PROPOSED RESIDENTIAL APARTMENTS DEVELOPMENT, 424 CHURCHILL AVENUE CITY OF OTTAWA

STRATEGY REPORT

Presented to:

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Project 7303

CASTLEGLENN CONSULTANTS LTD.

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1.0 SUMMARY OF DEVELOPMENT

The proposed 424 Churchill Avenue Residential Apartment development is proposed to be comprised of an 8-storey residential apartment building with 58 apartment units. The development also proposes two levels of underground car parking. The motor vehicle access to the site would be facing Danforth Avenue which is closed to eastbound traffic just to the east of the proposed garage entrance. Hence, motor-vehicle traffic may enter the building by way of a westbound left-in or an eastbound right-turn movement. However, all vehicle traffic leaving the building must egress by way of a northbound left-turn egress movement onto Danforth Avenue westbound. Pedestrian accesses would be provided by way of building entrances on Churchill Avenue and Byron Avenue.

2.0 THE TIA PROCESS

The 2017 City of Ottawa ñ*Transportation Impact Assessment Guidelines*ò set out a multi-step pre-application process where the scope, assumptions, study area and methodology to conduct a transportation impact assessment (TIA) are detailed and each sequential stage approved.

- The Screening and Scoping report was submitted to the City of Ottawa on August 17th, 2022. The comments were received on September 12, 2022. [Please note that Appendix ñGò contains City plannerôs comments and consultantsôresponses.] Section 3 and 4 of this report summarize the findings of the screening and scoping components of the TIA process.
- The Forecasting Report was submitted to the City of Ottawa on October 3rd, 2022. The comments were received on Tuesday, October 25th, 2022. [Please note that Appendix ñJò contains the City plannerôs comments and consultantsôresponses.] Section 5 of this report summarize the findings of the forecasting component of the TIA process.

This report is intended to address the third step (Step 4 ï Strategy Report) of the multi-step TIA process. Section 6 of this report is intended to address the aspects of the design related to sustainable modes, circulation and access, parking (motor-vehicle and bicycle parking), boundary street design, multi-modal levels of service and access intersection design.

3.0 SCREENING:

3.1 TRIP GENERATION TRIGGERS

The Screening Form has been completed and is included within Appendix ñBò. City of Ottawa TIA guidelines set the threshold for the trip generation trigger at 60 person-trips-or-more during the weekday peak hours. If the proposed development meets the trip threshold, both the Design Review and Network Impact components of the TIA need to be considered.

The threshold to meet a trip generation warrant for multifamily apartment is 90 apartment units[1]. Since the proposed developmentôs size is 58 units, **the traffic generation trigger would not be satisfied; therefore, the proposed development is not required to address the "Network Impact" component of a TIA.**

3.2 SCREENING: LOCATION TRIGGERS

The development site is located in close proximity to Richmond Road, and is zoned ñTM - Traditional Mainstreetò, which is considered a Design Priority Area; **therefore, the location trigger is satisfied.**

3.3 SCREENING SAFETY TRIGGERS

The proposed development proposes a left-in/left-out driveway access to/from a parking garage that connects to Danforth Avenue. The access is located approximately 100 meters away from the Byron Avenue / Churchill Avenue N intersection, and 130 meters away from the Richmond Road / Churchill Avenue North intersection, thus being considered within the ñarea of influenceò of both of these traffic signals[2]; **therefore, the safety trigger is satisfied.**

3.4 EXEMPTION REQUEST

Table 3-1 reflects exemptions/reductions in scope of work that were requested subsequent to the submission of the Scoping document. The following exemptions would ordinarily be contained within the Design Review and Network Impact Components of the TIA.

Table 3-1: Exemptions as per TIA Guidelines

Module	Element	Exemption Considerations	Include Module in TIA
Design Review Component			
4.1 Development Design	**4.1.3 New Street Networks**	There are no new streets being proposed as part of this development.	No
4.2 Parking	**4.2.2 Spillover Parking**	The parking supply at the time of writing is not anticipated to be deficient.	No
Network Impact Component			
4.5 through 4.9	**All Elements**	The development is not expected to generate more than 60 vehicle-trips during the peak hours of travel demand. Therefore, the "Network Impact" component of the TIA is not required.	No

1 City of Ottawa Transportation Impact Assessment Guidelines. Dillon Consulting, June 2017
2 City of Ottawa Transportation Impact Assessment Guidelines. Dillon Consulting, June 2017. Pg. 17

3.5 SCREENING CONCLUSIONS

The screening results indicate that since the Safety and Location Triggers are satisfied, while the Trip Generation Trigger is not, **therefore, the TIA is required to address only the "Design Review" component.**

The completed certification form is contained within Appendix ñAò and the completed stamped and signed screening form can be found within Appendix ñBò.

3.6 STUDY AREA AND TIME PERIODS

3.6.1 Study Area

A total of 6 intersections adjacent to the site were analyzed:

1. Richmond Road and Roosevelt Avenue (Traffic Signal Controlled);
2. Roosevelt Avenue and Byron Avenue (Traffic Signal Controlled);
3. Richmond Road and Churchill Avenue North (Traffic Signal Controlled);
4. Churchill Avenue North and Byron Avenue (Traffic Signal Controlled);
5. Churchill Avenue North and Danforth Avenue (Minor Leg STOP-Controlled);
6. Roosevelt Avenue and Danforth Avenue (Minor Leg STOP-Controlled);

3.6.2 Time Periods

The study provided an analysis of the weekday morning and afternoon peak hours of travel demand which represent the ñworst-caseò scenario in terms of weekday commuter traffic volumes.

3.6.3 Horizon Years

The proposed development, at this point in time, is anticipated to be achieved by the end of 2025. The analysis includes a period five-years-after-buildout, or 2030.

4.0 SCOPING

4.1 EXISTING AND PLANNED CONDITIONS

4.1.1 Proposed Development

Exhibit 4-1 illustrates the proposed 58-unit residential apartments development located in the north-west quadrant of the Byron Avenue / Churchill Avenue North intersection. The development is presently envisioned as a 8-storey 58-unit residential rental apartment building with a 2-level 30-stall parking garage that has vehicle access onto Danforth Avenue. Two pedestrian accesses are envisioned connecting to Churchill Avenue North and Byron Avenue.

The parcel is currently zoned ñ*TM H(24)-Traditional Mainstreet*ò, which is acceptable zoning for the above-mentioned use. The site currently contains a single-storey building housing a laundromat / dry cleaning service. The existing building on site is to be demolished.

Exhibit 4-2 illustrates the proposed site plan (January, 2022) for the development. The full site plan can be found in Appendix ñCò. The development is envisioned to be fully occupied by the end of 2025.

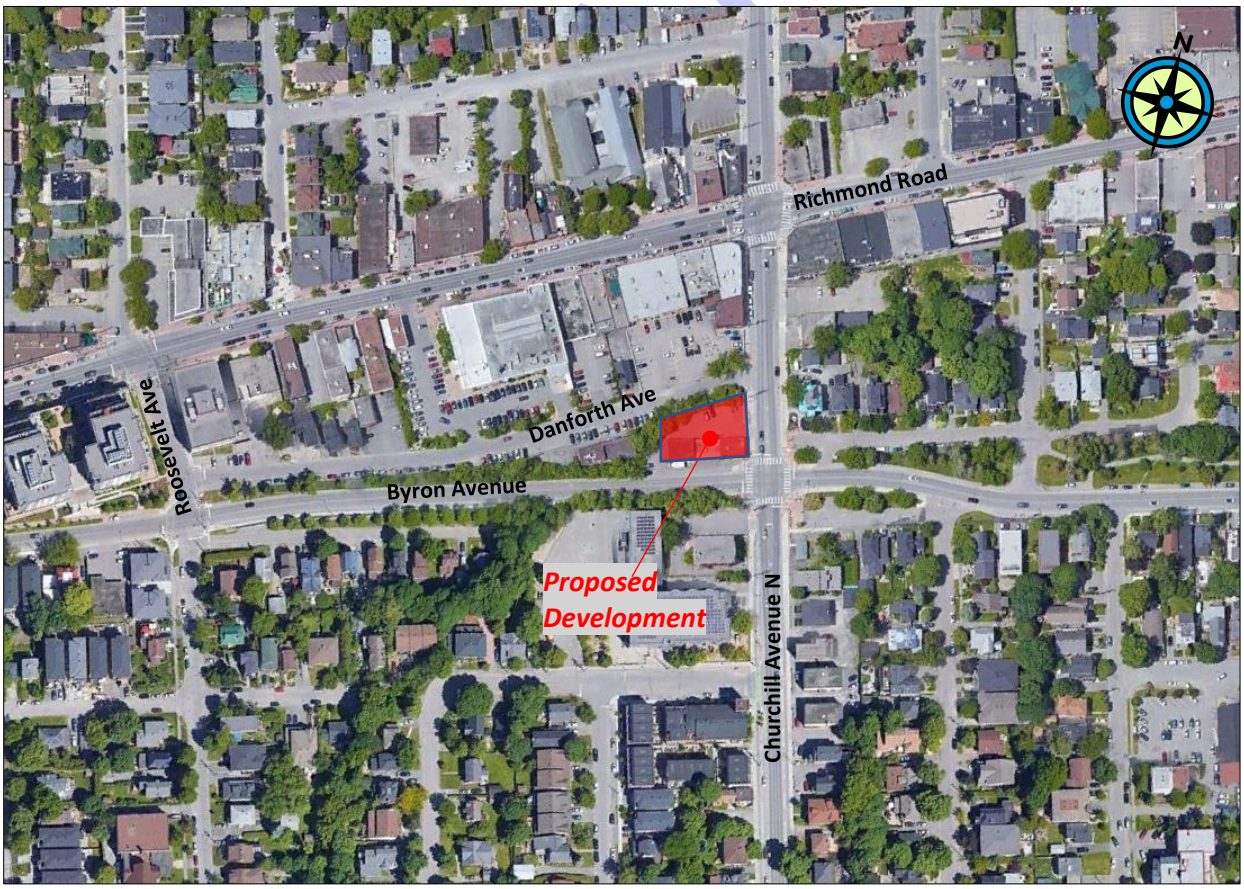


Exhibit 4-1: Location of Proposed Development

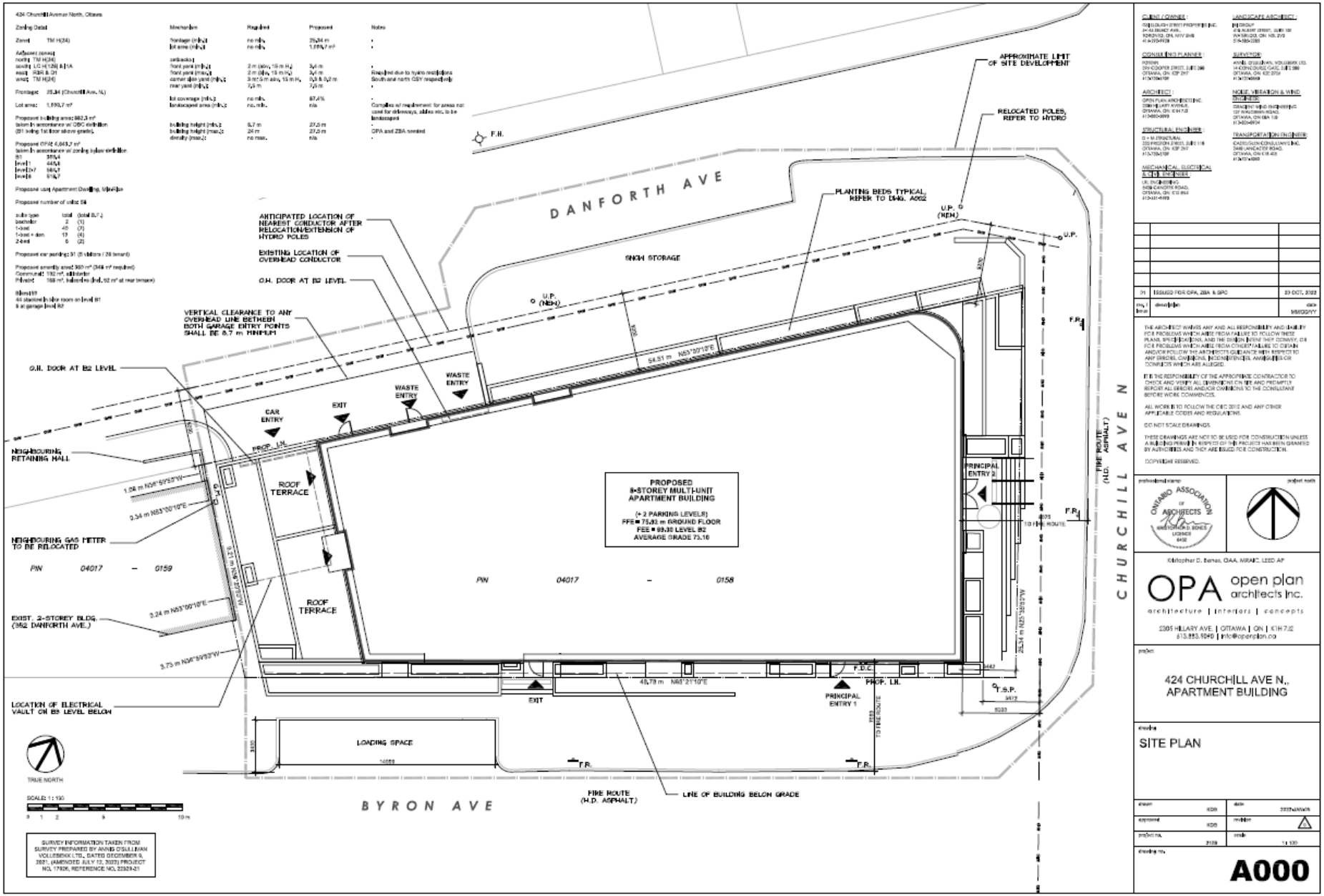


Exhibit 4-2: Site Plan (October 20, 2022)

4.1.2 Existing Conditions

4.1.2.1 Study Area Roadways

The City of Ottawa TMP (Map 8) was referenced along with a desktop review of aerial photography to document the existing roadways that would serve the proposed development and surrounding area. The municipal-owned roadways in the vicinity of the proposed development include the following:

Richmond Road

- is an existing 2-lane undivided arterial roadway;
- unposted speed limit of 50 km/hr;
- a lane of parallel street parking is provided on each side of the roadway;
- sidewalks are provided on each side;

Churchill Avenue North

- is an existing 2-lane undivided roadway;
- designated as ñmajor collectorò south of Richmond Road and ñArterialò north of Richmond Road
- unposted speed limit of 50 km/hr;
- sidewalks are provided on each side;
- physically separated bicycle lanes are provided south of Byron Avenue;

Byron Avenue

- is an existing 2-lane undivided collector roadway;
- unposted speed limit of 50 km/hr;
- sidewalks are provided on each side except for the stretch of Byron Ave between Roosevelt Ave and Churchill Ave N, where the sidewalk is only provided on the south side of the road;
- an eastbound bicycle lane is provided.

Roosevelt Avenue

- is an existing 2-lane undivided local roadway;
- posted speed limit of 40 km/hr north of Byron Avenue;
- posted speed limit of 30 km/hr south of Byron Avenue
- sidewalks are provided on each side;

Danforth Avenue

- is an existing 2-lane undivided local roadway;
- at the intersection with Churchill Ave N, it operates a one-way (entrance only) single-lane westbound roadway;
- unposted speed limit of 50 km/hr is assumed, however the operating speed is likely lower;
- street parking is provided on both sides of the roadway, both parallel and perpendicular parking configurations are present;
- no sidewalks are provided.

4.1.2.2 Study Area Intersections

1. Richmond Road and Roosevelt Avenue

This intersection is a 4-leg traffic signal-controlled intersection.

- Both the westbound and eastbound major approaches along Richmond Road provides for one shared all-movement lane and a street parking lane (without right turn markings).
- Both northbound and southbound minor approaches provide for one shared all movement lane.
- The southbound minor approach provides for one shared all movement lane. One hour on-street parking (7am-to-7pm) is permitted on the east side of corridor on the more northerly 200 meters.
- The south leg of the intersection does not provide for on-street parking and the east side of the corridor is a designated loading zone.
- Pedestrian sidewalks are provided in each quadrant of the intersection. Cyclists cross the intersection in mixed traffic.

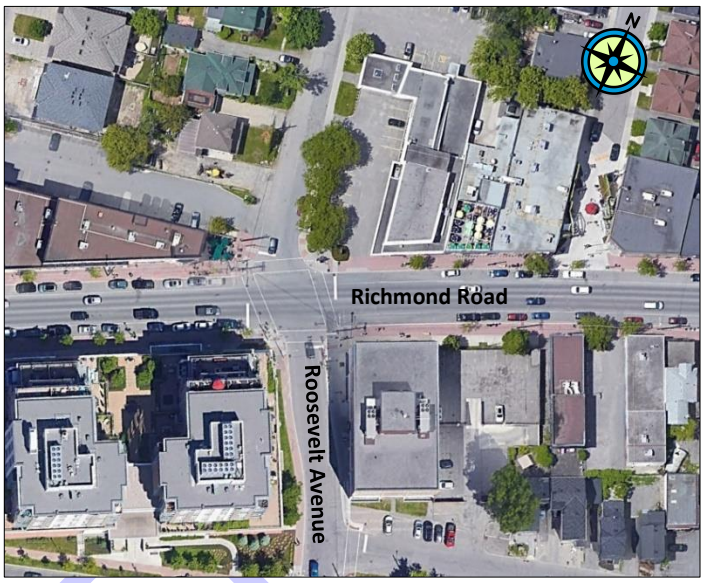


Exhibit 4-3: Richmond Road and Roosevelt Avenue Intersection

Exhibit 4-4: Roosevelt Avenue and Byron Avenue Intersection

2. Roosevelt Avenue and Byron Avenue

This 4-leg intersection is a traffic signal-controlled intersection.

Å Both westbound and eastbound major approaches provide for one shared all-movement lane.

Å Both northbound and southbound approaches provide for a shared all-movement lane.

Å Sidewalks are provided along both sides of the north and west legs of the intersection.

Å There is no continuous sidewalk along north side of Byron Avenue east of the intersection

Å The east leg of the intersection has a sidewalk along the south side of the corridor, and the south leg has a sidewalk along the west side of the corridor.

Å A continuous eastbound bike lane exists along the south side of Byron Avenue. Cyclists on other approaches cross in mixed traffic.

3. Richmond Road and Churchill Avenue North

This intersection is a 4-leg traffic signal-controlled intersection.

- Both westbound and eastbound major approaches provide for a single shared through-right turn lane and an auxiliary left turn lane.
- There are parking lanes present along each side of Richmond Road, which end about 10 meters away from the intersection STOP lines.
- The Northbound minor approach along Churchill Avenue North provides for a single shared through-right turn lane and a left turn lane. The southbound approach provides for one all-movement lane. The SB left turn movement is restricted between 3:30 PM and 5:30 PM on weekdays.
- Continuous sidewalks are provided along each side of all approaches to the intersection. Cyclists cross the intersection in mixed traffic.

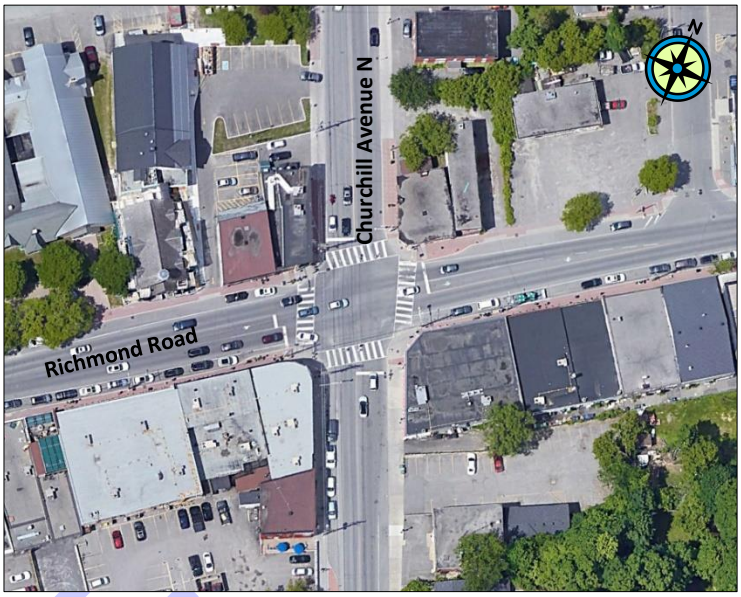


Exhibit 4-5 Richmond Road and Churchill Avenue North Intersection

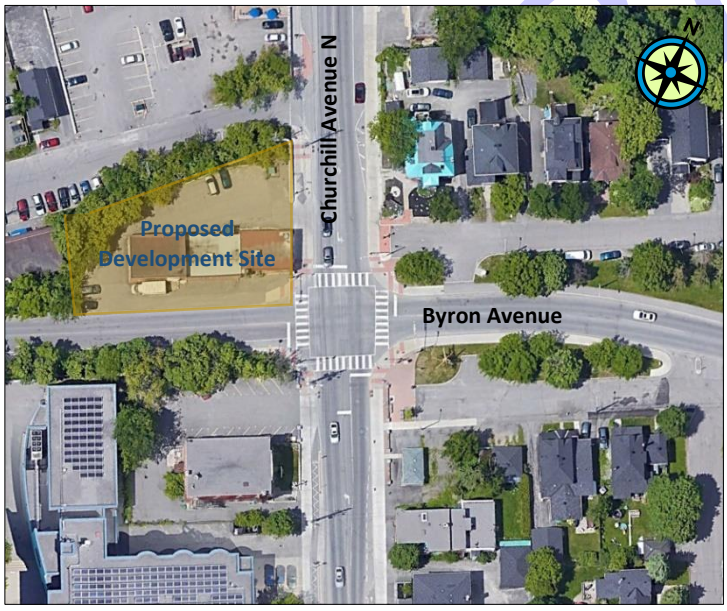


Exhibit 4-6: Churchill Avenue North and Byron Avenue

4. Churchill Avenue North and Byron Avenue

This intersection is a 4-leg traffic signal-controlled intersection located immediately adjacent to the proposed site.

- Both northbound and southbound Churchill Avenue North approaches provide for one auxiliary left turn lane, and one shared through-right turn lane;
- Both westbound and eastbound Byron Avenue approaches provide for a single shared through-turn lane;
- A continuous sidewalk is not present along the north side of Byron Avenue west of the intersection, but exists in other quadrants.
- A continuous eastbound bike lane is provided along Byron Avenue. Bike lanes are provided along the east and west sides of Churchill Avenue but terminate about 20 meters south of the intersection. Cyclists cross the intersection in mixed traffic on all other approaches

5. Churchill Avenue North and Danforth Avenue

This intersection is a 3-leg minor leg STOP-controlled intersection.

- Danforth Avenue is a one-way street that permits only westbound (inbound) movements.
- Both northbound and southbound major approaches along Churchill Ave N provide for a single shared through-turn lane.
- On-Street parking is present north of the intersection on the both sides of Churchill Avenue N.
- Sidewalks are provided in each quadrant of the intersection; however, continuous sidewalks do not exist on either side of Danforth Avenue.
- Cyclists cross the intersection in mixed traffic

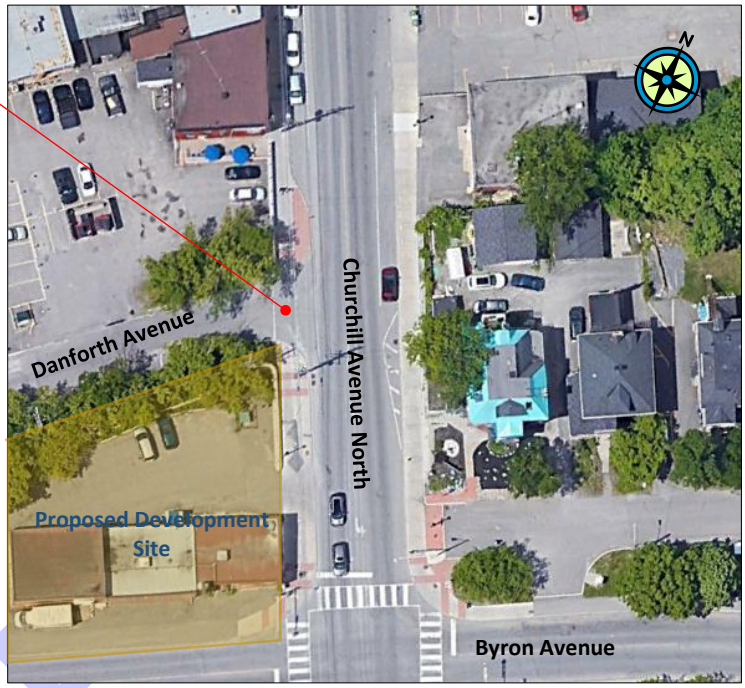


Exhibit 4-7: Churchill Avenue North and Danforth Avenue Intersection

6. Roosevelt Avenue and Danforth Avenue

Exhibit 4-8: Roosevelt Avenue and Danforth Avenue Intersection

This intersection is a 3-leg ñTò configured minor leg STOP-controlled intersection that is immediately adjacent (20 meters centre-to-centre) to the traffic signal-controlled Byron Avenue & Roosevelt Avenue intersection.

- Both northbound and southbound Roosevelt Avenue approaches provides for a single shared through-turn lane;
- The westbound minor approach provides for one shared through-turn lane;
- Sidewalks are provided in each quadrant of the intersection; however continuous sidewalks are not provided along Danforth Avenue;
- Cyclists cross the intersection in mixed traffic.

7. Danforth Avenue and MEC Parking Accesses

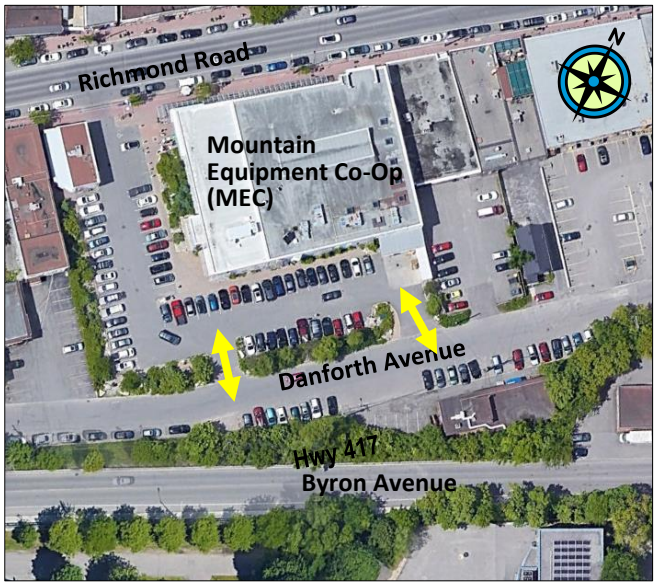


Exhibit 4-9: Danforth Avenue and MEC Parking Accesses

Danforth Avenue is accessed through the MEC (Mountain Equipment Co-Op) parking lot by way of two access.

- The two access roadways effectively form two intersections with Danforth Avenue;
- Each intersection provides one travel lane in each direction;
- No sidewalks or bicycle lanes are provided along Danforth Avenue or along the parking lot access;
- Intersection capacity analysis or MMLOS analysis will not be conducted for these accesses, however a traffic count was performed to evaluate the impacts of cut-through traffic from Richmond Road onto Danforth Avenue.

4.1.2.3 Existing Surrounding Driveways

Exhibit 4-10 illustrates the adjacent existing driveways within the immediate proximity (200 meters the access along each boundary street) of the proposed 424 Churchill Avenue Residential Apartments development. The existing site presently has access on both Byron Avenue and Churchill Avenue North. The proposed residential development would see these accesses closed and a new access connecting to Danforth Avenue.

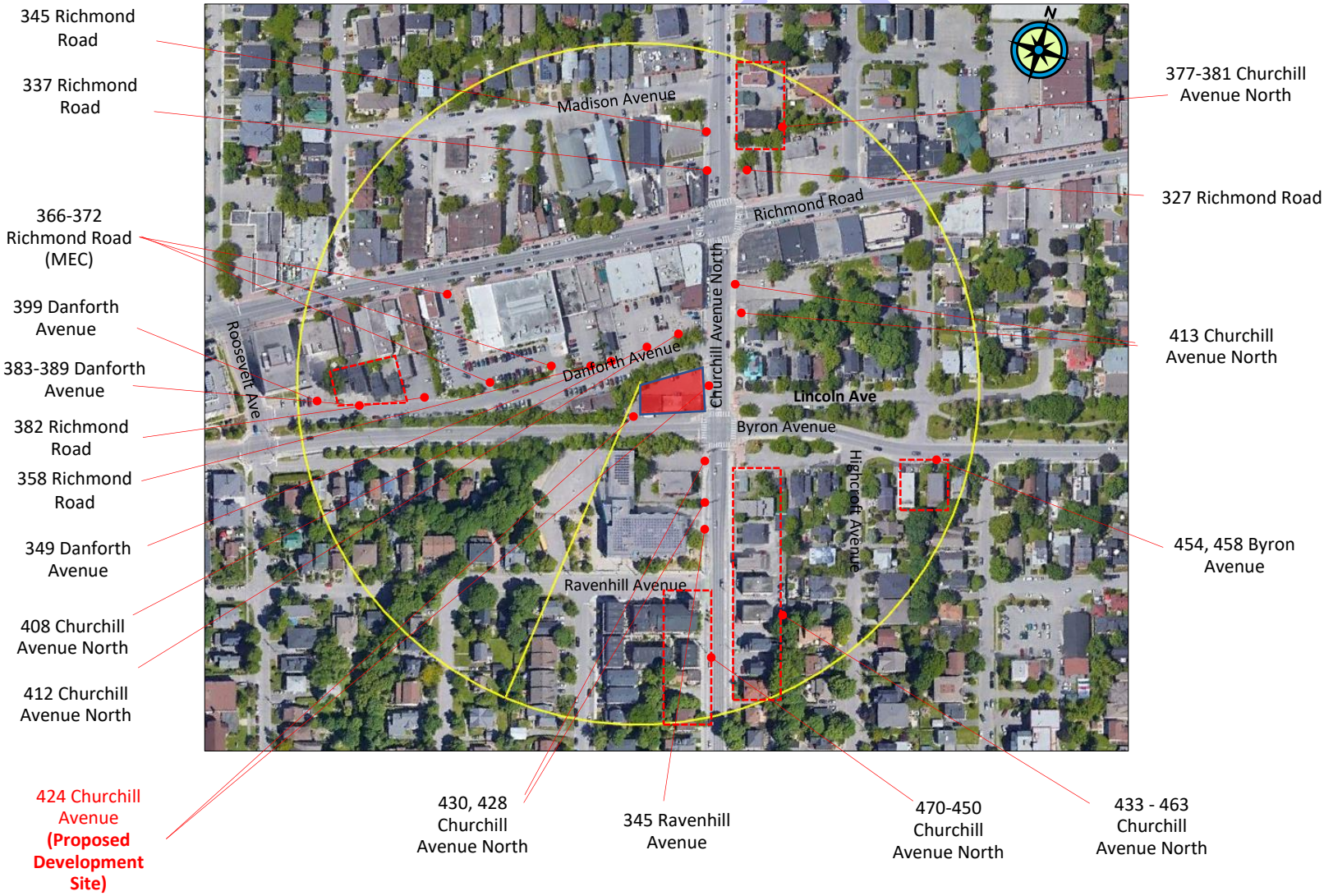
The following adjacent driveways were identified along three boundary streets (Byron Avenue, Danforth Avenue, Churchill Avenue North):

Danforth Avenue Accesses:

- *412 Churchill Avenue North* is a mixed-use building housing a coffee shop and office space. It is accessed by a single access approximately 35 meters east of the proposed development access. The access is shared with 408 Churchill Avenue North;
- *408 Churchill Avenue North* houses several retail stores and restaurants fronting Richmond Road. The parking lot in the back is accessed by two accesses - one approximately 15 meters east of the proposed development access, other shared with 412 Churchill Avenue North (see above);
- *349 Danforth Avenue* houses a doggy daycare business. It is accessed by a single access from Danforth Avenue, approximately opposite of the development access;

- *358 Richmond Road* houses several retail stores fronting Richmond Road. The parking lot in the back is accessed by a single access approximately 20 meters west of the proposed access.
- *366-372 Richmond Road (MEC)* is an outdoor equipment store. The parking lot is accessed by one access off Richmond Road and two accesses off Danforth Avenue that are approximately 35 and 80 meters west of the proposed development access;
- *382 Richmond Road* is a small real estate office building. The parking lot is accessed by a single access that is approximately 125 meters of the proposed development access;
- *383,385,387 & 389 Danforth Avenue* are four standalone former residential dwellings converted to commercial uses. There is 1 driveway for each building for a total of 4 driveways;
- *399 Danforth Avenue* is a mixed-use 4-storey office and commercial building. The parking lot is accessed by a single driveway approximately 190 meters west of the proposed development;

Exhibit 4-10: Overview of Existing Adjacent Driveways



Byron Avenue Accesses:

- *454,458 Byron Avenue* are two low-rise apartment buildings with driveways onto Byron Avenue. They are located approximately 120 meters east of the Churchill Avenue North / Byron Avenue intersection;

Churchill Avenue North Accesses:

- *470-450 Churchill Avenue North (even)* are residential buildings and an office building accessed by 4 driveways on the west side of Churchill Avenue;
- *345 Ravenhill Avenue* is Churchill Public School served by a driveway onto Churchill Avenue providing a layup area, as well as a driveway onto a parking lot from Ravenhill Avenue East;
- *430 Churchill Avenue* is Westboro Masonic Hall event centre served by a single driveway onto Churchill Avenue;
- *428 Churchill Avenue* is an Indigo parking lot with 17 parking spaces;
- *337 Richmond Road* is a restaurant with a parking / service area accessed from Churchill Avenue;
- *345 Richmond Road* is Churchill Seniorôs recreating centre. Access to the parking lot with 15 parking spaces is provided from Churchill Avenue North.
- *433-463 Churchill Avenue North* are 7 residential apartment buildings with 7 driveways onto Churchill Avenue North;
- *413 Churchill Avenue North* is a low-rise office building with 2 driveways providing access to parking lots adjacent to the building;
- *327 Richmond Road* is a low-rise office building with parking area access from Churchill Avenue;
- *377-381 Churchill Avenue North* are 3 residential and retail buildings with 3 driveways to Churchill Avenue North.

4.1.2.4 Existing Pedestrian and Cycling Facilities

Concrete sidewalks are provided along both sides of the following roadways in the study area:

- Richmond Road;
- Churchill Avenue North;
- Roosevelt Avenue (Sidewalks exist on both sides between Richmond Road and Byron Avenue. South of Byron a sidewalk exists only on the west side.);

Byron Avenue between Churchill Avenue North and Roosevelt Avenue only has a sidewalk on the south side. There are no sidewalks along Danforth Avenue.

Richmond Road and Churchill Avenue North are classified as ñSpine Routesò, while Byron Avenue and Roosevelt Avenue are classified as ñLocal Routesò.

Physically separated bicycle lanes are provided along Churchill Avenue North, south of Byron Avenue (just outside of the study area). Byron Avenue provides for an eastbound bicycle lane. All other roadways have no dedicated bicycle infrastructure with cyclists riding in mixed traffic with motor vehicles.

A Multi-Use-Pathway (MUP) runs parallel to Byron Avenue between Eden Avenue (just east of Churchill Avenue N) and Holland Avenue. The pathway is identified as a major pathway in the ultimate cycling network. The pathway facilitates pedestrian movement along Byron Avenue corridor and adjacent streets. Section 5.2.1 details future upgrades to the watermain and landscaping along Byron Avenue, which include widening of the pathway at the Kirkwood Avenue intersection[3].

4.1.2.5 Area Traffic Management

The City of Ottawa has developed the ñRichmond Road / Westboro Transportation Management Implementation Planò, which is intended to prepare the transportation network for intensification with advent of to LRT Stage 2. In addition, the following area traffic management strategies were identified in the study area:

- Two speed humps along Byron Avenue between Roosevelt Avenue and Churchill Avenue North;
- Danforth Avenue at Churchill Avenue North is open to westbound traffic;
- Heavy vehicles are prohibited from using Roosevelt Avenue (entering from Richmond Road); and
- Heavy vehicle turning restriction are in place at Churchill Avenue and Richmond Road. The left and right turns onto Churchill Avenue are prohibited between 11 PM and 6 AM.

4.1.2.6 Existing Transit Provisions

Exhibit 4-11 illustrates, and Table 4-1 describes, the existing transit (June 2022) operational service along roadways within the immediate proximity of the proposed development. Exhibit 4-12 illustrates the transit stops in the immediate vicinity of the proposed development.

The nearest transit routes adjacent to the proposed development include Routes 11 and 153 (which stops along Richmond Avenue), and Route 50 (which stops along Churchill Avenue North). There are no transit routes along the Byron Avenue corridor.

- Exhibit 4-13 illustrates that the proposed development is within 600 meters radius from the Westboro Transit Station and 550 meters from the Dominion Transit Station (as the crow flies).
- Exhibit 4-14 illustrates that, in terms of walking distance along public roadways/pathways, the development is located 770 meters from the Westboro Rapid Transit Station and 810 meters walking distance from the Dominion Transit Station.

3 Byron Avenue, Highcroft Avenue, and Athlone Avenue integrated infrastructure replacement ï City of Ottawa Website. Geometry plans prepared by Robinson Consultants

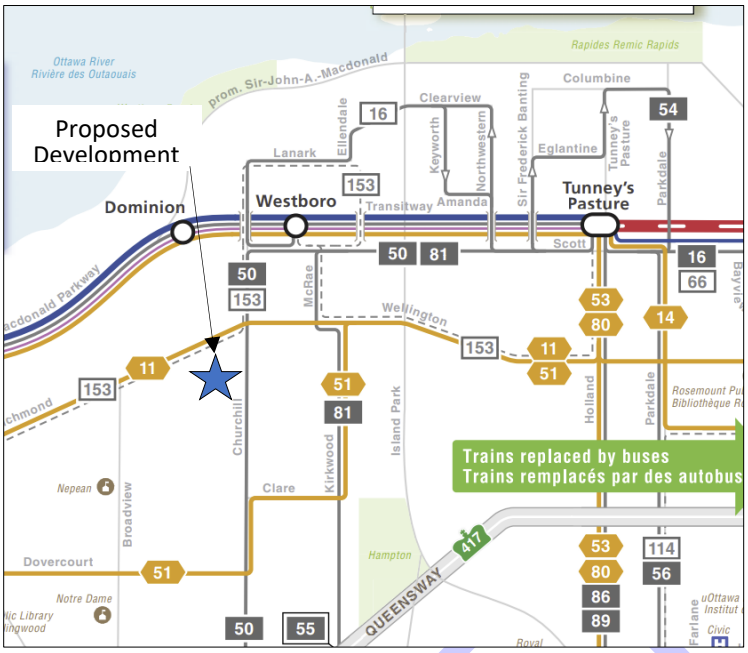


Exhibit 4-11: Transit Lines in the Study Area
(Not to Scale)

Both the Westboro and Dominion transit stations serve a variety of rapid transit routes that connect to the Tunneyôs Pasture LRT station (eastbound) and west-end suburbs (Bells Corners, Kanata, Stittsville, Barrhaven). At the time of writing this report, the LRT (O-Train Line 1) Stage 2 West Extension is planned to be completed in 2025. (See Section 4.1.3).

Table 4-1: Existing Transit Routes

Route	Description
11	This “Frequent” bus route connects Bayshore rapid transit station to downtown (Mackenzie King station) travelling via Richmond Road, Wellington Street and Somerset Street. The route runs Monday-thru-Sunday with peak hour headways of 15 minutes.
50	This is a “Local” bus route that connects the Tunney’s Pasture rapid transit station to neighbourhoods along Scott Street, Churchill Avenue North and Maitland Avenue. The route then connects to Iris, the Queensway and the Lincoln Fields stations. The buses run Monday-thru-Saturday with 30-minute headways.
153	This is a “Local” bus route that travels between Lincoln Fields station, the Carlingwood Mall and Tunney’s Pasture rapid bus station. Select trips only run between Lincoln Fields and Carlingwood Mall (outside of the study area). The headways are 1-2 hours.

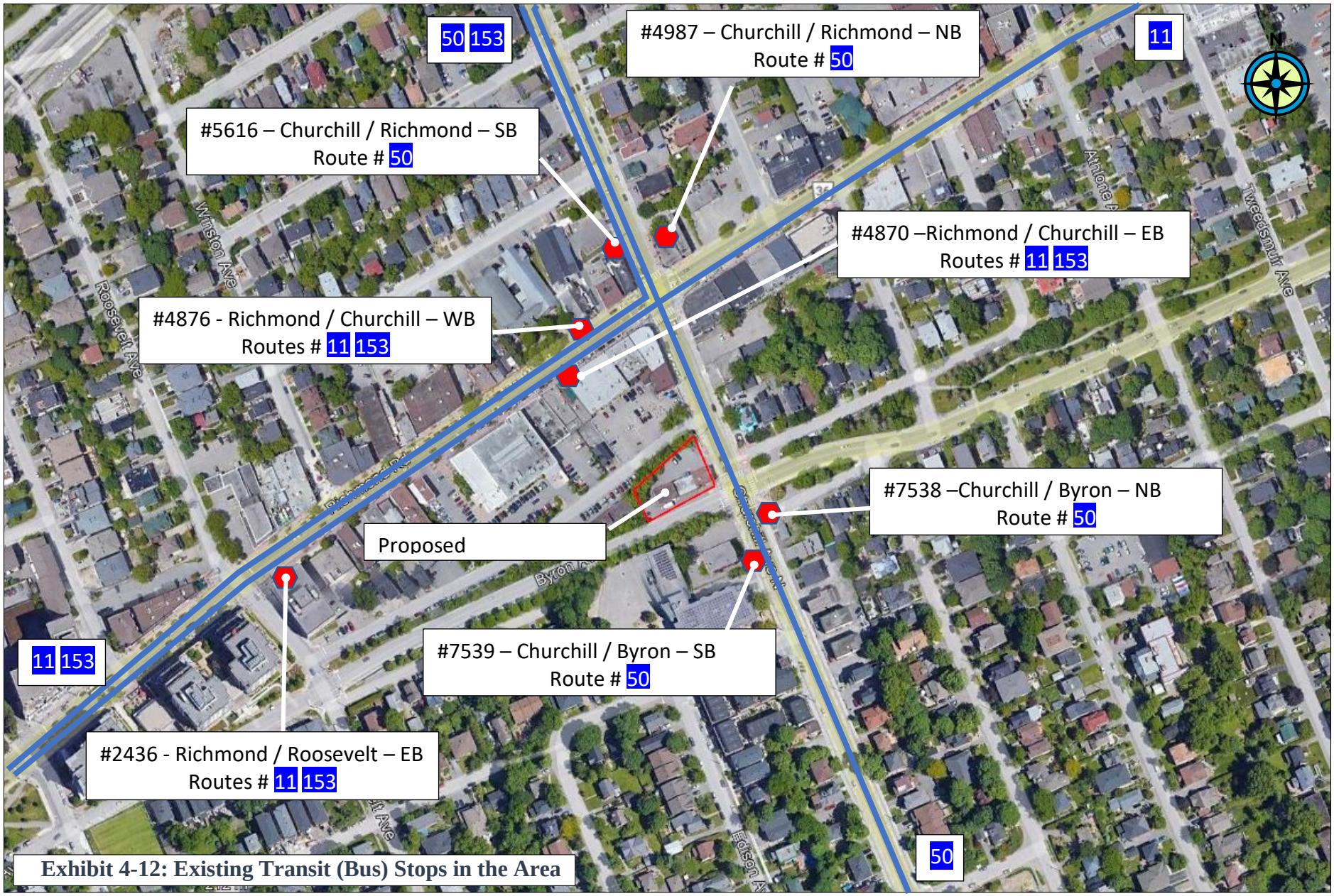


Exhibit 4-12: Existing Transit (Bus) Stops in the Area

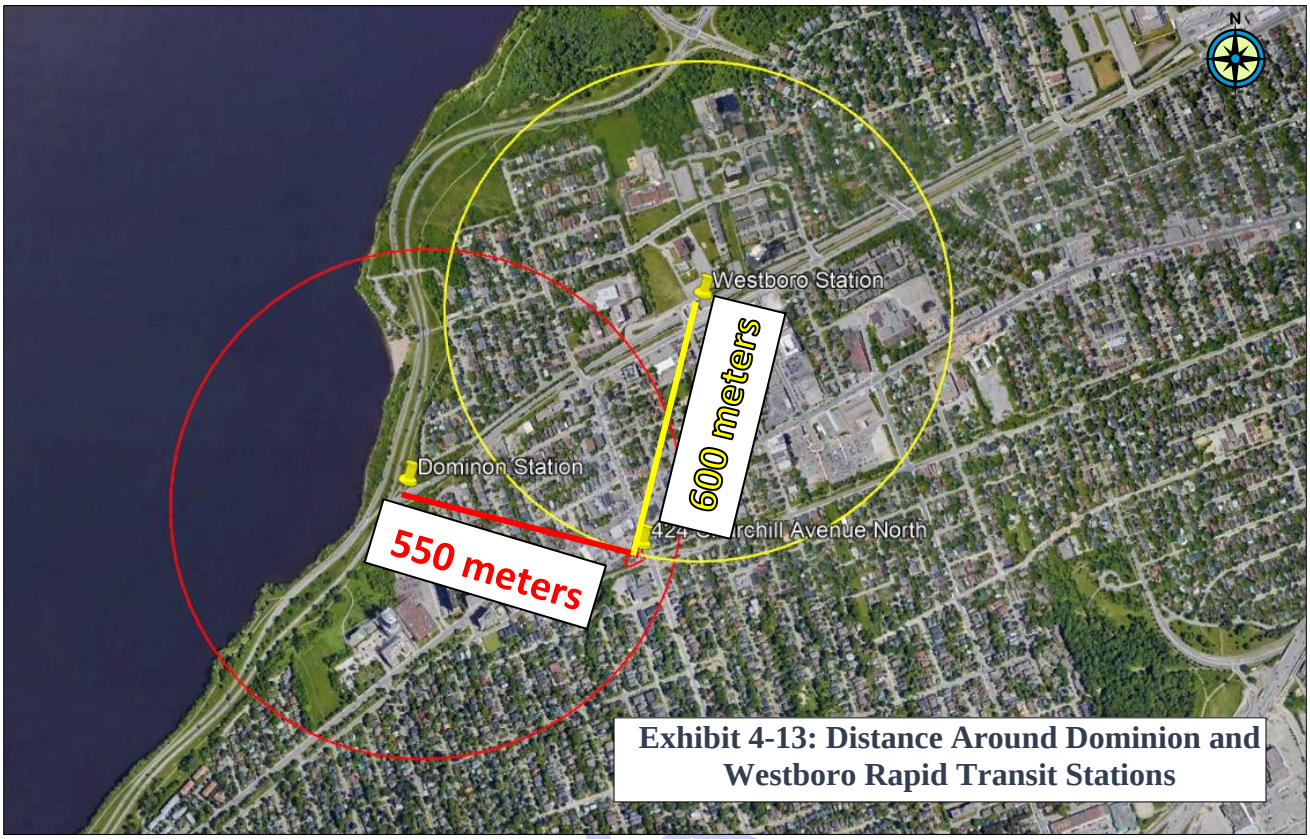


Exhibit 4-13: Distance Around Dominion and Westboro Rapid Transit Stations

Exhibit 4-14: Walking Distances to Dominion and Westboro Rapid Transit Stations

4.1.2.7 Existing Peak Hour Travel Demands by Mode

Appendix ñDò provides the existing traffic counts information obtained on behalf of this TIA.

Pedestrian and Cyclist Travel Demand

Table 4-2 indicates pedestrian travel and Table 4-3 indicated cyclist travel for the (2017) morning & afternoon peak hours and 8-hour time periods. (Source: City of Ottawa: Four adjacent intersections to the site.)

Four of the intersection traffic counts indicated that they were conducted in the winter (January-thru-February) of 2019 and 2020 and may not be representative of peak summer-time active transportation activity on the corridors.

The traffic counts were undertaken at:

- the Richmond Road and Roosevelt Avenue intersection on Thursday, January 23, 2020;
- the Roosevelt Avenue and Byron Avenue intersection on Wednesday, February 27, 2019;
- the Richmond Road and Churchill Avenue North intersection on Thursday, January 23, 2020;
- the Churchill Avenue North and Byron Avenue intersection on Thursday, January 23, 2020;

The traffic counts indicate significant pedestrian and cyclist activity along the study area intersections, despite the counts being conducted during the winter months.

