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

18 March 2022

City of Ottawa
Development Review Services
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: Mike Giampa

Dear Mike:

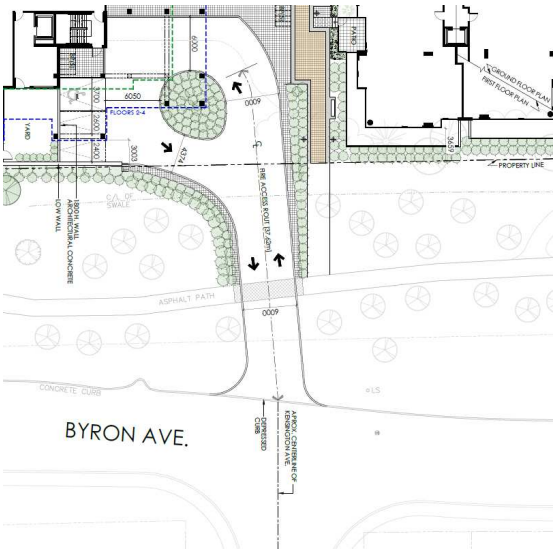
Re: 114 Richmond Road – Byron Avenue Access
City Comments & Responses

This letter has been prepared to address the comments received from the City of Ottawa, dated February 11, 2022, with corresponding responses from Parsons.

1.0 Transportation Engineering Services

Comment 1: *With the proposed access for Phase 2B crossing the Byron linear park and connecting to Byron Avenue at Kensington Drive, priority should be given to pedestrians and cyclists using the MUP. Consider a raised crossing and indicate the planned control at the new crossing of the existing MUP for the access to Byron Avenue.*

Response 1: The driveway approach is expected to be stop controlled. The Byron MUP is offset over 10m from the curb-line, which provides ample space for drivers to complete the right-turn and react to a cyclist or pedestrian. The applicant will consider other visual cues, such as signage and pavement markings/treatments to enhance safety of the crossing, and possibly a raised crossing. These elements will be confirmed during the detailed design.



Comment 2: *Also identify in the report and on the site plan the distance between the Byron Avenue MUP and the Byron Avenue roadway. Confirm that there is sufficient space for a vehicle to stop past the MUP crossing at the stop bar. Indicate whether there is a potential for queued vehicles on the access (leaving the site) to block the MUP crossing.*

Response 2: As previously noted, there is slightly over 10m separation between the MUP crossing and the street line, which is expected to be sufficient space for a single vehicle idling at a stop bar. This driveway access is only intended as a pickup/drop off location, with three parking surface parking spaces (two general spaces and one accessible space). There is no underground parking ramp access from this driveway. Therefore, anticipated vehicle traffic volumes will be low during peak periods.

Comment 3: *Review sight lines at this MUP crossing location due to the trees within the linear park. This will require an on-site review.*

Response 3: There are two trees within the linear park which may impact sight lines for inbound traffic. Upon review using Google Streetview, we can confirm these trees do not appear to represent a significant visual obstruction as the foliage does not extend low enough to affect sight lines. It will be important for City maintenance to ensure this area remains clear. For outbound vehicles, the only potential obstructions are the planned landscape treatments. The landscape design is still being refined, but the applicant will ensure these treatments do not exceed 0.75m in height, in accordance with the City Zoning By-law.

Comment 4: *Indicate if traffic calming will be required on Kensington Avenue to mitigate traffic using the proposed access.*

Response 4: As previously noted, this driveway access does not lead to an underground parking ramp – it is intended for pickup/drop-offs at the proposed development. The potential traffic impacts to Kensington Ave are low and are not expected to warrant traffic calming mitigation.

Comment 5: *In Section 2.2, it is stated that the Byron Avenue connection which will cross the existing MUP "would be safer than multiple existing road crossings along the MUP due to the low traffic volume projections". Clarify this subjective comment and provide evidence.*

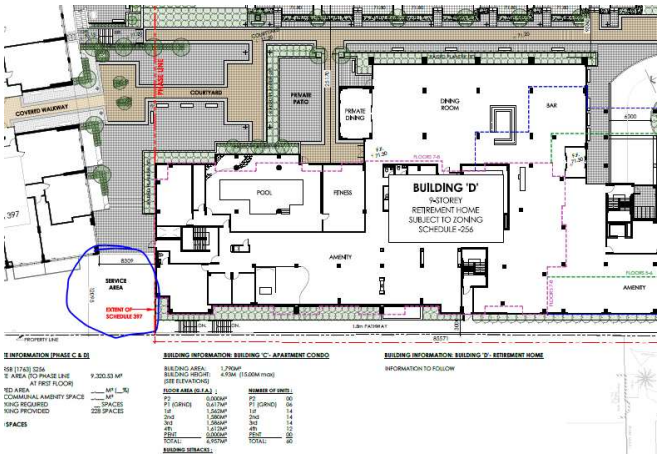
Response 5: This statement was meant to reiterate the intent of the access is for pickup/drop-offs only, and does not provide access to the underground parking garage, resulting in very low peak hour traffic volume generation.

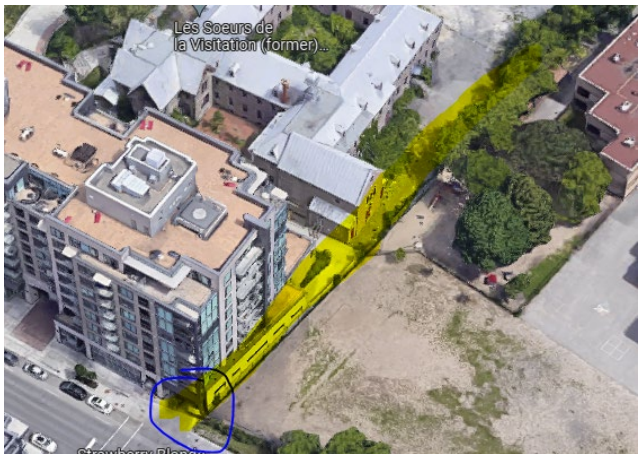
Comment 6: *Clarify whether there will be two underground parking ramps that lead to the same shared underground garage. The site plan and report are not very clear in this regard.*

Response 6: There will only be one ramp accessing the underground parking garage, which is accessed via Leighton Terrace within Phase 1A.

Comment 7: *Indicate where loading will occur. If it is from the proposed Byron Avenue access, provide turning templates and ensure that there are no resulting issues in turning for larger vehicles due to the existing speed table on Byron Avenue just east of the proposed site access location*

Response 7: Loading will occur at the basement access located at the north end of Building D, accessed from an existing connection on Richmond Road. Loading will not be accessed via Byron Ave.



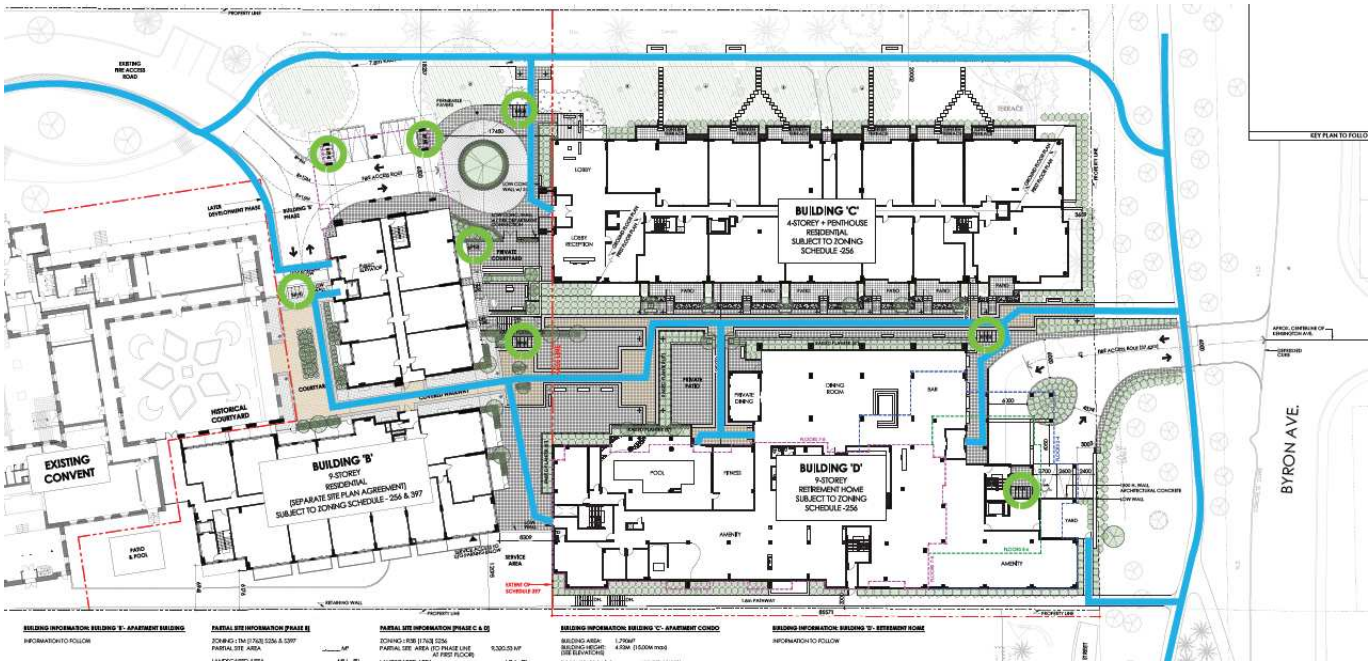


Comment 8: *To encourage transit usage, providing a prepaid Presto pass is a proven tool.*

Response 8: Noted, the applicant will consider Presto Pass incentives.

Comment 9: *On the site plan, provide access and underground parking ramp grades. Also indicate clearly the location of the aboveground bike parking spaces.*

Response 9: Proposed aboveground bike parking spaces have been identified in the following image (green circles). There are no longer any exterior ramps to the underground parking, all ramping is within the buildings.



2.0 Traffic Signal Operations

Comment 10: *The recommended site access via Byron Avenue (Phase 2B) requires updated traffic analysis to determine potential impacts to adjacent intersections.*

Response 10: Please see updated analysis below. As indicated in the table intersections are projected to operate within City of Ottawa standards.

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Patricia/Richmond	A(B)	0.34(0.68)	EBT(WBT)	6.1(11.0)	A(A)	0.30(0.58)
Island Park/Richmond	E(D)	0.99(0.90)	SBT(WBT)	40.8(32.2)	C(C)	0.75(0.77)
Island Park/Byron	C(C)	0.77(0.71)	SBT(SBT)	17.1(23.7)	B(B)	0.66(0.62)
Kirkwood/Byron	A(B)	0.48(0.65)	EBT(NBT)	16.3(18.6)	A(A)	0.43(0.58)

Comment 11: *The updated analyses / synchro modelling needs to include the signalized intersections of Byron Avenue and Island Park Drive as well as Byron Avenue and Kirkwood Avenue. (Intersections within 300m of proposed site access).*

Response 11: Noted, see Response 12.

Comment 12: *With the updated analysis, please provide 95th percentile queue lengths and indicate when storage length, or distance to upstream intersection, is exceeded.*

Response 13: Refer to table below:

Intersection	Weekday AM Peak (PM Peak) Queues (m) *							
	Eastbound		Westbound		Northbound		Southbound	
	95th% Queue	Storage Capacity	95th% Queue	Storage Capacity	95th% Queue	Storage Capacity	95th% Queue	Storage Capacity
Patricia/Richmond	40(65)	175	30(65)	175	10(0)	15 @	10(10)	180
Island Park/Richmond	55(30)	175	30(100)	200	95(35)	275	225(135)	310
Island Park/Byron	75(40)	400	45(50)	400	80(100)	210	15(110)	275
Kirkwood/Byron	50(45)	600	40(50)	400	45(85)	300	55(85)	200

* - Storage capacity of the approach is based distance to the upstream signalized intersection or PXO, not driveway or local unsignalized intersection.
@ - Building Access

The table above illustrates the 95th percentile queues during the AM and PM peak hours. All 95th percentile queues do not exceed the available storage to the upstream signalized intersection, which is most important for corridor efficiency. Due to the venerable neighbourhood street layout, there are a number of local street intersections or driveways that may be impacted by queues during peak periods, but these are low volume streets and is not considered a significant detriment to the overall system performance. It is important to note that the 95th percentile queues in the existing intersection were shown to be very similar to projected queues (with development traffic), meaning that the proposed development has a negligible impact on queues within the study intersections.

Comment 13: *The report notes that: "The Phase 2B garage, that will be an extension of the Phase 2A garage, will contain approximately 120 parking spaces, and will be controlled such that are Phase 2B traffic will connect to enter Shannon Street or Byron Avenue (to be determined) at the south end of the site." Please confirm if the control measures noted are intended to restrict Phase 2A vehicular traffic from using the proposed Byron Avenue (Phase 2B) access, and vice versa.*

Response 14: The circulation plan has been revised; there will only be one ramp accessing the underground parking garage, via Leighton Terrace. The Byron Avenue (Phase 2B) access is now a pickup/drop-off loop with access to only 3 surface parking spaces.

Comment 14: *Note: there are existing operational challenges at the intersection of Byron Avenue and Island Park Drive due to the fact that the intersection is not currently equipped with auxiliary turn lanes - left turning vehicles often create blockages to the applicable 'through' traffic volumes. Any additional site generated traffic volumes (associated with the proposed Byron Avenue site access) could further degrade the existing intersection operation. Please confirm anticipated site generated traffic volumes and proposed routing associated with the proposed Byron Avenue site access. No comments with initial TIS for this circulation. Traffic Signal Design & Specification reserves the right to make future comments based on subsequent submissions.*

Response 15: As previously noted, the Byron access is now only a pickup/drop-off area with very limited parking – it no longer provides access to the underground parking garage. Therefore, it is not expected to experience significant traffic volumes. It is unlikely that traffic associated with this driveway would impact existing operations at the Byron/IPD intersection.

3.0 Transit Services

Comment 15: *Please provide safe, accessible pedestrian connections from the southern edge of the site to Richmond Road. It appears that this is the case, but it is not clear if there is an accessible pedestrian path along the existing convent and through the new building fronting Richmond Road. A continuous pedestrian path through the entire site will provide access to the bus stops along Richmond Road.*

Response 16: The image above (from Comment 9) outlines accessible pedestrian connections (blue lines), which extend from Byron Ave to Richmond Rd with linkages provided to Buildings C and D, including an accessible route through the courtyard which uses a public elevator.

PARSONS

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Technical Memorandum

To:	Wally Dubyk (City of Ottawa)	Date:	11 January 2022
Copy:	Shawn Dolan (Ashcroft) P.Eng., MBA	Project:	476778-01000
From:	Rani Nahas E.I.T. / Mark Baker P.Eng.		

Re: Q West (114 Richmond Road) – Phase 2 Driveway Connection

1.0 Introduction

The purpose of this memo is to identify/confirm the location of the proposed vehicle driveway access to Phase 2 of the Q West development located in the Westboro Community of Ottawa, ON. Phase 1 has been constructed with vehicle access provided via Leighton Terrace, whereas previous transportation planning work related to Phase 2 of the development reflected various potential driveway locations, including Leighton Terrace, Shannon Street and Byron Avenue.

It is understood that Phase 2A will consist of a new 9-storey residential building (Building B) and reprogramming of the Convent building to include commercial space (two restaurants), residential units and amenity space. Phase 2B is proposed to include two new buildings, namely a 4-storey residential building (Building C) and 9-storey retirement home (Building D). Parking will be provided underground with approximately 340 spaces proposed.

In January 2020, a transportation review of Phase 2 was completed, in addition to analyses of potential access driveway locations serving this second phase of development. The ensuing memo summarizes the results of the previous analyses. Figure 1 illustrates local context and the updated Site Plan (Buildings B, C and D) is included at Attachment A.

Figure 1: Local Context

2.0 Previous Phase 2A and Phase 2B Analysis

2.1 Phase 2A Transportation Review (Parsons), January 7, 2020

The Technical Memo, included as the first part of Attachment B, summarized the impact of Phase 2A on the surrounding transportation network in terms of trip generation analysis, traffic analysis, MMLoS analysis, and applicable TDM measures. It was determined that Phase 2A would generate approximately 70 veh/h two-way new vehicle trips. At time, it was assumed that Phase 2A traffic would use the site's existing Leighton Terrace right-in/right-out connection and the future Phase 2B traffic will connect to either Shannon Street or Byron Avenue.

Study area intersections were projected to operate within City of Ottawa standards and vehicle and bicycle parking By-Law requirements were met. Overall, the development was found to fit well in the surrounding area.

2.2 Overview of Phases Phase 2A/2B Site Access Options (Parsons), January 7, 2020

The Technical Memo, included as second part of Attachment B, reviewed in detail the three potential access points for Phase 2. Below is a summary of the analyses for each proposed access.

1. Leighton Terrace (only one connection for entire development)
    a. All site generated vehicle traffic would utilize this connection (approximately 65 to 115 veh/h two-way traffic in peak hours).
    b. The addition of Phase 2 traffic can be accommodated at this driveway but reduces level of service to the B to C range.
    c. It would be very difficult for fire trucks and emergency vehicles to access Phase 2 of the development with only the Leighton Terrace access. Phase 2 is at the south end of the development and Leighton Terrace is at the north end.
2. Shannon Street Connection
    a. A road widening would be required as the 3.5m existing pavement width is insufficient. This would result in significant tree/shrub removal and shared-use pole relocation.
    b. Road widening and adding additional traffic may exacerbate existing traffic safety concerns at the adjacent Hilson/Byron intersection located 25m south of Shannon Street.
    c. The potential for conflict is increased given the short off-set (10m) and poor sight lines for vehicles turning out of Shannon Street and pedestrians/cyclists using the MUP.
3. Byron Avenue Connection
    a. While this driveway will cross the existing MUP on the north side of Byron Avenue, this crossing would be safer than multiple existing road crossings along the MUP due to the low traffic volume projections.
    b. This location provides the best opportunity to control and eliminate this potential on Kensington Avenue compared to Shannon Street.
    c. This option provides excellent fire service and emergency service access to Phase 2.

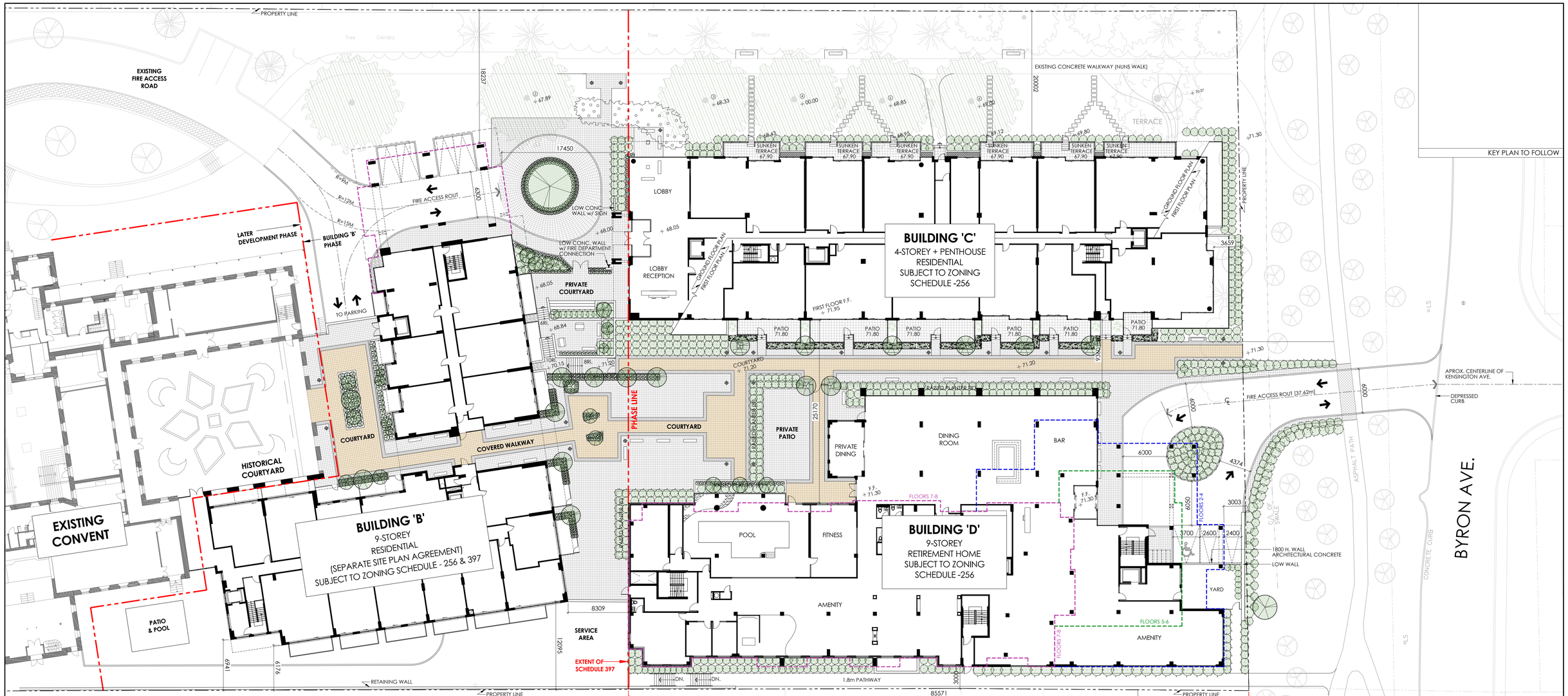
The conclusion of this memo indicated that a **Byron Avenue** driveway access would be the optimal due to minimal community impact, efficient traffic operations, safety, on-site functionality, and versatility in site operations.

3.0 Conclusion

Since the previous work, the decision has been made to provide a vehicle connection to Byron Avenue (and not Shannon Street). The updated Site Plan (Buildings B, C and D) reflects this current thinking with respect to vehicle access and is supported by the previous transportation analyses summarized herein.

