Rideau Carleton Raceway and Slots Expansion

Transportation Impact Assessment Report

PARSONS

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

1. 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;
2. 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;
3. 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
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check ✓ appropriate field(s)] 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

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at Ottawa this 30 day of January, 2018.
(City)

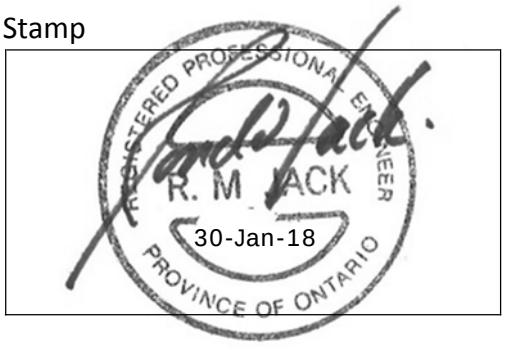
Name: Ronald Jack
(Please Print)

Professional Title: Senior Transportation Engineer

Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 1223 Michael Street
City / Postal Code: Ottawa K1J 7T2
Telephone / Extension: 613 – 738 - 4160
E-Mail Address: Ronald.Jack@Parsons.com

Stamp



Rideau Carleton Raceway and Slots Expansion

Transportation Impact Assessment Report

prepared for:
Hard Rock Ottawa
4837 Albion Road
Ottawa, ON K1X 1A3

prepared by:

PARSONS
1223 Michael Street
Suite 100
Ottawa, Ontario
K1J 7T2

January 30, 2018

476375 - 01000

PARSONS

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1. INTRODUCTION

This Transportation Impact Assessment Report is a compilation of the previously submitted and reviewed Screening Form, Scoping Report, Forecasting Report and Strategy Report, and addresses the City's comments on each. The Screening Form is included as Appendix A.

2. PROPOSED DEVELOPMENT

The Rideau Carleton Raceway and Slots is planning a three phase expansion over the next 5 years. The RCRS is municipally known as 4837 Albion Road and has one signalized and three unsignalized driveway connections to Albion Road. The RCRS expansion is proposed to occur in three phases as follows, and as depicted in Figure 1. The Site Plan of existing conditions is included as Appendix B.

- Phase 1 consists of 35 proposed gaming tables (previously a 21 gaming table expansion was proposed);
- Phase 2 consists of an additional 750 slot machines and 20 gaming tables for a total of 2,000 slot machines and 55 gaming tables; and
- Phase 3 consists of a proposed 200 room hotel and a 600 – 1200 parking space garage.

3. STUDY AREA

Given the location of the RCRS on Albion Road and the City's proposed transportation network changes identified later in this report, the study area for this TIA is depicted in Figure 2 and includes the following signalized and unsignalized intersections:

- Albion/Rideau
- Albion/RCRS Driveway
- Albion/High
- High/Earl Armstrong
- Albion/Findlay Creek
- Albion/Leitrim
- Albion/Lester
- Albion/Queensdale

4. EXISTING CONDITIONS

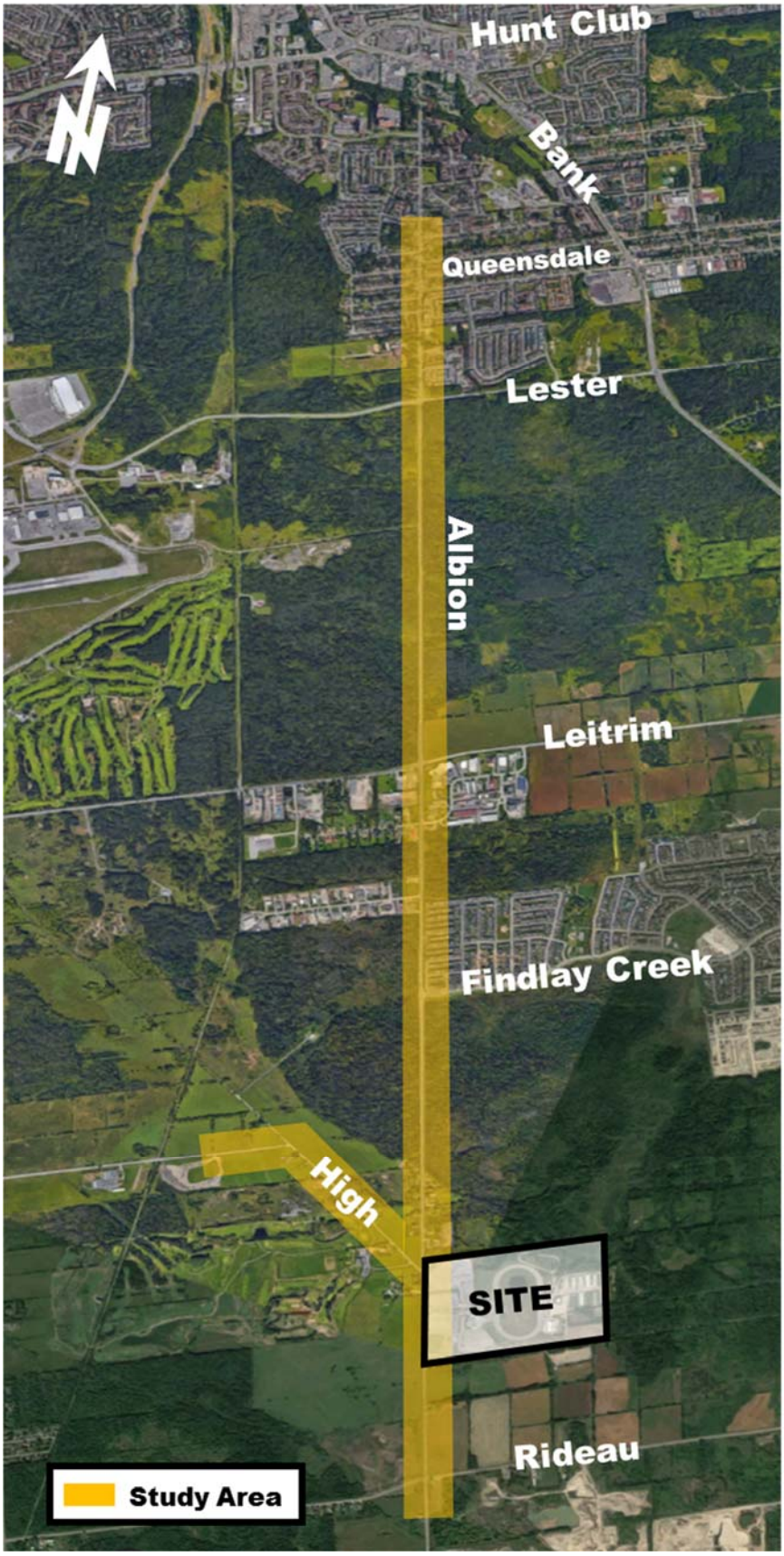
4.1. STUDY AREA ROADS

Albion Road is a north-south arterial roadway south of Lester Road and is a collector roadway north of Lester Road. It extends from Johnston Road in the north to Mitch Owens Road in the South. Albion Road has a two-lane cross-section with auxiliary turn lanes provided at major intersections, and paved shoulders to accommodate cyclists and pedestrians. The posted speed limit is 80 km/h between Mitch Owens Road to just south of the Rideau Carleton Raceway, where the posted speed limit is 60 km/h. It increases to 80 km/h north of the RCRS (approximately 650 m of High Road) until just south of Lester Road, where the posted speed limit is 50 km/h north through Blossom Park neighbourhood.

Lester Road is an east-west arterial roadway which extends from the Airport Parkway in the west to Bank Street in the east, where it continues as Davidson Road. Lester Road has a two-lane cross-section with auxiliary turn lanes provided at major intersections. Within the study area, the posted speed limit is 80 km/h. According to the Airport Parkway EA and the City's TMP, Lester Road is scheduled to be widened to four-lanes between Bank Street and the Airport Parkway as a Phase 2 (2020-2025) City project. Its intersection with Albion Road is signalized.

Figure 1: Proposed Expansion Concept

Figure 2: Site Context and Study Area



Leitrim Road is an east-west arterial roadway which extends from River Road in the west to Ramsayville Road in the east. Leitrim Road has a two-lane cross-section with auxiliary turn lanes provided at major intersections. Within the study area, the posted speed limit is 50 km/h and its intersection with Albion Road is signalized. As part of the Leitrim Road EA, the future alignment of Leitrim Road and the decision to widen the roadway to four-lanes will be determined. With regard to the signalized Albion/Leitrim intersection, the City plans to do a localized widening in 2023. Additional through lanes and right-turn channels will be provided in all directions.

Findlay Creek Drive is a collector roadway with a posted speed limit of 50 km/h. It has a two-lane cross section with auxiliary turn lanes provided at major intersections. It extends from Albion Road east to Bank Street, with both of these intersections being signalized.

Rideau Road is a collector roadway with a posted speed limit of 80 km/h. It has a two-lane cross section with auxiliary turn lanes provided at major intersections. Its intersection with Albion Road is signalized.

High Road and Queensdale Avenue are classified as local roadways. High Road is STOP sign controlled on its approach to Albion Road. High Road also connects to Earl Armstrong Road with this being STOP control on High Road southbound at the intersection. The Queensdale intersection with Albion Road is a three-way STOP.

4.2. ALBION ROAD PEAK HOUR VOLUMES

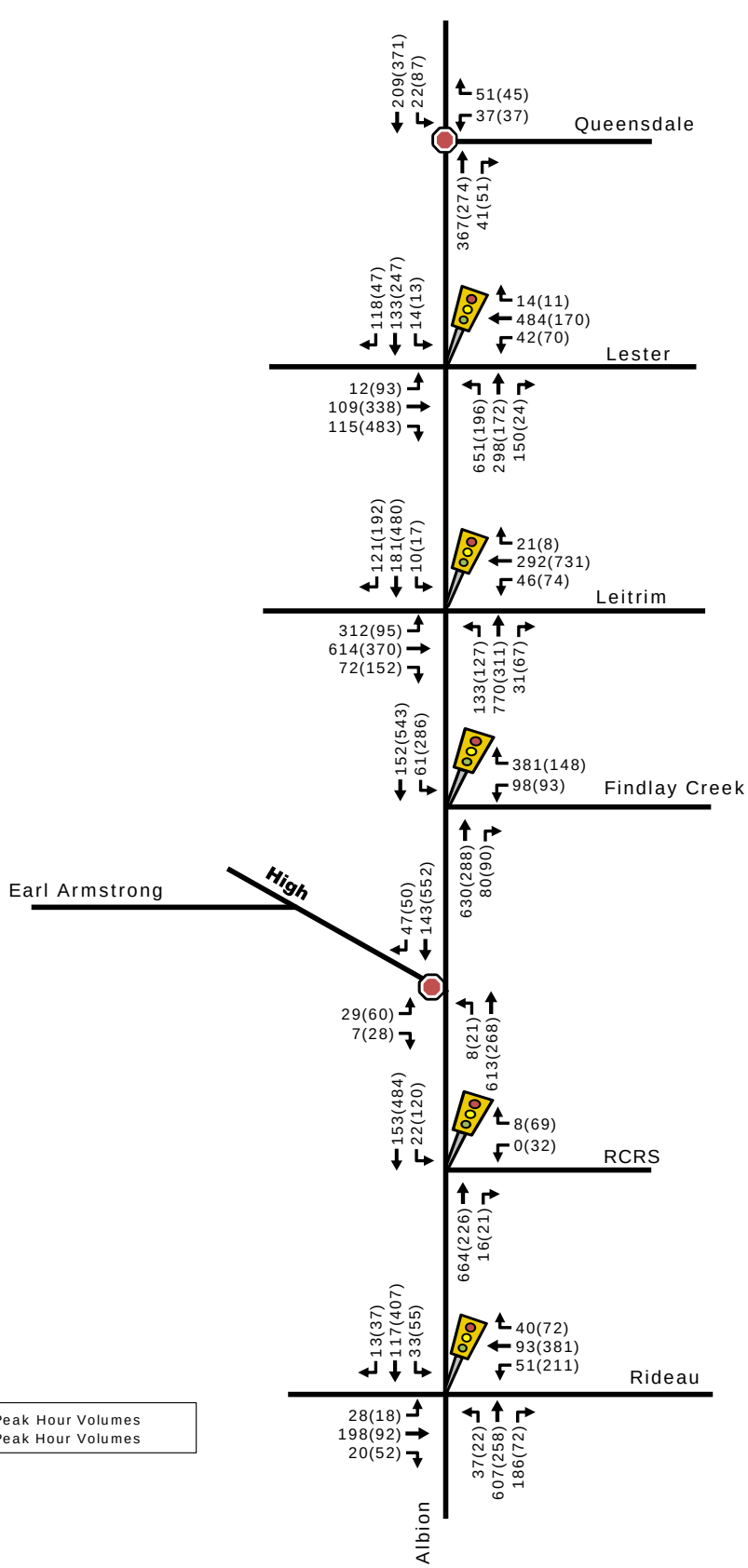
The City has provided the following most current available intersection traffic counts; Albion/Queensdale (2016), Albion/Lester (2016), Albion/Leitrim (2016), Albion/Findlay Creek (2016), Albion/High (2016), Albion/RCRS (2015), and Albion/Rideau (2017) for study area intersections. Weekday peak hour traffic volumes are illustrated as Figure 3 and included as Appendix C. The following Table 1 summarizes the northbound and southbound volumes on Albion Road for the three time periods of available counts.

Table 1: Current Albion Road Corridor Link Volumes (rounded)

Link	Morning Peak Hour (veh/h)		Afternoon Peak Hour (veh/h)		Mid-Day Peak Hour (veh/h)	
	NB	SB	NB	SB	NB	SB
Rideau to RCRS	680	150	350	500	225	240
RCRS to Findlay Creek	700	250	350	600	300	350
Findlay Creek to Leitrim	1,000	300	500	800	450	450
Leitrim to Lester	1,100	300	400	800	350	400
Lester to Queensdale	400	250	300	400	200	250
North of Queensdale	400	230	320	450	200	270

With regard to the High Road – Earl Armstrong link, the City's 2016 traffic count indicates very low peak hour volumes in the range of 90 veh/h and 160 veh/h two-way total.

Figure 3: Weekday Peak Hour Traffic Volumes



4.3. CURRENT STUDY AREA INTERSECTION OPERATIONS

Table 2 provides a summary of existing traffic operations at study area intersections based on the SYNCHRO (V9) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The subject intersections 'as a whole' were assessed based on a weighted v/c ratio. The unsignalized intersections were assessed 'as a whole' based on the average delay and the 'critical movement' is based on the movement experiencing the maximum delay. The SYNCHRO model output of existing conditions is provided as Appendix D.

Table 2: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Albion/Queensdale	B(B)	12.2(14.8)	NBT(SBT)	11.0(13.0)	-	-
Albion/Lester	F(C)	1.07(0.72)	NBL(SBT)	47.3(21.1)	E(A)	0.91(0.57)
Albion/Leitrim	E(F)	1.00(1.11)	EBT(WBT)	54.9(78.4)	E(F)	0.98(1.05)
Albion/Findlay Creek	C(A)	0.78(0.48)	WBR(WBR)	13.9(9.1)	A(A)	0.60(0.42)
Albion/High	C(C)	15.6(20.0)	EBL(EBL)	0.8(2.0)	-	-
Albion/RCRS	A(A)	0.43(0.35)	NBT(SBT)	5.1(6.4)	A(A)	0.41(0.34)
Albion/Rideau	B(D)	0.67(0.83)	NBT(WBT)	19.3(23.1)	B(B)	0.64(0.62)
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Table 2, the Albion/Lester and Albion/Leitrim intersections are currently operating 'as a whole' at an LoS 'E' during the weekday morning peak hour. The Albion/Leitrim intersection is also operating at an overall Los 'F' during the afternoon peak hour. The signalized Albion/RCRS, Albion/Rideau and Albion/Findlay Creek intersections are currently operating at an excellent LoS 'B' or better during weekday commuter peak hours.

With regard to the critical movements at study area intersections, the northbound left-turn movement at the Albion/Lester intersection is operating above capacity (LoS 'F') and the eastbound through and westbound through movements at the Albion/Leitrim intersection are operating at or above capacity (LoS 'E' and LoS 'F') during peak hours. All other critical movements at study area intersections are currently operating at an acceptable LoS 'D' or better during peak hours.

As part of the Airport Parkway Road Widening EA, Lester Road is planned to be widened to four-lanes with a double northbound left-turn lane on Albion Road. This will improve the northbound left-turn movement at this location that currently has over 600 veh/h turning left during the morning peak hour. The timing of this widening is planned as a Phase 2 City project (2020-2025).

As part of the Leitrim Road EA, Leitrim Road may be widened in the future, which will improve the capacity of the Albion/Leitrim intersection. It is noteworthy that the full widening of Leitrim Road is not identified as a City project in the TMP's affordable network. In the interim, the City is completing the design to add additional through and right-turn lanes to the Albion/Leitrim intersection for construction by approximately year 2023.

4.4. CURRENT RCRS PEAK HOUR SITE-GENERATED TRAFFIC TO/FROM NORTH ON ALBION ROAD

During June 2017, Parsons conducted peak hour afternoon and evening turning movement counts for traffic going into and out of all three RCRS driveways. Figure 4 illustrates the turning movements and Table 3 summarizes the total trips at all three site driveways during Thursday, Friday and Saturday evenings, and during Friday afternoon, which capture the busiest times of day for the raceway. It is noteworthy that horse racing occurs on Thursday and Saturday evenings.

Figure 4: Existing Site-Generated Traffic Volumes at Rideau Carleton Raceway Driveways

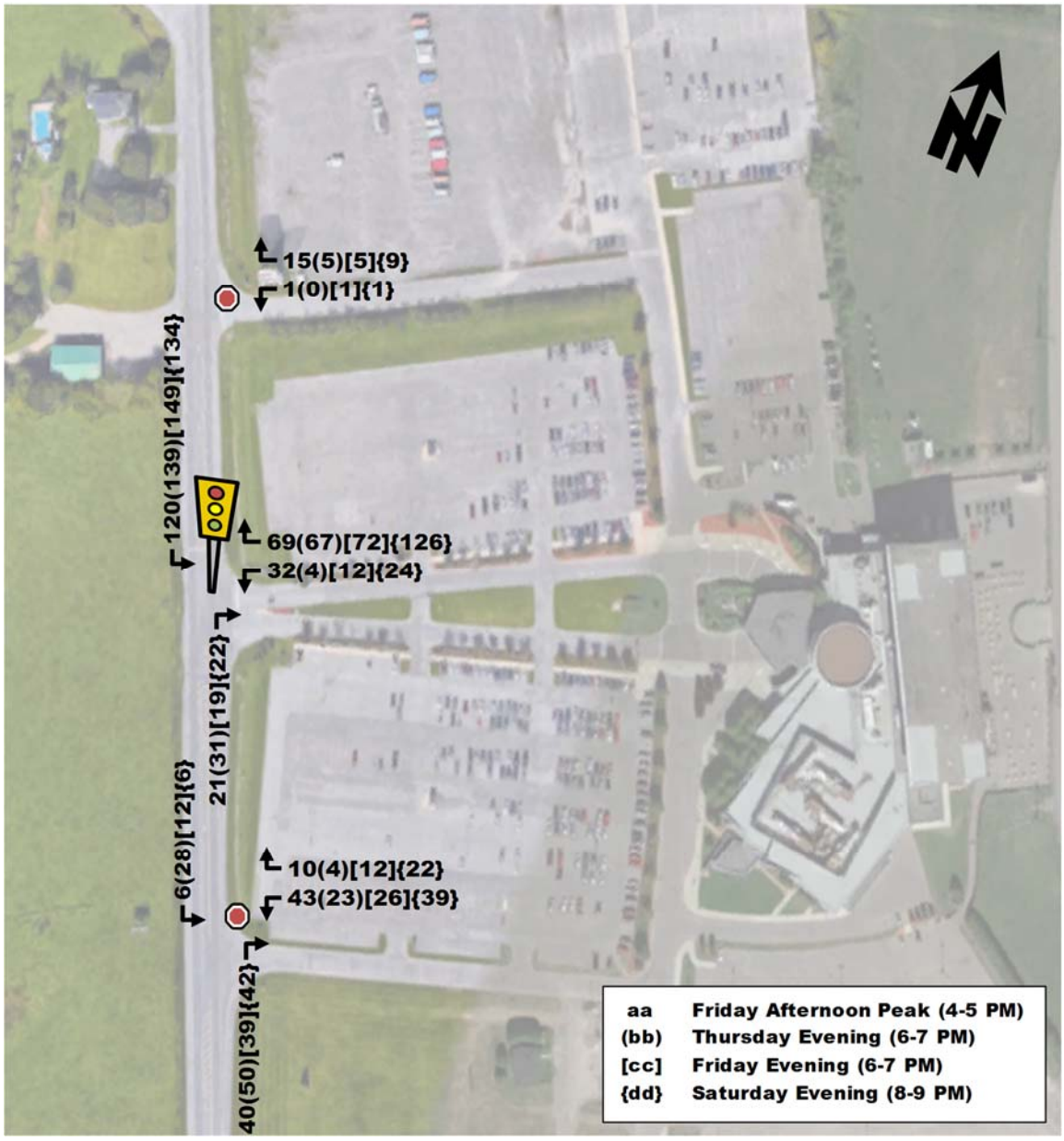


Table 3: Existing Rideau Carleton Raceway Generated Traffic Volumes

Friday Afternoon: 4-5 PM (veh/h)			Thursday Evening: 6-7 PM (veh/h)			Friday Evening: 6-7 PM (veh/h)			Saturday Evening: 8-9 PM (veh/h)		
IN	OUT	Total	IN	OUT	Total	IN	OUT	Total	IN	OUT	Total
187	170	**357**	248	103	**351**	219	128	**347**	204	221	**425**

When compared to the traffic volumes at the signalized Albion/RCRS weekday peak hour and mid-day peak hour volumes, it can be seen that the Saturday evenings are the busiest time of the week for the raceway. During the weekday mid-day peak, afternoon peak and evening peaks, similar volumes are recorded entering and exiting the raceway (approximately 240 veh/h at the signalized access).