Table 4-2: Pedestrian Peak Hour and 8-Hour Traffic Volumes

Period	Pedestrians Crossing	Richmond Road and Roosevelt Avenue	Roosevelt Avenue and Byron Avenue	Richmond Road and Churchill Avenue North	Churchill Avenue North and Byron Avenue
8 Hour	Crossing East Leg	530	148	330	206
AM Peak		40	13	36	18
PM Peak		92	17	54	29
8 - Hour	Crossing West Leg	714	277	553	282
AM Peak		65	33	45	43
PM Peak		116	46	84	40
8 Hour	Crossing North Leg	912	72	589	107
AM Peak		74	8	34	13
PM Peak		135	9	86	10
8 Hour	Crossing South Leg	1032	78	822	125
AM Peak		69	13	68	13
PM Peak		182	7	163	11
Total		**3,188**	**575**	**2,294**	**720**

Table 4-3: Cyclist Peak Hour and 8-Hour Traffic Volumes

Period	Cyclists Travelling	Richmond Road and Roosevelt Avenue	Roosevelt Avenue and Byron Avenue	Richmond Road and Churchill Avenue North	Churchill Avenue North and Byron Avenue
8 Hour	Eastbound	26	5	26	5
AM Peak		7	0	11	1
PM Peak		3	2	2	1
8 - Hour	Westbound	19	3	10	5
AM Peak		4	0	1	0
PM Peak		9	1	4	1
8 Hour	Northbound	12	4	24	27
AM Peak		4	0	8	7
PM Peak		2	1	1	0
8 Hour	Southbound	14	3	14	16
AM Peak		4	0	0	0
PM Peak		5	0	3	6
Total		**71**	**15**	**74**	**53**

Vehicular Travel Demand

Exhibit 4-15 illustrates the existing (unbalanced) morning and afternoon peak hour traffic volumes within the study area using the traffic count information obtained at the following intersections:

1. Richmond Road and Roosevelt Avenue;
2. Roosevelt Avenue and Byron Avenue;
3. Richmond Road and Churchill Avenue North;
4. Churchill Avenue North and Byron Avenue;
5. Churchill Avenue North and Danforth Avenue;
6. Roosevelt Avenue and Danforth Avenue;
7. Danforth Avenue and MEC Parking Accesses.

Exhibit 4-16 illustrates the existing balanced morning and afternoon peak hour traffic volumes. The following steps were completed in order to bring the traffic to a balanced 2022 horizon year:

- Traffic volumes were balanced along Roosevelt Avenue, Byron Avenue and Churchill Avenue North with respect to the highest traffic volume recorded;
- Upon review of TRANS Long-Range Transportation Model (provided in Appendix E) and comparison of existing volumes (See Exhibit 4-15) with 2031 forecast volumes from TRANS, no background growth rate was applied to the 2019 traffic counts.

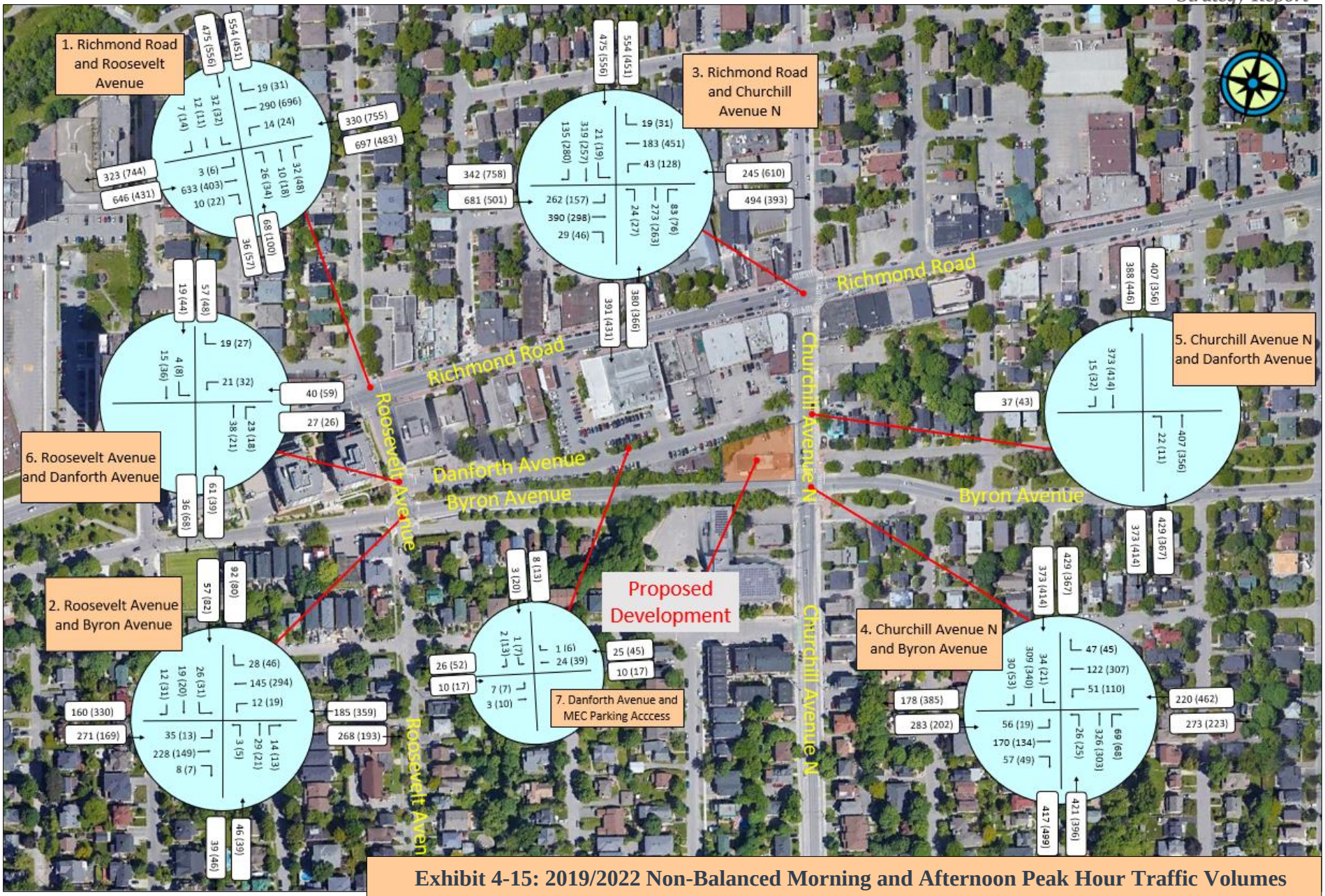


Exhibit 4-15: 2019/2022 Non-Balanced Morning and Afternoon Peak Hour Traffic Volumes

Morning (Afternoon), vph = vehicles-per-hour

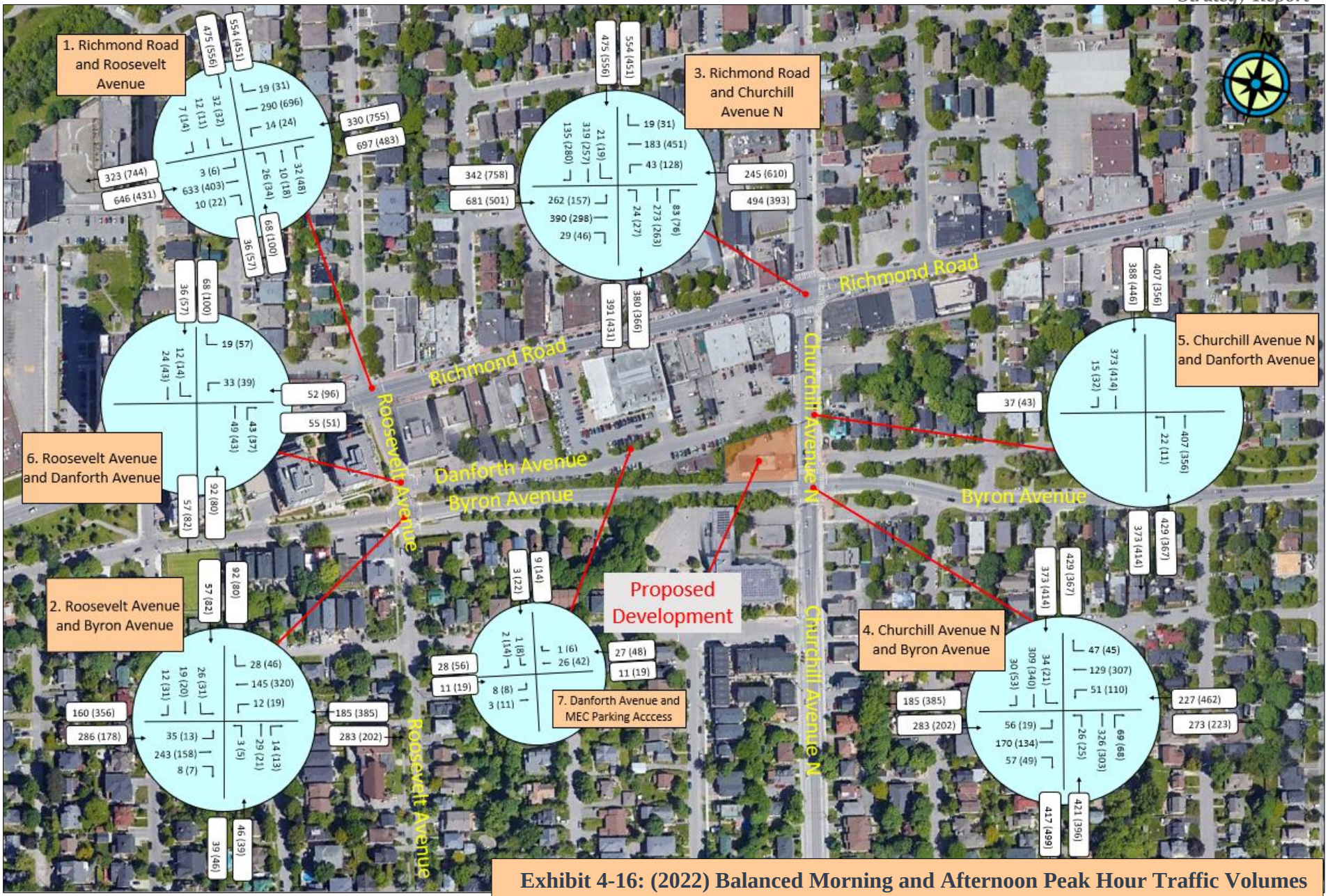


Exhibit 4-16: (2022) Balanced Morning and Afternoon Peak Hour Traffic Volumes

Morning (Afternoon), vph = vehicles-per-hour

Existing Traffic Volumes Intersection Capacity Analysis

Table 4-4 summarizes the existing (2022) intersection capacity analysis (See Exhibit 4-16 for traffic volumes) undertaken with Synchro™ 11 traffic analysis software. Appendix ñDò provides the traffic-signal timings\phasing that were provided by the City of Ottawa. This analysis assumes the development is not in place and only considers the effects of background growth and adjacent development traffic. Synchro analysis output sheets can be found in Appendix ñFò.

For the Richmond Road and Churchill Avenue N intersection, two scenarios (as shown on Exhibit 4-17) were evaluated: the lane arrangement in place at the time of count (January 2020), including the following:

- On the SB leg: one SB-RT lane and one shared SB-TH-LT lane;
- On the NB leg: one NB-RT and shared NB-LT-TH lane

As well as the second scenario, representing existing (July 2022) conditions with an updated lane arrangement as described below:

- On the SB leg: one all movement lane with a no left turn restriction between 3:30PM and 5:30PM;
- On the NB leg: one shared NB-TH-RT lane and an auxiliary NB-LT lane

Exhibit 4-17: 2022 vs 2022 Intersection Layout Scenarios

Table 4-4: Existing (2022) Traffic Analysis

Intersection	*Control Type*	*Weekday Morning Peak Hour (Afternoon Peak Hour)* *Critical Movement*				
		Approach / Movement	95th Percentile Queue (m)	Delay (seconds)	LOS	v/c
1. Richmond Road and Roosevelt Avenue (Distance to Dominion Station – 440 m)	Traffic Signal	*EB-TH (WB-TH)*	143 (189)	23.5 (27.3)	D (D)	0.81 (0.87)
2. Roosevelt Avenue and Byron Avenue (Distance to Dominion Station – 530 m)	Traffic Signal	*SB-TH (NB-TH)*	14 (10)	20.0 (17.5)	A (A)	0.16 (0.11)
		EB-TH (WB-TH)	26 (36)	6.3 (6.8)	A (A)	0.28 (0.37)
3. Richmond Road and Churchill Avenue (Distance to Churchill Alternative School – 185 m)	Traffic Signal [2020 Layout]	*NB-TH (NB-TH)*	76 (82)	28.1 (38.0)	C (C)	0.77 (0.70)
		SB-TH (SB-TH)	73 (73)	37.4 (34.9)	C (C)	0.78 (0.74)
	Traffic Signal [2022 Layout]	*NB-TH/RT (NB-TH/RT)*	85 (47)	18.4 (23.3)	B (C)	0.61 (0.72)
		Southbound	121 **(204)**	35.4 **(213)**	D **(F)**	0.83 **(1.38)**
		Southbound -no LT in PM	**(202)**	**(198)**	**(F)**	**(1.35)**
4. Churchill Avenue North and Byron Avenue (Distance to Churchill Alternative School – 50 m)	Traffic Signal	*EB-TH (WB-TH)*	49 (105)	12.1 (17.8)	A (A)	0.35 (0.59)
		NB-TH (SB-TH)	75 (44)	30.3 (23.9)	C (C)	0.73 (0.77)
		SB-LT (SB-LT)	8 (3)	37.2 (14.6)	A (A)	0.26 (0.16)
5. Churchill Avenue and Danforth Avenue (Distance to Churchill Alternative School – 110 m)	Free Flow (Inbound only)	N/A				
6. Roosevelt Avenue and Danforth Avenue (Distance to Dominion Station – 500 m)	Minor Leg-STOP control	*WB (WB)*	2 (3)	9.3 (94)	A (A)	0.06 (0.11)

According to the City of Ottawaôs MMLOS guidelines, the minimum desirable vehicular LOS target (Auto-LOS) for each intersection that is within 600 meters (assumed to be walking distance) of a rapid transit stationò policy area or ñwithin 300 meters of a schoolò policy area is LOS ñEò[4]. All of the intersections analyzed were found to be above these minimum desirable targets for level-of-service.

4 ñ*Multi-Modal Level of Service (MMLOS) Guidelines*ò, Supplement to the TIA Guidelines, City of Ottawa *September 2015*, IBI Group. Pages 21-24

Table 4-4 indicates the following:

- Intersection of Richmond Road and Roosevelt Avenue operates at an acceptable level of service ñDò with defined eastbound peak direction in the AM and westbound peak direction in the PM;
- The intersection of Richmond Road and Churchill Avenue North:
  - operates at an acceptable level of service ñCò assuming the 2020 intersection layout (which was in place at the time of January 2020 traffic count;
  - assuming the current (July 2022) intersection layout described above, the intersection operates above its capacity at a **level of service "F"** in the **southbound** direction during the afternoon peak hour of travel demand.
  - the calculated capacity of the southbound movement is 447 vph (vehicles-per-hour) (459 vph assuming no left turn movements in the PM); while the total demand of vehicles at the approach was counted to be 618 vph (after applying a peak hour factor of 0.9);
  - the intersection was calculated to have over 200 meters of queue length and an average delay of over 3 minutes;
  - this can be interpreted as a direct result of narrowing the north leg approach and egress of Churchill Avenue to one lane each.
- It is also important to note the following:
  - Present day (October 2022) volumes at Churchill Avenue North intersection may still be impacted by shifts in commuting behaviour after the Covid-19 pandemic. The present and future volumes could remain lower than the traffic count from January 2020;
  - A traffic signal was recently installed at the upstream Churchill Avenue North and Scott Street intersection. If properly coordinated with the downstream signal (Churchill Avenue North and Richmond Road), it may help reduce the queues. This intersection was not included within the study area of this TIA;
- The intersection of Churchill Avenue North and Byron Avenue operates at a level of service ñCò during the afternoon peak hour of travel demand. The peak hour 95th percentile queues for southbound left turn were determined to be 8 meters (less than a single car length);
- All other study area intersections were found to operate at a level of service ñAò.

4.1.2.8 Existing Road Safety Information

Historical collision information was reviewed for each of the study area intersections and segments. The collision information was referenced from the City of Ottawa for the period 2016-through-2020. (See Appendix ñDò)

The collision information provided:

- the date and time of each collision;
- the type of collision (e.g., angle collision, rear-end);
- the severity of damage involved;

- vehicle details (truck, passenger vehicle, etc.);
- vehicle path/maneuver characteristics; and
- the number of pedestrians involved in the collision.

Table 4-5 provides a summary of both intersection and mid-block reported collision for the locations within the study area in terms of the type of collision and collision severity. As well, the table presents the calculated collision rate [as measured in number of collisions per million vehicles that travelled either through the intersection or along the corridor.] A standard collision rate based on the number of collisions- per-million-entering-vehicles (MEV) was calculated. The rate greater than 1.0 collisions/MEV was considered to indicate a potential concern.

Table 4-5 indicates the following:

- The Richmond Road and Churchill Avenue North 4-leg intersection was determined to have 25 collisions over a five-year period and exhibited an overall collision rate of 0.59 collisions/MEV which was considered to be within an acceptable range.
  - Å 32% of collisions were rear end collisions;
  - Å 28% of the collisions resulted in injuries; and
  - Å 12% of collisions involved a pedestrian.

Table 4-5: Five -Year Collision History (January 1st, 2016 -to- December 31st, 2020)

Intersection / Mid-block Location		Richmond Road and Roosevelt Avenue	Roosevelt Avenue and Byron Avenue	Richmond Road and Churchill Avenue North	Churchill Avenue North and Byron Avenue	Churchill Avenue North and Danforth Avenue	Roosevelt Avenue and Danforth Avenue	Danforth Avenue between Churchill Avenue North and Roosevelt Avenue (mid-block)
Total Collisions		**8**	**3**	**25**	**5**	**1**	**1**	**5**
Collision Type	Rear End	6	-	8	1	-	-	-
	Single Vehicle	-	-	2	-	-	-	2
	Sideswipe	1	-	5	-	1	-	-
	Turning Movement	-	1	5	3	-	-	-
	Angle	-	-	2	-	-	-	2
	Pedestrian	-	-	3	1	-	-	
	Other	1	2	-	-	-	1	1
Collision Severity	Property Damage	7	3	18	3	1	1	5
	Non-Fatal Injury	1	-	7	2	-	-	-
	Fatal	-	-	-	-	-	-	-
Intersection AADT		**16,000**	**6,500**	**23,400**	**16,300**	**5,600**	**1,100**	**N/A**
Collision Rate per MEV		**0.27**	**0.25**	**0.59**	**0.17**	**0.10**	**0.5**	**N/A**

MEV = Millions of Vehicles Entering the Intersection or (mid-block) travelling along the corridor.
AADT = Average Annual Daily Traffic

- The Richmond Road and Roosevelt Avenue 4-leg intersection was determined to have 8 collisions over a five-year period and exhibited an overall collision rate of 0.27 collisions/MEV which was considered to be within an acceptable range.
  - 75% of collisions were rear end collisions; and
  - 13% of the collisions resulted in injuries.
- The Churchill Avenue North and Byron Avenue 4-leg intersection was determined to have 5 collisions over a five-year period and exhibited an overall collision rate of 0.17 collisions/MEV which was considered to be within an acceptable range.
  - 20% of collisions were rear end collisions;
  - 40% of collisions resulted in injuries; and
  - 20% of the collisions involved pedestrians.
- The Roosevelt Avenue / Byron Avenue, Churchill Avenue North / Danforth Avenue and Roosevelt Avenue / Danforth Avenue intersections all had less than 1 collision-per-year over the 5 year period evaluated. None of these collisions resulted in injuries.
- Additionally, there were five collisions reported along Danforth Avenue between Churchill Avenue North and Roosevelt Avenue. Two of these collisions were single-vehicle collisions. All collisions resulted in property damage only.
- Based on the available data that was reviewed, all 6 study area intersections presently exhibit an acceptable level of safety.

4.1.3 Planned Conditions

4.1.3.1 Changes to the Study Area Transportation Network

The following projects were identified that could impact the transportation network:

- The City of Ottawaôs TMP affordable road network includes plans for transit signal priority and queue jump lanes at select intersections along Richmond Road, Wellington Street W and Somerset Street[5]. The project is meant to reduce travel time and improve reliability of OC Transpoôs Route 11 (formerly known as Route 2).
- The Byron Avenue, Highcroft Avenue, and Athlone Avenue integrated infrastructure replacement project is underway and is scheduled for completion by 2023. This project involves the sanitary sewer and watermain replacement along Byron Avenue, [between Churchill Avenue and Hilson Avenue (east of Churchill Avenue North and Byron Avenue intersection)]. The road is to be fully reinstated upon completion. Bike lanes along both sides of Byron Avenue are planned[6].
- Exhibit 4-18 illustrates OC Transpoôs LRT (O-Train Line 1) West Extension that is currently undergoing construction and is planned to enter service by 2025. The extension consists of two branches with 11 new stations includes two new termini. Existing Line 1 will be split up into two new lines: Line 1 ending at Algonquin station in Nepean and Line 3 ending at Moodie station in the greenbelt, just west of Crystal Bay / Britannia Village community.

5 ñ*Transportation Master Plan*ò, City of Ottawa, November 2013, pg.106
6 Byron Avenue, Highcroft Avenue, and Athlone Avenue integrated infrastructure replacement, City of Ottawa

- The walking distance (See Exhibit 4-14)from the site:
- to the Westboro Station is 770m; and
- to the Kichi Sibi Station (presently known as Dominion Station) is 810m.

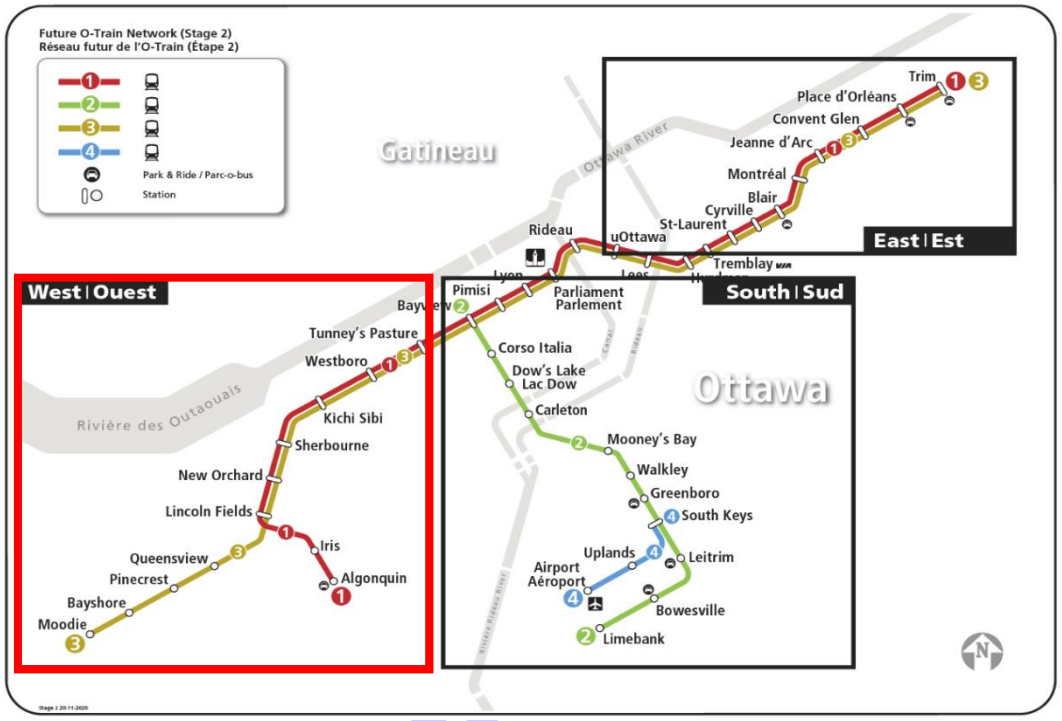


Exhibit 4-18: OC Transpo's LRT (O-Train Line 1) West Extension

4.1.3.2 Other Study Area Developments

A review of the City of Ottawaôs development applications website indicated 6 major development proposals with active applications adjacent to the study area that are anticipated to have an impact on the traffic volumes in the study areaôs transportation network. Exhibit 4-19 illustrates the location of the following adjacent development initiatives:

249-255 Richmond Road & 372 Tweedsmuir Avenue:

This is a proposal to redevelop an existing commercial retail and restaurant building with a mixed-use building containing 87 apartment units, 390 square meters of retail space and 240 meters of restaurant space. In terms of parking; 96 underground vehicle parking spaces along with 18 electric vehicle charging stations are proposed. The anticipated full occupancy year of the development is 2023. A TIA prepared by Novatech indicates that the redevelopment will add 18 vehicle trips during the morning peak hour of travel demand and remove 3 vehicle trips during the afternoon peak hour of travel demand.

319-327 Richmond Road, 380 Winona Avenue & 381 Churchill Avenue

This is a proposal to redevelop an existing car garage and maintenance shop, two retail stores and a residential apartment into a mixed-use building with 184 apartment units and 1,736 square meters of retail space. A total of 131 vehicle parking spots are proposed. The anticipated full occupancy year of the development is 2022. A TIA prepared by CGH indicates that the development will add 21 vehicle trips during the morning peak hour and 30 vehicle trips during the afternoon peak hour of travel demand.

335 Roosevelt Avenue

This is a proposal to construct two high-rise residential buildings with a total of 246 apartment units and two mid-rise residential buildings with a total of 17 apartment units. A total of 254 underground vehicle parking spots are proposed. The anticipated full occupancy year of the development is 2026. A TIA prepared by Novatech indicates that the development will add 15 vehicle trips during the morning peak hour and 16 vehicle trips during the afternoon peak hour of travel demand.

2050 Scott Street

This is a proposal to construct a mixed-use high-rise building with a total of 353 apartment units and 233 square meters of ground commercial space. 204 underground vehicle parking spots are proposed are proposed. The original full occupancy year of the development is stated as 2021. However, at the time of writing this report the construction at the site has not been started. Therefore, the new build-out year is assumed to be 2024. A TIA prepared by Parsons indicates that the development will add 35 vehicle trips during the morning peak hour and 35 vehicle trips during the afternoon peak hour of travel demand.

2070 Scott Street

This is a mixed-use 25-storey high-rise building that is presently in early stages of construction. The building is envisioned to have a total of 241 apartment units and 510 square meters of ground commercial space. 128 underground vehicle parking spots are proposed are proposed. The development is currently under construction and is assumed to be built-out and fully occupied by the end of 2024. A TIA prepared by Stantec indicates that the development will add 38 vehicle trips during the morning peak hour and 35 vehicle trips during the afternoon peak hour of travel demand.

398-406 Roosevelt Avenue

This is a proposal to construct a mid-rise residential building with a total of 28 apartment units. A total of 49 underground vehicle parking stalls are proposed. The anticipated full occupancy year of the development is 2023. A TIA prepared by Parsons indicates that the development will add a negligible amount of vehicle trips during both the morning peak hour and afternoon peak hour of travel demand.

403 Richmond Road

This is a proposal to redevelop an existing funeral home and residential dwelling into a mixed-use high-rise building with a total of 141 apartment units and 491 square meters of ground commercial space. 150 underground vehicle parking spots are proposed are proposed. The occupancy year of the development is 2025. A TIA prepared by CIMA+ indicates that the development will add 19 vehicle trips during the morning peak hour and 21 vehicle trips during the afternoon peak hour of travel demand.

397-399 Richmond Road

This development would see two existing homes on Winston Avenue being replaced by a new single seven-storey building with ground-floor commercial space, 42 residential units on the above-ground floors and two underground parking levels. Vehicle access to the site will take place by way of the Winston Avenue with the nearest northern intersection being the Madison Avenue/Winston Avenue intersection.

Exhibit 4-19: Adjacent Development Initiatives

5.0 FORECASTING

5.1 DEVELOPMENT GENERATED TRAVEL DEMAND

This section of the report describes the projected traffic generation by mode, as well as vehicle trip distribution and trip assignment associated with the full build-out and occupancy of the proposed development planned for 2025.

5.1.1 Trip Generation and Mode Shares

5.1.1.1 Trip Generation Rate

The City of Ottawa TIA guidelines indicate that the preferred source for forecasting traffic generation for residential developments is the 2009 TRANS Trip Generation Manual[7]. However, the 2020 TRANS Trip Generation Manual Summary Report[8] was referenced in this document.

- The proposed residential development is classified as a ñMulti-Unit High-Riseò, since it is an apartment building that contains more than two storeys[9].
- Table 5-1 outlines the residential person-trip generation rates as referenced from the 2020 TRANS Trip Generation Manual[10] for a multi-unit high rise residential building.

Table 5-1: Person Trip Generation per Peak Period (TRANS 2020)

ITE/TRANS Land Use	Size	Morning Peak Hour	Afternoon Peak Hour
		Rate	Rate
221&222 Multi-Unit (High-Rise)	58 units	0.80	0.90
		Trips*	**Trips***
		46	52

*The calculated value for total trips in the subsequent table is higher due to rounding by mode

5.1.1.2 Existing Dry-Cleaning Establishment

The traffic generated by existing land use was assumed to be low-to-negligible during the peak hours of travel demand, and thus was not included as a part of the calculation of siteôs net-effect on the traffic in the area. Given an already low auto vehicle traffic generation assumptions (7 vehicles in the AM and 8 vehicles in the PM), additional reductions to traffic demand were not applied.

7 City of Ottawa TIA Guidelines, Page 27
8 TRANS Trip Generation Manual Summary Report, *WSP*, October 2020
9 TRANS Trip Generation Manual Summary Report, Page 4
10 TRANS Trip Generation Manual Summary Report, Page 5, Table 3: Recommended Residential Person Trip Rates

5.1.1.3 Mode Shares

Table 5-2 outlines the residential mode shares for the high-rise multi-family housing in Ottawa West district, adopted from the 2020 TRANS Trip Generation Manual[11]. The number of trips was rounded up to remain conservative. Since the data in the manual is given in reference to the peak period, peak- period-to-peak-hour adjustment factors were used to forecast peak hour trips (See Table 5-2). A total of 28 and 27 person trips are forecast during the morning and afternoon peak hours of travel demand, respectively, of which only 7 and 8 trips respectively are auto-driver trips.

5.1.1.4 Directional Split

Table 5-3 outlines the directional split factors that were applied to forecast the number of inbound and outbound vehicle trips. The development is forecast to generate:

- only 2 inbound and 5 outbound trips during the morning peak hour; and
- only 5 inbound and 3 outbound trips during the afternoon peak hour.

Table 5-2: Mode Shares
High-Rise Multifamily Housing, Ottawa West (TRANS 2020)

Peak Period Mode Share Split (TRANS 2020 Table 8)		
Mode	**Mode Share, AM**	**Mode Share, PM**
Auto Driver	28%	33%
Auto Passenger	11%	11%
Transit	41%	26%
Cycling	3%	7%
Walking	16%	23%
Peak Period Trips by Mode (Rounded Up)		
Mode	**Trips, AM**	**Trips, PM**
Auto Driver	13	17
Auto Passenger	5	6
Transit	18	13
Cycling	2	4
Walking	7	12
Total Person Trips	**45**	**52**
Peak Period to Peak Hour Trip Adjustment Factor (TRANS 2020 Table 4)		
Mode	**AM**	**PM**
Auto Driver	0.48	0.44
Auto Passenger	0.48	0.44
Transit	0.55	0.47
Cycling	0.58	0.48
Walking	0.58	0.52
Peak Hour Trips by Mode (Rounded Up)		
Mode	**Trips, AM**	**Trips, PM**
Auto Driver	7	8
Auto Passenger	3	3
Transit	11	7
Cycling	2	2
Walking	5	7
Total	**28**	**27**

Table 5-3: Vehicle Directional Splits (TRANS 2020, Table 9)

Peak Hour Vehicle Directional Split (TRANS 2020 Table 9)				
Total Vehicles	**AM Peak**		**PM Peak**	
Direction	In	Out	In	Out
Directional Split	31%	69%	58%	42%
New Vehicle Trips (peak hour)	2	5	5	3

11 TRANS Trip Generation Manual Summary Report, Page 11, Table 8: Residential Mode Share for High-Rise Multifamily Housing

5.1.1.5 Future Mode Shares

Table 5-4 outlines the future mode share targets for this development, along with justifications for each target. A comparison between the mode shares in Table 5-4 with the existing mode shares in Table 5-2 indicates little difference. The existing mode shares indicated in Table 5-2 were used for trip forecasting.

Table 5-4: Future Mode Share Targets

Travel Mode	Mode Share Target	Rationale
Transit	30-45%	With the advent of LRT stage 2 and the site being within an 800-metre walking distance to Westboro station, the transit mode share is expected to remain high or increase
Walking	15-25%	Good pedestrian and cycling infrastructure is present in the area. Richmond Road houses commercial, services and employment sectors within walking/cycling distance from the development
Cycling	5%	
Auto Passenger	10-15%	Auto passenger mode share is assumed to remain between 10% and 15%. The upper limit of 15% is assuming a 1.15 vehicle occupancy rate[12]
Auto-driver	20-35%	With the advent of LRT stage 2, as well as intensification and active transportation improvements in the area, the auto driver mode is anticipated to remain low or decrease

5.1.2 Trip Distribution

All external vehicle trips will access the development via the parking garage access on Danforth Avenue. A review of TRANS transportation model and TRANS 2020 O-D Survey resulted in the following traffic distribution of traffic being adopted:

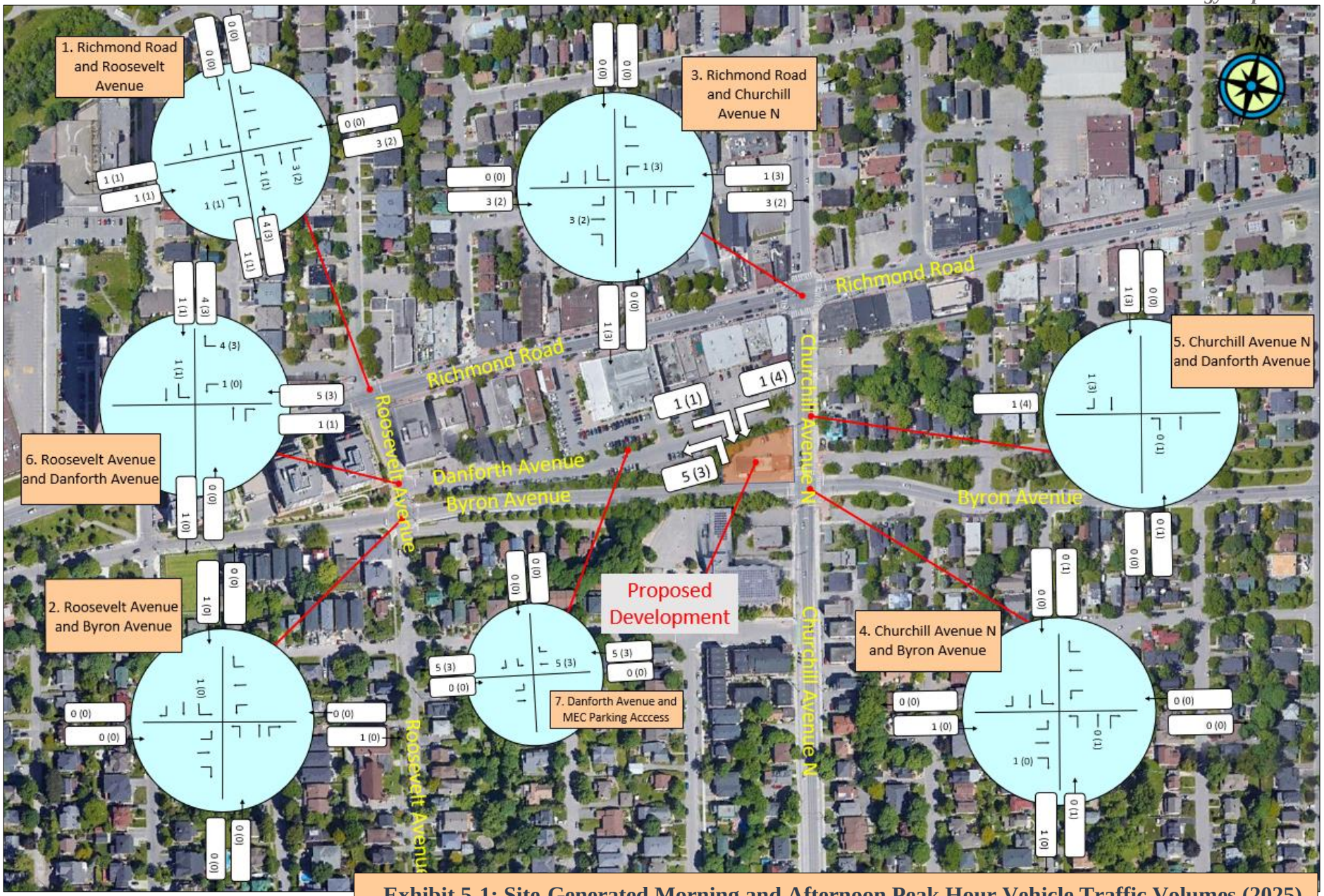
- 50% of vehicles going to/from the east on Richmond Road;
- 25% of vehicles going to/from the west on Richmond Road;
- 25% of vehicles going to/from the south on Churchill Avenue;

Provision for move-in/move-out vehicles and delivery vehicles at the time of writing is being considered along the south-west corner of the building parallel to Byron Avenue. These trips were assumed to happen during off-peak hours and were not accounted for in the traffic forecasts.

5.1.3 Trip Assignment

Exhibit 5-1 displays site-generated vehicle trips upon full occupancy of the development (2025). The traffic is assumed to access the development from the Churchill Avenue North / Danforth Avenue intersection or from the Roosevelt Avenue / Danforth Avenue intersection. It is acknowledged that some traffic may opt to use the adjacent Mountain Equipment Co-op (MEC) parking lot access road to cut through from Richmond Road. Further discussion on cut-through traffic is provided in Section 5.3.2 - Total Traffic Forecasts.

12 City of Ottawa TIA Guidelines, *June 2017*, Page 28



Morning (Afternoon), vph = vehicles-per-hour

Exhibit 5-1: Site-Generated Morning and Afternoon Peak Hour Vehicle Traffic Volumes (2025)

5.2 BACKGROUND NETWORK TRAVEL DEMAND

5.2.1 Transportation Network Plans

As previously discussed in Section 4.1.3.1, the following changes to the transportation network are anticipated in the coming years:

- As a part of City of Ottawaôs TMP affordable road network, there are plans to implement transit signal priority and queue jump lanes at select intersections along Richmond Road / Wellington Street W / Somerset Street[13]. The project is meant to reduce travel time and improve reliability of OC Transpoôs Route 11 (formerly known as Route 2). This measure is also anticipated to nominally increase non-transit vehicle delay along Richmond Road. Improved reliability of route 11 will aid in achieving target transit mode shares for 424 Churchill Avenue North and adjacent proposed developments.
- Byron Avenue, Highcroft Avenue, and Athlone Avenue integrated infrastructure replacement project is underway to replace sanitary sewers and watermains along Byron Avenue, between Churchill Avenue and Hilson Avenue (east of Churchill Avenue North and Byron Avenue intersection). Byron Avenue, Highcroft Avenue and Athlone Avenue will receive pedestrian infrastructure (sidewalk) upgrades, as well as cycle tracks along Byron Avenue (east of Churchill Avenue North intersection).
- OC Transpoôs LRT West extension is planned to enter service by the end of 2025. The proposed 424 Churchill Avenue North development is located 770m walking distance to Westboro Station and 810m walking distance to the Kichi Sibi Station (formerly known as Dominion Station) from the proposed developmentôs main entrance. Proximity of the LRT connection at the time of build-out will also aid in achieving the target transit mode shares for the development

5.2.2 Background Growth

This study assumes a zero percent background traffic growth rate on roadways in the study area. This assumption is consistent with the City of Ottawaôs long-range transportation model output (provided in Appendix ñEò), as well as other developmentôs TIAs[14].

Traffic from proposed future developments summarized in the following section was layered onto the traffic model individually.

5.2.3 Other Developments

There are 6 developments in the study area with active development applications and completed TIA studies (previously summarized in Section 4.1.3.2). The traffic generation and distribution for each of these developments is summarized below. Traffic from four (4) out of the six (6) developments was layered onto the background network.

13. ñ*Transportation Master Plan*ò, City of Ottawa, November 2013, pg.106
14. ñ*398-406 Roosevelt Ave TIA*ò by Parsons; 319-327 Richmond Road TIA (CGH); 335 Roosevelt Avenue TIA (Novatech) have adopted a zero percent background growth rate for their respective study areas.

249-255 Richmond Road & 372 Tweedsmuir Avenue

A TIA prepared by Novatech indicates that the redevelopment will add 18 vehicle trips during the morning peak hour of travel demand and remove 3 vehicle trips during the afternoon peak hour of travel demand. The TIA has not included the trip distribution assumptions for this development. As such, the developmentôs traffic impact is considered to have a negligible impact on the road network and was not included in the adjacent development traffic calculations

319-327 Richmond Road, 380 Winona Avenue & 381 Churchill Avenue

A TIA prepared by CGH indicates that the development will add 21 vehicle trips during the morning peak hour and 30 vehicle trips during the afternoon peak hour of travel demand in the anticipated full occupancy year of the development (2022). Exhibit 5-2 (adopted from the CGH TIA) illustrates the vehicle traffic generated by the development upon full occupancy.

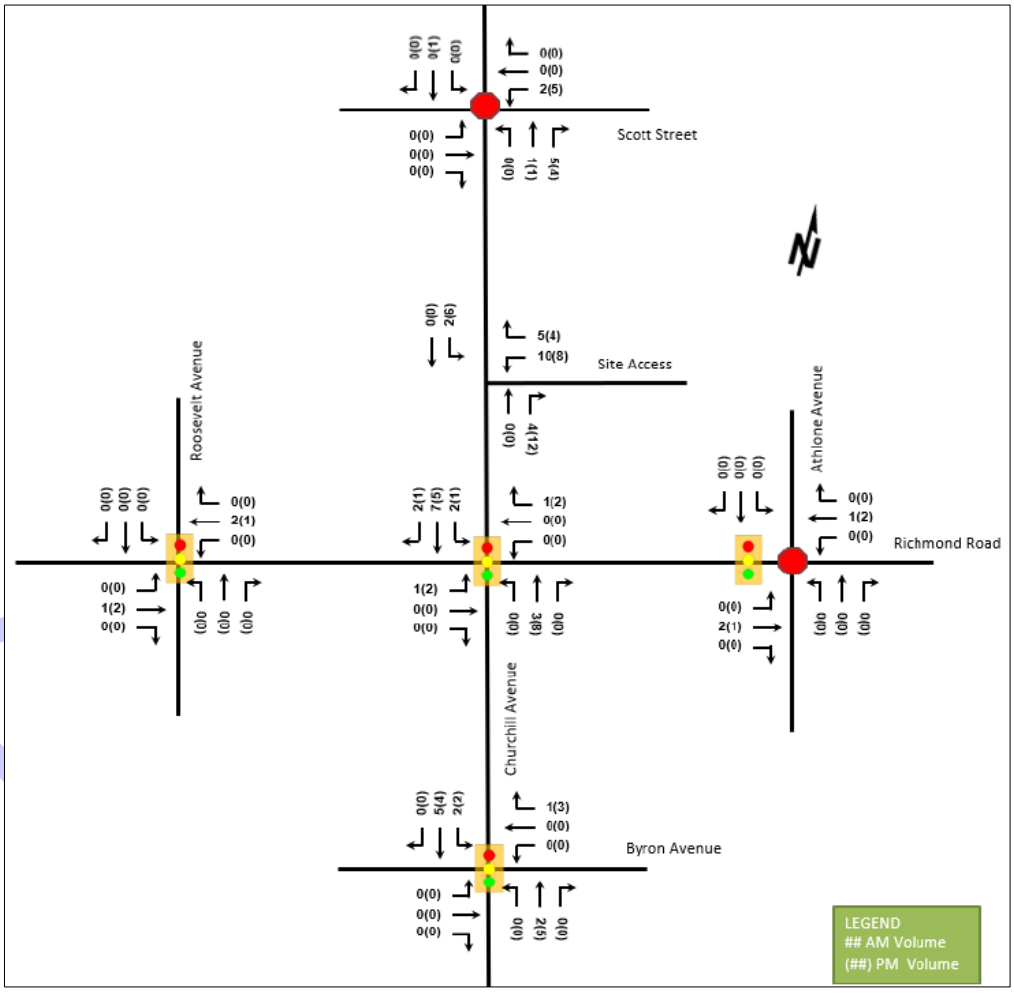


Exhibit 5-2: 319-327 Richmond Road Traffic Generation

335 Roosevelt Avenue

A TIA prepared by Novatech indicates that this development will add 15 vehicle trips during the morning peak hour and 16 vehicle trips during the afternoon peak hour of travel demand in the anticipated full occupancy year of the development (2026). Exhibit 5-3 (adopted from the Novatech TIA) illustrates the vehicle traffic generated by the development upon full occupancy.

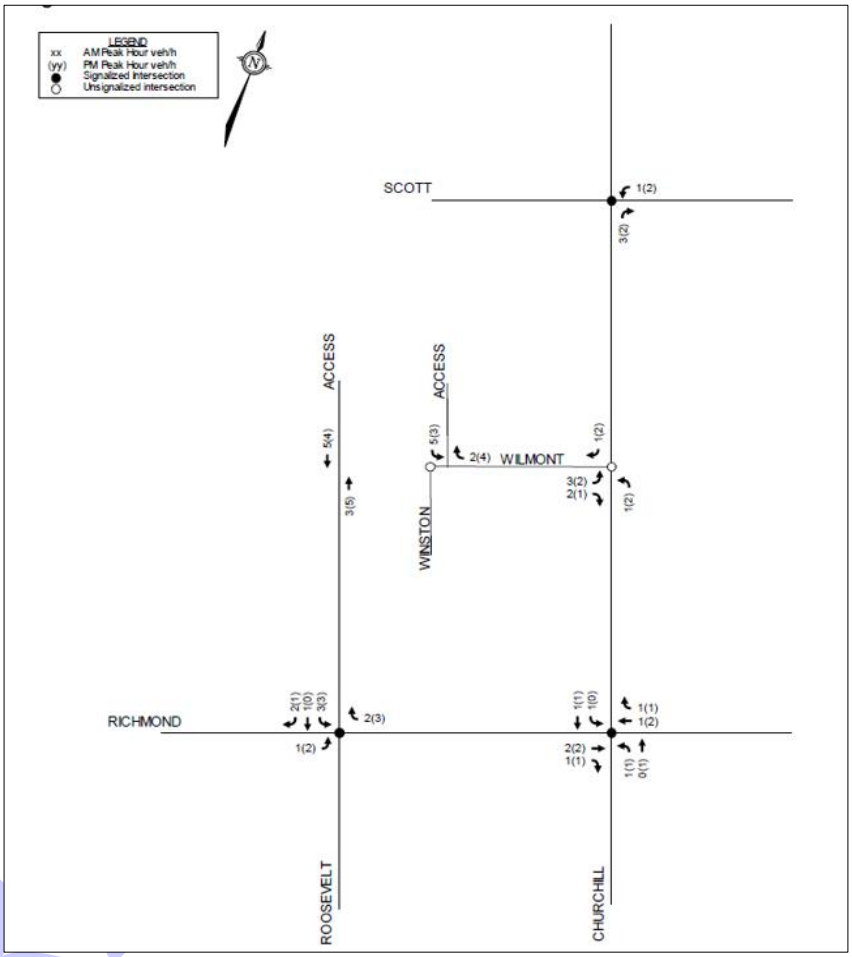


Exhibit 5-3: 335 Roosevelt Avenue Traffic Generation

2050 Scott Street

A TIA prepared by Parsons indicates that the development will add 35 vehicle trips during the morning peak hour and 35 vehicle trips during the afternoon peak hour of travel demand in the anticipated full occupancy year of the development (2024). Exhibit 5-4 (adopted from the Parsons TIA) illustrates the vehicle traffic generated by the development upon full occupancy.

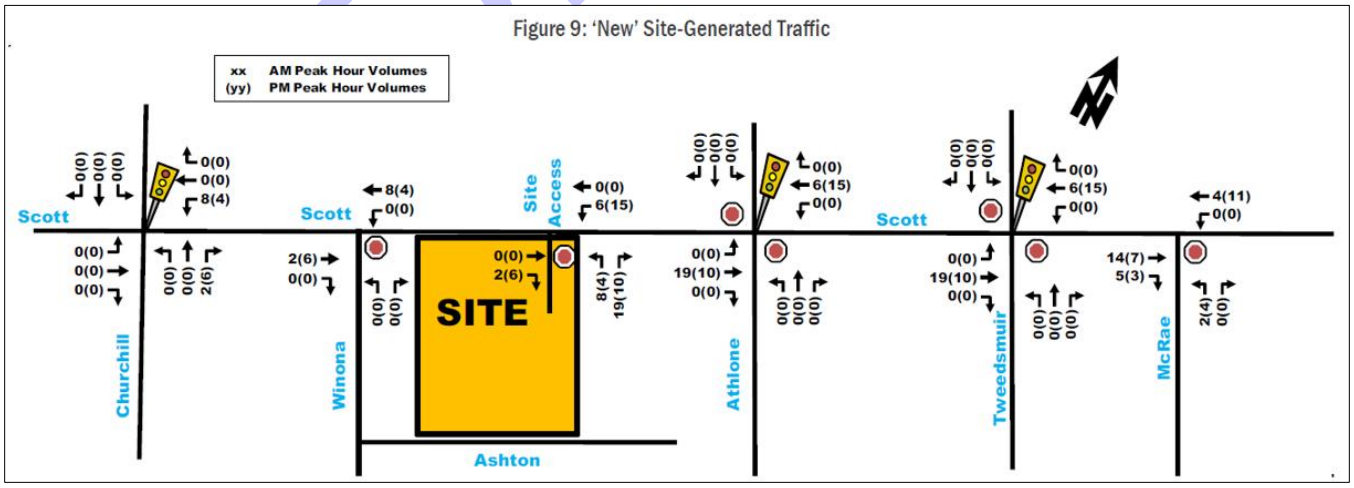


Exhibit 5-4: 2050 Scott Street Traffic Generation

398 Roosevelt Avenue

A TIA prepared by Parsons indicates that the development will add a negligible amount of vehicle trips during both the morning peak hour and afternoon peak hour of travel demand.