Attachment A

Site Plan



BUILDING INFORMATION: BUILDING 'B'- APARTMENT BUILDING

INFORMATION TO FOLLOW

PARTIAL SITE INFORMATION [PHASE B]

ZONING : TM [1763] S256 & S397
PARTIAL SITE AREA _,_____ M²

LANDSCAPED AREA _,_____ M² (__%)
EXTERIOR COMMUNAL AMENITY SPACE _,_____ M²
TOTAL PARKING REQUIRED ___ SPACES
TOTAL PARKING PROVIDED 112 SPACES

PARTIAL SITE INFORMATION [PHASE C & D]

ZONING : R5B [1763] S256
PARTIAL SITE AREA (TO PHASE LINE AT FIRST FLOOR) 9,320.53 M²

LANDSCAPED AREA _,_____ M² (__%)
EXTERIOR COMMUNAL AMENITY SPACE _,_____ M²
TOTAL PARKING REQUIRED ___ SPACES
TOTAL PARKING PROVIDED 228 SPACES

TOTAL PARKING PROVIDED = 340 SPACES

BUILDING INFORMATION: BUILDING 'C'- APARTMENT CONDO

BUILDING AREA: 1,790M²
BUILDING HEIGHT: 4.93M (15.00M max)
(SEE ELEVATIONS)

FLOOR AREA (G.F.A.) :

P2	0,000M²
P1 (GRND)	0,617M²
1st	1,562M²
2nd	1,580M²
3rd	1,586M²
4th	1,612M²
PENT	0,000M²
TOTAL:	6,957M²

NUMBER OF UNITS :

P2	00
P1 (GRND)	06
1st	14
2nd	14
3rd	14
4th	12
PENT	00
TOTAL:	60

BUILDING SETBACKS :

NORTH: N/A
EAST: 20.00M
SOUTH: 3.66M
WEST: N/A

PARKING :

REQUIRED: 0.5 PER D.U.= 30 SPACES
VISITORS: 0.1 PER D.U.= 05 SPACES
(AFTER FIRST 12 D.U.)
PROVIDED: 35 SPACES

BICYCLE PARKING :

REQUIRED: 0.5 PER D.U.= 30 SPACES
PROVIDED= 44 (P1 LEVEL)

AMENITY AREA :

REQUIRED: 6M² PER D.U.= 360M² TOTAL
COMMUNAL= 180 (50%)

PROVIDED: PRIVATE= 2,602M²
COMMUNAL= 628M²
TOTAL= 3,230M² **

**PLUS EXTERIOR COMMUNAL AMENITY AREA ON SITE (_,___M²)

BUILDING INFORMATION: BUILDING 'D'- RETIREMENT HOME

INFORMATION TO FOLLOW

M. David Blakely Architect Inc.
2200 Prince of Wales Dr. Suite 101 Ottawa, Ontario
Phone (613) 226-8811 Fax (613) 226-7942 K2E 6Z9

GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING AND VERIFYING ALL DIMENSIONS. ANY DISCREPANCY MUST BE REPORTED TO M. DAVID BLAKELY ARCHITECT INC.
2. ALL WORK AND MATERIALS TO BE IN COMPLIANCE WITH ALL CODES, REGULATIONS, & BY-LAWS
3. ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST THE PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE PLANS IN CONTRACT DOCUMENTS
4. DO NOT SCALE DRAWINGS.
5. THIS DRAWING SHALL NOT BE USED OR COPIED WITHOUT THE AUTHORIZATION OF THE ARCHITECT
6. THIS DRAWING SHALL NOT BE USED FOR PERMIT OR CONSTRUCTION UNLESS THE DRAWING BEARS THE ARCHITECT'S SEAL AND SIGNATURE

SEAL

No.	DATE	DESCRIPTION	INIT.
12.			
11.			
10.			
9.			
8.			
7.			
6.			
5.	15/12/21	BASE PLAN UPDATED/ SHANNON ST.	MB
4.	23/11/21	FOR DISCUSSION	MB
3.	01/11/21	BLDG. 'D' PARKING RAMP DELETED	MB
2.	29/07/21	BLD. 'D'/ ENTRANCE OFF BYRON REV.	MB
1.	09/11/18	FOR SITE PLAN SUBMISSION	MB

REVISIONS

No.	DATE	DESCRIPTION	INIT.
24.			
23.			
22.			
21.			
20.			
19.			
18.			
17.			
16.			
15.			
14.			
13.			

REVISIONS

A - DETAIL NUMBER
B - SHEET NUMBER (DETAIL REQUIRED)
C - SHEET NUMBER (DETAIL LOCATION)

PROJECT:
Q WEST
114 RICHMOND ROAD
OTTAWA, ONTARIO

CLIENT:
ASHCROFT HOMES

DRAWING TITLE:
PRELIMINARY
PARTIAL SITE PLAN
BUILDINGS 'B', 'C', & 'D'

DATE: NOVEMBER 2018
SCALE: 1 : 250
DRAWN BY: mdb
CHECKED: MDB
SHEET No. REV No.: SP1

D00-00-00-0000

Attachment B

Previous January 2021 Analyses

PARSONS

1223 Michael Street North, Suite 100, Ottawa, Ontario K1J 7T2
P: +1.613.738.4160 I F: +1.613.739.7105 I www.parsons.com

January 7, 2020

BY EMAIL: kwatson@ashcrofthomes.ca
Reference: 476778 - 01000

Ashcroft Homes
18 Antares Drive
Ottawa, Ontario
K2E 1A9

Attention: Kieran Watson, Development Planner

Dear Kieran:

RE: Q West (378 Leighton Terrace)
Phase 2A Transportation Review

1. INTRODUCTION

Following review of the Phase 2A Site Plan, the related transportation submission (Addendum #6, July 2008), the City provided transportation comments to which we have responded. The formal response is included as Attachment 1.

2. CONTEXT

The whole of the Q West development consists of the three phases as depicted in Figure 1 and summarized as follows. Phase 1, fronting onto Richmond Road is built and occupied. Phase 2 is located in the middle of the site just to the south of the existing Convent building and will include a 9 storey residential building and mixed-use within the Convent building. Phase 3 is located at the south end of the site adjacent to the Byron corridor and will consist of a residential building (4 storey) and a seniors/retirement building (10 storey). The focus of this report is Phase 2A, however, the built Phase 1 and proposed Phase 2B are summarized for context.

Phase 1 is built/occupied and consists of 297 condo units and a mix of retail and commercial land uses. Phase 1 parking is below grade, totals 291 spaces, and has its only access via a driveway connection to the signalized Richmond/Patricia intersection. The combination of April 2017 and December 2019 counts at this intersection (Attachments 2 and 3) reveals a Phase 1 peak hour traffic generation of approximately 60 veh/h two-way total during both peak hours.

The following Table 1 indicates that for the 2017 full intersection count, the Richmond/Patricia/Q West intersection operates at an excellent level of service in the LoS A to C range.

Table 1: Richmond/Patricia/Q-West Intersection Performance (for Phase 1 only)

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Richmond/Leighton/Q-West	A(C)	0.36(0.74)	EBT(EBT)	7.1(10.5)	A(B)	0.32(0.61)
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

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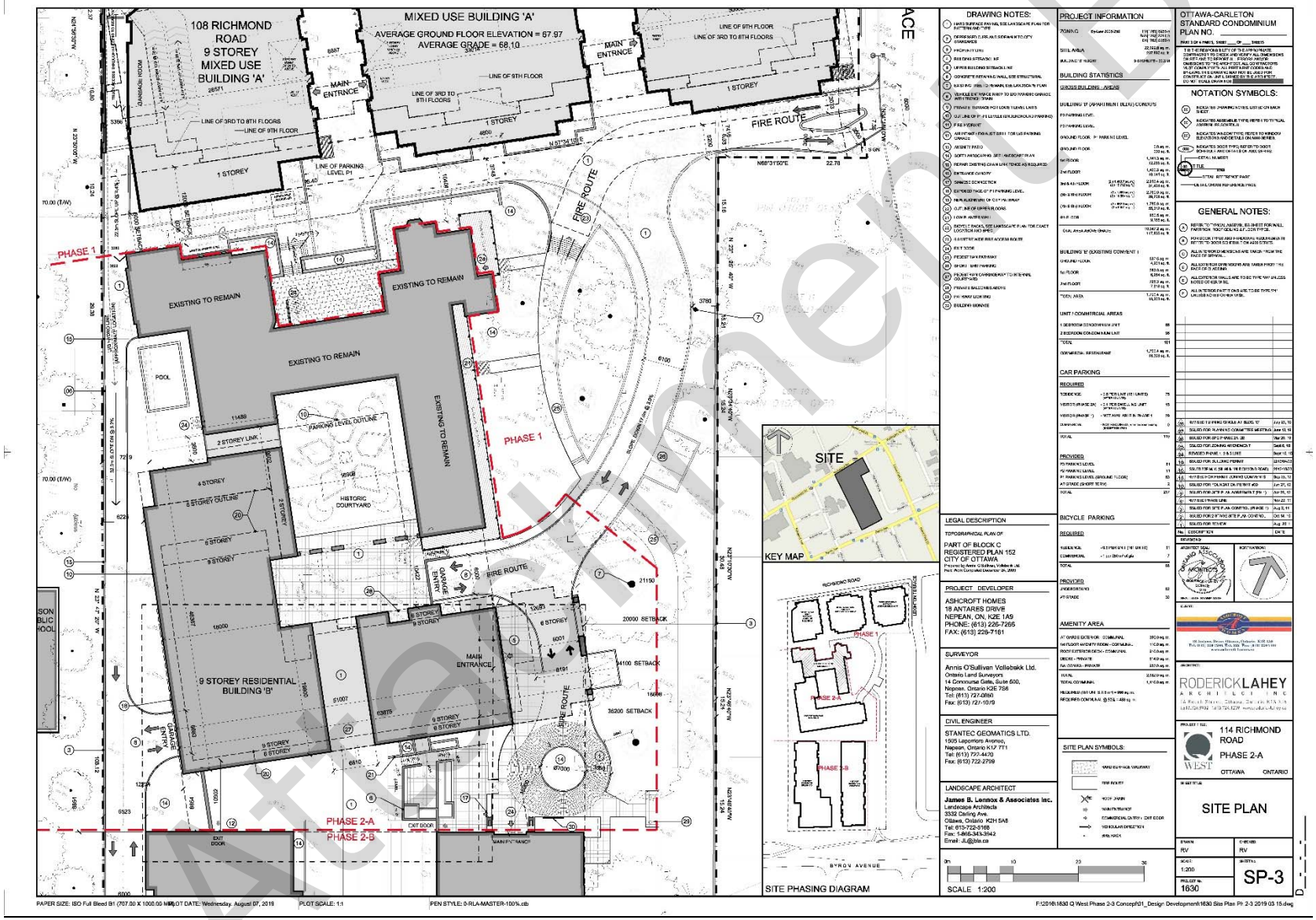
Figure 1: Site Plan



Phase 2A will consist of a new 9 storey residential building (161 units) and reprogramming of the Convert building to include 1,700m^2 of commercial space (two restaurants), 5 residential units and amenity space. Its parking will be in a new garage located beneath Phase 2A and will total approximately 120 parking spaces. The garage will be designed/controlled so that all Phase 2A traffic can be directed to the site's existing right-in/right-out driveway connection to Leighton Terrance. Phase 2 traffic volumes are estimated to be approximately 35 veh/h two-way total during both the morning and afternoon peak hours. The impact and requirement (if any) of this Phase 2 traffic using the Richmond/Leighton Terrance intersection will be analyzed / discussed herein.

Phase 2B is proposed to include 62 residential units and 200 retirement units and approximately 90 to 100 parking spaces. The total parking supply for Phase 2A and 2B is approximately 215 to 230 spaces. The Phase 2B garage, that will be an extension of the Phase 2A garage, will contain approximately 120 parking spaces, and will be controlled such that are Phase 2B traffic will connect to enter Shannon or Byron (to be determined) at the south end of the site.

3. SCOPE OF WORK FOR PHASE 2 TRANSPORTATION REVIEW

As agreed to with the City's lead planner on the Q West file, the scope of work for the study herein includes:

- A description of Phase 2A in the context of Phase 1 and Phase 2B;
- A description of the site's Richmond Road and Leighton Terrace frontages;
- Phase 2A's peak hour trip generation broken down into vehicles, transit riders and the bike/walk component;
- The assignment of Phase 2A traffic to the right-in/right-out Leighton Terrace intersection and to the Richmond/Leighton Terrace intersections;
- Analysis of the Leighton Terrace intersection with regard to vehicular level of service, multi-modal level of services (MMLOS) and collision history;
- MMLOS analysis of the overall site's Richmond and Byron frontages;
- Identification of TDM measures applicable to Phase 2A development; and
- A report containing the foregoing and also addressing the City's Transportation Comments in their October 28th, 2019 correspondence.

4. EXISTING CONDITIONS

4.1. STUDY AREA ROAD

Richmond Road extends from Robertson Road in the west to Island Park Drive in the east, where it continues east into Ottawa's downtown area as Wellington Street and then Somerset Street. It is designated as an arterial roadway in the City of Ottawa's Official Plan, with a right-of-way (ROW) protection of 26 m in the vicinity of the site. Within the study area, it has a four-lane cross-section and a posted speed limit of 50 km/h. One hour parking is permitted from 7 a.m. – 7 p.m. in the eastbound direction, with no stopping permitted between 3:30 – 5:30 p.m. Dedicated turn lanes are not provided on Richmond Road at study area intersections, except for the Island Park intersection. The section of Richmond Road adjacent to the site has recently been reconstructed as a result of recent development and has wide streetscaped sidewalks.

Island Park Drive extends from the Ottawa River Parkway in the north to Carling Avenue in the South. It provides a connection to the City of Gatineau (Quebec) via the Champlain Bridge. It is designated as a Federal roadway in the City Ottawa's Official Plan. Within the study area, it has a two-lane cross-section with designated on-street cycling lanes and a posted speed limit 40 km/h. Northbound and southbound left-turn lanes are provided at the signalized Richmond/Island Park intersection. No turn lanes are currently provided at the signalized Byron/Island Park intersection.

Byron Avenue is an east-west two-lane municipal collector road with a 10m pavement width and an unposted speed of 50 km/h. It extends from Holland Avenue int eh east to Richardson Avenue in the west. Byron Avenue's function as a collector road is to distribute traffic between the area's local streets and arterial roads.

In the vicinity of the subject site, Byron Avenue has a sidewalk on the south side and a recreation pathway within the landscaped green corridor on the north side. At its signalized Island Park Drive intersection, there are no dedicated turn lanes. At its signalized Kirkwood Avenue intersection, there is a westbound right-turn lane and bicycle pocket and a southbound right-turn lane. At the Hilson intersection, it has been recently reconstructed to include a raised pedestrian crosswalk on the east leg of Byron.

4.2. STUDY AREA TRANSIT

Within the study area, OC Transpo bus routes currently operate along Richmond Road as "Frequent" routes #11 and #51 and "Local" route #153. All three bus routes connect to the transitway at Tunney's Pasture station, approximately 1km away from the proposed development site, where passengers may choose to transfer to one of the following routes:

- O-Train Line 1: Confederation Line
- Rapid/Frequent Routes (operate every day of the week):
  - 11, 14, 51, 53, 57, 61, 62, 63, 74, 75, 80, 87
- Connexion Routes (O-Train Line 1 connection, during weekday rush hours only):
  - 251, 252, 256, 257, 258, 261, 262, 263, 264, 265, 266, 267, 268, 270, 271, 272, 273, 275, 277, 278, 282, 283, 284
- Local Routes (customized times and routing):
  - 16, 50, 54, 56, 58, 64, 66, 73, 81, 82, 83, 84, 86, 89, 153

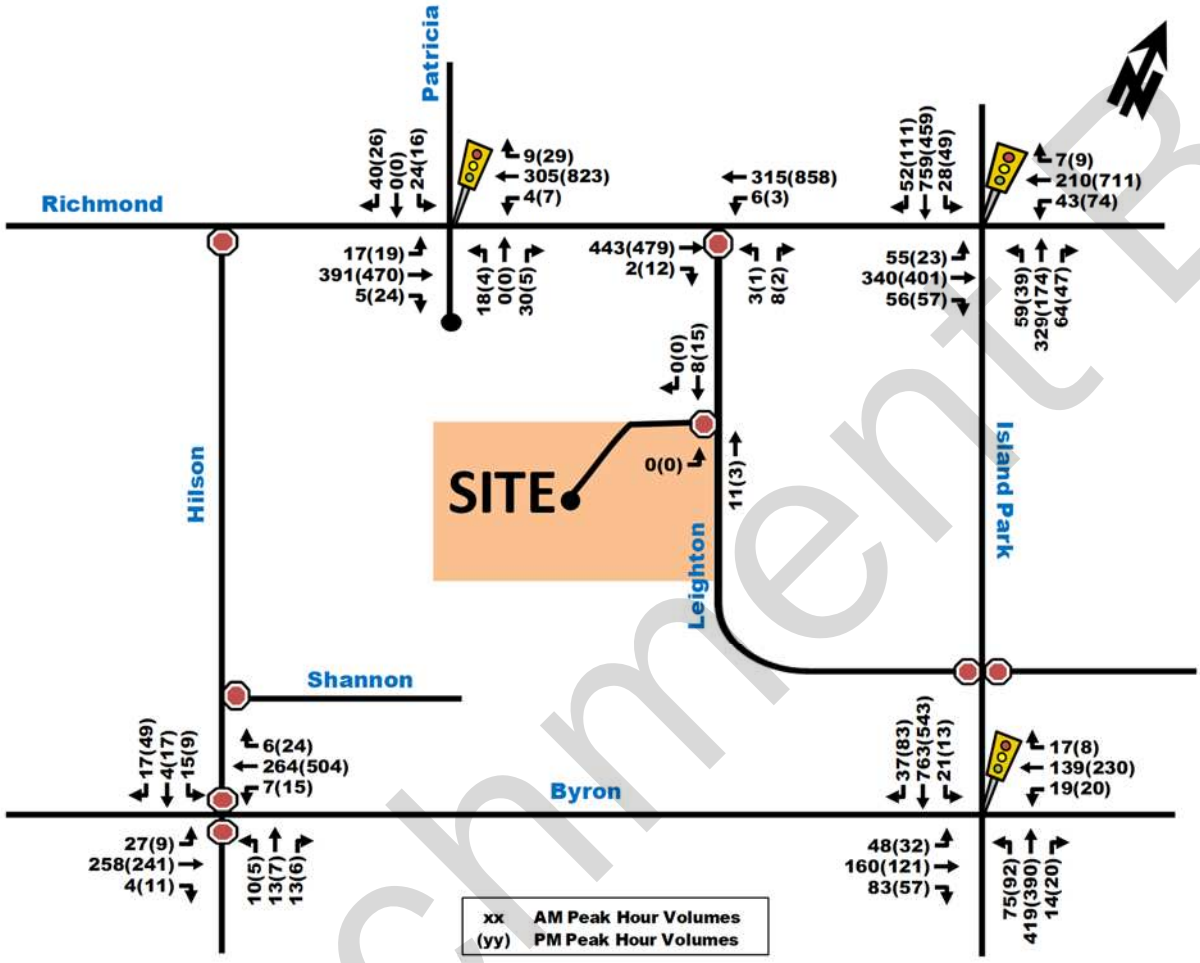
Figure 2: illustrates the OC Transpo transit network, relative to the location of the development site.

Figure 2: Area Transit Network

4.3. STUDY AREA TRAFFIC VOLUMES

The current traffic counts at key study area intersections are summarized in Figure 3 and provided in Attachment 4.

Figure 3: Existing Peak Hour Traffic Volumes



4.4. EXISTING CONDITIONS TRAFFIC OPERATIONS

The following Table 2 provides a summary of the existing traffic operations at the study area intersection 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 SYNCHRO model outputs of existing conditions are provided in Attachment 5. Note that the Peak-Hour-Factor (PHF) used is 0.90 in existing conditions and 1.00 in all future conditions, based on the requirements of the TIA Guidelines.

Table 2: Existing Conditions Intersection Performance

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
Signalized						
Richmond/Patricia/Q West Garage	A(C)	0.37(0.73)	EBT(WBT)	6.9(11.8)	A(B)	0.33(0.61)
Richmond/Island Park	E(D)	0.95(0.81)	SBT(WBT)	30.7(24.2)	C(B)	0.72(0.70)
Unsignalized						
Richmond/Leighton	B(B)	12(14)	NB(NB)	0(0)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Table 2, all study area intersections 'as a whole' operate at a LOS 'C' or better during the morning and afternoon peak hour periods. Critical movements at the intersection of Richmond/Patricia/Q West Garage operate at a LOS 'C' or better during peak hours, while critical movements at the intersection of Richmond/Island Park operate near capacity with a LOS 'E' during the morning peak hour. The critical movements at the unsignalized intersection of Richmond/Leighton operate at a LOS 'B' during both peak hour periods.

4.5. RICHMOND FRONTAGE COLLISION SUMMARIES

A five-year collision history data (2014-2018 inclusive) was requested and obtained from the City of Ottawa for the following intersections and road segments within the study area:

- Richmond/Island Park
- Richmond/Leighton
- Richmond/Patricia
- Richmond Rd between Leighton and Patricia
- Richmond Rd between Leighton and Island Park

Collision analysis was conducted, which determined that a total of 64 collisions occur at the above locations, 50 of which involved two or more vehicles. Of the 50 collisions, 43 occurred at the intersection of Richmond/Island Park alone. A standard unit of measure for assessing collisions at an intersection is based on the number of collisions per million entering vehicles (MEV). At the intersection of Richmond/Island Park, reported collisions have historically taken place at a rate of 0.92 Collisions/MEV. Although the majority of collisions show no particular pattern, it should be noted that 7 collisions were rear enders for vehicles travelling northbound and 7 other collisions occurred due to sideswipe for vehicles travelling eastbound. The northbound rear end collisions may be attributed to queuing along Island Park Dr, which causes vehicles to brake abruptly before crossing through the intersection. Furthermore, the eastbound sideswipe collisions may be attributed to vehicles switching lanes in order to avoid the queue of vehicles in the eastbound left-turn.