The following Table 4, summarizes the traffic volumes at the signalized RCRS/Albion intersection and their directional distribution to/from the north and south.

Table 4: RCRS Site-Generated Traffic Distribution at Signalized Access

Location of Count Data	Morning Peak Hour (veh/h)			Afternoon Peak Hour (veh/h)			Mid-Day Peak Hour (veh/h)			Friday Evening Peak Hour (veh/h)			Saturday Evening (veh/h)		
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
Signalized Access Only	30	16	**46**	189	53	**242**	201	39	**240**	221	31	**252**	260	46	**306**
All Three Accesses	*41*	*22*	***63****	220	137	**357**	*277*	*54*	***331****	250	97	**347**	297	128	**425**
* The unsignalized site driveways were not counted during the morning and mid-day peak hours, a factor was applied to the signalized access count to provide an assumption for the overall site traffic.															

As shown in Table 4, the origin/destination of the majority of traffic travelling to/from the RCRS is to/from the north. When assessing the signalized site driveway only, on average 15% to 20% of site-generated traffic is travelling to/from the south. When assessing all three driveways, it can be seen that a higher percentage of site-generated traffic (approximately 30%) is travelling to/from the south during peak hours.

4.5. EXISTING RCRS TRAFFIC USING ALBION ROAD THROUGH BLOSSOM PARK

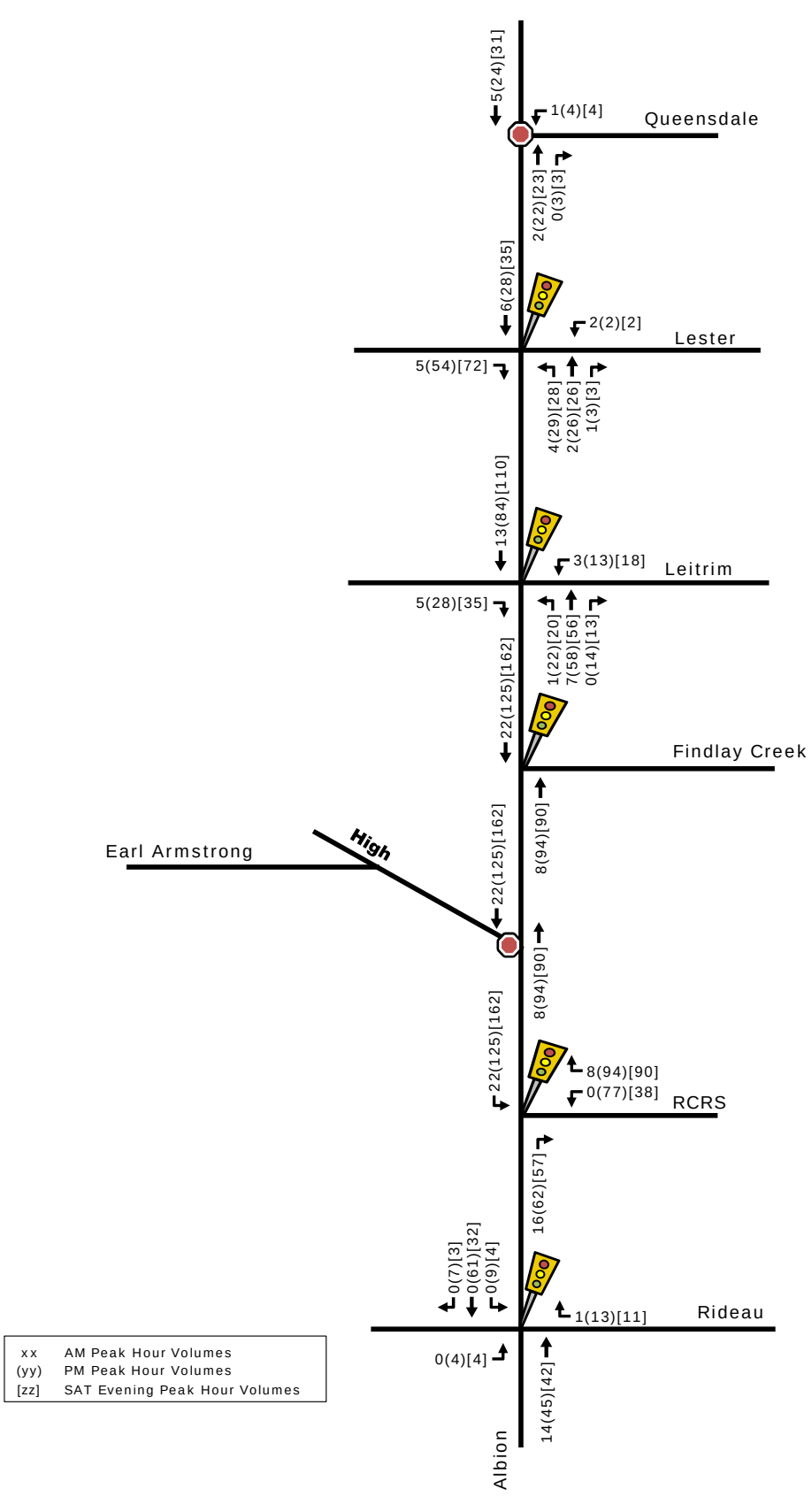
To estimate how much of existing RCRS peak hour traffic travels on Albion Road through the study area intersections and Blossom Park community, the site-generated traffic summarized in Table 6 were extrapolated south through the Rideau Road intersection and north through each of the Leitrim Road, Lester Road and Queensdale intersections, with traffic removed (northbound) or added to (southbound), based on the current ratio of right turns, left turns and through movements for the relevant approach direction. The resultant assignment of current peak hour RCRS traffic to Albion Road through the study area including Blossom Park, is depicted in Figure 5. Note that the Friday evening peak hour traffic estimates were distributed to the Albion Road Corridor based on the same percentages of the afternoon peak hour, as counts were not available for this time period but it is only one hour later than the afternoon peak hour.

Table 5 summarizes the amount of existing RCRS-generated two-way traffic on the various sections of Albion Road divided by the existing traffic on these road links, and the resultant percentage.

Table 5: RCRS Current Two-Way Peak Hour Traffic on Albion Road through Blossom Park

Road Section	Morning Peak Hour	Afternoon Peak Hour	Friday Evening Peak Hour
Rideau to RCRS	14 ÷ 830 = 1.5%	139 ÷ 850 = 16%	95 ÷ N/A = N/A
RCRS to Leitrim	30 ÷ 1300 = 2.5%	219 ÷ 1300 = 17%	252 ÷ N/A = N/A
Leitrim to Lester	20 ÷ 1400 = 1.5%	142 ÷ 1200 = 12%	167 ÷ N/A = N/A
Lester to Queensdale	8 ÷ 650 = 1.2%	54 ÷ 700 = 8%	61 ÷ N/A = N/A
North of Queensdale	7 ÷ 630 = 1.1%	46 ÷ 770 = 6%	54 ÷ N/A = N/A

Figure 5: RCRS-Generated Traffic Volumes Through Study Area



As highlighted in the bottom row, the percentage that RCRS traffic is of the total existing traffic volume on Albion Road through Blossom Park (north of Queensdale) ranges from 1% to 6% for the analysis time periods. The absolute values range from 7 veh/h to 55 veh/h two-way total, with the average for the three time periods analyzed being less than 1 RCRS-generated vehicle per minute.

5. THE RIDEAU CARLETON RACEWAY AND SLOTS TRANSPORTATION CONTEXT IN SOUTH-CENTRAL OTTAWA

The Rideau Carleton Raceway and Slots (RCRS) facility is located at 4837 Albion Road at the south end of South-Central Ottawa. The characteristics of the primary road network in South-Central Ottawa are unique to the City in that there is not the same continuity in north-south roads as there is elsewhere. Due to a number of factors, including the diagonal orientation of each of the Rideau River, Bank Street and Highway 417, the three major north-south roads of Riverside Drive, the Airport Parkway and Bank Street all converge at the area's north end near the RA Centre and Billings Bridge Shopping Centre. The combination of discontinuity of some roads and merging of others, combined with ongoing growth in the South-Central sector of the City has resulted in some peak period traffic congestion on some of the area's major roads, and less than ideal traffic volumes on some of the area's collector roads.

Traffic growth on the primary north-south South-Central roads of Bank Street, Albion Road, Airport Parkway and Riverside Drive is due to:

- Provincial highway traffic growth (Bank);
- Rural village and bedroom community growth (all of the above-roads);
- Riverside South growth (Riverside Drive and Airport Parkway);
- Findley Creek Buildout (Albion and Bank); and
- Rideau Carleton Raceway and Slots (Albion Road).

It should also be noted that the foregoing factors have also resulted in east-west traffic growth on Leitrim, Earl Armstrong and Mitch Owens.

The significant majority of commuter peak period traffic on the area's roads is due to the first four components listed above, with the RCRS facility having a relatively minor contribution. In the aforementioned 2011 study concluded by Parsons (formerly Delcan), it was determined/presented that for the section of Albion Road, from the RCRS to north of Lester Road, RCRS-generated traffic during peak periods was only between 2% to 20% of total traffic on Albion Road. The RCRS traffic (2011 report) as a percentage of each section of Albion is provided in the following Table 6.

Table 6: Percentage of RCRS Traffic and Total Albion Road Traffic (from 2011 report)

Road Section	Morning Peak Hour	Afternoon Peak Hour	Mid-Day Peak Hour	Friday Evening Peak Hour
Rideau to RCRS	26 ÷ 1060 = **2.5%**	163 ÷ 1090 = **15%**	97 ÷ 480 = **20%**	116 ÷ N/A = N/A
RCRS to Leitrim	53 ÷ 1090 = **5%**	268 ÷ 1290 = **21%**	196 ÷ 720 = **27%**	345 ÷ N/A = N/A
Leitrim to Lester	39 ÷ 1150 = **3.4%**	204 ÷ 1375 = **15%**	146 ÷ 710 = **20%**	255 ÷ N/A = N/A
Lester to Queensdale	14 ÷ 530 = **2.6%**	78 ÷ 720 = **11%**	58 ÷ 495 = **12%**	91 ÷ 545 = **17%**
North of Queensdale	13 ÷ 555 = **2.3%**	66 ÷ 750 = **8.8%**	51 ÷ 510 = **10%**	78 ÷ 605 = **13%**

It is noteworthy that since the completion of the 2011 study, Findley Creek has fully build out, and with its signalized intersection to Albion Road, has added significantly to peak hour traffic on Albion Road. Current 2016 counts at the Findley Creek/Albion Road intersection indicate full build-out of the Findley Creek subdivision has added over 400 veh/h two-way

total to Albion Road during the weekday morning and afternoon peak hours. These recent increased volumes, combined with the background traffic, have necessitated the need to add additional capacity to the signalized Albion/Leitrim intersection located just to the north of Findlay Creek. The City is currently completing the design to add additional northbound and southbound lanes on Albion Road through this intersection.

In summary of the foregoing, there are period peak traffic pressures on the major roads in South-Central Ottawa that will continue to grow as Riverside South and other communities build out and as facilities such as the RCRS expand. The City is well aware of the need to address the transportation pressures in this section of the City and have identified a number of significant transit and road construction initiatives to address/resolve current and future needs. These are identified in the City's current (revised) Transportation Master Plan as follows (Table 7), and as depicted in Figure 6 and Figure 7.

Table 7: (Revised) Transportation Master Plan's Transit and Road Network Modifications for the South-Central Sector of Ottawa.

Link	2031 Network Concept	2031 Affordable Network
O-Train extension from Hunt Club:		
• to Riverside South Town Centre	✓	–
• to Bowesville Road*	–	2021
• Leitrim LRT Station and Park and Ride Lot	✓	2021
Airport Parkway widening to 4 lanes	✓	2014-2031
Lester Road widening to 4 lanes	✓	Post 2025
Leitrim Road realignment and widening to 4 lanes	✓	Post 2031 (EA underway)
Albion Road widening from Lester to realigned Leitrim	✓	–
Bank Street widening to 4 lanes from:		
• Leitrim to Findley Creek	✓	Post 2025
• Findley Creek to Rideau	✓	Post 2031
Earl Armstrong Road:		
• Limebank to Bowesville (widening)	✓	Post 2031
• Bowesville to Hawthorne (extension)	✓	Post 2031
*The City is currently considering extending the O-Train (Trillium Line) further south beyond Bowesville Road Toward the Riverside South Town Center.		

Figure 6: TMP Rapid Transit and Transit Priority – 2031 Affordable Network

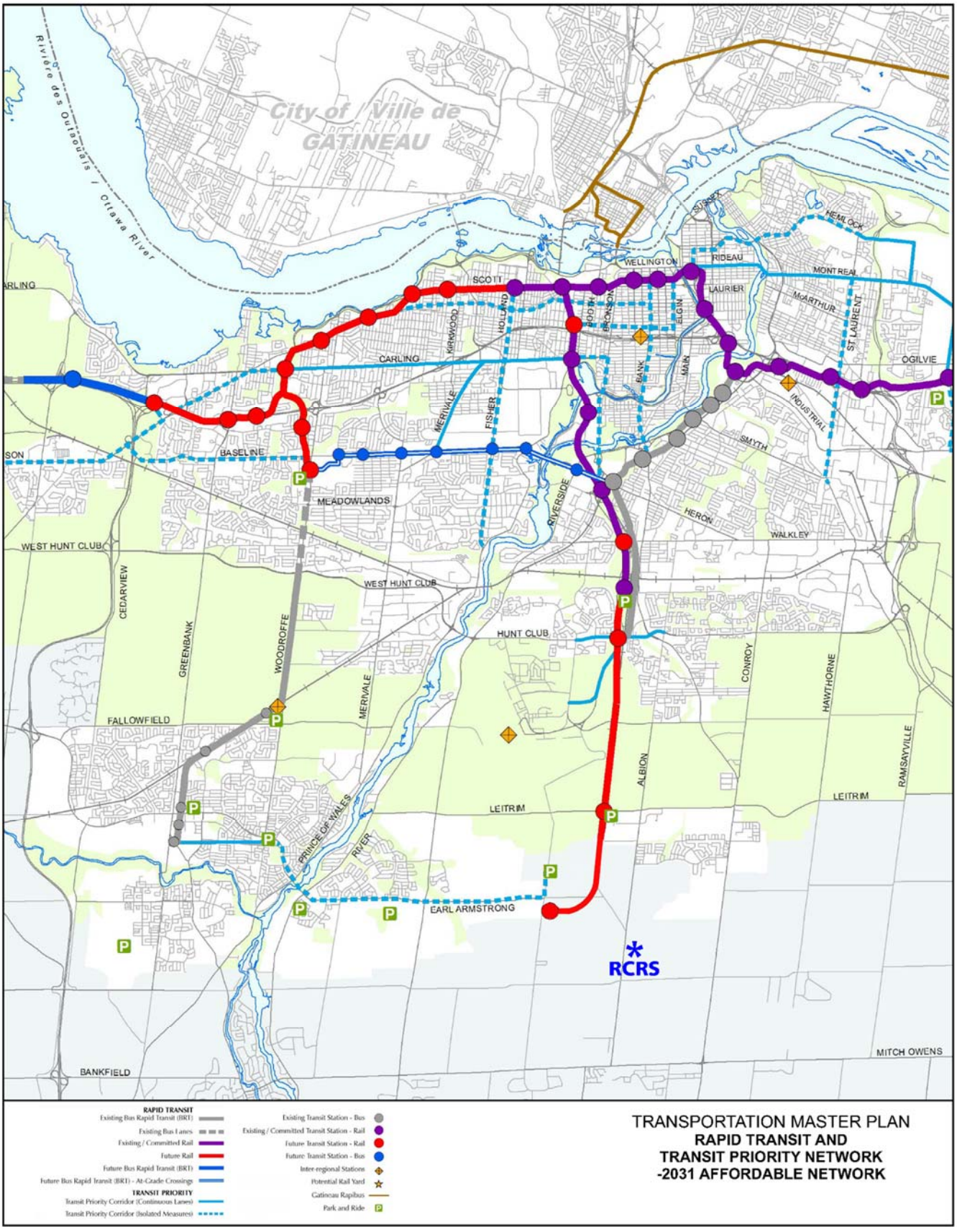
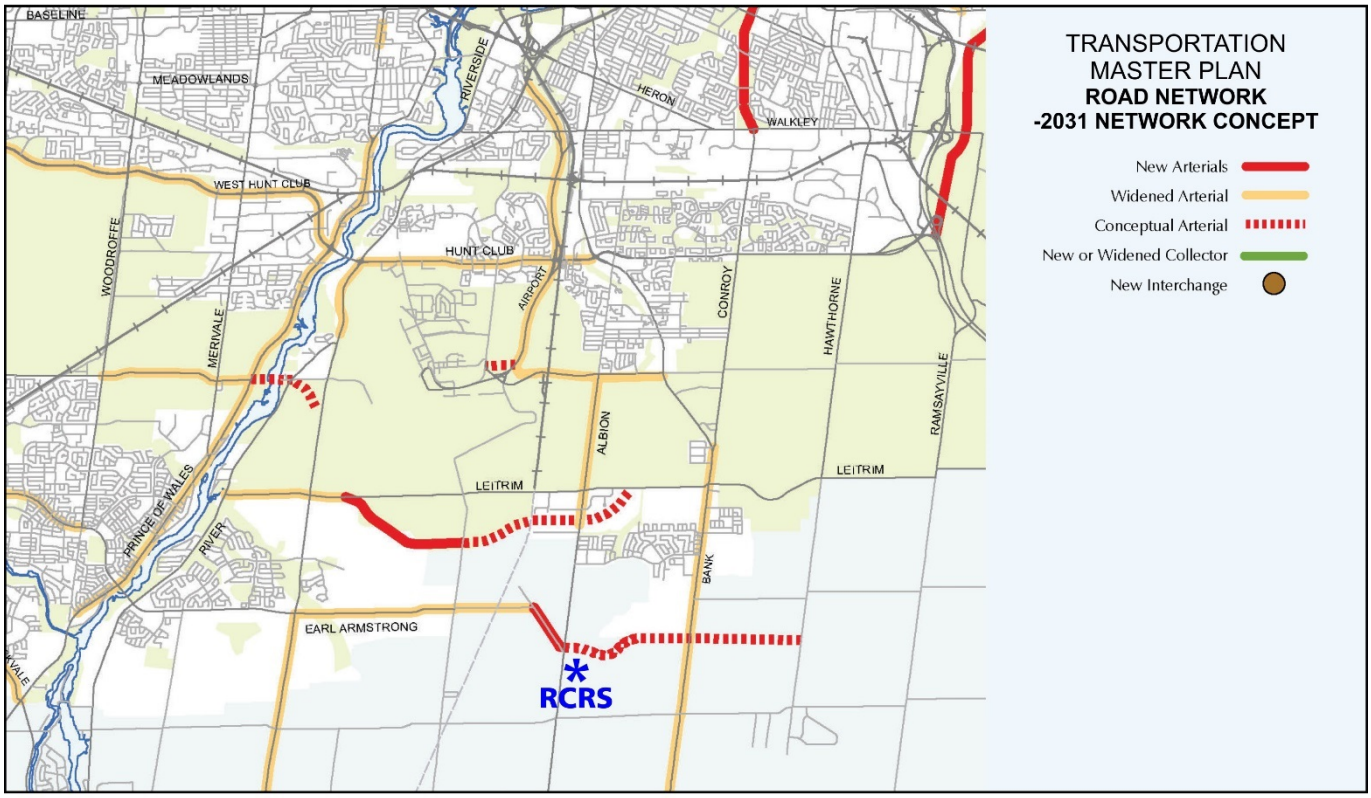
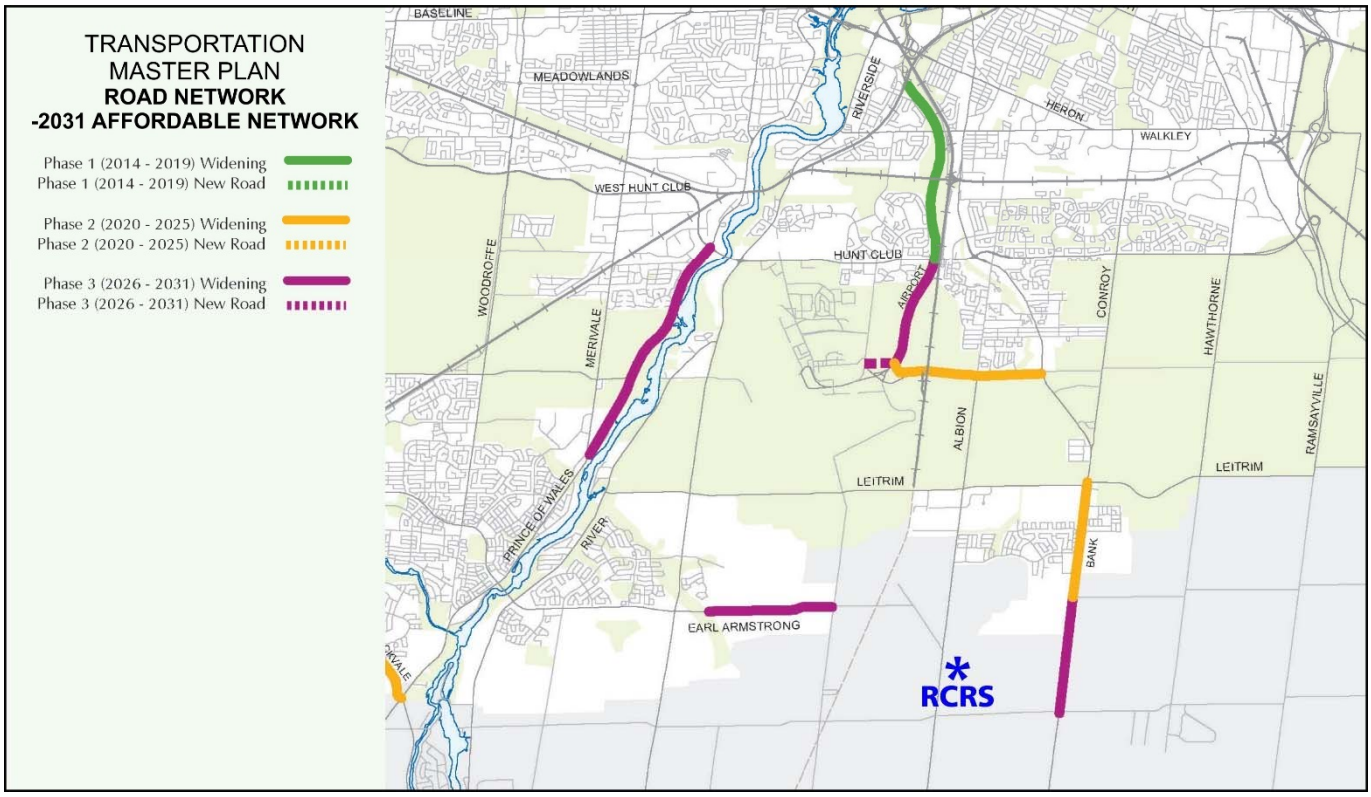


