT**	
		3.1	**Transit information**	
BASIC		3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		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)*	☐
		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)	☐
		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	☑ Proponent will likely provide
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐ Proponent will consider
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐ Proponent will consider

			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	☐

Appendix F

MMLoS and SYNCHRO Analysis – Existing Conditions

Multi-Modal Level of Service - Intersections Form

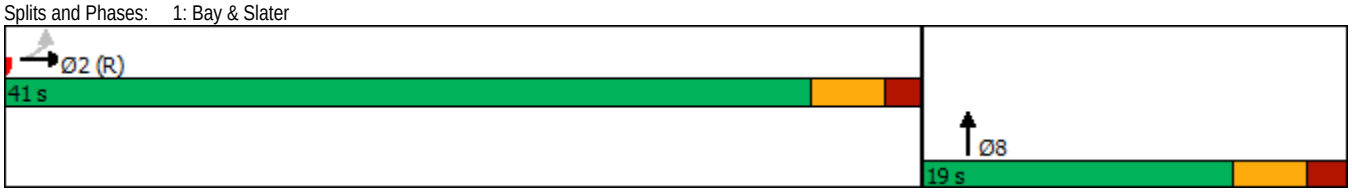
Consultant	Parsons	**Project**	400 Albert
Scenario	Existing	**Date**	Aug-19
Comments			

INTERSECTIONS		Laurier/Bay				Slater/Bay				Albert/Bay				Queen/Bay				Albert/Lyon				Slater/Lyon			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	3	3	0 - 2	0 - 2	4	3	0 - 2	0 - 2	0 - 2	0 - 2	3	3	4	3	3	3	3	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	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	Protected/ Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn
	Right Turns on Red (RToR) ?	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	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	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	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	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	Std transverse markings
	PETSI Score	**90**	**103**	**100**	**97**	**95**	**100**	**83**	**88**	**98**	**100**	**68**	**80**	**90**	**100**	**95**	**92**	**85**	**80**	**71**	**83**	**88**	**83**	**80**	**68**
	Ped. Exposure to Traffic LoS	**A**	**A**	**A**	**A**	**A**	**A**	**B**	**B**	**A**	**A**	**C**	**B**	**A**	**A**	**A**	**A**	**B**	**B**	**C**	**B**	**B**	**B**	**B**	**C**
	Cycle Length	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Effective Walk Time	19	19	11	11	31	31	7	7	22	22	9	9	16	16	18	18	14	14	19	19	20	20	18	18
	Average Pedestrian Delay	**14**	**14**	**20**	**20**	**7**	**7**	**23**	**23**	**12**	**12**	**22**	**22**	**16**	**16**	**15**	**15**	**18**	**18**	**14**	**14**	**13**	**13**	**15**	**15**
	Pedestrian Delay LoS	**B**	**B**	**C**	**C**	**A**	**A**	**C**	**C**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service	**B**	**B**	**C**	**C**	**A**	**A**	**C**	**C**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**B**	**B**	**C**	**B**	**B**	**B**	**B**	**C**
		C				**C**				**C**				**B**				**C**				**C**			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach		Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Curb Bike Lane, Cycletrack or MUP		Mixed Traffic		Curb Bike Lane, Cycletrack or MUP	Mixed Traffic			Curb Bike Lane, Cycletrack or MUP			Mixed Traffic		Mixed Traffic		Curb Bike Lane, Cycletrack or MUP			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	**-**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**-**	**Not Applicable**	**-**	**D**	**-**	**Not Applicable**	**D**	**-**	**-**	**Not Applicable**	**-**	**-**	**D**	**-**	**D**	**-**	**Not Applicable**	**-**	**-**	**D**
	Separated or Mixed Traffic	**-**	**Separated**	**Separated**	**Separated**	**-**	**Separated**	**-**	**Mixed Traffic**	**-**	**Separated**	**Mixed Traffic**	**-**	**-**	**Separated**	**-**	**-**	**Mixed Traffic**	**-**	**Mixed Traffic**	**-**	**Separated**	**-**	**-**	**Mixed Traffic**
	Left Turn Approach		1 lane crossed	2-stage, LT box			1 lane crossed		≥ 2 lanes crossed		1 lane crossed	No lane crossed			1 lane crossed		No lane crossed			≥ 2 lanes crossed		≥ 2 lanes 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 km/h			> 40 to ≤ 50 km/h		> 40 to ≤ 50 km/h			> 40 to ≤ 50 km/h		> 40 to ≤ 50 km/h			
	Left Turning Cyclist	**-**	**C**	**A**	**-**	**-**	**C**	**-**	**E**	**-**	**C**	**B**	**-**	**-**	**C**	**-**	**B**	**-**	**-**	**E**	**-**	**E**	**-**	**-**	**-**
	Level of Service	**-**	**C**	**A**	**-**	**-**	**C**	**-**	**E**	**-**	**C**	**D**	**-**	**-**	**C**	**-**	**B**	**-**	**-**	**E**	**-**	**E**	**-**	**-**	**-**
		C				**E**				**D**				**C**				**E**				**E**			
Transit	Average Signal Delay							≤ 10 sec	≤ 10 sec		≤ 10 sec	≤ 10 sec	≤ 10 sec		≤ 10 sec	≤ 20 sec			≤ 10 sec					≤ 10 sec	≤ 10 sec
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**B**	**B**	**-**	**B**	**B**	**B**	**-**	**B**	**C**	**-**	**-**	**-**	**B**	**-**	**-**	**-**	**B**	**B**
		-				**B**				**B**				**C**				**B**				**B**			
Truck	Effective Corner Radius		10 - 15 m	10 - 15 m		< 10 m						< 10 m			10 - 15 m	< 10 m		< 10 m							< 10 m
	Number of Receiving Lanes on Departure from Intersection		1	≥ 2		≥ 2						≥ 2			1	≥ 2		≥ 2							≥ 2
	Level of Service	**-**	**E**	**B**	**-**	**D**	**-**	**-**	**-**	**-**	**-**	**D**	**-**	**-**	**E**	**D**	**-**	**D**	**-**	**-**	**-**	**-**	**-**	**-**	**D**
		E				**D**				**D**				**E**				**D**				**D**			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60				0.0 - 0.60				0.71 - 0.80				0.71 - 0.80				0.61 - 0.70			
	Level of Service	**B**				**A**				**A**				**C**				**C**				**B**			

Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	736	194
Future Volume (vph)	736	194
Lane Group Flow (vph)	976	284
Turn Type	NA	NA
Protected Phases	2	8
Permitted Phases		
Minimum Split (s)	29.0	19.2
Total Split (s)	41.0	19.0
Total Split (%)	68.3%	31.7%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Act Effct Green (s)	36.0	13.8
Actuated g/C Ratio	0.60	0.23
v/c Ratio	0.53	0.41
Control Delay	7.5	16.0
Queue Delay	0.0	0.0
Total Delay	7.5	16.0
LOS	A	B
Approach Delay	7.5	16.0
Approach LOS	A	B
Queue Length 50th (m)	25.1	9.8
Queue Length 95th (m)	37.8	19.0
Internal Link Dist (m)	111.5	72.8
Turn Bay Length (m)		
Base Capacity (vph)	1837	693
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.53	0.41

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 3 (5%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 50.5%	ICU Level of Service A
Analysis Period (min) 15	