403 Richmond Road

A TIA prepared by CIMA+ indicates that the development will add 19 vehicle trips during the morning peak hour and 21 vehicle trips during the afternoon peak hour of travel demand in the first occupancy year of the development (2025). Exhibit 5-5 (adopted from the CIMA+ TIA) illustrates the vehicle traffic generated by the development upon full occupancy.

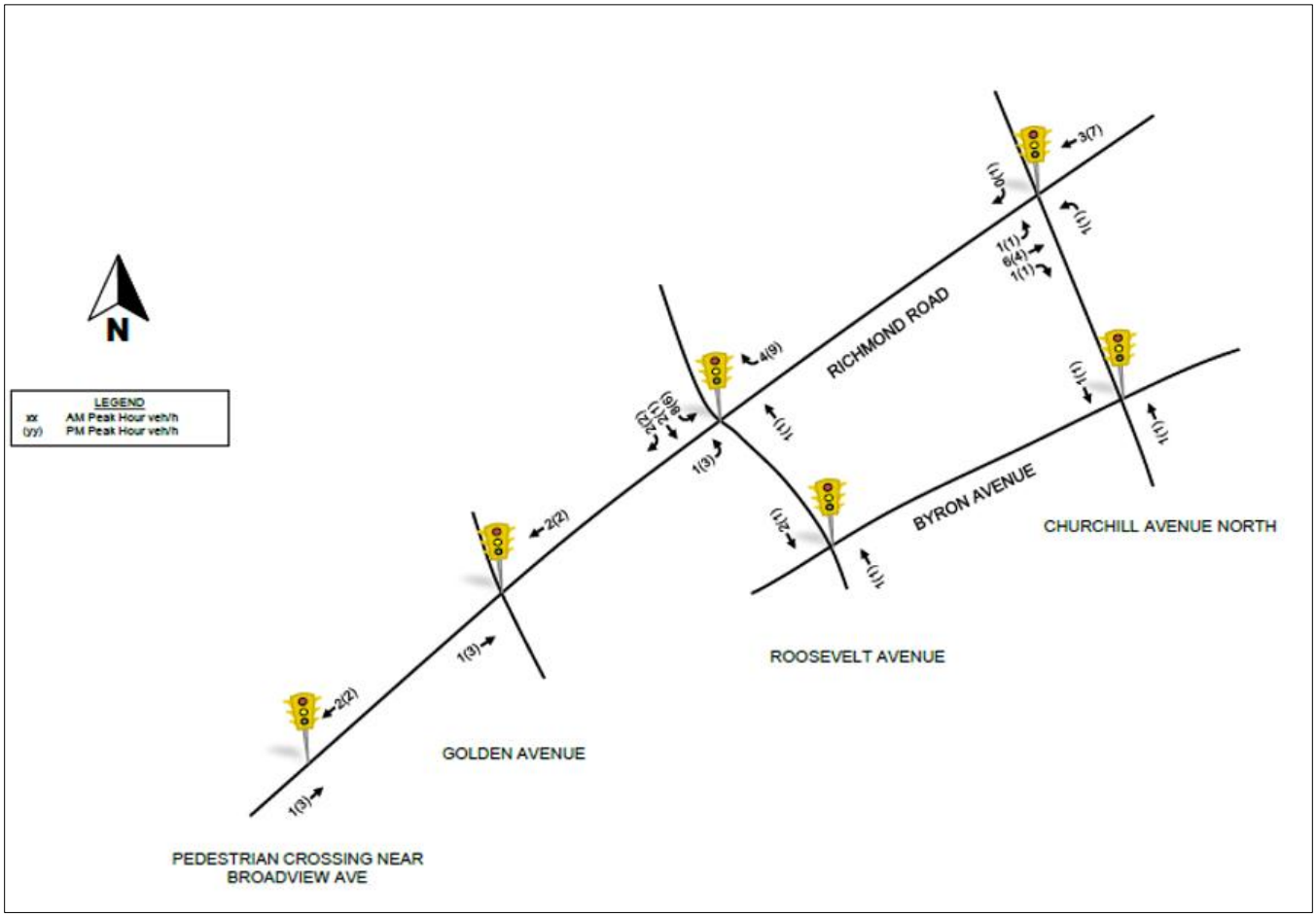


Exhibit 5-5: 403 Richmond Road Traffic Generation

397-399 Richmond Road

Vehicle access to the site will take place by way of the Winston Avenue with the nearest northern intersection being the Madison Avenue/Winston Avenue intersection. The impact of this development on the roadways adjacent to the proposed development was considered to be negligible.

2070 Scott Street

A TIA prepared by Stantec indicates that the development will add 38 vehicle trips during the morning peak hour and 35 vehicle trips during the afternoon peak hour of travel demand in the first occupancy year of the development (assumed to be 2024). Exhibit 5-6 (adopted from the Stantec TIA) illustrates the vehicle traffic generated by the development upon full occupancy.

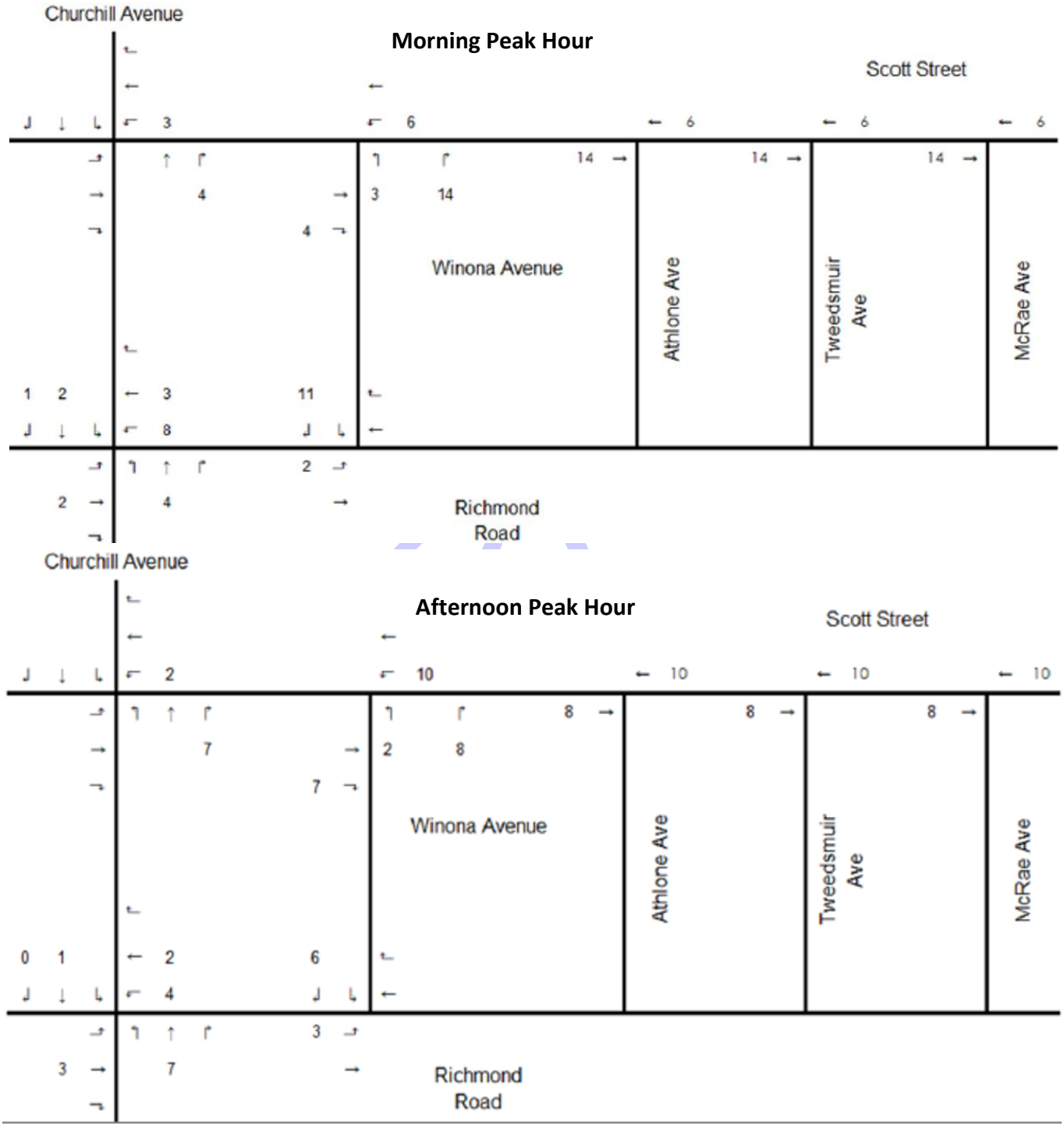


Exhibit 5-6: 2070 Scott Street Traffic Generation

5.3 DEMAND RATIONALIZATION

The following section contains forecast traffic volumes for the forecast time of build-out (2025) and 5-years after build-out (2030), both with, and without, the proposed 424 Churchill Avenue North Residential Apartments development.

5.3.1 Background Traffic Forecasts

Exhibit 5-7 and Exhibit 5-8 illustrate background traffic forecasts for the forecast years 2025 and 2030, which combine the existing traffic network and the traffic generated by future developments in the study area. These exhibits exclude the impacts of the proposed 424 Churchill Avenue North Residential development. A comparison of these traffic volumes with the existing traffic volumes indicates no significant changes.

Since the forecast net increase in traffic in the study area over the next 8 years (2022 to 2030) is low, the intersection capacity analysis was not performed for the future background horizon years. Refer to Section *4.1.2.7 - Existing Peak Hour Travel Demands by Mode* for the intersection capacity analysis in existing conditions.

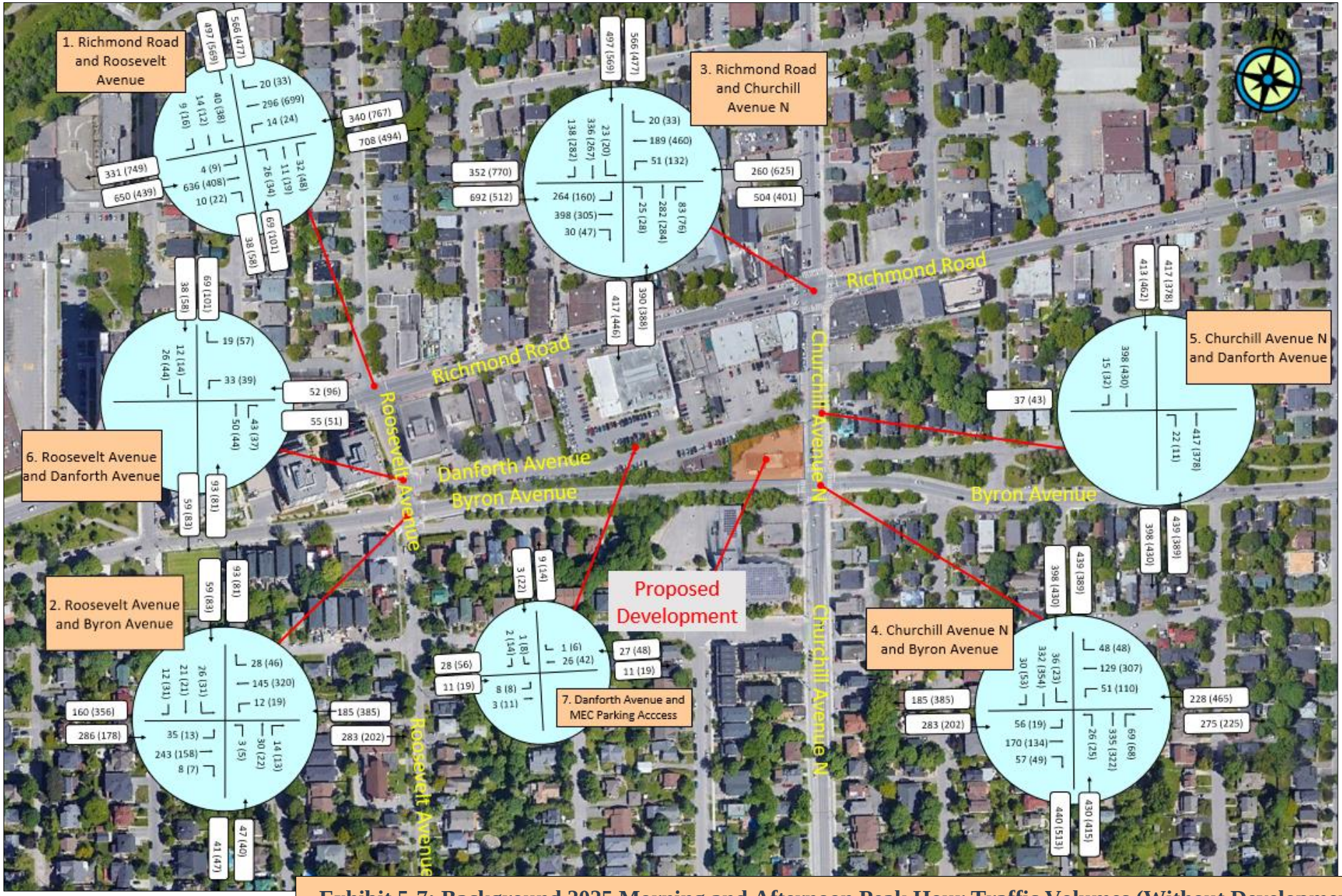
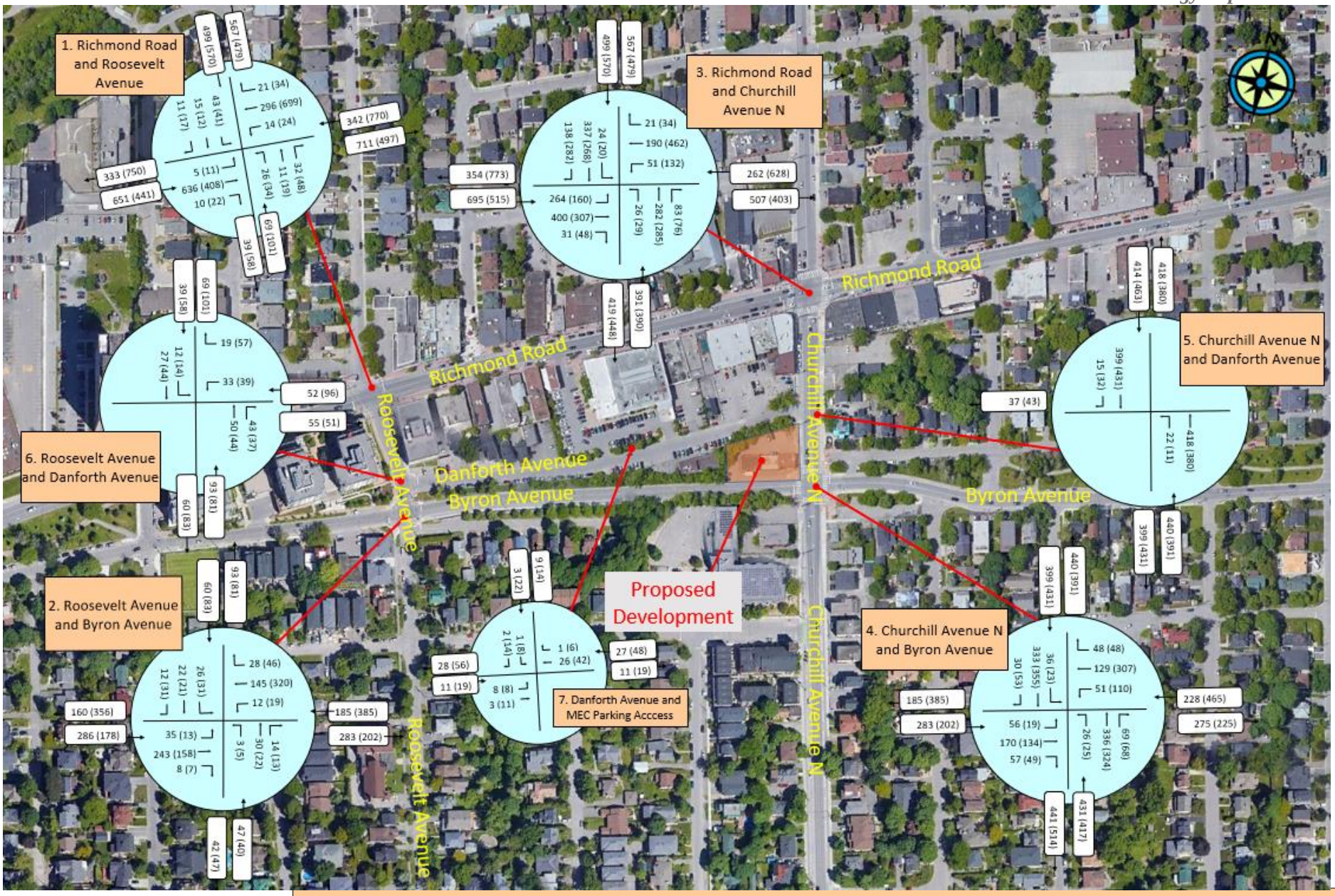


Exhibit 5-7: Background 2025 Morning and Afternoon Peak Hour Traffic Volumes (Without Development)

Morning (Afternoon), vph = vehicles-per-hour



Morning (Afternoon), vph = vehicles-per-hour

Exhibit 5-8: Background 2030 Morning and Afternoon Peak Hour Traffic Volumes (Without Development)

5.3.2 Total Traffic Forecasts

Exhibit 5-9 and Exhibit 5-10 illustrate total traffic forecasts for years 2025 and 2030, which combine the forecast background network traffic and development-generated traffic demands.

Since the forecast net increase in traffic in the study area over the next 8 years (2022 to 2030) is extremely low (even with the impact of 424 Churchill Avenue North development ï See Exhibit 5-1.), the intersection capacity analysis was not performed for the future total traffic horizon years. Refer to Section *4.1.2.7 - Existing Peak Hour Travel Demands by Mode* for the intersection capacity analyses depicted in existing conditions

Development-Generated Traffic Impacts

The advent of development is expected to cause a low-to-negligible impact on the surrounding transportation network adding a total of:

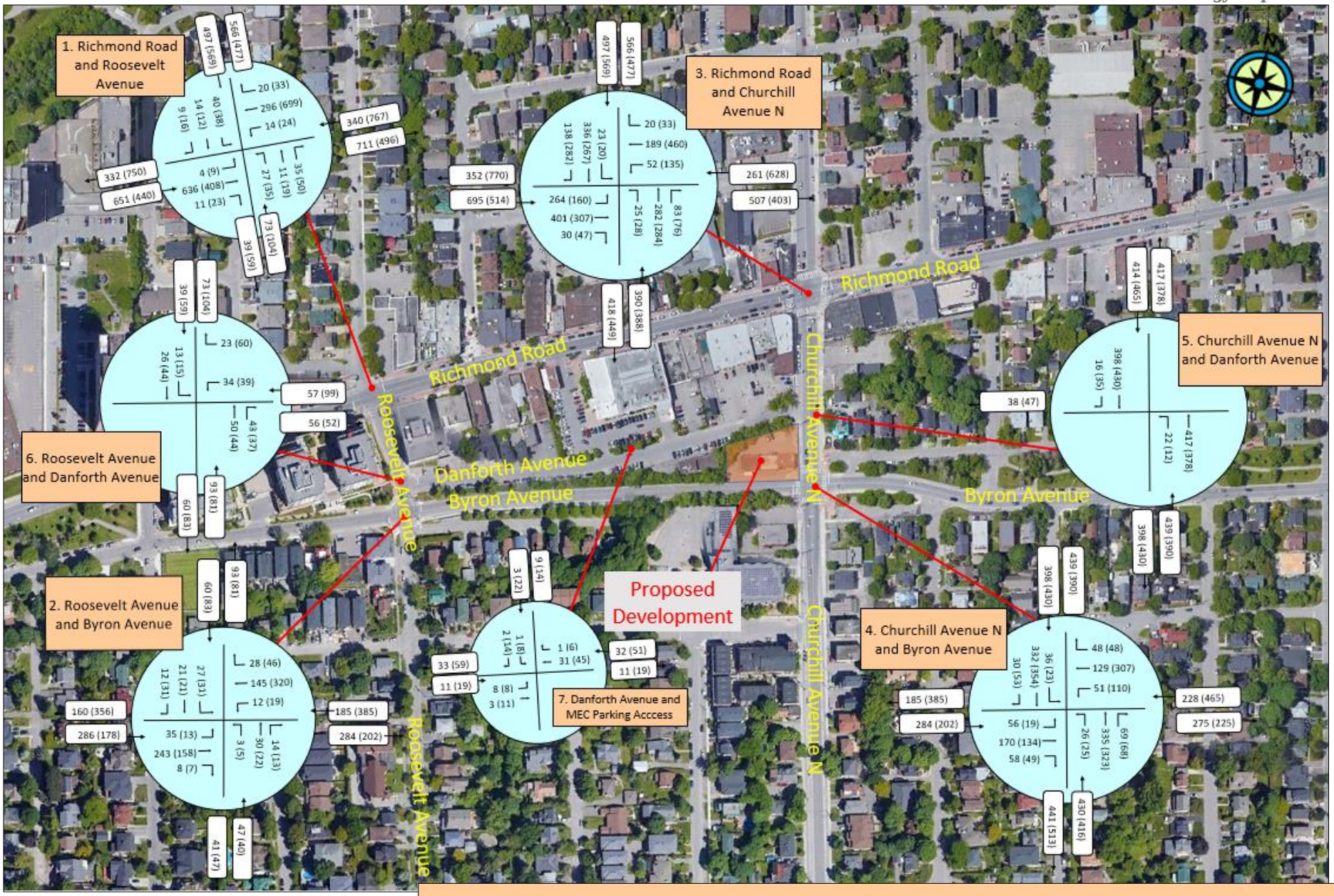
- 7 two-way auto-vehicle trips (2 inbound and 5 outbound) during the morning peak hour; and
- 8 two-way auto-vehicle trips (5 inbound and 3 outbound) during the afternoon peak hour.

Due to the configuration of Danforth Avenue, which operates as a one-way westbound roadway immediately east of the site entrance (and as two-way roadway for the rest of its length between site entrance and Roosevelt Avenue), all outbound vehicles were assumed to exit the development by way of making a left turn onto Danforth Avenue, and then using Roosevelt Avenue to access the adjacent road network.

Cut-Through Traffic Impacts

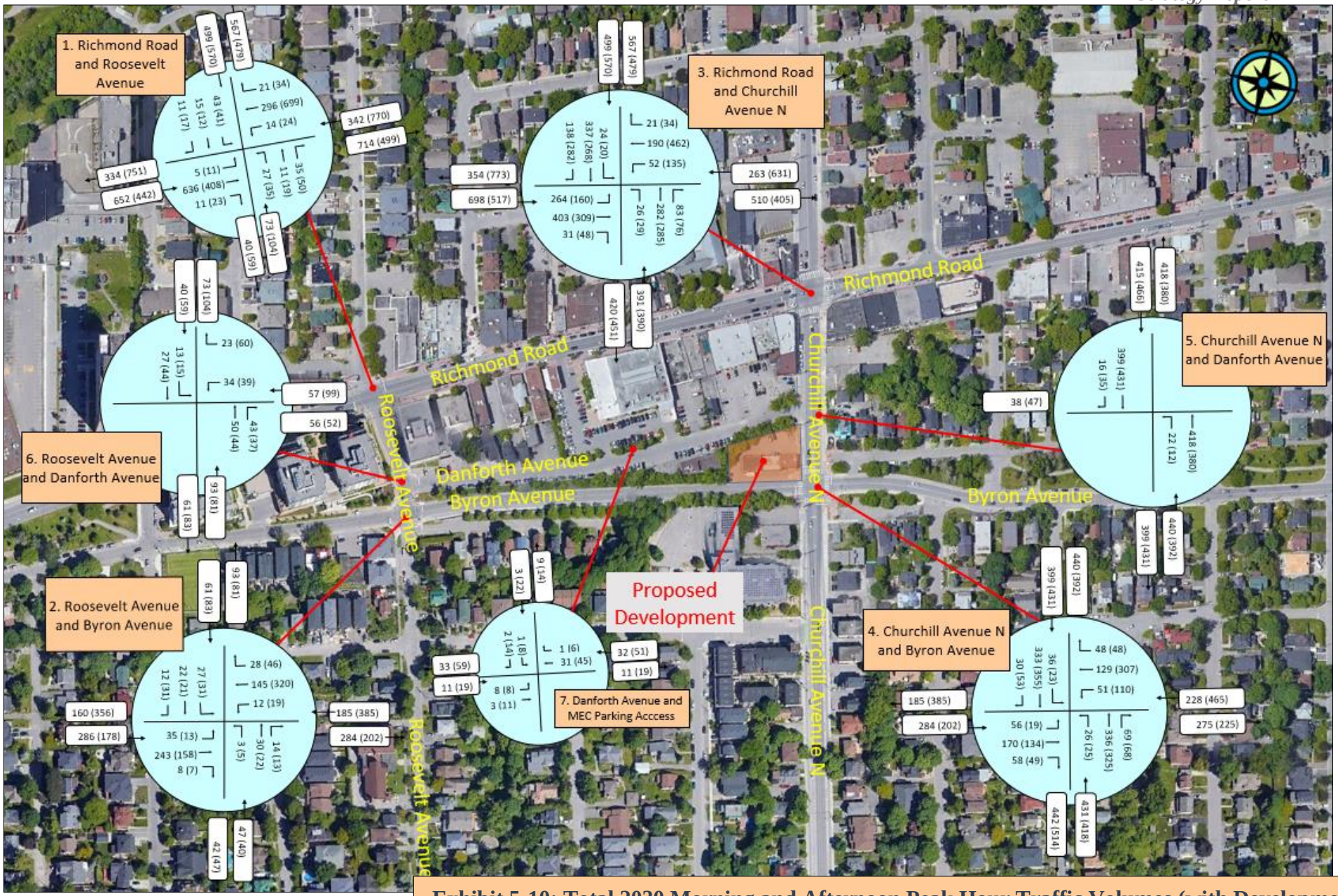
It was noted that some motorists may opt to use the adjacent MEC Parking lot as a way to cut-through and access eastbound and westbound Richmond Road, or northbound and southbound Churchill Avenue. The inbound trips coming from Richmond Road in the west are also prone to use MEC parking lot for cutting through to access the proposed development. The traffic count conducted on June 29, 2022 indicated that there were 12 trips accessing the parking lot from Danforth Avenue (9 into the parking lot and 3 out). In the afternoon peak hour, there were 36 trips during the peak hour of travel demand (14 into the parking lot and 22 out). Based on the mode shares selected for this report, the development will produce up to 8 two-way trips in the afternoon peak hour of traffic demand, of which 5 trips will be inbound to the development and 3 outbound from the development. Even if all traffic opted to cut through MEC parking lot, the traffic volumes through the parking lot would increase to 44 trips during the peak hour of travel demand (17 into the parking lot and 27 out), which is still under 2 vehicles in during the peak hour of travel demand.

Notwithstanding the above, the development proponent is encouraged to apprise the Mountain Equipment Co-Opôs property owners of the potential impacts of their development, so that measures could be implemented, if necessary, to discourage potential cut-thru traffic.



Morning (Afternoon), vph = vehicles-per-hour

Exhibit 5-9: Total 2025 Morning and Afternoon Peak Hour Traffic Volumes (with Development)



Morning (Afternoon), vph = vehicles-per-hour

Exhibit 5-10: Total 2030 Morning and Afternoon Peak Hour Traffic Volumes (with Development)

6.0 STRATEGY

6.1 DEVELOPMENT DESIGN

6.1.1 Design for Sustainable Modes

Appendix ñHò provides City of Ottawaôs Travel Demand Management (TDM) Supportive Development Design and Infrastructure checklist. A review of the checklists indicate that the development meets all of the required TDM infrastructure measures.

The development was found to provide good pedestrian connectivity to both Byron Avenue and Churchill Avenue North. Vehicular access into the parking garage is located on Danforth Avenue, away from pedestrian entrances.

A review of nearby active transportation infrastructure indicates that pedestrian sidewalks are provided on both sides of Churchill Avenue N, and on south side of Byron Avenue. The north side of Byron Avenue between Churchill Avenue N and Roosevelt Avenue lacks a sidewalk due to topography and space constraints.

6.1.2 Circulation and Access

Garbage Pickup: Refuse would be picked up curbside along Danforth Avenue. Particular attention was paid to the clearance requirements under the existing hydro lines which run along the south side of Danforth Avenue. Discussions with utilities are taking place which involve raising the existing lines.

Resident/Visitor Parking: The garage access to residentsô and visitorsô parking is located on Danforth Avenue. The review of the turning movements indicates that the parking garage design provides adequate provisions for circulation of most passenger vehicles. The ramp between lower and upper parking garage levels is designed to operate as one-way only. Appendix ñIò provides a proposed strategy for one-way ramp operation and parking garage vehicle turning movements.

Loading/Unloading: The site plan calls for a loading facility to be located parallel to the Byron Avenue right-of-way to facilitate resident move-in/move-out. This is nearly identical to the current arrangement of the existing dry-cleaning establishment as illustrated in the picture opposite. The new official plan (Section 4.6.5.3) notes that loading areas should best be internalized within the design of the building. This OP design recommendation has been brought to the attention of the architect.

6.2 PARKING

6.2.1 Motor Vehicle Parking

The parking stall requirement for the residential and visitor components of the development were determined as follows knowing the development is contained within Area ñXò (Inner Urban Area) within Schedule 1A of the City of Ottawaôs parking by-law. Moreover, the development is located within a 600-metre radius of Dominion Station (future Kichi Sibi LRT station)[15].

- *Resident Parking:* According to the City of Ottawaôs parking by-law, ñIn the case of a building containing residential uses, no off-street motor vehicle parking is required to be provided under this section for the first twelve dwelling units and the parking requirements under Table 101 apply only to dwelling units and rooming units in excess of 12.ò[16] The Cityôs minimum parking rate applicable to the residential component of the development (58 less 12 = 46 dwelling units in a high rise apartment building) was found to be 0.5 parking stall per unit.[17] Hence:
  - 23 parking stalls would be required for residents.
- *Visitor Parking*: According to the City of Ottawaôs parking by-law, ñwithin Areas B, X, Y and Z, no visitor parking spaces are required for the first twelve dwelling units on a lot.[18] The Cityôs minimum parking rate applicable to the visitor parking component of the residential development (58 less 12 = 46 dwelling units in a high-rise apartment building) was found to be 0.1 parking stall per unit.[19] Hence:
  - 5 parking stalls would be required for visitors.
- *Maximum Parking Provisions*: Section 103 of the City of Ottawaôs parking by-law indicates that for developments located within 600 meters of a Rapid Transit Station, the parking provisions are subject to a limit based on the size of the proposed development. For residential apartment dwellings[20], the maximum parking provisions are limited to 1.75 parking stalls per dwelling unit (combined residential and visitor rate)[21]. Hence:
  - a maximum of 101 parking stalls (combined residents and visitors) would have to be provided.

Table 6-1 summarizes the supply of parking required by the City of Ottawaôs by-laws compared to the planned parking provisions associated with the proposed development. The table indicates that the planned developmentôs supply of parking requirements fully satisfies the City of Ottawaôs by-law requirements with 30 parking stalls being provided compared to the required minimum 28 stalls (and a maximum of 101 stalls). It is noted that between 5 stalls nearest to the parking garage entrance will be used for visitor parking spaces. One Type ñAò accessible stall is provided beside the waste room.

15. See section 4.1.2.6 Exhibit 4-13
16. City of Ottawa By-Law 2016-249, Section 101, Clause (3) (a)
17. City of Ottawa By-Law 2016-249, Table 101, Row 12, Dwelling, Mid-High Rise Apartment, Area “X” on Schedule 1A
18. City of Ottawa By-Law 2016-249, Section 102, Clause (2)
19. City of Ottawa By-Law 2016-249, Table 102, Row 1, Area “X” on Schedule 1A
20. Proposed Development is located in Area B (Inner Urban) on Schedule 1 of the by-law
21. City of Ottawa By-Law 2016-249, Table 103, Row 1, Area B on Schedule 1 – Inner Urban

6.2.2 Bicycle Parking

The City of Ottawaôs bicycle parking requirements[22] indicate that 0.5 bicycle stalls are required per each unit in the proposed apartment building. Therefore, given the 58 residential units proposed within the site plan, 29 cycling parking stalls are required. The proposed planned development would provide for 50 bicycle stalls (28 horizontal and 22 vertical), which exceeds the City of Ottawaôs by-law requirements.

Table 6-2 summarizes the bicycle parking stall requirement of the City of Ottawaôs by-law as compared to the bicycle parking provisions associated with the proposed development. The table indicates that the planned development significantly exceeds the Cityôs cycling stall requirements.

Table 6-1: Auto Parking Provisions Summary

Land Use	*Development Size*	*Reduced Development Size*	*City Parking Requirement Rate*	*City Parking Requirement*	*Parking Provisions (Underground Stalls)*
Residential Dwellings, Mid-high-Rise Apartment - Residents	58 dwelling units	58-12 = 46 dwelling units	0.5 per dwelling unit	23 stalls	25 stalls
Residential Dwellings, Mid-high-Rise Apartment - Visitors			0.1 per dwelling unit	5 stalls	5 stalls
Total				**Min: 28 stalls Max: 101 stalls**	**30 stalls**

Table 6-2: Bicycle Parking Provisions Summary

Land Use	*City Requirement*	*Parking Provisions*	
		Horizontal Stalls	*Vertical Stalls*
Residential Apartments	29 stalls	28 stalls	22 stalls
Total	**29 stalls**	**50 stalls**	

6.3 BOUNDARY STREET DESIGN

City of Ottawaôs Multi-Modal Level of Service Guidelines[23] along with the MMLOS addendum[24] were used to evaluate multi-modal operational characteristics of roadway segments in the vicinity of the proposed development.

22 City of Ottawa By-Law 2016-249, Section 111, Table 11A, (b) and (g)
23 Multi-Modal Level of Service (MMLOS) Guidelines, IBI Group, September 2015
24 Document 5: Addendum to the City's Multi-Modal Level of Service Guidelines, December 2016

The City of Ottawaôs Multi-Modal Level of Service Guidelines outline the following level of service measures for various non-automotive transportation modes in the city:

- Pedestrian Level of Service (PLOS);
- Bicycle Level of Service (BLOS);
- Transit Level of Service (TLOS); and
- Truck Level of Service (TkLOS).

Exhibit 6-1 illustrates the location of the following five boundary street segments adjacent to the proposed 424 Churchill Avenue N development analyzed for MMLOS:

- Churchill Ave N b/w Richmond and Byron;
- Churchill Ave N b/w Byron and Ravenhill;
- Byron Avenue b/w Roosevelt and Churchill;
- Byron Avenue b/w Churchill and Athlone; and
- Danforth Avenue.

Exhibit 6-1: Boundary Street Segments for MMLOS Analysis

Table 6-3 provides results of segment MMLOS analysis in each direction of travel. The worst-scoring direction can be used as an overall segment score. The highlighted levels-of-service (in yellow) significantly fail to meet the targets indicated within the guidelines.

Table 6-3: Segment MMLOS Analysis Results

Location			Level of Service and Targets							
Roadway Segment	**Direction**	**Policy Area/ Land Use Designation**	**PLOS**	**Target PLOS**	**BLOS**	**Target BLOS**	**TLOS**	**Target TLOS**	**TkLOS**	**Target TkLOS**
Churchill Ave N b/w Richmond and Byron	NB	Within 300 m of a school	**B**	A	**D**	B	**E**	D	C	D
	SB		**B**	A	**D**	B	**E**	D	C	D
Churchill Ave N b/w Byron and Ravenhill	NB		**C**	A	A	B	D	D	C	D
	SB		**B**	A	A	B	D	D	B	D
Byron Avenue b/w Roosevelt and Churchill	EB		**B**	A	B	C	N/A	N/A	B	D
	WB		**F**	A	**D**	C	N/A	N/A	B	D
Byron Avenue b/w Churchill and Athlone	EB		**B**	A	A	C	N/A	N/A	N/A	N/A
	WB		**C**	A	**D** (B)*	C	N/A	N/A	N/A	N/A
Danforth Avenue	EB		**F**	A	B	D	N/A	N/A	N/A	N/A
	WB		**F**	A	B	D	N/A	N/A	N/A	N/A

Note – Levels of Service highlighted in bold font fail to meet the respective target LOS

- Detailed segment MMLOS analysis calculations are provided within Appendix "K".
- TLOS analysis was not performed on segments without existing transit service
- TkLOS was not performed on Byron Avenue segment between Churchill and Athlone as it has prohibitive truck signage; and Danforth Avenue since it's classified as a local street

* A complete streets concept has been developed for this segment, which includes a WB bike lane. BLOS "B" is expected after implementation

Pedestrian Level of Service (PLOS):

None of the evaluated segments were found to meet their required PLOS of ñAò. A reduction of operating speed to 30 km/h (or less); or addition of boulevards is required to bring the PLOS along study area segment to target levels. While the target PLOS for Danforth Avenue is ñAò, no improvements are recommended to the street since it functions very much as a laneway rather than a thru corridor.

Bicycle Level of Service (BLOS):

Churchill Avenue between Richmond and Byron fails to meets its BLOS target due to lack of cycling facilities. Byron Avenue presently (as of October 2022) lacks an eastbound bike lane, bringing the BLOS down to ñDò. A complete street concept for Byron Avenue east of Churchill Avenue N was developed to include a bike lane that would address this, with construction planned to start in the near future. (See Section 5.2.1)

The segment of Byron Avenue between Roosevelt and Churchill lacks a westbound bike lane due to space and topographical constraints.

Transit Level of Service (TLOS):

Churchill Avenue between Richmond and Byron exhibits a TLOS ñEò due to lack of transit priority measures, and presence of street parking along with some driveway friction. The other segment of Churchill Avenue N was found to meet its desired TLOS. The Byron and Danforth segments were not required to be evaluated since there is no existing transit service along them.

Truck Level of Service (TkLOS):

All relevant segments meet the required TkLOS.

6.3.1 Access Intersection Design

As indicated in Section 6.1, motor vehicles will access the developmentôs parking structure via an access off Danforth Avenue. Danforth Avenue is a local roadway used to provide vehicular access to the rear parking lots of those establishments facing Richmond Road. As well, Danforth Avenue provides on-street parking largely used by patrons of those businesses fronting Richmond Road.

Given the present motor-vehicle oriented uses of Danforth Avenue, and the existing topography constraints near Churchill Avenue, the proposed motor-vehicle access is considered to be the optimal location for vehicular access into, and out of, the proposed development.

6.3.2 Access Control

The proposed accesses to the development would operate with STOP control on the minor leg (parking garage exit). Danforth Avenue is characterized as a low-volume local roadway with multiple parking lot accesses and on-street parking provisions. The forecast traffic volumes destined to, and originating from the proposed development (See Exhibit 5-1) were deemed to be sufficiently low enough (less than 5 vph per movement) to trigger the warrants for other traffic control measures.

6.3.3 Access Design

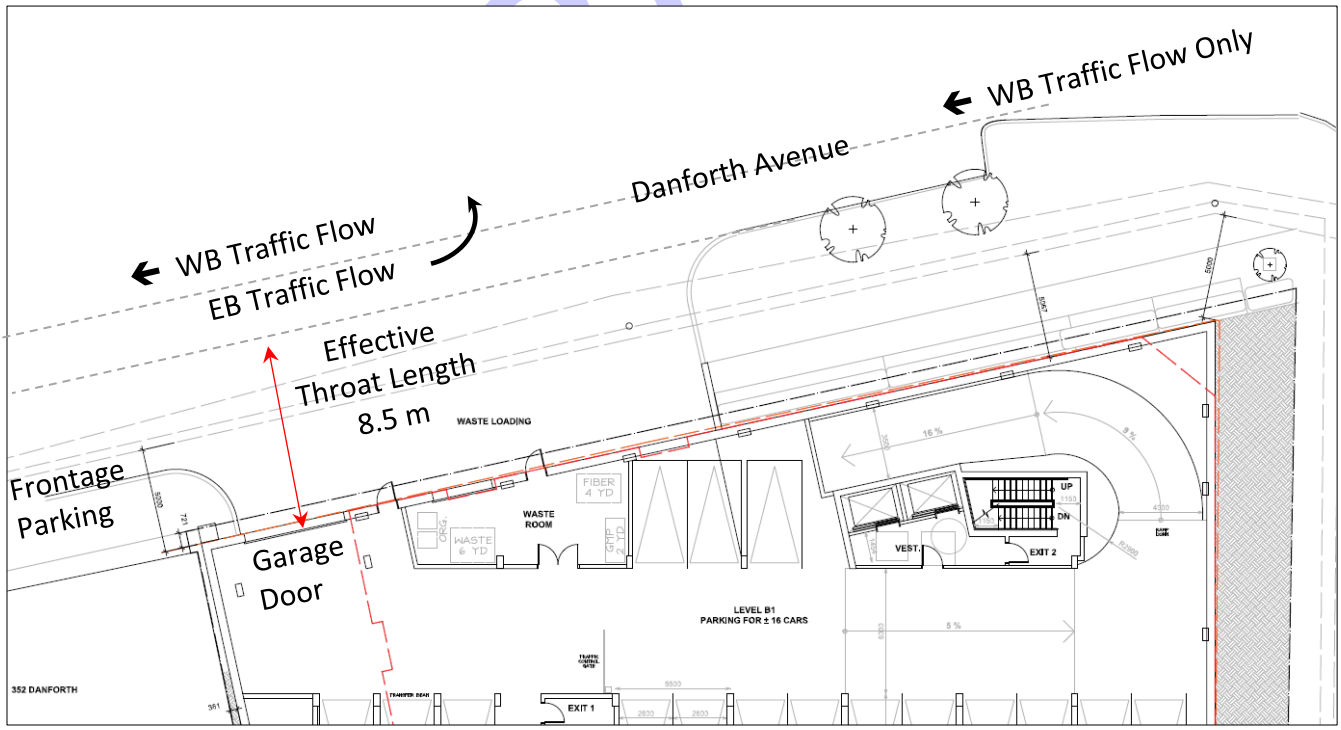
Since the access is operating as a minor leg-STOP control, no MMLOS analysis (including the auto LOS intersection capacity analysis) is required to be performed for the proposed access. The City of Ottawaôs MMLOS guidelines state that the LOS analysis is applicable to signalized intersections only[25].

The low traffic volumes generated by the proposed development (less than 5 vph per movement) does not trigger the trip generation warrant[26]. The impact of the nominal amount of vehicle traffic generated by the proposed development upon the study area is considered to be negligible.

6.3.4 Location and Design Characteristics of Proposed Accesses

The following summarizes the design characteristics of the proposed access to the development:

- The access is located approximately 55 meters west from the centreline of Churchill Avenue N (from the Churchill Avenue N and Danforth Avenue intersection);
- The west edge of the access driveway is located 1.5 meters east from the property line, which satisfies City of Ottawaôs minimum requirement of 0.3 meters;
- The access is approximately 6 meters in width;
- The access affords approximately 8.5 meters of effective throat length measured from the farther end of Danforth Avenue curb line.



25 Multi-Modal Level of Service (MMLOS) Guidelines, IBI Group, September 2015. Page 4
26 See section 0

7.0 CONCLUSION

The proposed 424 Churchill Avenue North development é

- is expected to cause a negligible increase in motor-vehicle traffic volumes at the adjacent intersections;
- provides sufficient parking facilities for both motor-vehicles and bicycles;
- provides adequate connections to transit and active mode infrastructure in the area;
- provides space for adequate circulation of passenger vehicle traffic in the parking structure;

The City of Ottawa is encouraged to permit the proposed 424 Churchill Avenue North Residential Rental Apartment Development Site Plan Application to proceed from the transportation/traffic standpoint.

We await your feedback on Step 4 - Strategy prior to finalizing this TIA report.

Yours truly,

Mr. Arthur Gordon B.A. P.Eng
Principal Engineer
Castleglenn Consultants Inc.

Mr. Andrey Kirillov B.Eng , EIT
Transportation Planner
Castleglenn Consultants Inc.

APPENDIX A: CERTIFICATION FORM FOR TIA STUDY PROJECT MANAGER

Certification Form for TIA Study PM

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

- ☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- ☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- ☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- ☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☑ or transportation planning.

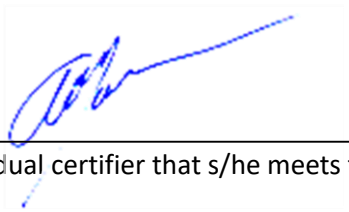
[1,2] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Dated at Ottawa (City) this 26th day of July, 20 22.

Name : Arthur E. Gordon

Professional title: Principal



Signature of individual certifier that s/he meets the above criteria

Office Contact Information (Please Print)
Address: ~~2460 Lancaster Road, Suite 200~~
City / Postal Code: ~~K1B 4S5~~
Telephone / Extension: (613) 731-4052
E-Mail Address: agordon@castleglenn.ca

Stamp

APPENDIX B: SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	424 Churchill Avenue
Description of Location	8-storey residential building with 58 units
Land Use Classification	TM H(24) - Traditional Mainstreet
Development Size (units)	58 units
Development Size (m^2)	N/A
Number of Accesses and Locations	1 Access off Danforth Avenue
Phase of Development	1
Buildout Year	2025

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

2. Trip Generation Trigger

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

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

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

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

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		✓
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*	✓	

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

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

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	X	
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

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

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		✓
Does the development satisfy the Location Trigger?	X	
Does the development satisfy the Safety Trigger?	X	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C: SITE PLAN

424 Churchill Avenue North, Ottawa

Zoning Data:

Zone: TM H(24)

Adjacent zones:
north: TM H[24]
south: LC H[128] & I1A
east: R3R & O1
west: TM H[24]

Frontage: 25.34 (Churchill Ave. N.)

Lot area: 1,009.7 m²

Proposed building area: 882.3 m²
taken in accordance w/ OBC definition
(B1 being 1st floor above grade).