Figure 7: TMP 2031 Road Network – Concept and Affordable Networks





In review of the proposed transit and road elements that the City has planned for the South-Central sector of Ottawa, it is noteworthy that while they are being planned/provided to accommodate primarily ongoing traffic growth due to continued residential development, they will also be of benefit to the existing and planned expansion at the RCRS. Of most value in the shorter term to the RCRS facility will be planned widening of the Airport Parkway, Lester Road and Albion Road, and in the longer term the extension of Earl Armstrong Road east to Bank Street, and the widening of Bank Street. Once Earl Armstrong Road is extended east from Albion to Bank Street, it will result in a redistribution of some RCRS site-generated traffic away from the Albion Road corridor and onto the Bank Street, Conroy Road and Hawthorne Road corridors.

From a rapid transit perspective, it is very important to note that the current plan is to extent the O-Train south from Hunt Club to Bowesville (near Earl Armstrong) by 2021 (approximately only 2.5 km from the RCRS site.) As well, there has been very recent discussion at the City of advancing the timing of this extension even further south (and west) into Riverside South to be a Stage 2 project to accommodate the transit requirements of the projected additional 40,000 residents. Having this rapid transit corridor in place by 2021, while primarily benefiting Riverside South residents, could also improve transit ridership to/from the RCRS Facility.

As an overview of the foregoing, the City in their Transportation Master Plan, have identified many transportation network modifications for the South-Central sector of Ottawa that will significantly benefit area residents by providing much needed and conveniently located transit and road network capacity. As the planned road network improvements are in the road corridors used by patrons of the existing and planned RCRS facility, they will also benefit access to/from this facility from all sectors of Ottawa, as well as result in a broader distribution of site-generated traffic away from the Albion Road corridor. As previously noted, RCRS traffic is a relatively small component of traffic in the Albion Road corridor but as the South-Central sector continues to grow and as the City's planned transportation network elements are built, there will be some redistribution of RCRS traffic and its percentage contribution to peak period traffic on area roads will decrease to even smaller amounts.

6. TIME PERIODS AND HORIZON YEARS

While the proponent has requested permission from the City to introduce 35 gaming tables as soon as possible, the overall three phase development is estimated to be completed in 5 years (year 2022). As the analysis for the additional 35 gaming tables estimated a peak hour traffic generation of only between approximately 10 veh/h and 80 veh/h two-way total, the TIS will focus on the full site development (Phase 1, 2 and 3) by 2022, and not phased development.

With regard to background traffic growth, we have reviewed both 10 years of historic traffic counts at the Albion/Rideau intersection and the 2031 TMP model plots provided to us by the City. Based on these two sources (Appendix D), and as the Findley Creek Community has recently built out, we propose to use a 0.5% increase per year for background traffic growth. As such, for a 10 year horizon, 5 years after completion of Phase 3, this results in a background traffic growth factor along the Albion Road corridor of 1.05.

7. EXCEPTIONS REVIEW

The following is a summary of the topics identified in the City's TIA Guidelines that we propose to either address or exclude in this TIA;

- Development Design: - circulation and access: **required**
  - new street network: **exempt**
- Parking: - parking supply: **required**
  - spillover parking: **exempt**

- Transportation Demand Management: - **required**
- Neighbourhood Traffic Management: - **exempt, but site traffic through Blossom Park will be analyzed**
- Network Concept: - **exempt**

8. DEVELOPMENT – GENERATED TRAFFIC

The proposed expansion of the RCRS facility will occur in three phases over 5 years with construction starting in 2018. Each phase is described as follows:

- Phase 1: 35 proposed gaming tables; (previously a 21 gaming table expansion proposed);
- Phase 2: An addition 750 slot machines and an additional 20 gaming tables for a total of 2,000 slot machines and 55 gaming tables; and
- Phase 3: A proposed 200 room hotel and a 600 – 1,200 space garage.

Due to the uniqueness of a race track's/casino's trip generation, combined with the unique rural/suburban location for the RCRS facility, the trip generation for the proposed three phase expansion was based on a combination of existing site-generated traffic, the proponent's estimates of gambling-related attendance, and first principals. The 2015 TRANS Committee report titled National Capital Region Special Generators Survey: Sports, Entertainment and Event Venues was also reviewed as one of the events it surveyed was the Casino du Lac-Lemay. While its location is quite urban compared to RCRS, its results were considered in finalizing the projected Phase 1 to 3 trip generation herein.

With regard to the 2015 National Capital Commission Special Generators Survey, the following are the key findings that may be of consideration to trip projections and traffic assignments for the planned expansion at the RCRS:

- Average daily attendance of 4,900 persons;
- Longest patron age group is the 55 - 75 year bracket, which comprises 47% of total attendance;
- Trip origins are 46% Ottawa, 42% Gatineau, 6% external Ontario and 6% external Quebec;
- 70% of patrons come from home, 8% from a bar/restaurant, 5% from work, 5% from a hotel and 12% other;
- Travel mode of non-residents of Ottawa-Gatineau (26% of the total attendees):
    - 32% car driver
    - 25% car passenger
    - 31% intercity or charter bus
    - 12% other
- Travel modes for all patrons regardless of trip origin;
    - 46% car driver
    - 37% car passenger
    - 7% transit
    - 7% intercity/charter bus
    - 4% taxi
    - 4% walk
    - 0% bicycle
- Auto occupancy (1.78 persons/car average); and
    - 39% one occupant
    - 50% two occupants
    - 7% three occupants

- Peak arrival/departure times.
    - Peak arrival, 5:00 – 9:00 p.m.
    - Peak departure, 9:00 p.m. – 10:00 p.m.
    - Shoulder hours are steady

Of most interest/relevance in review of the foregoing, to the trip generation related to the RCRS expansion, was the overall model split data. As noted, the Casino du Lac-Lemay is predominately auto oriented with 78% of patrons arriving by car. Local transit is 7%, intercity/charter transit is 7%, taxi is 4%, walk is 4% and bicycle is 0%. By comparison, we expect the expanded RCRS facility to be even more auto oriented as its location is more rural, there is no local bus service and there will be no walk-in component. As such, more realistic assumptions for the expanded RCRS would be approximately 90% auto, 8% transit and 2% taxi during daytime peak periods. During evening peak periods (not commuter peak hours) when patronage is the highest it is expected that the transit mode split would be less and in the 5% maximum range. This 8% transit assumes LRT extension to Bowesville Road and a shuttle bus services (2.5 km) to/from the RCRS facility. The following analysis of phased vehicle trip generation is reflective of these high auto mode and low transit mode estimates.

8.1. PHASE 1 TRIP GENERATION

The Phase 1 expansion of the Rideau Carleton Raceway includes:

- Proposed 35 gaming table (21 gaming tables were previously proposed in 2011 report); and
- Reduction in the number of horse racing events from 90 days/year to 70 days/year – On Thursday and Sundays.

In the previously submitted Transportation Impact Study (2011), OLG had provided estimations on the number of trips generated by the proposed gaming tables. For 21 gaming tables, at 5 to 6 persons per table and based on a 2.5 person/vehicle occupancy, the increase in vehicle traffic was estimated to be 15 vehicles per hour or 360 vehicles per day (15 veh/hour x 24 hours/day) entering the site. As these vehicles will leave the site as well, the total two-way traffic associated with 21 gaming tables was estimated to be 720 veh/day.

Based on these assumptions, the vehicle trip generation rate per gaming table was calculated to be 34.29 vehicles per day per table. Using this rate, the increase in traffic volumes to/from the raceway was based on the proposed 35 gaming table is 1,200 two-way veh/day (or 600 veh/day in and 600 veh/day out). It is reasonable to assume patrons will play at more than one table during their visit. As such, a 10% reduction of the above rate was applied to account for multiple table visits. This results in a total of 1,080 two-way vehicles per day (or 540 veh/day in and 540 veh/day out) visiting the proposed 35 gaming tables.

Based on the foregoing, approximately 540 additional vehicles per day will arrive at the RCRS, and it is assumed they will arrive and depart similar to current RCRS patrons. The RCRS keeps hour by hour patron arrival and departure data for every day. A review of the March 2017 arrival/departure data indicates that Saturdays and Sundays are the highest attendance days, with Saturdays being slightly higher. During the weekdays, Fridays have the highest attendance. To determine a representative daily arrival profile for RCRS patrons, the average data for the four Saturdays and five Fridays in March 2017 were used, resulting in the vehicle arrival/departure distribution summarized in the following Table 8 and Table 9.

Table 8: Average Arrivals and Departures during Saturday

Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)	Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)
12AM to 1AM	1.36%	7	5.47%	30	12PM to 1PM	7.05%	38	3.84%	21
1AM to 2AM	0.77%	4	4.50%	24	1PM to 2PM	7.07%	38	3.44%	19
2AM to 3AM	0.37%	2	1.95%	10	2PM to 3PM	7.58%	41	5.94%	32
3AM to 4AM	0.32%	2	1.45%	8	3PM to 4PM	6.14%	33	6.03%	33
4AM to 5AM	0.28%	2	1.08%	5	4PM to 5PM	6.86%	37	6.64%	36
5AM to 6AM	0.19%	2	0.27%	1	5PM to 6PM	8.21%	44	5.10%	28

Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)	Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)
6AM to 7AM	0.58%	4	0.37%	2	6PM to 7PM	10.15%	55	6.99%	38
7AM to 8AM	0.92%	5	0.30%	2	7PM to 8PM	7.87%	42	6.21%	34
8AM to 9AM	2.01%	10	0.78%	4	8PM to 9PM	6.35%	34	8.32%	45
9AM to 10AM	3.17%	17	1.33%	7	9PM to 10PM	5.84%	32	10.02%	54
10AM to 11AM	4.32%	23	2.08%	11	10PM to 11PM	3.58%	19	8.24%	44
11AM to 12PM	6.70%	36	3.01%	16	11PM to 12AM	2.33%	13	6.65%	36
Total		114		120			426		420

Table 9: Average Arrivals and Departures during Friday

Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)	Time	% IN	IN (veh/h)	% OUT	OUT (veh/h)
12AM to 1AM	2.05%	11	5.74%	31	12PM to 1PM	5.88%	32	4.40%	24
1AM to 2AM	0.96%	5	3.75%	20	1PM to 2PM	6.03%	33	5.78%	31
2AM to 3AM	0.73%	4	2.56%	14	2PM to 3PM	6.42%	35	6.34%	34
3AM to 4AM	0.48%	3	1.60%	9	3PM to 4PM	6.52%	35	7.37%	40
4AM to 5AM	0.17%	1	0.54%	3	4PM to 5PM	4.71%	25	5.91%	32
5AM to 6AM	0.19%	1	0.31%	2	5PM to 6PM	6.55%	35	5.65%	30
6AM to 7AM	0.33%	2	0.30%	2	6PM to 7PM	9.01%	49	6.09%	33
7AM to 8AM	0.74%	4	0.31%	2	7PM to 8PM	7.27%	39	6.62%	36
8AM to 9AM	2.19%	12	0.64%	4	8PM to 9PM	5.93%	32	6.68%	36
9AM to 10AM	4.81%	26	1.19%	6	9PM to 10PM	6.06%	33	7.85%	42
10AM to 11AM	7.86%	42	2.94%	16	10PM to 11PM	4.31%	23	7.11%	38
11AM to 12PM	8.16%	44	4.13%	22	11PM to 12AM	2.66%	14	6.18%	33
Total		155		131			385		409

In review of the foregoing estimates of hourly "inbound and outbound" traffic generated by the proposed gaming tables, the volumes that correspond to the peak hours analyzed in this report are summarized in the following Table 10 (and highlighted in red text above). The percent increase in site-generated traffic during each peak hour is also included in Table 10.

Table 10: Estimate 35 Gaming Tables Vehicle Trip Generation

Time Period	Inbound	Outbound	Two-Way Total	% of Existing RCRS-Generated Traffic
Morning Peak Hour	4 veh/h	2 veh/h	6 veh/h	6 ÷ 63 = 10%
Afternoon Peak Hour	25 veh/h	32 veh/h	57 veh/h	57 ÷ 357 = 16%
Mid-day Peak Hour	44 veh/h	22 veh/h	66 veh/h	66 ÷ 331 = 20%
Weekday Evening Peak Hour	49 veh/h	33 veh/h	82 veh/h	82 ÷ 347 = 24%
Saturday Evening Peak Hour	55 veh/h	38 veh/h	93 veh/h	93 ÷ 425 = 22%

In summary of Table 10, the proposed 35 gaming tables are estimated to generate approximately 10% to 25% more traffic than the RCRS currently generates during the five peak periods analyzed. During the busiest time of the week, an increase of approximately 90 veh/h two-way total is projected to enter/exit RCRS.

8.2. PHASE 2 TRIP GENERATION

Phase 2 is proposed to consist of the following RCRS expansion:

- 20 additional gaming tables for a total of 55 gaming tables (Phase 1 plus Phase 2); and
- 750 additional slot machines for a total of 2,000 slot machines (existing plus Phase 2).

These are understood to be the maximum number of gaming tables and slot machines that RCRS will include in their proposed expansion. As the expansion phasing is further developed, these number may decrease, but they are not expected to increase.

8.2.1. GAMING TABLE TRIP GENERATION

Similar to the trip-generation projections outlined in Section 8.1 (Phase 1 Trip Generation), the following vehicle trip generation is projected for the increase of 20 additional gaming tables for Phase 2.

The vehicle trip generation rate per gaming table is calculated to be 34.29 vehicles per day per table. Using this rate, and applying an increased reduction rate for multi-table visits of 20%, the projected increase in traffic volumes to/from the raceway based on the proposed 20 gaming table is 550 two-way veh/day (or 275 veh/day in and 275 veh/h out). Based on this amount of projected traffic increase, and given the daily splits of patrons entering/exiting the RCRS, the following Table 11 summarizes the projected vehicle increase during the peak hours.

Table 11: Estimated 20 Gaming Table Vehicle Trip Generation

Time Period	Inbound	Outbound	Two-Way Total
Morning Peak Hour	2 veh/h	1 veh/h	3 veh/h
Afternoon Peak Hour	13 veh/h	16 veh/h	29 veh/h
Mid-day Peak Hour	22 veh/h	11 veh/h	33 veh/h
Weekday Evening Peak Hour	25 veh/h	17 veh/h	42 veh/h
Saturday Evening Peak Hour	28 veh/h	19 veh/h	47 veh/h

It is assumed that a percentage of this vehicle traffic has already been accounted for by the existing and Phase 1 traffic. As such, a 25% reduction factor has been applied to the overall Phase 1 and 2 vehicle trip generation to account for patrons playing at existing slot machines or Phase 1 gaming tables. This reduction is shown in Section 8.2.3, Table 14.

8.2.2. SLOT MACHINE TRIP GENERATION

We are advised that there are approximately 1,250 slot machines at the RCRS today. Based on the existing site-generated traffic volumes, an estimated trip generation rate per slot machine can be calculated. We are advised that the majority of existing traffic to/from the site is related to slot machines use (on non-race days) and few patrons use only the restaurant. As such, the vehicle per slot machine trip generation rate was calculated and is summarized in the following Table 12.

Table 12: Trip Generation Rate for Slot Machine

Trip Generation Rate (veh/slot machine)				
Morning Peak Hour	Mid-Day Peak Hour	Afternoon Peak Hour	Weekday Evening Peak Hour	Saturday Evening Peak Hour
0.05	0.26	0.27	0.28	0.34

As shown in Table 12, the vehicle trip generation rates range from 0.26 to 0.34 during the afternoon and evening peak hours, assuming all existing site-generated traffic is related to slot machines. It is assumed that this rate will not increase linearly with the addition of 750 proposed new slot machines as many existing patrons are likely to use the proposed new slot machines as well. RCRS agrees with this assumption and as such a trip generation rate based on 75% of existing traffic related to the existing slot machines is calculated to be 0.20 to 0.25 vehicles per slot machine during the peak hours. This rate was applied to the proposed 750 slot machines to calculate a projected vehicle volume associated with this Phase 2 growth. The resultant future trips are outlined in Table 13.

Table 13: Projected Vehicle Trip Generation for 750 Slot Machines

Time of Day	Vehicle Trip Generation Rate (veh/slot machine)	Trip Generation (veh/h)		
		IN	OUT	Total
Morning Peak Hour	0.04	23	5	28
Afternoon Peak Hour	0.20	86	63	149
Mid-day Peak Hour	0.20	96	52	148
Weekday Evening Peak Hour	0.21	98	57	155
Saturday Evening Peak Hour	0.25	91	98	189

As shown in Table 13, with the addition of 750 slot machines, the vehicle traffic to/from RCRS is projected to increase by approximately 190 veh/h two-way total during the busiest time of the week (Saturday evening).

8.2.3. SUMMARY OF PHASES 1 AND 2 TRIP GENERATION

This section provides a summary of the trips generated by the proposed Phases 1 and 2 expansion of RCRS. Given the trip-generation analysis was broken down by gaming tables and slot machines, it is reasonable to assume that a percentage of patrons who play slot machines also visit the gaming tables. RCRS agrees with this assumption and as such a 25% reduction factor was applied to the overall trip generation for Phases 1 and 2 to account for existing and future trips that visit both slot machines and gaming tables. The resultant increase in vehicle trips to/from RCRS for the proposed Phases 1 and 2 expansion is summarized in Table 14. As shown in this Table 14, the total projected 'new' site-generated vehicle trips range from 175 to 250 additional veh/h two-way total during the weekday afternoon, mid-day, evening and Saturday evening peak hours. This represents an approximate 60% increase in existing RCRS vehicle traffic during peak hours. The future total projected vehicle traffic projected to travel to/from RCRS (including the existing trips) is estimated to range from 515 to 675 veh/h two-way total during the peak hours, as shown in the bottom of Table 14.

As the ITE Trip Generation Manual does not provide an appropriate casino land use vehicle trip generation rate that would be applicable to this site, the foregoing 'first-principles' method was applied to project the identified vehicle trips. As a cross-check, however, the Mid-Atlantic Section of ITE and Washington D.C. Section - ITE referenced a vehicle trip generation rate for large casinos to be 0.246 to 0.305 vehicles per hour per gaming position[1]. Gaming positions are defined as "a seat for either a video lottery terminal (slot machine) or a table game (e.g. blackjack)."[2] Using this rate, the total projected RCRS trip generation is estimated to be in the range of 560 to 710 two-way veh/h during the afternoon, evening and weekend peak hours. This is shown in the following Table 15.