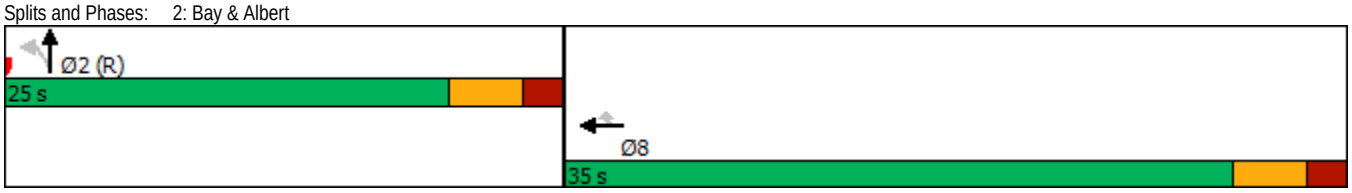
Splits and Phases: 1: Bay & Slater



Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	246	87	350
Future Volume (vph)	246	87	350
Lane Group Flow (vph)	259	92	405
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Minimum Split (s)	20.2	20.2	23.2
Total Split (s)	35.0	35.0	25.0
Total Split (%)	58.3%	58.3%	41.7%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Act Effct Green (s)	29.8	29.8	19.8
Actuated g/C Ratio	0.50	0.50	0.33
v/c Ratio	0.17	0.13	0.40
Control Delay	12.2	6.2	13.2
Queue Delay	0.0	0.0	0.0
Total Delay	12.2	6.2	13.2
LOS	B	A	B
Approach Delay	10.6		13.2
Approach LOS	B		B
Queue Length 50th (m)	10.6	0.0	16.3
Queue Length 95th (m)	15.6	8.4	28.9
Internal Link Dist (m)	123.5		54.5
Turn Bay Length (m)		75.0	
Base Capacity (vph)	1515	724	1017
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.17	0.13	0.40

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 58 (97%), Referenced to phase 2:NBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 29.5%	ICU Level of Service A
Analysis Period (min) 15	

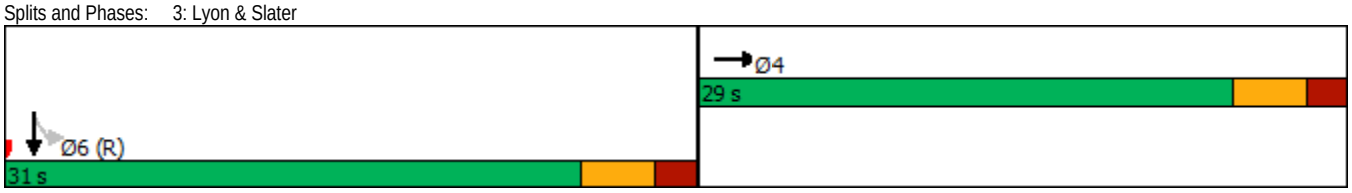
Splits and Phases: 2: Bay & Albert



Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	637	810
Future Volume (vph)	637	810
Lane Group Flow (vph)	855	1121
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Minimum Split (s)	21.2	24.3
Total Split (s)	29.0	31.0
Total Split (%)	48.3%	51.7%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.9	2.0
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.2	5.3
Lead/Lag		
Lead-Lag Optimize?		
Act Effct Green (s)	23.8	25.7
Actuated g/C Ratio	0.40	0.43
v/c Ratio	0.70	0.58
Control Delay	25.3	6.7
Queue Delay	0.0	0.2
Total Delay	25.3	6.9
LOS	C	A
Approach Delay	25.3	6.9
Approach LOS	C	A
Queue Length 50th (m)	48.8	9.3
Queue Length 95th (m)	67.6	18.7
Internal Link Dist (m)	124.5	56.5
Turn Bay Length (m)		
Base Capacity (vph)	1213	1921
Starvation Cap Reductn	0	184
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.70	0.65

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 14 (23%), Referenced to phase 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

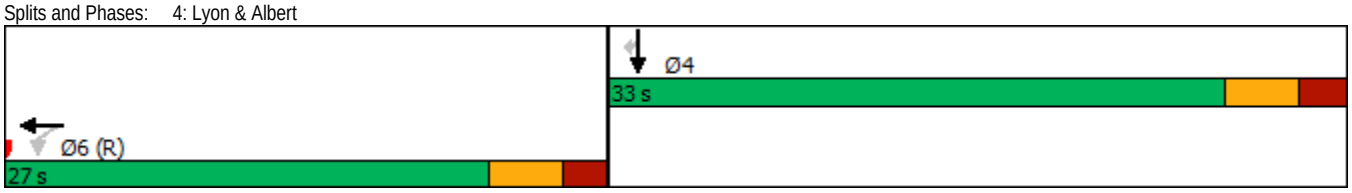
Splits and Phases: 3: Lyon & Slater



Lane Group	WBT	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	159	927	174
Future Volume (vph)	159	927	174
Lane Group Flow (vph)	312	976	183
Turn Type	NA	NA	Perm
Protected Phases	6	4	
Permitted Phases			4
Minimum Split (s)	20.4	21.5	21.5
Total Split (s)	27.0	33.0	33.0
Total Split (%)	45.0%	55.0%	55.0%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.1	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.5	5.5
Lead/Lag			
Lead-Lag Optimize?			
Act Effct Green (s)	21.6	27.5	27.5
Actuated g/C Ratio	0.36	0.46	0.46
v/c Ratio	0.28	0.70	0.26
Control Delay	11.6	16.3	4.2
Queue Delay	0.0	0.0	0.0
Total Delay	11.6	16.3	4.2
LOS	B	B	A
Approach Delay	11.6	14.4	
Approach LOS	B	B	
Queue Length 50th (m)	9.7	42.2	2.3
Queue Length 95th (m)	17.6	61.2	11.4
Internal Link Dist (m)	117.5	50.0	
Turn Bay Length (m)			20.0
Base Capacity (vph)	1113	1398	703
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	0.70	0.26

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 49.0%	ICU Level of Service A
Analysis Period (min) 15	

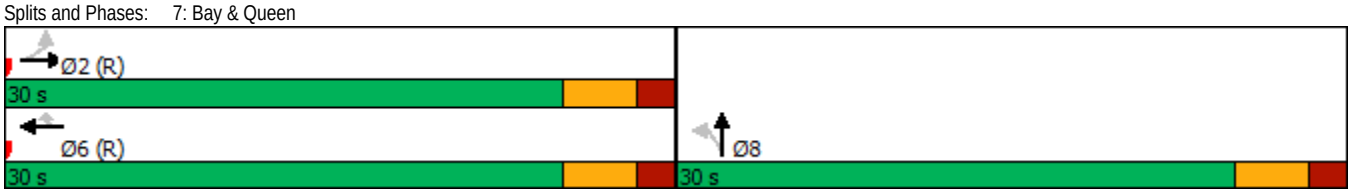
Splits and Phases: 4: Lyon & Albert

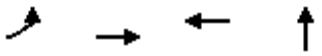


Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations					
Traffic Volume (vph)	183	194	68	35	300
Future Volume (vph)	183	194	68	35	300
Lane Group Flow (vph)	0	397	72	37	415
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Minimum Split (s)	21.1	21.1	21.1	21.1	29.1
Total Split (s)	30.0	30.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)		0.0	0.0	0.0	0.0
Total Lost Time (s)		5.1	5.1	5.1	5.1
Lead/Lag					
Lead-Lag Optimize?					
Act Effct Green (s)		24.9	24.9	24.9	24.9
Actuated g/C Ratio		0.42	0.42	0.42	0.42
v/c Ratio		0.74	0.11	0.06	0.33
Control Delay		25.4	11.4	4.5	2.9
Queue Delay		0.0	0.0	0.0	0.0
Total Delay		25.4	11.4	4.5	2.9
LOS		C	B	A	A
Approach Delay		25.4	9.0		2.9
Approach LOS		C	A		A
Queue Length 50th (m)		35.2	4.6	0.0	2.0
Queue Length 95th (m)		#74.9	11.1	4.3	5.1
Internal Link Dist (m)		51.6	57.9		57.5
Turn Bay Length (m)					
Base Capacity (vph)		539	666	588	1263
Starvation Cap Reductn		0	0	0	0
Spillback Cap Reductn		0	0	0	0
Storage Cap Reductn		0	0	0	0
Reduced v/c Ratio		0.74	0.11	0.06	0.33

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 31 (52%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 58.1%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: Bay & Queen