Proposed GFA: 4,643.7 m²
taken in accordance w/ zoning bylaw definition

B1	300.4
level 1	440.6
level 2-7	564.0
level 8	518.7

Proposed use: Apartment Dwelling, Mid-Rise

Proposed number of units: 58

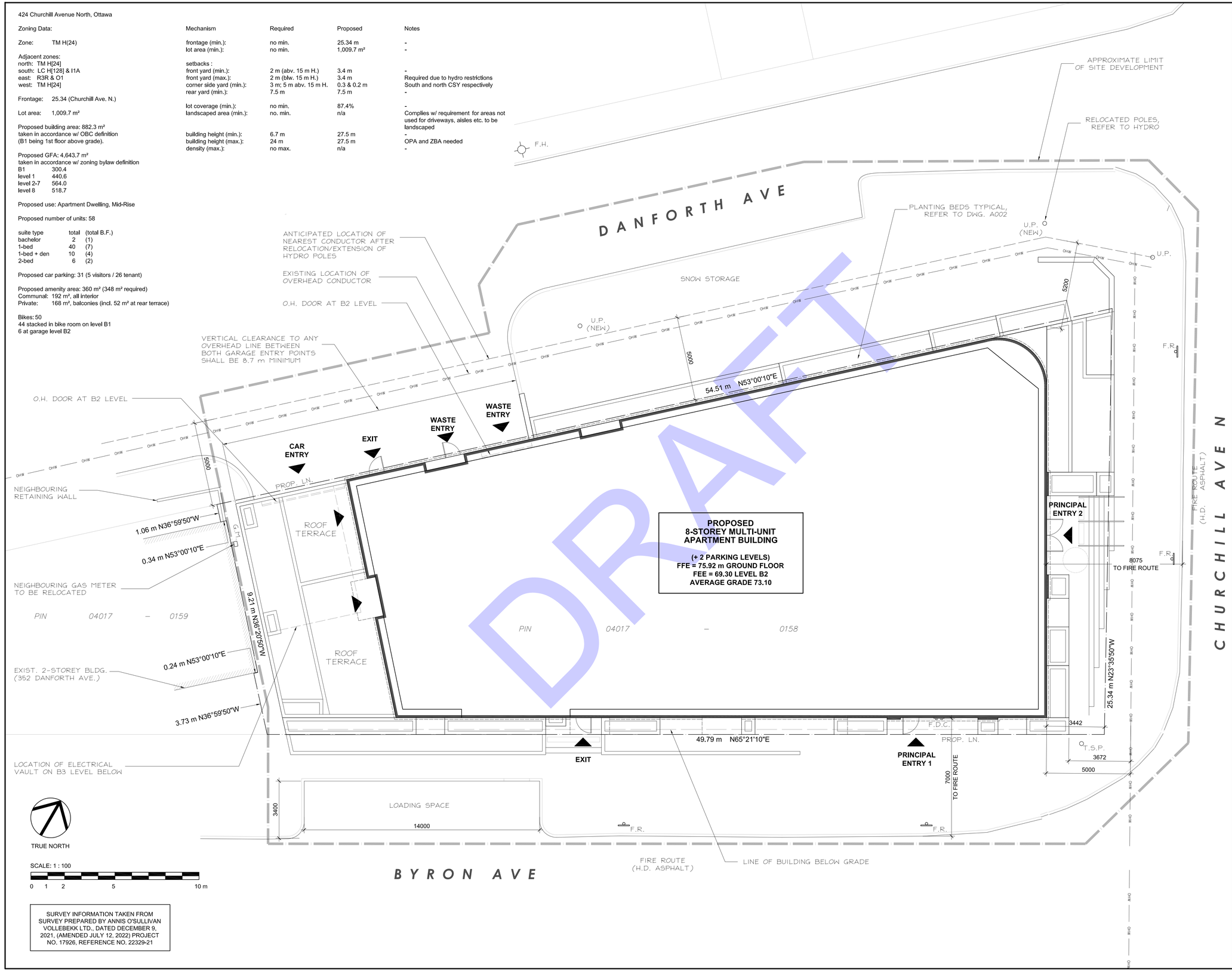
suite type	total	(total B.F.)
bachelor	2	(1)
1-bed	40	(7)
1-bed + den	10	(4)
2-bed	6	(2)

Proposed car parking: 31 (5 visitors / 26 tenant)

Proposed amenity area: 360 m² (348 m² required)
Communal: 192 m², all interior
Private: 168 m², balconies (incl. 52 m² at rear terrace)

Bikes: 50
44 stacked in bike room on level B1
6 at garage level B2

Mechanism	Required	Proposed	Notes
frontage (min.):	no min.	25.34 m	-
lot area (min.):	no min.	1,009.7 m²	-
setbacks :			
front yard (min.):	2 m (abv. 15 m H.)	3.4 m	-
front yard (max.):	2 m (blw. 15 m H.)	3.4 m	Required due to hydro restrictions
corner side yard (min.):	3 m; 5 m abv. 15 m H.	0.3 & 0.2 m	South and north CSY respectively
rear yard (min.):	7.5 m	7.5 m	-
lot coverage (min.):	no min.	87.4%	-
landscaped area (min.):	no. min.	n/a	Complies w/ requirement for areas not used for driveways, aisles etc. to be landscaped
building height (min.):	6.7 m	27.5 m	-
building height (max.):	24 m	27.5 m	OPA and ZBA needed
density (max.):	no max.	n/a	-



TRUE NORTH

SCALE: 1 : 100

0 1 2 5 10 m

SURVEY INFORMATION TAKEN FROM SURVEY PREPARED BY ANNIS O'SULLIVAN VOLLEBEKK LTD., DATED DECEMBER 9, 2021, (AMENDED JULY 12, 2022) PROJECT NO. 17926, REFERENCE NO. 22329-21

CLIENT / OWNER :
GSI SLOUGH STREET PROPERTIES INC.
5-145 SELECT AVE.,
TORONTO, ON, M1V 5M8
416-292-9920

LANDSCAPE ARCHITECT :
IBI GROUP
410 ALBERT STREET, SUITE 101
WATERLOO, ON N2L 3V3
519-585-2285

CONSULTING PLANNER :
FOTENN
396 COOPER STREET, SUITE 300
OTTAWA, ON K2P 2H7
613-730-5709

SURVEYOR:
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 CONCOURSE GATE, SUITE 500
OTTAWA, ON K2E 2756
613-727-0850

ARCHITECT :
OPEN PLAN ARCHITECTS INC.
2305 HILLARY AVENUE
OTTAWA, ON K1H 7J2
613-883-5090

NOISE, VIBRATION & WIND ENGINEER:
GRADIENT WIND ENGINEERING
127 WALGREEN ROAD,
OTTAWA, ON K0A 1L0
613-836-0934

STRUCTURAL ENGINEER :
D + M STRUCTURAL
333 PRESTON STREET, SUITE 110
OTTAWA, ON K2P 2H7
613-730-5709

TRANSPORTATION ENGINEER:
CASTELGLEN CONSULTANTS INC.
2460 LANCASTER ROAD,
OTTAWA, ON K1B 4S5
613-731-4052

MECHANICAL, ELECTRICAL & CIVIL ENGINEER :
LRL ENGINEERING
5430 CANOTEK ROAD,
OTTAWA, ON K1S 5N4
613-451-9490

rev. / issue	description	date MM/DD/YY
01	ISSUED FOR OPA, ZBA & SPC	20 OCT. 2022

professional stamp

ONTARIO ASSOCIATION OF ARCHITECTS
KRISTOPHER D. BENES
LICENCE 6432

project north

Kristopher D. Benes, OAA, MRAIC, LEED AP

OPA open plan architects inc.
architecture | interiors | concepts

2305 HILLARY AVE. | OTTAWA | ON | K1H 7J2
613.883.5090 | info@openplan.ca

project

424 CHURCHILL AVE N.,
APARTMENT BUILDING

drawing

SITE PLAN

drawn	KDB	date	2022-JAN-06
approved	KDB	revision	01
project no.	2109	scale	1 : 100

drawing no.

A000

APPENDIX D: EXISTING TRAFFIC COUNTS, SIGNAL TIMINGS AND COLLISION DATA

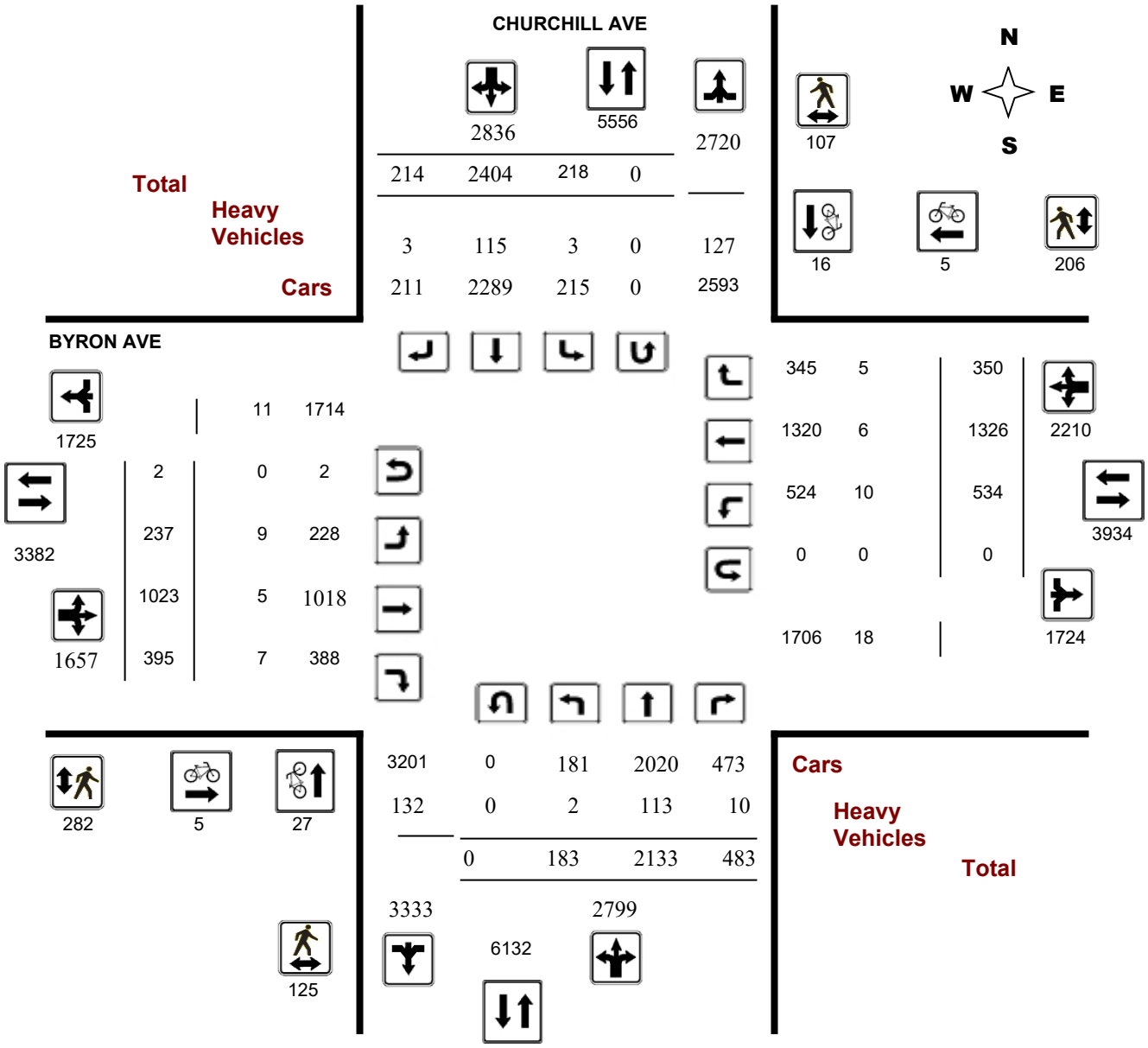
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020
Start Time: 07:00
WO No: 39387
Device: Miovision

Full Study Diagram



5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

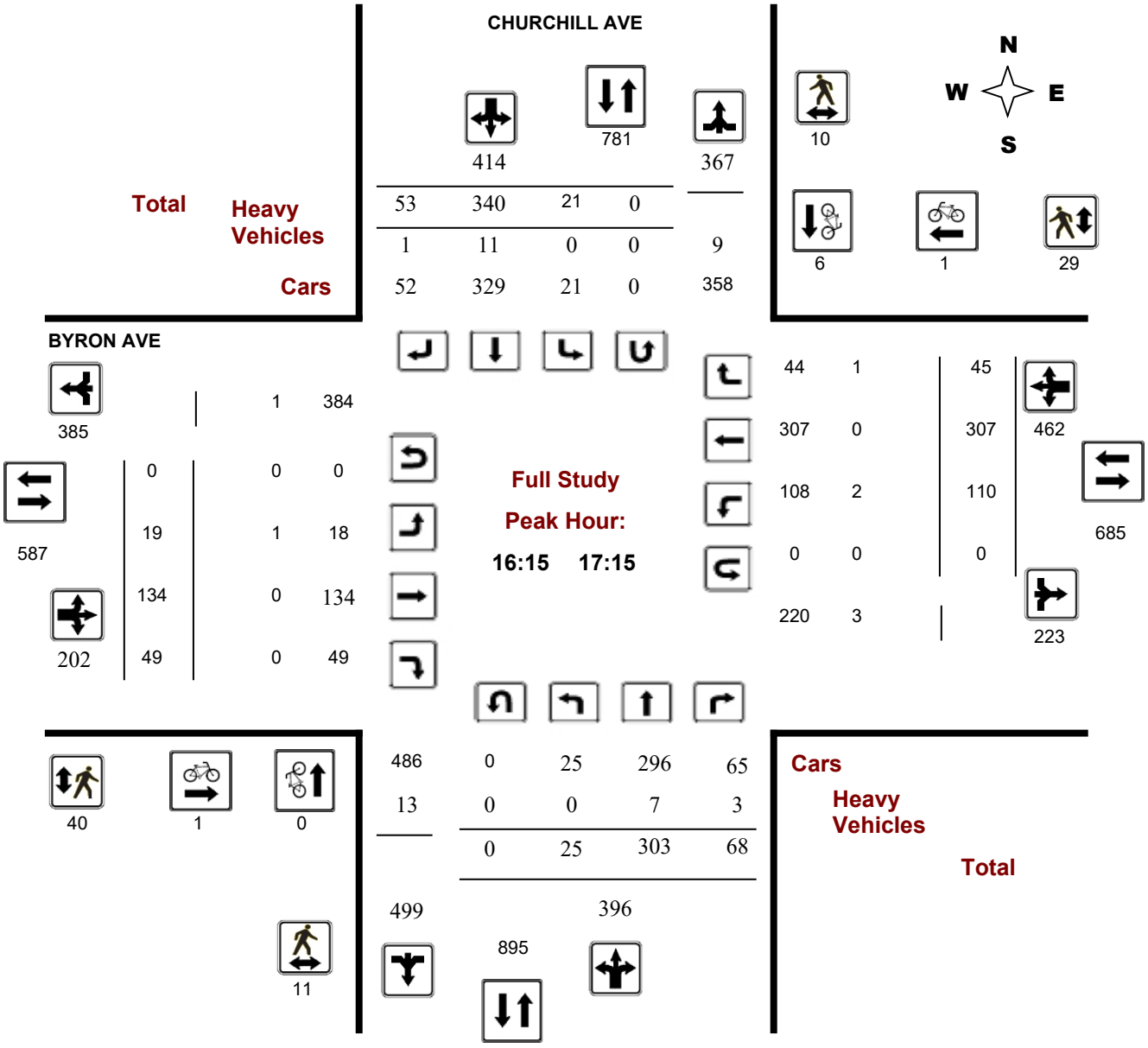
Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study Peak Hour Diagram



5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

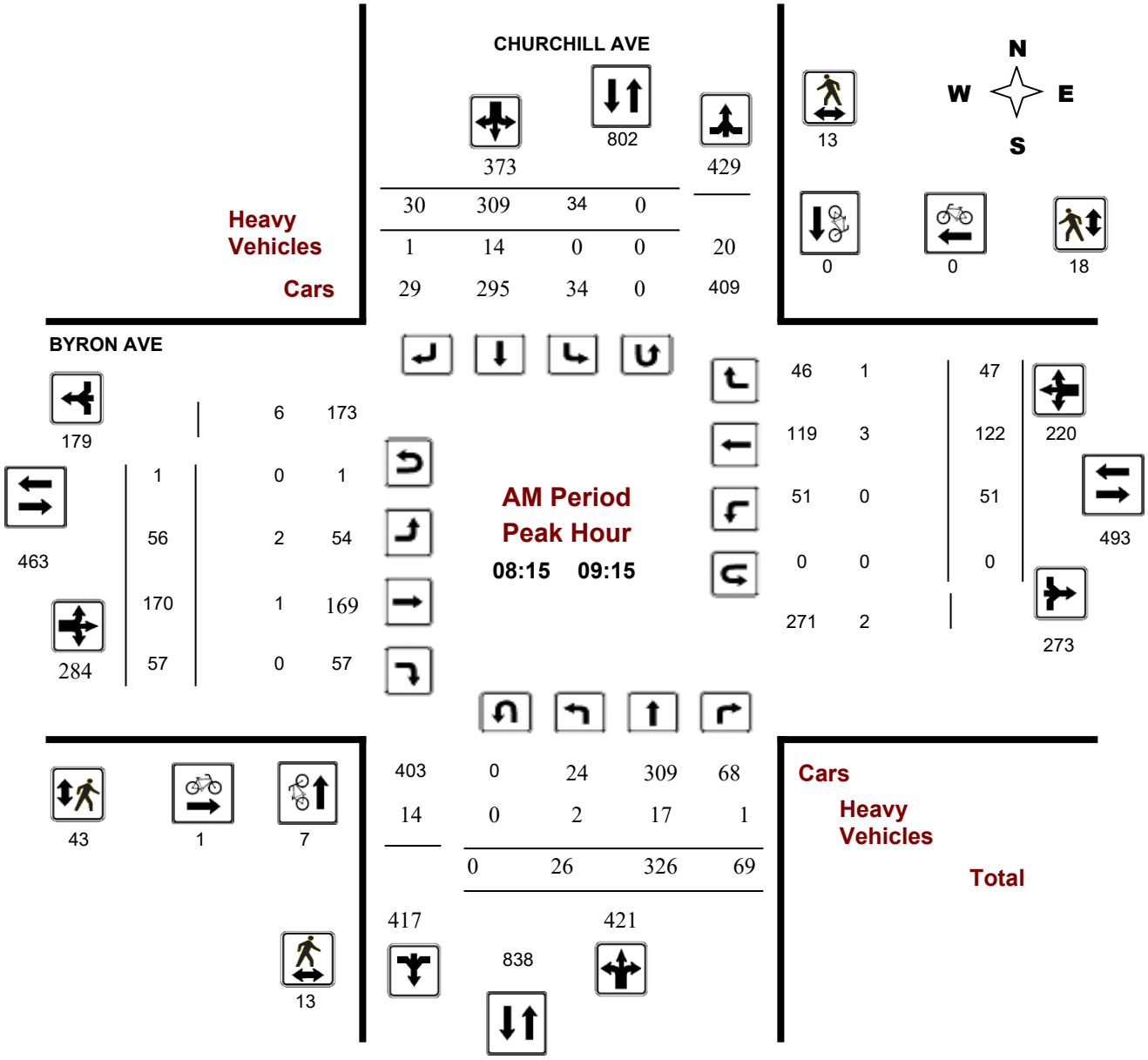
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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



Comments 5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

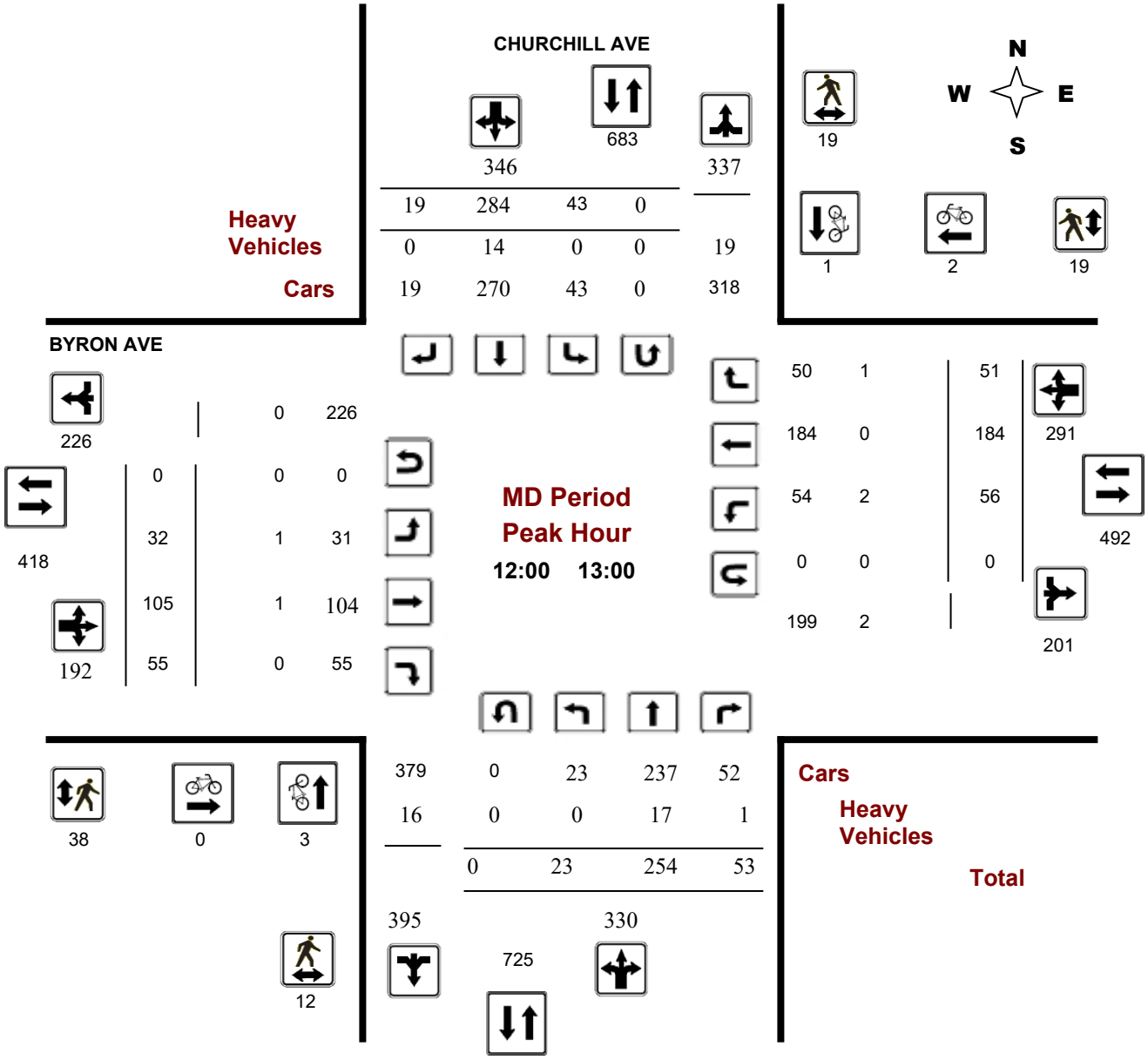
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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



Comments 5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

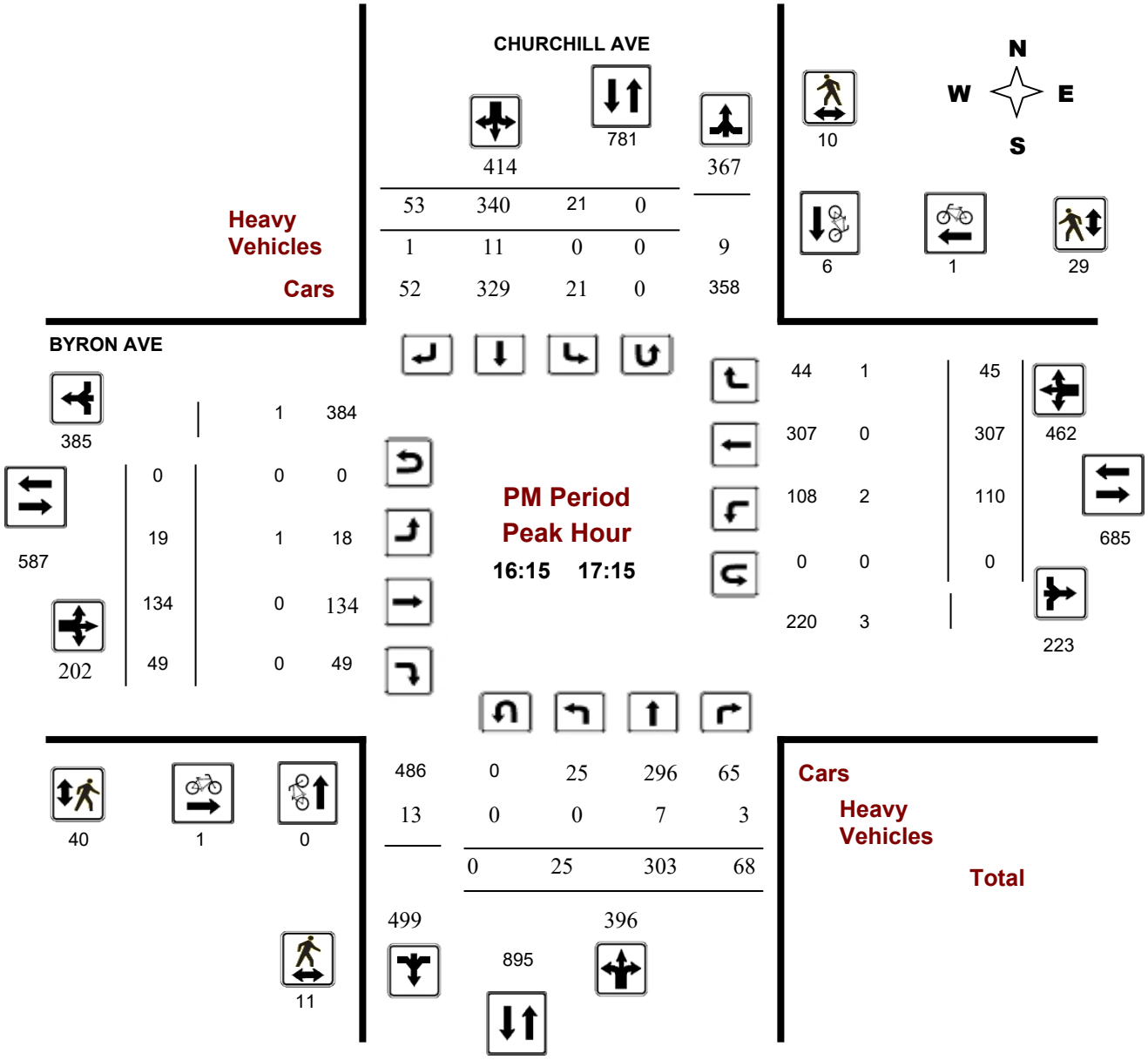
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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



Comments 5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 23, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 2 Westbound: 0

AADT Factor

1.00

	CHURCHILL AVE									BYRON AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	12	215	42	**269**	18	255	3	**276**	**545**	20	89	34	**143**	42	70	22	**134**	**277**	**822**
08:00 09:00	25	325	62	**412**	32	293	25	**350**	**762**	53	165	53	**271**	50	108	43	**201**	**472**	**1234**
09:00 10:00	23	273	65	**361**	19	257	25	**301**	**662**	36	125	51	**212**	32	99	48	**179**	**391**	**1053**
11:30 12:30	25	240	73	**338**	40	275	17	**332**	**670**	24	126	46	**196**	58	153	59	**270**	**466**	**1136**
12:30 13:30	23	240	49	**312**	39	284	26	**349**	**661**	27	105	48	**180**	56	192	39	**287**	**467**	**1128**
15:00 16:00	23	257	52	**332**	25	373	30	**428**	**760**	24	150	70	**244**	85	213	46	**344**	**588**	**1348**
16:00 17:00	22	293	72	**387**	22	346	50	**418**	**805**	25	122	46	**193**	111	280	49	**440**	**633**	**1438**
17:00 18:00	30	290	68	**388**	23	321	38	**382**	**770**	28	141	47	**216**	100	211	44	**355**	**571**	**1341**
Sub Total	183	2133	483	**2799**	218	2404	214	**2836**	**5635**	237	1023	395	**1655**	534	1326	350	**2210**	**3865**	**9500**
U Turns				**0**				**0**	**0**				**2**				**0**	**2**	**2**
Total	183	2133	483	**2799**	218	2404	214	**2836**	**5635**	237	1023	395	**1657**	534	1326	350	**2210**	**3867**	**9502**
EQ 12Hr	254	2965	671	**3891**	303	3342	297	**3942**	**7833**	329	1422	549	**2303**	742	1843	486	**3072**	**5375**	**13208**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	240	2794	633	**3667**	286	3149	280	**3715**	**7833**	310	1340	517	**2171**	700	1737	458	**2895**	**5375**	**13208**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	314	3660	829	**4803**	374	4126	367	**4867**	**9670**	407	1756	678	**2844**	916	2276	601	**3793**	**6637**	**16307**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study 15 Minute Increments

		CHURCHILL AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	2	40	10	52	4	53	0	57	4	1	15	7	23	5	3	7	15	4	147
07:15	07:30	0	32	7	39	5	56	1	62	4	4	31	10	45	6	20	1	27	4	173
07:30	07:45	6	62	11	79	3	64	2	69	10	3	17	12	32	17	15	6	38	10	218
07:45	08:00	4	81	14	99	6	82	0	88	7	12	26	5	43	14	32	8	54	7	284
08:00	08:15	7	80	9	96	5	66	6	77	7	8	38	8	54	10	12	9	31	7	258
08:15	08:30	6	89	14	109	16	83	3	102	7	13	38	15	66	10	17	15	42	7	319
08:30	08:45	5	85	22	112	8	67	11	86	8	20	45	14	79	15	31	9	55	8	332
08:45	09:00	7	71	17	95	3	77	5	85	8	12	44	16	73	15	48	10	73	8	326
09:00	09:15	8	81	16	105	7	82	11	100	12	11	43	12	66	11	26	13	50	12	321
09:15	09:30	2	62	15	79	5	69	5	79	16	14	37	13	64	8	24	12	44	16	266
09:30	09:45	4	71	14	89	4	53	7	64	12	4	18	16	38	4	19	9	32	12	223
09:45	10:00	9	59	20	88	3	53	2	58	10	7	27	10	44	9	30	14	53	10	243
11:30	11:45	6	54	27	87	6	75	3	84	19	2	37	9	48	11	24	14	49	19	268
11:45	12:00	7	71	20	98	9	56	7	72	13	6	37	9	52	17	42	14	73	13	295
12:00	12:15	6	62	15	83	14	77	2	93	12	9	26	13	48	15	43	16	74	12	298
12:15	12:30	6	53	11	70	11	67	5	83	5	7	26	15	48	15	44	15	74	5	275
12:30	12:45	5	68	11	84	11	74	4	89	10	7	28	14	49	13	34	8	55	10	277
12:45	13:00	6	71	16	93	7	66	8	81	5	9	25	13	47	13	63	12	88	5	309
13:00	13:15	7	52	11	70	6	77	10	93	9	5	28	11	44	17	45	8	70	9	277
13:15	13:30	5	49	11	65	15	67	4	86	11	6	24	10	40	13	50	11	74	11	265
15:00	15:15	5	65	11	81	7	103	4	114	9	5	45	23	73	18	47	12	77	9	345
15:15	15:30	5	64	10	79	5	99	8	112	5	8	50	17	76	21	55	14	90	5	357
15:30	15:45	7	60	18	85	9	81	7	97	3	5	25	14	44	18	50	9	77	3	303
15:45	16:00	6	68	13	87	4	90	11	105	3	6	30	16	52	28	61	11	100	3	344
16:00	16:15	10	71	25	106	4	91	5	100	5	7	30	11	48	25	53	13	91	5	345
16:15	16:30	7	82	17	106	6	73	18	97	8	7	33	16	56	30	78	9	117	8	376
16:30	16:45	3	73	14	90	6	93	13	112	7	4	23	10	37	25	77	13	115	7	354
16:45	17:00	2	67	16	85	6	89	14	109	5	7	36	9	52	31	72	14	117	5	363
17:00	17:15	13	81	21	115	3	85	8	96	2	1	42	14	57	24	80	9	113	2	381
17:15	17:30	5	76	14	95	4	86	10	100	4	10	35	9	54	28	48	7	83	4	332
17:30	17:45	7	63	16	86	8	80	10	98	5	8	36	13	57	18	52	13	83	5	324
17:45	18:00	5	70	17	92	8	70	10	88	1	9	28	11	48	30	31	15	76	1	304
Total:		183	2133	483	2799	218	2404	214	2836	246	237	1023	395	1657	534	1326	350	2210	246	9,502

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study Cyclist Volume

Time Period		CHURCHILL AVE			BYRON AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	1	0	1	0	0	0	1
07:15	07:30	1	1	2	0	0	0	2
07:30	07:45	1	0	1	1	1	2	3
07:45	08:00	4	0	4	0	0	0	4
08:00	08:15	6	0	6	0	0	0	6
08:15	08:30	4	0	4	0	0	0	4
08:30	08:45	1	0	1	1	0	1	2
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	2	0	2	0	0	0	2
09:15	09:30	0	0	0	1	0	1	1
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	1	0	1	0	0	0	1
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	1	0	1	0	0	0	1
12:00	12:15	2	1	3	0	0	0	3
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	1	1	1
12:45	13:00	1	0	1	0	1	1	2
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	1	1	1	0	1	2
16:00	16:15	0	1	1	0	0	0	1
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	1	1	0	0	0	1
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	5	5	1	1	2	7
17:15	17:30	0	3	3	0	0	0	3
17:30	17:45	0	3	3	0	1	1	4
17:45	18:00	2	0	2	0	0	0	2
Total		27	16	**43**	5	5	10	53

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study Pedestrian Volume

	CHURCHILL AVE			BYRON AVE			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	**0**	2	1	**3**	**3**
07:15 07:30	6	0	**6**	1	6	**7**	**13**
07:30 07:45	5	3	**8**	7	3	**10**	**18**
07:45 08:00	11	5	**16**	22	5	**27**	**43**
08:00 08:15	18	6	**24**	18	6	**24**	**48**
08:15 08:30	2	5	**7**	12	2	**14**	**21**
08:30 08:45	6	0	**6**	11	6	**17**	**23**
08:45 09:00	2	3	**5**	13	4	**17**	**22**
09:00 09:15	3	5	**8**	7	6	**13**	**21**
09:15 09:30	2	4	**6**	3	7	**10**	**16**
09:30 09:45	2	2	**4**	3	3	**6**	**10**
09:45 10:00	6	6	**12**	7	7	**14**	**26**
11:30 11:45	3	2	**5**	6	1	**7**	**12**
11:45 12:00	4	2	**6**	10	7	**17**	**23**
12:00 12:15	4	9	**13**	8	2	**10**	**23**
12:15 12:30	3	5	**8**	10	4	**14**	**22**
12:30 12:45	3	1	**4**	13	3	**16**	**20**
12:45 13:00	2	4	**6**	7	10	**17**	**23**
13:00 13:15	2	1	**3**	6	7	**13**	**16**
13:15 13:30	3	2	**5**	4	6	**10**	**15**
15:00 15:15	2	2	**4**	8	10	**18**	**22**
15:15 15:30	2	5	**7**	13	6	**19**	**26**
15:30 15:45	4	10	**14**	13	17	**30**	**44**
15:45 16:00	4	4	**8**	7	7	**14**	**22**
16:00 16:15	5	3	**8**	10	7	**17**	**25**
16:15 16:30	2	4	**6**	18	10	**28**	**34**
16:30 16:45	2	1	**3**	6	5	**11**	**14**
16:45 17:00	4	3	**7**	11	11	**22**	**29**
17:00 17:15	3	2	**5**	5	3	**8**	**13**
17:15 17:30	8	2	**10**	8	13	**21**	**31**
17:30 17:45	1	2	**3**	9	10	**19**	**22**
17:45 18:00	1	4	**5**	4	11	**15**	**20**
Total	125	107	**232**	282	206	**488**	**720**

5472205 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study Heavy Vehicles

		CHURCHILL AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	2	1	**3**	0	1	0	**1**	**4**	0	0	1	**1**	0	0	0	**0**	**1**	**5**
07:15	07:30	0	2	0	**2**	0	2	0	**2**	**4**	1	0	0	**1**	0	1	0	**1**	**2**	**6**
07:30	07:45	0	6	0	**6**	0	4	0	**4**	**10**	1	0	1	**2**	3	0	0	**3**	**5**	**15**
07:45	08:00	0	3	0	**3**	0	4	0	**4**	**7**	0	0	1	**1**	0	0	0	**0**	**1**	**8**
08:00	08:15	0	6	0	**6**	0	1	0	**1**	**7**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
08:15	08:30	1	2	0	**3**	0	4	0	**4**	**7**	0	0	0	**0**	0	1	0	**1**	**1**	**8**
08:30	08:45	0	7	0	**7**	0	1	0	**1**	**8**	2	0	0	**2**	0	0	0	**0**	**2**	**10**
08:45	09:00	1	4	1	**6**	0	1	1	**2**	**8**	0	0	0	**0**	0	0	1	**1**	**1**	**9**
09:00	09:15	0	4	0	**4**	0	8	0	**8**	**12**	0	1	0	**1**	0	2	0	**2**	**3**	**15**
09:15	09:30	0	8	0	**8**	0	8	0	**8**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**16**
09:30	09:45	0	10	0	**10**	0	2	0	**2**	**12**	0	0	0	**0**	0	0	1	**1**	**1**	**13**
09:45	10:00	0	5	0	**5**	0	5	0	**5**	**10**	1	0	1	**2**	0	0	0	**0**	**2**	**12**
11:30	11:45	0	5	2	**7**	0	12	0	**12**	**19**	0	0	0	**0**	0	0	0	**0**	**0**	**19**
11:45	12:00	0	10	0	**10**	0	3	0	**3**	**13**	0	0	1	**1**	0	1	0	**1**	**2**	**15**
12:00	12:15	0	6	0	**6**	0	6	0	**6**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
12:15	12:30	0	0	1	**1**	0	4	0	**4**	**5**	1	1	0	**2**	0	0	0	**0**	**2**	**7**
12:30	12:45	0	7	0	**7**	0	3	0	**3**	**10**	0	0	0	**0**	2	0	0	**2**	**2**	**12**
12:45	13:00	0	4	0	**4**	0	1	0	**1**	**5**	0	0	0	**0**	0	0	1	**1**	**1**	**6**
13:00	13:15	0	4	0	**4**	1	4	0	**5**	**9**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
13:15	13:30	0	0	0	**0**	1	10	0	**11**	**11**	0	1	0	**1**	0	0	1	**1**	**2**	**13**
15:00	15:15	0	3	0	**3**	1	5	0	**6**	**9**	1	1	0	**2**	1	0	0	**1**	**3**	**12**
15:15	15:30	0	1	0	**1**	0	4	0	**4**	**5**	0	1	0	**1**	0	0	0	**0**	**1**	**6**
15:30	15:45	0	0	0	**0**	0	2	1	**3**	**3**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
15:45	16:00	0	1	1	**2**	0	1	0	**1**	**3**	0	0	1	**1**	0	0	0	**0**	**1**	**4**
16:00	16:15	0	2	1	**3**	0	2	0	**2**	**5**	1	0	1	**2**	2	0	0	**2**	**4**	**9**
16:15	16:30	0	3	1	**4**	0	3	1	**4**	**8**	1	0	0	**1**	1	0	0	**1**	**2**	**10**
16:30	16:45	0	1	1	**2**	0	5	0	**5**	**7**	0	0	0	**0**	1	0	0	**1**	**1**	**8**
16:45	17:00	0	1	1	**2**	0	3	0	**3**	**5**	0	0	0	**0**	0	0	1	**1**	**1**	**6**
17:00	17:15	0	2	0	**2**	0	0	0	**0**	**2**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
17:15	17:30	0	2	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	0	1	0	**1**	**1**	**5**
17:30	17:45	0	2	0	**2**	0	3	0	**3**	**5**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
17:45	18:00	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
Total:	None	2	113	10	**125**	3	115	3	**121**	**246**	9	5	7	**21**	10	6	5	**21**	**42**	**288**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ CHURCHILL AVE

Survey Date: Thursday, January 23, 2020 **WO No:** 39387

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

Full Study 15 Minute U-Turn Total

		CHURCHILL AVE		BYRON AVE		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	1	0	1
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	1	0	1
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	2	0	2

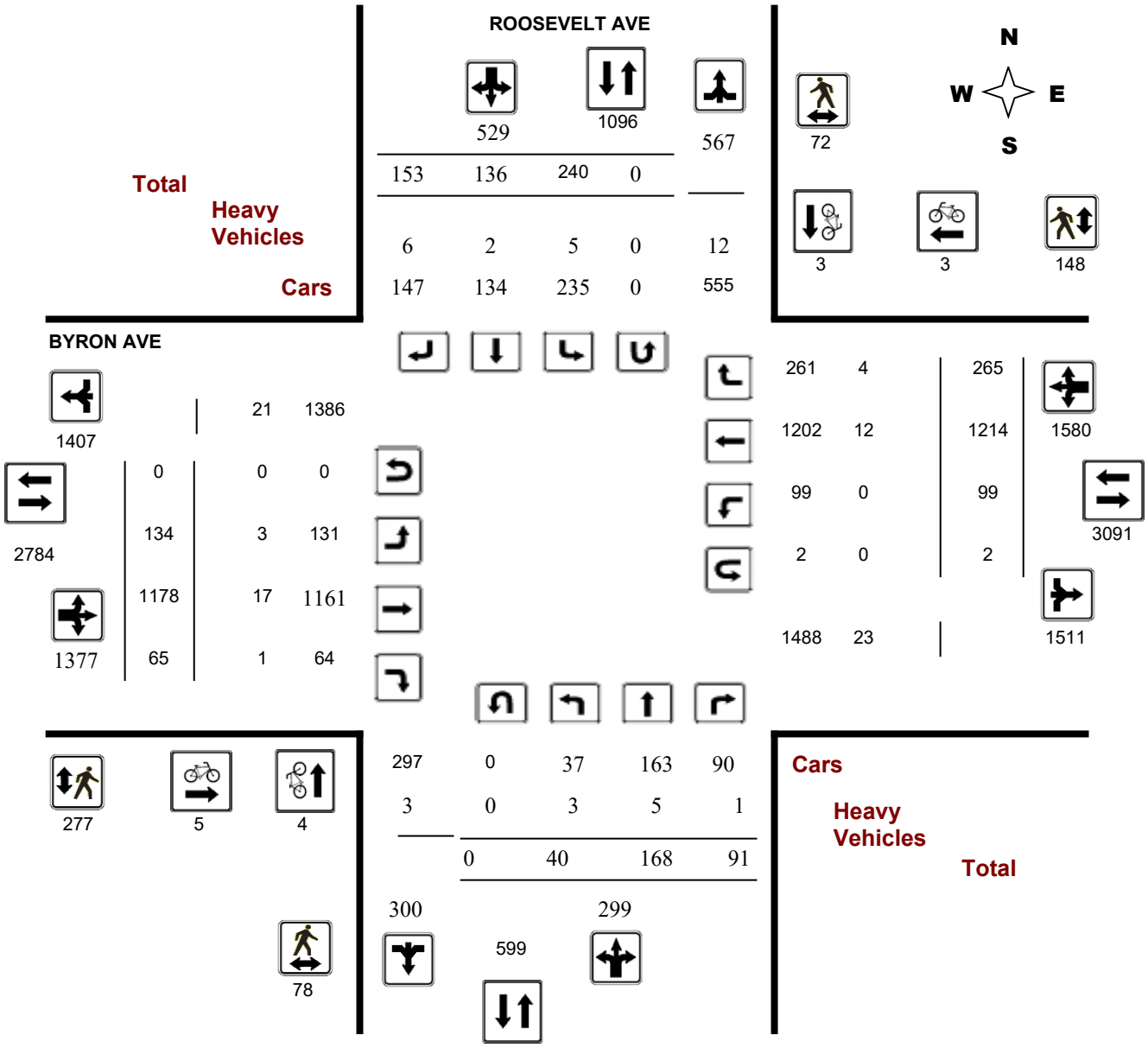
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019
Start Time: 07:00
WO No: 38395
Device: Miovision

Full Study Diagram



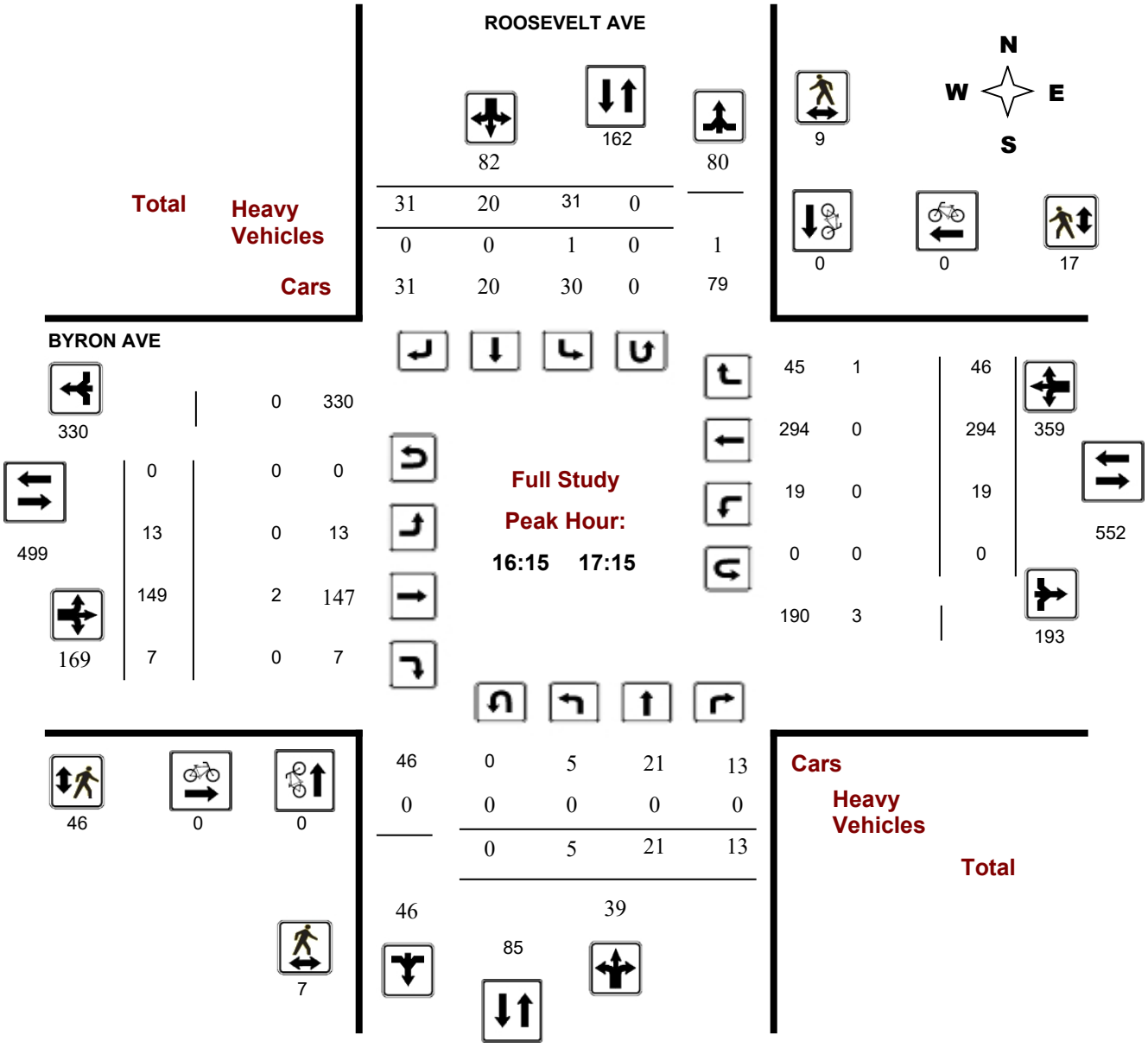
Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019
Start Time: 07:00
WO No: 38395
Device: Miovision

Full Study Peak Hour Diagram



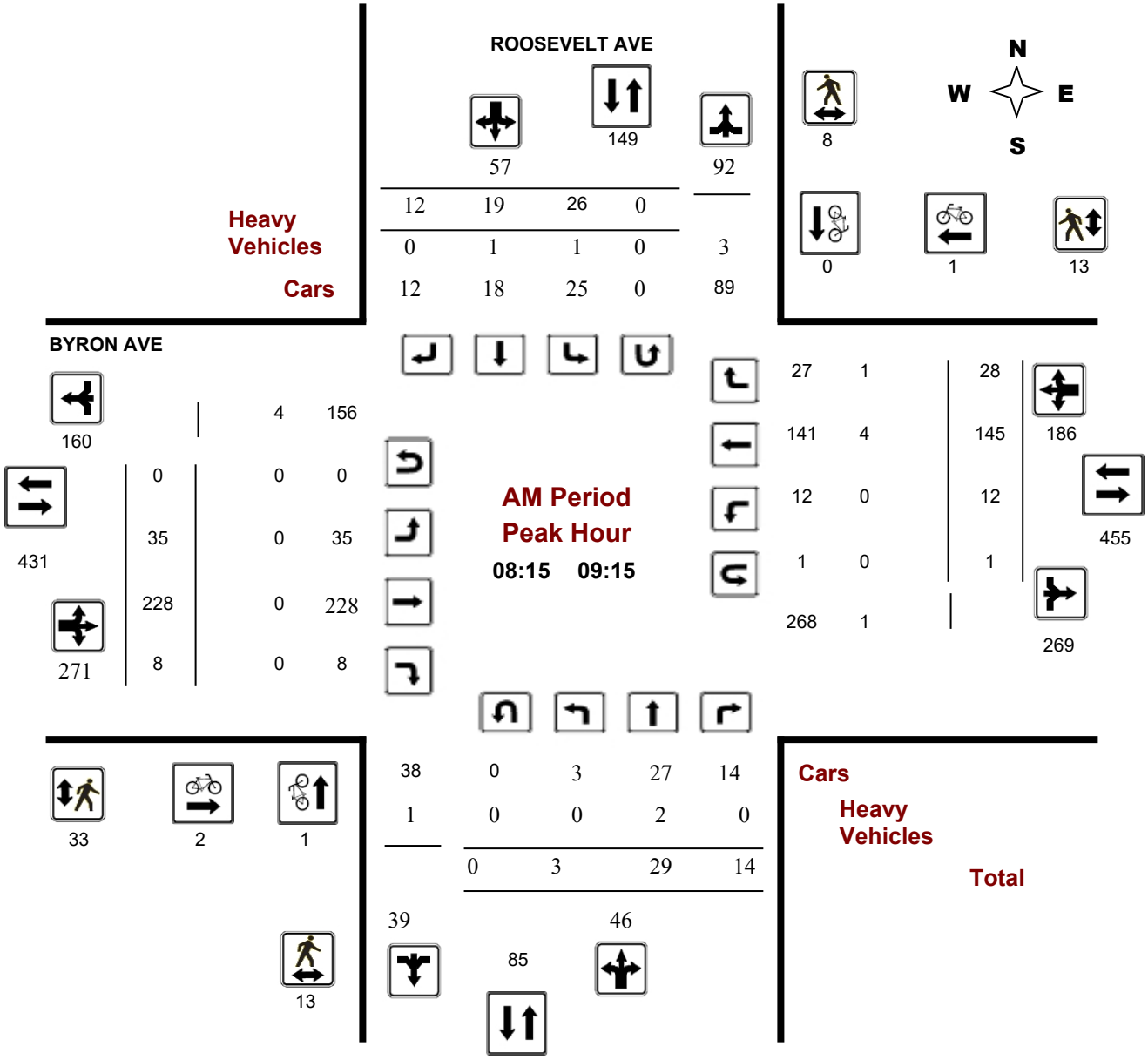
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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