[1] Whitman, Requardt & Associates and RJM Engineering, Inc. *Traffic Impact Study – Baltimore Casino.* Retrieved from https://baltimoreldc.files.wordpress.com/2013/02/1525-russell-street-site-plan-traffic-impact-study-2013feb27.pdf
[2] Subhani, R. and Silberman, P. *Casino Trip Generation* [PowerPoint slides]. Retrieved from http://www.masite.org/PDF/Past/2014_05_18_3A3_Subhani_Silberman.pdf

Table 14: Phase 1 and 2 Trip Generation Summary

Phase	Use	Morning Peak Hour (veh/h)			Afternoon Peak Hour (veh/h)			Mid-Day Peak Hour (veh/h)			Friday Evening Peak Hour (veh/h)			Saturday Evening (veh/h)		
		IN	OUT	Total	IN	OUT	Total	IN	OUT	Total	IN	OUT	Total	IN	OUT	Total
1	35 Gaming Table	4	2	**6**	25	32	**57**	44	22	**66**	49	33	**82**	55	38	**93**
2	20 Gaming Tables	2	1	**3**	13	16	**29**	22	11	**33**	25	17	**42**	28	19	**47**
	750 Slot Machines	23	5	**28**	86	63	**149**	96	52	**148**	98	57	**155**	91	98	**189**
Phase 1 and 2 New Trips		**29**	**8**	**37**	**124**	**111**	**235**	**162**	**85**	**247**	**172**	**107**	**279**	**174**	**155**	**329**
Reduction for patrons at Slots and Tables (25%)		*-7*	*-2*	*-9*	*-31*	*-28*	*-59*	*-41*	*-21*	*-62*	*-43*	*-27*	*-70*	*-44*	*-39*	*-82*
TOTAL NEW TRIPS		**22**	**6**	**28**	**93**	**83**	**176**	**121**	**64**	**185**	**129**	**80**	**209**	**130**	**116**	**247**
Existing RCRS Trips (from Table 3 in Screening and Scoping Report		41	22	**63**	187	170	**357**	277	54	**331**	219	128	**347**	204	221	**425**
Total Future RCRS Trips		63	28	**91**	280	253	**533**	398	118	**516**	348	208	**556**	334	337	**672**
NET INCREASE		22	6	**28**	93	83	**176**	121	64	**185**	129	80	**209**	130	116	**247**

Table 15: Casino Trip Generation Rate

Timing	Use	Gaming Positions	Vehicle Trip Generation Rate (veh/gaming position)	Estimated Vehicle Trips
Existing	-1,250 slot machines	1,250	0.246	308 veh/h
			0.305	380 veh/h
Phase 1	-35 gaming tables at 5 to 6 seats per table	175 to 210	0.246	43 to 52 veh/h
			0.305	53 to 64 veh/h
Phase 2	-20 gaming tables at 5 to 6 seats per table -750 slot machines	850 to 870	0.246	210 to 215 veh/h
			0.305	260 to 265 veh/h
Existing plus Phases 1 and 2	-2,000 slot machines -55 gaming tables	2,275 to 2,330	0.246	560 to 575 veh/h
			0.305	690 to 710 veh/h

As shown in Table 15, the vehicle site-generated trips calculated using rates from comparable studies results in similar estimated site-generated vehicle volumes as the first-principles method previously presented. For example, the total existing plus Phase 1 and 2 vehicle trip generation was estimated to be 515 to 675 veh/h two-way total during the critical weekday afternoon, mid-day, evening and Saturday peak hours using the first-principles method. Using the vehicle trip generation rates, the estimated amount of traffic given the same land use is 560 to 710 veh/h two-way total, a difference of 35 to 45 two-way veh/h. Therefore, the 'first-principles' method outlined above is consistent with similar sites and is related to the existing Ottawa market demand for the RCRS. As such, the trip-generation analysis is considered an appropriate estimation of future trips to/from the proposed RCRS expansion.

8.3. PHASE 3 TRIP GENERATION

Phase 3 of the proposed RCRS expansion consists of a 200 room hotel and a 600 - 1,200 space above ground parking facility. The ITE Trip Generation Manuel provides a trip generation rate of 0.53 to 0.72 vehicles per hotel room during peak hours. Using this rate, the proposed 200 room hotel will generate approximately 105 to 145 veh/h during the weekday commuter peak and Saturday peak hours.

However, as the proposed hotel will likely serve patrons of the casino only, the typical hotel rate that captures business and recreational type trips is not necessarily appropriate. It is expected that a large majority of the patrons of the hotel will not leave the RCRS area during their hotel stay. As such, the hotel-generated vehicle trips were calculated based on a first-principles method outlined below in Table 16.

Table 16: Daily Trips Generated by Proposed 200 Room Hotel

Trip Generation Factors		Number of vehicle trips
Number of rooms	200 rooms	-
Number of vehicles per room	1 vehicle	-
Percent Rooms Occupied[3]	70%	140 potential vehicle trips
Percent of Internal trips (to/from Casino)	30%	0

[3] Statista. *Occupancy rate of hotels in Canada from 1995 to 2016*. Retrieved from: https://www.statista.com/statistics/437023/occupancy-rate-canada-hotels/

Trip Generation Factors		Number of vehicle trips
Percent of external trips (to/from Airport or other attractions)	70%	98 in/98 out = 196 two-way vehicles per day
Percent traveling during weekday morning peak hour	5%	10 veh/h (6 in/4 out)
Percent traveling during weekday mid-day peak hour	25%	49 veh/h (25 in/24 out)
Percent traveling during weekday afternoon peak hour	25%	49 veh/h (25 in/24 out)
Percent traveling during weekday evening peak hour	25%	49 veh/h (25 in/24 out)
Percent traveling during Saturday evening peak hour	25%	49 veh/h (25 in/24 out)

As shown in Table 16, the projected vehicle traffic associated with the proposed 200 room hotel is approximately 50 veh/h two-way total during the mid-day, afternoon, evening, and Saturday peak hours. It is assumed that these peak hours correspond to the RCRS peak hours.

8.4. SUMMARY OF VEHICLE TRIP GENERATION

A summary of the projected vehicle trip-generation for Phases 1, 2 and 3 of the proposed RCRS expansion is provided in Table 18. It is the total Phase 1, 2 and 3 traffic that will be added to the background traffic (existing x 1.05) at 2028 to derive total projected traffic along the Albion Road corridor for the 2028 horizon year.

8.5. MODE SHARES

Mode shares were derived based on a combination of the findings of the Casino de Lac-Lemay Special Generators Study, adjustments made for the more non-urban (rural) location of the RCRS and anecdotal information provided by the RCRS. The values in Table 18 were assumed to derive non-auto mode splits for the total projected person trips estimated following the build out of Phase 3.

Table 17: Projected Percentage Mode Splits by Time Period

	Time Period			
Travel Mode	Morning Peak	Afternoon Peak	Midday Peak	Evening Peak
Walk	0 %	0 %	0 %	0 %
Bicycle	0 %	0 %	0 %	0 %
Taxi	1 %	2 %	2 %	2 %
Transit	2 %	5 %	3 %	5 %
Auto	97 %	93 %	95 %	93 %
	100 %	**100 %**	**100 %**	**100 %**

When the Table 17 model splits and an average auto occupancy of 1.8 were utilized in conjunction with the total projected vehicle trips summarized in Table 18, the absolute volume of the modal shares for the full development of Phase 1, 2 and 3 of the RCRS expansion are as presented in Table 19.

Table 18: Summary of Phases 1, 2 and 3 Vehicle Trip Generation

Use		Morning Peak Hour (veh/h)			Afternoon Peak Hour (veh/h)			Mid-Day Peak Hour (veh/h)			Friday Evening Peak Hour (veh/h)			Saturday Evening (veh/h)		
		In	OUT	Total	In	OUT	Total	In	OUT	Total	In	OUT	Total	In	OUT	Total
Phase 1	35 Gaming Table	4	2	**6**	25	32	**57**	44	22	**66**	49	33	**82**	55	38	**93**
Phase 2	20 Gaming Tables	2	1	**3**	13	16	**29**	22	11	**33**	25	17	**42**	28	19	**47**
	750 Slot Machines	23	5	**28**	86	63	**149**	96	52	**148**	98	57	**155**	91	98	**189**
Reduction for Phases 1 and 2 (25%)		-7	-2	**-9**	-31	-28	**-59**	-41	-21	**-62**	-43	-27	**-70**	-44	-39	**-82**
Phase 3	200 Rm Hotel	6	4	**10**	25	24	**49**	25	24	**49**	25	24	**49**	25	24	**49**
TOTAL Phases 1, 2, 3		**28**	**10**	**38**	**123**	**112**	**235**	**146**	**88**	**234**	**172**	**115**	**287**	**173**	**151**	**325**
Existing RCRS Trips (from Table 3 in Screening and Scoping Report)		41	22	**63**	187	170	**357**	277	54	**331**	219	128	**347**	204	221	**425**
Total Future RCRS Trips		**69**	**32**	**101**	**310**	**282**	**592**	**423**	**142**	**565**	**391**	**243**	**634**	**377**	**372**	**750**

We are advised that the traffic volumes outlined above for gaming tables and slot machines are considered the maximum number RCRS would plan to construct. As the expansion details are refined, these volumes may decrease. However, the above assumptions represent a conservative estimate of the proposed expansion's peak period traffic generation.

Table 19: Projected Two-Way Model Share Volumes by Peak Time Periods (per hour and rounded)

	Time Period			
Travel Mode	Morning Peak	Afternoon Peak	Midday Peak	Sat. Evening Peak
Walk	0	0	0	0
Bicycle	0	0	0	0
Taxi	2	23	21	29
Transit	4	56	32	73
Auto: Driver	101	592	565	750
Passenger	80	474	452	600
Total Person Trip:	**187**	**1,145**	**1,070**	**1,452**

As summarized in Table 19, peak hour transit ridership ranges from 4 persons during the morning peak hour to a maximum of 75 persons during the evening peak hour. The total projected peak hour vehicle volumes identified in Table 19 are the same as those in Table 18.

8.6. VEHICLE TRIP DISTRIBUTION AND ASSIGNMENT

8.6.1. SITE-GENERATED TRAFFIC ASSIGNMENT

Traffic distribution for Phases 1 to 3 of RCRS expansion was based on the north-south split at the existing site driveways to Albion Road and then existing volume splits at study area intersections along the length of Albion Road. As shown in the Screening and Scoping Report, approximately 70% of RCRS-related traffic travels to/from the north today and 30% travels to/from the south. The resultant morning, afternoon and Saturday peak hour vehicle assignments are illustrated in Figure 1. Midday and Friday evening peak hour volumes are not shown as they are outside commuter peak hours are also lower than the weekday afternoon and Saturday volumes.

As shown in Figure 8, the increase in vehicle traffic through the Blossom Park community, located north of Lester Road, is projected to be 7 to 35 veh/h two-way total during the morning and afternoon peak hours. This represents an approximate 1% to 5% increase in vehicle traffic on Albion Road through this community during the commuter peak hours as a result of the Phases 1 - 3 of RCRS expansion. During the Saturday evening peak hour, the projected increase is traffic on Albion Road through Blossom Park is approximately 60 veh/h (two-way total), which equates to approximately 1 new vehicle every minute.

8.6.2. TOTAL PROJECTED HORIZON YEAR (2028) VOLUMES

The total projected peak hour traffic volumes associated with the proposed Phases 1, 2 and 3 expansion of RCRS were derived by superimposing 'new' Phase 1, 2 and 3 site-generated traffic volumes (Figure 8) onto existing traffic volumes which have been increased by a 1.05 factor (see Section 2.3) to account for background traffic growth to the horizon year 2028. The resulting total projected traffic volumes are illustrated as Figure 9.

The following Table 20 provides a summary of the projected performance summary for study area intersections for the 2028 horizon year volumes (Figure 9). Similar to the previous phases, all 'new' site-generated traffic is assumed to use the signalized RCRS access to Albion Road and the planned roadway modifications at the Albion/Leitrim and Albion/Lester intersection have been applied to the SYNCHRO analysis. In addition, to improve the level of service for the critical movement at the Albion/Leitrim intersection, signal timing was adjusted. The detailed SYNCHRO model output of the total projected traffic conditions is provided within Appendix F.

Figure 8: **Phases 1, 2 and 3 'New' Site-Generated Vehicles Trips**

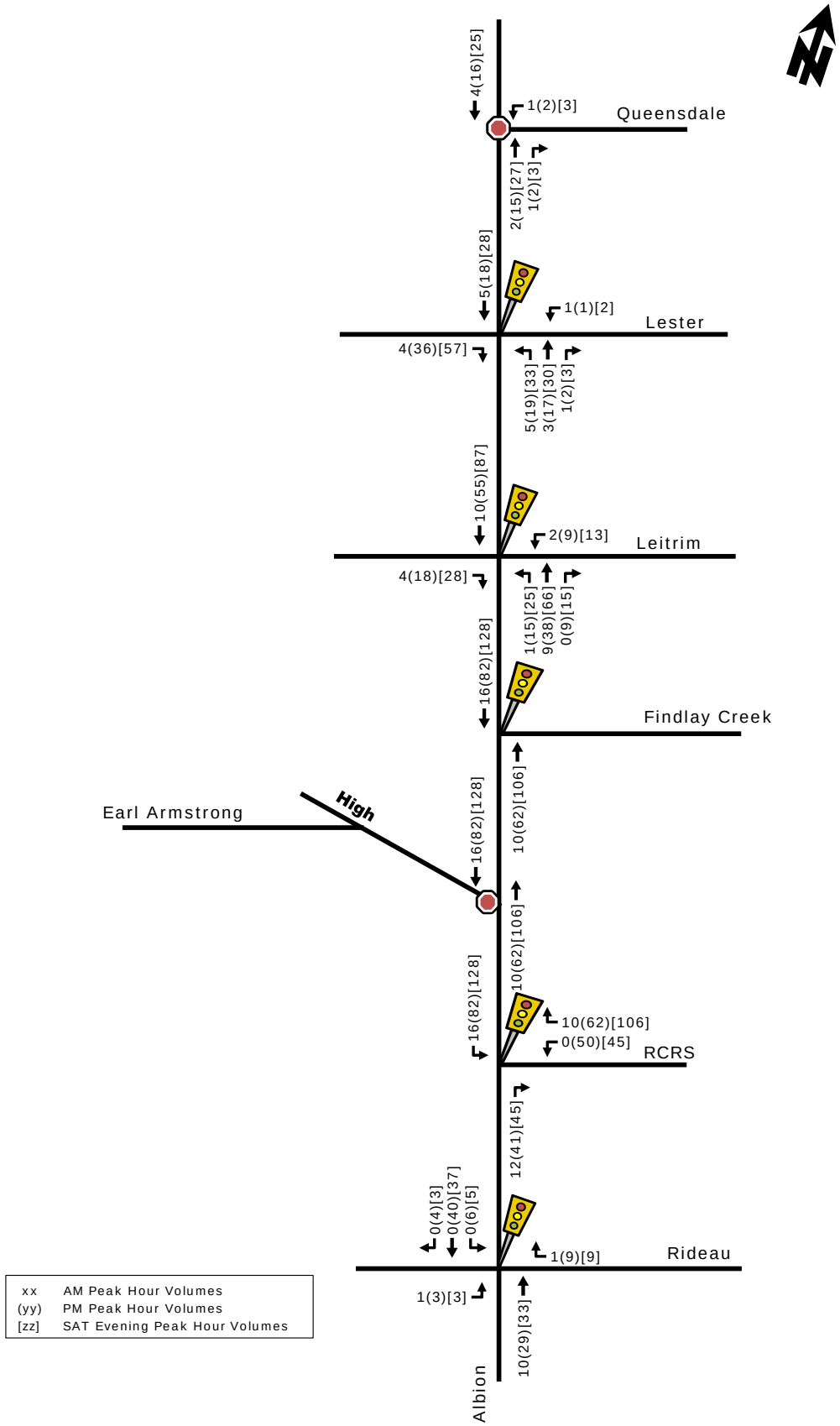


Table 20: Projected Performance of Study Area Intersections at Full RCRS Buildout

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'as a whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Albion/Queensdale	B(C)	12.8(16.7)	NBT(SBT)	11.5(14.3)	-	-
Albion/Lester	D(C)	0.85(0.76)	SBT(SBT)	30.6(23.7)	B(B)	0.61(0.63)
Albion/Leitrim	D(E)	0.86(0.94)	EBT(WBT)	30.6(50.7)	C(D)	0.79(0.90)
Albion/Findlay Creek	C(A)	0.80(0.49)	WBR(WBR)	16.0(9.5)	B(A)	0.63(0.48)
Albion/High	C(D)	17.0(27.5)	EBL(EBL)	0.8(2.4)	-	-
Albion/RCRS	A(A)	0.51(0.41)	NBT(WBR)	8.3(8.1)	A(A)	0.48(0.40)
Albion/Rideau	C(D)	0.72(0.87)	NBT(WBT)	20.5(24.4)	B(B)	0.68(0.67)
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.						

As shown in Table 20, with the implementation of the planned modifications to the Albion/Lester and Albion/Leitrim intersections, all signalized study area intersections 'as a whole' are projected to operate at an acceptable LoS 'C' or better during the weekday morning and afternoon peak hours, except the Albion/Leitrim intersection during the afternoon peak hour, which is projected to be at LoS D. In addition, the "critical movements" at study area intersections are projected to operate at an acceptable LoS 'D' or better with the aforementioned signal timing and geometric modifications to certain intersections, except the same Albion/Leitrim which will have a LoS 'E' movement (WBT) in the afternoon peak hour.

With regard to the existing Earl Armstrong – High Road link to the RCRS facility, it is a very low volume link immediately west of Albion Road as depicted in Figure 3, where two-way peak hour volumes are in the 90 veh/h to 160 veh/h range. As the RCRS builds out over the next five years, this link will attract some of the new site-generated traffic, but a very small percentage compared to Albion Road or Bank Street. Of the additional new vehicle trips projected to be generated by an expanded RCRS, the use of the High Road – Earl Armstrong link is expected to be in the 0 – 15 vph two-way total during peak hours. This new volume will have no impact on the operation of the High Road – Earl Armstrong link.

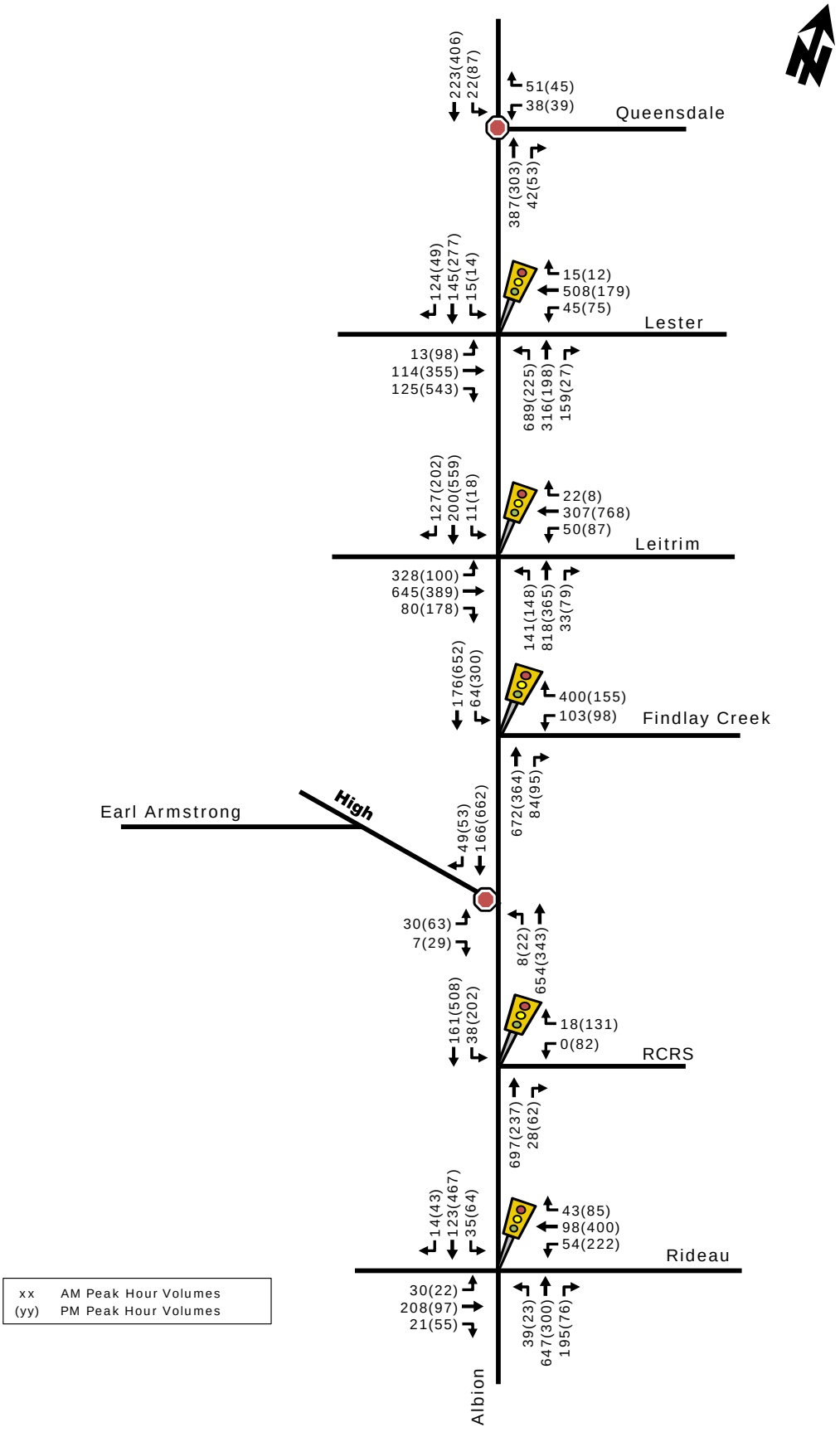
9. BACKGROUND NETWORK TRAFFIC

9.1. CHANGES TO THE TRAFFIC NETWORK

As previously mentioned, there are a number of transportation network changes identified in the City's Affordable Network in the TMP within the vicinity of the RCRS, which are listed below and depicted in Figure 6 and Figure 7.