Lane Group	EBL	EBT	WBT	NBT	Ø1	Ø5
Lane Configurations						
Traffic Volume (vph)	58	209	96	213		
Future Volume (vph)	58	209	96	213		
Lane Group Flow (vph)	0	281	198	286		
Turn Type	Perm	NA	NA	NA		
Protected Phases		2	6	8	1	5
Permitted Phases	2					
Minimum Split (s)	20.4	20.4	20.4	23.4	5.0	5.0
Total Split (s)	32.0	32.0	32.0	28.0	5.0	5.0
Total Split (%)	49.2%	49.2%	49.2%	43.1%	8%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0		
Total Lost Time (s)		5.4	5.4	5.4		
Lead/Lag	Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes
Act Effct Green (s)		26.6	26.6	22.6		
Actuated g/C Ratio		0.41	0.41	0.35		
v/c Ratio		0.48	0.32	0.28		
Control Delay		17.5	14.9	16.2		
Queue Delay		0.0	0.0	0.0		
Total Delay		17.5	14.9	16.2		
LOS		B	B	B		
Approach Delay		17.5	14.9	16.2		
Approach LOS		B	B	B		
Queue Length 50th (m)		23.9	15.6	12.8		
Queue Length 95th (m)		43.0	29.3	21.1		
Internal Link Dist (m)		53.7	62.8	73.7		
Turn Bay Length (m)						
Base Capacity (vph)		588	613	1031		
Starvation Cap Reductn		0	0	0		
Spillback Cap Reductn		0	0	0		
Storage Cap Reductn		0	0	0		
Reduced v/c Ratio		0.48	0.32	0.28		

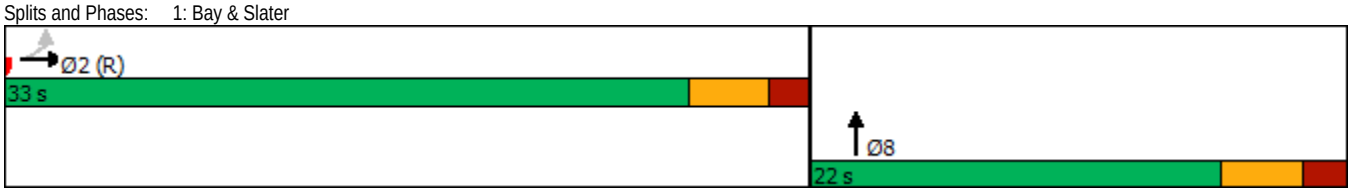
Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 7 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 51.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Bay & Laurier

Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	440	400
Future Volume (vph)	440	400
Lane Group Flow (vph)	701	475
Turn Type	NA	NA
Protected Phases	2	8
Permitted Phases		
Minimum Split (s)	29.0	19.2
Total Split (s)	33.0	22.0
Total Split (%)	60.0%	40.0%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Act Effct Green (s)	28.0	16.8
Actuated g/C Ratio	0.51	0.31
v/c Ratio	0.44	0.52
Control Delay	7.2	17.2
Queue Delay	0.0	0.0
Total Delay	7.2	17.2
LOS	A	B
Approach Delay	7.2	17.2
Approach LOS	A	B
Queue Length 50th (m)	14.8	19.0
Queue Length 95th (m)	24.6	30.7
Internal Link Dist (m)	103.1	73.0
Turn Bay Length (m)		
Base Capacity (vph)	1595	921
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.52

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 39 (71%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 46.0%	ICU Level of Service A
Analysis Period (min) 15	

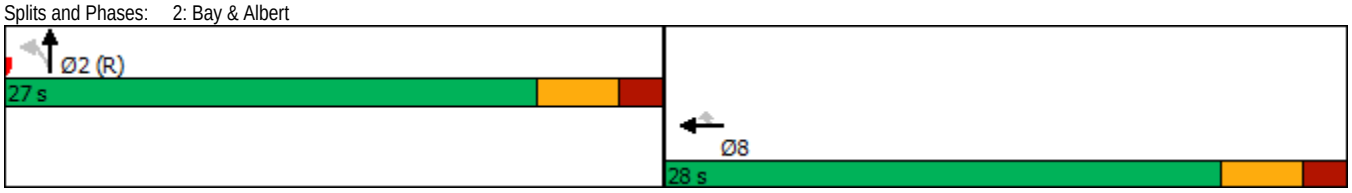
Splits and Phases: 1: Bay & Slater



Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	458	161	550
Future Volume (vph)	458	161	550
Lane Group Flow (vph)	482	169	612
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Minimum Split (s)	20.2	20.2	23.2
Total Split (s)	28.0	28.0	27.0
Total Split (%)	50.9%	50.9%	49.1%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Act Effct Green (s)	22.8	22.8	21.8
Actuated g/C Ratio	0.41	0.41	0.40
v/c Ratio	0.38	0.29	0.50
Control Delay	12.3	4.0	9.7
Queue Delay	0.0	0.0	0.4
Total Delay	12.3	4.0	10.1
LOS	B	A	B
Approach Delay	10.2		10.1
Approach LOS	B		B
Queue Length 50th (m)	16.6	0.5	8.1
Queue Length 95th (m)	26.3	9.4	27.3
Internal Link Dist (m)	122.0		55.8
Turn Bay Length (m)		75.0	
Base Capacity (vph)	1264	581	1232
Starvation Cap Reductn	0	0	237
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	0.29	0.62

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 26 (47%), Referenced to phase 2:NBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 45.7%	ICU Level of Service A
Analysis Period (min) 15	

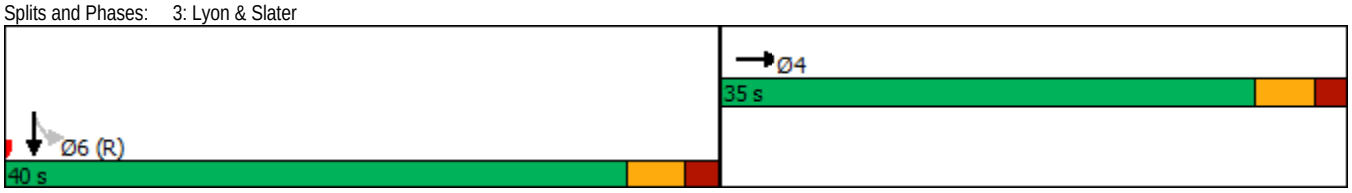
Splits and Phases: 2: Bay & Albert



Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	323	863
Future Volume (vph)	323	863
Lane Group Flow (vph)	517	1113
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Minimum Split (s)	21.2	24.3
Total Split (s)	35.0	40.0
Total Split (%)	46.7%	53.3%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.9	2.0
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.2	5.3
Lead/Lag		
Lead-Lag Optimize?		
Act Effct Green (s)	29.8	34.7
Actuated g/C Ratio	0.40	0.46
v/c Ratio	0.43	0.54
Control Delay	15.0	3.5
Queue Delay	0.0	0.3
Total Delay	15.0	3.8
LOS	B	A
Approach Delay	15.0	3.8
Approach LOS	B	A
Queue Length 50th (m)	22.5	6.0
Queue Length 95th (m)	34.7	7.8
Internal Link Dist (m)	123.5	56.3
Turn Bay Length (m)		
Base Capacity (vph)	1198	2058
Starvation Cap Reductn	0	364
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.43	0.66

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 4 (5%), Referenced to phase 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 49.7%	ICU Level of Service A
Analysis Period (min) 15	