Comments

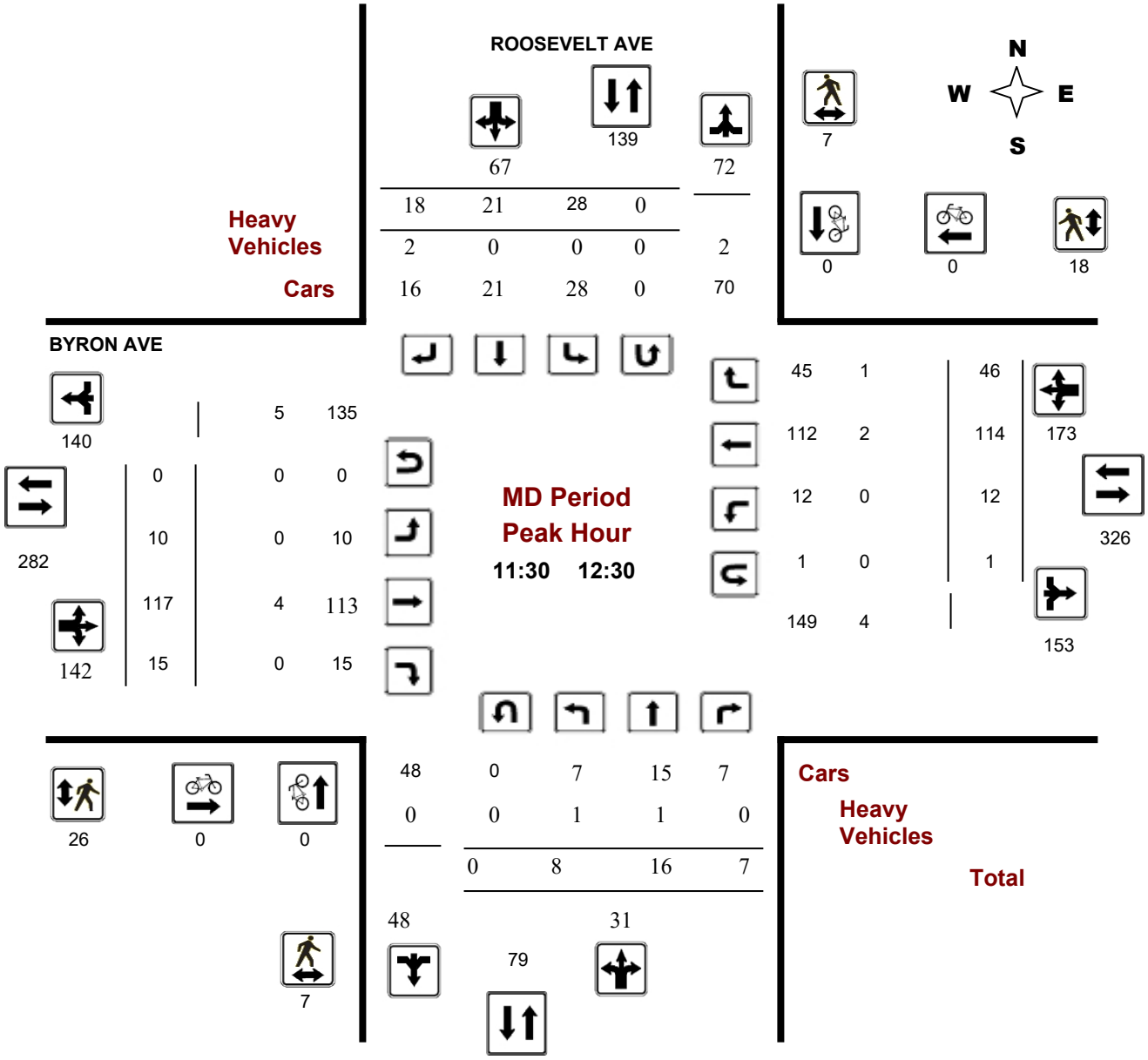
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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



Comments

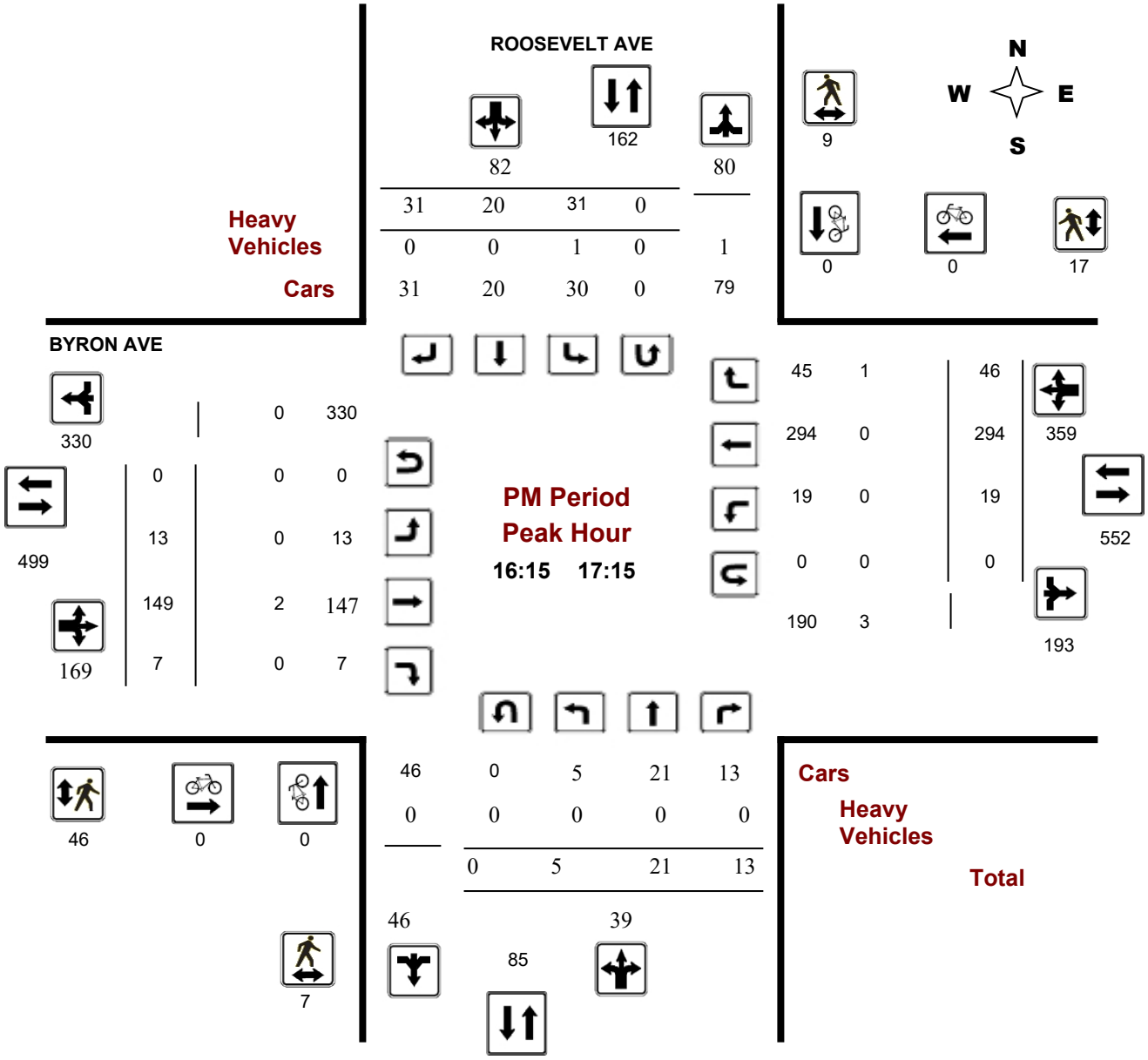
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, February 27, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 2

AADT Factor

1.00

	ROOSEVELT AVE								BYRON AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	3	19	17	**39**	14	9	7	**30**	**69**	9	161	7	**177**	5	54	17	**76**	**253**	**322**
08:00 09:00	3	32	17	**52**	27	15	12	**54**	**106**	28	247	2	**277**	10	138	28	**176**	**453**	**559**
09:00 10:00	0	25	13	**38**	21	15	12	**48**	**86**	28	152	12	**192**	12	104	30	**146**	**338**	**424**
11:30 12:30	8	16	7	**31**	28	21	18	**67**	**98**	10	117	15	**142**	12	114	46	**172**	**314**	**412**
12:30 13:30	11	18	6	**35**	37	20	24	**81**	**116**	17	101	4	**122**	13	111	30	**154**	**276**	**392**
15:00 16:00	8	14	9	**31**	38	19	22	**79**	**110**	16	133	5	**154**	12	189	31	**232**	**386**	**496**
16:00 17:00	6	23	9	**38**	30	21	29	**80**	**118**	12	137	12	**161**	14	253	47	**314**	**475**	**593**
17:00 18:00	1	21	13	**35**	45	16	29	**90**	**125**	14	130	8	**152**	21	251	36	**308**	**460**	**585**
Sub Total	40	168	91	**299**	240	136	153	**529**	**828**	134	1178	65	**1377**	99	1214	265	**1578**	**2955**	**3783**
U Turns				**0**				**0**	**0**				**0**				**2**	**2**	**2**
Total	40	168	91	**299**	240	136	153	**529**	**828**	134	1178	65	**1377**	99	1214	265	**1580**	**2957**	**3785**
EQ 12Hr	56	234	126	**416**	334	189	213	**735**	**1151**	186	1637	90	**1914**	138	1687	368	**2196**	**4110**	**5261**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	52	220	119	**392**	314	178	200	**693**	**1151**	176	1543	85	**1804**	130	1590	347	**2070**	**4110**	**5261**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	69	288	156	**513**	412	233	263	**908**	**1421**	230	2022	112	**2363**	170	2083	455	**2711**	**5074**	**6495**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study 15 Minute Increments

		ROOSEVELT AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	5	3	8	3	2	1	6	0	1	17	0	18	0	4	2	6	0	38
07:15	07:30	2	4	4	10	3	2	0	5	0	1	45	0	46	1	14	2	17	0	78
07:30	07:45	0	6	2	8	4	2	3	9	0	2	41	2	45	2	14	5	21	0	83
07:45	08:00	1	4	8	13	4	3	3	10	0	5	58	5	68	2	22	8	32	0	123
08:00	08:15	0	11	7	18	7	3	2	12	2	5	66	0	71	3	30	5	38	2	139
08:15	08:30	1	13	5	19	6	4	4	14	1	7	69	0	76	2	25	8	36	1	145
08:30	08:45	0	6	2	8	10	1	5	16	1	9	60	1	70	2	32	11	45	1	139
08:45	09:00	2	2	3	7	4	7	1	12	0	7	52	1	60	3	51	4	58	0	137
09:00	09:15	0	8	4	12	6	7	2	15	2	12	47	6	65	5	37	5	47	2	139
09:15	09:30	0	6	3	9	5	2	1	8	0	10	40	3	53	2	23	7	32	0	102
09:30	09:45	0	5	3	8	4	1	2	7	0	3	37	2	42	2	25	8	35	0	92
09:45	10:00	0	6	3	9	6	5	7	18	1	3	28	1	32	3	19	10	32	1	91
11:30	11:45	2	3	0	5	8	4	4	16	2	3	35	7	45	2	26	10	38	2	104
11:45	12:00	3	6	2	11	5	5	5	15	2	3	27	4	34	5	30	11	46	2	106
12:00	12:15	2	3	2	7	6	8	7	21	0	2	27	0	29	0	32	12	44	0	101
12:15	12:30	1	4	3	8	9	4	2	15	0	2	28	4	34	5	26	13	45	0	102
12:30	12:45	5	4	2	11	9	3	7	19	1	4	21	0	25	1	33	8	42	1	97
12:45	13:00	0	5	2	7	10	5	5	20	1	7	29	1	37	3	29	7	39	1	103
13:00	13:15	3	6	2	11	12	3	2	17	0	5	23	2	30	7	24	9	40	0	98
13:15	13:30	3	3	0	6	6	9	10	25	0	1	28	1	30	2	25	6	33	0	94
15:00	15:15	4	3	2	9	7	5	6	18	3	7	24	0	31	4	36	7	47	3	105
15:15	15:30	3	4	1	8	14	6	7	27	2	3	36	4	43	2	44	11	57	2	135
15:30	15:45	1	3	0	4	7	4	6	17	1	2	38	0	40	3	51	7	61	1	122
15:45	16:00	0	4	6	10	10	4	3	17	1	4	35	1	40	3	58	6	67	1	134
16:00	16:15	1	10	2	13	9	4	6	19	1	4	30	5	39	2	46	15	63	1	134
16:15	16:30	1	3	3	7	3	7	2	12	0	3	33	0	36	4	77	13	94	0	149
16:30	16:45	1	7	3	11	8	5	12	25	1	1	24	1	26	4	57	8	69	1	131
16:45	17:00	3	3	1	7	10	5	9	24	0	4	50	6	60	4	73	11	88	0	179
17:00	17:15	0	8	6	14	10	3	8	21	0	5	42	0	47	7	87	14	108	0	190
17:15	17:30	1	3	3	7	7	4	8	19	0	5	27	3	35	9	72	5	86	0	147
17:30	17:45	0	6	1	7	12	4	8	24	0	4	31	2	37	2	53	8	63	0	131
17:45	18:00	0	4	3	7	16	5	5	26	0	0	30	3	33	3	39	9	51	0	117
Total:		40	168	91	299	240	136	153	529	22	134	1178	65	1377	99	1214	265	1580	22	3,785

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study Cyclist Volume

Time Period		ROOSEVELT AVE			BYRON AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	1	0	1	1	0	1	2
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	1	0	1	0	0	0	1
08:00	08:15	1	0	1	2	0	2	3
08:15	08:30	0	0	0	1	0	1	1
08:30	08:45	1	0	1	0	0	0	1
08:45	09:00	0	0	0	1	1	2	2
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	2	2	2
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	1	1	0	0	0	1
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	1	1	0	0	0	1
17:45	18:00	0	1	1	0	0	0	1
Total		4	3	**7**	5	3	8	15

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study Pedestrian Volume

	ROOSEVELT AVE			BYRON AVE			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	2	0	**2**	4	1	**5**	**7**
07:15 07:30	2	1	**3**	7	2	**9**	**12**
07:30 07:45	1	0	**1**	5	2	**7**	**8**
07:45 08:00	2	0	**2**	13	4	**17**	**19**
08:00 08:15	2	1	**3**	9	5	**14**	**17**
08:15 08:30	5	2	**7**	12	2	**14**	**21**
08:30 08:45	4	3	**7**	7	4	**11**	**18**
08:45 09:00	3	3	**6**	10	5	**15**	**21**
09:00 09:15	1	0	**1**	4	2	**6**	**7**
09:15 09:30	2	3	**5**	9	0	**9**	**14**
09:30 09:45	1	1	**2**	3	3	**6**	**8**
09:45 10:00	1	0	**1**	0	3	**3**	**4**
11:30 11:45	1	0	**1**	6	1	**7**	**8**
11:45 12:00	1	4	**5**	10	8	**18**	**23**
12:00 12:15	2	1	**3**	7	6	**13**	**16**
12:15 12:30	3	2	**5**	3	3	**6**	**11**
12:30 12:45	16	17	**33**	26	18	**44**	**77**
12:45 13:00	1	0	**1**	10	7	**17**	**18**
13:00 13:15	2	3	**5**	12	8	**20**	**25**
13:15 13:30	1	2	**3**	6	2	**8**	**11**
15:00 15:15	6	4	**10**	4	8	**12**	**22**
15:15 15:30	0	1	**1**	0	6	**6**	**7**
15:30 15:45	1	3	**4**	9	7	**16**	**20**
15:45 16:00	2	5	**7**	14	5	**19**	**26**
16:00 16:15	3	2	**5**	14	6	**20**	**25**
16:15 16:30	0	1	**1**	9	8	**17**	**18**
16:30 16:45	0	4	**4**	11	1	**12**	**16**
16:45 17:00	3	4	**7**	11	4	**15**	**22**
17:00 17:15	4	0	**4**	15	4	**19**	**23**
17:15 17:30	4	2	**6**	10	6	**16**	**22**
17:30 17:45	1	1	**2**	13	3	**16**	**18**
17:45 18:00	1	2	**3**	4	4	**8**	**11**
Total	78	72	**150**	277	148	**425**	**575**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study Heavy Vehicles

		ROOSEVELT AVE									BYRON AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
07:30	07:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	1	0	**1**	**1**	**1**
07:45	08:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	0	0	**0**	**2**	**2**
08:00	08:15	0	0	0	**0**	0	0	2	**2**	**2**	0	0	0	**0**	0	1	0	**1**	**1**	**3**
08:15	08:30	0	1	0	**1**	0	0	0	**0**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
08:30	08:45	0	0	0	**0**	1	0	0	**1**	**1**	0	0	0	**0**	0	1	1	**2**	**2**	**3**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	2	0	**2**	**2**	**2**
09:00	09:15	0	1	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	1	0	**1**	**1**	**3**
09:15	09:30	0	0	0	**0**	0	0	0	**0**	**0**	1	1	0	**2**	0	0	0	**0**	**2**	**2**
09:30	09:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
09:45	10:00	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
11:30	11:45	0	1	0	**1**	0	0	1	**1**	**2**	0	2	0	**2**	0	1	0	**1**	**3**	**5**
11:45	12:00	1	0	0	**1**	0	0	1	**1**	**2**	0	2	0	**2**	0	0	0	**0**	**2**	**4**
12:00	12:15	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	1	0	**1**	**1**	**1**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	1	**1**	**1**	**1**
12:30	12:45	0	1	0	**1**	0	0	0	**0**	**1**	0	1	0	**1**	0	0	0	**0**	**1**	**2**
12:45	13:00	0	0	0	**0**	1	0	0	**1**	**1**	0	1	0	**1**	0	0	0	**0**	**1**	**2**
13:00	13:15	0	0	0	**0**	0	0	0	**0**	**0**	1	1	1	**3**	0	0	0	**0**	**3**	**3**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	0	0	**0**	**2**	**2**
15:00	15:15	2	0	0	**2**	1	0	0	**1**	**3**	1	2	0	**3**	0	0	1	**1**	**4**	**7**
15:15	15:30	0	0	0	**0**	0	0	2	**2**	**2**	0	0	0	**0**	0	2	0	**2**	**2**	**4**
15:30	15:45	0	0	0	**0**	1	0	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
15:45	16:00	0	0	1	**1**	0	0	0	**0**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
16:00	16:15	0	1	0	**1**	0	0	0	**0**	**1**	0	1	0	**1**	0	1	0	**1**	**2**	**3**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	0	1	**1**	**3**	**3**
16:30	16:45	0	0	0	**0**	1	0	0	**1**	**1**	0	0	0	**0**	0	0	0	**0**	**0**	**1**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	1	0	**1**	**1**	**1**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
Total:	None	3	5	1	**9**	5	2	6	**13**	**22**	3	17	1	**21**	0	12	4	**16**	**37**	**59**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BYRON AVE @ ROOSEVELT AVE

Survey Date: Wednesday, February 27, 2019 **WO No:** 38395

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

Full Study 15 Minute U-Turn Total

Time Period		ROOSEVELT AVE Northbound U-Turn Total	ROOSEVELT AVE Southbound U-Turn Total	BYRON AVE Eastbound U-Turn Total	BYRON AVE Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	1	1
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	1	1
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	2	2

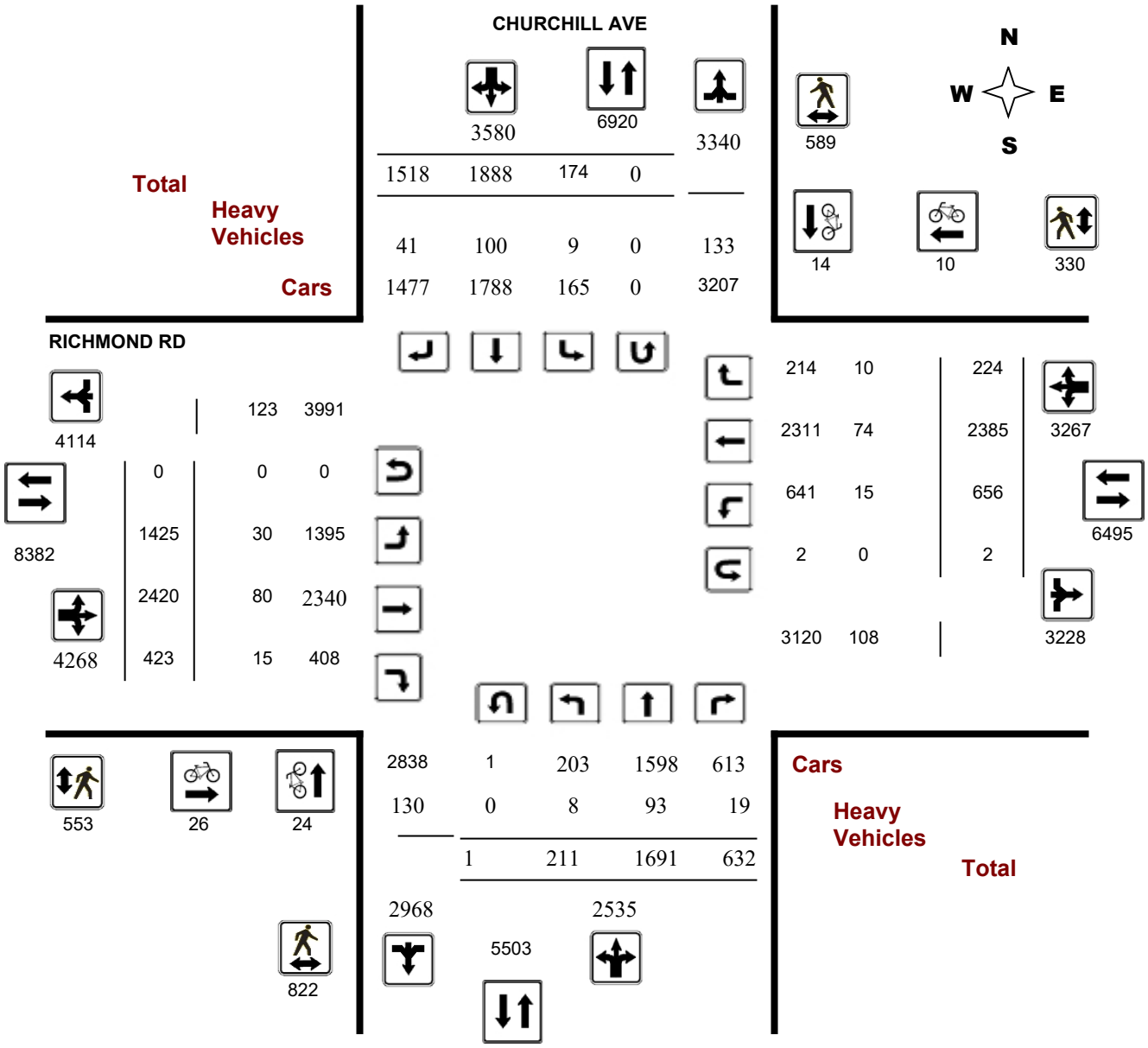
Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020
Start Time: 07:00
WO No: 39644
Device: Miovision

Full Study Diagram



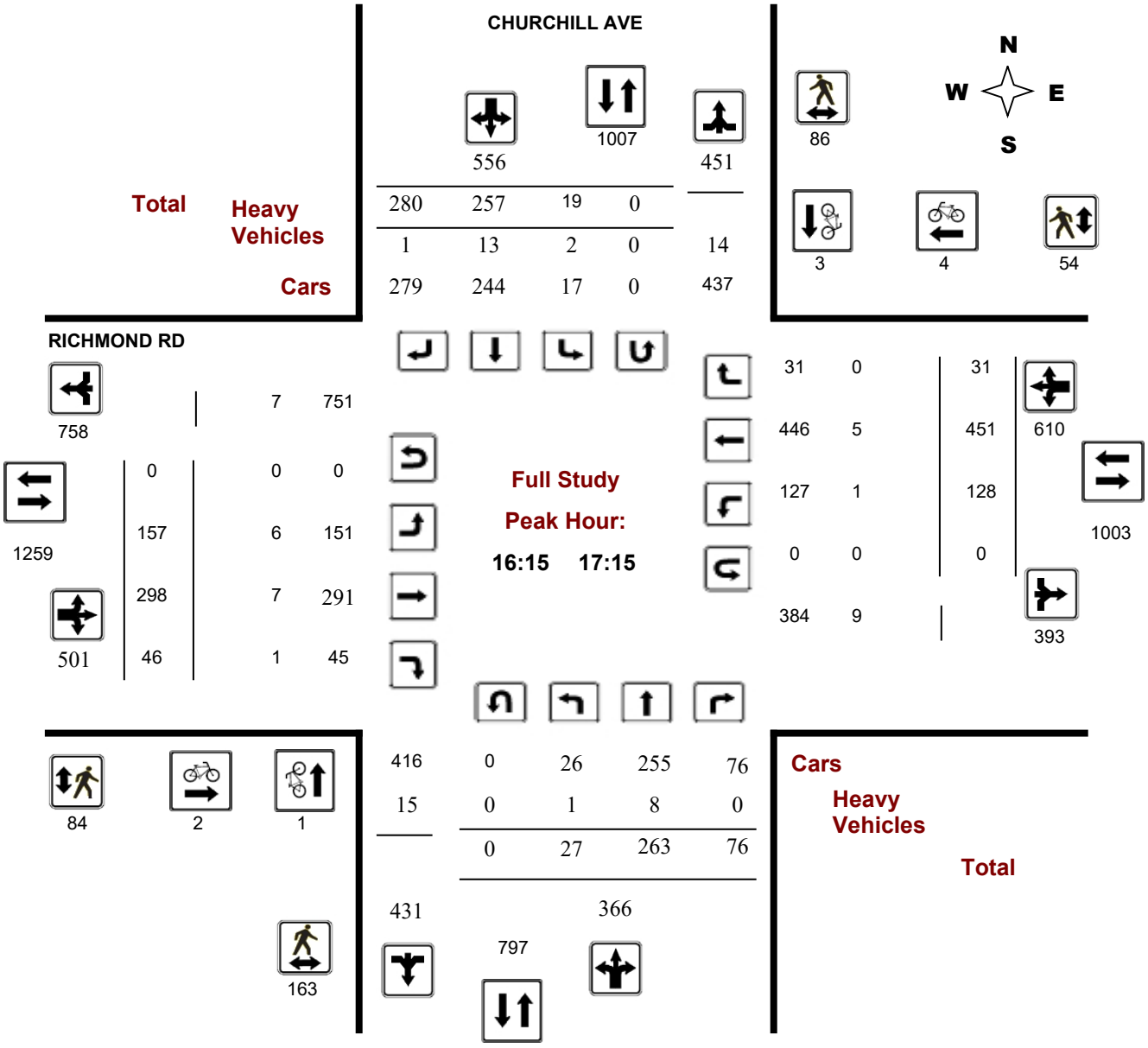
Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020
Start Time: 07:00
WO No: 39644
Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 23, 2020

Total Observed U-Turns

Northbound: 1 Southbound: 0

Eastbound: 0 Westbound: 2

AADT Factor

1.00

	CHURCHILL AVE								RICHMOND RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	14	161	59	**234**	16	226	90	**332**	**566**	274	347	24	**645**	35	126	22	**183**	**828**	**1394**
08:00 09:00	16	270	93	**379**	21	296	136	**453**	**832**	287	373	32	**692**	40	182	16	**238**	**930**	**1762**
09:00 10:00	27	205	81	**313**	18	219	137	**374**	**687**	162	329	35	**526**	64	173	33	**270**	**796**	**1483**
11:30 12:30	42	173	77	**292**	36	195	161	**392**	**684**	122	289	72	**483**	79	308	33	**420**	**903**	**1587**
12:30 13:30	31	183	83	**297**	30	215	187	**432**	**729**	128	254	83	**465**	73	340	27	**440**	**905**	**1634**
15:00 16:00	28	201	84	**313**	18	247	276	**541**	**854**	145	283	78	**506**	116	393	29	**538**	**1044**	**1898**
16:00 17:00	28	260	71	**359**	16	256	270	**542**	**901**	145	279	57	**481**	132	453	25	**610**	**1091**	**1992**
17:00 18:00	25	238	84	**347**	19	234	261	**514**	**861**	162	266	42	**470**	117	410	39	**566**	**1036**	**1897**
Sub Total	211	1691	632	**2534**	174	1888	1518	**3580**	**6114**	1425	2420	423	**4268**	656	2385	224	**3265**	**7533**	**13647**
U Turns				**1**				**0**	**1**				**0**				**2**	**2**	**3**
Total	211	1691	632	**2535**	174	1888	1518	**3580**	**6115**	1425	2420	423	**4268**	656	2385	224	**3267**	**7535**	**13650**
EQ 12Hr	293	2350	878	**3524**	242	2624	2110	**4976**	**8500**	1981	3364	588	**5933**	912	3315	311	**4541**	**10474**	**18974**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	276	2215	828	**3321**	228	2473	1989	**4690**	**8500**	1867	3170	554	**5591**	859	3124	293	**4280**	**10474**	**18974**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	362	2902	1085	**4350**	299	3240	2605	**6144**	**10494**	2445	4153	726	**7324**	1126	4093	384	**5606**	**12930**	**23424**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

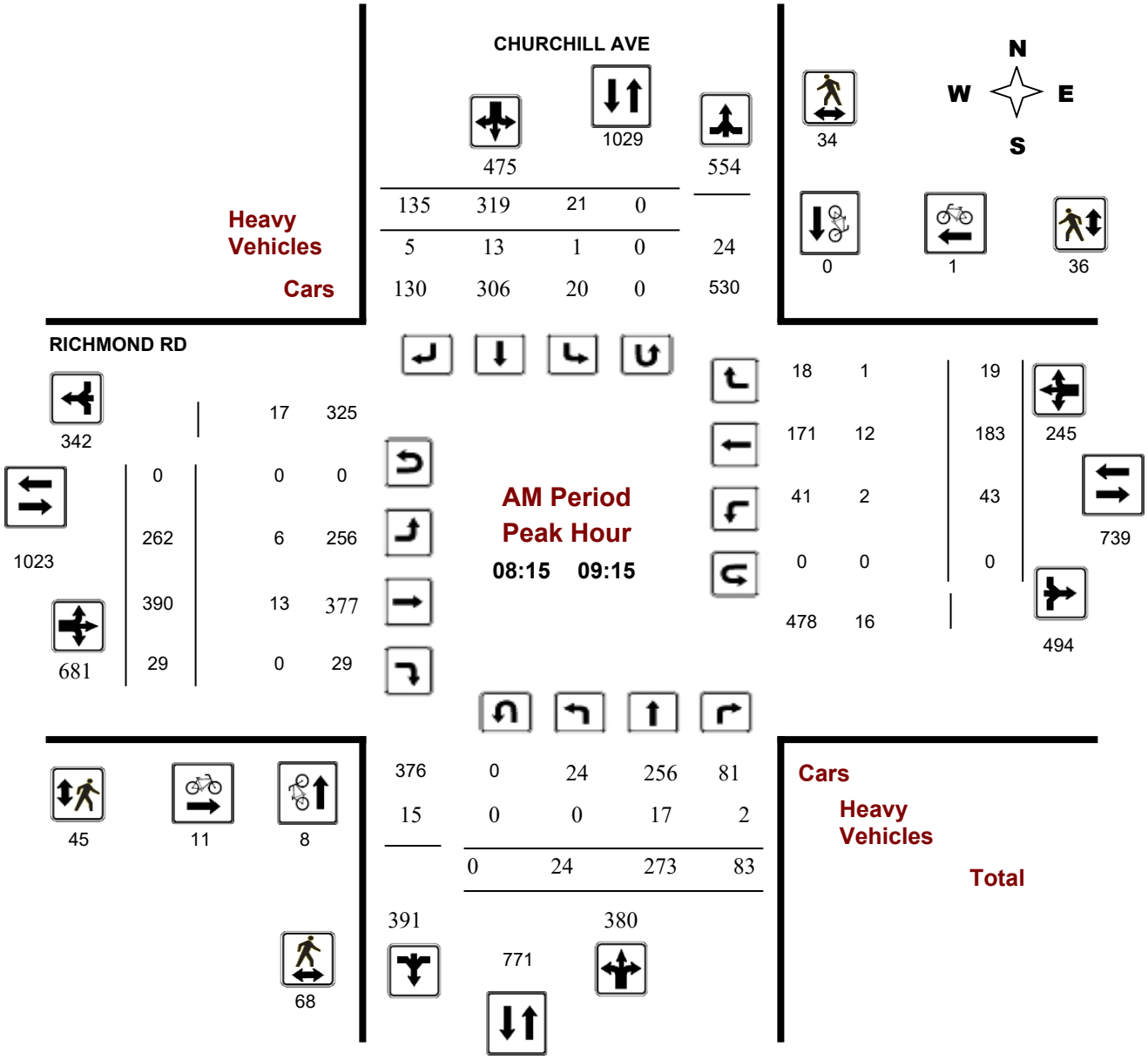
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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



Comments

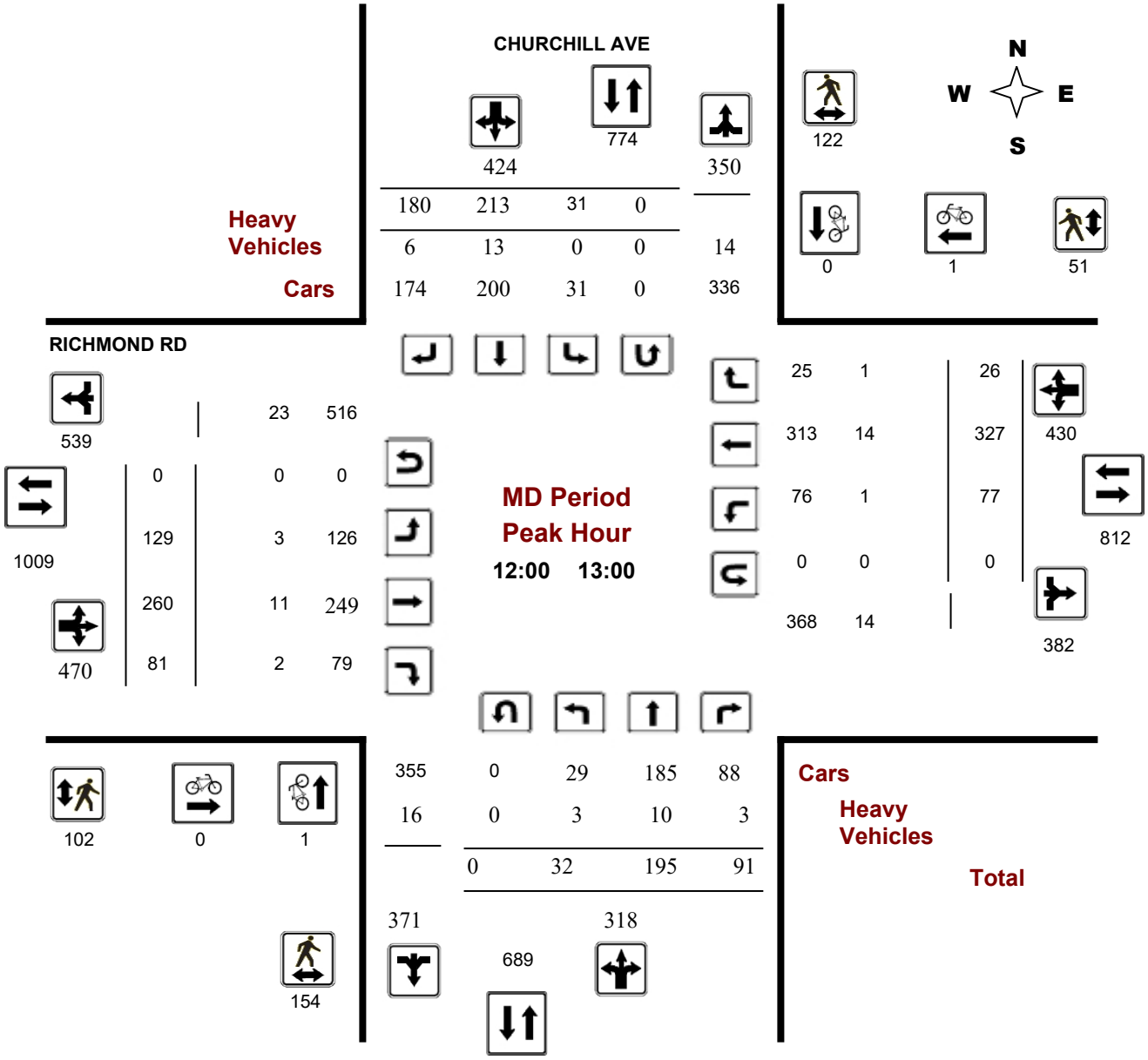
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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



Comments

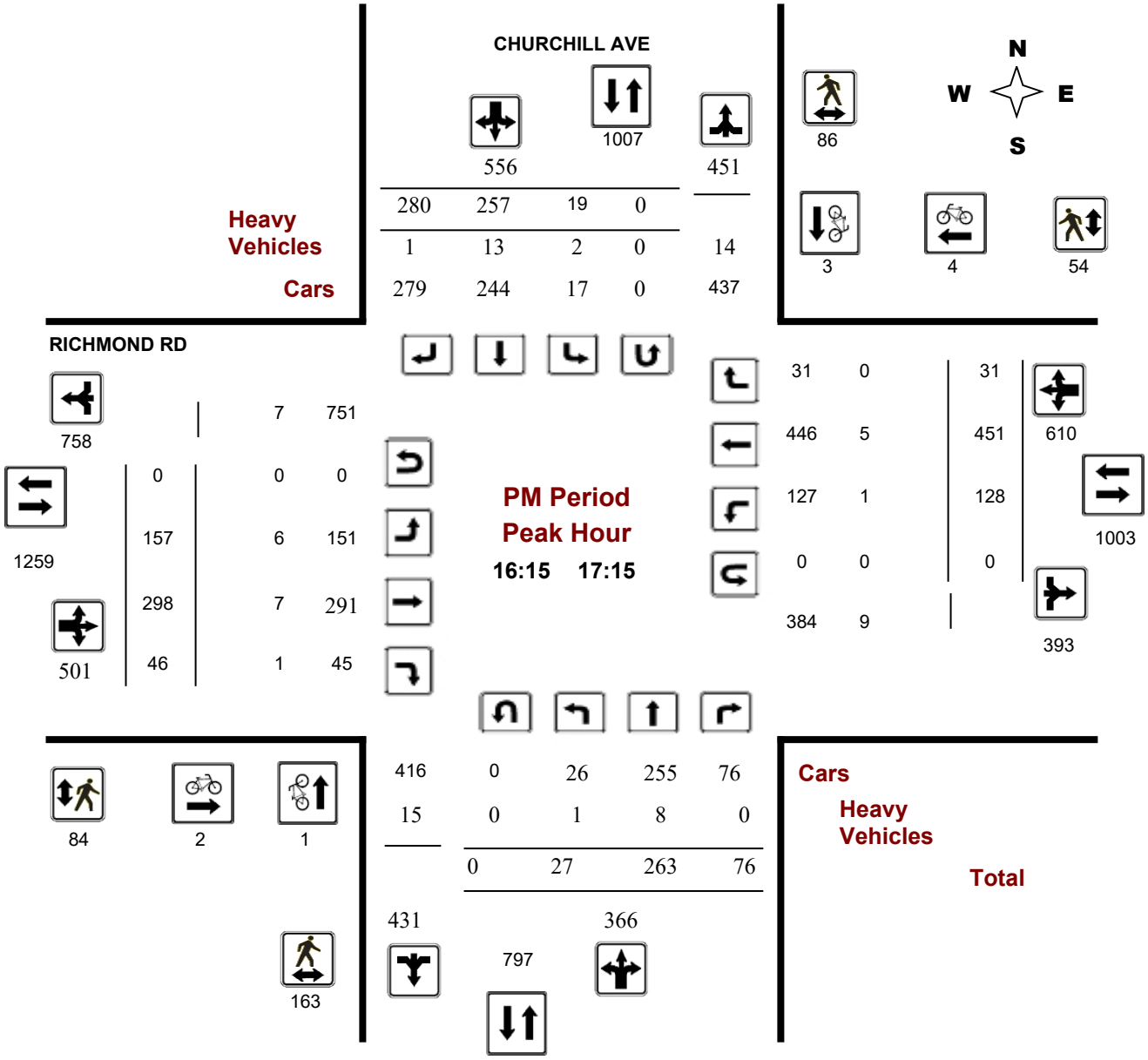
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study 15 Minute Increments

		CHURCHILL AVE									RICHMOND RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	4	25	10	39	3	46	20	69	4	56	75	5	136	7	27	6	40	4	284
07:15	07:30	4	28	8	40	2	50	19	71	6	63	91	5	159	5	35	2	42	6	312
07:30	07:45	2	37	18	57	9	59	24	92	13	80	85	10	175	11	26	4	41	13	365
07:45	08:00	4	71	23	98	2	71	27	100	8	75	96	4	175	12	38	10	60	8	433
08:00	08:15	1	69	22	93	6	60	32	98	10	72	83	11	166	11	39	3	53	10	410
08:15	08:30	6	60	30	96	7	83	29	119	7	77	95	7	179	9	43	7	59	7	453
08:30	08:45	4	66	20	90	3	74	36	113	11	76	83	8	167	8	53	4	65	11	435
08:45	09:00	5	75	21	101	5	79	39	123	8	62	112	6	180	12	47	2	61	8	465
09:00	09:15	9	72	12	93	6	83	31	120	12	47	100	8	155	14	40	6	60	12	428
09:15	09:30	4	48	27	79	5	55	39	99	13	46	79	12	137	14	37	6	58	13	373
09:30	09:45	6	46	19	71	4	43	34	81	17	38	74	8	120	19	56	10	85	17	357
09:45	10:00	8	39	23	70	3	38	33	74	12	31	76	7	114	17	40	11	68	12	326
11:30	11:45	9	32	16	57	12	46	29	87	14	28	75	13	116	22	78	11	111	14	371
11:45	12:00	15	52	19	86	8	43	39	90	14	31	73	22	126	19	63	12	94	14	396
12:00	12:15	10	48	22	80	7	59	44	110	14	31	82	20	133	17	90	6	113	14	436
12:15	12:30	8	41	20	69	9	47	49	105	5	32	59	17	108	21	77	4	102	5	384
12:30	12:45	5	46	25	76	9	51	41	101	10	31	52	27	110	16	77	6	99	10	386
12:45	13:00	9	60	24	93	6	56	46	108	6	35	67	17	119	23	83	10	116	6	436
13:00	13:15	11	42	13	66	6	50	56	112	9	30	70	24	124	17	83	4	104	9	406
13:15	13:30	6	35	21	62	9	58	44	111	12	32	65	15	112	17	97	7	121	12	406
15:00	15:15	10	48	16	74	5	61	62	128	7	32	77	34	143	28	98	11	137	7	482
15:15	15:30	10	53	24	87	6	66	71	143	8	46	74	18	138	32	84	7	123	8	491
15:30	15:45	4	49	15	68	6	57	61	124	4	35	68	9	112	30	110	8	148	4	452
15:45	16:00	4	51	29	84	1	63	82	146	3	32	64	17	113	26	101	3	131	3	474
16:00	16:15	4	53	15	72	4	57	62	123	7	28	60	18	106	36	114	5	155	7	456
16:15	16:30	8	70	12	90	4	60	68	132	6	37	76	12	125	29	113	7	149	6	496
16:30	16:45	6	64	23	93	4	71	67	142	8	43	72	13	128	35	114	7	156	8	519
16:45	17:00	10	73	21	104	4	68	73	145	7	37	71	14	122	32	112	6	150	7	521
17:00	17:15	3	56	20	79	7	58	72	137	4	40	79	7	126	32	112	11	155	4	497
17:15	17:30	10	62	16	88	5	61	68	134	4	44	52	16	112	28	116	8	152	4	486
17:30	17:45	8	59	22	89	3	68	66	137	6	40	72	5	117	28	89	7	124	6	467
17:45	18:00	4	61	26	91	4	47	55	106	1	38	63	14	115	29	93	13	135	1	447
Total:		211	1691	632	2535	174	1888	1518	3580	270	1425	2420	423	4268	656	2385	224	3267	270	13,650

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study Cyclist Volume

Time Period		CHURCHILL AVE			RICHMOND RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	1	0	1	1
07:15	07:30	2	0	2	0	0	0	2
07:30	07:45	1	0	1	0	0	0	1
07:45	08:00	3	0	3	4	0	4	7
08:00	08:15	4	1	5	0	1	1	6
08:15	08:30	5	0	5	4	0	4	9
08:30	08:45	2	0	2	2	1	3	5
08:45	09:00	0	0	0	2	0	2	2
09:00	09:15	1	0	1	3	0	3	4
09:15	09:30	2	1	3	0	1	1	4
09:30	09:45	0	1	1	1	1	2	3
09:45	10:00	1	0	1	0	0	0	1
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	1	1	1
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	1	0	1	0	0	0	1
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	1	0	1	1
15:15	15:30	0	0	0	1	0	1	1
15:30	15:45	0	0	0	2	0	2	2
15:45	16:00	0	1	1	1	0	1	2
16:00	16:15	0	2	2	0	1	1	3
16:15	16:30	0	0	0	0	1	1	1
16:30	16:45	0	1	1	0	0	0	1
16:45	17:00	0	0	0	1	0	1	1
17:00	17:15	1	2	3	1	3	4	7
17:15	17:30	0	2	2	0	0	0	2
17:30	17:45	0	1	1	2	0	2	3
17:45	18:00	1	2	3	0	0	0	3
Total		24	14	**38**	26	10	36	74

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study Pedestrian Volume

	CHURCHILL AVE			RICHMOND RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	3	2	**5**	2	2	**4**	**9**
07:15 07:30	4	3	**7**	6	3	**9**	**16**
07:30 07:45	10	8	**18**	4	2	**6**	**24**
07:45 08:00	17	4	**21**	14	4	**18**	**39**
08:00 08:15	11	9	**20**	6	3	**9**	**29**
08:15 08:30	18	5	**23**	10	11	**21**	**44**
08:30 08:45	19	15	**34**	18	10	**28**	**62**
08:45 09:00	15	7	**22**	8	10	**18**	**40**
09:00 09:15	16	7	**23**	9	5	**14**	**37**
09:15 09:30	8	16	**24**	6	4	**10**	**34**
09:30 09:45	14	8	**22**	12	6	**18**	**40**
09:45 10:00	14	9	**23**	10	7	**17**	**40**
11:30 11:45	26	24	**50**	19	7	**26**	**76**
11:45 12:00	23	28	**51**	24	14	**38**	**89**
12:00 12:15	46	21	**67**	31	12	**43**	**110**
12:15 12:30	34	35	**69**	20	16	**36**	**105**
12:30 12:45	32	34	**66**	24	8	**32**	**98**
12:45 13:00	42	32	**74**	27	15	**42**	**116**
13:00 13:15	37	19	**56**	18	11	**29**	**85**
13:15 13:30	35	28	**63**	33	14	**47**	**110**
15:00 15:15	33	27	**60**	26	14	**40**	**100**
15:15 15:30	28	20	**48**	24	12	**36**	**84**
15:30 15:45	23	28	**51**	17	18	**35**	**86**
15:45 16:00	28	24	**52**	16	12	**28**	**80**
16:00 16:15	27	16	**43**	24	5	**29**	**72**
16:15 16:30	29	23	**52**	16	15	**31**	**83**
16:30 16:45	48	20	**68**	24	11	**35**	**103**
16:45 17:00	48	25	**73**	18	17	**35**	**108**
17:00 17:15	38	18	**56**	26	11	**37**	**93**
17:15 17:30	31	27	**58**	27	11	**38**	**96**
17:30 17:45	33	24	**57**	17	16	**33**	**90**
17:45 18:00	32	23	**55**	17	24	**41**	**96**
Total	822	589	**1411**	553	330	**883**	**2294**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study Heavy Vehicles