- O-Train extension from Hunt Club to Bowesville Road (2021);
- Airport Parkway widening to 4-lanes (2014- 2031);
- Lester Road widening to 4-lanes (Post 2025);
- Leitrim Road realignment and widening to 4-lanes (Post 2031 - EA underway);
- Bank Street widening to 4-lanes from: Leitrim to Findley Creek (Post 2005);
- Bank Street widening to 4-lanes from: Findley Creek to Rideau (Post 2031); and
- Earl Armstrong Road widening to Bowesville (Post 2031 – EA process initiated).

Figure 9: Total Projected 2028 Horizon Year Peak Hour Traffic Volumes



These are depicted on Figure 3 and Figure 4. It is noteworthy that the Bowesville LRT station, shown in Figure 3, will be located approximately 2.5 km from the RCRS.

The majority of these broader study area road network modifications are planned to be in place by the 2028 horizon year and as such many of the existing capacity issues a few kilometers north of the RCRS will be addressed. Of particular relevance are the planned improvements to the Albion/Leitrim intersection (2023), the widening of Lester Road (Post 2025) and the staged widening of the Airport Parkway (2014-2031).

Of significant interest to the RCRS and most likely to Blossom Park residents as well, is the planned extension of Earl Armstrong Road from Bowesville Road east to Hawthorne Road, and move importantly, the section from Albion Road east to Bank Street, for which the Environmental Assessment Study will be initiated shortly (by the City). The preferred corridor/alignment for the extension of Earl Armstrong has not yet been determined, but given the constraints in the area it could be in close proximity to the RCRS.

As the alignment of this road extension could potentially be very close to, or adjacent to, the north boundary of the RCRS, their interests are to make sure all impacts can be accommodated/remediated, but most importantly to connect to it as a means of getting direct access to Bank Street via a City arterial road. We are advised the RCRS supports the study, will be active in it, and may assist the City in front-ending the cost of the first two lanes from Albion Road to Bank Street, as it is currently scheduled for after 2031. The importance of having this arterial road link to Bank Street is that it will attract some site-generated traffic away from Albion Road which will reduce traffic pressure on the road network to the north, and it will also reduce some RCRS traffic that currently uses Albion Road through the Blossom Park community (north of Lester).

9.2. POSSIBLE RCRS VEHCILE CONNECTION TO BANK STREET

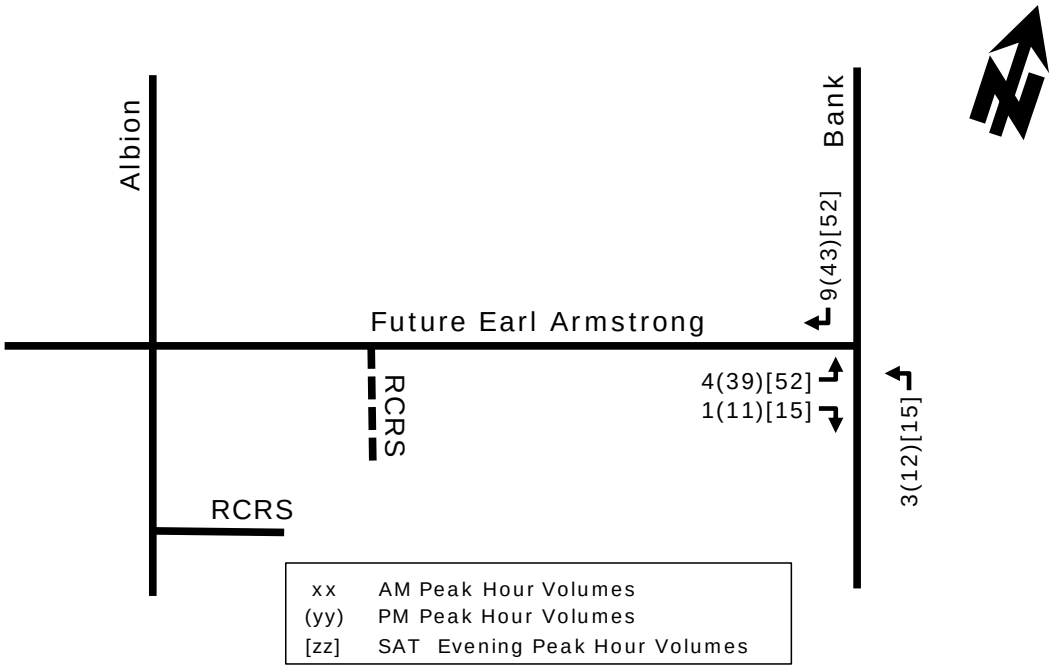
This section estimates the potential for RCRS traffic to use an Earl Armstrong link from Albion Road to Bank Street. The projected redistribution of traffic to/from a site connection to Bank Street is based on the existing site-generated traffic travelling to/from the east on study area roads, as shown previously. As Bank Street veers west and intersects Albion Road north of the study area, it is assumed that most site-generated traffic traveling to/from the north and west would continue to use Albion Road if there was a Bank Street connection via Earl Armstrong, however, a small percentage heading southbound may use Bank Street. Based on the foregoing, it is estimated that approximately 18% of site-generated traffic could be expected to use a connection to Bank Street. This equates to the following number of vehicles during the peak hours for all three phases combined, as summarized in Table 21.

Table 21: Traffic Distribution to Potential Bank Street Connection

Timing	Site-Generated Traffic to Albion Road (two-way veh/h)				Site-Generated Traffic that could be redirected to Bank Street (two-way veh/h)			
	AM Peak	PM Peak	Evening Peak	Saturday Evening	AM Peak	PM Peak	Evening Peak	Saturday Evening
Existing	52	293	285	349	11	64	62	76
Phase 1	5	47	67	76	1	10	15	17
Phase 2	18	98	104	126	4	21	23	28
Phase 3	8	48	64	64	2	11	14	14
Total	**83**	**486**	**520**	**615**	**18**	**106**	**114**	**135**

Based on the assumption that all traffic traveling to/from the east and a percentage a traffic travelling to/from the south would use a more direct road connection to Bank Street, the resulting distribution shows a total (excluding the AM Peak) of 106 to 135 veh/h two-way total using a Bank Street link, compared to 485 to 615 veh/h two-way total using Albion Road. This amount of traffic, when distributed through the intersection, would likely not warrant signalization. The following Figure 10 illustrates the total projected site-generated vehicle volumes to/from RCRS that is estimated to use a potential connection to Bank Street.

Figure 10: Total Projected Traffic to/from Bank Street



In summary, when the first two lanes of the Earl Armstrong Road Extension is provided between Albion and Bank, there will be a high quality arterial road connection to Bank Street that can be used by RCRS patrons. Given this planned future roadway connection, providing a direct "driveway" access from RCRS to Bank Street via the existing rear service road is considered both redundant and not practical.

9.3. BACKGROUND TRAFFIC GROWTH

With regard to background traffic growth, we have reviewed both 10 years of historic traffic counts at the Albion/Rideau intersection and the 2031 TMP model plots provided to us by the City. Based on these two sources (Appendix E), and as the Findley Creek Community has recently built out, we propose to use a 0.5% increase per year for background traffic growth. As such, for a 10 year horizon, 5 years after completion of Phase 3, this results in a background traffic growth factor along the Albion Road corridor of 1.05.

9.4. FUTURE AREA DEVELOPMENT

There is significant development growth expected in the south end of Ottawa, within proximity of RCRS. The City has Community Design Plans (CPD) for the Riverside South, Greely, and Leitrim communities, shown in Figure 11. The growth in these areas will increase traffic volumes and transit ridership within the area as developments are built-out. The proposed changes to the road network and transit network, as outlined in Section 8.1 and the City's TMP are directly-related to the expected growth within these communities. Table 22 summarizes the projected growth in terms of population, housing units and jobs as outlined in each CPD.

It should be noted that while an Earl Armstrong link has the potential to remove some traffic from travelling through Blossom Park, it would also add traffic to Bank Street (up to 10 veh/h in the morning peak hour and 45 veh/h in the afternoon peak hours, in peak direction) which is already under pressure from Findley Creek Drive north. If/when there is the opportunity to provide the first two lanes of Earl Armstrong from Albion to Bank, the City will need to determine if the improved access to the RCRS facility and the improved traffic distribution, out weights additional traffic impact on the Bank Street corridor.

Figure 11: CDP Growth Areas in Proximity to RCRS

Table 22: Projected Growth in Riverside South, Leitrim and Greely CDPs

Community	Date of CDP	Projected Growth			
		Residents	Dwelling Units	Jobs	Retail (m^2)
Riverside South	2016	41,009	15,614	17,703	98,000
Greely	2012	~4,570	~1,728	-	-
Leitrim	2005	15,000	5,300	6,900	30,000
Note, that given the date of these CDP's some of the identified development has already occurred and is included in the study area's existing traffic counts.					

It is noteworthy that a portion of this growth has occurred since the CDPs were approved. In addition, related traffic will be distributed over several north-south arterials (Albion Road, Bank Street, Limebank Road/Riverside Drive) and east-west arterials (Leitrim Road, Earl Armstrong Road, and Mitch Owens Road). As mentioned previously, the City's planned modifications for the road and transit network in south-central Ottawa is designed to accommodate person and vehicle traffic generated by the future growth in these areas.

10. DEMAND RATIONALIZATION

10.1. NETWORK CAPACITY ISSUES

Within the immediate vicinity of the RCRS there are no road network capacity issues related to the projected 2028 horizon year traffic volumes. The site driveway connections will continue to operate at an acceptable level of service as will immediately adjacent intersections.

Well known to the City and area residents, are the capacity deficiencies on the arterial roads well downstream (to the north) from the RCRS. As the RCRS is not a significant commuter peak hour traffic generator, these deficiencies are due primarily to suburban and bedroom community traffic growth using River Road, Albion Road, Leitrim Road, Bank Street, Lester Road and the Airport Parkway to travel to/from the urban core of Ottawa. These existing and projected road network capacity

deficiencies are well known to the City and it is why that are increasing the capacity of the Albion/Leitrim intersection by 2023, and why they are also planning to widen the Airport Parkway, Lester Road and Bank Street as described in Section 9.1.

While these planned road network enhancements are very important to accommodate existing and planned growth, of particular importance/interest to RCRS is the planned easterly extension of Earl Armstrong Road. The EA Study for the extension from Bowesville east to Hawthorne will commence shortly and there is the potential for RCRS to work with the City in fronting the first two lanes from Albion to Bank Street. This extension would reduce demand on the road network to the north where road capacity issues are the greatest, but equally important is the traffic volume reduction through Blossom Park with the redistribution of some RCRS traffic to Bank Street.

10.2. TDM OVERVIEW

Given its somewhat rural location and the fact that the RCRS is a region-wide draw as opposed to a local community draw, there is little potential for a meaningful walk/cycle component. However, with the planned future extension of LRT to the Bowesville Station (2021) to a location just south of High Road, and the related proposed multi-use pathway along High Road to Albion Road, the RCRS will be better connected to the area's pathway network (including the Osgoode Pathway) and to the Bowesville Station. When the City extends the Earl Armstrong Road from Bowesville east to Albion and beyond, more appropriate cycling and pedestrian facilities can be provided to improve the connection to the Bowesville station. With regard to the park-and-ride lot that will be adjacent to the LRT station, while it will be of significant benefit to rural and Riverside South residents who take transit to central Ottawa, we do not foresee it of benefit to the RCRS as far as reducing vehicle travel to/from the site. With an LRT station approximately only 2.5 km from the RCRS, the opportunity will exist to provide a shuttle service to service/attract patrons. Including LeBreton Flats and downtown Ottawa, there are six LRT stations in very close proximity to residents and hotel guests within the greater downtown. If a frequent peak period shuttle service were provided between the Bowesville Station and the RCRS, it is expected that transit ridership would increase meaningfully as it becomes a very viable, stress free alternative to a 18 km car drive from downtown to RCRS. Ridership could increase even further when LRT is extended into the Ottawa International Airport. The foregoing Table 19 summarizes the projected mode shares for the RCRS expansion.

At some time in the future there may be sufficient transit ridership demand from growth areas south of Mitch Owens Road to warrant OC Transpo providing transit service to these areas. If this were to happen, there may be the opportunity to include a transit stop at RCRS. However, as previously noted, normal day to day activity at RCRS will not warrant City transit service on its own. With the planned expansion at the RCRS there is the potential for periodic events such as music concerts, that could benefit from a bump-up in transit service. If/when these events occur, it is recommended that dialogue occur between RCRS and OC Transpo to determine how best to provide transit services to these events, and at what cost. Attached as Appendix G is the City's TDM-Supportive Development Design and Infrastructure Checklist.

11. DEVELOPMENT DESIGN

11.1. CIRCULATION ACCESS

As previously noted, the existing RCRS has one signalized and three unsignalized site driveway connections to Albion Road. As shown in Figure 2: Expansion Concept Plan, no new site connections are proposed to Albion Road. As summarized in Table 20, the signalized site connection to Albion is projected to operate at an excellent LoS A at the horizon year, therefore, no modifications are required to site driveways or to the adjacent section of Albion Road to accommodate traffic from the proposed expansion. The current site intersections are adequately designed to accommodate the turn requirements of tractor trailer trucks, intercity buses, horse trailers and patron vehicles.

The site is very porous with regard to access/egress to various parking modules. There are a number of ways to get into and out of each module and this spreads traffic throughout the site and avoids any delays/conflicts. The patron vehicle drop-off function occurs via a vehicle loop at the front door, removed from access to the parking modules and thereby eliminating any on-site congestion/delay potential.

Tractor trailer delivery occurs at the north and south ends of the proposed facility and as shown on the above-noted Figure 2, the existing and proposed on-site road network can accommodate tractor trailer turn requirements.

11.2. DESIGN FOR SUSTAINABLE MODES

The on-site parking is divided into different zones for specific/controlled use. There are specific parking areas for patrons, valet parking, OLC staff parking, racing staff parking and bus parking. There are currently approximately 2,500 on-site parking spaces, with the plan to add a 600 to 1,200 parking structure as part of Phase 3. This parking structure could displace 200 to 300 existing parking spaces.

With regard to on-site sidewalks, they exist and will be maintained on both sides of the main driveway from Albion Road to the building's main entrance. Sidewalks are also provided along the full west frontage of the facility and extend into the adjacent parking lots. Patrons parked in any module can easily walk from their vehicle to one of these sidewalks to access the facility's main entrance.

With regard to on-site bus accommodation, there are/will be a minimum of 30 bus parking spaces as well as a lengthy bus lay-by lane near the front entrance of the facility, that connects directly to the drop-off loop at the front door. These bus facilities are for chartered buses as there is no OC Transpo service to the site. The closest OC Transpo bus service is on Findley Creek Drive at Albion Road approximately 1.8 km to the north.

When the Bowesville LRT station is operational and if/when a shuttle bus service is provided between the LRT station and the RCRS, the on-site bus facilities can also be used by these shuttle buses due to their proximity to the front door.

12. PARKING SUPPLY AND SPILLOVER

As noted in foregoing Section 11.2, the proposed parking supply at full RCRS development is in the 2,500 to 3,500 range, depending on demand. The By-Law requirements for full build-out of Phase 3 have yet to be determined, however, we are advised that sufficient parking will be provided to meet the needs of the facility. As there is no other off-site parking supply in the immediate area, there is no potential for spill-over parking.

With regard to on-site bicycle parking, we are advised that it is too early in the process to determine the number required and their location, however, we are also advised that By-Law requirements will be met and bicycle parking will be provided in a safe, secure and accessible location.

13. BOUNDARY STREETS

13.1. MOBILITY

The only existing boundary street is Albion Road and there are no plans, or need, to modify it adjacent to the RCRS site. In the future, when Earl Armstrong Road is built adjacent to the north boundary of the site, it will initially be built as the first two lanes of an ultimate four- lane (possibly divided) arterial. As documented in Section 9.1, the RCRS supports the extension of Earl Armstrong Road and may assist the City by front-ending the cost to build the first two lanes from Albion Road east to Bank Street. The importance of having this arterial road link to Bank Street is that it will attract some site-generated traffic away from Albion Road which will reduce traffic pressure on the road network to the north, and it will also reduce some of the RCRS traffic that currently uses Albion Road through Blossom Park community (north of Lester). During the upcoming EA Study for the Earl Armstrong Road Extension, the RCRS will be involved and would likely request that a direct driveway connection be provided to Earl Armstrong from their site.

As noted in previous modules, there are no sidewalks or bicycle lanes on Albion Road in the study area. The upcoming EA study will determine what is required on the future Earl Armstrong Road extension. Also, as previously documented, there is no planned OC Transpo service on Albion Road, however, shuttle service has been recommended to connect the site to the Barrhaven LRT station when it becomes operational in 2021, and it is only 2.5 km from the RCRS.

13.2. ROAD SAFETY

The City has provided five years of collision data (2011 to 2015) for Albion Road between High Road and Rideau Road. It is included as Appendix H and identified that there were only 4 collisions during this five year period. One included only a single vehicle due to a slippery surface. The other three collisions each involved two or more vehicles. Two were rear end collisions and one was two approaching vehicles. This very low number of collisions over a five year period is indicative of a very safe operating environment along the site's Albion Road frontage.

13.3. NEIGHBOURHOOD TRAFFIC

As there is no neighbourhood in the immediate vicinity of the RCRS site, there are no related "local" traffic impacts. However, as presented in the TA Forecasting module, as some RCRS traffic currently uses Albion Road through Blossom Park (5 km to the north), of interest to the City and the RCRS is the planned extension of Earl Armstrong from Albion Road to Bank Street, and its potential to remove some RCRS traffic from travelling through Blossom Park. Section 9.2 discusses this topic and Figure 10 presents the estimate of total projected RCRS traffic that would shift from Albion Road to Bank Street if/when the Earl Armstrong link is provided.

Regarding the potential for Findley Creek Drive to be used as a cut-through route, this is very unlikely as it is a lengthy (2.3 km) curvy collector street with a lower speed limit than the adjacent arterial roads, numerous STOP signs along it length and traffic signal control at its Albion and Bank Street intersections. We are not aware of any current community concern with cut through traffic and we do not foresee it becoming an issue, particularly once Earl Armstrong is extended east of Albion Road.

14. ACCESS INTERSECTIONS

This topic is addressed previously in this module and therefore is not repeated. With regard to the MMLoS at the site's signalized intersection to Albion Road, the analysis results are summarized in Table 1 and the worksheet is included as Appendix I. It is noteworthy that due to the RCRS's location there is not an Official Plan policy designation to assist in the MMLoS. Accordingly, the "other designations" category was used. The existence of a paved shoulder on Albion to accommodate pedestrians and cyclist, and Albion being a truck route were accounted for in Table 23 summary.

Table 23: Albion/RCRS MMLoS Results Summary

Mode	Level of Service	Target	Target Met?
Pedestrian	PLoS 'D'	PLoS 'D'	Yes
Cycling	BLoS 'F'	BLoS 'C'	No
Transit	n/a	No transit service	n/a
Truck	TkLoS 'C'	TkLoS 'D'	Yes
Vehicle	LoS 'A'	LoS 'D'	Yes

15. TRANSPORTATION DEMAND MANAGEMENT

As identified in Table 17 and Table 19 of the TIA Forecasting Report, the bike and walk travel modes to/from the site are projected to be non-existent or negligible and the City has no plans to provide bicycle lanes or sidewalks along the length

of Albion Road. With regard to transit (non-charter) service, even with a planned shuttle service to the Bowesville LRT station (open 2021), it is expected to be modest, with ridership being in the 4 to 75 person/hour range depending on the peak hour.

Even with these low projected walk/bike/transit modal splits and the lack of related facilities because of the site's location, the following are TDM measurements that should be addressed/implemented by the RCRS:

- Provide a sufficient number of visible, safe, secure and weather protected bicycle parking spaces;
- Provide on-site locker rooms and showers for employees;
- Provide frequent shuttle service between the Bowesville LRT station and the site; and
- Advertise the availability and benefits of using LRT and the shuttle service to travel to/from the site.

16. ADJACENT NEIGHBOURHOODS

This element is exempt for this project except for the Blossom Park discussion previously included herein as Section 13.3.