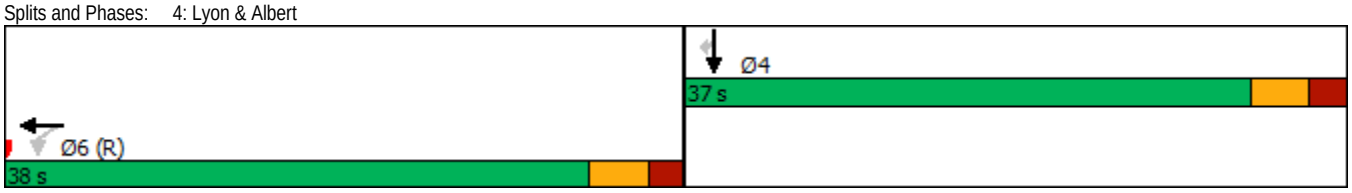
Splits and Phases: 3: Lyon & Slater



Lane Group	WBT	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	466	912	153
Future Volume (vph)	466	912	153
Lane Group Flow (vph)	645	960	161
Turn Type	NA	NA	Perm
Protected Phases	6	4	
Permitted Phases			4
Minimum Split (s)	23.4	21.5	21.5
Total Split (s)	38.0	37.0	37.0
Total Split (%)	50.7%	49.3%	49.3%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.1	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.5	5.5
Lead/Lag			
Lead-Lag Optimize?			
Act Effct Green (s)	32.6	31.5	31.5
Actuated g/C Ratio	0.43	0.42	0.42
v/c Ratio	0.48	0.75	0.26
Control Delay	15.3	22.9	7.5
Queue Delay	0.0	0.0	0.0
Total Delay	15.3	22.9	7.5
LOS	B	C	A
Approach Delay	15.3	20.7	
Approach LOS	B	C	
Queue Length 50th (m)	30.1	58.4	5.4
Queue Length 95th (m)	43.8	80.4	16.3
Internal Link Dist (m)	53.7	61.6	
Turn Bay Length (m)			20.0
Base Capacity (vph)	1339	1281	628
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.48	0.75	0.26

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 37 (49%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 58.7%	ICU Level of Service B
Analysis Period (min) 15	

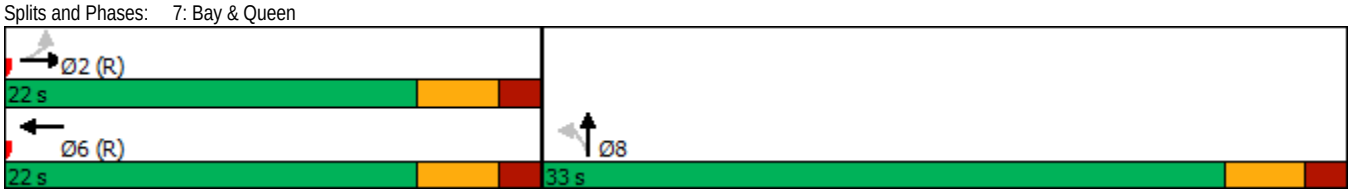
Splits and Phases: 4: Lyon & Albert



Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	109	57	120	611
Future Volume (vph)	109	57	120	611
Lane Group Flow (vph)	0	175	307	717
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Minimum Split (s)	21.1	21.1	21.1	29.1
Total Split (s)	22.0	22.0	22.0	33.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	1.8	1.8
Lost Time Adjust (s)		-1.1	-1.1	-1.1
Total Lost Time (s)		4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Act Effct Green (s)		18.0	18.0	29.0
Actuated g/C Ratio		0.33	0.33	0.53
v/c Ratio		0.60	0.53	0.45
Control Delay		26.4	12.0	3.0
Queue Delay		0.0	0.0	0.0
Total Delay		26.4	12.0	3.0
LOS		C	B	A
Approach Delay		26.4	12.0	3.0
Approach LOS		C	B	A
Queue Length 50th (m)		14.2	12.3	4.4
Queue Length 95th (m)		#36.6	31.2	9.0
Internal Link Dist (m)		52.1	53.3	60.9
Turn Bay Length (m)				
Base Capacity (vph)		292	577	1598
Starvation Cap Reductn		0	0	42
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.60	0.53	0.46

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 3 (5%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 62.7%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

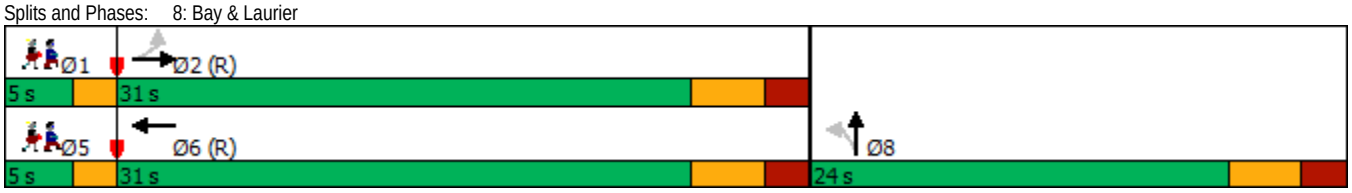
Splits and Phases: 7: Bay & Queen



Lane Group	EBL	EBT	WBT	NBT	Ø1	Ø5
Lane Configurations						
Traffic Volume (vph)	37	109	222	278		
Future Volume (vph)	37	109	222	278		
Lane Group Flow (vph)	0	154	441	335		
Turn Type	Perm	NA	NA	NA		
Protected Phases		2	6	8	1	5
Permitted Phases	2					
Minimum Split (s)	20.4	20.4	20.4	23.4	5.0	5.0
Total Split (s)	31.0	31.0	31.0	24.0	5.0	5.0
Total Split (%)	51.7%	51.7%	51.7%	40.0%	8%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		-1.4	-1.4	-1.4		
Total Lost Time (s)		4.0	4.0	4.0		
Lead/Lag	Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes
Act Effct Green (s)		27.0	27.0	20.0		
Actuated g/C Ratio		0.45	0.45	0.33		
v/c Ratio		0.25	0.65	0.34		
Control Delay		11.6	18.5	16.2		
Queue Delay		0.0	0.0	0.0		
Total Delay		11.6	18.5	16.2		
LOS		B	B	B		
Approach Delay		11.6	18.5	16.2		
Approach LOS		B	B	B		
Queue Length 50th (m)		9.9	35.6	14.2		
Queue Length 95th (m)		20.2	63.1	23.3		
Internal Link Dist (m)		53.7	52.3	65.9		
Turn Bay Length (m)						
Base Capacity (vph)		614	677	1000		
Starvation Cap Reductn		0	0	0		
Spillback Cap Reductn		0	0	0		
Storage Cap Reductn		0	0	0		
Reduced v/c Ratio		0.25	0.65	0.34		

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 23 (38%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 8: Bay & Laurier



Appendix G

MMLoS and SYNCHRO Analysis – Projected Conditions

Multi-Modal Level of Service - Intersections Form

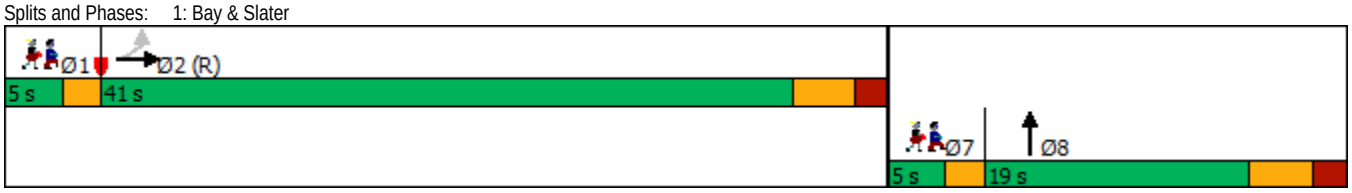
Consultant	Parsons	**Project**	Bay Street Cycling
Scenario	Future Proposed Bay Street	**Date**	May-18
Comments			