		CHURCHILL AVE									RICHMOND RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	1	**2**	0	1	1	**2**	**4**	3	2	0	**5**	0	1	0	**1**	**6**	**10**
07:15	07:30	0	1	2	**3**	0	2	1	**3**	**6**	1	4	0	**5**	0	2	0	**2**	**7**	**13**
07:30	07:45	0	5	1	**6**	1	2	4	**7**	**13**	1	1	2	**4**	1	1	0	**2**	**6**	**19**
07:45	08:00	1	2	1	**4**	1	3	0	**4**	**8**	1	2	0	**3**	1	4	1	**6**	**9**	**17**
08:00	08:15	0	8	0	**8**	1	1	0	**2**	**10**	2	4	0	**6**	0	5	1	**6**	**12**	**22**
08:15	08:30	0	2	0	**2**	1	4	0	**5**	**7**	1	4	0	**5**	0	3	1	**4**	**9**	**16**
08:30	08:45	0	5	2	**7**	0	1	3	**4**	**11**	3	3	0	**6**	0	2	0	**2**	**8**	**19**
08:45	09:00	0	7	0	**7**	0	1	0	**1**	**8**	2	2	0	**4**	1	3	0	**4**	**8**	**16**
09:00	09:15	0	3	0	**3**	0	7	2	**9**	**12**	0	4	0	**4**	1	4	0	**5**	**9**	**21**
09:15	09:30	0	6	1	**7**	0	5	1	**6**	**13**	0	5	0	**5**	1	1	1	**3**	**8**	**21**
09:30	09:45	1	7	2	**10**	1	3	3	**7**	**17**	0	5	0	**5**	1	3	0	**4**	**9**	**26**
09:45	10:00	0	2	3	**5**	0	4	3	**7**	**12**	1	5	0	**6**	2	1	1	**4**	**10**	**22**
11:30	11:45	0	2	1	**3**	1	10	0	**11**	**14**	0	1	1	**2**	0	4	2	**6**	**8**	**22**
11:45	12:00	1	7	2	**10**	0	2	2	**4**	**14**	0	3	0	**3**	0	2	1	**3**	**6**	**20**
12:00	12:15	0	4	2	**6**	0	6	2	**8**	**14**	0	4	2	**6**	0	4	1	**5**	**11**	**25**
12:15	12:30	1	0	0	**1**	0	4	0	**4**	**5**	2	2	0	**4**	0	3	0	**3**	**7**	**12**
12:30	12:45	1	4	0	**5**	0	3	2	**5**	**10**	1	2	0	**3**	0	6	0	**6**	**9**	**19**
12:45	13:00	1	2	1	**4**	0	0	2	**2**	**6**	0	3	0	**3**	1	1	0	**2**	**5**	**11**
13:00	13:15	0	4	0	**4**	1	3	1	**5**	**9**	1	2	1	**4**	0	1	0	**1**	**5**	**14**
13:15	13:30	0	2	0	**2**	0	8	2	**10**	**12**	3	1	1	**5**	2	4	0	**6**	**11**	**23**
15:00	15:15	1	1	0	**2**	0	3	2	**5**	**7**	1	5	4	**10**	2	4	0	**6**	**16**	**23**
15:15	15:30	0	3	0	**3**	0	4	1	**5**	**8**	0	1	1	**2**	0	2	0	**2**	**4**	**12**
15:30	15:45	0	0	0	**0**	0	2	2	**4**	**4**	0	2	1	**3**	0	0	0	**0**	**3**	**7**
15:45	16:00	0	1	0	**1**	0	1	1	**2**	**3**	1	2	0	**3**	0	2	0	**2**	**5**	**8**
16:00	16:15	0	2	0	**2**	0	1	4	**5**	**7**	0	2	0	**2**	1	3	1	**5**	**7**	**14**
16:15	16:30	0	2	0	**2**	0	4	0	**4**	**6**	1	1	1	**3**	0	2	0	**2**	**5**	**11**
16:30	16:45	1	2	0	**3**	1	4	0	**5**	**8**	3	1	0	**4**	0	0	0	**0**	**4**	**12**
16:45	17:00	0	2	0	**2**	0	5	0	**5**	**7**	1	3	0	**4**	1	0	0	**1**	**5**	**12**
17:00	17:15	0	2	0	**2**	1	0	1	**2**	**4**	1	2	0	**3**	0	3	0	**3**	**6**	**10**
17:15	17:30	0	2	0	**2**	0	1	1	**2**	**4**	0	1	1	**2**	0	1	0	**1**	**3**	**7**
17:30	17:45	0	2	0	**2**	0	4	0	**4**	**6**	0	0	0	**0**	0	1	0	**1**	**1**	**7**
17:45	18:00	0	0	0	**0**	0	1	0	**1**	**1**	0	1	0	**1**	0	1	0	**1**	**2**	**3**
Total:	None	8	93	19	**120**	9	100	41	**150**	**270**	30	80	15	**125**	15	74	10	**99**	**224**	**494**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

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

Full Study 15 Minute U-Turn Total

Time Period		CHURCHILL AVE Northbound U-Turn Total	CHURCHILL AVE Southbound U-Turn Total	RICHMOND RD Eastbound U-Turn Total	RICHMOND RD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	1	0	0	0	1
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	1	1
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	1	1
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	0	0	2	3

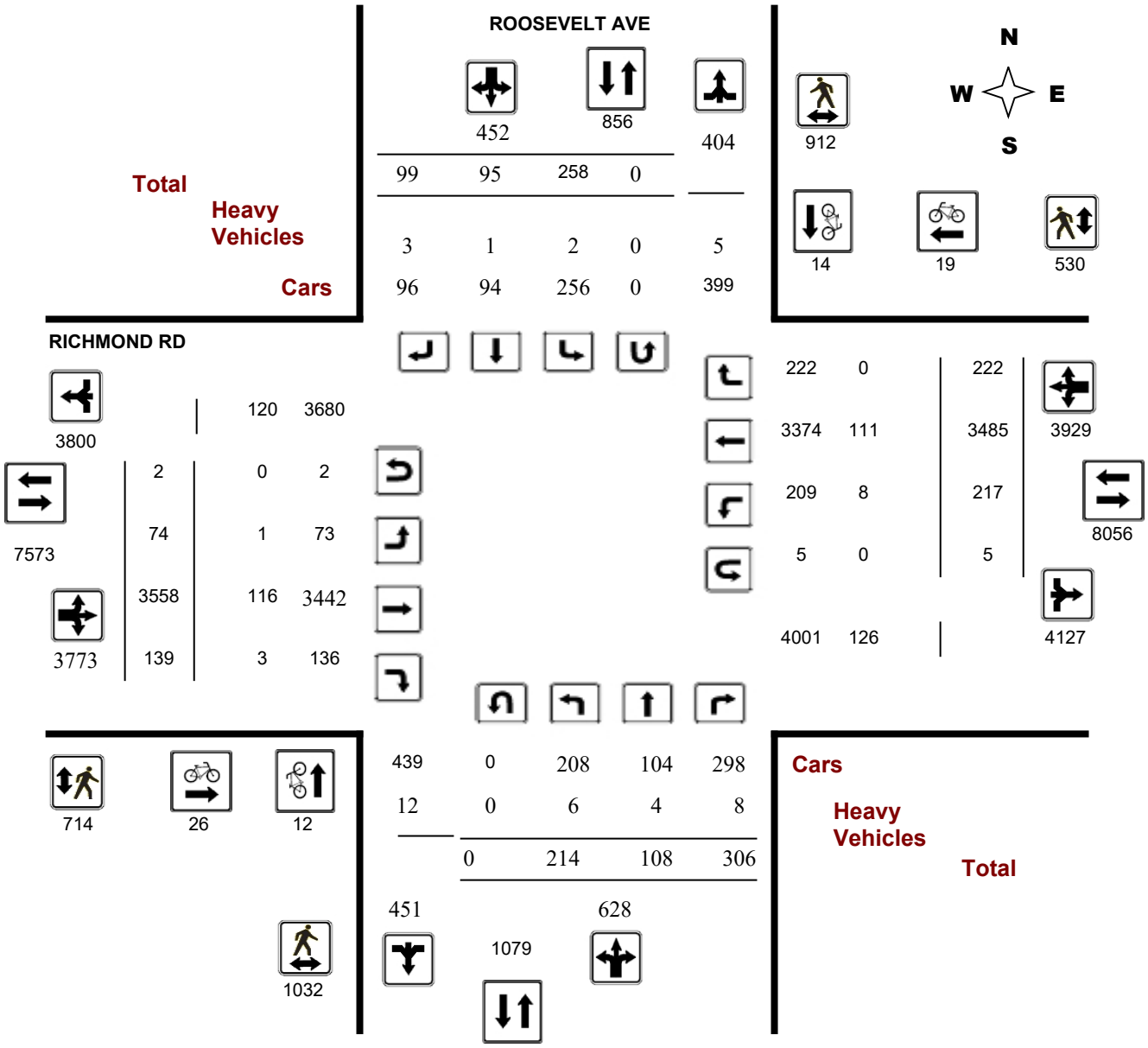
Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020
Start Time: 07:00
WO No: 39385
Device: Miovision

Full Study Diagram



5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

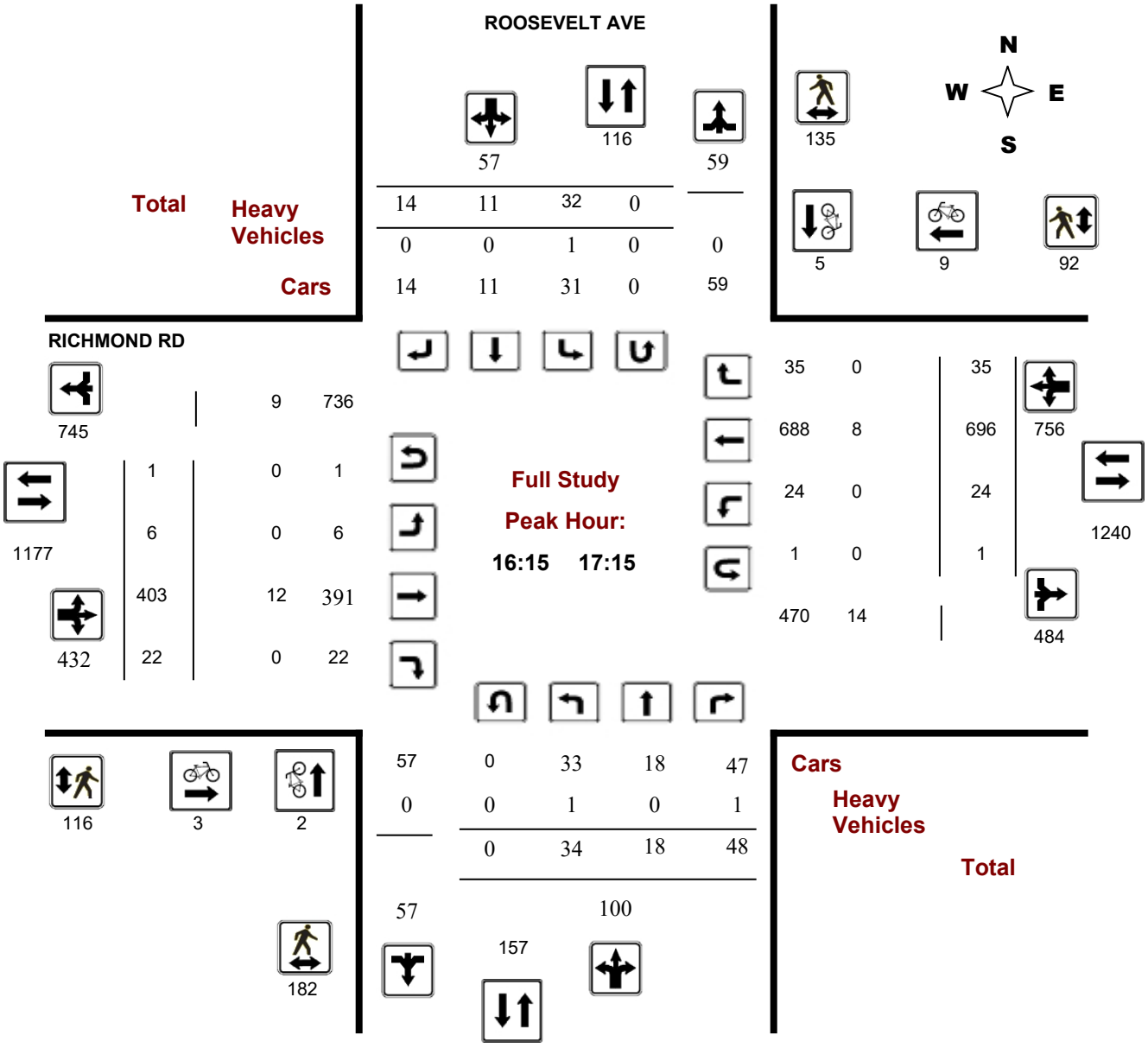
Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study Peak Hour Diagram



5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

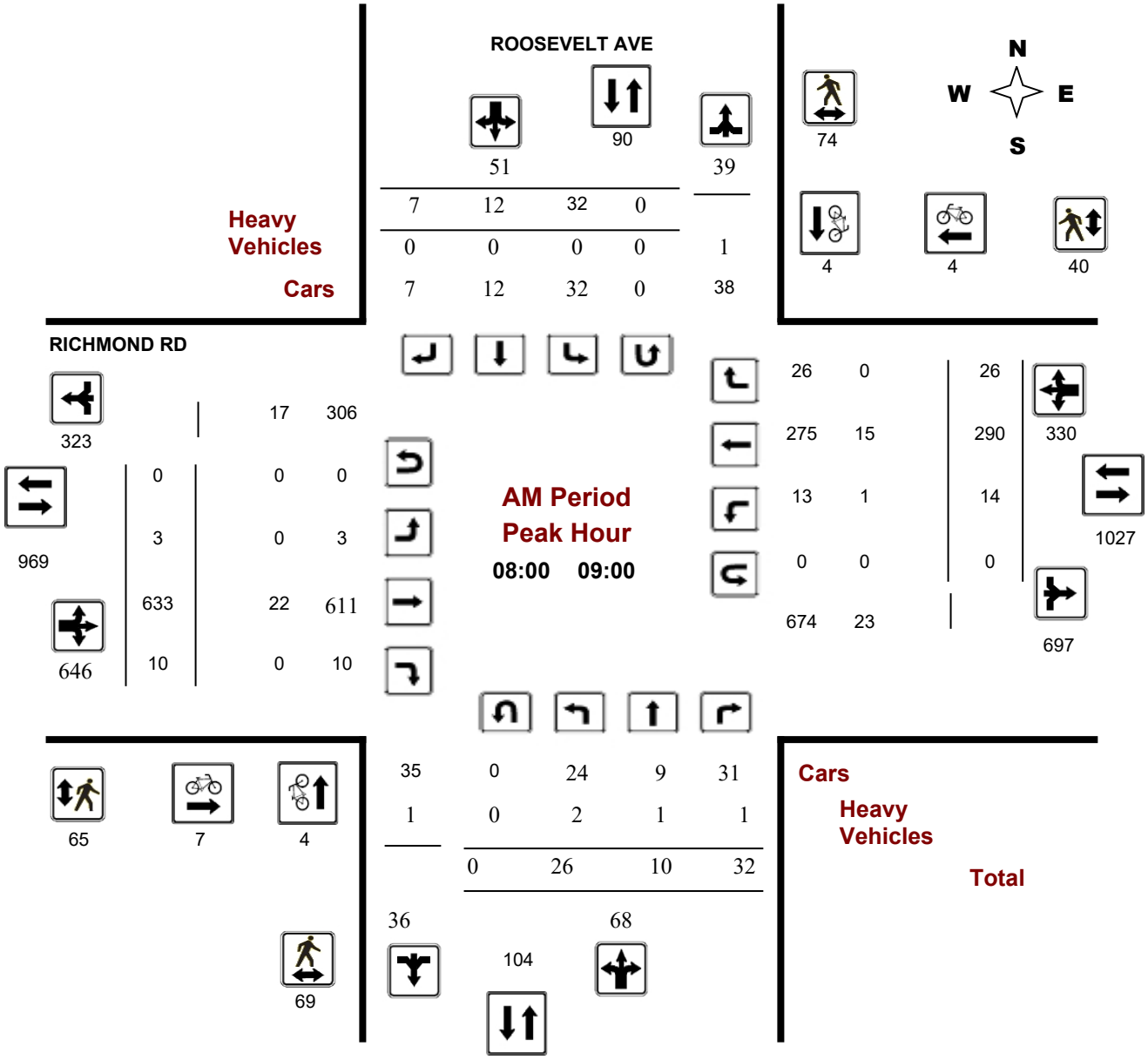
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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



Comments 5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

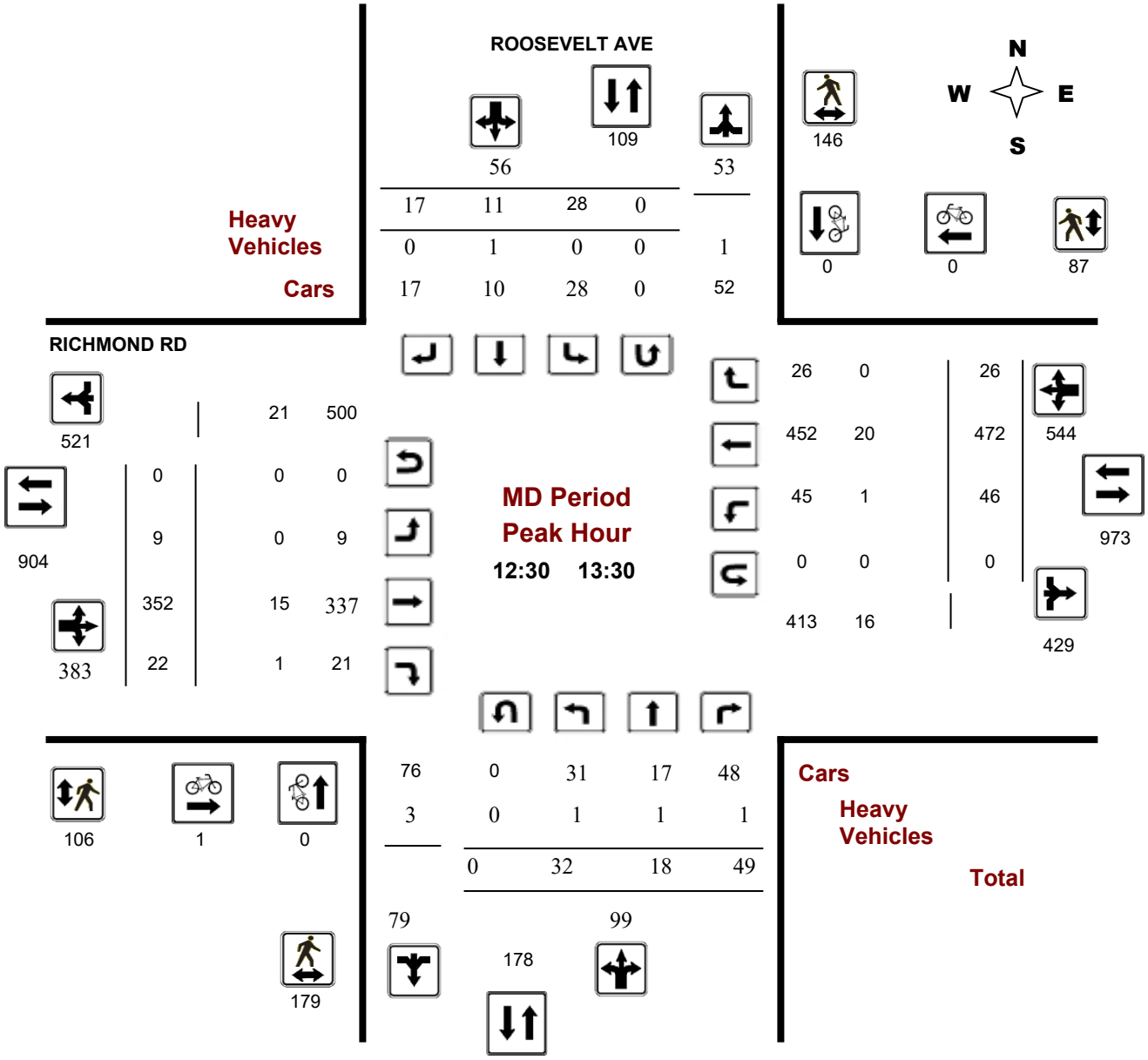
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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



Comments 5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

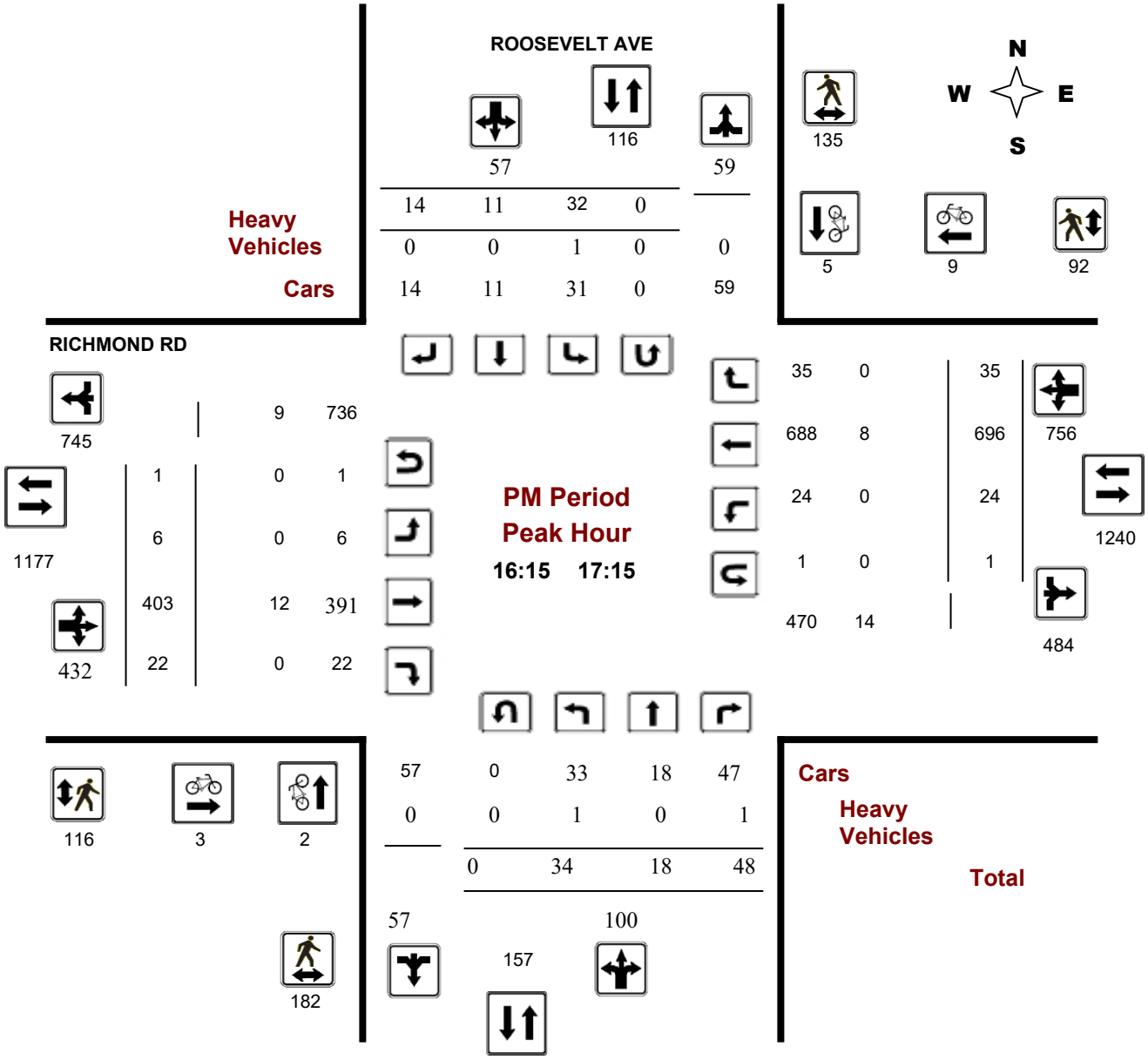
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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



Comments 5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 23, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 2 Westbound: 5

AADT Factor

1.39

	ROOSEVELT AVE								RICHMOND RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	13	3	23	**39**	21	10	6	**37**	**76**	10	605	10	**625**	7	195	8	**210**	**835**	**911**
08:00 09:00	26	10	32	**68**	32	12	7	**51**	**119**	3	633	10	**646**	14	290	26	**330**	**976**	**1095**
09:00 10:00	20	18	27	**65**	34	15	8	**57**	**122**	4	462	12	**478**	25	263	21	**309**	**787**	**909**
11:30 12:30	30	16	62	**108**	39	15	16	**70**	**178**	15	359	20	**394**	41	375	48	**464**	**858**	**1036**
12:30 13:30	32	18	49	**99**	28	11	17	**56**	**155**	9	352	22	**383**	46	472	26	**544**	**927**	**1082**
15:00 16:00	31	14	27	**72**	36	10	21	**67**	**139**	16	401	27	**444**	32	603	27	**662**	**1106**	**1245**
16:00 17:00	27	18	50	**95**	27	13	13	**53**	**148**	8	376	22	**406**	17	670	37	**724**	**1130**	**1278**
17:00 18:00	35	11	36	**82**	41	9	11	**61**	**143**	9	370	16	**395**	35	617	29	**681**	**1076**	**1219**
Sub Total	214	108	306	**628**	258	95	99	**452**	**1080**	74	3558	139	**3771**	217	3485	222	**3924**	**7695**	**8775**
U Turns				**0**				**0**	**0**				**2**				**5**	**7**	**7**
Total	214	108	306	**628**	258	95	99	**452**	**1080**	74	3558	139	**3773**	217	3485	222	**3929**	**7702**	**8782**
EQ 12Hr	297	150	425	**873**	359	132	138	**628**	**1501**	103	4946	193	**5244**	302	4844	309	**5461**	**10706**	**12207**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr	297	150	425	**873**	359	132	138	**628**	**1501**	103	4946	193	**5244**	302	4844	309	**5461**	**10706**	**12207**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **1**

AVG 24Hr	390	197	557	**1144**	470	173	180	**823**	**1967**	135	6479	253	**6870**	395	6346	404	**7154**	**14024**	**15991**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study 15 Minute Increments

		ROOSEVELT AVE									RICHMOND RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	1	1	3	2	1	1	4	16	2	132	2	136	0	43	3	46	16	189
07:15	07:30	3	1	2	6	7	4	1	12	34	3	150	2	155	3	47	3	53	34	226
07:30	07:45	7	1	9	17	6	2	2	10	35	1	163	2	166	1	46	1	48	35	241
07:45	08:00	2	0	11	13	6	3	2	11	39	4	160	4	168	3	59	1	63	39	255
08:00	08:15	3	5	7	15	12	3	1	16	52	1	154	4	159	1	68	7	76	52	266
08:15	08:30	4	2	7	13	8	5	1	14	47	1	161	3	165	3	68	6	77	47	269
08:30	08:45	12	2	7	21	6	2	2	10	50	0	154	1	155	6	75	8	89	50	275
08:45	09:00	7	1	11	19	6	2	3	11	45	1	164	2	167	4	79	5	88	45	285
09:00	09:15	5	2	7	14	5	5	2	12	46	1	141	3	145	6	69	3	78	46	249
09:15	09:30	4	5	9	18	11	5	1	17	60	1	122	0	123	6	58	8	73	60	231
09:30	09:45	5	5	4	14	8	4	2	14	56	1	98	6	106	7	79	5	91	56	225
09:45	10:00	6	6	7	19	10	1	3	14	55	1	101	3	105	6	57	5	68	55	206
11:30	11:45	7	3	17	27	9	6	6	21	91	7	88	6	101	10	87	11	108	91	257
11:45	12:00	7	3	18	28	13	1	4	18	88	4	101	6	111	10	79	18	107	88	264
12:00	12:15	8	8	15	31	9	1	4	14	83	2	87	3	92	13	109	11	134	83	271
12:15	12:30	8	2	12	22	8	7	2	17	71	2	83	5	90	8	100	8	116	71	245
12:30	12:45	10	7	19	36	6	2	4	12	74	1	81	4	86	4	102	8	114	74	248
12:45	13:00	8	2	12	22	7	3	5	15	72	1	82	3	86	17	111	9	137	72	260
13:00	13:15	4	5	6	15	7	2	3	12	69	3	90	9	102	18	125	5	148	69	277
13:15	13:30	10	4	12	26	8	4	5	17	72	4	99	6	109	7	134	4	145	72	297
15:00	15:15	6	3	7	16	6	3	7	16	73	4	119	11	134	13	132	7	152	73	318
15:15	15:30	9	5	11	25	12	2	5	19	84	4	98	7	109	11	131	11	153	84	306
15:30	15:45	11	2	7	20	13	3	6	22	65	6	88	4	98	5	176	3	184	65	324
15:45	16:00	5	4	2	11	5	2	3	10	43	2	96	5	103	3	164	6	173	43	297
16:00	16:15	5	5	12	22	7	3	5	15	65	3	74	5	82	5	149	7	162	65	281
16:15	16:30	7	5	13	25	4	5	5	14	70	2	108	5	115	3	179	11	193	70	347
16:30	16:45	9	5	16	30	6	1	2	9	65	2	97	7	106	5	181	6	192	65	337
16:45	17:00	6	3	9	18	10	4	1	15	63	1	97	5	104	4	161	13	179	63	316
17:00	17:15	12	5	10	27	12	1	6	19	75	1	101	5	107	12	175	5	192	75	345
17:15	17:30	8	2	12	22	7	4	1	12	59	1	82	3	86	4	164	11	179	59	299
17:30	17:45	9	2	6	17	16	0	1	17	57	4	93	4	101	5	141	8	155	57	290
17:45	18:00	6	2	8	16	6	4	3	13	61	3	94	4	101	14	137	5	156	61	286
Total:		214	108	306	628	258	95	99	452	1935	74	3558	139	3773	217	3485	222	3929	1935	8,782

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study Cyclist Volume

Time Period		ROOSEVELT AVE			RICHMOND RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	1	0	1	1
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	3	1	4	4
07:45	08:00	2	0	2	3	0	3	5
08:00	08:15	0	2	2	3	1	4	6
08:15	08:30	3	1	4	1	2	3	7
08:30	08:45	1	1	2	2	1	3	5
08:45	09:00	0	0	0	1	0	1	1
09:00	09:15	0	1	1	3	0	3	4
09:15	09:30	0	0	0	0	1	1	1
09:30	09:45	0	0	0	1	0	1	1
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	1	0	1	0	0	0	1
12:30	12:45	0	0	0	1	0	1	1
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	1	0	1	1
15:15	15:30	1	2	3	0	1	1	4
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	1	0	1	1
16:00	16:15	0	1	1	1	0	1	2
16:15	16:30	0	0	0	0	3	3	3
16:30	16:45	1	2	3	2	3	5	8
16:45	17:00	0	1	1	1	1	2	3
17:00	17:15	1	2	3	0	2	2	5
17:15	17:30	0	1	1	0	1	1	2
17:30	17:45	2	0	2	1	1	2	4
17:45	18:00	0	0	0	0	1	1	1
Total		12	14	**26**	26	19	45	71

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study Pedestrian Volume

	ROOSEVELT AVE			RICHMOND RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	**Total**	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	**Total**	**Grand Total**
07:00 07:15	3	7	**10**	5	3	**8**	**18**
07:15 07:30	6	7	**13**	10	4	**14**	**27**
07:30 07:45	9	10	**19**	18	6	**24**	**43**
07:45 08:00	10	13	**23**	8	9	**17**	**40**
08:00 08:15	9	10	**19**	13	8	**21**	**40**
08:15 08:30	14	15	**29**	20	4	**24**	**53**
08:30 08:45	29	17	**46**	18	13	**31**	**77**
08:45 09:00	17	32	**49**	14	15	**29**	**78**
09:00 09:15	9	18	**27**	16	15	**31**	**58**
09:15 09:30	23	8	**31**	11	7	**18**	**49**
09:30 09:45	15	20	**35**	5	15	**20**	**55**
09:45 10:00	28	25	**53**	19	12	**31**	**84**
11:30 11:45	39	26	**65**	16	14	**30**	**95**
11:45 12:00	50	39	**89**	33	32	**65**	**154**
12:00 12:15	42	66	**108**	31	22	**53**	**161**
12:15 12:30	34	45	**79**	29	13	**42**	**121**
12:30 12:45	36	32	**68**	31	23	**54**	**122**
12:45 13:00	43	31	**74**	21	25	**46**	**120**
13:00 13:15	51	32	**83**	15	19	**34**	**117**
13:15 13:30	49	51	**100**	39	20	**59**	**159**
15:00 15:15	35	39	**74**	20	26	**46**	**120**
15:15 15:30	52	34	**86**	31	20	**51**	**137**
15:30 15:45	57	39	**96**	23	17	**40**	**136**
15:45 16:00	48	46	**94**	36	26	**62**	**156**
16:00 16:15	38	41	**79**	39	24	**63**	**142**
16:15 16:30	39	37	**76**	24	23	**47**	**123**
16:30 16:45	56	34	**90**	29	23	**52**	**142**
16:45 17:00	34	25	**59**	38	23	**61**	**120**
17:00 17:15	53	39	**92**	25	23	**48**	**140**
17:15 17:30	33	21	**54**	17	14	**31**	**85**
17:30 17:45	39	31	**70**	35	17	**52**	**122**
17:45 18:00	32	22	**54**	25	15	**40**	**94**
Total	1032	912	**1944**	714	530	**1244**	**3188**

5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study Heavy Vehicles

ROOSEVELT AVE **RICHMOND RD**

Time Period		Northbound				Southbound					Eastbound				Westbound					
		LT	ST	RT	**N TOT**	LT	ST	RT	**S TOT**	**STR TOT**	LT	ST	RT	**E TOT**	LT	ST	RT	**W TOT**	**STR TOT**	**Grand Total**
07:00	07:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**7**	0	2	0	**7**	**14**	**7**
07:15	07:30	0	0	0	**2**	0	0	0	**0**	**2**	0	4	1	**8**	1	3	0	**8**	**16**	**9**
07:30	07:45	0	0	1	**1**	0	0	0	**0**	**1**	0	3	0	**8**	0	5	0	**9**	**17**	**9**
07:45	08:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**5**	0	3	0	**5**	**10**	**5**
08:00	08:15	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**12**	0	5	0	**12**	**24**	**12**
08:15	08:30	1	0	1	**2**	0	0	0	**0**	**2**	0	4	0	**9**	0	4	0	**9**	**18**	**10**
08:30	08:45	1	1	0	**3**	0	0	0	**1**	**4**	0	6	0	**10**	1	3	0	**10**	**20**	**12**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**8**	0	3	0	**8**	**16**	**8**
09:00	09:15	0	0	0	**0**	0	0	1	**2**	**2**	1	4	0	**12**	0	6	0	**10**	**22**	**12**
09:15	09:30	0	0	0	**0**	0	0	1	**1**	**1**	0	5	0	**8**	0	2	0	**7**	**15**	**8**
09:30	09:45	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**11**	0	6	0	**11**	**22**	**11**
09:45	10:00	0	2	1	**3**	0	0	0	**2**	**5**	0	6	0	**10**	0	4	0	**11**	**21**	**13**
11:30	11:45	0	0	1	**2**	0	0	0	**0**	**2**	0	1	0	**4**	1	3	0	**6**	**10**	**6**
11:45	12:00	0	0	0	**2**	0	0	0	**0**	**2**	0	4	0	**7**	2	3	0	**9**	**16**	**9**
12:00	12:15	0	0	1	**2**	0	0	0	**0**	**2**	0	5	0	**11**	1	6	0	**13**	**24**	**13**
12:15	12:30	1	0	0	**2**	0	0	0	**0**	**2**	0	5	0	**9**	1	3	0	**9**	**18**	**10**
12:30	12:45	0	0	1	**2**	0	0	0	**0**	**2**	0	3	1	**13**	0	9	0	**13**	**26**	**14**
12:45	13:00	0	0	0	**1**	0	1	0	**1**	**2**	0	4	0	**8**	0	4	0	**8**	**16**	**9**
13:00	13:15	1	0	0	**2**	0	0	0	**0**	**2**	0	3	0	**5**	1	1	0	**5**	**10**	**6**
13:15	13:30	0	1	0	**1**	0	0	0	**1**	**2**	0	5	0	**11**	0	6	0	**11**	**22**	**12**
15:00	15:15	0	0	1	**1**	0	0	0	**0**	**1**	0	6	0	**8**	0	2	0	**9**	**17**	**9**
15:15	15:30	0	0	0	**0**	1	0	0	**1**	**1**	0	1	0	**6**	0	5	0	**7**	**13**	**7**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**5**	0	2	0	**5**	**10**	**5**
15:45	16:00	0	0	0	**0**	0	0	1	**1**	**1**	0	3	0	**7**	0	3	0	**6**	**13**	**7**
16:00	16:15	1	0	0	**2**	0	0	0	**0**	**2**	0	3	1	**11**	0	6	0	**9**	**20**	**11**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**5**	0	3	0	**5**	**10**	**5**
16:30	16:45	1	0	1	**2**	0	0	0	**0**	**2**	0	3	0	**5**	0	1	0	**5**	**10**	**6**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	0	0	**4**	**8**	**4**
17:00	17:15	0	0	0	**0**	1	0	0	**1**	**1**	0	3	0	**7**	0	4	0	**8**	**15**	**8**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**2**	0	1	0	**2**	**4**	**2**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**2**	0	2	0	**2**	**4**	**2**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**2**	0	1	0	**2**	**4**	**2**
Total:	None	6	4	8	**30**	2	1	3	**11**	**41**	1	116	3	**240**	8	111	0	**245**	**485**	**263**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

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

Full Study 15 Minute U-Turn Total

		ROOSEVELT AVE		RICHMOND RD		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	1	1
09:30	09:45	0	0	1	0	1
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	1	1
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	1	1
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	1	1	2
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	1	1
17:45	18:00	0	0	0	0	0
Total		0	0	2	5	7

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

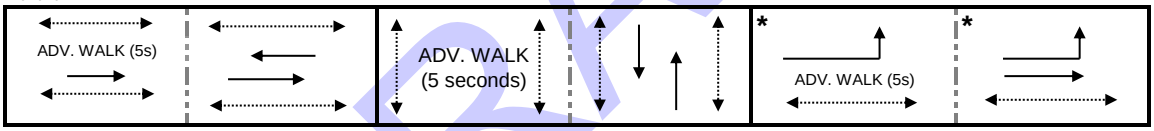
Intersection:	***Main:*** Richmond	***Side:***	Churchill
Controller:	**ATC3**	**TSD:**	**5229**
Author:	Matthew Anderson	**Date:**	26-May-2022

Existing Timing Plans†

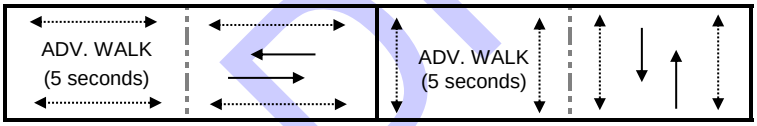
	Plan					Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	80	75	90	65	75			
Offset	43	16	0	29	16			
EB Thru	45	43	57	33	43	14	11	3.3+2.8
WB Thru	31	31	45	33	31	14	11	3.3+2.8
NB Thru	35	32	33	32	32	7	11	3.6+2.6
SB Thru	35	32	33	32	32	7	11	3.6+2.6
EB Left	14	12	12	-	12	-	-	3.3+2.8

Phasing Sequence‡

Plan: 1,2,3,5



Plan: 4



Notes: 1) The Thru arrow is displayed during the East-West advanced walk, followed by the green ball.

Schedule

Weekday

Time	Plan
0:15	4
6:30	1
9:30	2
15:00	3
18:30	2
22:30	4

Saturday

Time	Plan
0:15	4
6:30	2
9:00	5
18:30	2
22:30	4

Sunday

Time	Plan
0:15	4
6:30	2
9:00	5
18:00	2
22:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

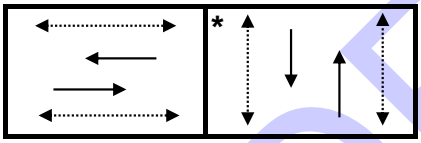
Intersection:	***Main:*** Richmond	***Side:***	Roosevelt
Controller:	MS 3200	**TSD:**	**5231**
Author:	Matthew Anderson	**Date:**	26-May-2022

Existing Timing Plans†

	Plan					Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	75	70	85	65	70			
Offset	27	X	78	X	X			
EB Thru	45	40	55	35	40	18	8	3.3+2.1
WB Thru	45	40	55	35	40	18	8	3.3+2.1
NB Thru	30	30	30	30	30	14	10	3.3+2.3
SB Thru	30	30	30	30	30	14	10	3.3+2.3

Phasing Sequence‡

Plan: All



Schedule

Weekday

Time	Plan
0:15	4
6:30	1
9:00	2
15:00	3
18:30	2
23:00	4

Saturday

Time	Plan
0:15	4
9:10	5
18:30	2
23:30	4

Sunday

Time	Plan
0:15	4
9:10	2
22:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

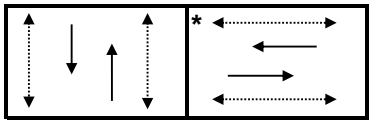
Intersection:	***Main:*** Churchill	***Side:***	Byron
Controller:	**ATC 3**	**TSD:**	**5634**
Author:	Matthew Anderson	**Date:**	26-May-2022

Existing Timing Plans†

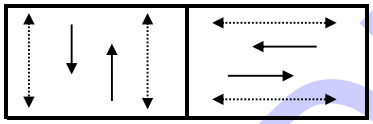
	Plan							Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	**AM School** 11	**PM School** 12	***Walk***	***DW***	***A+R***
Cycle	80	75	90	60	75	80	75			
Offset	74	45	40	X	45	74	45			
NB Thru	42	40	45	32	40	42	40	10	11	3.3+2.1
SB Thru	42	40	45	32	40	42	40	10	11	3.3+2.1
EB Thru	38	35	45	28	35	38	35	10	15	3.3+2.3
WB Thru	38	35	45	28	35	38	35	10	15	3.3+2.3

Phasing Sequence‡

Plan: **1,2,3,4,5**



Plan: **11,12**



Notes: 1) In plan 4, the EW walk time is 7s

Schedule

Weekday

Time	Plan
0:15	4
6:30	1
7:45	11
8:15	1
9:30	2
14:15	12
15:00	3
18:30	2
22:30	4

Saturday

Time	Plan
0:15	4
6:30	2
9:00	5
18:30	2
22:30	4

Sunday

Time	Plan
0:15	4
6:30	2
9:00	5
18:00	2
22:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

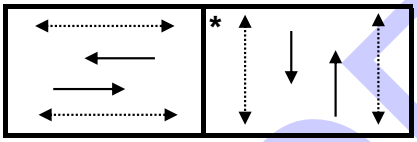
Intersection:	***Main:*** Byron	***Side:***	Roosevelt
Controller:	**ATC 3**	**TSD:**	**6765**
Author:	Matthew Anderson	**Date:**	26-May-2022

Existing Timing Plans†

	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	70	65	70	60	65			
Offset	X	X	X	X	X			
EB Thru	50	45	50	40	45	7	10	3.3+2.2
WB Thru	50	45	50	40	45	7	10	3.3+2.2
NB Thru	20	20	20	20	20	7	8	3.3+1.7
SB Thru	20	20	20	20	20	7	8	3.3+1.7

Phasing Sequence‡

Plan: All



Schedule

Weekday

Time	Plan
0:15	4
6:30	1
9:30	2
15:00	3
18:30	2
23:00	4

Saturday

Time	Plan
0:15	4
9:10	5
18:30	2
23:30	4

Sunday

Time	Plan
0:15	4
9:10	2
22:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: BYRON AVE @ CHURCHILL AVE

Traffic Control: Traffic signal **Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Mar-26, Sat,12:30	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Jun-11, Sat,09:49	Rain	Turning movement	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-Sep-12, Tue,14:43	Clear	Turning movement	P.D. only	Dry	West	Turning right	Unknown	Cyclist	0
					West	Going ahead	Bicycle	Other motor vehicle	
2019-Nov-05, Tue,21:32	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Cyclist	0
					West	Changing lanes	Bicycle	Other motor vehicle	
2020-Jan-30, Thu,08:58	Clear	SMV other	Non-fatal injury	Loose snow	South	Turning left	Passenger van	Pedestrian	1

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: BYRON AVE @ ROOSEVELT AVE

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
2017-Feb-11, Sat,08:55	Clear	Other	P.D. only	Packed snow	East	Overtaking	Automobile, station wagon	Other motor vehicle	0
					West	Reversing	Truck - closed	Other motor vehicle	
2017-Mar-24, Fri,10:41	Snow	Other	P.D. only	Packed snow	West	Reversing	Pick-up truck	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Oct-12, Thu,15:26	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: CHURCHILL AVE @ DANFORTH AVE

Traffic Control: Stop sign **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Mar-21, Wed,11:46	Clear	Sideswipe	P.D. only	Dry	South	Merging	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: CHURCHILL AVE @ RICHMOND RD

Traffic Control: Traffic signal **Total Collisions:** 25

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Jan-04, Mon,12:08	Clear	Rear end	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Jun-02, Thu,14:22	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Pedestrian	1
2016-Jun-17, Fri,05:29	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Aug-07, Sun,12:12	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2016-Aug-13, Sat,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	North	Unknown	Unknown	Unattended vehicle	0
2016-Dec-09, Fri,08:40	Clear	Rear end	P.D. only	Ice	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Dec-31, Sat,12:01	Snow	SMV other	Non-fatal injury	Loose snow	East	Turning left	Automobile, station wagon	Pedestrian	1
2017-Jan-28, Sat,15:02	Snow	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	1
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-06, Wed,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	0
2017-Sep-26, Tue,19:08	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Feb-09, Fri,12:45	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Mar-12, Mon,10:21	Clear	Turning movement	P.D. only	Dry	North	Stopped	Pick-up truck	Other motor vehicle	0
					North	Turning right	Truck - tractor	Other	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: CHURCHILL AVE @ RICHMOND RD

Traffic Control: Traffic signal **Total Collisions:** 25

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Jun-09, Sat,10:48	Clear	Angle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Sep-11, Tue,18:51	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Oct-27, Sat,21:39	Snow	SMV other	Non-fatal injury	Wet	West	Turning left	Passenger van	Pedestrian	2
2018-Nov-06, Tue,13:25	Rain	Rear end	Non-fatal injury	Wet	East	Going ahead	Truck - closed	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-17, Mon,10:39	Clear	Sideswipe	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Truck - open	Other motor vehicle	
2019-Jan-31, Thu,07:25	Clear	Turning movement	P.D. only	Packed snow	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-20, Wed,16:55	Clear	Rear end	P.D. only	Dry	West	Going ahead	Unknown	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jul-12, Fri,21:01	Clear	Sideswipe	P.D. only	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-09, Mon,14:41	Rain	Turning movement	Non-fatal injury	Wet	South	Overtaking	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2020-Jan-15, Wed,13:10	Clear	Sideswipe	P.D. only	Wet	North	Overtaking	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-May-17, Sun,17:18	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2020-Sep-26, Sat,17:07	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Delivery van	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: CHURCHILL AVE @ RICHMOND RD

Traffic Control: Traffic signal **Total Collisions:** 25

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2020-Dec-13, Sun,07:26	Clear	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: DANFORTH AVE @ ROOSEVELT AVE

Traffic Control: Stop sign **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Aug-12, Sat,14:08	Clear	Other	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: DANFORTH AVE btwn CHURCHILL AVE N & ROOSEVELT AVE

Traffic Control: No control **Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-May-12, Thu,15:51	Clear	Angle	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	
2018-Dec-21, Fri,10:00	Clear	Angle	P.D. only	Dry	South	Reversing	Unknown	Other motor vehicle	0
					West	Going ahead	Passenger van	Other motor vehicle	
2019-Feb-24, Sun,12:00	Rain	SMV unattended vehicle	P.D. only	Wet	West	Unknown	Unknown	Unattended vehicle	0
2019-Sep-13, Fri,11:30	Clear	Other	P.D. only	Dry	East	Reversing	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Mar-03, Tue,00:00	Rain	SMV unattended vehicle	P.D. only	Wet	Unknown	Unknown	Unknown	Unattended vehicle	0

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 **To:** December 31, 2020

Location: ROOSEVELT AVE @ RICHMOND RD

Traffic Control: Traffic signal **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Apr-09, Sat,10:57	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-02, Tue,12:14	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Passenger van	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-03, Thu,14:19	Snow	Rear end	Non-fatal injury	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Jan-03, Thu,15:48	Snow	Rear end	P.D. only	Slush	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Jul-26, Fri,07:45	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Sep-17, Tue,13:51	Clear	Sideswipe	P.D. only	Dry	East	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Pick-up truck	Other motor vehicle	
2020-Jan-06, Mon,10:55	Snow	Rear end	P.D. only	Slush	East	Unknown	Unknown	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2020-Jul-22, Wed,08:44	Clear	Other	P.D. only	Dry	East	Reversing	Unknown	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	

APPENDIX E: TRANS SNAPSHOTS, 2011 AND 2031 HORIZON YEARS

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Richmond Road and Churchill Ave

2011 Model - Basecase

N/A

User Initials: KN
Plot Prepared: July 4, 2022
EMME Scenario: 21713

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

Distance (m)

50 100 150 200 250

N

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Richmond Rd and Churchill Ave

2031 Model - Basecase

N/A

User Initials: KN
Plot Prepared: July 4, 2022
EMME Scenario: 21715

TRANS

Legend

AM Peak Hour Total Traffic Volume

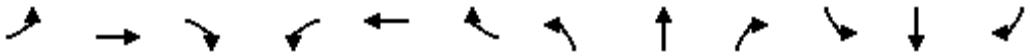
1000 2000 3000 4000 5000

N

Distance (m)

50 100 150 200 250

APPENDIX F: EXISTING (2022) SYNCHRO ANALYSIS



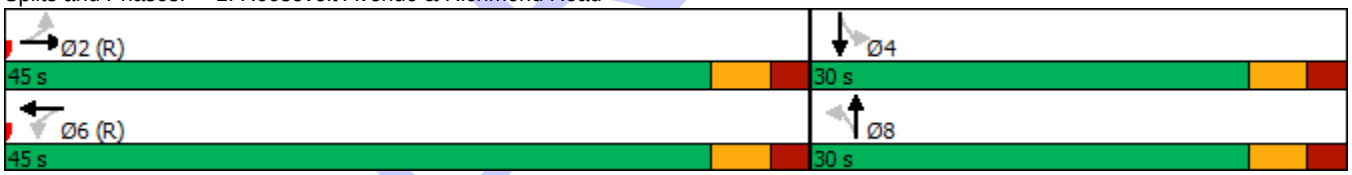
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	633	10	14	290	19	26	10	32	32	12	7
Future Volume (vph)	3	633	10	14	290	19	26	10	32	32	12	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	4.0	3.7	3.7	4.5	3.7	3.7	4.5	3.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.992			0.936			0.981	
Flt Protected					0.998			0.981			0.969	
Satd. Flow (prot)	0	1676	0	0	1687	0	0	1812	0	0	1987	0
Flt Permitted		0.999			0.963			0.896			0.824	
Satd. Flow (perm)	0	1675	0	0	1628	0	0	1655	0	0	1689	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			6			36			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		154.9			294.4			54.7			103.0	
Travel Time (s)		11.2			21.2			3.9			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	7%	5%	0%	8%	10%	3%	0%	0%	0%
Parking (#/hr)		0			0							
Adj. Flow (vph)	3	703	11	16	322	21	29	11	36	36	13	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	717	0	0	359	0	0	76	0	0	57	0
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)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	30.6	30.6		30.6	30.6		30.0	30.0		30.0	30.0	
Total Split (s)	45.0	45.0		45.0	45.0		30.0	30.0		30.0	30.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	39.4	39.4		39.4	39.4		24.4	24.4		24.4	24.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.6			5.6			5.6			5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		39.4			39.4			24.4			24.4	
Actuated g/C Ratio		0.53			0.53			0.33			0.33	
v/c Ratio		0.81			0.42			0.14			0.10	
Control Delay		24.3			12.5			11.7			16.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		24.3			12.5			11.7			16.4	