17. TRANSIT

Transit service and ridership is previously discussed herein in Section 11.2.

18. STUDY AREA INTERSECTION DESIGN

As previously documented herein, the site's existing signalized intersection with Albion Road and its other three non-signalized intersections are projected to operate at excellent levels with no required improvements at full site development. The immediately adjacent intersections at Rideau Road and Findley Creek Drive (both signalized) are also projected to operate (Table 20) at an excellent level of service in the LoS A to B range, with the critical movements being in the LoS C to D range.

With regard to downstream intersections quite remote from the RCRS (Albion/Leitrim and Albion/Lester), the City has plans to improve these intersections and widen roads as identified in Table 7.

As previously noted herein, the City has initiated the EA Study process for the Extension of Earl Armstrong Road. The RCRS supports and will be involved in this study and has an interest in front-ending the initial two lanes of this road between Albion Road and Bank Street. If possible, they would also like a site driveway connection to this new road. This, and all related details will be addressed in the upcoming EA Study and the functional design of the road.

19. SUMMARY OF IMPROVEMENTS INDICATED AND MODIFICATION OPTIONS

As discussed herein, the proposed three phase expansion of the RCRS facility has minimal traffic impact and no requirements on the immediately adjacent road networks. Further north where RCRS traffic is only a small percentage of total existing and projected traffic, there are intersection and network capacity issues, however, the City has planned intersection and road widening improvements to address these issues.

The primary traffic concern is the modest amount of RCRS traffic that uses Albion Road north of Lester Road (through Blossom Park). The provision of the Earl Armstrong Road Extension east to Bank Street and to Hawthorne Road will attract some of this Albion Road traffic over to Bank Street thereby minimalizing RCRS-generated traffic through Blossom Park. The EA Study process for the Extension has been initiated by the City, the RCRS has said they will be involved in the study, and they are interested in front-ending the cost of the first two lanes from Albion Road to Bank Street. They have also said they would like a site driveway connection directly to the new link, if possible.

Due to the site's location and the type of facility that it is, the walk/bike/transit modes of travel are and will be low. However, a number of TDM measures have been identified to maximize these sustainable travel modes including providing shuttle bus service between the RCRS site and the forthcoming (2021) Bowesville LRT Station.

20. RECOMMENDATIONS

Based on the foregoing analysis and findings, the Site Plan for the proposed RCRS Expansion is recommended from a transportation perspective.

Please advise of any comments or concerns with regard to this Transportation Impact Assessment Report.

Prepared by:

Ronald Jack, P.Eng.
Senior Transportation Engineer

Attachments

Appendix A

Screening Form

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

City of Ottawa 2017 TIA Guidelines
TIA Screening Form

Date 2-Oct-17
Project RCRS Expansion
Project Number 476375 01000

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

Module 1.1 - Description of Proposed Development	
Municipal Address	4837 Albion Road, Ottawa
Description of location	On a two lane, rural arterial in south Ottawa between the Rideau Road and High Road intersections.
Land Use	Current use is a racetrack, restaurant and slot machines. Proposal is to add 750 slot machines, 45 gaming tables, a 200 room hotel and a 600-1200 space parking garage.
Development Size	See previous answer
Number of Accesses and Locations	The site currently has a signalized intersection with Albion Road including turning lanes, as well as three other unsignalized driveway connections. A future site connection to the planned Earl Armstrong Road Extension is also desirable.
Development Phasing	Phase 1 is for 35 gaming tables. Phase 2 is for 750 additional slot machines and 45 additional gaming tables. Phase 3 is for a 200 room hotel and a 600-1200 space parking structure.
Buildout Year	Approximately 5 years
Sketch Plan / Site Plan	See attached

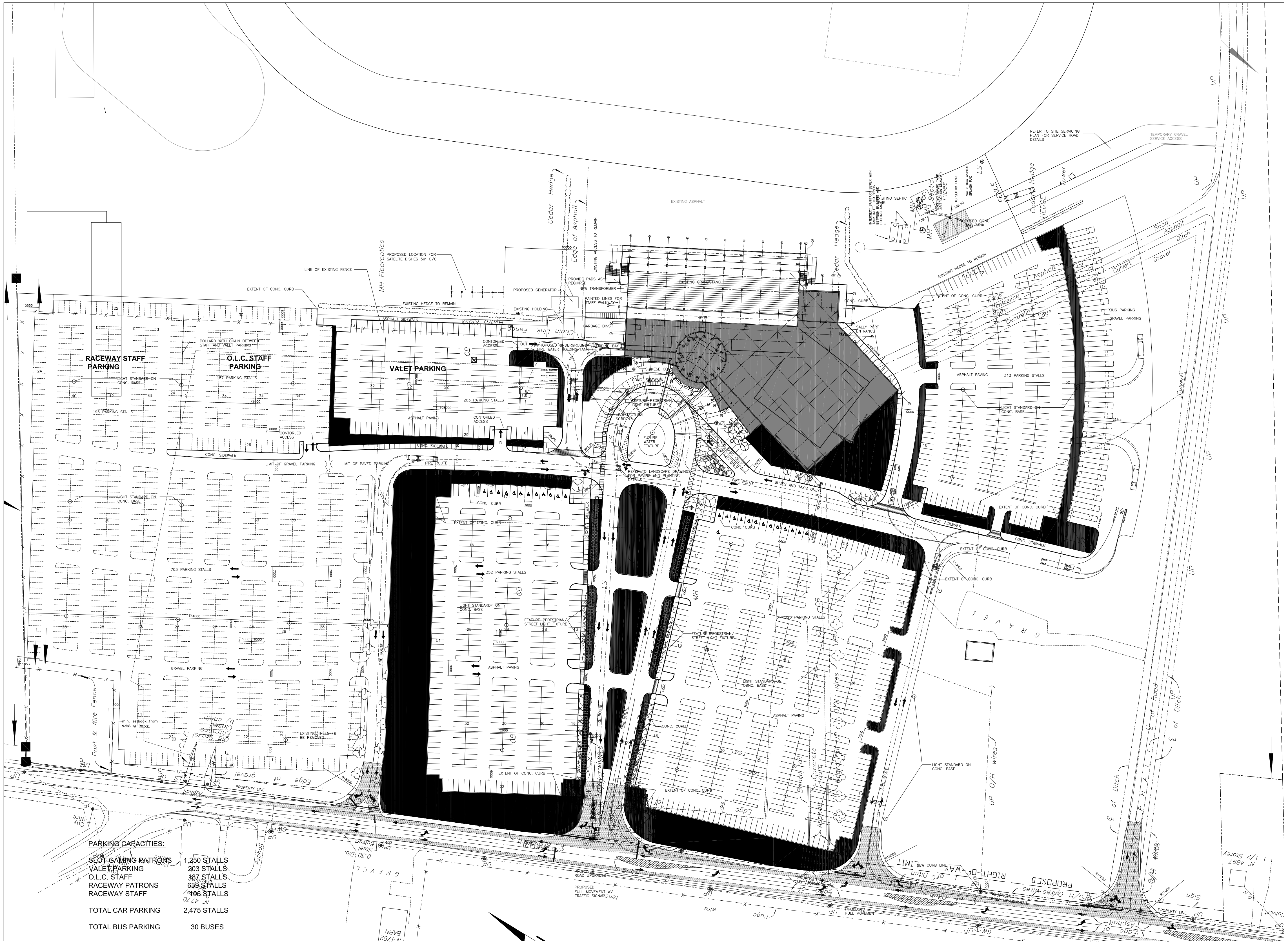
Module 1.2 - Trip Generation Trigger	
Land Use Type	See Module 1.1
Development Size	Based on the above-noted lane use, peak hour site-generated traffic will be in the range of 50 veh/h to 340 veh/h, depending on which peak hour is being considered.
Trip Generation Trigger Met?	Yes

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	>60	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	No	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No	
The development includes a drive-thru facility	No	
Safety Trigger Met?	Yes	

Appendix B

Existing Site Plan



Hard Rock HOTEL & CASINO

EXISTING OVERALL SITE PLAN

SOSH

Appendix C

Existing Peak Hour Traffic Volumes at Study Area Intersections

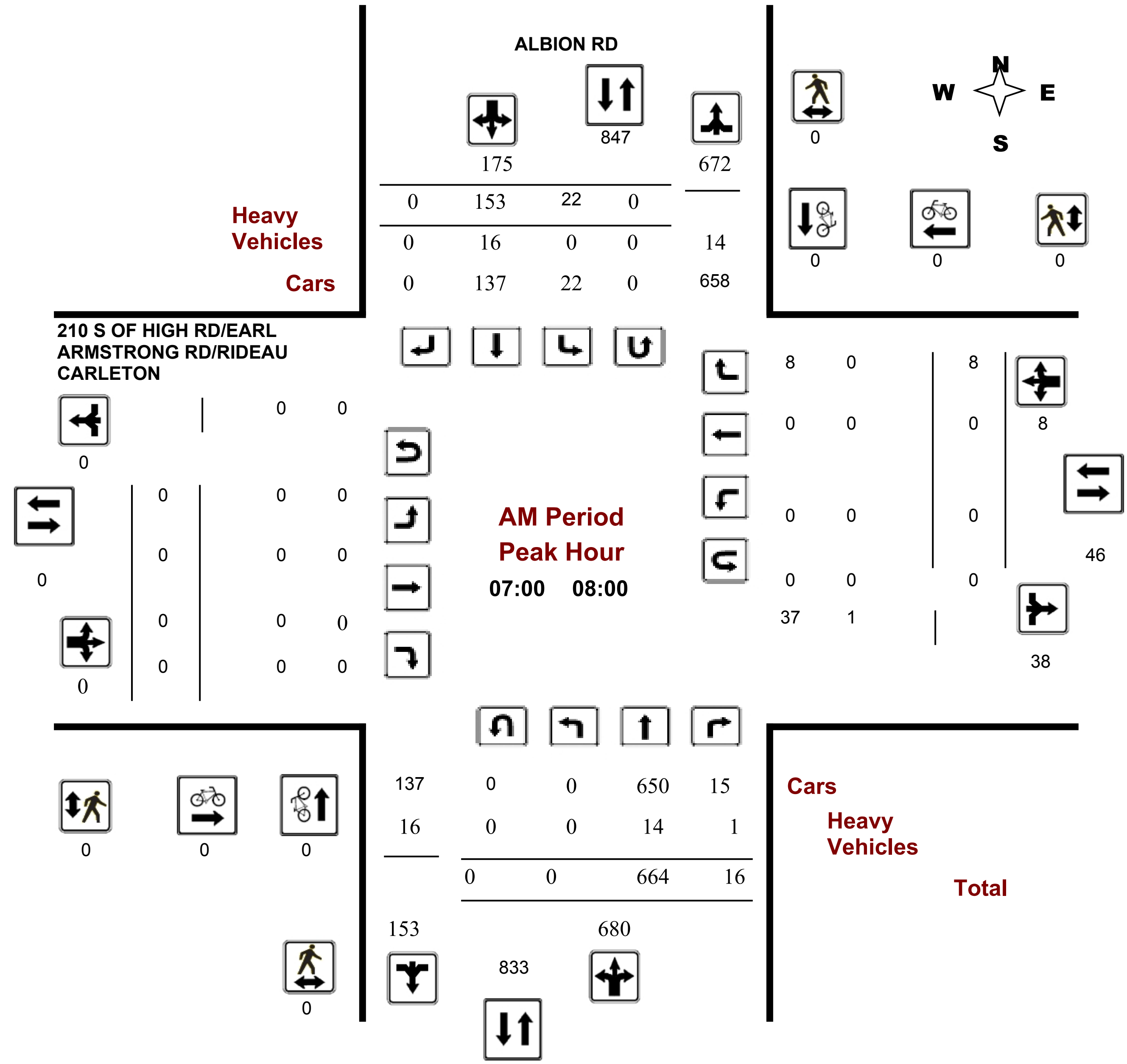
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

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



Comments

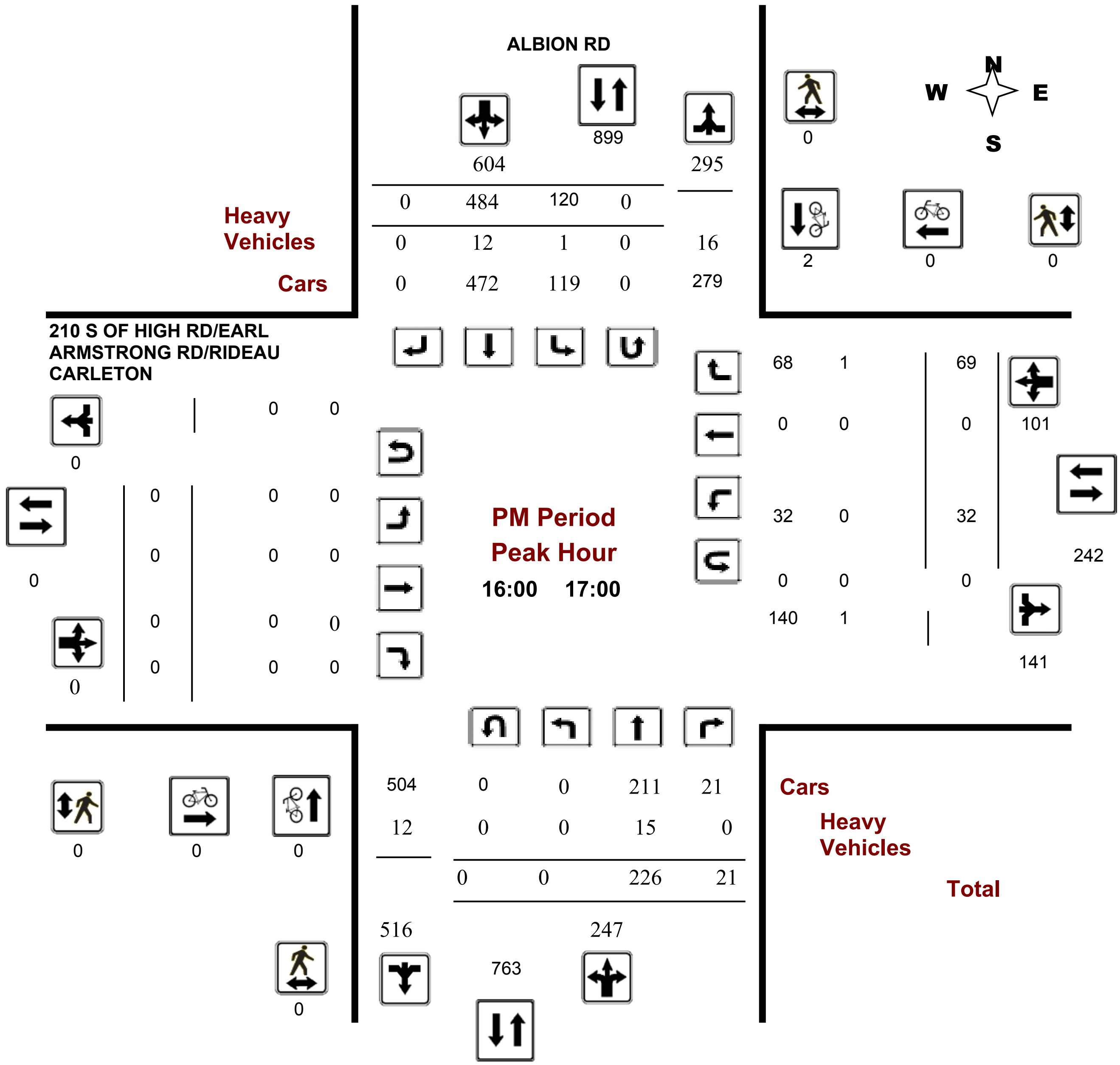
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

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

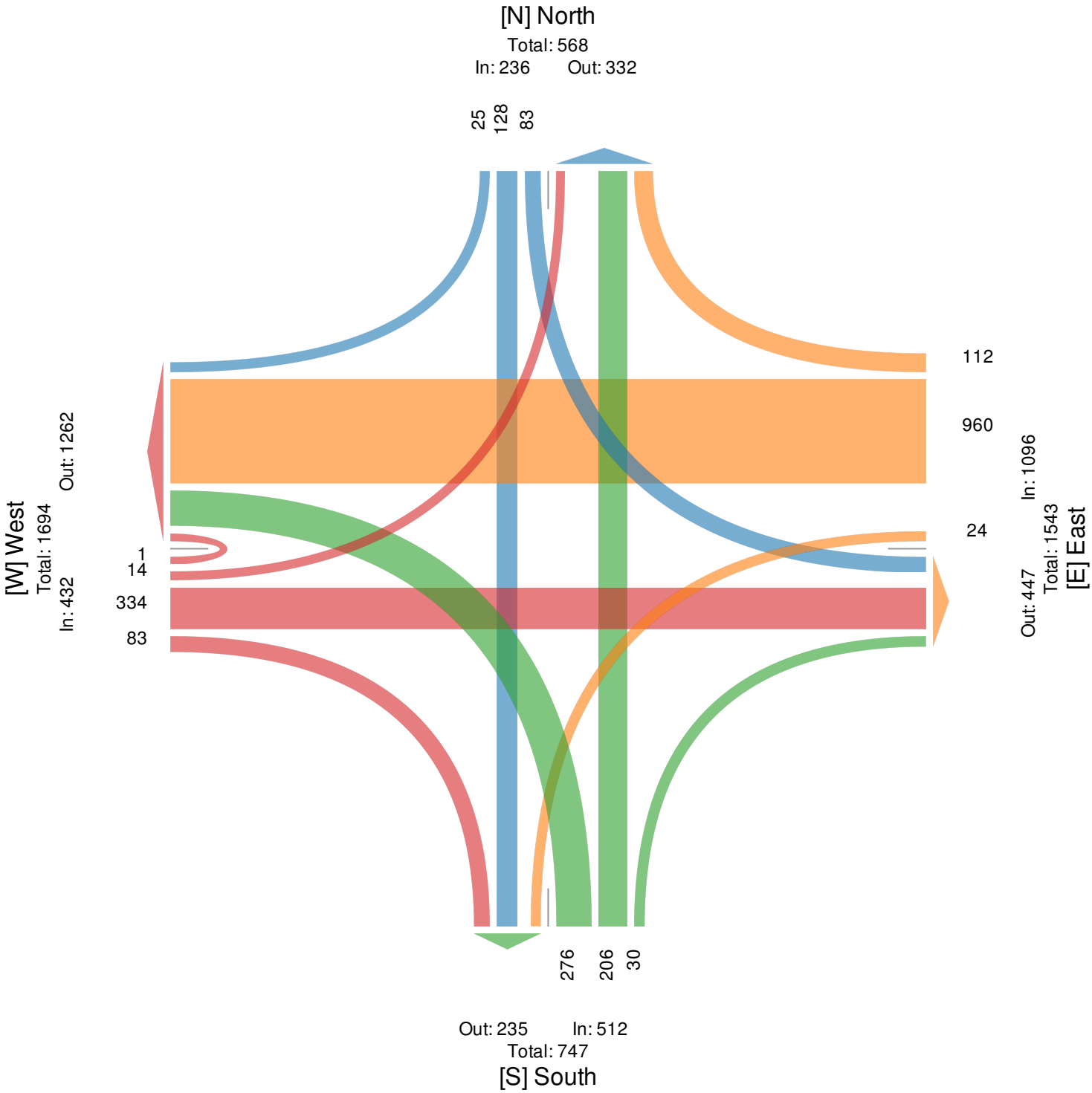


Comments

5207035- Albion and Bank- Oct 15th - TMC

Thu Oct 15, 2015
AM Peak (7:30AM - 8:30AM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 266564, Location: 45.35392, -75.643018, Site Code: 35458103