INTERSECTIONS		Laurier/Bay				Slater/Bay				Albert/Bay				Queen/Bay				Albert/Lyon				Slater/Lyon			
Crossing Side		**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	3	0 - 2	0 - 2	0 - 2	3	0 - 2	3	3	0 - 2	0 - 2	3	3	0 - 2	0 - 2
	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	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	Protected/ Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	No right turn	No right turn	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn
	Right Turns on Red (RToR) ?	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited
	Ped Signal Leading Interval?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	Yes
	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	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	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	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	Std transverse markings
	PETSI Score	**92**	**105**	**100**	**97**	**97**	**105**	**100**	**105**	**100**	**105**	**90**	**97**	**92**	**105**	**83**	**95**	**88**	**80**	**105**	**100**	**88**	**83**	**97**	**105**
	Ped. Exposure to Traffic LoS	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**B**	**A**	**B**	**B**	**A**	**A**	**B**	**B**	**A**	**A**
	Cycle Length	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Effective Walk Time	19	19	11	11	31	31	7	7	22	22	9	9	16	16	18	18	14	14	19	19	20	20	18	18
	Average Pedestrian Delay	**14**	**14**	**20**	**20**	**7**	**7**	**23**	**23**	**12**	**12**	**22**	**22**	**16**	**16**	**15**	**15**	**18**	**18**	**14**	**14**	**13**	**13**	**15**	**15**
	Pedestrian Delay LoS	**B**	**B**	**C**	**C**	**A**	**A**	**C**	**C**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
	Level of Service	**B**	**B**	**C**	**C**	**A**	**A**	**C**	**C**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**
		C				**C**				**C**				**B**				**B**				**B**			
Approach From		**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP			Mixed Traffic		Curb Bike Lane, Cycletrack or MUP		Curb Bike Lane, Cycletrack or MUP			Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration																	≤ 50 m							
	Right Turning Speed																	≤ 25 km/h							
	Cyclist relative to RT motorists	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**-**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**-**	**Not Applicable**	**Not Applicable**	**-**	**-**	**D**	**-**	**Not Applicable**	**-**	**Not Applicable**	**-**	**-**	**Not Applicable**
	Separated or Mixed Traffic	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**-**	**Separated**	**Separated**	**Separated**	**Separated**	**-**	**Separated**	**Separated**	**-**	**-**	**Mixed Traffic**	**-**	**Separated**	**-**	**Separated**	**-**	**-**	**Separated**
	Left Turn Approach	2-stage, LT box	2-stage, LT box	2-stage, LT box		2-stage, LT box	2-stage, LT box		2-stage, LT box		2-stage, LT box	2-stage, LT box		2-stage, LT box	2-stage, LT box	No lane crossed	No lane crossed	No lane crossed		2-stage, LT box		2-stage, LT box			
	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 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 to ≤ 50 km/h			
	Left Turning Cyclist	**A**	**A**	**A**	**-**	**A**	**A**	**-**	**A**	**-**	**A**	**A**	**-**	**A**	**A**	**B**	**B**	**B**	**-**	**A**	**-**	**A**	**-**	**-**	**-**
	Level of Service	**A**	**A**	**A**	**-**	**A**	**A**	**-**	**A**	**-**	**A**	**A**	**-**	**A**	**A**	**B**	**B**	**D**	**-**	**A**	**-**	**A**	**-**	**-**	**-**
		A				**A**				**A**				**B**				**D**				**A**			
Transit	Average Signal Delay							0 sec	0 sec		≤ 10 sec	0 sec	0 sec		≤ 10 sec	≤ 20 sec				0 sec				0 sec	0 sec
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**A**	**A**	**-**	**B**	**A**	**A**	**-**	**B**	**C**	**-**	**-**	**-**	**A**	**-**	**-**	**-**	**A**	**A**
		-				**A**				**B**				**C**				**A**				**A**			
Truck	Effective Corner Radius		10 - 15 m	10 - 15 m		< 10 m					< 10 m				10 - 15 m	< 10 m		< 10 m							< 10 m
	Number of Receiving Lanes on Departure from Intersection		1	≥ 2		≥ 2					≥ 2				1	≥ 2		≥ 2							≥ 2
	Level of Service	**-**	**E**	**B**	**-**	**D**	**-**	**-**	**-**	**-**	**-**	**D**	**-**	**-**	**E**	**D**	**-**	**D**	**-**	**-**	**-**	**-**	**-**	**-**	**D**
		E				**D**				**D**				**E**				**D**				**D**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.61 - 0.70				0.0 - 0.60				0.71 - 0.80				0.81 - 0.90				0.71 - 0.80			
	Level of Service	**C**				**B**				**A**				**C**				**D**				**C**			

Lane Group	EBT	NBT	Ø1	Ø7
Lane Configurations				
Traffic Volume (vph)	736	200		
Future Volume (vph)	736	200		
Lane Group Flow (vph)	983	291		
Turn Type	NA	NA		
Protected Phases	2	8	1	7
Permitted Phases				
Minimum Split (s)	29.0	19.2	5.0	5.0
Total Split (s)	41.0	19.0	5.0	5.0
Total Split (%)	58.6%	27.1%	7%	7%
Yellow Time (s)	3.3	3.3	2.0	2.0
All-Red Time (s)	1.7	1.9	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.0	5.2		
Lead/Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Act Effct Green (s)	36.0	13.8		
Actuated g/C Ratio	0.51	0.20		
v/c Ratio	0.62	0.54		
Control Delay	12.9	21.4		
Queue Delay	0.0	0.0		
Total Delay	12.9	21.4		
LOS	B	C		
Approach Delay	12.9	21.4		
Approach LOS	B	C		
Queue Length 50th (m)	40.1	11.3		
Queue Length 95th (m)	57.6	17.3		
Internal Link Dist (m)	111.5	72.8		
Turn Bay Length (m)				
Base Capacity (vph)	1587	537		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.62	0.54		

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 3 (4%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 50.8%	ICU Level of Service A
Analysis Period (min) 15	

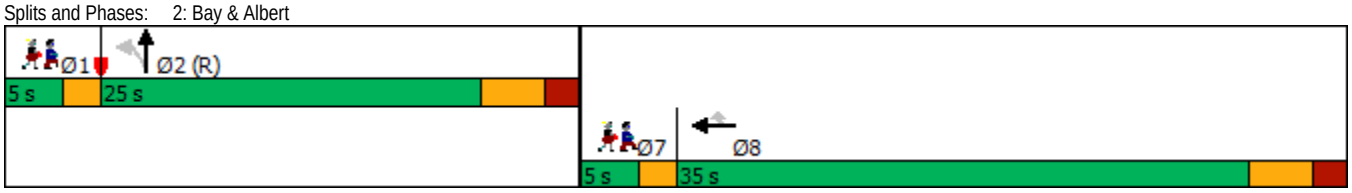
Splits and Phases: 1: Bay & Slater



Lane Group	WBT	WBR	NBT	Ø1	Ø7
Lane Configurations					
Traffic Volume (vph)	246	87	371		
Future Volume (vph)	246	87	371		
Lane Group Flow (vph)	259	92	454		
Turn Type	NA	Perm	NA		
Protected Phases	8		2	1	7
Permitted Phases		8			
Minimum Split (s)	20.2	20.2	23.2	5.0	5.0
Total Split (s)	35.0	35.0	25.0	5.0	5.0
Total Split (%)	50.0%	50.0%	35.7%	7%	7%
Yellow Time (s)	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	1.9	1.9	1.9	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	5.2	5.2	5.2		
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)	29.8	29.8	19.8		
Actuated g/C Ratio	0.43	0.43	0.28		
v/c Ratio	0.20	0.16	0.50		
Control Delay	13.1	13.4	18.6		
Queue Delay	0.0	0.0	0.3		
Total Delay	13.1	13.4	18.9		
LOS	B	B	B		
Approach Delay	13.2		18.9		
Approach LOS	B		B		
Queue Length 50th (m)	10.7	7.1	12.6		
Queue Length 95th (m)	17.7	15.5	37.0		
Internal Link Dist (m)	123.5		54.5		
Turn Bay Length (m)		25.0			
Base Capacity (vph)	1298	581	909		
Starvation Cap Reductn	0	0	122		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.20	0.16	0.58		