Collision data obtained from the City of Ottawa and analysis conducted are both provided in Attachment 6.

5. PROJECT PHASE 2A TRIP GENERATION

5.1. RESIDENTIAL

As previously noted, Phase 2A will consist pf 161 mid-rise residential condo/apt units, 5 units in the Convent building and 1,700 m^2 of restaurant (two) space, with the remainder being amenity space within the Convent building. The City's 2009 Trip Generation Manual will be used to generate restaurant trips. For the residential component either

the ITE Manual could be used or the Phase 1 site generation rate could be used as a proxy. Typically, if proxy rates are available, they are preferable as we have found that use of the ITE rates tends to overestimate traffic generation for urban condo/apartment projects. As such, the "proxy" approach has been used herein for the residential component of Phase 2A.

Two recent, a peak hour traffic counts have been conducted at the Richmond/Patricia/Phase 1 intersection. The first was conducted in April 2017 (Attachment #2) at a time when the Phase 1 condo building (294 units) was 95% occupied and the parking garage (291 spaces) was sold out. The two-way volumes totaled 53 veh/h and 37 veh/h during the morning and afternoon peak hours respectively. To account for the 5% unoccupied units and for a small amount of additional retail/commercial garage traffic, these volumes should be increased to 60 veh/h two-way total to represent full Phase 1 occupancy. The second count (Attachment #3) was conducted in December 2019 when the building was fully occupied. The two-way site-generated peak hour volumes were 58 veh/h and 40 veh/h during the morning and afternoon peak hours respectively, which is very similar, but slightly higher than the 2017 counts. Based on the two counts, a Phase 1 proxy of 60 veh/h two-way total for both peak hours is considered appropriate. When applying the resultant trip generation rate to the 166 units in Phase 2A and using the directional splits of 10% in/90% out during the morning peak and 85% in/15% out during the afternoon peak, the resultant Phase 2A peak hour residential traffic generation is as per summarized in Table 3.

Table 3 : Phase 2A Residential Vehicle Trip Generation (Proxy Method) veh/h

Use	# units	Morning Peak hour			Afternoon Peak hour		
		In	Out	Total	In	Out	Total
Condo/Apt	166	4	31	35	30	5	35

5.2. RESTAURANT

With regard to the restaurant component of the development, the number of trips generated by two 850 m^2 restaurants (1,700 m^2 total) was determined using the ITE Trip Generation Manual (10^{th} edition), assuming the "Quality Restaurant" land use. The trip rates obtained from the ITE manual are summarized in Table 4. Note that only the PM peak has been provided as the restaurants, being higher quality sit-down restaurants, are assumed to be closed during the AM peak.

Table 4: ITE Trip Rates for Restaurants

Land Use	Data Source	Average Trip Rates
		PM Peak
Quality Restaurants	ITE 931	T = 7.80
Notes:	*T = Average Vehicle Trip Ends* *X = 1000 Sq. ft GFA*	

The ITE vehicle trip rates shown in Table 4 were then multiplied by a factor of 1.28, which was calculated by assuming a default 10% non-auto mode share and an average vehicle occupancy of 1.15, in order to convert the vehicle trips provided by the ITE manual to person trips. The resulting person trips/h are provided in Table 5 below. Note that the percentages of in and out traffic was obtained from the ITE Trip Generation Manual.

Table 5: Person Trips Generated by the Restaurants

Land Use	Area (ft^2)	PM Peak (Person Trips/h)		
		In (67%)	Out (33%)	Total (100%)
Quality Restaurants	18,303	122	61	183

As shown in Table 5, the total person trips/h expected to be generated by the two restaurants, is 183 person trips/h during the afternoon weekday peak hour period. Travel modes and their associated mode share percentages were

then obtained from the 2011 NCR Household Origin-Destination Survey for the Ottawa West district. Table 6 provides the projected person trips/h for each of the travel modes.

Table 6: Restaurant Trips Generated Based on Travel Modes

Travel Mode	Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total
Auto Driver	50%	61	31	92
Auto Passenger	15%	19	9	28
Transit	20%	24	12	36
Non-motorized	15%	18	9	27
Total Person Trips	100%	122	61	183
Total 'New' Auto Trips		**61**	**31**	**92**

However, based on the location of the restaurants along Richmond Rd and the surrounding higher density development buildings, it is assumed that a higher percentage of trips would be of a non-motorized travel mode. As such, the mode share percentages were further adjusted as shown in Table 7.

Table 7: Restaurant Trips Generated Based on Adjusted Mode Shares

Travel Mode	Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total
Auto Driver	40%	49	25	74
Auto Passenger	20%	25	12	37
Transit	10%	12	6	18
Non-motorized	30%	36	18	54
Total Person Trips	100%	122	61	183
Total 'New' Auto Trips		**49**	**25**	**74**

The number of 'New' Auto Trips anticipated to be generated by the proposed restaurants is approximately 74 vehicle trips/h during the afternoon peak hour period.

5.3. PHASE 2A VEHICLE TRIP DISTRIBUTION AND ASSIGNMENT

The parking for Phase 2A will be in the proposed parking garage located beneath Phase 2A and 2B once the site is fully developed. The total parking count will be approximately 230 spaces but initially only approximately 120 spaces will be provided for Phase 2A. With regard to the distribution of residential traffic to/from Phase 2A, it will all be directed to site's existing right-in/right-out driveway connection to Leighton Terrance, which will in turn distribute the traffic to/from the Richmond/Leighton Terrace intersection. When Phase 2B is built and the below grade garage is complete, the two components of the garage will be connected, however, the current strategy is to control the traffic flow in the garage such that all Phase 2A traffic goes north to Leighton Terrace and Richmond Road and all Phase 2B traffic goes south toward Byron (connection to be determined). Based on the combination of the location of employment centres, retails districts and the primary road network relative to the subject site, the Phase 2A traffic distribution assumptions are as depicted in Figure 4. Applying these distribution assumptions to the Phase 2A residential traffic generation (Table 2) results in the assignment depicted in Figure 5.

Figure 4: Phase 2A Residential Traffic Distribution Assumptions

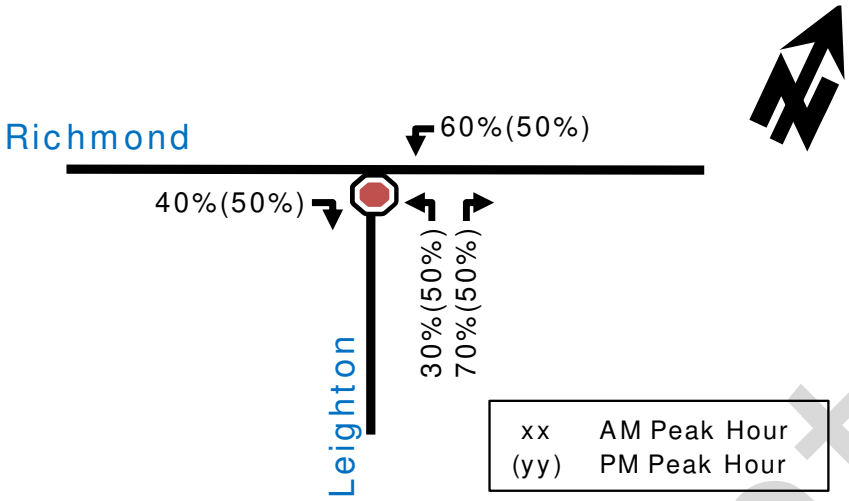
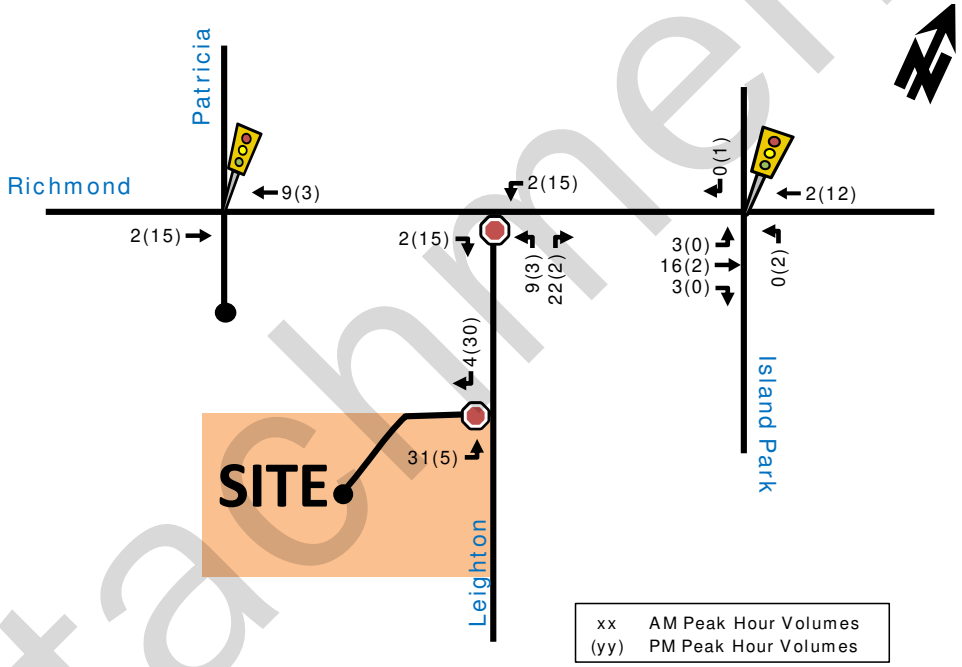
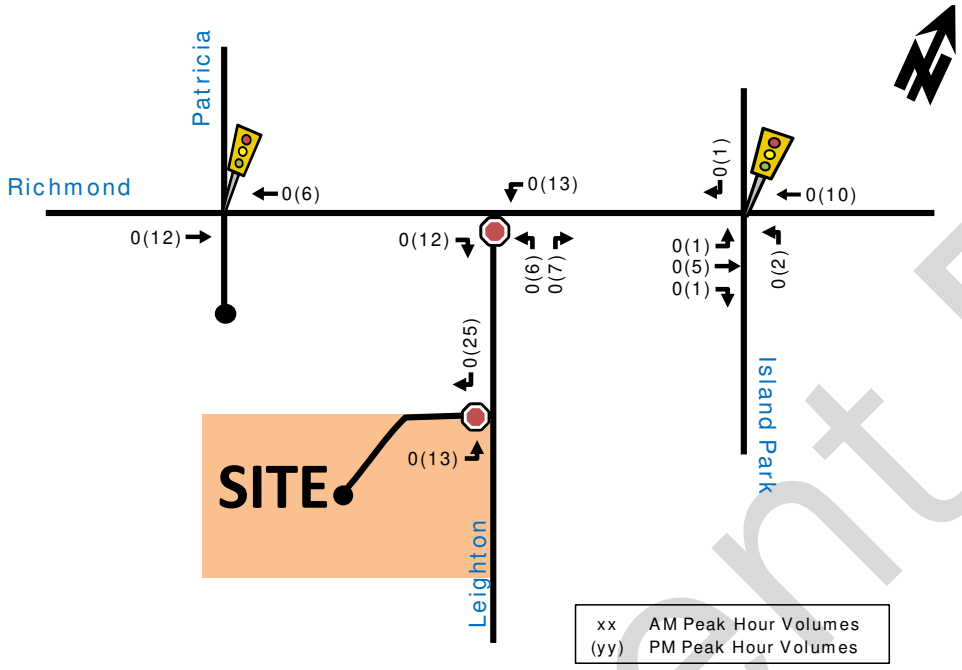


Figure 5: Phase 2A Residential Vehicle Trip Assignment



With regard to the distribution of restaurant-generated traffic, the afternoon commuter peak hour is 4:30 to 5:30 and as such is a bit earlier than the peak hour of restaurant traffic generation. This will impact the site traffic generation as will the desire for restaurant patrons to use the area's on-street parking instead of the on-site underground visitor parking. For purposes of traffic assignment to the site's Leighton Terrace driveway connection, it has been assumed that 50% of the restaurant traffic (25 veh/h) will park on-street within the study area and 50% (25 vph) will use the garage. The resultant restaurant traffic assignment is depicted in Figure 6.

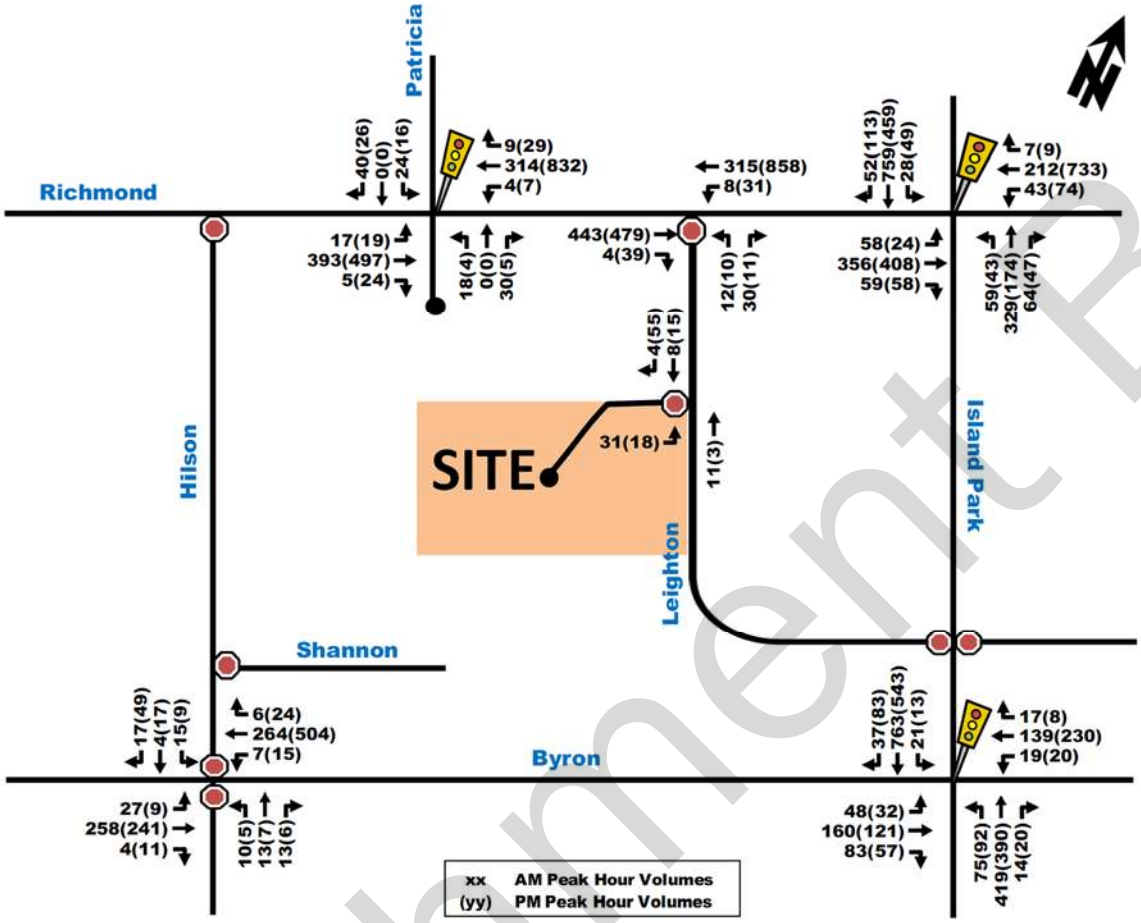
Figure 6: Restaurant-Generated Traffic Assignment



5.4. INTERSECTION LEVEL OF SERVICE AS A RESULT OF PHASE 2A DEVELOPMENT

The following Figure 7 depicts the projected Phase 2A residential and restaurant traffic (Figures 5 and 6) superimposed onto existing volumes (Figure 3). Note that traffic growth analysis was partaken at the intersection of Richmond/Island Park through a regression analysis of three different traffic counts (2011, 2016 and 2017 counts) conducted by the City of Ottawa at the intersection. The analysis determined that traffic growth is on a decline along Richmond Rd and as such, 0% traffic growth has been applied to the study area.

Figure 7: Total Projected Peak Hour Traffic Volumes



Synchro analysis was conducted using the total projected Phase 2A traffic volumes shown in Figure 7. The analysis results are provided in Attachment 7 and summarized in Table 8.

Table 8: Total Projected Conditions Intersection Performance

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
Signalized						
Richmond/Patricia/Q West Garage	A(B)	0.34(0.67)	SBT(WBT)	6.7(10.1)	A(A)	0.30(0.56)
Richmond/Island Park	D(C)	0.85(0.72)	SBT(WBT)	23.9(21.5)	B(B)	0.64(0.63)
Unsignalized						
Richmond/Leighton	B(C)	12(16)	NB(NB)	0(0)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.00 and a saturation flow rate of 1800 veh/h/lane.						

As shown in the table above, the signalized intersections operate slightly better compared to existing conditions due to increasing PHF to 1.00 in the analysis. The unsignalized intersection of Richmond/Leighton shows slightly higher delays to the critical movement during the afternoon peak hour period due to the added site-generated traffic.

5.5. MULTI-MODAL LEVEL OF SERVICE (MMLOS) ON PROJECTED CONDITIONS

A multi-modal level of service analysis was conducted at boundary streets and signalized intersections at the frontage of the development site. Since there are no anticipated changes to the study area in the future, the analysis was conducted assuming future projected conditions, where Phase 2A of the proposed development is fully constructed. The signalized intersection analyzed was Richmond/Patricia, while the road segments analyzed were from the mid-blocks of the boundary streets at the frontage of the site, Richmond Rd and Byron Ave.

Richmond Rd (classified arterial) along the frontage of the proposed site consists of the following design and roadway features:

- 2 vehicle travel lanes in each direction, with one lane used as on-street parking;
- 2.0m sidewalks on both sides of the roadway;
- No planned bike lanes;
- More than 3000 avg daily curb lane traffic volumes;
- Posted speed limit of 50km/h;
- Approximately 3.3m wide lanes;
- Truck route designation; and
- A high potential of friction to transit routes due to on-street parking and various driveways.

Byron Ave (classified collector) along the frontage of the proposed site consists of the following design and roadway features:

- 1 vehicle travel lane in each direction;
- 2.0m wide sidewalk and more than 2.0m wide boulevard on the north side of the roadway;
- 1.5m wide sidewalk and 0.6m wide boulevard on the south side of the roadway;
- Multi-Use Pathway (MUP) on north side of the roadway;
- Less than 3000 avg daily curb lane traffic volumes;
- Posted speed limit of 50km/h;
- Approximately 4.7m wide lanes;
- No truck route designation; and
- No transit routes.

The multi-modal level of service analysis is summarized in Table 9, with detailed analysis provided in Attachment 8. The table also identifies the MMLOS targets (obtained from MMLOS Guidelines) with respect to each travel mode, based on the land-use designation and road classification of the development site and the boundary streets. The Official Plan of the City of Ottawa identifies the land-use designation of Richmond Rd as a "Traditional Mainstreet" and Byron Ave as a "General Urban Area". The road classifications of each of the boundary streets were noted above.

Table 9: MMLOS Analysis Summary

Intersection or Road Segment	Level of Service							
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLOS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Richmond/Patricia	D	B	D	C	C	D	F	D
Richmond Rd	B	B	C	C	F	D	D	D
Byron Ave	A	C	A	B	-	N/A	B	No Target
Note: Red letters indicate that the LOS does not meet its respective target.								

With regards to pedestrians, the PLOS at the intersection of Patricia/Richmond does not meet the target LOS. This is primarily due to the number of lanes pedestrians have to cross on the east and west crosswalks (4 lanes) of the

intersection. It is noteworthy, however, that the PLOS along Richmond Rd and Byron Ave meet their respective LOS targets.

With regards to cyclists, the BLOS at the intersection of Patricia/Richmond does not meet the target LOS. This is due to the lack of dedicated bike lanes on any leg of the intersection. The BLOS target is met along Richmond Rd and Byron Ave.

With regards to transit, the TLOS along Richmond Rd does not meet its target LOS. This is due to the high friction assumed to be caused by the on-street parking to the transit vehicles. The TLOS target is met at the intersection of Richmond/Patricia. Note that no TLOS result or target are provided for the Byron Ave road segment as there are no transit routes along this segment of Byron Ave and there are no known planned transit measures.

With regards to trucks, the TkLOS at the intersection of Richmond/Patricia does not meet the target LOS due to narrow corner radiuses and single receiving lane along Patricia Ave. The TkLOS target is met along Richmond Rd, but no target LOS is provided by the MMLOS Guidelines for Byron Ave.

6. DEVELOPMENT DESIGN

As Phase 2A has no public street frontage and as the majority of the supporting transporting infrastructure was built as part of Phase 1, Phase 2 has no off-site requirements/modifications.

6.1. SUSTAINABLE MODES

With Phase 1 construction a new wider streetscaped sidewalk was provided along the site's Richmond frontage from Patricia to Leighton Terrace. Also, along the eastern edge of Phase 2, but within the overall property, a 3 m wide multi-use pathway was constructed from Byron north through the site to connect to Richmond Road at three locations. Two of the connections are via the large open pedestrian portals through the Phase 1 building and the third is to Leighton Terrace which has a new west side sidewalk connection to Richmond Road.

In addition to these pedestrian facilities, extending east-west through the whole site and located between the Convent building and Phase 1 building is a substantial share-use traffic-calmed pedestrian/bicycle/service vehicle area. All pedestrian entrances to/from the Convent building and the Phase 2A building connect directly to these existing on-site pedestrian facilities via either sidewalks or exterior stairs.

With the foregoing on-site pedestrian facilities and connections, the Phase 2A redevelopment has excellent pedestrian and cycling connections to each of Richmond Road, Leighton Terrace and the MUP in the Byron Greenway. It is noteworthy that there are no cycling facilities on Richmond or Leighton Terrace, therefore, cyclist have to share the curb lane with motorized vehicles.

With regard to By-Law bicycle parking requirements, we are advised by the proponent that 88 spaces are required and that 92 spaces will be provided. Of the 92 spaces, 62 will be in a secure area within the garage and 32 will be in safe, highly visible location at-grade around the building.