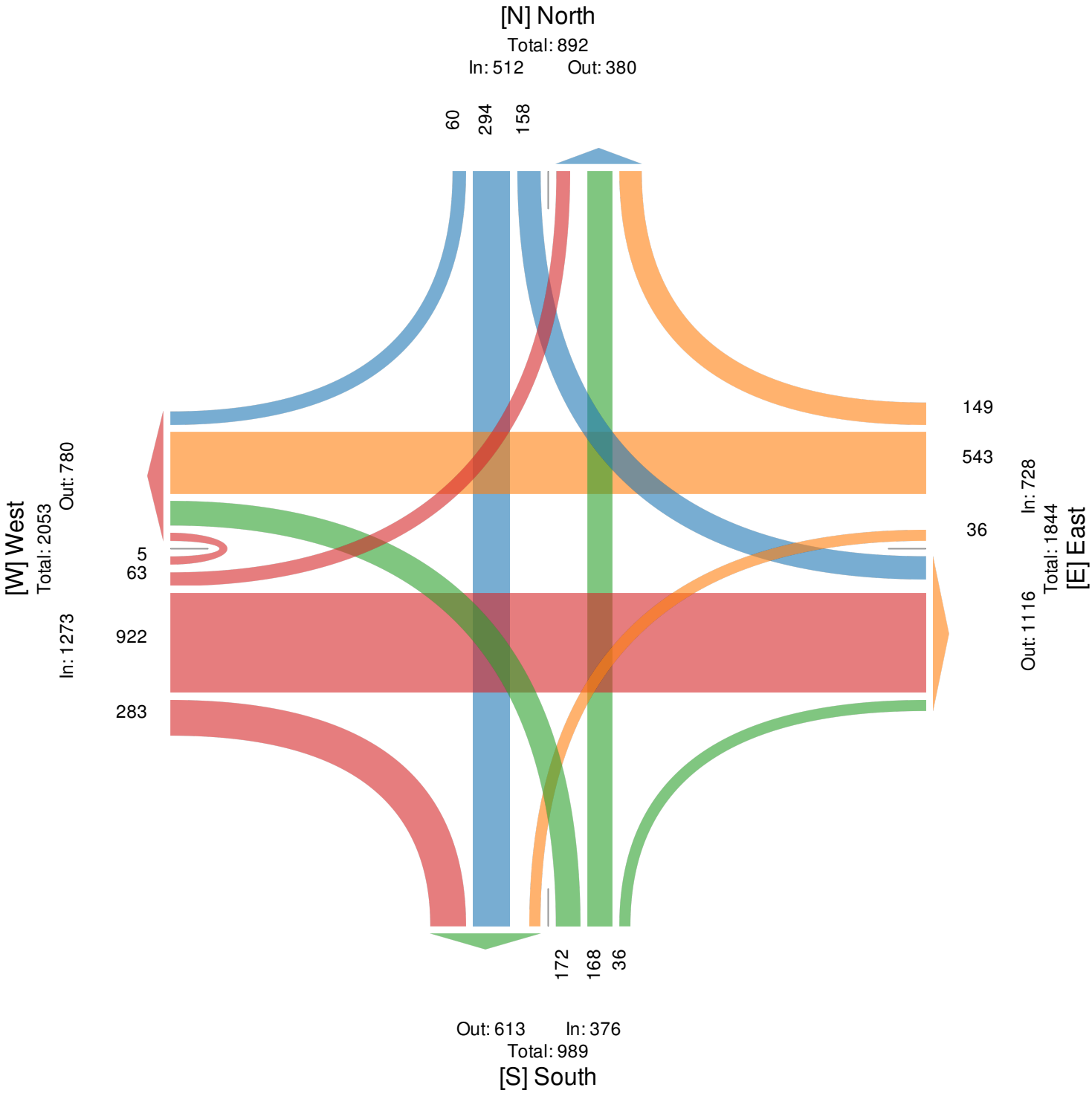
Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



5207035- Albion and Bank- Oct 15th - TMC

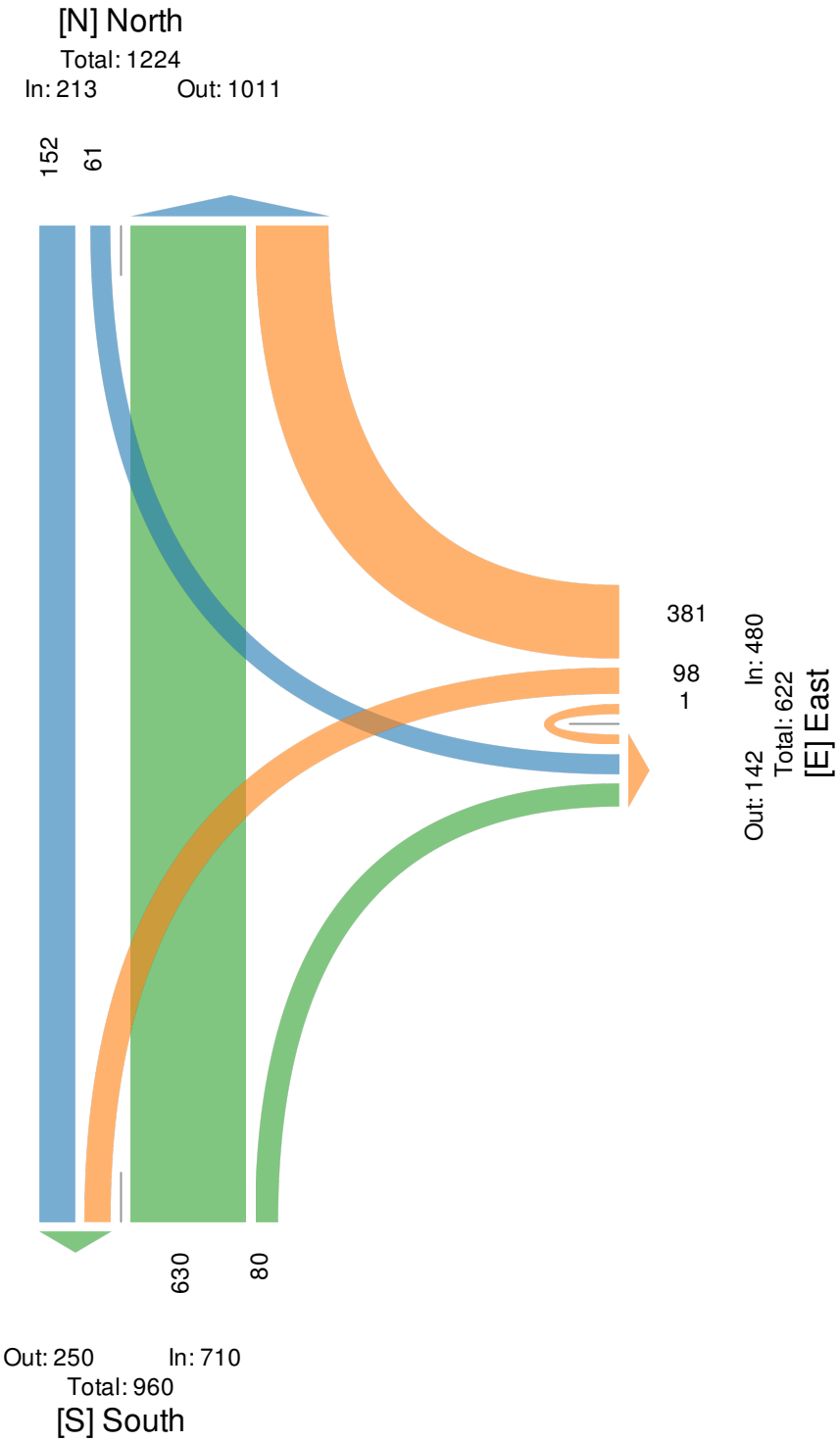
Thu Oct 15, 2015
PM Peak (4:15PM - 5:15PM) - Overall Peak Hour
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 266564, Location: 45.35392, -75.643018, Site Code: 35458103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



5273860 - Albion and Findlay Creek - Sept - 28th - TMC
Wed Sep 28, 2016
AM Peak (7AM - 8AM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 350246, Location: 45.309444, -75.617398, Site Code: 36300103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



5273860 - Albion and Findlay Creek - Sept - 28th - TMC

Wed Sep 28, 2016

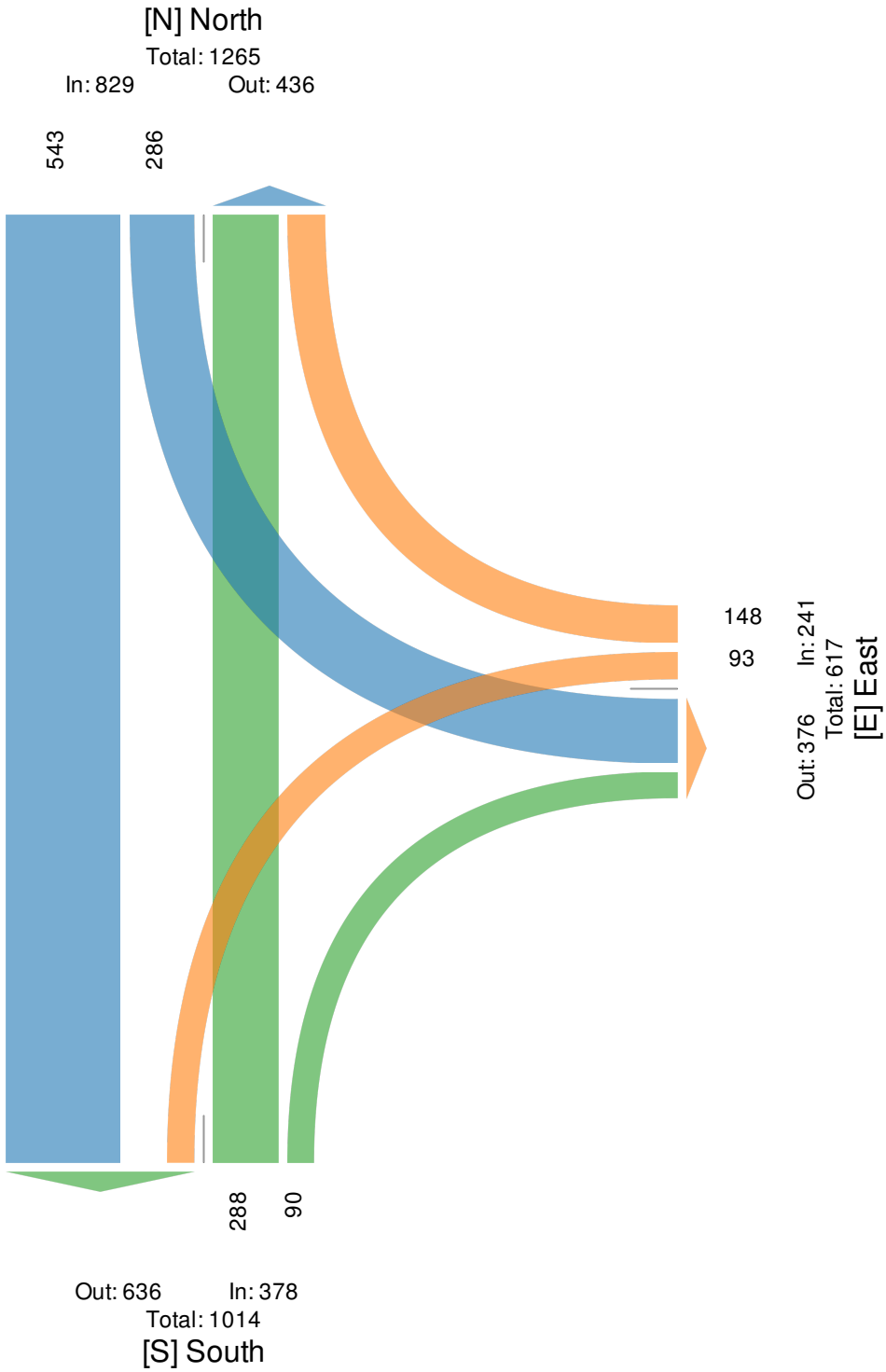
PM Peak (4:30PM - 5:30PM) - Overall Peak Hour

All Classes (Pedestrians, Bicycles on Road, Lights)

All Movements

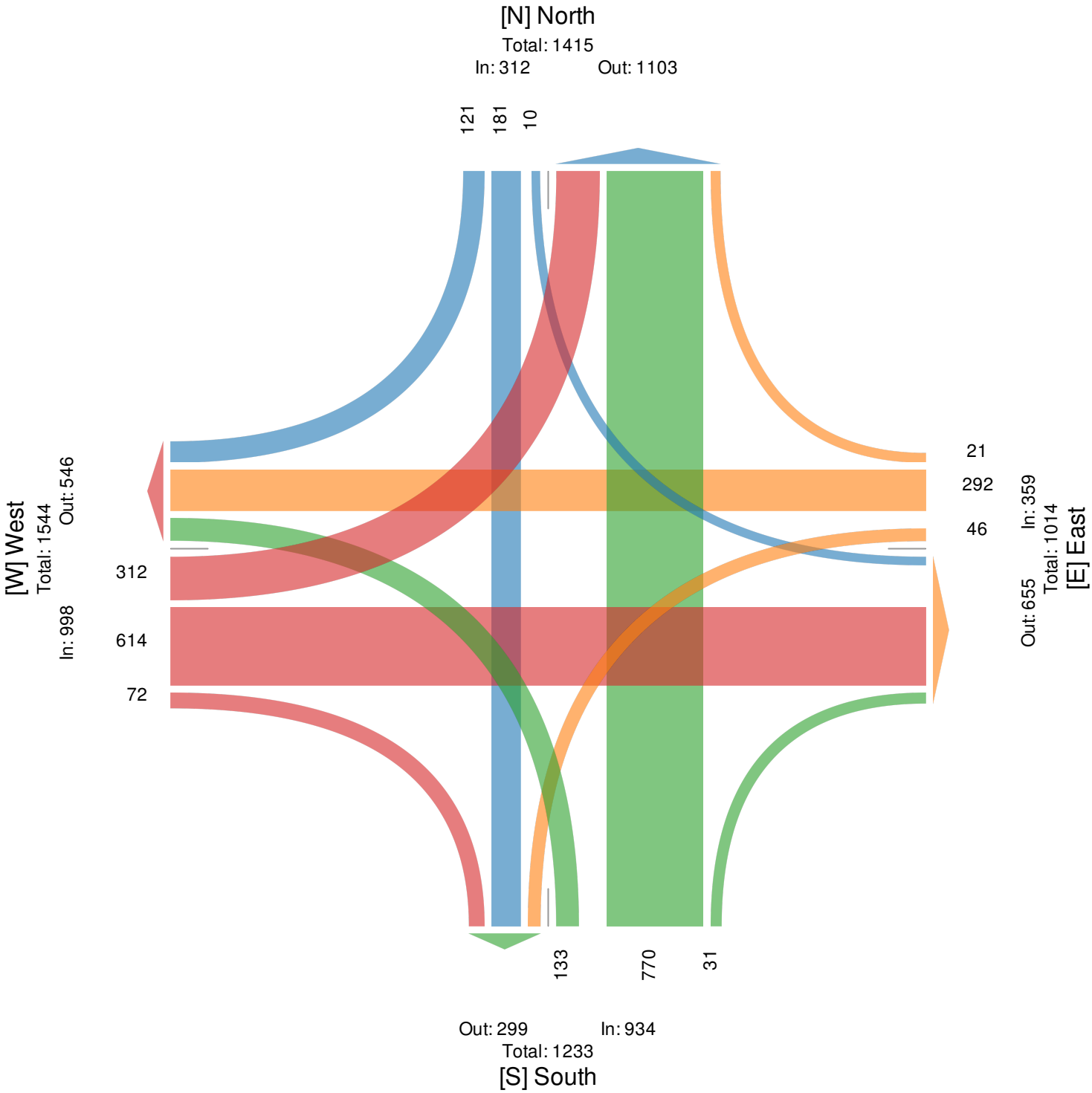
ID: 350246, Location: 45.309444, -75.617398, Site Code: 36300103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



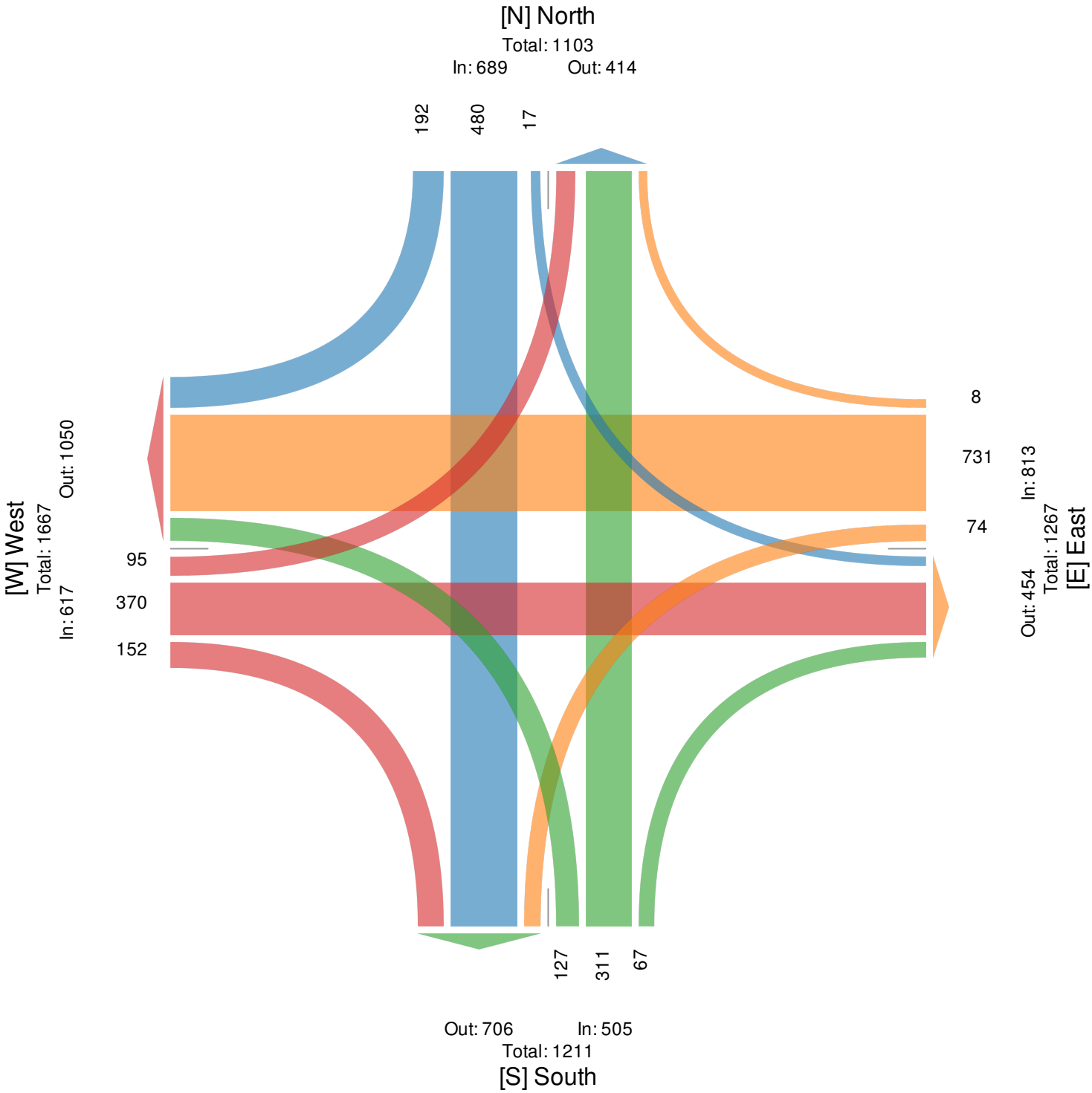
5269526 - Albion and Leitrim - Sept - 8th - TMC
Thu Sep 8, 2016
AM Peak (7:15AM - 8:15AM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 342730, Location: 45.320391, -75.623724, Site Code: 36286103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



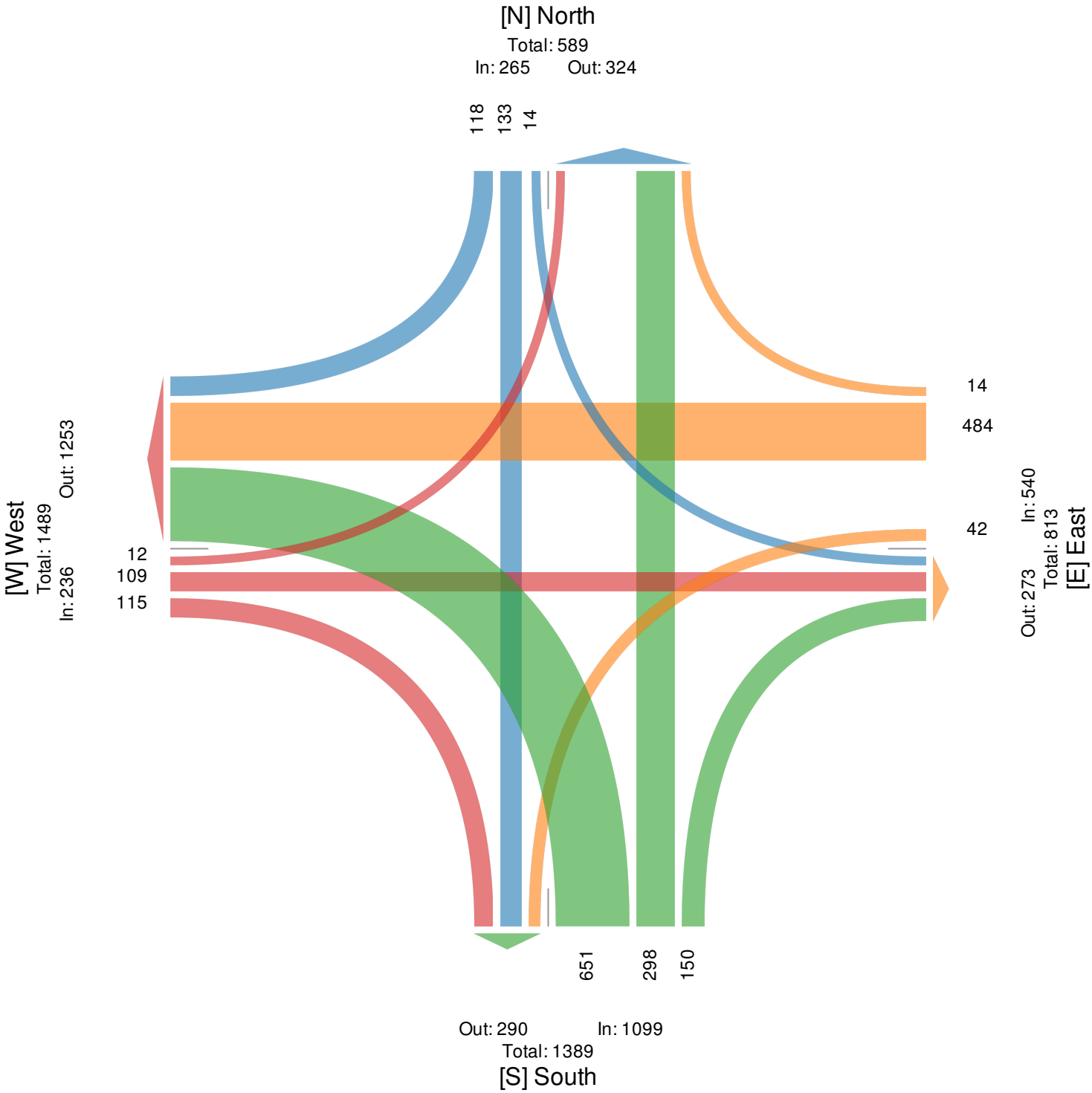
5269526 - Albion and Leitrim - Sept - 8th - TMC
Thu Sep 8, 2016
PM Peak (4PM - 5PM) - Overall Peak Hour
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 342730, Location: 45.320391, -75.623724, Site Code: 36286103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