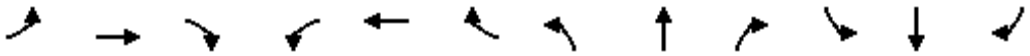
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			B			B			B	
Approach Delay		24.3			12.5			11.7			16.4	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		78.2			28.2			3.9			4.8	
Queue Length 95th (m)		#144.0			46.8			12.4			12.3	
Internal Link Dist (m)		130.9			270.4			30.7			79.0	
Turn Bay Length (m)												
Base Capacity (vph)		880			858			562			554	
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		0.81			0.42			0.14			0.10	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 27 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 48.9% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Roosevelt Avenue & Richmond Road



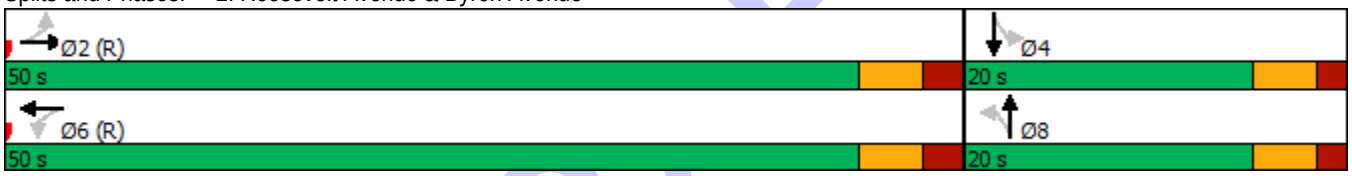


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	243	8	12	145	28	3	29	14	26	19	12
Future Volume (vph)	35	243	8	12	145	28	3	29	14	26	19	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	4.1	3.7	3.7	4.5	3.7	3.7	4.8	3.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.980			0.958			0.972	
Flt Protected		0.994			0.997			0.997			0.978	
Satd. Flow (prot)	0	1902	0	0	1903	0	0	1912	0	0	1978	0
Flt Permitted		0.949			0.977			0.987			0.865	
Satd. Flow (perm)	0	1816	0	0	1865	0	0	1893	0	0	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			25			16			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		113.7			54.4			135.0			20.2	
Travel Time (s)		8.2			3.9			9.7			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	3%	4%	0%	7%	0%	4%	5%	0%
Adj. Flow (vph)	39	270	9	13	161	31	3	32	16	29	21	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	318	0	0	205	0	0	51	0	0	63	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	23.5	23.5		23.5	23.5		20.0	20.0		20.0	20.0	
Total Split (s)	50.0	50.0		50.0	50.0		20.0	20.0		20.0	20.0	
Total Split (%)	71.4%	71.4%		71.4%	71.4%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	44.5	44.5		44.5	44.5		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		44.5			44.5			15.0			15.0	
Actuated g/C Ratio		0.64			0.64			0.21			0.21	
v/c Ratio		0.28			0.17			0.12			0.16	
Control Delay		6.3			5.0			17.7			20.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.3			5.0			17.7			20.0	
LOS		A			A			B			C	
Approach Delay		6.3			5.0			17.7			20.0	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		15.7			8.2			3.7			5.3	
Queue Length 95th (m)		26.2			15.4			11.6			14.3	
Internal Link Dist (m)		89.7			30.4			111.0			0.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)												
Base Capacity (vph)		1155			1194			418			385	
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		0.28			0.17			0.12			0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 42.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Roosevelt Avenue & Byron Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	262	390	29	43	183	19	24	273	83	21	319	135
Future Volume (vph)	262	390	29	43	183	19	24	273	83	21	319	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	4.0	3.7	3.3	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	33.0		0.0	27.0		0.0	0.0		25.0	0.0		35.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.986				0.850			0.850
Flt Protected	0.950			0.950				0.996			0.997	
Satd. Flow (prot)	1711	1911	0	1662	1832	0	0	1814	1601	0	1841	1570
Flt Permitted	0.493			0.496				0.800			0.947	
Satd. Flow (perm)	888	1911	0	868	1832	0	0	1457	1601	0	1748	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			7				180			180
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		294.4			106.1			75.8			111.4	
Travel Time (s)		21.2			7.6			5.5			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	0%	5%	7%	5%	0%	6%	2%	5%	4%	4%
Adj. Flow (vph)	291	433	32	48	203	21	27	303	92	23	354	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	291	465	0	48	224	0	0	330	92	0	377	150
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.1	31.1		31.0	31.0		24.2	24.2	24.2	24.2	24.2	24.2
Total Split (s)	14.0	40.0		31.0	31.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	17.5%	50.0%		38.8%	38.8%		37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	7.9	33.9		24.9	24.9		23.8	23.8	23.8	23.8	23.8	23.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0		0	0		0	0	0	0	0	0
Act Effct Green (s)	45.5	45.5		29.4	29.4			22.2	22.2		22.2	22.2
Actuated g/C Ratio	0.57	0.57		0.37	0.37			0.28	0.28		0.28	0.28
v/c Ratio	0.48	0.43		0.15	0.33			0.81	0.16		0.78	0.27
Control Delay	13.5	12.4		21.2	21.1			31.1	0.5		37.4	3.2

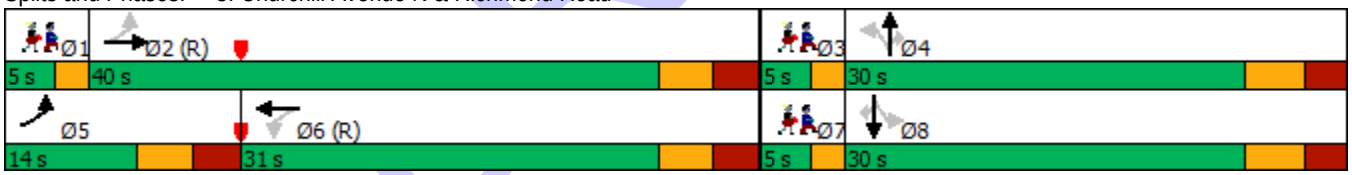
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (m)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	1.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	13.5	12.4		21.2	21.1			31.1	0.5		37.4	3.2
LOS	B	B		C	C			C	A		D	A
Approach Delay		12.8			21.1			24.4			27.7	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	21.5	37.2		5.2	24.9			24.5	0.0		52.0	0.0
Queue Length 95th (m)	42.7	69.3		13.3	43.9			30.5	0.0		73.0	7.7
Internal Link Dist (m)		270.4			82.1			51.8			87.4	
Turn Bay Length (m)	33.0			27.0					25.0			35.0
Base Capacity (vph)	607	1088		318	677			457	626		549	616
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.48	0.43		0.15	0.33			0.72	0.15		0.69	0.24

Intersection Summary

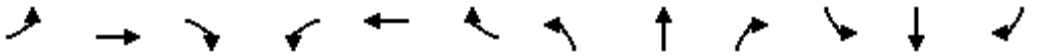
Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 52 (65%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 20.4 Intersection LOS: C
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Churchill Avenue N & Richmond Road



Lane Group	Ø1	Ø3	Ø7
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

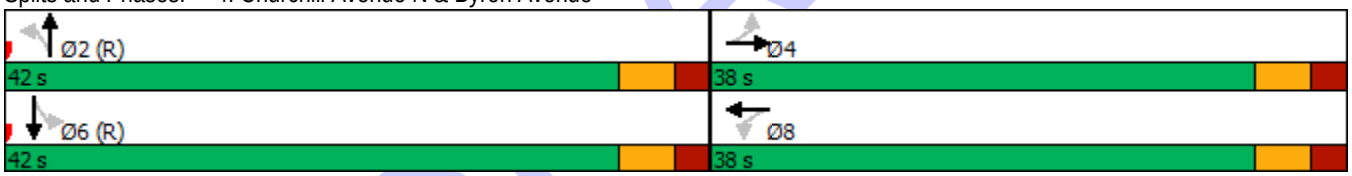


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	170	57	51	129	47	26	326	69	34	309	30
Future Volume (vph)	56	170	57	51	129	47	26	326	69	34	309	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.0	3.7	3.0	4.0	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	18.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.972			0.974			0.987	
Flt Protected		0.990			0.989		0.950			0.950		
Satd. Flow (prot)	0	1825	0	0	1819	0	1560	1853	0	1685	1869	0
Flt Permitted		0.889			0.869		0.449			0.389		
Satd. Flow (perm)	0	1639	0	0	1598	0	737	1853	0	690	1869	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			20			18			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		222.5			63.6			184.9			45.3	
Travel Time (s)		16.0			4.6			13.3			3.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	1%	0%	0%	2%	2%	8%	5%	1%	0%	5%	3%
Adj. Flow (vph)	62	189	63	57	143	52	29	362	77	38	343	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	0	0	252	0	29	439	0	38	376	0
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)	30.6	30.6		30.6	30.6		26.4	26.4		26.4	26.4	
Total Split (s)	38.0	38.0		38.0	38.0		42.0	42.0		42.0	42.0	
Total Split (%)	47.5%	47.5%		47.5%	47.5%		52.5%	52.5%		52.5%	52.5%	
Maximum Green (s)	32.4	32.4		32.4	32.4		36.6	36.6		36.6	36.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.6			5.6		5.4	5.4		5.4	5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		32.4			32.4		36.6	36.6		36.6	36.6	
Actuated g/C Ratio		0.40			0.40		0.46	0.46		0.46	0.46	
v/c Ratio		0.47			0.38		0.09	0.51		0.12	0.44	
Control Delay		19.1			17.5		13.2	17.3		4.8	5.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.2	
Total Delay		19.1			17.5		13.2	17.3		4.8	5.3	
LOS		B			B		B	B		A	A	
Approach Delay		19.1			17.5			17.1			5.3	
Approach LOS		B			B			B			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		31.7			23.9		2.4	43.3		1.0	9.7	
Queue Length 95th (m)		53.4			41.7		7.0	68.2		m2.2	18.2	
Internal Link Dist (m)		198.5			39.6			160.9			21.3	
Turn Bay Length (m)							15.0			18.0		
Base Capacity (vph)		675			659		337	857		315	859	
Starvation Cap Reductn		0			0		0	0		0	97	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.47			0.38		0.09	0.51		0.12	0.49	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 57.4%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Churchill Avenue N & Byron Avenue



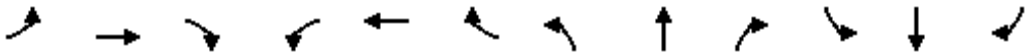
Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	19	49	43	12	24
Future Vol, veh/h	33	19	49	43	12	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	5	0	0	5
Mvmt Flow	37	21	54	48	13	27

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	131	78	0	0	102	0
Stage 1	78	-	-	-	-	-
Stage 2	53	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	868	988	-	-	1503	-
Stage 1	950	-	-	-	-	-
Stage 2	975	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	860	988	-	-	1503	-
Mov Cap-2 Maneuver	860	-	-	-	-	-
Stage 1	950	-	-	-	-	-
Stage 2	966	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	2.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	903	1503	-
HCM Lane V/C Ratio	-	-	0.064	0.009	-
HCM Control Delay (s)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-



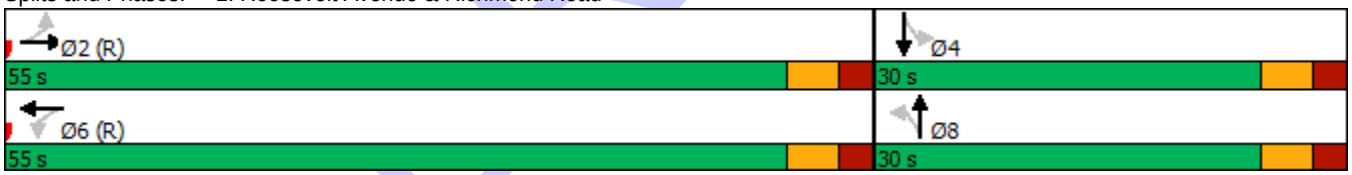
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	403	22	24	696	31	34	18	48	32	11	14
Future Volume (vph)	6	403	22	24	696	31	34	18	48	32	11	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.7	3.7	3.7	4.0	3.7	3.7	4.5	3.7	3.7	4.5	3.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.994			0.936			0.966	
Flt Protected		0.999			0.998			0.983			0.973	
Satd. Flow (prot)	0	1581	0	0	1663	0	0	1786	0	0	1830	0
Flt Permitted		0.989			0.977			0.891			0.819	
Satd. Flow (perm)	0	1565	0	0	1628	0	0	1619	0	0	1540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			4			53			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		154.9			294.4			54.7			103.0	
Travel Time (s)		11.2			21.2			3.9			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	3%	0%	2%	3%	0%	0%
Parking (#/hr)		0			0							
Adj. Flow (vph)	7	448	24	27	773	34	38	20	53	36	12	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	479	0	0	834	0	0	111	0	0	64	0
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)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	30.6	30.6		30.6	30.6		30.0	30.0		30.0	30.0	
Total Split (s)	55.0	55.0		55.0	55.0		30.0	30.0		30.0	30.0	
Total Split (%)	64.7%	64.7%		64.7%	64.7%		35.3%	35.3%		35.3%	35.3%	
Maximum Green (s)	49.4	49.4		49.4	49.4		24.4	24.4		24.4	24.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.6			5.6			5.6			5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		49.4			49.4			24.4			24.4	
Actuated g/C Ratio		0.58			0.58			0.29			0.29	
v/c Ratio		0.53			0.88			0.22			0.14	
Control Delay		13.2			28.3			14.4			19.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.2			28.3			14.4			19.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			B			B	
Approach Delay		13.2			28.3			14.4			19.0	
Approach LOS		B			C			B			B	
Queue Length 50th (m)		42.7			106.3			6.9			5.7	
Queue Length 95th (m)		67.5			#190.3			18.9			14.9	
Internal Link Dist (m)		130.9			270.4			30.7			79.0	
Turn Bay Length (m)												
Base Capacity (vph)		911			947			502			453	
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		0.53			0.88			0.22			0.14	

Intersection Summary

Area Type: Other
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 27 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 22.0 Intersection LOS: C
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Roosevelt Avenue & Richmond Road

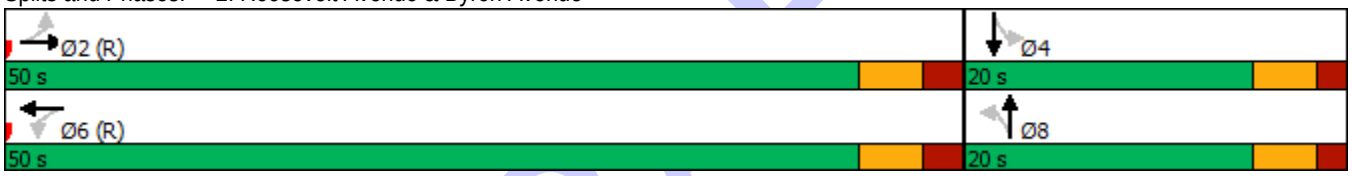


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	158	7	19	320	46	5	21	13	31	20	31
Future Volume (vph)	13	158	7	19	320	46	5	21	13	31	20	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.7	3.7	3.7	4.1	3.7	3.7	4.5	3.7	3.7	4.8	3.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984			0.956			0.949	
Flt Protected		0.996			0.998			0.993			0.981	
Satd. Flow (prot)	0	1788	0	0	1861	0	0	1880	0	0	1878	0
Flt Permitted		0.967			0.983			0.964			0.883	
Satd. Flow (perm)	0	1736	0	0	1833	0	0	1825	0	0	1690	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			19			14			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		113.7			54.4			135.0			20.2	
Travel Time (s)		8.2			3.9			9.7			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	14	176	8	21	356	51	6	23	14	34	22	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	198	0	0	428	0	0	43	0	0	90	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	23.5	23.5		23.5	23.5		20.0	20.0		20.0	20.0	
Total Split (s)	50.0	50.0		50.0	50.0		20.0	20.0		20.0	20.0	
Total Split (%)	71.4%	71.4%		71.4%	71.4%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	44.5	44.5		44.5	44.5		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		44.5			44.5			15.0			15.0	
Actuated g/C Ratio		0.64			0.64			0.21			0.21	
v/c Ratio		0.18			0.37			0.11			0.23	
Control Delay		5.6			6.8			17.5			17.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.6			6.8			17.5			17.3	
LOS		A			A			B			B	
Approach Delay		5.6			6.8			17.5			17.3	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		8.9			21.7			3.1			6.0	
Queue Length 95th (m)		16.3			35.7			10.3			16.8	
Internal Link Dist (m)		89.7			30.4			111.0			0.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)												
Base Capacity (vph)		1105			1172			402			388	
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		0.18			0.37			0.11			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 46.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Roosevelt Avenue & Byron Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	298	46	128	451	31	27	263	76	19	257	280
Future Volume (vph)	157	298	46	128	451	31	27	263	76	19	257	280
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	4.0	3.7	3.3	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	33.0		0.0	27.0		0.0	0.0		25.0	0.0		35.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.990				0.850			0.850
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1589	1806	0	1637	1844	0	0	1757	1547	0	1721	1547
Flt Permitted	0.250			0.535				0.917			0.960	
Satd. Flow (perm)	418	1806	0	922	1844	0	0	1619	1547	0	1658	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			5				160			300
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		294.4			106.1			75.8			111.4	
Travel Time (s)		21.2			7.6			5.5			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	2%	1%	1%	0%	4%	3%	0%	11%	5%	0%
Adj. Flow (vph)	174	331	51	142	501	34	30	292	84	21	286	311
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	382	0	142	535	0	0	322	84	0	307	311
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.1	31.1		32.0	32.0		24.2	24.2	24.2	24.2	24.2	24.2
Total Split (s)	12.0	52.0		45.0	45.0		28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	13.3%	57.8%		50.0%	50.0%		31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	5.9	45.9		38.9	38.9		21.8	21.8	21.8	21.8	21.8	21.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0		0	0		0	0	0	0	0	0
Act Effct Green (s)	52.0	52.0		39.8	39.8			25.7	25.7		25.7	25.7
Actuated g/C Ratio	0.58	0.58		0.44	0.44			0.29	0.29		0.29	0.29
v/c Ratio	0.54	0.36		0.35	0.65			0.70	0.15		0.65	0.47
Control Delay	16.5	11.3		20.1	24.6			38.0	7.4		35.2	6.2

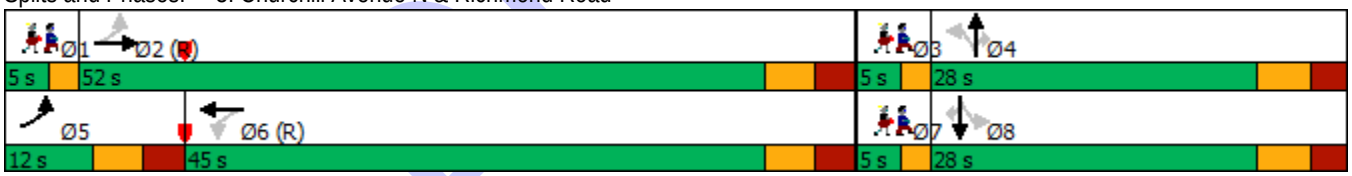
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (m)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	1.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.1	0.0			0.0	0.0		0.0	0.0
Total Delay	16.5	11.3		20.3	24.6			38.0	7.4		35.2	6.2
LOS	B	B		C	C			D	A		D	A
Approach Delay		12.9			23.7			31.7			20.6	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	13.7	32.5		16.0	71.0			54.7	2.6		45.5	1.4
Queue Length 95th (m)	23.8	50.6		30.7	106.2			m82.3	m9.9		72.4	19.3
Internal Link Dist (m)		270.4			82.1			51.8			87.4	
Turn Bay Length (m)	33.0			27.0					25.0			35.0
Base Capacity (vph)	321	1049		407	817			463	557		474	657
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	46		23	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.54	0.38		0.37	0.65			0.70	0.15		0.65	0.47

Intersection Summary

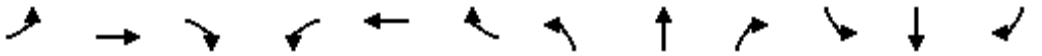
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 88.3% ICU Level of Service E
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Churchill Avenue N & Richmond Road



Lane Group	Ø1	Ø3	Ø7
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary



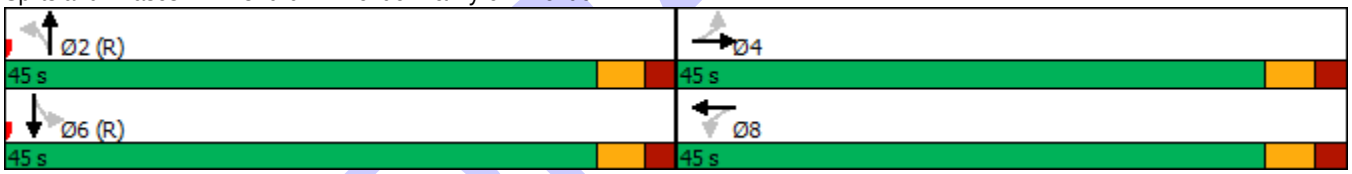
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	134	49	110	307	45	25	303	69	21	340	53
Future Volume (vph)	19	134	49	110	307	45	25	303	69	21	340	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.0	3.7	3.0	4.0	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	18.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.987			0.972			0.980	
Flt Protected		0.995			0.988		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1740	0	1565	1792	0	1565	1806	0
Flt Permitted		0.936			0.859		0.371			0.393		
Satd. Flow (perm)	0	1615	0	0	1513	0	611	1792	0	647	1806	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			8			16			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		222.5			63.6			184.9			45.3	
Travel Time (s)		16.0			4.6			13.3			3.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	149	54	122	341	50	28	337	77	23	378	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	224	0	0	513	0	28	414	0	23	437	0
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)	30.6	30.6		30.6	30.6		26.4	26.4		26.4	26.4	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	39.4	39.4		39.4	39.4		39.6	39.6		39.6	39.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.6			5.6		5.4	5.4		5.4	5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		39.4			39.4		39.6	39.6		39.6	39.6	
Actuated g/C Ratio		0.44			0.44		0.44	0.44		0.44	0.44	
v/c Ratio		0.31			0.77		0.10	0.52		0.08	0.55	
Control Delay		16.1			30.6		16.2	20.4		18.9	25.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	1.4	
Total Delay		16.1			30.6		16.2	20.4		18.9	27.1	
LOS		B			C		B	C		B	C	
Approach Delay		16.1			30.6			20.2			26.7	
Approach LOS		B			C			C			C	
Queue Length 50th (m)		21.6			71.9		2.8	48.3		2.8	56.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)		37.7			#115.6		8.0	74.6		m6.0	90.0	
Internal Link Dist (m)		198.5			39.6			160.9			21.3	
Turn Bay Length (m)							15.0			18.0		
Base Capacity (vph)		719			666		268	797		284	800	
Starvation Cap Reductn		0			0		0	0		0	189	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.31			0.77		0.10	0.52		0.08	0.72	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 24.7		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 4: Churchill Avenue N & Byron Avenue



Intersection	
Int Delay, s/veh	4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	57	43	37	14	43
Future Vol, veh/h	39	57	43	37	14	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	62	47	40	15	47

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	144	67	0	0	87	0
Stage 1	67	-	-	-	-	-
Stage 2	77	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	849	997	-	-	1509	-
Stage 1	956	-	-	-	-	-
Stage 2	946	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	841	997	-	-	1509	-
Mov Cap-2 Maneuver	841	-	-	-	-	-
Stage 1	956	-	-	-	-	-
Stage 2	937	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	927	1509	-
HCM Lane V/C Ratio	-	-	0.113	0.01	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

APPENDIX G: RESPONSE TO SCREENING AND SCOPING REPORT COMMENTS

The following email was received on September 12, 2022 regarding the Screening and Scoping Report submission. The responses in red font were prepared by the Consultant. All concerns were addressed in the subsequent Forecasting Report.

From: McMahon, Patrick <patrick.mcmahon@ottawa.ca>
Sent: Monday, September 12, 2022 7:59 AM
To: Andrey Kirillov <akirillov@castleglenn.ca>
Cc: Arthur Gordon <agordon@castleglenn.ca>; Jemmy Taing <jemmy@gsiproperties.ca>
Subject: RE: 424 Churchill Avenue North TIA Screening and Scoping Report

Hi Andrey,
Thank you for the submission, here are my comments:

- Section 2.1.2.2: Include the pedestrian and cycling crossing treatments, as applicable.
  Response: Section 2.1.2.2 now includes a discussion on pedestrian and cycling treatments at each intersection, or a lack thereof.
- Section 2.1.2.6: Consider including the locations of the stops for the identified routes on Exhibit 2-13 or another figure.
  Response: A new Exhibit 2-12 now includes locations of the 7 nearest bus stops and their corresponding bus routes.
- Section 2.1.3.1: Include the changes to Byron Avenue as part of the integrated road works project, see Ottawa.ca
  Response: Section 2.1.3.1 now includes a discussion on changes to pedestrian and cycling infrastructure along Byron Avenue. The changes will be considered in the MMLOS segment analysis.

Thank you and please proceed to the forecasting report.

Best regards,

Patrick McMahon
Project Manager, Infrastructure Approvals | GPRJ Approbation des demandes d'infrastructure
Development Review Branch | Dir Examen des projets d'aménagement
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
Tel |Tél. : 613-580- 2424 ext. | poste 23298
web | Site Web : www.ottawa.ca

APPENDIX H: TDM-SUPPORTIVE DESIGN AND INFRASTRUCTURE MEASURES

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	☒ Refer to site plan
	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)*	☒ Churchill entrance provides best access to rapid transit
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	☐ N/A
	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)*	☒ All spaces are secure
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ N/A
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ N/A
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ N/A

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☒
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐ N/A
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)	☒ visitor parking at the front of garage

APPENDIX I: PARKING GARAGE ONE-WAY RAMP STRATEGY

Appendix I: Parking Garage One-Way Ramp Strategy

I-1. Parking Garage Requirements

The proposed development calls for a two-level parking garage (with the upper level referred to as "B2" and the lower level as "B3") connected by a single lane ramp. The ramp is characterized by a down grade between "B2" and "B3" which transition from 16% over a 10m distance, then 10% over a 5m distance and then a level surface with the "B3" level over the remaining 5m length of the ramp. Access up and down the ramp would be controlled by traffic signals to minimize any chance of conflict between an entering and exiting vehicle.

A review of vehicle turning movements was undertaken on both levels of the parking garage to identify maneuverability constraints which may be evident. The analysis assumed that a conventional passenger vehicle as defined by Transportation Association of Canada (TAC) standards was assumed to represent the design vehicle that would circulate through the parking garage. This vehicle is 5.6m in length, has a wheel base of 3.2m, a width of 2m and a front overhang of 1.1m. The TAC standard passenger vehicle is intended to incorporate the requirements of compacts, subcompacts, all light vehicles, and all light delivery trucks (vans and pick ups).

I-2. Turning Movement Analysis

The attached design sheets (Sheets 1) illustrate the turning movements and swept paths of vehicles circulating into, and out of, the upper B2 level of the parking garage and the proximity to adjacent parking stalls.

- *Sheet 1*: illustrates a TAC standard passenger vehicle leaving and entering the "B2" parking level in a single continuous movement. The maneuvers illustrate one-directional access into, and out of, the ramp connecting the B2 level to the B3 level.

The attached design sheets (Sheets 2-thru-7) illustrate the turning movements and swept paths of vehicles circulating into, and out of, the lower B3 level of the parking garage and the proximity to adjacent parking stalls.

- *Sheet 2*: illustrates a TAC standard passenger vehicle leaving and entering the "B3" parking level in a single continuous movement. The drawing indicates a potential conflict with two vehicle stalls parked against the southern wall of the garage in the front of the ramp. The maneuvers cannot succeed as the turning vehicle would encroach into the parked ones.
- *Sheet 3*: illustrates a situation where a TAC standard passenger vehicle would be required to make a 3-point turn into and out of the "B3" level to avoid conflicts with the two vehicle stalls identified on Sheet 1. This maneuver is facilitated by the relatively flat surface along the 5m of the ramp that transitions onto the "B3" level.
- *Sheet 4*: illustrates a situation where a TAC standard passenger vehicle leaves and enters the "B3" parking level in a single continuous movement, but when the two stalls parked against the southern wall are dedicated for smaller vehicles. For the purpose of this exercise a Honda Civic with a length of 4.67m was assumed to be parked in the two critical parking stalls. Given the presence of these shorter vehicles in the critical parking stalls, the turning movement of the TAC standard passenger vehicle was found to succeed.

- *Sheet 5 and Sheet 6*: illustrates a smaller 5.23m long Chevrolet vehicle and 5.04m long Acura MDX respectively leaving and entering the "B3" parking level in a single continuous movement when the same sized vehicles are parked in the two critical spaces. This maneuver was determined to succeed provided the smaller same size vehicles are parked way to the back wall.
- *Sheet 7*: illustrates the movements within the B3 level originating from, and destined to the west side of the B3 level lot and indicates that all movements can be successfully navigated.

I-3. Turning Movements Assumptions

The following assumptions were incorporated in the vehicle turning analyses:

- The vehicle dimensions (which include length, width, wheel base, overhangs and track) were obtained from the Canadian Association of the Road Safety Professional database.
    - The Honda Civic characteristics illustrated on Sheet 3 represent a 2.0L vehicle intended to represent all vehicles less than 5m in length.
    - The "Chevrolet" characteristics illustrated on Sheet 4 were derived from a 2023 Chevrolet Traverse 4DR SUV which was selected to represent all vehicles of approximately 5.2m in length.
    - The Acura MDX characteristics illustrated on Sheet 5 were derived from a 2023 ACURA MDX 4 Door vehicle which was selected to represent all vehicles of approximately 5.0 m in length.
- The steering angles and lock-to-lock time used in the assessment of vehicle turning maneuvers were assumed to be the same as the TAC Passenger car as provided in the Transoft Solutions AutoTURN software. Therefore, the simulation provided does not guarantee that the actual vehicle would maneuver as illustrated.

I-4. One-Way Ramp Strategy

The 15 parking stalls on level B3 (bottom parking level) will be accessed by way of a one-way ramp. This in turn means that vehicles entering and leaving level B3 may conflict with each other while on the ramp.

A strategy to avoid potential vehicle conflicts was developed to ensure only one direction (inbound or outbound) has the right-of-way to enter the ramp. The traffic entering the ramp from either level (outbound traffic from B3 to B2; and inbound traffic from B2 to B3) will be controlled by way of a traffic signal located at each ramp entrance.

The default phase for each traffic signal is red, thus prohibiting entrance to the ramp unless one of the following conditions is met:

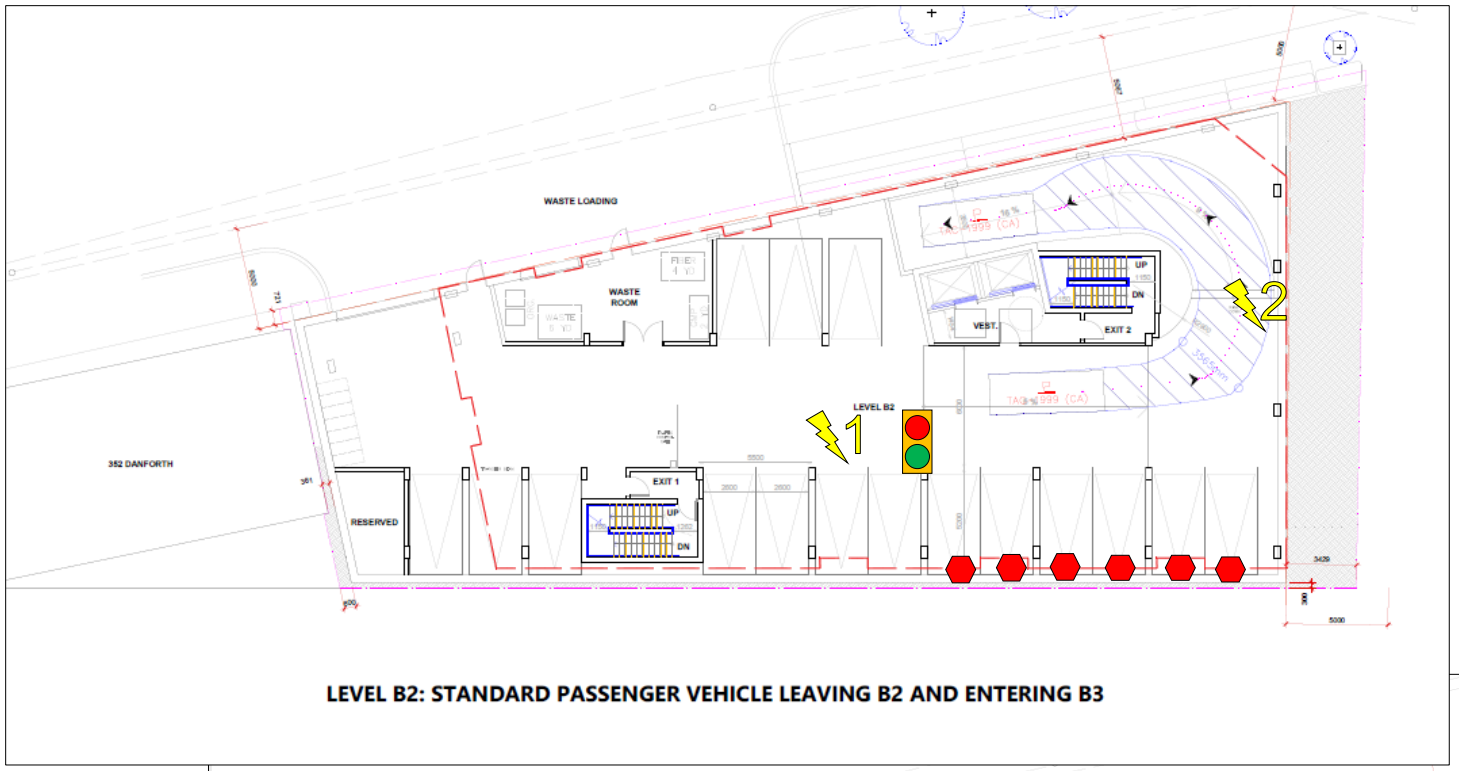
- *To permit outbound movements (from level B3 up the ramp):* Motion detector 3 (level B3 exit) detects motion, while motion detectors 1 and 2 (level B2 entrance and along the ramp) detect no motion.

- *To permit inbound movements (from level B2 down the ramp):* Motion detector 1 (level B2 entrance) detects motion, while motion detectors 2 and 3 (along the ramp and level B3 exit) detect no motion.

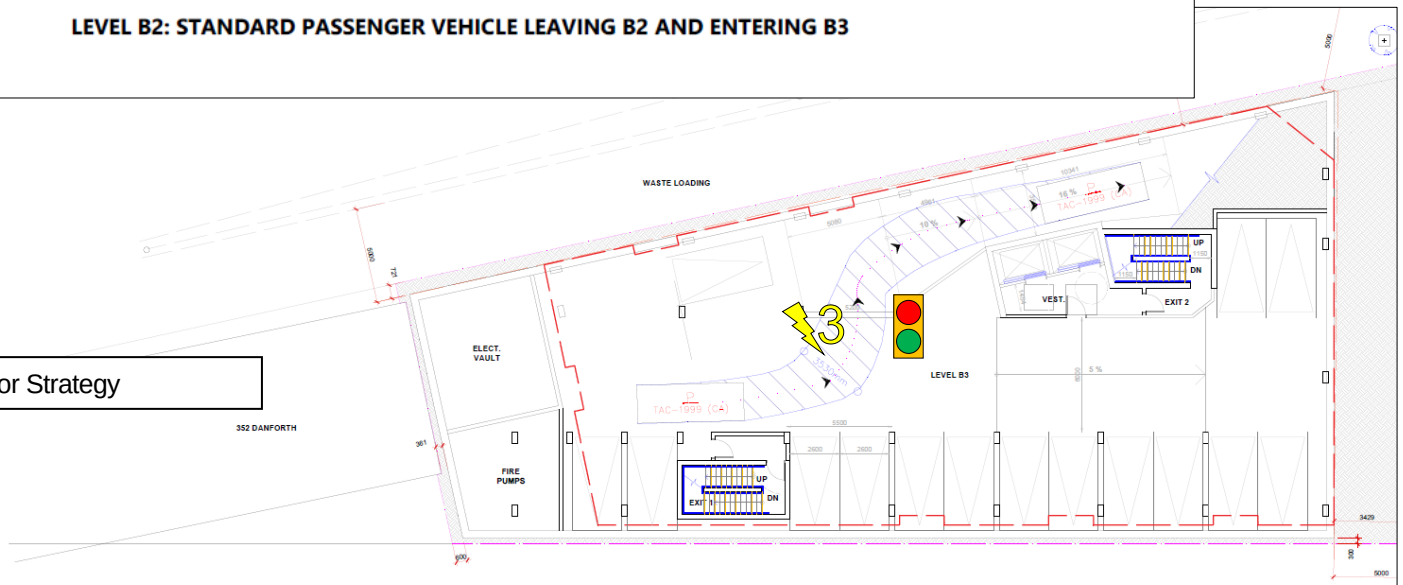
The 4 (four) parking stalls on Level B2 nearest to the ramp were found to also cause a potential conflict with vehicles leaving parking Level B3. A series of auxiliary parking lights is to be placed at each stall indicating whether movement in and out of the stall is permitted. The movement is to be prohibited if motion sensor 2 or 3 (along the ramp and level B3 exit) detects any motion. The default condition for the auxiliary parking light permits movement in and out of the stalls.

To supplement the traffic signals, blind spot mirrors are recommended to provide some view of traffic on the ramp to the traffic entering and leaving the ramp. Exact location of the mirrors is to be confirmed.

Exhibit 1 provide approximate locations for the traffic signal lights, auxiliary parking lights and motion sensors / detectors. Table 1 and Table 2 summarize signal configurations and conditions for permitting inbound or outbound movements from and to level B3.



LEVEL B2: STANDARD PASSENGER VEHICLE LEAVING B2 AND ENTERING B3



LEVEL B3: STANDARD PASSENGER VEHICLE LEAVING B3

Exhibit 1: Parking Signal and Detector Strategy

Table 1: Main Ramp Signal Phasing Configuration

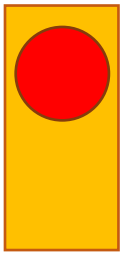
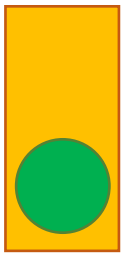
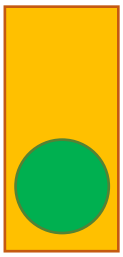
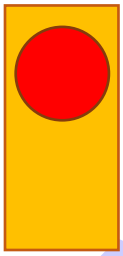
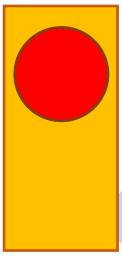
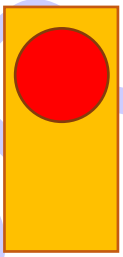
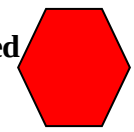
Traffic Signal Phase		Condition	Explanation
Level B2 (inbound)	**Level B3 (outbound)**		
"STOP" 	**"GO"** 	1 = no motion	Outbound movement permitting phase.
		2 = no motion	
		3 = motion	
"GO" 	**"STOP"** 	1 = motion	Inbound movement permitting phase
		2 = no motion	
		3 = no motion	
"STOP" 	**"STOP"** 	All other conditions	Default phase prohibits entry to the ramp unless either of the previous conditions is met

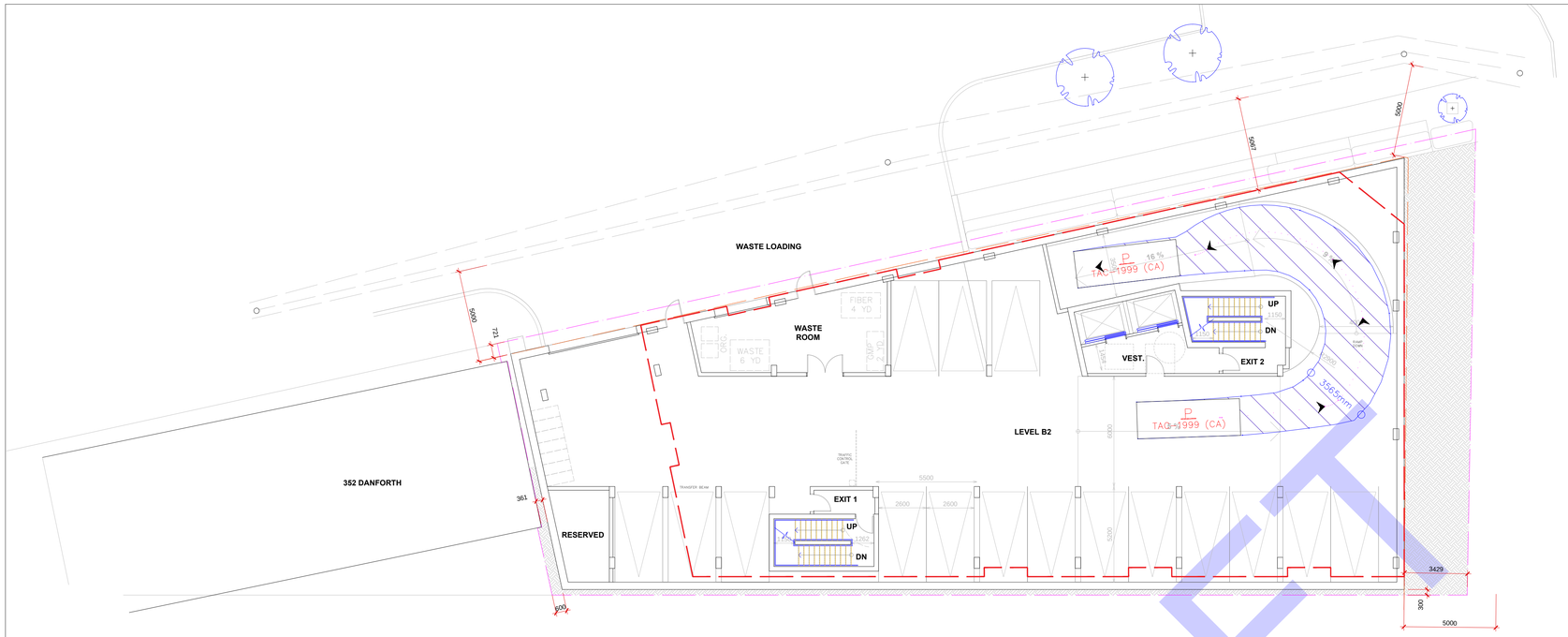
Table 2: Auxiliary Parking Signal Phasing Configuration

Auxiliary Parking Signal Phase	Condition	Explanation
Movement Prohibited 	when sensor 2 or 3 detects motion	Do not permit movement out of the stall if there is motion on the bottom floor or along the ramp
Movement Permitted 	All other conditions	Default condition permits movement out of the stall

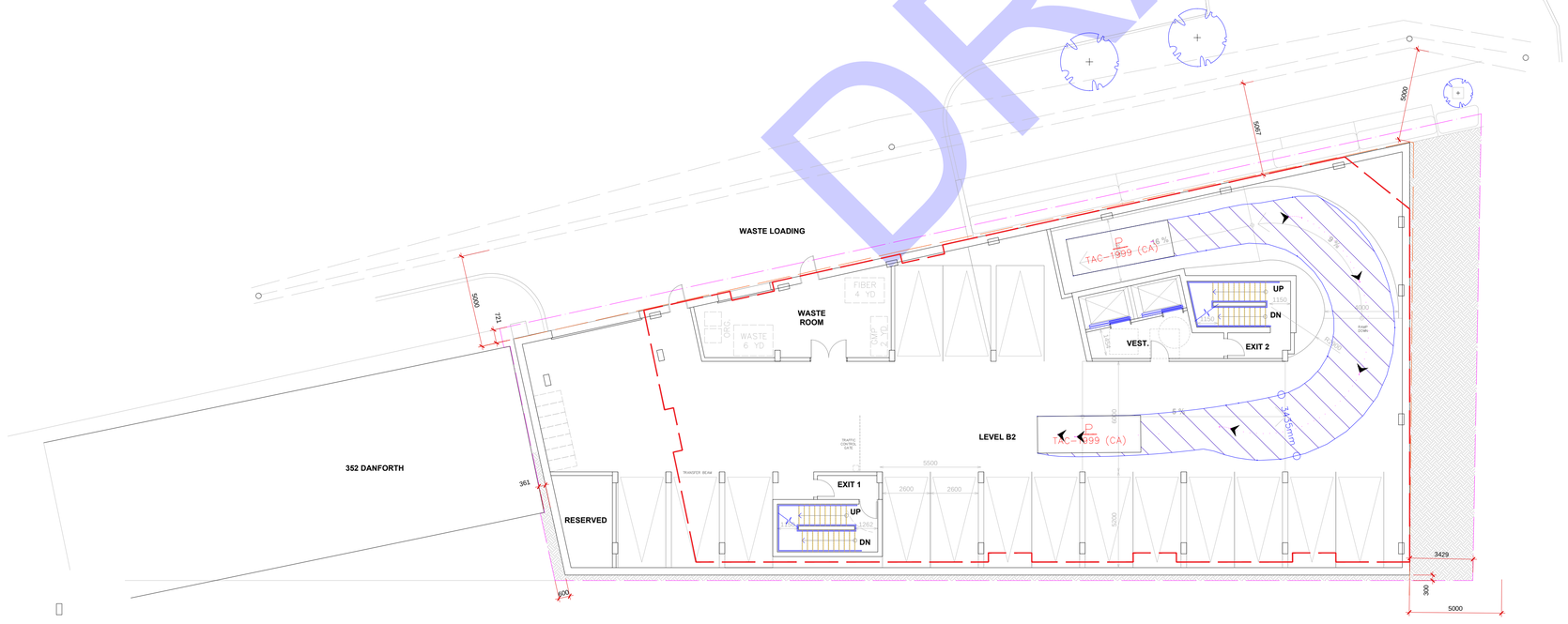
I-5. Conclusions and Recommendations

It was concluded from the above evaluation that:

- the two parking stalls nearest the "B3" ramp along the south wall of Level "B2" should be designated specifically for small vehicle parking only and not to exceed 4.7m in length;
- signage at the bottom of the Level "B3" ramp should be prominently displayed which indicates a 3 point-turn may be necessary to avoid parked vehicles and other obstacles;
- All leases, agreements with tenants should indicate that the two critical stalls are to be designated for small vehicles only not to exceed 4.7m in length;
- Given the design grade transition between the ramp segments, it is thought prudent that owners of vehicles characterized with low (less than 5") undercarriage clearances be cautioned that higher operational speeds on the ramps could well result in a "bottoming-out" effect and vehicle damage.
- To facilitate movement along a one-way ramp, a traffic signal solution activated upon detecting motion in conflicting direction should be implemented.
- Auxiliary parking lights permitting or prohibiting movement out of the 6 parking stalls on Level B2 nearest tot the ramp are recommended.
- Blind spot mirrors are recommended along the ramp. The exact location of the mirrors is to be confirmed.