With regard to bus transit service on area streets and transitway service and future LRT service adjacent to the north of Scott Street, the site is very well connected to the area's existing sidewalk and MUP systems that link the site to these transit services.

6.2. VEHICULAR ACCESS, CIRCULATION AND PARKING

As previously noted Phase 2A's garage will connect directly to the site's existing on-site (Phase 1) driveway system (minimum 6.1 m wide) that connects to Leighton Terrace via a right-in/right-out only connection. The driveway connection to Leighton Terrace has been built and was designed and signed to accommodable only right-in/right-out traffic (including fire trucks) and as such, all site traffic would use the Richmond/Leighton Terrace intersection and no site-generated traffic would use Leighton Terrance south of the driveway connection to Leighton Terrace. This

driveway connection is located approximately 35 m south of the Richmond/Leighton Terrace intersection and there are no single-family homes located between the driveway and Richmond Road.

With regards to service vehicles, it is noteworthy that they will have the option to access the rear of both the Convent building and the residential tower via the existing service lane that runs along the west property line and connects to the Richmond/Patricia/Q West Garage signalized intersection.

With regard to garage layout and design, an initial review indicates aisle widths of 6.0 m and parking space dimensions of 5.2 m long and 2.6 m wide, all of which meet By-Law requirements. The entrance/exit to/from the garage is at-grade and all floor to floor ramps are internal to the garage. The ramp widths are 6 m and the ramp grades are approximately 12% to 15% with the appropriate transition grades, both of which are considered acceptable for an internal ramp.

With regard to By-law vehicle parking requirements. We are advised by the proponent that Phase 2A requires and 90 parking spaces (including visitor parking) and the balance of the development (Phase 1 visitor parking and Phase 2B) requires 106 parking spaces for a total of 206 spaces. A total of 215 to 230 spaces will be provided in the garage beneath Phase 2A and 2B, which will be staged in a manner to meet the By-law requirements of both phases.

6.3. 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 850 m of a rapid transit station, the bus service on the adjacent streets, its close proximity to the downtown core and its location in the middle of Westboro Village are all advantageous in lessening the reliance on the private automobile. The close proximity to significant employment and residential uses will also contribute to a high walk percentage. The close proximity of multi-use pathway will contribute to maximizing the bicycle mode split.

As part of the overall Q West development, it is well connected to the adjacent sidewalks and the north-south multi-use pathway through the site provide excellent pedestrian and bicycle system connectivity.

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 Attachment 9.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Existing Conditions

- Phase 1 development, which is built and occupied, generates significantly less traffic that was projected in the initial Traffic Study due primarily to a projected office component not being realized;
- Of the three study area intersections along Richmond Road, the Richmond/Leighton Terrace and Richmond/Patricia/Q West Garage intersections currently operate at good levels of service in the LoS 'A' to 'B' range. The Richmond/Island Park intersection, due primarily to the high north-south volume to/from Quebec, is operating at a poor LoS 'E' in the SB, during the afternoon peak;
- New streetscaped sidewalks exist on both sides of Richmond along the site's frontage and a 3.0 m wide MUP existing along the east side of the site connecting the Byron Greenway corridor to the site and to Richmond Road; and

Projected Conditions

- A review of recent historic traffic counts along Richmond Road reveals that there has been no background traffic growth along the site's Richmond Road frontage;
- The combination of projected Phase 2A residential and restaurant traffic will generate a two-way total of 35 veh/h and 110 veh/h during the weekday morning and afternoon peak hours respectively. Of these afternoon peak hour vehicle trips (74 veh/h) attributed to the restaurant use only 50% are estimated to travel on-site as 50% are assumed to find parking on-street in the area. Therefore during the afternoon peak hour the new volume to/from the Phase 2A garage will be approximately 70 veh/h two-way total.
- At full build-out of Phase 2A study area intersections are projected to operate continue operating well within City standards. It is noteworthy that Phase 2A site traffic has no impact on the operation of either the Richmond/Patricia/Q West intersection or the Richmond/Island Park intersection. The unsignalized intersection of Richmond/Leighton operates with slightly higher delays during the afternoon peak;
- The pedestrian and cycling level of service target are not met at the intersection of Richmond/Patricia/Q West Garage, but met along the Richmond Rd and Byron Ave road segments;
- The Transit LOS is not met along Richmond Rd due to high friction levels to transit vehicles from the on-street parking. The target LOS is met at the intersection of Richmond/Patricia/Q West Garage.
- The truck level of service is not met at the intersection of Richmond/Patricia/Q West Garage due to narrow turning radiuses and single receiving lane along Patricia Ave. the target LOS is met along the Richmond Rd road segment.
- Service vehicles will have the option to access the rear of both the Convent building and the residential tower via the existing service lane that runs along the west property line and connects to the Richmond/Patricia/Q West Garage signalized intersection.

Site Plan Review

- The proposed vehicle and bicycle parking supply meets By-Law requirements;
- The proposed parking garage space, circulation aisle and ramp width dimensions meet By-Law requirements;
- Ramp grades internal to the garage are considered acceptable; and
- The proposed parking garage beneath Phase 2A and 2B will be designed/controlled such that all Phase 2A traffic will use the site's existing Leighton Terrace right-in/right-out connections and the future Phase 2B traffic will connect to either Shannan or Byron (yet to be determined)

Based on the foregoing, the proposed development fits well into the context of the surrounding area, and its location and design serves to provide 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 Q West Phase 2A development is recommended from a transportation perspective.

Sincerely,

Ronald Jack, P.Eng.
Senior Transportation Engineer

Attachments

Attachment 1:
Response to City's Transportation-Related Comments

PARSONS

1223 Michael Street North, Suite 100, Ottawa, Ontario K1J 7T2
P: +1.613.738.4160 I F: +1.613.739.7105 I www.parsons.com

December 12, 2019

BY EMAIL: kwatson@ashcrofthomes.ca
Reference: 476778 - 01000

Ashcroft Homes
18 Antares Drive
Ottawa, Ontario
K2E 1A9

Attention: Kieran Watson, Development Planner

Dear Kieran:

RE: Q West (378 Leighton Terrace)
Phase 2A Transportation Study

Following the review of the Phase 2A Site Plan and the related transportation submission (Addendum #6, July 2008), the City provided the following transportation-related comments for which our responses are provided below in italics.

TRANSPORTATION

Comment 1: The initial CTS from 2010 is outdated and a new TIA report is recommended for the Site Plan Application (apply 2017 TIA Guidelines).

Response 1: *The scope of transportation work for Phase 2A was recently discussed with the City's lead planner on the Q West file and the agreed-upon scope is described in ensuing Transportation Study letter report.*

Comment 2: MMLOS Analysis should be provided for impacted intersections and for segments of the boundary streets.

Response 2: *Agreed and provided in ensuing report.*

Comment 3: Appropriate TDM measures should be recommended to enable and encourage travel by sustainable modes.

Response 3: *Agreed and provided in ensuing report.*

Comment 4: Clarify whether the community and/or commercial and/or retail uses planned for Phase 2A within the existing heritage building are included in the trip generation estimate of Addendum 6. It appears that at the time of Addendum 6 the heritage building was part of a "Phase 3" and therefore its use and trip generation was not included in Phase 2.

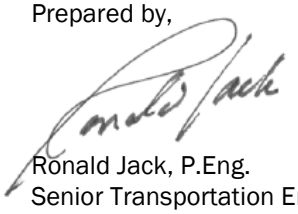
Response 4: *The ensuing Phase 2A trip generation analysis included the proposed retail/commercial uses in the Convent building.*

Comment 5: The Site Plan shows a connection from the 9-storey residential (Phase 2A) building to the south (either Shannon or Byron), however, no trips are assigned to this garage entry. If there are no trips from this garage this should be clearly indicated in the "traffic memo". As well, remove all mention of the Phase 2B driveway connection to Byron or to Shannon if this is not part of Phase 2A. Assessment of the Phase 2B connection will be completed as part of the Phase 2B submission.

Response 5: *The ensuing transportation report confirms that all Phase 2A traffic will be directed and assigned to the Leighton Terrace and the Richmond/Leighton Terrace intersections. As well, the new text is modified to reflect the concerns about the Phase 2B driveway connection.*

Based on the foregoing and the ensuing/updated Transportation Report, the proposed Q West Phase 2A Site Plan continues to be recommended from a transportation perspective.

Prepared by,



Ronald Jack, P.Eng.
Senior Transportation Engineer

Attachment 2:
Richmond/Patricia/Q West Intersection 2017 Peak Hour Count

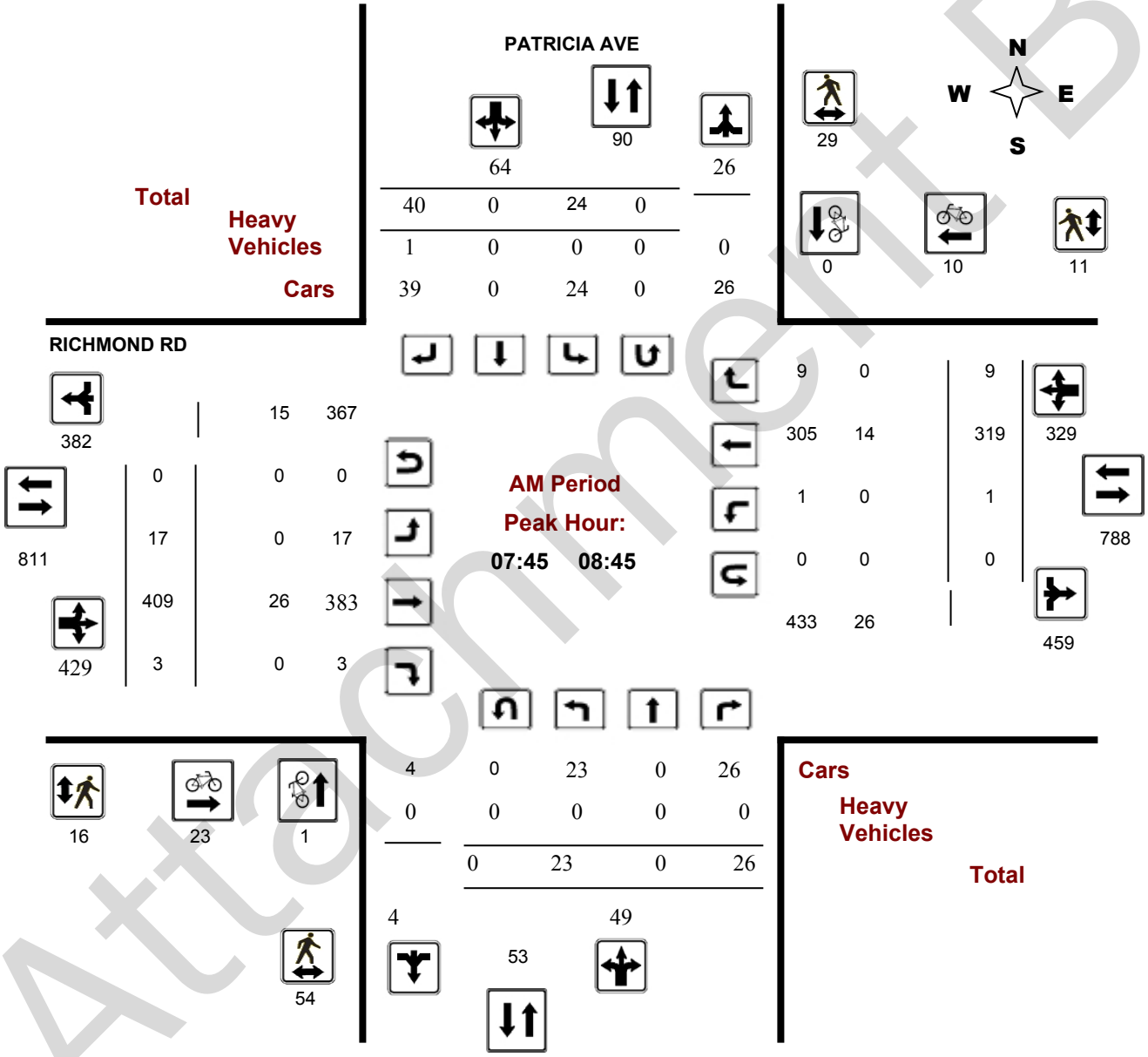
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36949
Device: Miovision



Comments

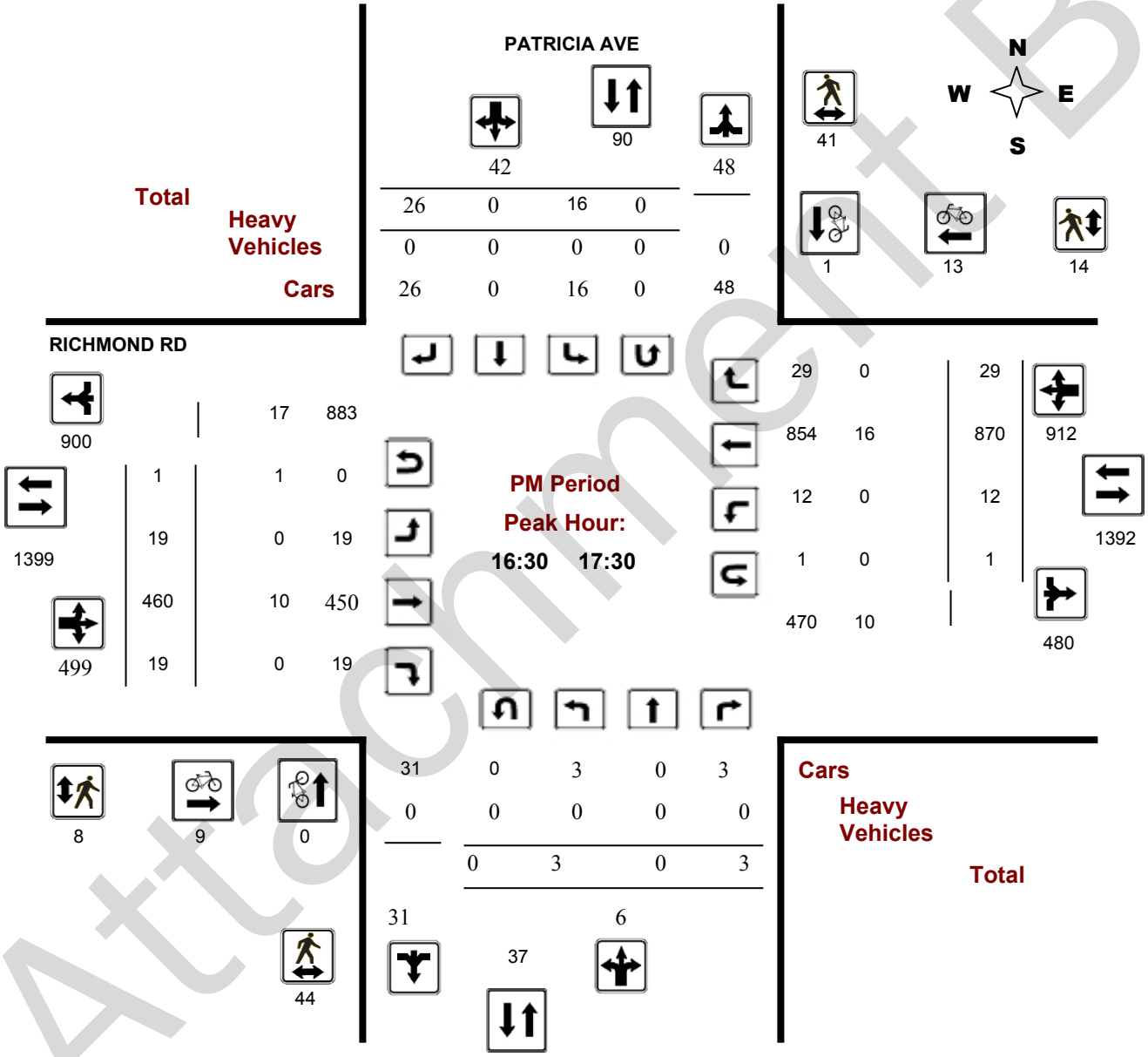
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017 **WO No:** 36949

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

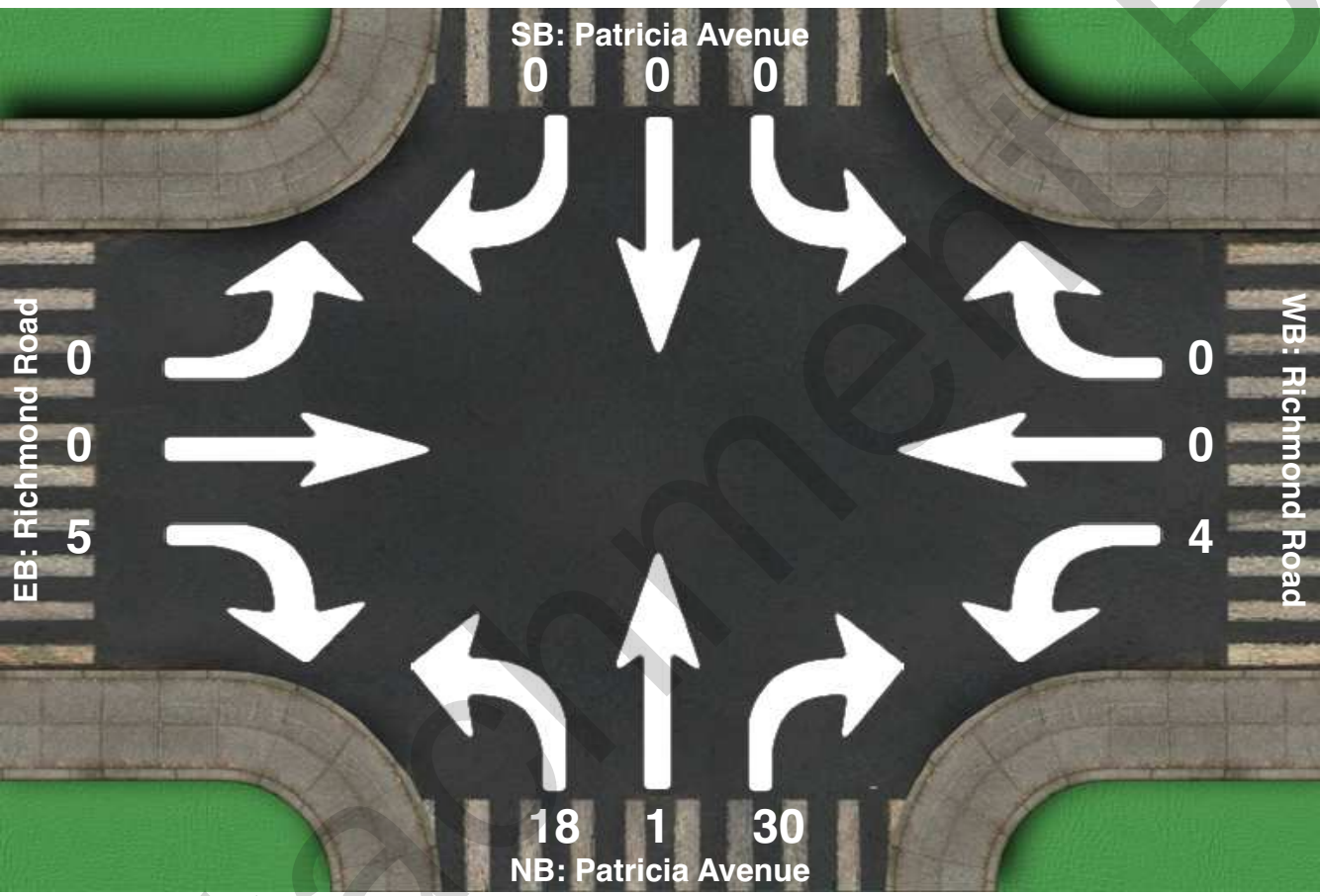


Comments

Attachment 3:
Richmond/Patricia/Q West Intersection 2019 Peak Hour Driveway Count

Intersection Peak Hour

Location: Patricia Avenue at Richmond Road, Ottawa
GPS Coordinates:
Date: 2019-12-12
Day of week: Thursday
Weather: Clear
Analyst: Basel Ansari