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 58 (83%), Referenced to phase 2:NBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 31.1%	ICU Level of Service A
Analysis Period (min) 15	

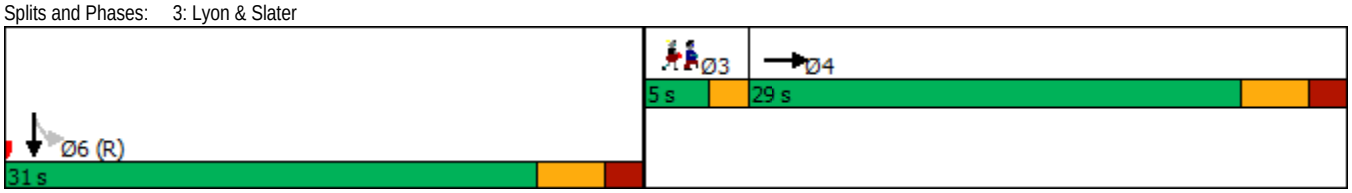
Splits and Phases: 2: Bay & Albert



Lane Group	EBT	SBT	Ø3
Lane Configurations			
Traffic Volume (vph)	637	816	
Future Volume (vph)	637	816	
Lane Group Flow (vph)	855	1127	
Turn Type	NA	NA	
Protected Phases	4	6	3
Permitted Phases			
Minimum Split (s)	21.2	24.3	5.0
Total Split (s)	29.0	31.0	5.0
Total Split (%)	44.6%	47.7%	8%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	1.9	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.2	5.3	
Lead/Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes
Act Effct Green (s)	23.8	25.7	
Actuated g/C Ratio	0.37	0.40	
v/c Ratio	0.79	0.63	
Control Delay	25.1	8.0	
Queue Delay	0.0	0.2	
Total Delay	25.1	8.3	
LOS	C	A	
Approach Delay	25.1	8.3	
Approach LOS	C	A	
Queue Length 50th (m)	47.1	8.3	
Queue Length 95th (m)	#68.8	22.4	
Internal Link Dist (m)	124.5	56.5	
Turn Bay Length (m)			
Base Capacity (vph)	1081	1799	
Starvation Cap Reductn	0	173	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.79	0.69	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 14 (22%), Referenced to phase 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

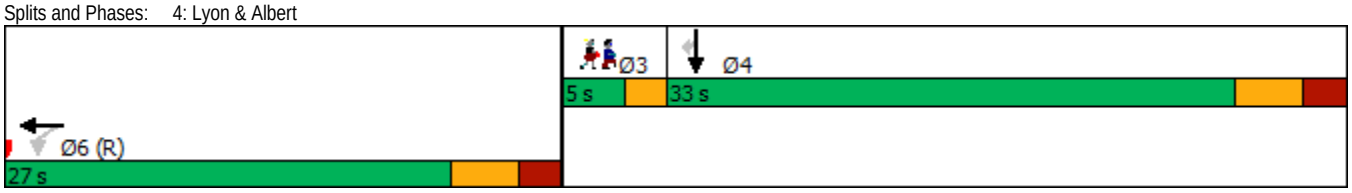
Splits and Phases: 3: Lyon & Slater



Lane Group	WBT	SBT	SBR	Ø3
Lane Configurations				
Traffic Volume (vph)	159	933	174	
Future Volume (vph)	159	933	174	
Lane Group Flow (vph)	312	982	183	
Turn Type	NA	NA	Perm	
Protected Phases	6	4		3
Permitted Phases			4	
Minimum Split (s)	20.4	21.5	21.5	5.0
Total Split (s)	27.0	33.0	33.0	5.0
Total Split (%)	41.5%	50.8%	50.8%	8%
Yellow Time (s)	3.3	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.4	5.5	5.5	
Lead/Lag		Lag	Lag	Lead
Lead-Lag Optimize?		Yes	Yes	Yes
Act Effct Green (s)	21.6	27.5	27.5	
Actuated g/C Ratio	0.33	0.42	0.42	
v/c Ratio	0.29	0.76	0.32	
Control Delay	9.2	20.7	14.5	
Queue Delay	0.0	0.0	0.0	
Total Delay	9.2	20.7	14.5	
LOS	A	C	B	
Approach Delay	9.2	19.7		
Approach LOS	A	B		
Queue Length 50th (m)	7.3	50.6	14.1	
Queue Length 95th (m)	15.4	72.0	27.2	
Internal Link Dist (m)	117.5	50.0		
Turn Bay Length (m)			20.0	
Base Capacity (vph)	1087	1290	577	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.29	0.76	0.32	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 48 (74%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 49.2%	ICU Level of Service A
Analysis Period (min) 15	

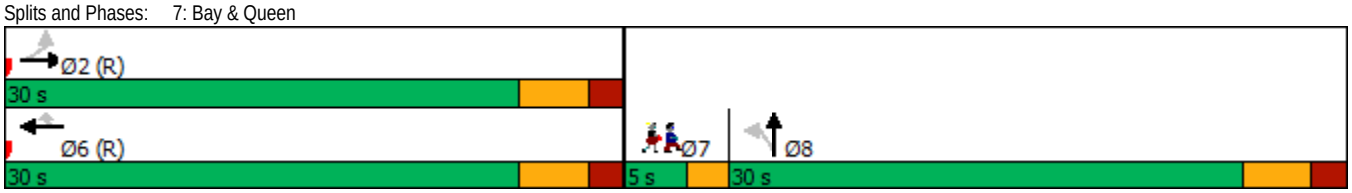
Splits and Phases: 4: Lyon & Albert



Lane Group	EBL	EBT	WBT	WBR	NBT	Ø7
Lane Configurations						
Traffic Volume (vph)	183	194	68	35	312	
Future Volume (vph)	183	194	68	35	312	
Lane Group Flow (vph)	0	397	72	37	437	
Turn Type	Perm	NA	NA	Perm	NA	
Protected Phases		2	6		8	7
Permitted Phases	2			6		
Minimum Split (s)	21.1	21.1	21.1	21.1	29.1	5.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	5.0
Total Split (%)	46.2%	46.2%	46.2%	46.2%	46.2%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8	0.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1	5.1	5.1	5.1	
Lead/Lag					Lag	Lead
Lead-Lag Optimize?					Yes	Yes
Act Effct Green (s)		24.9	24.9	24.9	24.9	
Actuated g/C Ratio		0.38	0.38	0.38	0.38	
v/c Ratio		0.72	0.11	0.06	0.34	
Control Delay		26.3	13.5	13.2	13.1	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		26.3	13.5	13.2	13.1	
LOS		C	B	B	B	
Approach Delay		26.3	13.4		13.1	
Approach LOS		C	B		B	
Queue Length 50th (m)		39.4	5.4	2.7	16.2	
Queue Length 95th (m)		#77.4	12.5	7.7	26.0	
Internal Link Dist (m)		51.6	57.9		57.5	
Turn Bay Length (m)						
Base Capacity (vph)		553	683	581	1292	
Starvation Cap Reductn		0	0	0	0	
Spillback Cap Reductn		0	0	0	0	
Storage Cap Reductn		0	0	0	0	
Reduced v/c Ratio		0.72	0.11	0.06	0.34	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 31 (48%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