LEVEL B2: STANDARD PASSENGER VEHICLE LEAVING B2 AND ENTERING B3



LEVEL B2: STANDARD PASSENGER VEHICLE LEAVING B3 AND ENTERING B2

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

TAC VEHICLE TURNING ON LEVEL B2

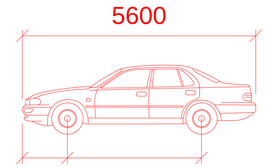
Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 1
Sheet 01	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

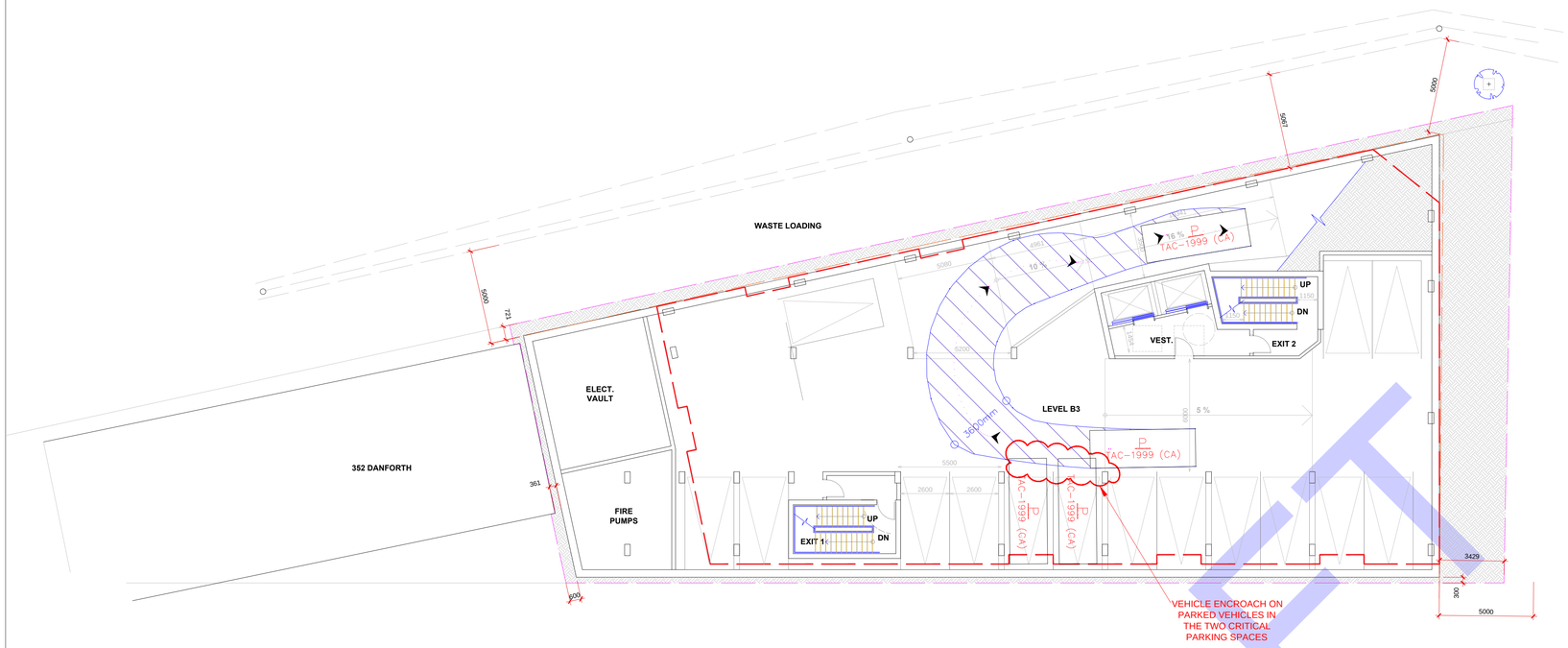
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

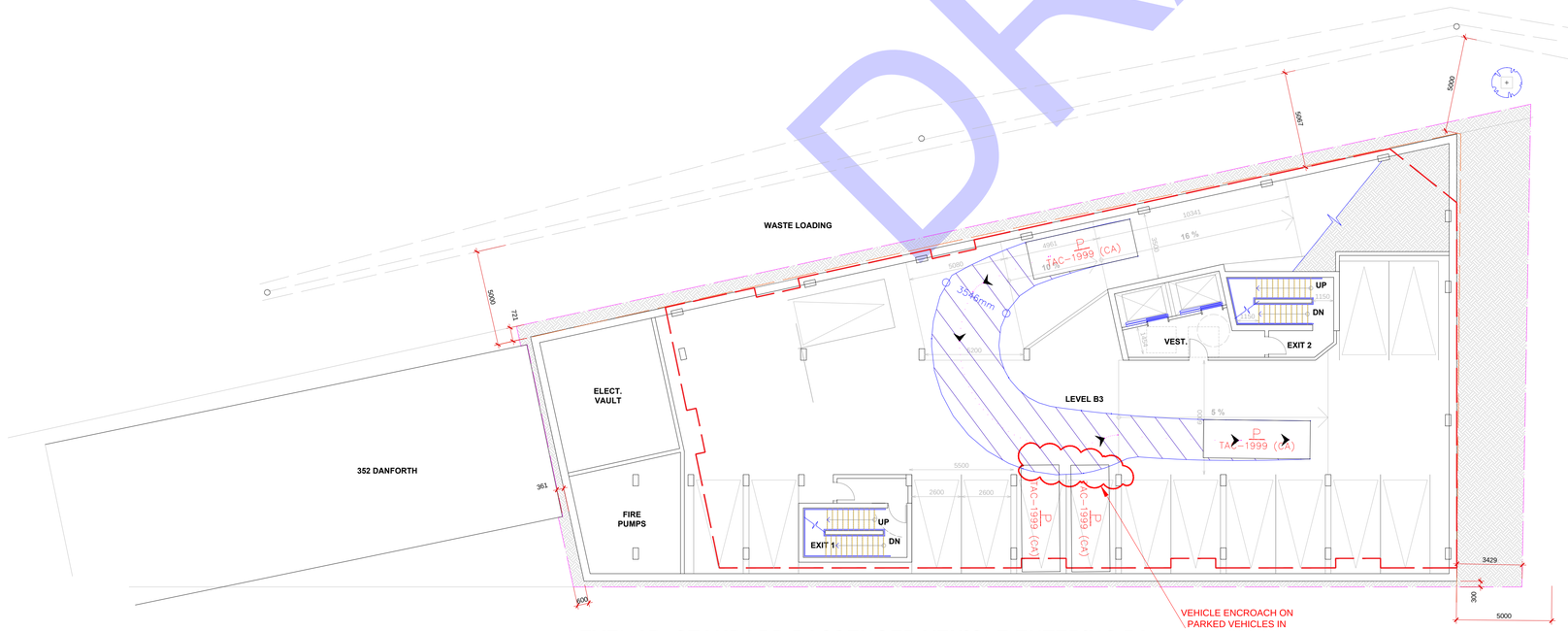
No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			



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



LEVEL 3B: STANDARD PASSENGER VEHICLE LEAVING B3



LEVEL 3B: STANDARD PASSENGER VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS
TAC PASSENGER CAR TURNING WHEN OTHER LONGER VEHICLES ARE PARKED IN CRITICAL SPACES

Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 2
Sheet 02	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
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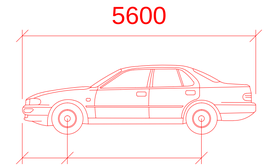
3			



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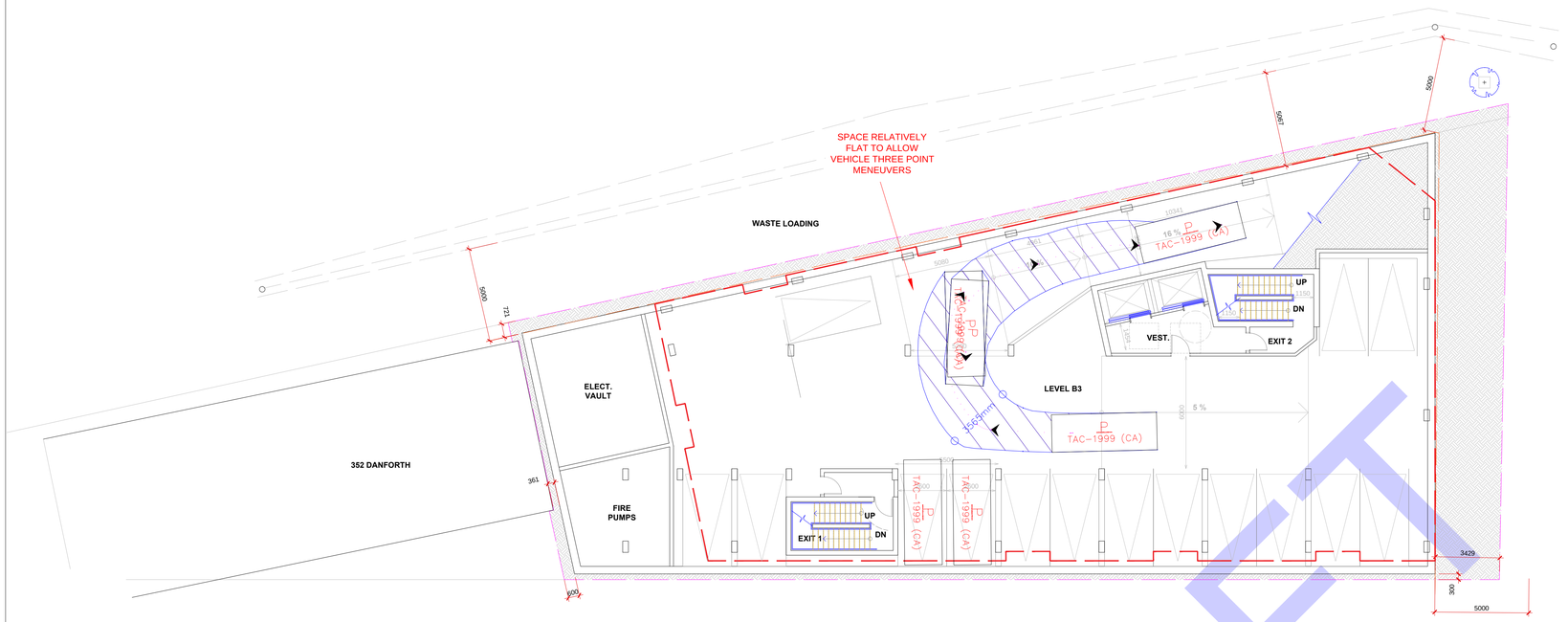
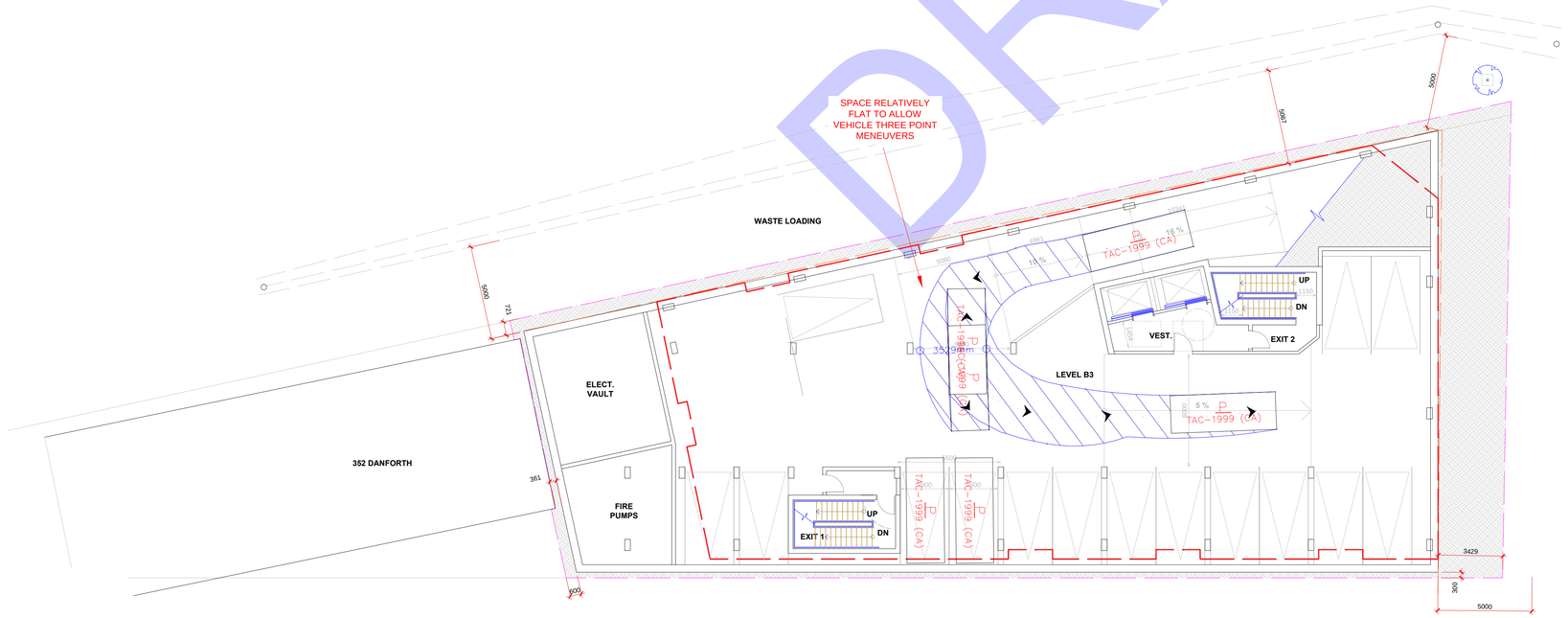
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



LEVEL B3: STANDARD PASSENGER VEHICLE LEAVING B3



LEVEL B3: STANDARD PASSENGER VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

TAC PASSENGER CAR MAKING 3 POINT TURN

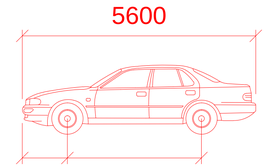
Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 3
Sheet 03	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

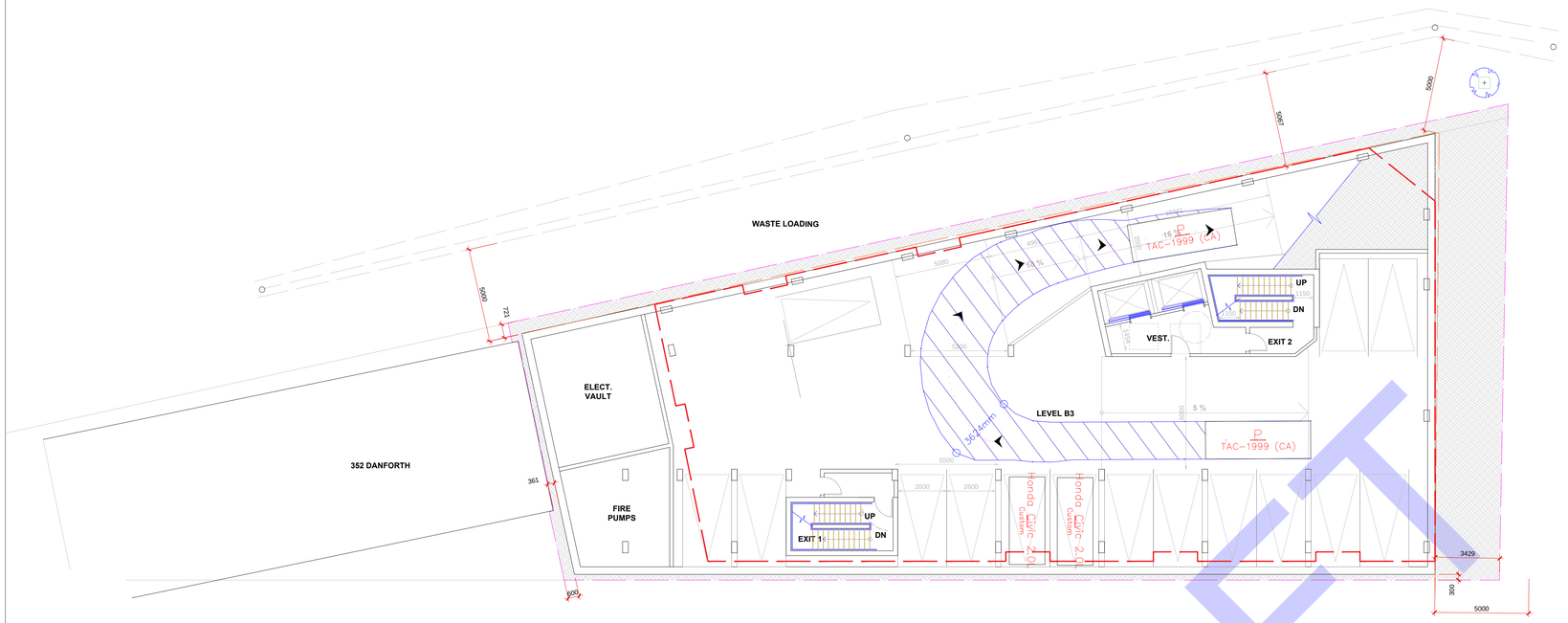
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

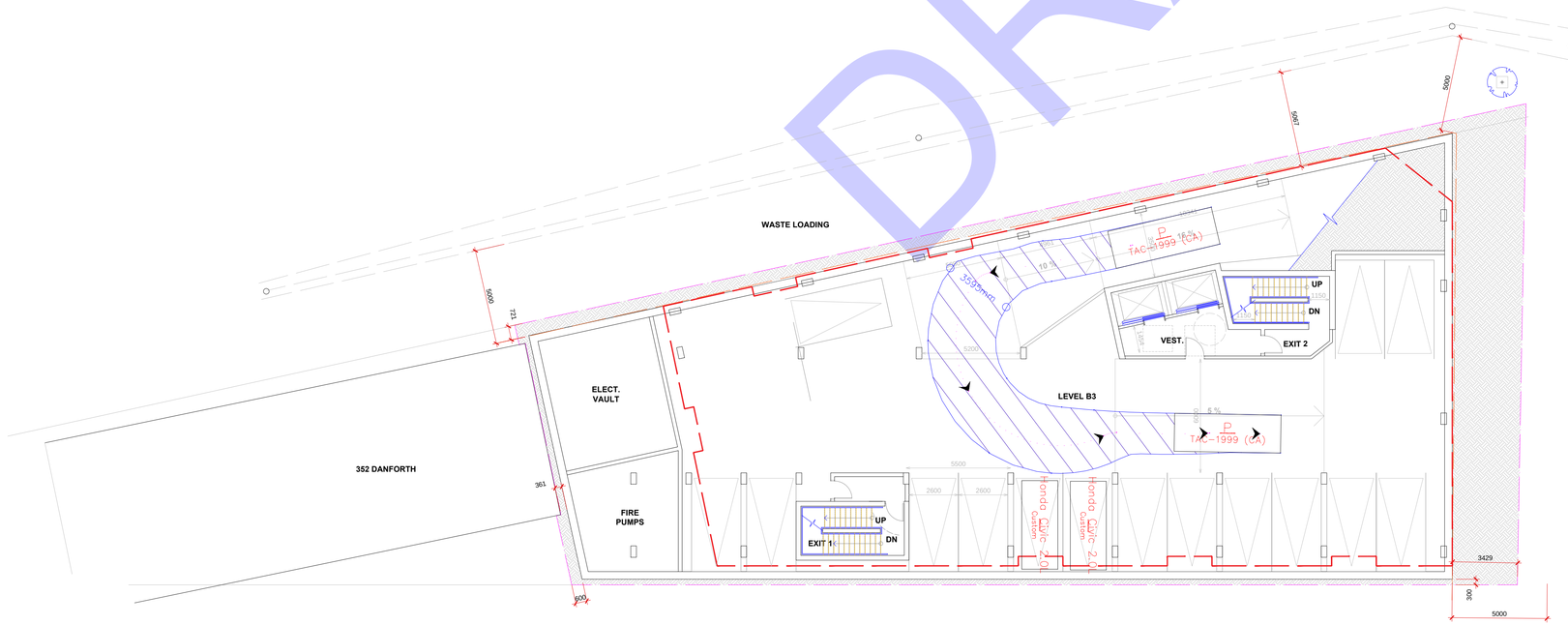
No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			



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



LEVEL B3: STANDARD PASSENGER VEHICLE LEAVING B3



LEVEL B3:STANDARD PASSENGER VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

TAC VEHICLE TURNING WITH SMALLER VEHICLES IN CRITICAL PARKING SPACES

Contract No.	Dwg. No. 4
Sheet 04	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

Castleglenn Consultants
Engineers, Project Managers & Planners

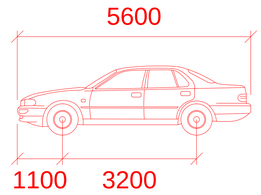
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

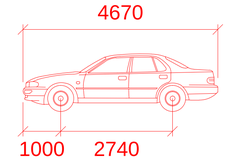
No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			

NOTES:

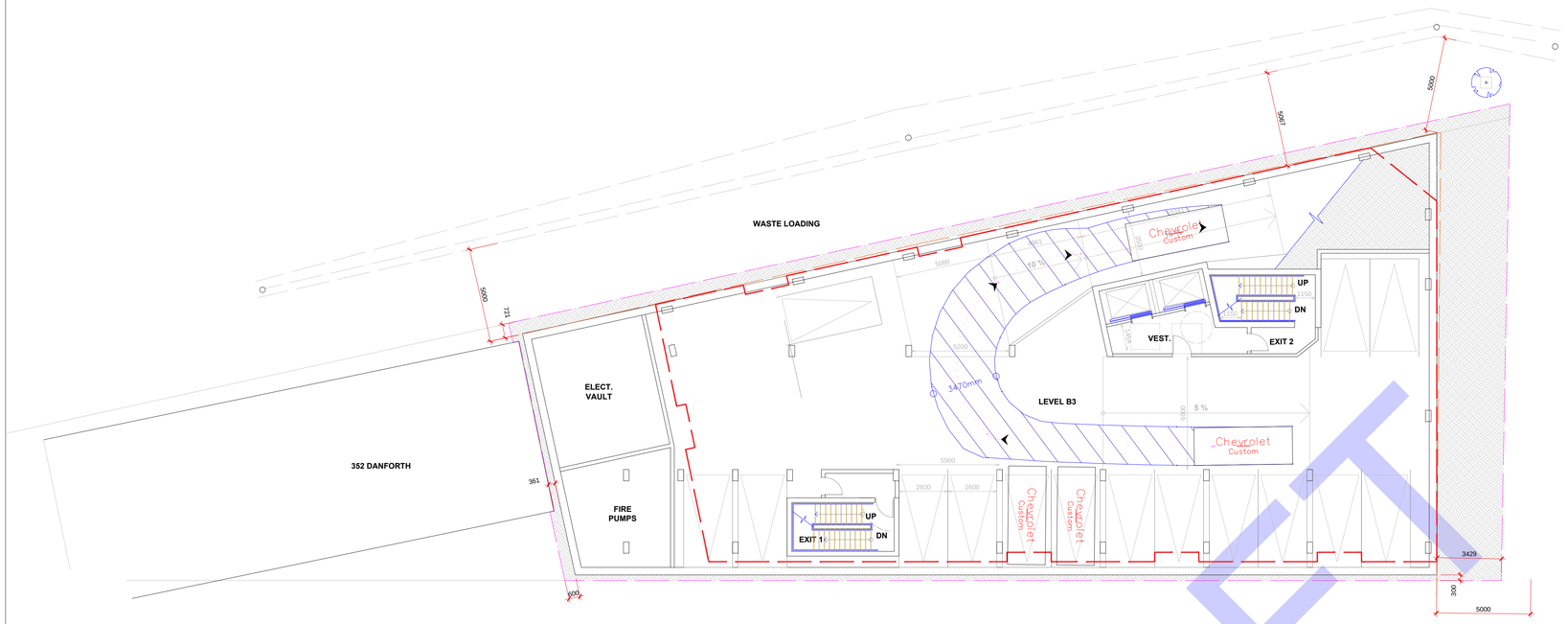
1. THE HONDA CIVIC DIMENSIONS (WHICH INCLUDE LENGTH, WIDTH, WHEELBASE, OVERHANGS AND TRACK) WERE OBTAINED FROM THE CANADIAN ASSOCIATION OF THE ROAD SAFETY PROFESSIONAL DATABASE. THE WIDTH DOES NOT INCLUDE SIDE MIRRORS



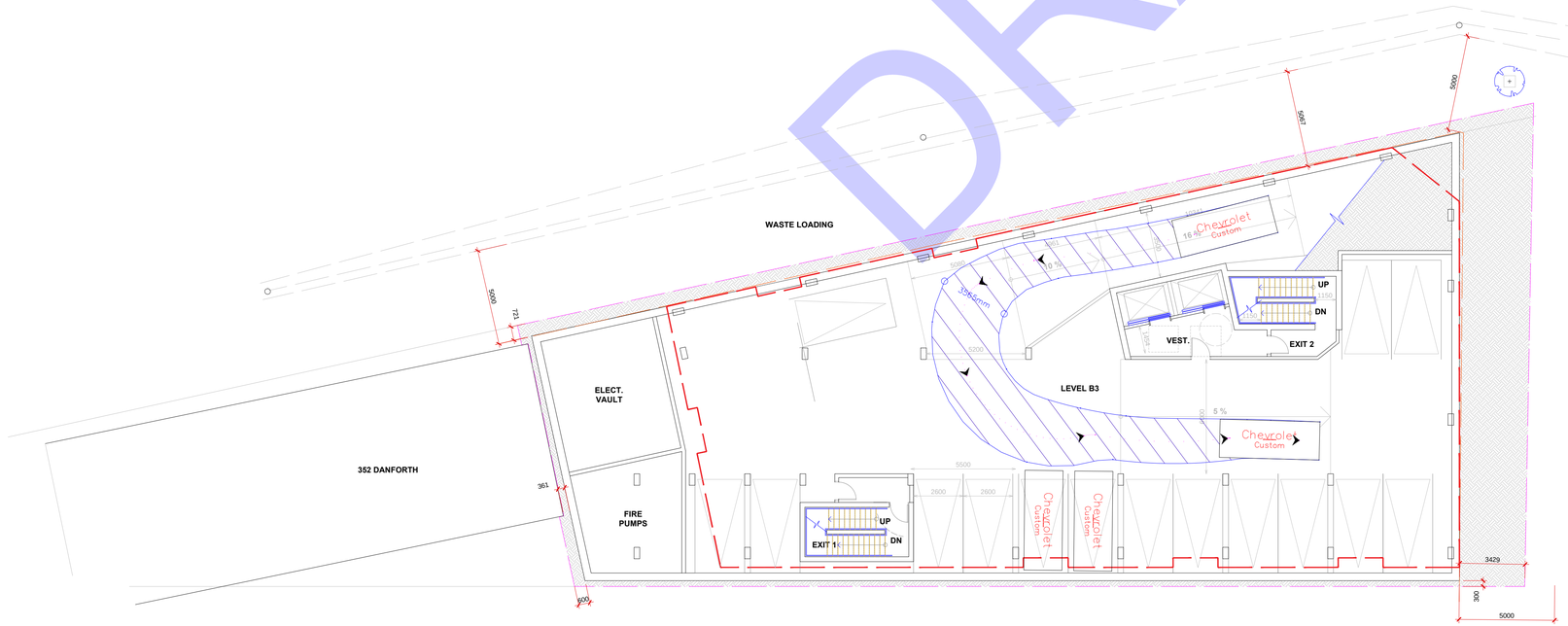
P	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



Honda Civic 2.0L	mm
Width	: 1900
Track	: 1580
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



LEVEL B3: 5.23m LONG CHEVROLET VEHICLE LEAVING B3



LEVEL B3: 5.23m LONG CHEVROLET VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

5.23m LONG VEHICLE TURNING MENEUVERS

Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 5
Sheet 05	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

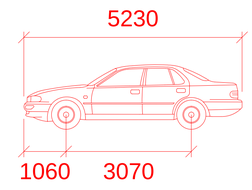
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			

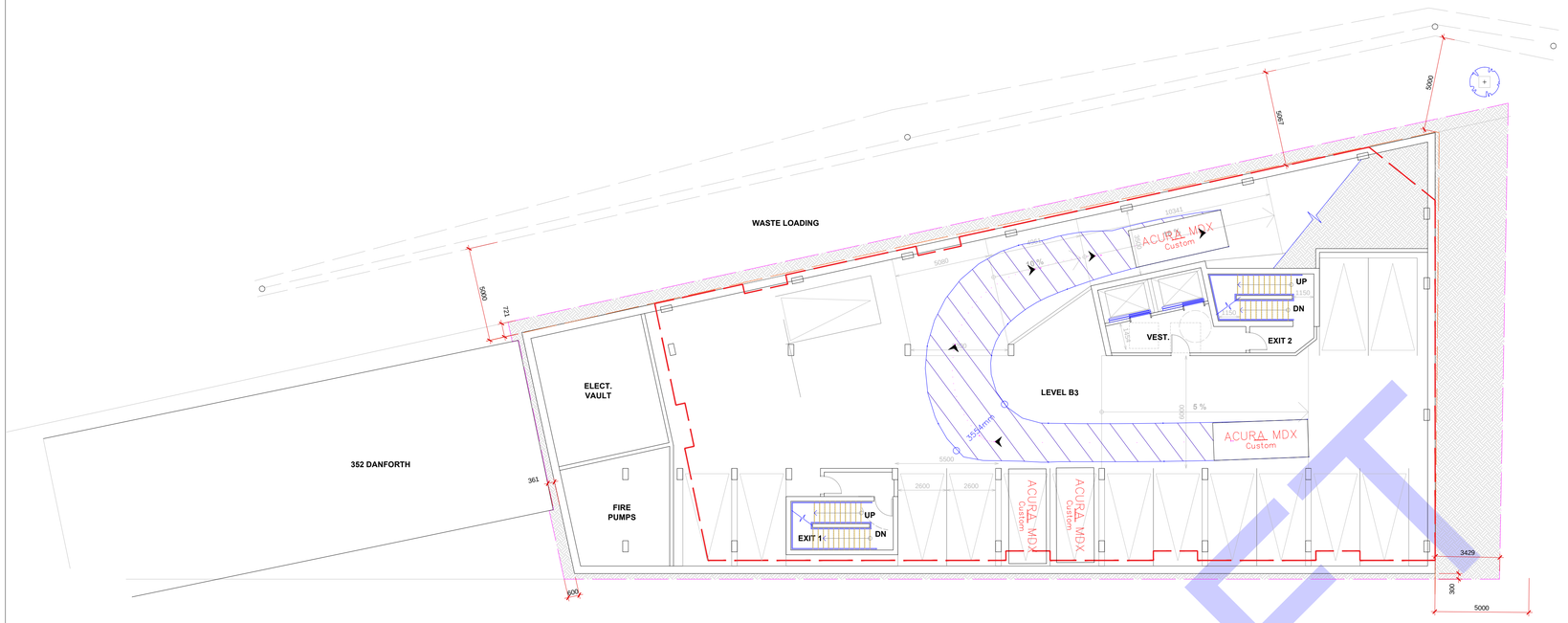
NOTES:

1. THE VEHICLE DIMENSIONS (WHICH INCLUDE LENGTH, WIDTH, WHEELBASE, OVERHANGS AND TRACK) WERE OBTAINED FROM THE CANADIAN ASSOCIATION OF THE ROAD SAFETY PROFESSIONAL DATABASE. THE WIDTH DOES NOT INCLUDE SIDE MIRRORS.

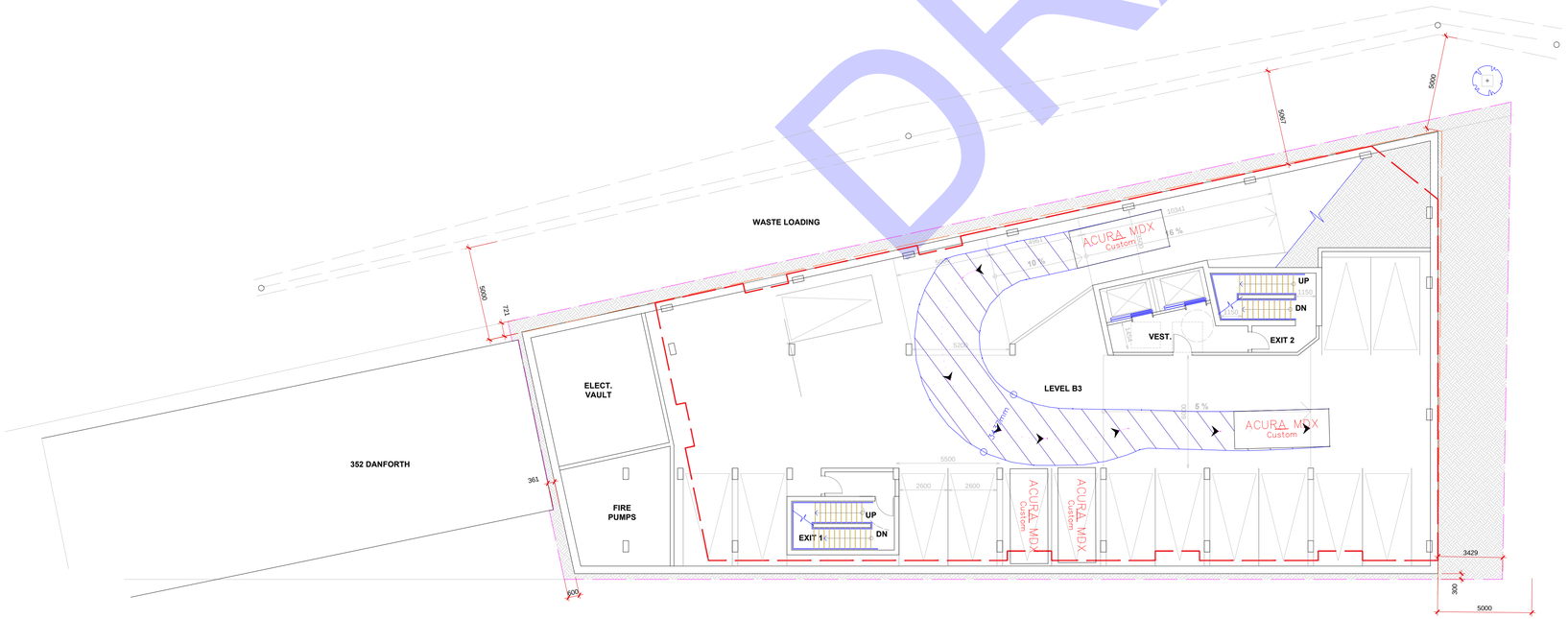
2. THE STEERING ANGLE AND LOCK TO LOCK TIME USED IN THE HONDA CIVIC WERE ASSUMED TO BE THE SAME AS THE TAC PASSENGER CAR AS PROVIDED IN THE TRANSOFT SOLUTIONS AUTOTURN SOFTWARE. THEREFORE, THE SIMULATION DOES NOT GUARANTEE THAT THE ACTUAL VEHICLE WOULD MANEUVER AS ILLUSTRATED.



Chevrolet	mm
Width	: 2000
Track	: 1700
Lock to Lock Time	: 6.0
Steering Angle	: 36.2



LEVEL B3: 5.04m LONG ACURA MDX VEHICLE LEAVING B3



LEVEL B3: 5.04m LONG ACURA MDX VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

5.04m LONG VEHICLE TURNING MENEUVERS

Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 6
Sheet 06	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

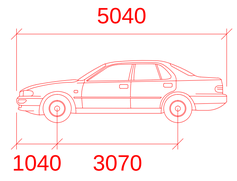
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			

NOTES:

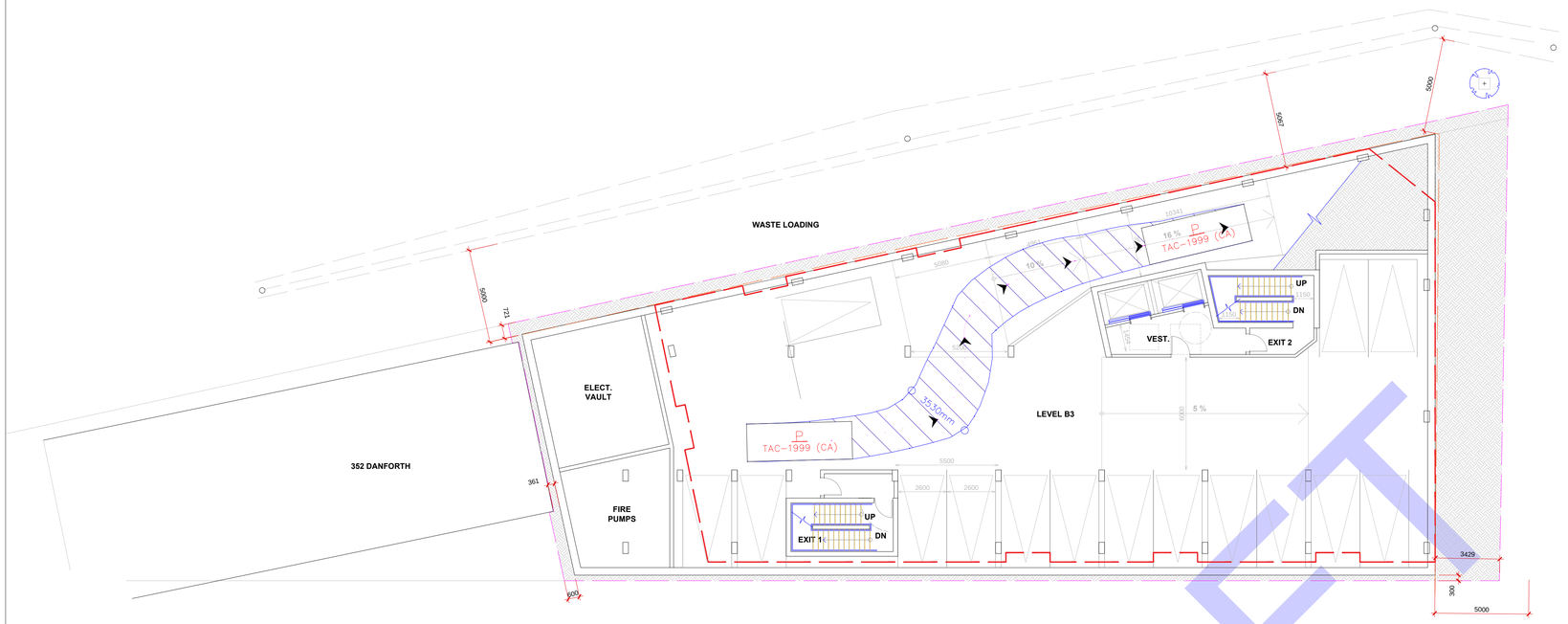
1. THE VEHICLE DIMENSIONS (WHICH INCLUDE LENGTH, WIDTH, WHEELBASE, OVERHANGS AND TRACK) WERE OBTAINED FROM THE CANADIAN ASSOCIATION OF THE ROAD SAFETY PROFESSIONAL DATABASE. THE WIDTH DOES NOT INCLUDE SIDE MIRRORS.

2. THE STEERING ANGLE AND LOCK TO LOCK TIME USED IN THE HONDA CIVIC WERE ASSUMED TO BE THE SAME AS THE TAC PASSENGER CAR AS PROVIDED IN THE TRANSOFT SOLUTIONS AUTOTURN SOFTWARE. THEREFORE, THE SIMULATION DOES NOT GUARANTEE THAT THE ACTUAL VEHICLE WOULD MANEUVER AS ILLUSTRATED.



ACURA MDX mm

Width	:	2000
Track	:	1720
Lock to Lock Time	:	6.0
Steering Angle	:	36.2



LEVEL B3: STANDARD PASSENGER VEHICLE LEAVING B3

LEVEL B3: STANDARD PASSENGER VEHICLE ENTERING B3

424 CHURCHILL AVE N., CONDOMINIUM

VEHICLE TURNING ANALYSIS

TAC VEHICLE TURNING TO AND FROM WEST OF B3

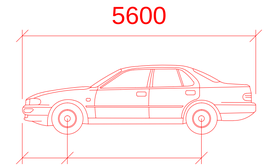
Castleglenn Consultants
Engineers, Project Managers & Planners

Contract No.	Dwg. No. 7
Sheet 07	
Asset No.	
Asset Group	
Des. RM	Chk'd. AEG
Dwn. RM	Chk'd. AEG
Utility Circ. No.	Index No.
Cost. Inspector	
Scale: 3m 0 3m HORIZ 1:150	

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	XX		XX/XX/XX
2			
3			



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

APPENDIX J: RESPONSE TO FORECASTING REPORT COMMENTS

The following email was received on October 25, 2022 regarding the Forecasting Report submission. Below, in red font, are the consultant responses to each issue raised which have been addressed within this Strategy Report.

From: McMahon, Patrick <patrick.mcmahon@ottawa.ca>
Sent: Tuesday, October 25, 2022 11:32 AM
To: Andrey Kirillov <akirillov@castleglenn.ca>
Cc: Arthur Gordon <agordon@castleglenn.ca>; Jemmy Taing <jemmy@gsiproperties.ca>
Subject: RE: 424 Churchill Avenue North TIA Forecasting Report

Hi Andrey,
Here are the comments for the forecasting submission:

Transportation Engineering Services

1. Section 2.1.1.1 Proposed Development: Please include estimated date of occupancy in this section.
   Response: Added "The development is envisioned to be fully occupied by the end of 2025." (See Section 4.1.1 3 Paragraph)

2. Section 2.1.2.2 [Existing] Study Area Intersections: For the Roosevelt Avenue and Byron Avenue intersection, the fifth bullet says, *"The east leg of the intersection has a sidewalk along the south side of the corridor, and the north leg has a sidewalk along the west side of the corridor."* It is the south leg (not the north leg) that has a sidewalk along the west side only.
   Response: This has been corrected in the text. (See Section 4.1.2 2 Intersection No. 2)

3. For the Richmond Road and Churchill Avenue North intersection, the northbound and southbound approach lane arrangement has changed. Refer to the latest Google Street View imagery from July 2022. The northbound approach now includes a single shared through-right lane and an auxiliary left turn lane, while the southbound approach includes a single shared all-movement lane. The southbound left-turn movement is restricted between 3:30PM and 5:30PM, Monday to Friday.
   Response: The intersection configuration has been updated in the text. (See Section 4.1.2 2 Intersection No. 3) Synchro analysis was performed using the updated lane arrangement, southbound movement was found to fail due to reduced capacity.

4. Section 2.1.2.4 [Existing] Pedestrian and Cycling Facilities: Include a description of the multi-use pathway (MUP) that runs parallel to Byron Avenue and is identified as a major pathway in the ultimate cycling network.
   Response: A paragraph addressing existing MUP (and planned future upgrades) was added. (See Last paragraph of Section 4.1.2 4)

5. Section 2.1.2.6 Existing Transit Provisions: Bus stop #4860 no longer exists. It has been replaced by the new eastbound bus stop #4870, located west of the Richmond Road and Churchill Avenue North intersection. Bus stop #4870 accommodates Route #11 and Route #153.
   Response: Exhibit 2-12 has been updated to reflect the above noted conditions. (See Exhibit 4-12)

6. Section 2.1.2.7 Existing Peak Hour Travel Demands by Mode: At the bottom of page 20 it is stated that "all other intersections' target minimum desirable level of service is LOS 'D'". However, all intersections in the study area have a target auto LOS of 'E' because they are either within 600m of a rapid transit station or within 300m of a school (Churchill Alternative).
   Response: Section 2.1.2.7 has been updated to indicate the distances to Churchill Alternative school. Text has been amended to indicate that all intersections in the study area have a target LOS "E" (See Section 4.1.2.7)

7. Section 2.1.3.2 Other Study Area Developments: Include a description of 2070 Scott Street, a 25-storey residential tower with ground floor commercial that is currently under construction.

Response: 2070 Scott Street was added to the list of adjacent development initiatives, and the traffic it generates is now accounted for in 2025 and 2030 background and design traffic exhibits (See Section 4.1.3.2)

8. Section 3.1.1 Trip Generation and Mode Shares: The first sentence of Section 3.1.1.2 is truncated at the start. Please correct.
   Response: This was a missing reference to Table 3-2. It is now added to the sentence, (See Section 5.1.1)

9. Trip generation of the existing land use (laundromat / dry cleaning service) should be estimated and/or acknowledged, and these trips should be deducted from the future background network before adding the new site generated volumes to find the future total traffic volumes.
   Response: The traffic generated by existing land use was assumed to be low-to-negligible during the peak hours of travel demand, and thus was not included as a part of the calculation of site's net-effect on the traffic in the area. Given an already low auto vehicle traffic generation assumptions (7 vehicles in the AM and 8 vehicles in the PM), we do not believe additional reductions to traffic should be applied) (See Section 5.1.1.2)

10. Preliminary Comments on the Next Step (TIA Strategy) and the Site Plan: For Element 4.2.1 Parking Supply, note that Section 103 of the Zoning By-Law (Maximum Limit on Number of Parking Spaces Near Rapid Transit Stations) applies to this development. Ensure Element 4.2.1 includes discussion of the number of accessible parking spaces required in the Zoning By-law and the number provided.
    Response: Thank you for the heads up – this has been incorporated into the Strategy report. (See Section 6.2.1)

11. Transportation Engineering Services does not support the loading bay proposed on Byron Avenue:
    - Section 4.6.5 3) of the new Official Plan states that *"Development shall minimize conflict between vehicles and pedestrians and improve the attractiveness of the public realm by internalizing all servicing, loading areas, mechanical equipment and utilities into the design of the building, and by accommodating space on the site for trees, where possible."*
    - If loading activities must occur on public right-of-way, loading activities should occur on Danforth Avenue. There is an existing area of no parking (but stopping permitted) on the south side of Danforth Avenue appropriately 15m west of Churchill Avenue North that could potentially serve as loading space.

    Response: This was communicated to the architect and owner on October 28th, 2022. Viability of loading from Danforth Avenue will be assessed. (See Section 6.1.2)

12. The Draft 2023 Transportation Master Plan includes a cycling feasibility study to add cycling facilities on Churchill Avenue from Byron Avenue to Scott Street. The project will likely include design of a protected intersection at Byron Avenue and Churchill Avenue North to facilitate safe crossings and turning movements for cyclists travelling on the Byron Avenue bike lanes / cycle tracks and the Churchill Avenue cycle tracks. Protected intersections require additional space for pedestrian and cyclist circulation at the corners (refer to the City's Protected Intersection Design Guide for more information and minimum dimensions). Consequently, the City of Ottawa would require land for a large corner site triangle on the northwest corner of Byron Avenue and Churchill Avenue North. A 10m-by-10m corner site triangle is preferred if possible.
    Response: This was communicated to the architect on November 3rd, 2022 to confirm the requirement for a 10m-by-10m sight triangle recognizing that the west leg of Byron Avenue is unlikely to accommodate cycling facilities in the future.

13. Infrastructure such as staircases, ramps, and retaining walls must not be located on public right-of-way. For example, the site plan shows a staircase leading to the 'Principal Entry 2' encroaching on the Churchill Avenue North right-of-way. There also appears to be a staircase to an 'Exit' encroaching on the Byron Avenue right-of-way. Please remove these encroachments in future revisions.
    Response: This was communicated to the architect and owner on October 28th, 2022.

Traffic Engineering

14. North-south phases must be modelled as ped recalled in Synchro
    Response: This Strategy report includes revised synchro analysis with ped recalled N-S phases along Churchill Ave N and Roosevelt Ave. (See Section 4.1.2.7 – Table 4-4 and Appendix "F")

15. There is an advance walk after the eastbound left turn and before the westbound thru phases. This must be included. Additionally, there are leading thru arrows displayed during the advance walks in the east-west directions. While it would be proper to model these advance walks with a thru arrow display, we can consider the omission of this as a conservative approach to the intersection's capacity analysis.
    Response: The signal phasing for Richmond Road / Churchill Ave N intersection was revised. Section 4.1.2.7 along with Appendix "F" contains updated intersection capacity analysis

Thank you and proceed to step 4.

Best regards,

Patrick McMahon
Project Manager, Infrastructure Approvals | GPRJ Approbation des demandes d'infrastructure
Development Review Branch | Dir Examen des projets d'aménagement
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
Tel |Tél. : 613-580- 2424 ext. | poste 23298
web | Site Web : www.ottawa.ca

APPENDIX K: MMLOS ANALYSIS WORKSHEET

Performance Measure	*Roadway Segments Adjacent to the Development*									
	Churchill Ave N b/w Richmond and Byron		Churchill Ave N b/w Byron and Ravenhill		Byron Ave b/w Roosevelt and Churchill		Byron Ave b/w Churchill and Athlone		Danforth Avenue	
	Northbound	Southbound	Northbound	Southbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Pedestrian LOS (PLOS)										
Sidewalk Width (m)	>2	>2	>2	>2	1.8	0	>2	>2	0	0
Boulevard Width (m)	0	0	0	>2 (segr bike lane)	0	0	0	0	0	0
Average Daily Curb Lane Traffic Volume	>3000	>3000	>3000	>3000	<3000	>3000	<3000	>3000	N/A	N/A
Presence of On-Street Parking	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	n/a	n/a
Operating Speed (km/h)	50	50	50	50	50	50	50	50	50	50
Segment PLOS	**B**	**B**	**C**	**B**	**B**	**F**	**B**	**C**	**F**	**F**
Target PLOS	A	A	A	A	A	A	A	A	A	A
Bicycle LOS (BLOS)										
Bikeway Type	Mixed Traffic	Mixed Traffic	Physically Separated	Physically Separated	Bike Lane not adj to Parking	Mixed Traffic	Bike Lane not adj to Parking	Mixed Traffic	Mixed Traffic	Mixed Traffic
Number of Lanes per direction	1	1	N/A	N/A	1	1	1	1	1	1
Bike Lane Width (m)	N/A	N/A	N/A	N/A	1.5 m = B	N/A	1.8 m =A	N/A	N/A	N/A
Operating Speed (km/h)	50	50	N/A	N/A	50 = A	50	50 = A	50	50	50
Bike Lane Blockage	N/A	N/A	N/A	N/A	Rare = A	N/A	Rare = A	N/A	N/A	N/A
Segment BLOS	**D**	**D**	A	A	B	D	A	**D**	B	B
Designation	**Spine Route**	**Spine Route**	**Spine Route**	**Spine Route**	**Major Pathway / Local**	**Major Pathway / Local**	**Major Pathway / Local**	**Major Pathway / Local**	**Local**	**Local**
Target BLOS	B	B	B	B	C	C	C	C	D	D
Transit LOS (TLOS)										
Facility Type	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	N/A	N/A	N/A	N/A	N/A	N/A
Level/Exposure to Parking/Driveway Friction	Medium	Medium	Low	Low	N/A	N/A	N/A	N/A	N/A	N/A
Segment TLOS	**E**	**E**	D	D	N/A	N/A	N/A	N/A	N/A	N/A
Target TLOS	D	D	D	D	N/A	N/A	N/A	N/A	N/A	N/A
Truck LOS (TkLOS)										
Number of lanes (in each direction)	1	1	1	1	1	1	N/A	N/A	N/A	N/A
Curb Lane Width (m)	>3.7	>3.7	3.5	>3.7	3.5	>3.7	N/A	N/A	N/A	N/A
Segment TkLOS	C	C	C	B	B	B	N/A	N/A	N/A	N/A
Target TkLOS	D	D	D	D	D	D	N/A	N/A	N/A	N/A