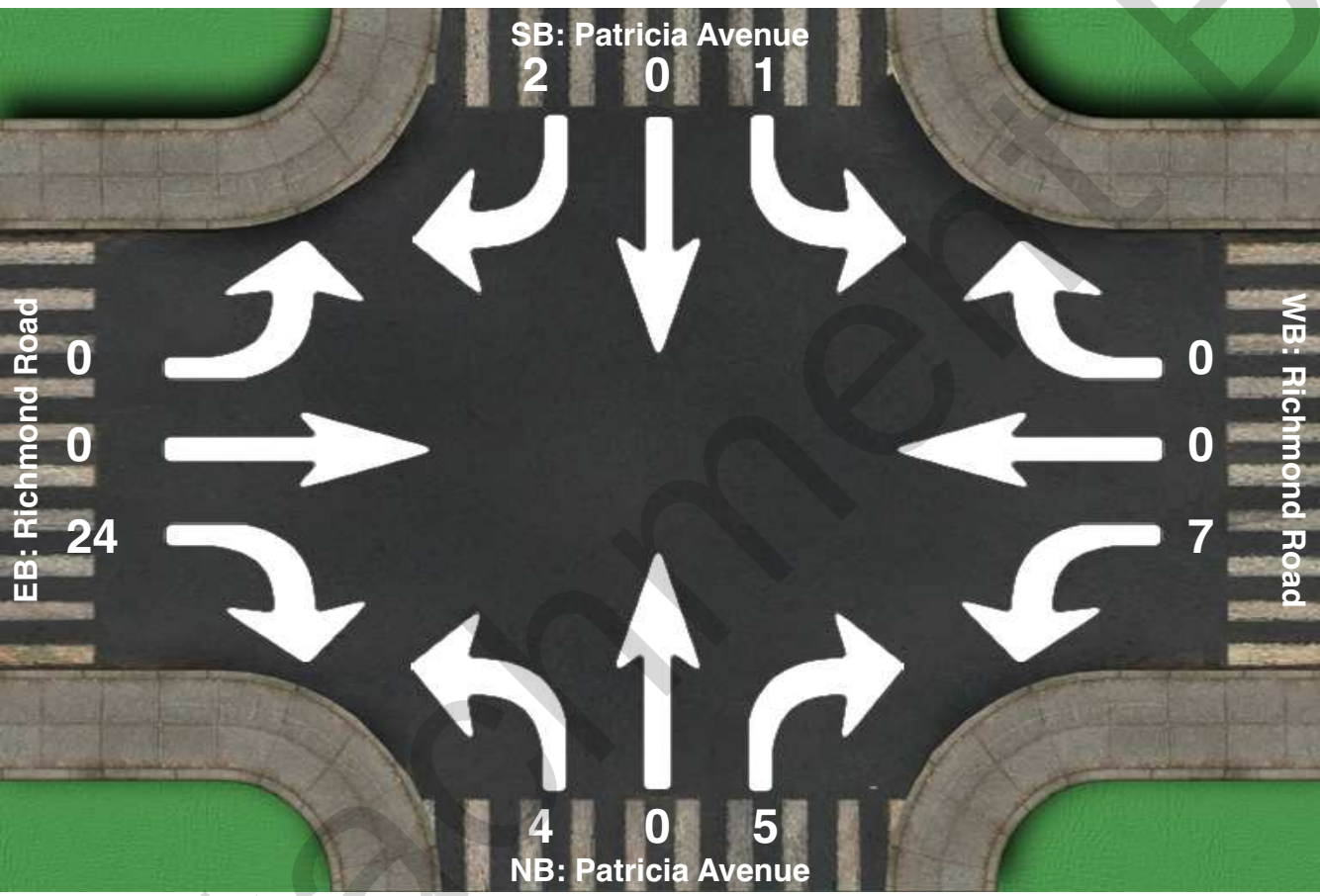
Intersection Peak Hour

07:45 - 08:45

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	4	0	0	18	1	30	0	0	5	58
Factor	0.00	0.00	0.00	0.33	0.00	0.00	0.75	0.25	0.94	0.00	0.00	0.62	0.73
Approach Factor	0.00			0.33			0.82			0.62			

Intersection Peak Hour

Location: Patricia Avenue at Richmond Road, Ottawa
GPS Coordinates:
Date: 2019-12-12
Day of week: Thursday
Weather: Clear
Analyst: Basel Ansari



Intersection Peak Hour

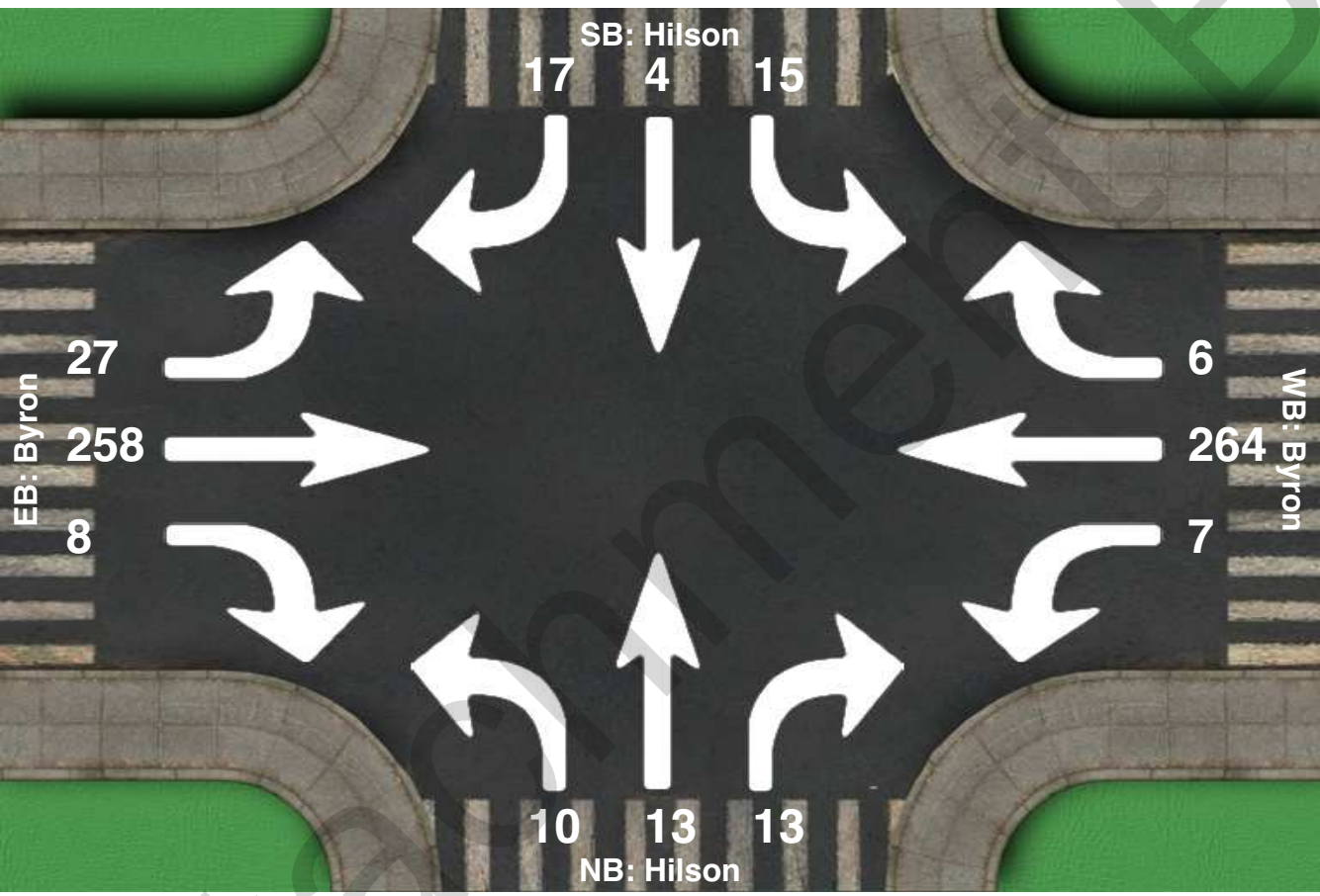
16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	1	0	2	7	0	0	4	0	5	0	0	24	43
Factor	0.25	0.00	0.25	0.58	0.00	0.00	0.50	0.00	0.42	0.00	0.00	0.55	0.60
Approach Factor	0.25			0.58			0.56			0.55			

Attachment 4:
Study Area's Existing Peak Hour Traffic Volumes

Intersection Peak Hour

Location: Hilson at Byron, Ottawa, On
GPS Coordinates:
Date: 2018-12-03
Day of week: Monday
Weather: Raining
Analyst: Basel Ansari



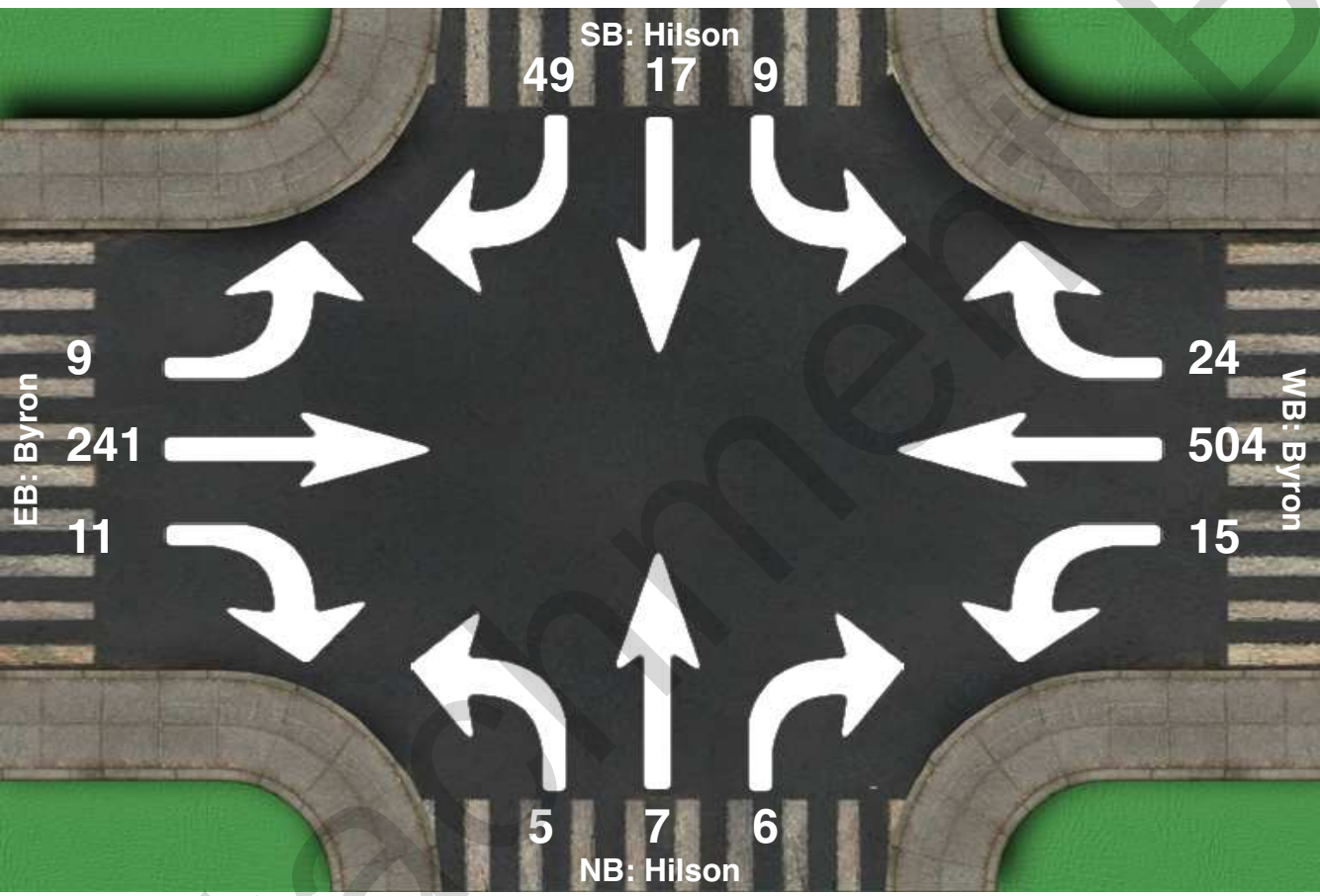
Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	15	4	17	7	264	6	10	13	13	27	258	8	642
Factor	0.54	0.50	0.53	0.88	0.81	0.50	0.50	0.81	0.41	0.75	0.87	0.40	0.90
Approach Factor	0.60			0.83			0.75			0.87			

Intersection Peak Hour

Location: Hilson at Byron, Ottawa, On
GPS Coordinates:
Date: 2018-12-03
Day of week: Monday
Weather: Overcast
Analyst: Basel Ansari



Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	9	17	49	15	504	24	5	7	6	9	241	11	897
Factor	0.75	0.61	0.82	0.54	0.95	0.67	0.42	0.58	0.75	0.56	0.90	0.46	0.95
Approach Factor	0.75			0.96			0.75			0.86			

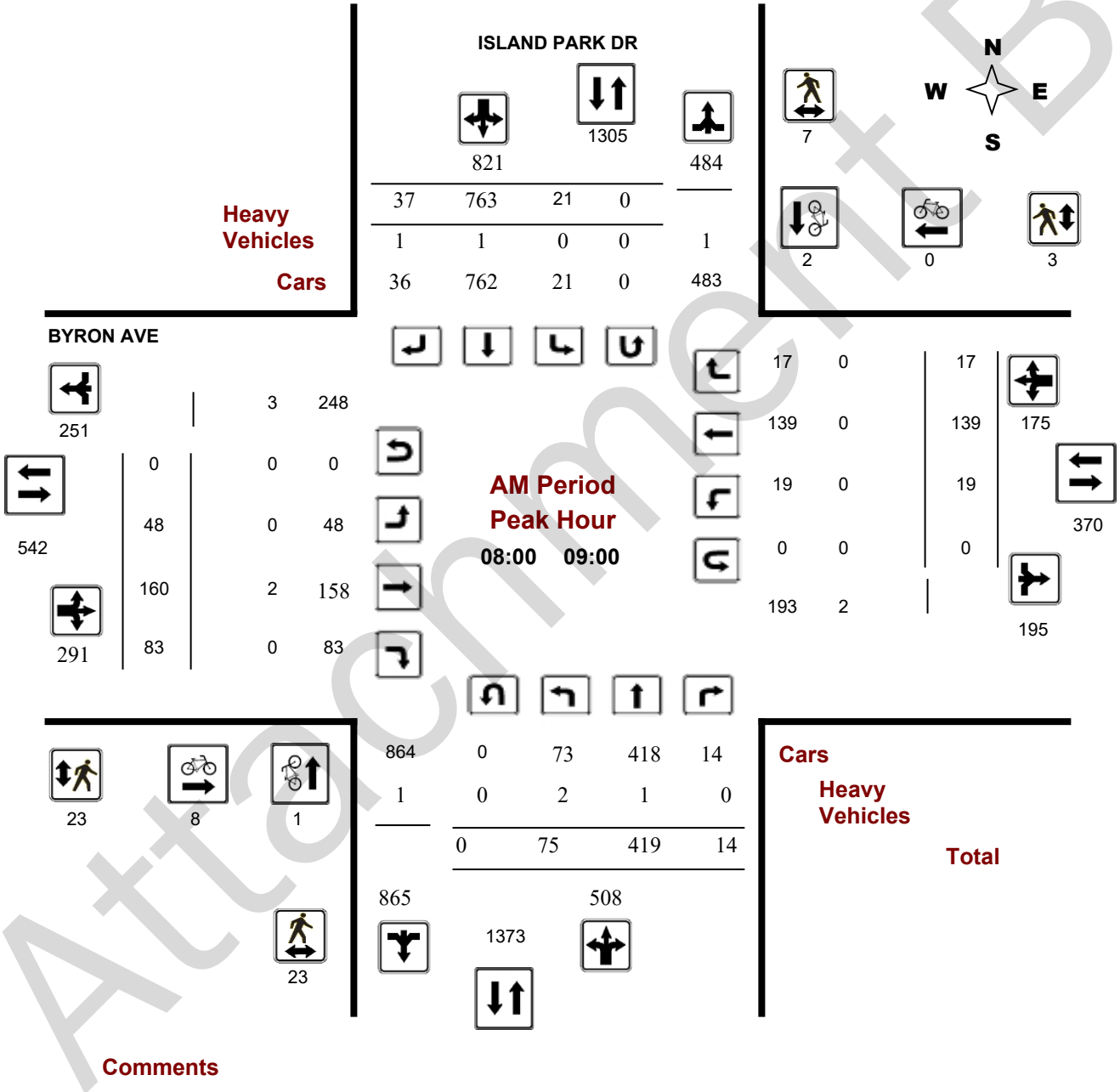
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ISLAND PARK DR

Survey Date: Wednesday, March 09, 2016 **WO No:** 35708

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



Comments

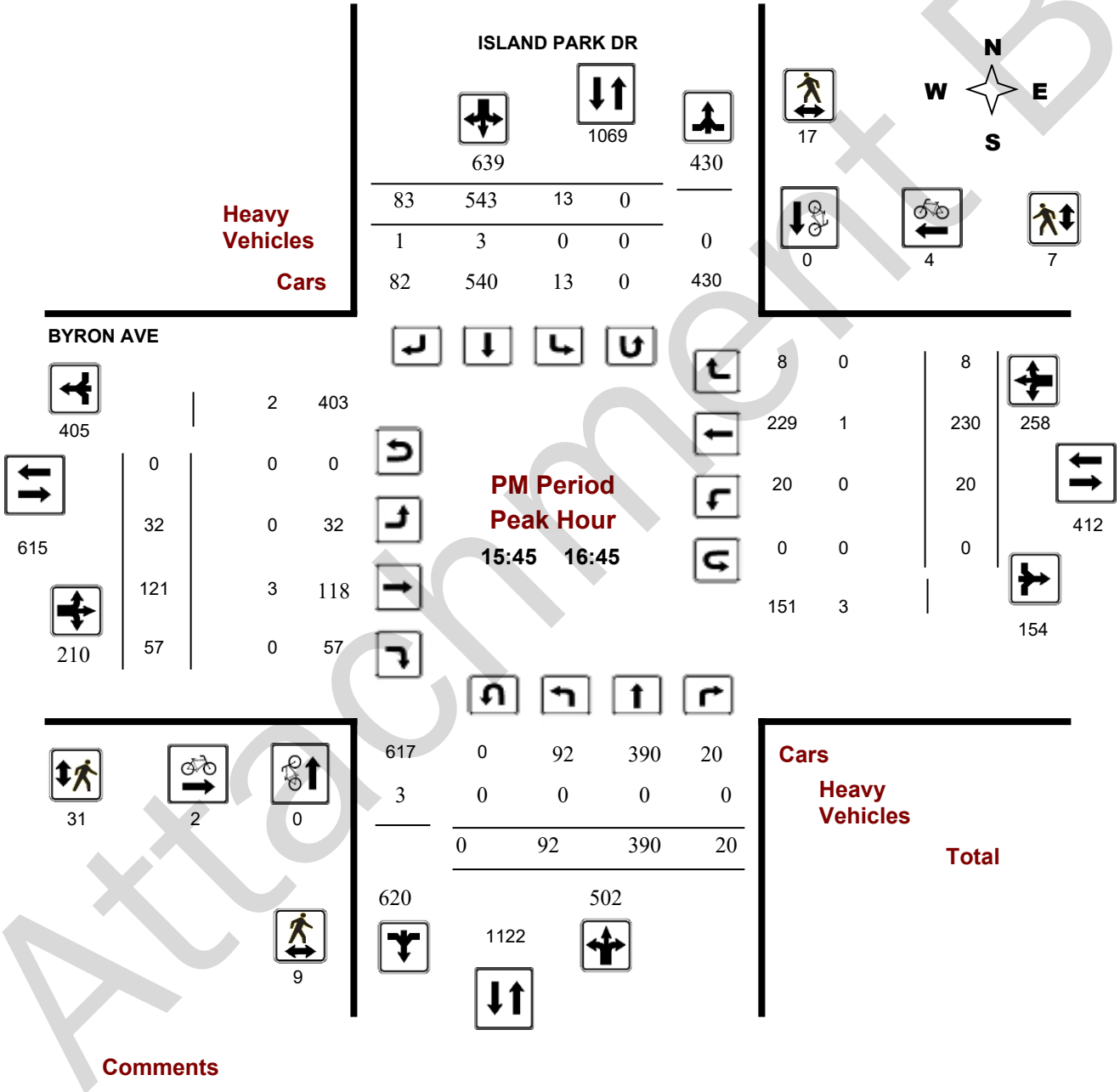
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ISLAND PARK DR

Survey Date: Wednesday, March 09, 2016 **WO No:** 35708

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



Comments

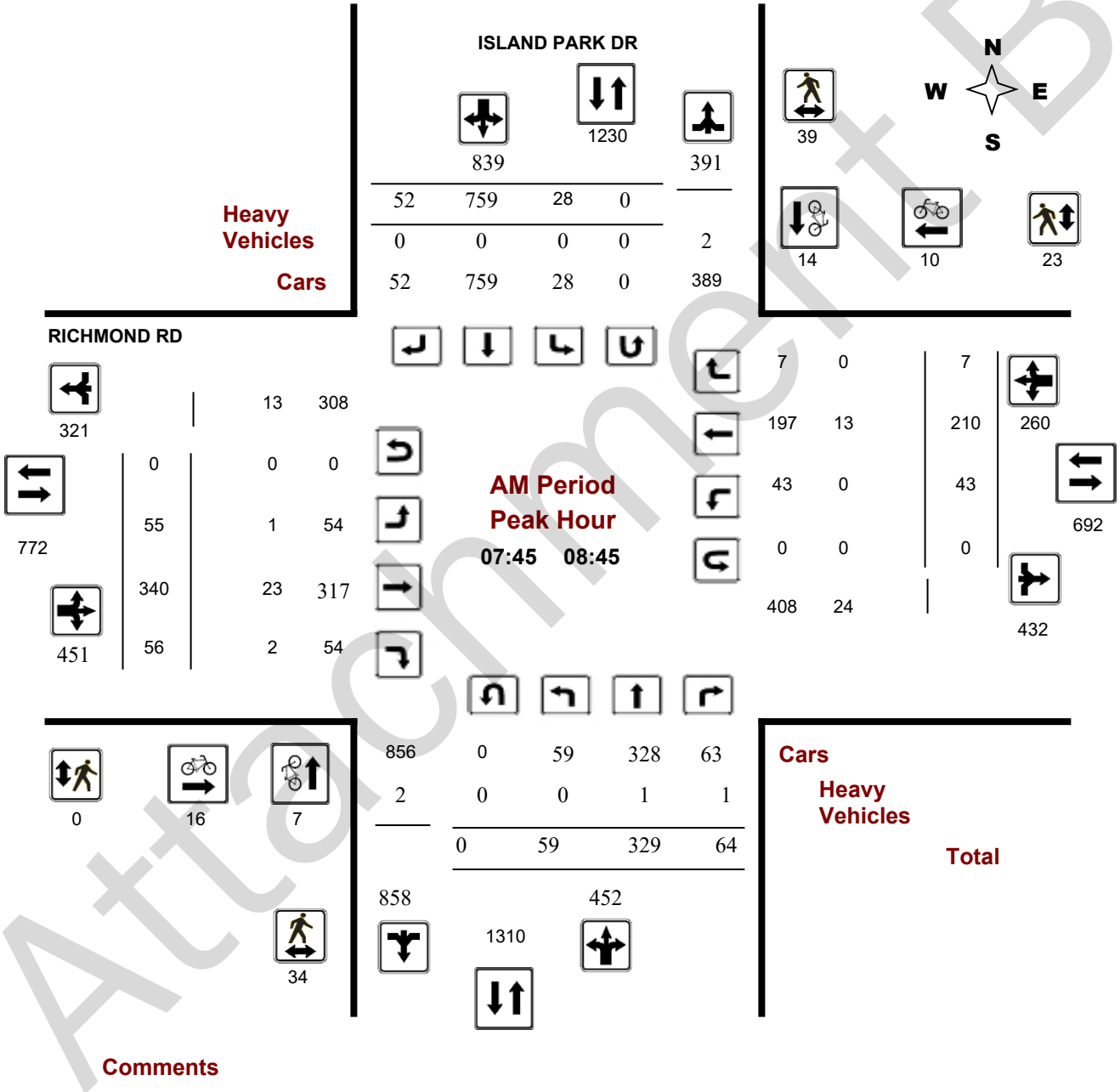
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision