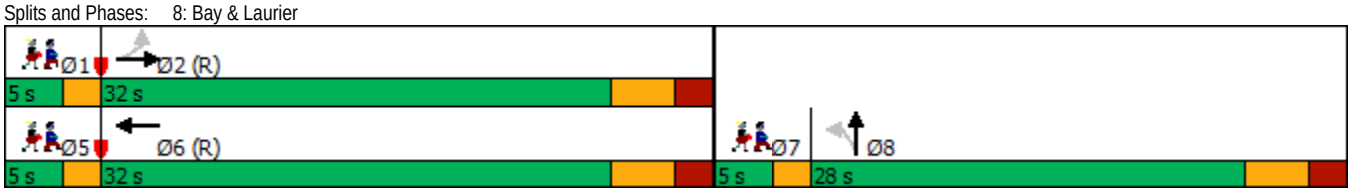
Splits and Phases: 7: Bay & Queen



Lane Group	EBL	EBT	WBT	NBT	Ø1	Ø5	Ø7
Lane Configurations							
Traffic Volume (vph)	58	209	96	218			
Future Volume (vph)	58	209	96	218			
Lane Group Flow (vph)	0	281	199	291			
Turn Type	Perm	NA	NA	NA			
Protected Phases		2	6	8	1	5	7
Permitted Phases	2						
Minimum Split (s)	20.4	20.4	20.4	23.4	5.0	5.0	5.0
Total Split (s)	32.0	32.0	32.0	28.0	5.0	5.0	5.0
Total Split (%)	45.7%	45.7%	45.7%	40.0%	7%	7%	7%
Yellow Time (s)	3.3	3.3	3.3	3.3	2.0	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	0.0	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0			
Total Lost Time (s)		5.4	5.4	5.4			
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)		26.6	26.6	22.6			
Actuated g/C Ratio		0.38	0.38	0.32			
v/c Ratio		0.47	0.31	0.27			
Control Delay		19.5	17.0	18.5			
Queue Delay		0.0	0.0	0.0			
Total Delay		19.5	17.0	18.5			
LOS		B	B	B			
Approach Delay		19.5	17.0	18.5			
Approach LOS		B	B	B			
Queue Length 50th (m)		27.0	17.8	14.6			
Queue Length 95th (m)		46.7	32.3	23.5			
Internal Link Dist (m)		53.7	62.8	73.7			
Turn Bay Length (m)							
Base Capacity (vph)		604	633	1065			
Starvation Cap Reductn		0	0	0			
Spillback Cap Reductn		0	0	0			
Storage Cap Reductn		0	0	0			
Reduced v/c Ratio		0.47	0.31	0.27			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 7 (10%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 48.2%	ICU Level of Service A
Analysis Period (min) 15	

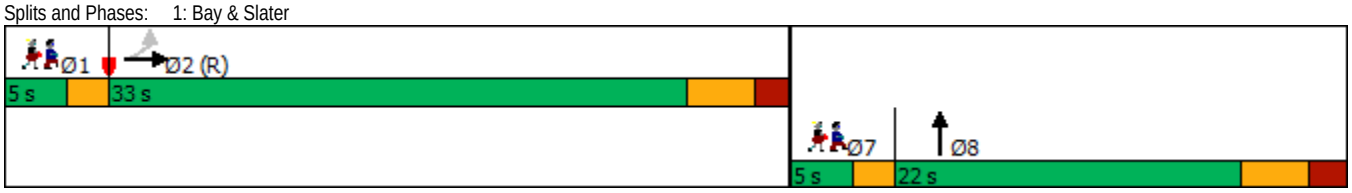
Splits and Phases: 8: Bay & Laurier



Lane Group	EBT	NBT	Ø1	Ø7
Lane Configurations				
Traffic Volume (vph)	440	425		
Future Volume (vph)	440	425		
Lane Group Flow (vph)	734	501		
Turn Type	NA	NA		
Protected Phases	2	8	1	7
Permitted Phases				
Minimum Split (s)	29.0	19.2	5.0	5.0
Total Split (s)	33.0	22.0	5.0	5.0
Total Split (%)	50.8%	33.8%	8%	8%
Yellow Time (s)	3.3	3.3	2.0	2.0
All-Red Time (s)	1.7	1.9	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.0	5.2		
Lead/Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Act Effct Green (s)	28.0	16.8		
Actuated g/C Ratio	0.43	0.26		
v/c Ratio	0.52	0.66		
Control Delay	10.6	29.2		
Queue Delay	0.0	0.0		
Total Delay	10.6	29.2		
LOS	B	C		
Approach Delay	10.6	29.2		
Approach LOS	B	C		
Queue Length 50th (m)	21.1	34.8		
Queue Length 95th (m)	35.0	50.4		
Internal Link Dist (m)	103.1	73.0		
Turn Bay Length (m)				
Base Capacity (vph)	1400	764		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	2	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.53	0.66		

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 39 (60%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 47.8%	ICU Level of Service A
Analysis Period (min) 15	

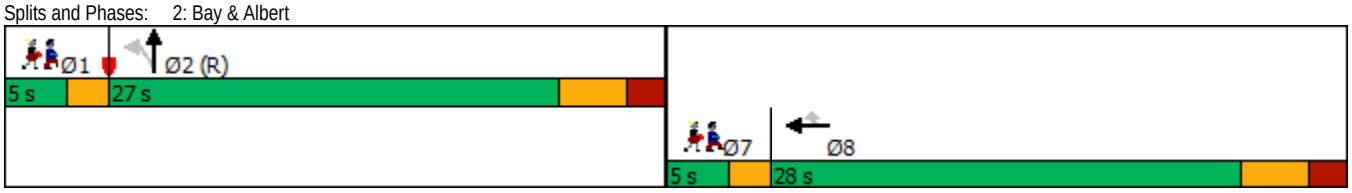
Splits and Phases: 1: Bay & Slater



Lane Group	WBT	WBR	NBT	Ø1	Ø7
Lane Configurations					
Traffic Volume (vph)	458	161	569		
Future Volume (vph)	458	161	569		
Lane Group Flow (vph)	482	169	656		
Turn Type	NA	Perm	NA		
Protected Phases	8		2	1	7
Permitted Phases		8			
Minimum Split (s)	20.2	20.2	23.2	5.0	5.0
Total Split (s)	28.0	28.0	27.0	5.0	5.0
Total Split (%)	43.1%	43.1%	41.5%	8%	8%
Yellow Time (s)	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	1.9	1.9	1.9	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	5.2	5.2	5.2		
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)	22.8	22.8	21.8		
Actuated g/C Ratio	0.35	0.35	0.34		
v/c Ratio	0.45	0.42	0.60		
Control Delay	17.9	20.1	14.6		
Queue Delay	0.0	0.0	0.9		
Total Delay	17.9	20.1	15.5		
LOS	B	C	B		
Approach Delay	18.5		15.5		
Approach LOS	B		B		
Queue Length 50th (m)	23.0	15.2	37.8		
Queue Length 95th (m)	34.9	30.4	54.0		
Internal Link Dist (m)	122.0		55.8		
Turn Bay Length (m)		25.0			
Base Capacity (vph)	1070	401	1088		
Starvation Cap Reductn	0	0	197		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.45	0.42	0.74		

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 26 (40%), Referenced to phase 2:NBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 47.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Bay & Albert

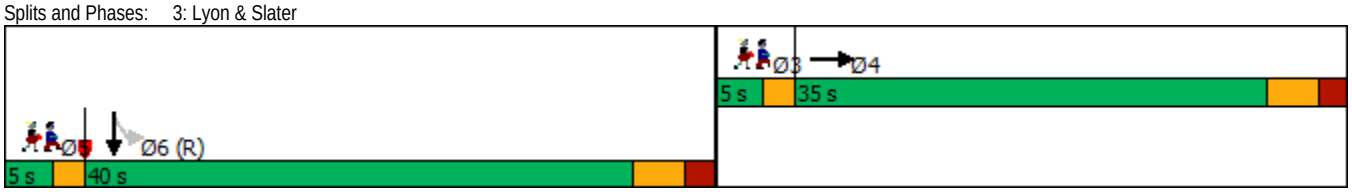


Lane Group	EBT	SBT	Ø3	Ø5
Lane Configurations				
Traffic Volume (vph)	323	872		
Future Volume (vph)	323	872		
Lane Group Flow (vph)	517	1123		
Turn Type	NA	NA		
Protected Phases	4	6	3	5
Permitted Phases				
Minimum Split (s)	21.2	24.3	5.0	5.0
Total Split (s)	35.0	40.0	5.0	5.0
Total Split (%)	41.2%	47.1%	6%	6%
Yellow Time (s)	3.3	3.3	2.0	2.0
All-Red Time (s)	1.9	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	5.2	5.3		
Lead/Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Act Effct Green (s)	29.8	34.7		
Actuated g/C Ratio	0.35	0.41		
v/c Ratio	0.47	0.62		
Control Delay	17.8	6.2		
Queue Delay	0.0	1.8		
Total Delay	17.8	8.0		
LOS	B	A		
Approach Delay	17.8	8.0		
Approach LOS	B	A		
Queue Length 50th (m)	25.3	7.0		
Queue Length 95th (m)	39.2	m8.8		
Internal Link Dist (m)	123.5	56.3		
Turn Bay Length (m)				
Base Capacity (vph)	1094	1821		
Starvation Cap Reductn	0	501		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.47	0.85		