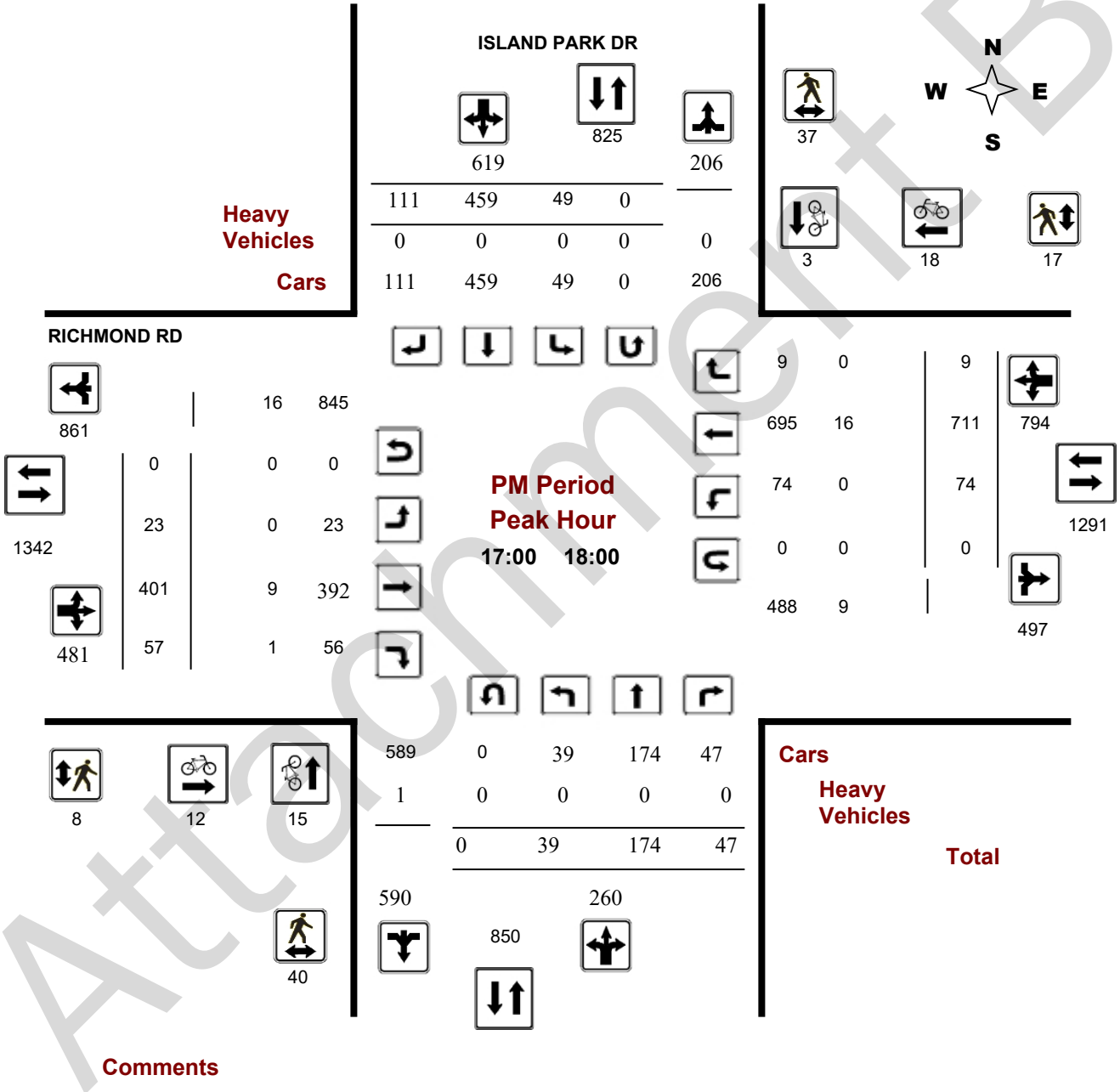
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017 **WO No:** 36954

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



Comments

DIRECTIONAL TRAFFIC FLOW

Intersection: **Leighton** at **Richmond**

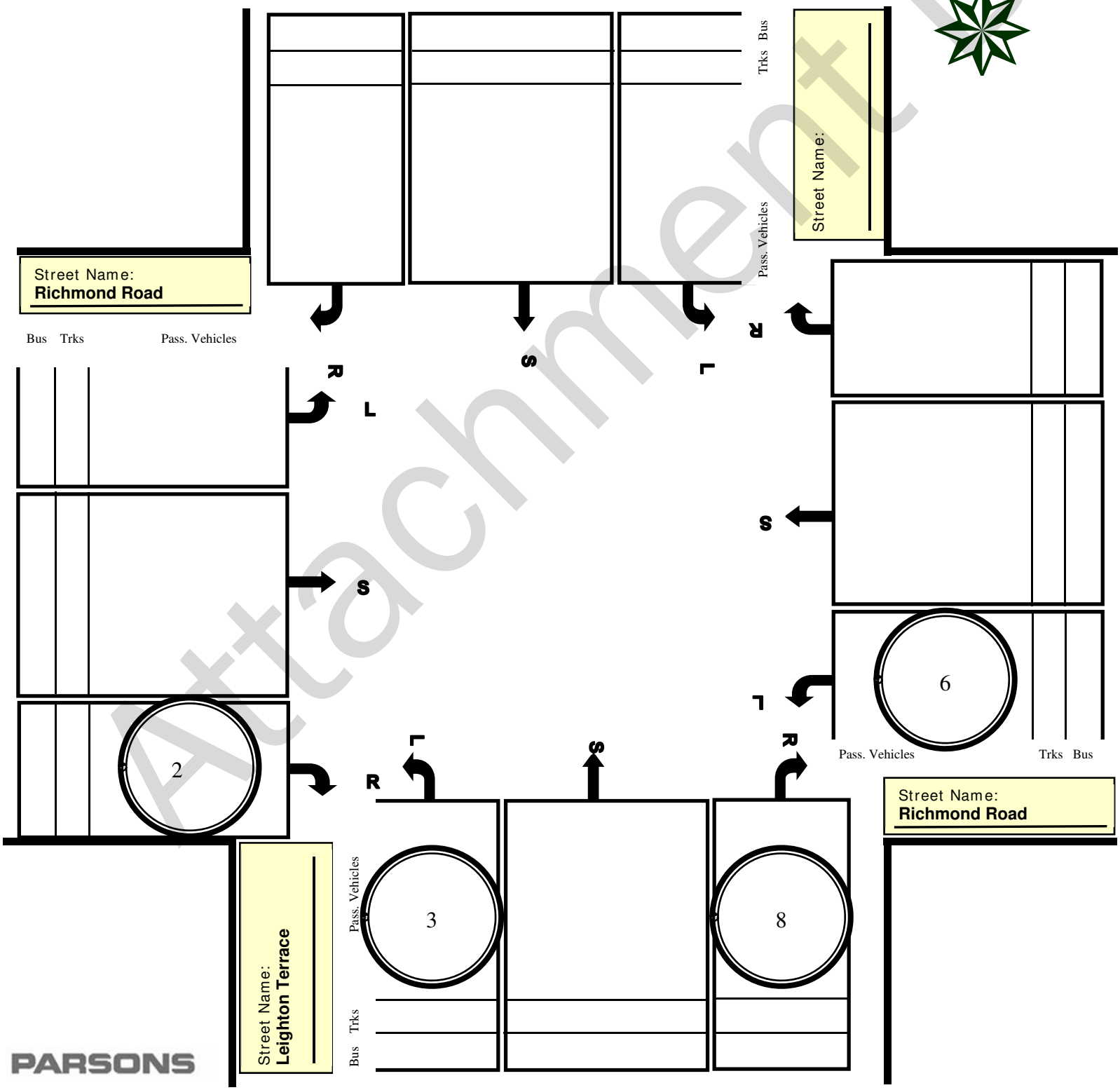
DATE: Day: **8** Month: **June** Year: **2018** Day of Week: **Friday**

Observer: **Matt M.** Weather: **Clear**

Chkd by: _____ Date: _____

TIME PERIOD: From: **8 : 00** To: **9 : 00**

Instructions: 1) Use tally marks to indicate vehicles.
2) Use one sheet for each 15-minute period.



PARSONS

DIRECTIONAL TRAFFIC FLOW

Intersection: **Leighton** at **Richmond**

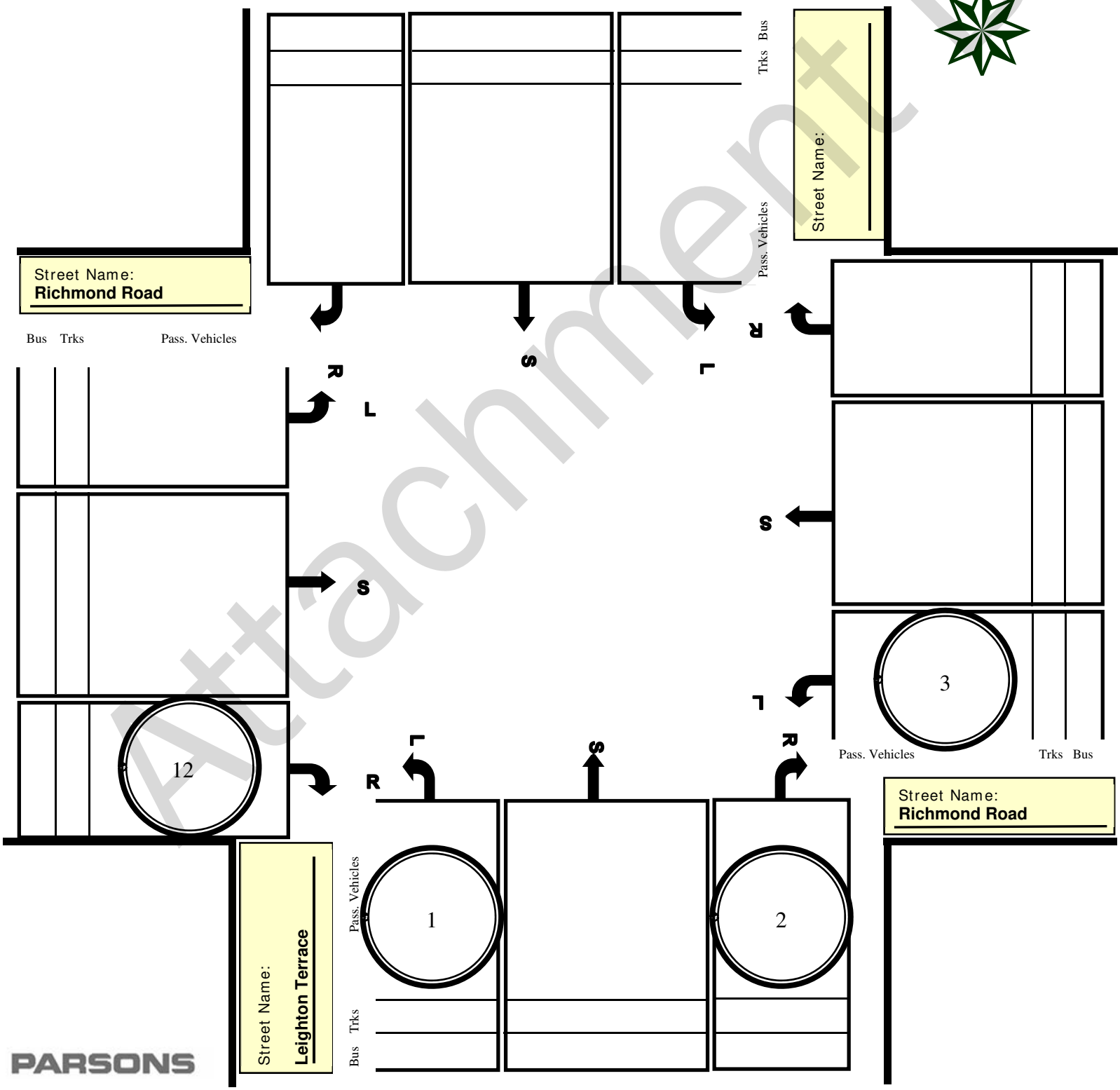
DATE: Day: **7** Month: **June** Year: **2018** Day of Week: **Thursday**

Observer: **Matt M.** Weather: **Cloudy**

Chkd by: _____ Date: _____

TIME PERIOD: From: **16 : 00** To: **17 : 00**

Instructions: 1) Use tally marks to indicate vehicles.
2) Use one sheet for each 15-minute period.



PARSONS

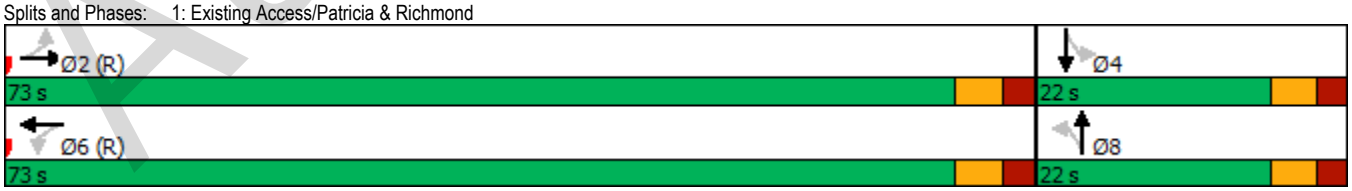
Attachment 5:
Existing Conditions Synchro Analysis

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	17	391	4	305	18	0	24	0
Future Volume (vph)	17	391	4	305	18	0	24	0
Lane Group Flow (vph)	0	459	0	353	0	53	0	71
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5
Total Split (s)	73.0	73.0	73.0	73.0	22.0	22.0	22.0	22.0
Total Split (%)	76.8%	76.8%	76.8%	76.8%	23.2%	23.2%	23.2%	23.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.8		5.8		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		75.6		75.6		12.4		12.4
Actuated g/C Ratio		0.80		0.80		0.13		0.13
v/c Ratio		0.37		0.28		0.28		0.36
Control Delay		5.2		3.6		22.1		22.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		5.2		3.6		22.1		22.8
LOS		A		A		C		C
Approach Delay		5.2		3.6		22.1		22.8
Approach LOS		A		A		C		C
Queue Length 50th (m)		20.9		10.1		3.4		4.6
Queue Length 95th (m)		44.5		m16.4		13.4		16.1
Internal Link Dist (m)		60.6		102.6		19.8		66.1
Turn Bay Length (m)								
Base Capacity (vph)		1246		1264		242		245
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		0.37		0.28		0.22		0.29

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 21 (22%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 6.9 Intersection LOS: A
Intersection Capacity Utilization 56.3% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Existing Access/Patricia & Richmond



Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	443	2	6	315	3	8
Future Vol, veh/h	443	2	6	315	3	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	492	2	7	350	3	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	494	0	682	493
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	189	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1068	-	399	575
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1068	-	396	575
Mov Cap-2 Maneuver	-	-	-	-	396	-
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	825	-

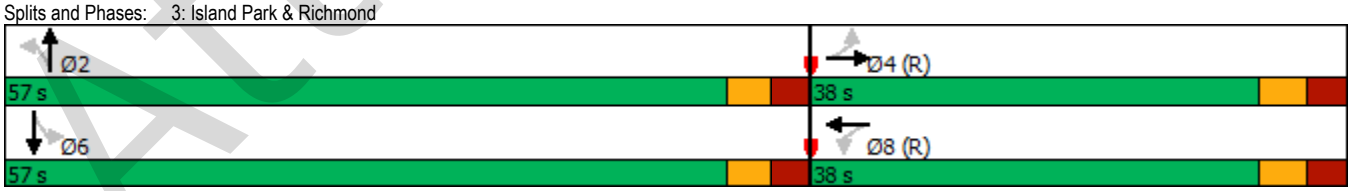
Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.2
HCM LOS			B

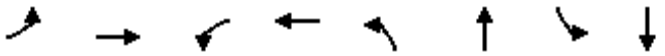
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	512	-	-	1068	-
HCM Lane V/C Ratio	0.024	-	-	0.006	-
HCM Control Delay (s)	12.2	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	55	340	43	210	59	329	28	759
Future Volume (vph)	55	340	43	210	59	329	28	759
Lane Group Flow (vph)	0	501	0	289	66	437	31	901
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.3	31.3	31.3	31.3	24.0	24.0	24.0	24.0
Total Split (s)	38.0	38.0	38.0	38.0	57.0	57.0	57.0	57.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		31.7		31.7	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.33		0.33	0.54	0.54	0.54	0.54
v/c Ratio		0.53		0.32	0.82	0.47	0.08	0.95
Control Delay		23.3		24.6	87.3	15.0	11.3	41.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		23.3		24.6	87.3	15.0	11.3	41.0
LOS		C		C	F	B	B	D
Approach Delay		23.3		24.6		24.5		40.0
Approach LOS		C		C		C		D
Queue Length 50th (m)		28.5		20.3	9.4	44.9	2.6	146.4
Queue Length 95th (m)		34.6		31.0	#35.6	68.5	7.0	#234.8
Internal Link Dist (m)		56.3		48.4		113.1		148.3
Turn Bay Length (m)					20.0		15.0	
Base Capacity (vph)		949		896	80	935	402	951
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.53		0.32	0.82	0.47	0.08	0.95

Intersection Summary		
Cycle Length: 95		
Actuated Cycle Length: 95		
Offset: 28 (29%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green		
Natural Cycle: 80		
Control Type: Pretimed		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 30.7	Intersection LOS: C	
Intersection Capacity Utilization 108.8%	ICU Level of Service G	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Island Park & Richmond

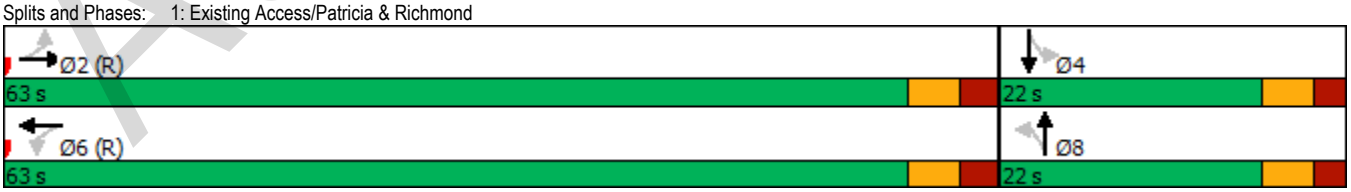




Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	470	7	823	4	0	16	0
Future Volume (vph)	19	470	7	823	4	0	16	0
Lane Group Flow (vph)	0	570	0	954	0	10	0	47
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5
Total Split (s)	63.0	63.0	63.0	63.0	22.0	22.0	22.0	22.0
Total Split (%)	74.1%	74.1%	74.1%	74.1%	25.9%	25.9%	25.9%	25.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.8		5.8		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		69.8		69.8		12.4		12.4
Actuated g/C Ratio		0.82		0.82		0.15		0.15
v/c Ratio		0.46		0.73		0.05		0.22
Control Delay		6.1		15.0		0.4		16.2
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		6.1		15.0		0.4		16.2
LOS		A		B		A		B
Approach Delay		6.1		15.0		0.4		16.2
Approach LOS		A		B		A		B
Queue Length 50th (m)		29.2		60.2		0.0		1.6
Queue Length 95th (m)		64.8		#89.7		0.5		10.2
Internal Link Dist (m)		60.6		102.6		19.8		66.1
Turn Bay Length (m)								
Base Capacity (vph)		1249		1303		268		267
Starvation Cap Reductn		0		11		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.46		0.74		0.04		0.18

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 45 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Existing Access/Patricia & Richmond



Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	12	3	858	1	2
Future Vol, veh/h	479	12	3	858	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	532	13	3	953	1	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	545	0	1022	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	483	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1022	-	246	542
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	587	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1022	-	245	542
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	587	-

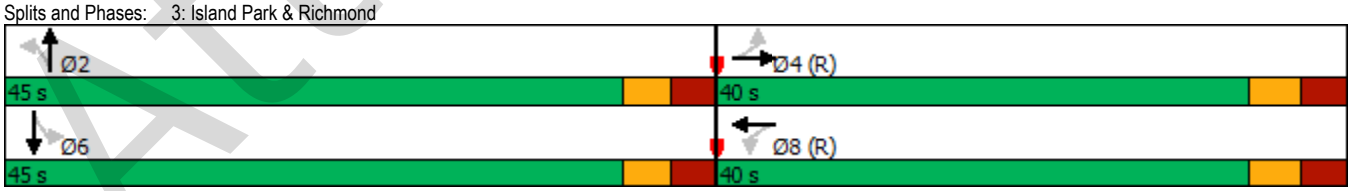
Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	386	-	-	1022	-
HCM Lane V/C Ratio	0.009	-	-	0.003	-
HCM Control Delay (s)	14.4	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	23	401	74	711	39	174	49	459
Future Volume (vph)	23	401	74	711	39	174	49	459
Lane Group Flow (vph)	0	535	0	882	43	245	54	633
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.3	31.3	31.3	31.3	24.0	24.0	24.0	24.0
Total Split (s)	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0
Total Split (%)	47.1%	47.1%	47.1%	47.1%	52.9%	52.9%	52.9%	52.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		33.7		33.7	39.1	39.1	39.1	39.1
Actuated g/C Ratio		0.40		0.40	0.46	0.46	0.46	0.46
v/c Ratio		0.46		0.81	0.24	0.31	0.11	0.79
Control Delay		16.2		30.3	18.4	14.4	14.0	27.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		16.2		30.3	18.4	14.4	14.0	27.6
LOS		B		C	B	B	B	C
Approach Delay		16.2		30.3		15.0		26.5
Approach LOS		B		C		B		C
Queue Length 50th (m)		17.8		65.4	4.1	21.7	4.8	81.5
Queue Length 95th (m)		24.5		89.7	11.7	37.5	11.4	#128.9
Internal Link Dist (m)		56.3		48.4		113.1		148.3
Turn Bay Length (m)					20.0		15.0	
Base Capacity (vph)		1158		1084	178	798	471	803
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.46		0.81	0.24	0.31	0.11	0.79

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 53 (62%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 102.6%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Island Park & Richmond



Attachment 6:
Collision Data for Richmond Road Frontage and at Island Park Drive

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	14	6	14	7	0	0	0	1	42	84%
Non-fatal injury	0	3	0	5	0	0	0	0	8	16%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	14	9	14	12	0	0	0	1	50	100%
	#1 or 28%	#4 or 18%	#1 or 28%	#3 or 24%	#6 or 0%	#6 or 0%	#6 or 0%	#5 or 2%		

Richmond Rd/ Island Park Dr

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	43	25,538	1825	0.92

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	13	5	12	6	0	0	0	1	37	86%
Non-fatal injury	0	3	0	3	0	0	0	0	6	14%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	13	8	12	9	0	0	0	1	43	100%
	30%	19%	28%	21%	0%	0%	0%	2%		

Richmond Rd/ Leighton Terrace

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	4	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	1	1	0	0	0	0	2	50%
Non-fatal injury	0	0	0	2	0	0	0	0	2	50%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	1	3	0	0	0	0	4	100%
	0%	0%	25%	75%	0%	0%	0%	0%		

Richmond Rd/ Patricia Avenue

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	1	0	0	0	0	0	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	1	0	0	0	0	0	0	0	1	100%
	100%	0%	0%	0%	0%	0%	0%	0%		

Richmond Rd, Leighton Terrace to Island Park Dr

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	1	0	0	0	0	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	1	0	0	0	0	0	0	1	100%
	0%	100%	0%	0%	0%	0%	0%	0%		

Richmond Rd, Patricia Avenue to Leighton Terrace

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	1	0	0	0	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	1	0	0	0	0	0	1	100%
	0%	0%	100%	0%	0%	0%	0%	0%		

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: ISLAND PARK DR @ RICHMOND RD

Traffic Control: Traffic signal **Total Collisions:** 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-07, Tue,16:30	Clear	Angle	P.D. only	Loose snow	North	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jan-20, Mon,12:15	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jul-11, Fri,17:48	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-02, Sat,15:11	Clear	Rear end	P.D. only	Dry	East	Changing lanes	Passenger van	Other motor vehicle	
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Oct-04, Sat,11:50	Rain	Angle	P.D. only	Wet	West	Going ahead	Police vehicle	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2014-Jul-08, Tue,16:44	Rain	Turning movement	Non-fatal injury	Wet	North	Turning right	Automobile, station wagon	Cyclist	

					North	Going ahead	Bicycle	Other motor vehicle
2014-Aug-24, Sun,12:19	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-Oct-04, Sat,13:00	Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Sep-17, Wed,08:40	Clear	Rear end	P.D. only	Dry	South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Oct-18, Sat,13:40	Clear	SMV other	P.D. only	Wet	East	Turning left	Automobile, station wagon	Curb
2015-Mar-18, Wed,10:27	Clear	Angle	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Oct-14, Wed,12:46	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Apr-21, Tue,22:30	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Unknown	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle

2015-Feb-14, Sat,14:00	Snow	Other	P.D. only	Slush	East	Reversing	Delivery van	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2014-Nov-02, Sun,19:05	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Feb-28, Sat,11:31	Clear	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2015-Feb-01, Sun,16:45	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-May-26, Tue,21:33	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Delivery van	Other motor vehicle
2015-Jul-17, Fri,13:40	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Municipal transit bus	Other motor vehicle
2015-Jul-31, Fri,15:29	Clear	Angle	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

2015-Oct-27, Tue,09:40	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Sep-02, Fri,07:27	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2015-May-23, Sat,16:30	Clear	Rear end	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Turning left	Passenger van	Other motor vehicle
2015-Oct-20, Tue,21:56	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Passenger van	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-09, Sat,12:37	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2015-Apr-28, Tue,18:26	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Automobile, station wagon	Other motor vehicle
					North	Unknown	Automobile, station wagon	Other motor vehicle
2016-Jun-04, Sat,14:00	Clear	Sideswipe	P.D. only	Dry	South	Slowing or stopping	Pick-up truck	Other motor vehicle

					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Oct-13, Thu,20:10	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Cyclist
					West	Going ahead	Bicycle	Other motor vehicle
2016-Jun-07, Tue,18:37	Rain	Turning movement	P.D. only	Wet	North	Going ahead	Bicycle	Other motor vehicle
					South	Turning left	Unknown	Cyclist
2016-Oct-28, Fri,17:30	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Dec-11, Sun,03:04	Clear	SMV other	P.D. only	Ice	North	Overtaking	Automobile, station wagon	Ran off road
2016-Aug-31, Wed,15:30	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2017-Jan-20, Fri,12:54	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jan-03, Tue,13:29	Freezing Rain	Turning movement	P.D. only	Slush	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

2017-Mar-28, Tue,17:56	Rain	Turning movement	P.D. only	Wet	East	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Passenger van	Other motor vehicle	
2017-Apr-30, Sun,11:15	Rain	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Unknown	Other motor vehicle	
2018-Feb-03, Sat,15:04	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Passenger van	Other motor vehicle	
2017-Sep-26, Tue,15:26	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Apr-10, Tue,14:40	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Pedestrian	1
2018-May-02, Wed,15:17	Clear	Sideswipe	Non-reportable	Dry	West	Changing lanes	Unknown	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-29, Tue,14:56	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

2018-Jun-23, Sat,20:51	Rain	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Sep-28, Fri,21:55	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-Nov-26, Mon,17:25	Rain	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Oct-27, Sat,18:11	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Oct-09, Tue,12:02	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Passenger van	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2018-Dec-27, Thu,20:23	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Tow truck	Other motor vehicle

Location: LEIGHTON TER @ RICHMOND RD

Traffic Control: Stop sign

Total Collisions: 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Dec-27, Sat,21:50	Clear	SMV unattended vehicle	P.D. only	Wet	West	Going ahead	Pick-up truck	Unattended vehicle	

2015-Jul-24, Fri,14:36	Clear	Angle	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	
2018-Jan-27, Sat,21:30	Clear	Angle	Non-fatal injury	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Oct-26, Fri,15:10	Clear	Angle	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Nov-18, Sun,15:35	Clear	Sideswipe	P.D. only	Loose snow	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: PATRICIA AVE @ RICHMOND RD

Traffic Control: Traffic signal

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Apr-06, Sun,02:05	Clear	SMV other	P.D. only	Dry	Unknown	Unknown	Unknown	Pole (utility, power)	
2016-Jan-31, Sun,15:34	Clear	Rear end	P.D. only	Wet	West	Slowing or stopping	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jun-13, Wed,10:47	Clear	SMV other	Non-fatal injury	Dry	South	Turning left	Passenger van	Pedestrian	1

Location: RICHMOND RD btwn LEIGHTON TER & ISLAND PARK DR

Traffic Control: No control

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Nov-24, Mon,15:58	Clear	Turning movement	P.D. only	Dry	West	Turning right	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jul-06, Wed,21:30	Rain	SMV unattended vehicle	P.D. only	Wet	Unknown	Unknown	Unknown	Unattended vehicle	

Location: RICHMOND RD btwn PATRICIA AVE & LEIGHTON TER

Traffic Control: No control

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-09, Thu,22:22	Clear	SMV unattended vehicle	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Unattended vehicle	
2014-Jul-16, Wed,14:15	Clear	Sideswipe	P.D. only	Dry	West	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2014-Nov-24, Mon,15:01	Clear	SMV unattended vehicle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Unattended vehicle	
2015-Jul-22, Wed,19:00	Clear	SMV unattended vehicle	P.D. only	Dry	East	Pulling onto shoulder or toward curb	Automobile, station wagon	Unattended vehicle	
2016-May-09, Mon,16:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	
2018-Feb-14, Wed,10:10	Clear	SMV unattended vehicle	P.D. only	Dry	West	Going ahead	Unknown	Unattended vehicle	

2018-Nov-21, Wed,12:32	Clear	SMV unattended vehicle	P.D. only	Dry	East	Going ahead	Pick-up truck	Unattended vehicle

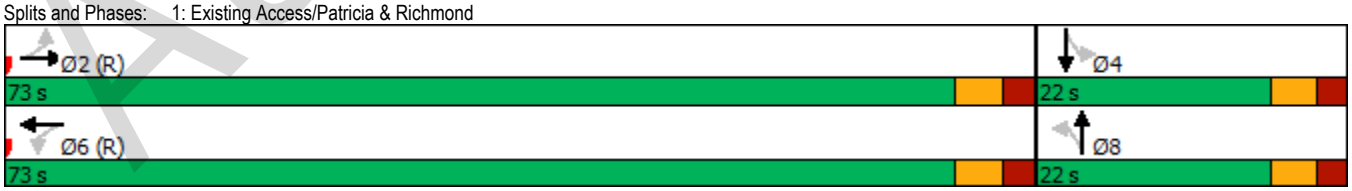
Attachment 7:
Total Projected Conditions Synchro Analysis

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	17	393	4	314	18	0	24	0
Future Volume (vph)	17	393	4	314	18	0	24	0
Lane Group Flow (vph)	0	415	0	327	0	48	0	64
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5
Total Split (s)	73.0	73.0	73.0	73.0	22.0	22.0	22.0	22.0
Total Split (%)	76.8%	76.8%	76.8%	76.8%	23.2%	23.2%	23.2%	23.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.8		5.8		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		75.6		75.6		12.4		12.4
Actuated g/C Ratio		0.80		0.80		0.13		0.13
v/c Ratio		0.33		0.26		0.26		0.34
Control Delay		4.9		3.7		21.0		22.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		4.9		3.7		21.0		22.7
LOS		A		A		C		C
Approach Delay		4.9		3.7		21.0		22.7
Approach LOS		A		A		C		C
Queue Length 50th (m)		18.2		9.1		2.7		4.1
Queue Length 95th (m)		38.9		m17.9		12.2		15.2
Internal Link Dist (m)		60.6		102.6		19.8		66.1
Turn Bay Length (m)								
Base Capacity (vph)		1249		1264		240		240
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		0.33		0.26		0.20		0.27

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 21 (22%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 6.7 Intersection LOS: A
Intersection Capacity Utilization 56.5% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Existing Access/Patricia & Richmond



Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	443	4	8	315	12	30
Future Vol, veh/h	443	4	8	315	12	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	4	8	315	12	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	447	0	619	445
Stage 1	-	-	-	-	445	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1111	-	436	612
Stage 1	-	-	-	-	645	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1111	-	432	612
Mov Cap-2 Maneuver	-	-	-	-	432	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	839	-

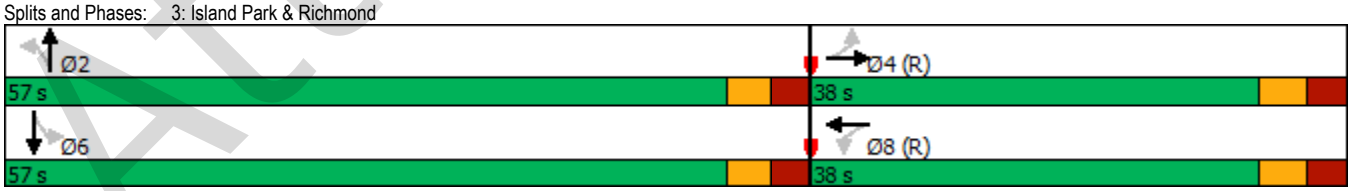
Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	547	-	-	1111	-
HCM Lane V/C Ratio	0.077	-	-	0.007	-
HCM Control Delay (s)	12.1	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	58	356	43	212	59	329	28	759
Future Volume (vph)	58	356	43	212	59	329	28	759
Lane Group Flow (vph)	0	473	0	262	59	393	28	811
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.3	31.3	31.3	31.3	24.0	24.0	24.0	24.0
Total Split (s)	38.0	38.0	38.0	38.0	57.0	57.0	57.0	57.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		31.7		31.7	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.33		0.33	0.54	0.54	0.54	0.54
v/c Ratio		0.49		0.29	0.42	0.42	0.06	0.85
Control Delay		22.9		24.1	24.4	14.2	11.1	29.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		22.9		24.1	24.4	14.2	11.1	29.4
LOS		C		C	C	B	B	C
Approach Delay		22.9		24.1		15.5		28.8
Approach LOS		C		C		B		C
Queue Length 50th (m)		25.3		18.2	6.1	38.9	2.3	119.2
Queue Length 95th (m)		33.4		28.1	18.5	59.9	6.5	#197.1
Internal Link Dist (m)		56.3		48.4		113.1		148.3
Turn Bay Length (m)					20.0		15.0	
Base Capacity (vph)		956		911	142	935	436	951
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.49		0.29	0.42	0.42	0.06	0.85

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 28 (29%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 108.8%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Island Park & Richmond

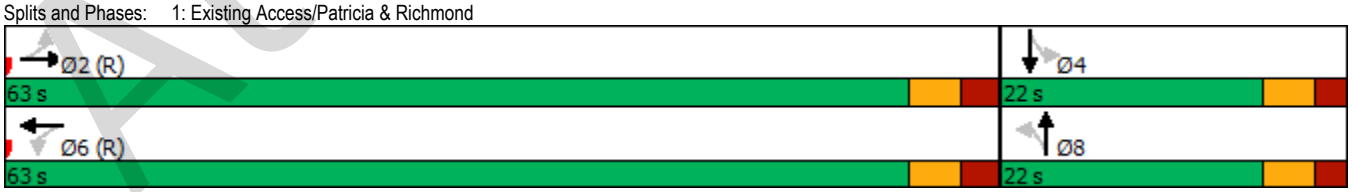


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	497	7	832	4	0	16	0
Future Volume (vph)	19	497	7	832	4	0	16	0
Lane Group Flow (vph)	0	540	0	868	0	9	0	42
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5
Total Split (s)	63.0	63.0	63.0	63.0	22.0	22.0	22.0	22.0
Total Split (%)	74.1%	74.1%	74.1%	74.1%	25.9%	25.9%	25.9%	25.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.8		5.8		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		69.8		69.8		12.4		12.4
Actuated g/C Ratio		0.82		0.82		0.15		0.15
v/c Ratio		0.43		0.67		0.04		0.20
Control Delay		5.8		12.6		0.3		14.6
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		5.8		12.6		0.3		14.6
LOS		A		B		A		B
Approach Delay		5.8		12.6		0.3		14.6
Approach LOS		A		B		A		B
Queue Length 50th (m)		26.6		54.7		0.0		0.9
Queue Length 95th (m)		59.1		75.6		0.1		9.0
Internal Link Dist (m)		60.6		102.6		19.8		66.1
Turn Bay Length (m)								
Base Capacity (vph)		1258		1303		268		267
Starvation Cap Reductn		0		11		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.43		0.67		0.03		0.16

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 45 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 10.1 Intersection LOS: B
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Existing Access/Patricia & Richmond



Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	39	31	858	10	11
Future Vol, veh/h	479	39	31	858	10	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	479	39	31	858	10	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	518	0	990	499
Stage 1	-	-	-	-	499	-
Stage 2	-	-	-	-	491	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1046	-	258	571
Stage 1	-	-	-	-	609	-
Stage 2	-	-	-	-	582	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1046	-	243	571
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	574	-
Stage 2	-	-	-	-	582	-

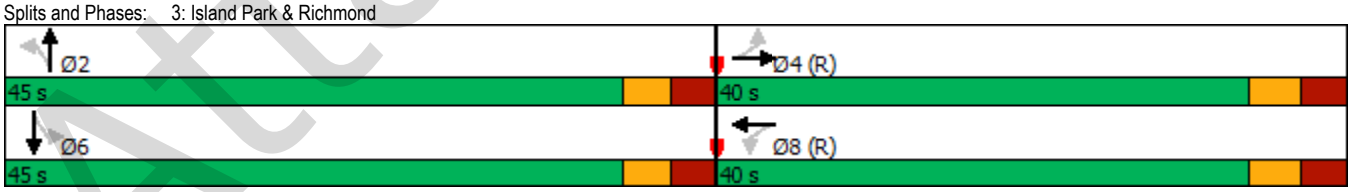
Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	348	-	-	1046	-
HCM Lane V/C Ratio	0.06	-	-	0.03	-
HCM Control Delay (s)	16	-	-	8.5	0.2
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	24	408	74	733	43	174	49	459
Future Volume (vph)	24	408	74	733	43	174	49	459
Lane Group Flow (vph)	0	490	0	816	43	221	49	572
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.3	31.3	31.3	31.3	24.0	24.0	24.0	24.0
Total Split (s)	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0
Total Split (%)	47.1%	47.1%	47.1%	47.1%	52.9%	52.9%	52.9%	52.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		33.7		33.7	39.1	39.1	39.1	39.1
Actuated g/C Ratio		0.40		0.40	0.46	0.46	0.46	0.46
v/c Ratio		0.42		0.72	0.19	0.28	0.10	0.71
Control Delay		15.7		26.2	16.5	13.9	13.8	23.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		15.7		26.2	16.5	13.9	13.8	23.9
LOS		B		C	B	B	B	C
Approach Delay		15.7		26.2		14.3		23.1
Approach LOS		B		C		B		C
Queue Length 50th (m)		16.3		57.5	4.0	19.1	4.3	69.4
Queue Length 95th (m)		22.5		78.7	10.9	33.5	10.5	107.6
Internal Link Dist (m)		56.3		48.4		113.1		148.3
Turn Bay Length (m)					20.0		15.0	
Base Capacity (vph)		1169		1127	222	798	492	802
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.42		0.72	0.19	0.28	0.10	0.71

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 53 (62%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 103.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Island Park & Richmond



Attachment 8:
MMLOS Detailed Analysis

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons**	**Project**	**476778 - 01000**
Scenario	**Existing/Future**	**Date**	**17-Dec-19**
Comments			

INTERSECTIONS		**Richmond / Patricia**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	0 - 2	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited
	Ped Signal Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	5-10m	5-10m	5-10m	5-10m
	Crosswalk Type	Std transverse markings	Textured/coloured pavement	Std transverse markings	Std transverse markings
	PETSI Score	**86**	**89**	**54**	**57**
	Ped. Exposure to Traffic LoS	**B**	**B**	**D**	**D**
	Cycle Length	85	85	85	85
	Effective Walk Time	49	49	8	8
	Average Pedestrian Delay	**8**	**8**	**35**	**35**
	Pedestrian Delay LoS	**A**	**A**	**D**	**D**
	Level of Service	**B**	**B**	**D**	**D**
		D			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	No lane crossed	No lane crossed	One lane crossed	One lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	**B**	**B**	**D**	**D**
	Level of Service	**D**	**D**	**D**	**D**
		D			
Transit	Average Signal Delay	≤ 20 sec	≤ 10 sec	≤ 20 sec	≤ 10 sec
	Level of Service	**C**	**B**	**C**	**B**
		C			
Truck	Effective Corner Radius	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1
	Level of Service	**D**	**D**	**F**	**F**
		F			
Auto	Volume to Capacity Ratio	0.61 - 0.70			
	Level of Service	**B**			

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons**	**Project**	**476788-01000**
Scenario	**Existing/Future**	**Date**	**17-Dec-19**
Comments			

SEGMENTS		**Street A**	Richmond 1	Byron 2
Pedestrian	Sidewalk Width Boulevard Width	-	≥ 2 m < 0.5	≥ 2 m > 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000	≤ 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h yes	> 30 to 50 km/h no
	Exposure to Traffic PLoS		**B**	**A**
	Effective Sidewalk Width			
	Pedestrian Volume			
	Crowding PLoS		-	-
	Level of Service		**-**	**-**
Bicycle	Type of Cycling Facility	C	Mixed Traffic	Physically Separated
	Number of Travel Lanes		≤ 2 (no centreline)	
	Operating Speed		>40 to <50 km/h	
	# of Lanes & Operating Speed LoS		**B**	**-**
	Bike Lane (+ Parking Lane) Width			
	Bike Lane Width LoS		-	-
	Bike Lane Blockages			
	Blockage LoS		-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		4-5 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		**C**	**A**
	Level of Service		**C**	**A**
Transit	Facility Type	F	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≤ 0.4	
	Level of Service		**F**	**-**
Truck	Truck Lane Width	D	≤ 3.3 m	> 3.7 m
	Travel Lanes per Direction		1	1
	Level of Service		**D**	**B**

Attachment 9:
TDM Strategy Checklist

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)*	☐ ***N/A as rapid transit station is approximately 850m from the site.***
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		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)*	☑
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	☑
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *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)*	☑
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)*	☑
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)*	☑
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)*	☑
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	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

		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)	☑

PARSONS

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January 7, 2020

BY EMAIL: kwatson@ashcrofthomes.ca
Reference: 476778 - 01000

Ashcroft Homes
18 Antares Drive
Ottawa, Ontario
K2E 1A9

Attention: Kieran Watson, Development Planner

Dear Kieran:

RE: Q West (378 Leighton Terrace)
Overview of Phases 2A/2B Site Access Options

1. CONTEXT

The location of site driveway connections to the roads that bound the Q West development site has been a point of interest/concern since the first Site Plan Application in 2020 and has been addressed in one form or another in the initial April 2010 Community Transportation and Traffic Impact Study and in all subsequent transportation addendums prepared and submitted since then.

The initial overall Site Plan and Transportation Study showed/recommended a Phase 1 garage connection directly to the Richmond/Patricia signalized intersection and a Phase 2 site driveway connection directly to Byron at the Kensington intersection. Through traffic would be prohibited from using Kensington by aligning the driveway with Kensington and erecting signs in the northbound and southbound directions prohibiting the straight through north-south movement.