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 4 (5%), Referenced to phase 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 49.9%	ICU Level of Service A
Analysis Period (min) 15	

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

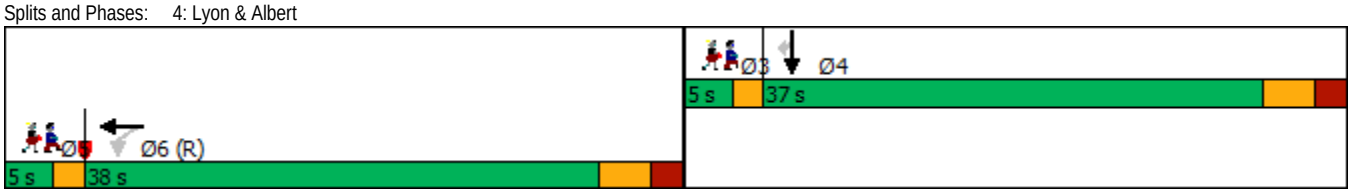
Splits and Phases: 3: Lyon & Slater



Lane Group	WBT	SBT	SBR	Ø3	Ø5
Lane Configurations					
Traffic Volume (vph)	466	921	153		
Future Volume (vph)	466	921	153		
Lane Group Flow (vph)	645	969	161		
Turn Type	NA	NA	Perm		
Protected Phases	6	4		3	5
Permitted Phases			4		
Minimum Split (s)	23.4	21.5	21.5	5.0	5.0
Total Split (s)	38.0	37.0	37.0	5.0	5.0
Total Split (%)	44.7%	43.5%	43.5%	6%	6%
Yellow Time (s)	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.2	2.2	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	5.4	5.5	5.5		
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)	32.6	31.5	31.5		
Actuated g/C Ratio	0.38	0.37	0.37		
v/c Ratio	0.53	0.86	0.29		
Control Delay	19.4	34.0	11.2		
Queue Delay	0.0	0.3	0.0		
Total Delay	19.4	34.3	11.2		
LOS	B	C	B		
Approach Delay	19.4	31.0			
Approach LOS	B	C			
Queue Length 50th (m)	36.2	75.0	8.4		
Queue Length 95th (m)	51.8	#109.2	21.8		
Internal Link Dist (m)	53.7	61.6			
Turn Bay Length (m)			20.0		
Base Capacity (vph)	1207	1130	557		
Starvation Cap Reductn	0	0	0		
Spillback Cap Reductn	0	14	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.53	0.87	0.29		

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 37 (44%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

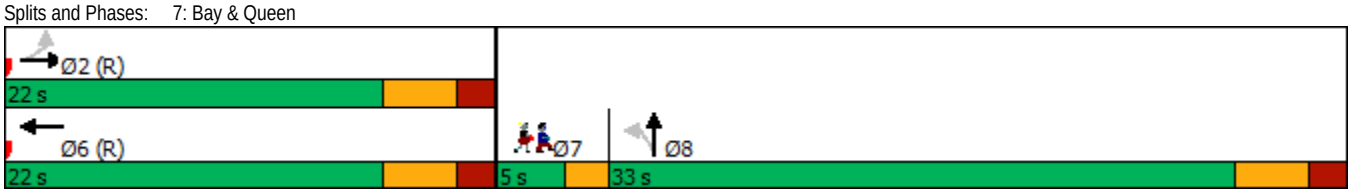
Splits and Phases: 4: Lyon & Albert



Lane Group	EBL	EBT	WBT	NBT	Ø7
Lane Configurations					
Traffic Volume (vph)	109	57	120	622	
Future Volume (vph)	109	57	120	622	
Lane Group Flow (vph)	0	175	307	737	
Turn Type	Perm	NA	NA	NA	
Protected Phases		2	6	8	7
Permitted Phases	2				
Minimum Split (s)	21.1	21.1	21.1	29.1	5.0
Total Split (s)	22.0	22.0	22.0	33.0	5.0
Total Split (%)	36.7%	36.7%	36.7%	55.0%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	1.8	1.8	1.8	1.8	0.0
Lost Time Adjust (s)		-1.1	-1.1	-1.1	
Total Lost Time (s)		4.0	4.0	4.0	
Lead/Lag				Lag	Lead
Lead-Lag Optimize?				Yes	Yes
Act Effct Green (s)		18.0	18.0	29.0	
Actuated g/C Ratio		0.30	0.30	0.48	
v/c Ratio		0.73	0.69	0.50	
Control Delay		39.9	28.8	11.8	
Queue Delay		0.0	0.0	0.6	
Total Delay		39.9	28.8	12.3	
LOS		D	C	B	
Approach Delay		39.9	28.8	12.3	
Approach LOS		D	C	B	
Queue Length 50th (m)		17.0	29.5	26.2	
Queue Length 95th (m)		#44.8	#60.5	39.0	
Internal Link Dist (m)		52.1	53.3	60.9	
Turn Bay Length (m)					
Base Capacity (vph)		241	443	1466	
Starvation Cap Reductn		0	0	361	
Spillback Cap Reductn		0	0	0	
Storage Cap Reductn		0	0	0	
Reduced v/c Ratio		0.73	0.69	0.67	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 3 (5%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 7: Bay & Queen



Lane Group	EBL	EBT	WBT	NBT	Ø1	Ø5	Ø7
Lane Configurations							
Traffic Volume (vph)	37	109	222	298			
Future Volume (vph)	37	109	222	298			
Lane Group Flow (vph)	0	154	447	356			
Turn Type	Perm	NA	NA	NA			
Protected Phases		2	6	8	1	5	7
Permitted Phases	2						
Minimum Split (s)	20.4	20.4	20.4	23.4	5.0	5.0	5.0
Total Split (s)	31.0	31.0	31.0	24.0	5.0	5.0	5.0
Total Split (%)	47.7%	47.7%	47.7%	36.9%	8%	8%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	2.0	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	0.0	0.0	0.0
Lost Time Adjust (s)		-1.4	-1.4	-1.4			
Total Lost Time (s)		4.0	4.0	4.0			
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)		27.0	27.0	20.0			
Actuated g/C Ratio		0.42	0.42	0.31			
v/c Ratio		0.27	0.72	0.39			
Control Delay		14.2	23.9	19.2			
Queue Delay		0.0	0.0	0.0			
Total Delay		14.2	23.9	19.2			
LOS		B	C	B			
Approach Delay		14.2	23.9	19.2			
Approach LOS		B	C	B			
Queue Length 50th (m)		11.7	43.0	17.5			
Queue Length 95th (m)		23.3	#76.7	27.7			
Internal Link Dist (m)		53.7	52.3	65.9			
Turn Bay Length (m)							
Base Capacity (vph)		563	624	924			
Starvation Cap Reductn		0	0	0			
Spillback Cap Reductn		0	0	0			
Storage Cap Reductn		0	0	0			
Reduced v/c Ratio		0.27	0.72	0.39			

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 23 (35%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Bay & Laurier