Following review of the initial Site Plan, the City determined that the overall development should have a right-in/right-out connection to Leighton Terrace and that the Phase 2 driveway connection should be to Shannon Street and not directly to Byron. Subsequently, Phase 1 along the Richmond Road frontage is fully built including the garage connection to signalized Richmond/Patricia intersection and the right-in/right-out connection to Leighton Terrace. A 3.0m wide north-south multi-use pathway has also been built along the east side of the site extending from the Byron Greenway Corridor north to Richmond Road.

Recently, Ashcroft is proceeding with a Phase 2A Site Plan Application for the middle portion of the site containing the Convent building and a 161 unit residential building. A garage will be built beneath the residential building with a driveway that connects to the right-in/right-out connection to Leighton Terrace. The intent is for Phase 2A traffic to always use this connection whereas when Phase 2B to the south is built, all its traffic would use a driveway connection to either Shannon or Byron (to be determined).

With regard to traffic generation, and the resultant driveway volume, Phase 2A traffic volumes are projected to be 35 veh/h and 75 veh/h two-way total during the weekday morning and afternoon peak hours respectively. These volumes would use the Leighton Terrace connection. Phase 2B, comprised of 62 residential units and 200 retirement units, is projected to generate approximately 30 veh/h and 40 veh/h two-way total during the morning and afternoon peak hours respectively, with these volumes using the future driveway connection to either Shannon or Byron.

With the imminent submission of the Phase 2A Site Plan, to be followed shortly by the Phase 2B Site Plan, there is a need for the City to confirm the vehicular access/egress solution for Phase 2B. Accordingly, we have been asked to assess the following three options; Phase 2B connecting to Shannon, Phase 2B connecting to Byron at Kensington, and Phase 2B connecting to the Leighton Terrace driveway connection with no linkage to the south (neither via

Shannon nor Byron). These options have been assessed at length in previous documents and the results of these assessments are summarized herein.

2. ASSESSMENT OF THE PHASE 2B DRIVEWAY CONNECTION OPTIONS

2.1 SHANNON CONNECTION

This option was evaluated extensively in the October 4 and 11, 2019 letter reports submitted to the City. Relevant excerpts follow. Attachment 1 includes a plan of existing Shannon Street, pictures highlighting the street's narrow width and adjacent trees, and a plan of proposed road widening to the north so as to not impact the existing street lighting or the tree line along the Byron Greenway. Preliminary cost estimate of this widening option is approximately $470,000.

If Phase 2B were connected to Shannon, the intent would be for it to be used as follows:

- By existing adjacent residents;
- Access/egress to the senior's residence portion (200 units) of Phase 2B;
- Access/egress to the drop-off/pick-up loop located at the main entrance to the Senior's Residence; and
- By the service vehicles exiting Phase 1 and entering/exiting Phase 2A and 2B.

The resultant two-way peak hour volumes on Shannon Street are projected to be approximately 35 to 40 veh/h, with the inbound/outbound directional splits being approximately equal.

While these volumes are low, the existing 3.5 m pavement width on Shannon is not sufficient (particularly during winter conditions) to safely accommodate two-way traffic. As such, road widening would be required. Possible widening options and related comments follows:

Option	Comments
1. Build to the City's minimum 16.5 m residential street cross-section. This would include 8.5 m road surface and a 1.8 m wide sidewalk on one side as shown in Attachment 6.	As there is only approximately 10 m available between the rows of trees on the north and south side of, and parallel to, Shannon Street, this option would require shared-use pole relocation (±$40,000 to $60,000) and loss of, or detrimental impact on, both rows of trees. The total approximated design and construction costs are $470,000
2. Widen the existing pavement to 6.0 m. This substandard width meets fire route requirements and could accommodate two 3.0 m wide lanes (no parking). No sidewalk as adjacent parallel MUP would suffice.	To keep joint use utility poles as is, would require tree and shrub removal all along the north side of the street. To keep all north side trees would require relocation of the 3 joint use poles (±$40,000 to $60,000), regrading on the south side and likely root damage for the tree line on the south side. Pole relocation could be problematic/impractical due to the proximity of the adjacent mature trees.
3. Leave road at 3.5 m wide but add lay-by lanes (2 m) between joint-use poles to allow two-way traffic to pass, when necessary.	Potential concerns about safety, snow clearing, and delay on Hilson for entering vehicles.

It is also noteworthy that widening Shannon and adding more traffic compounds existing safety concerns over the short length of Hilson between Shannon and Byron. There is only 25 m between these two intersections and the 3.0 m wide multi-use pathway is located parallel to and between these two streets. As Hilson is used by students walking to the local public school and as the City has recently provided a raised crosswalk on Byron at Hilson, there are current safety concerns that would be compounded by adding more turning traffic in this compressed location. Also,

given the short off-set (10m) and poor sight lines for vehicles turning out of Shannon and pedestrians/cyclists using the MUP, the potential for conflict is increased.

In summary of the foregoing, due to the necessary road widening requirements to accommodate a Phase 2B connection to Shannon, this option is very unattractive due to the combination of impacts on existing adjacent properties/homes, significant tree loss, safety concerns on Hilson and the high cost of design and construction. Anecdotally, we have also been advised that the older homes on Shannon Street may have existing or potential basement structural issues and the combination of road construction, moving the road closer to the homes, having more traffic vibration on Shannon Street and it being used by service vehicles could be extremely detrimental and/or costly.

2.2 BYRON CONNECTION

This option involves a 6.0 m wide driveway extending from the middle of Phase 2B directly south across the Byron Greenway and the MUP to connect to the Byron/Kensington intersection. A sketch of this option is included as Attachment 2. Its key characteristics/effects are:

- It crosses the MUP which will require STOP signs on both MUP approaches;
- At least 4 mature trees will need to be removed;
- STOP sign and No Through Traffic signs on the driveway approach to Byron;
- STOP sign and No Through Traffic signs on the Kensington approach to Byron;
- A sidewalk extension from the site to the MUP; and
- An estimated design and construction cost of approximately $195,000.

This option introduces another vehicular crossing of the MUP, but at only 6 m wide, with low volume usage, and with STOP sign control on the MUP approach, this crossing will be safer than the multiple existing road crossings along the full length of the MUP.

With regard to the potential for neighbourhood and cut-through traffic, aligning the site driveway with Kensington provides the best opportunity to control and eliminate this potential on Kensington. The Shannon option does not have the option to control through traffic as any measures to do so would also directly affect existing residential traffic movements. It is noteworthy that this option would provide excellent and direct fire truck and emergency vehicle access to the front of the retirement residence, which is a key consideration.

In summary of the Byron Connection option, it is a good solution due to the combination of; no adverse impact on adjacent homes, no or limited cut-through traffic potential, safe operations, excellent fire truck and emergency vehicle access to the Senior's Residence, and affordability.

2.3 LEIGHTON TERRACE ONLY CONNECTION

This option entails no new site driveway connections for Phase 2 (A +B), therefore all Phase 2 traffic would use the site's existing right-in/right-out only connection to Leighton Terrace. As such, all of the Phase 2 (A+B) traffic would use this connection as well as fire trucks and emergency vehicles trying to access the Phase 2B senior's residence and condo buildings.

With regard to traffic operations, all projected Phase 2 (A+B) traffic would use the site's Leighton Terrace connection and then the unsignalized Richmond/Leighton Terrace intersection. These volumes total 65 veh/h and 115 veh/h two-way total during the weekday morning and afternoon peak hours respectively. As analyzed in previous correspondence, this additional traffic can be accommodated at an acceptable, but reduced level of service in the LoS B to C range and while the delay for vehicles waiting to exit onto Richmond is considered acceptable, it would increase to be in the 15 to 20 second range.

With regard to emergency vehicle access to Phase 2B, it would be somewhat convoluted and not ideal, particularly when compared to the Byron Connection option. To get to the rear of the Phase 2 buildings, fire trucks and emergency vehicles would have to use the unsignalized Richmond/Leighton terrace intersection, the right-in/right-out connection to Leighton Terrace, then drive halfway through the site along a curvilinear driveway. Even with this, they would not be at the front entrance of the retirement residence building.

In summary of having only the Leighton Terrace driveway connection to accommodate Phase 2 (A+B) development, it is low cost, has limited cut-through traffic potential and the Richmond/Leighton Terrace intersection will operate at an acceptable, but reduced, level of service. Its adverse characteristics include increased delay for left-turning traffic from Leighton Terrace onto Richmond which could increase vehicle collision potential, all Phase 2 traffic driving at-grade through the middle of the site and conflicting with pedestrian and cyclists using the on-site MUP, and poor fire and emergency vehicle access to Phase 2B buildings and in particular the proposed Seniors Residence which has the greatest need for these services.

4. OPTIONS SUMMARY

Table 1 summarizes the characteristics/implications of the three Phase 2B vehicular access options assessed herein.

Table 1: Summary of Phase 2B Driveway Connection Options

	Shannon Connection	Byron Connection	Leighton Terrace Connection
Immediate Home/Neighbourhood Impact	Significant due to tree loss and front yard loss	None	None
Cut-Through Traffic	Limited but not controllable	Limited but controllable	Limited but controllable
Traffic Operations	Some concern due to close proximity of Shannon to the MUP and Byron	None	Increased delay for turning vehicles from Leighton Terrace onto Richmond
Safety Considerations	Increase conflict potential with school children on Hilson, and poor sight lines between MUP users and traffic turning left from Shannon to head southbound on Hilson.	Minimal	Increased volume turning from Leighton Terrace onto Richmond increases collision potential.
Fire and Emergency Access	Ok for all Phases	Best for all Phases as most direct, particularly to the Senior Residence.	Not good for Phase 2 Senior's Residence and Condo
Cost	High at $470,000	Moderate at $195,000	None

In review of Table 1, it appears that the Byron Connection is the best option for the Phase 2B driveway connection due to a combination of minimal community impact, efficient traffic operations, safety, on-site functionality, and versatility in site operations.

Please call if you have any questions of the foregoing.

Sincerely,

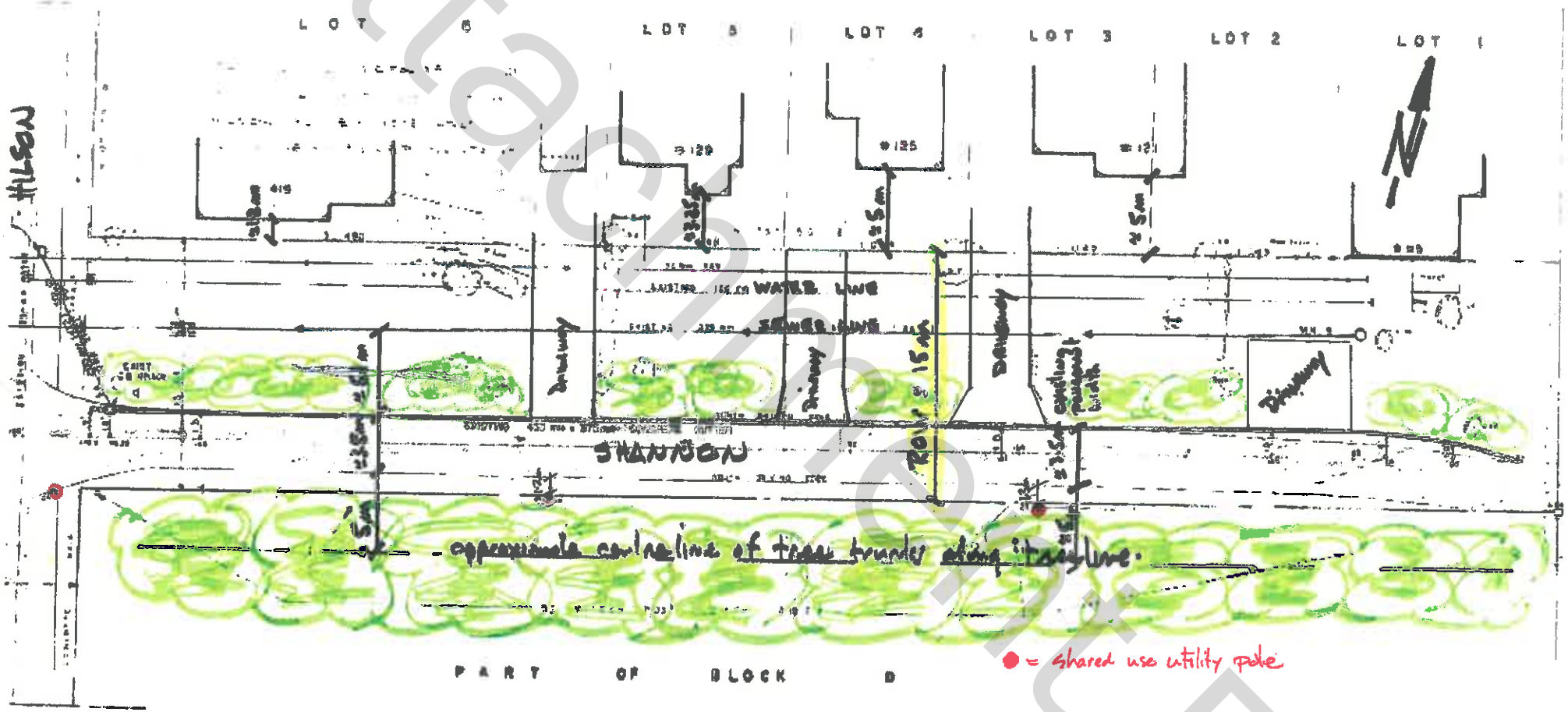
Ronald Jack, P.Eng.
Senior Transportation Engineer

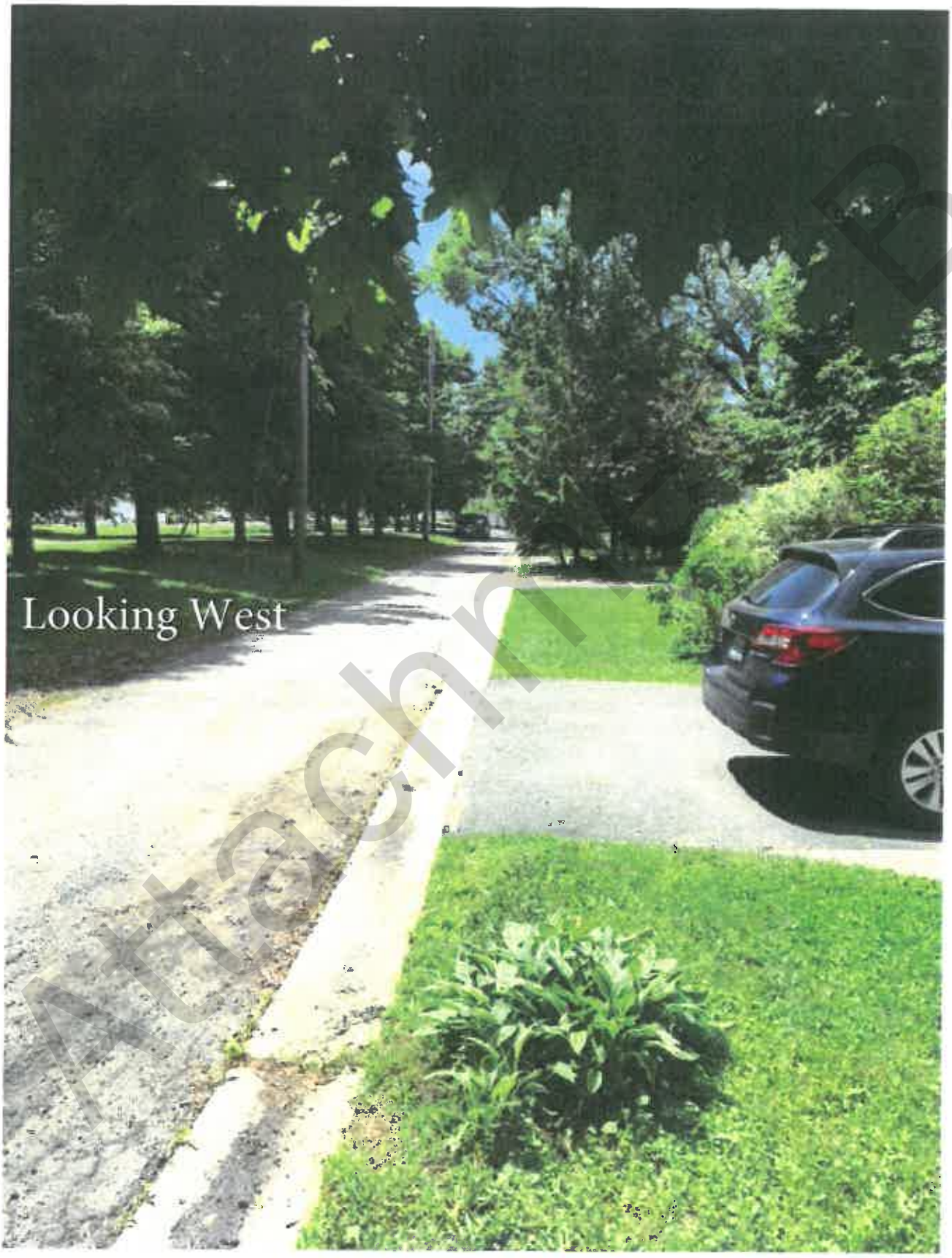
Attachments

Attachment 1:

Existing Plan of Shannon Street, Shannon Street Photos on Possible ROW Widening Plan

SHANNON STREET
- Existing Conditions -





Scale (m)

0 5 10 15

Shannon Widening Option

- 0.5 m widening on south side
- 2.0 m on north side
- optional 1.8 m sidewalk on north side

LOT 6 | LOT 5 | LOT 4 | LOT 3 | LOT 2 | LOT 1

WILSON

Proposed 6.0 m wide road

Proposed 1.8m wide sidewalk

existing sidewalk

WATER LINE

SEWER LINE

driveway

SHANNON

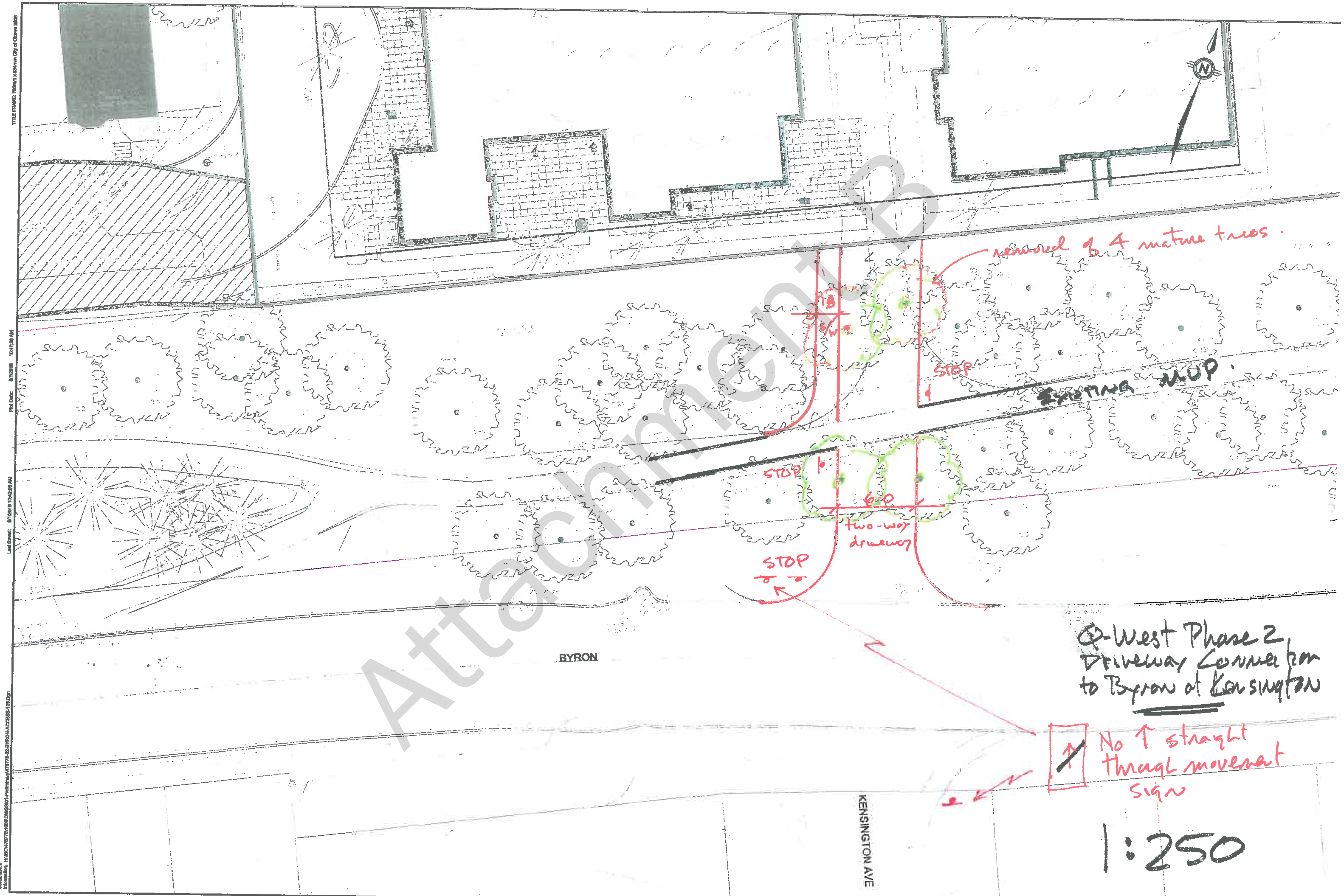
- approximate centreline of tree trunks along treeline.

PART OF BLOCK D

● = shared use utility pole

Attachment 2:

Sketch of the Byron Connection Option


Attachment B
removal of 4 mature trees.
STOP
EXISTING MUP
STOP
6.0
two-way driveway
STOP
BYRON
KENSINGTON AVE
Q-West Phase 2
Driveway Connection to Byron at Kensington
No ↑ straight through movement sign
1:250