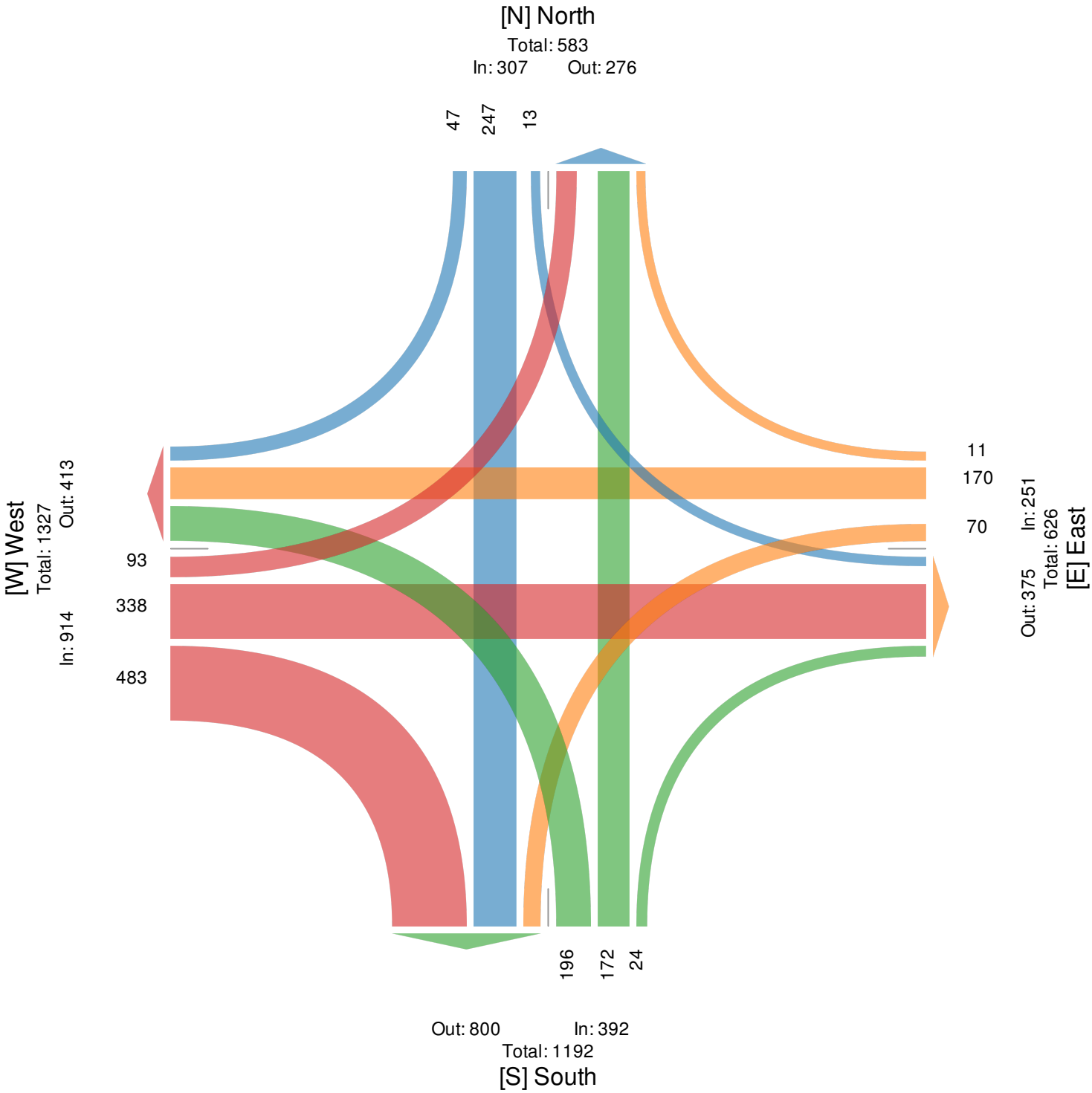
5233443-Albion and Lester-Feb-10th - TMC
Wed Feb 10, 2016
AM Peak (7:15AM - 8:15AM) - Overall Peak Hour
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 292159, Location: 45.337646, -75.633709, Site Code: 35724103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



5233443-Albion and Lester-Feb-10th - TMC
Wed Feb 10, 2016
PM Peak (3:30PM - 4:30PM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 292159, Location: 45.337646, -75.633709, Site Code: 35724103

Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



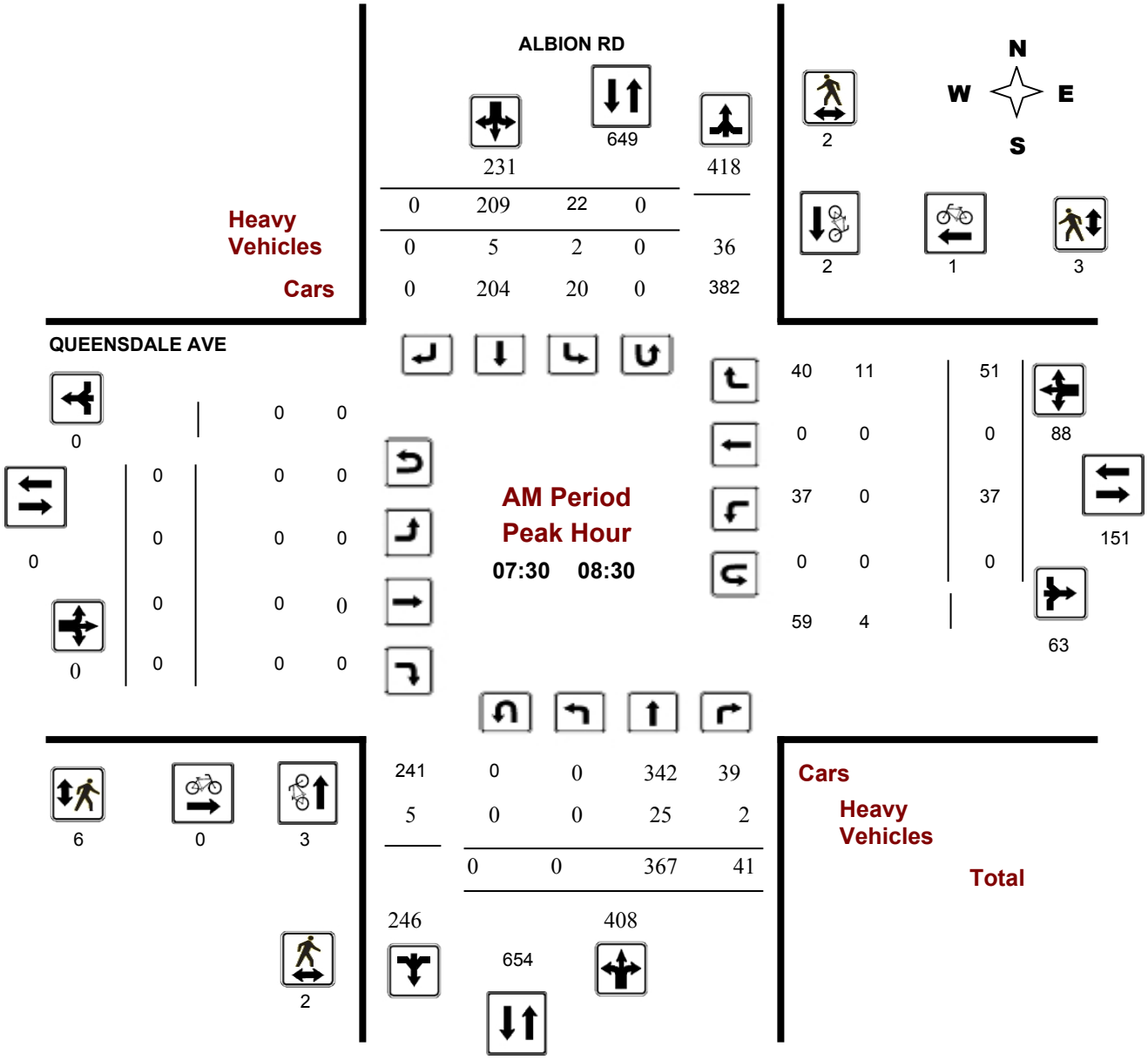
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

QUEENSDALE AVE @ ALBION RD

Survey Date: Wednesday, May 18, 2016 **WO No:** 35688

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



Comments

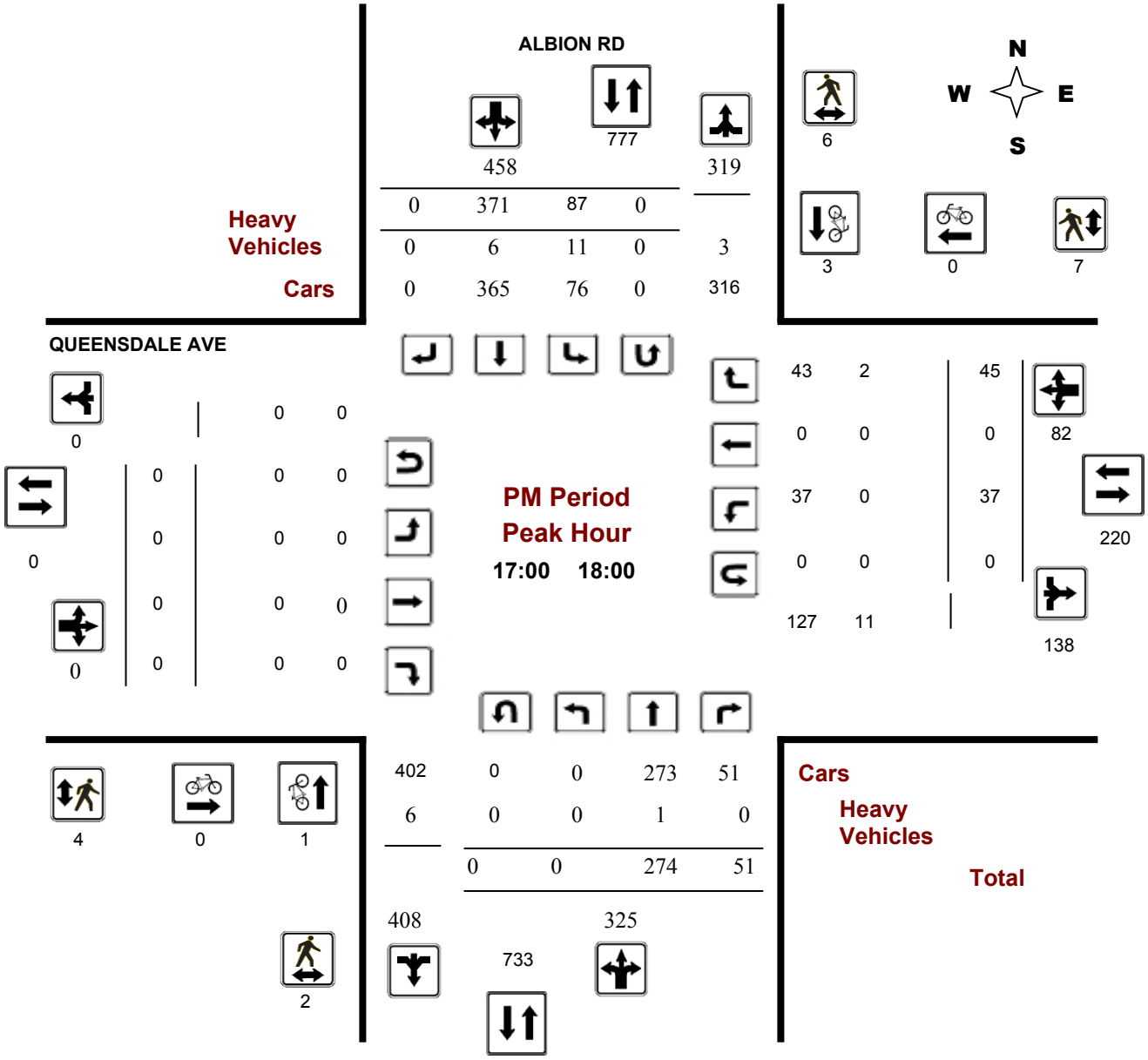
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

QUEENSDALE AVE @ ALBION RD

Survey Date: Wednesday, May 18, 2016 **WO No:** 35688

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



Comments

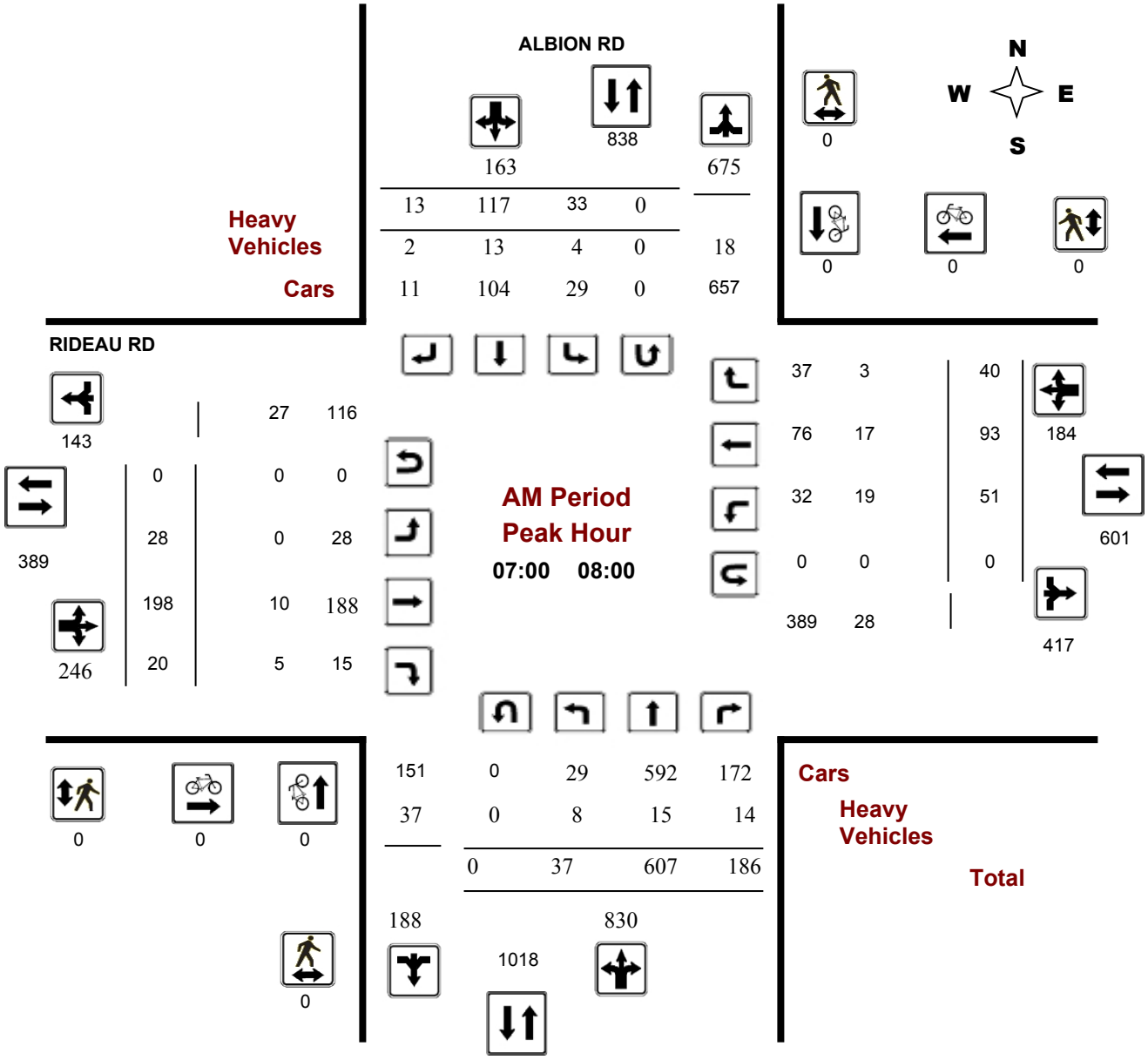
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

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



Comments

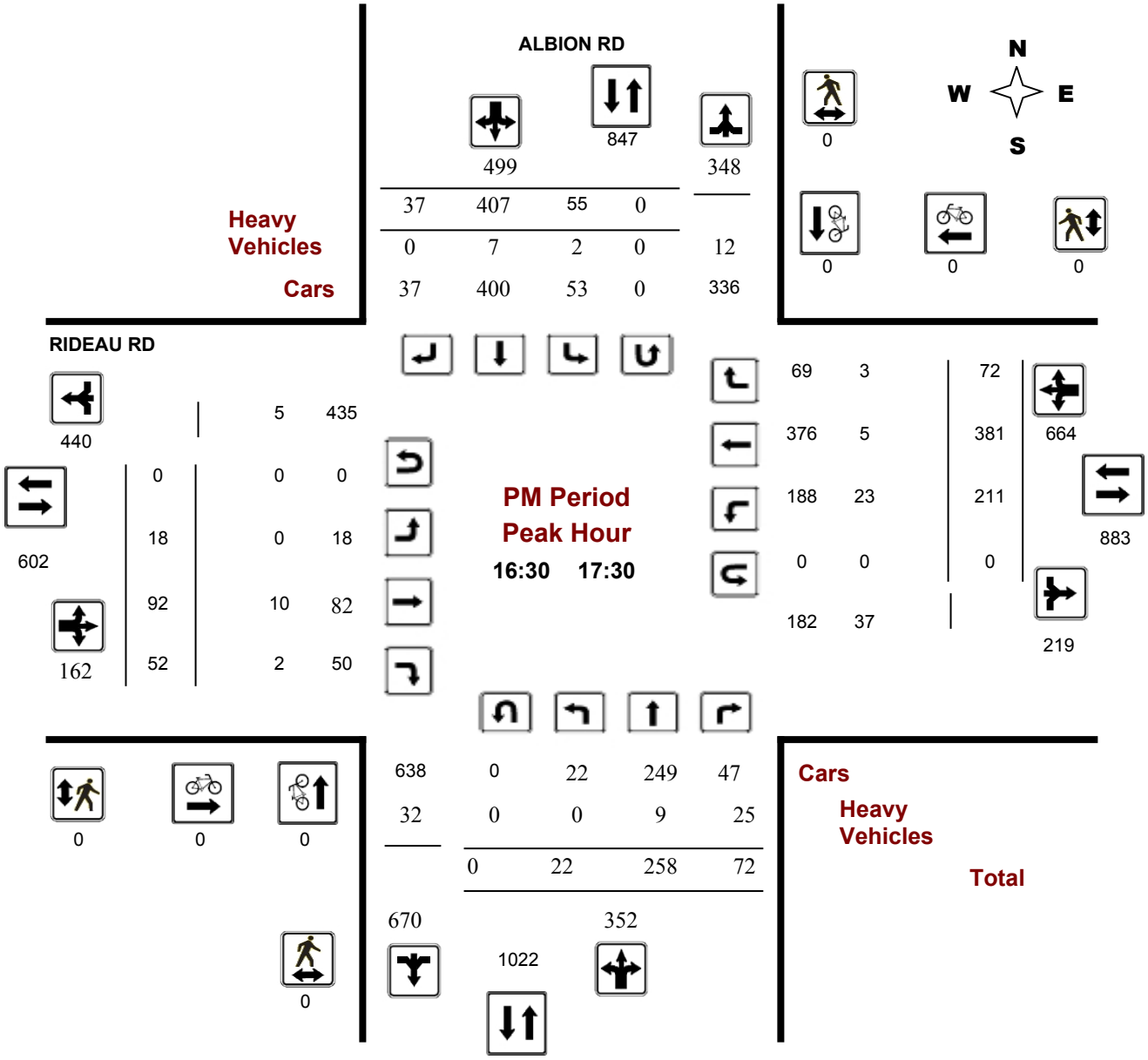
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

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



Comments

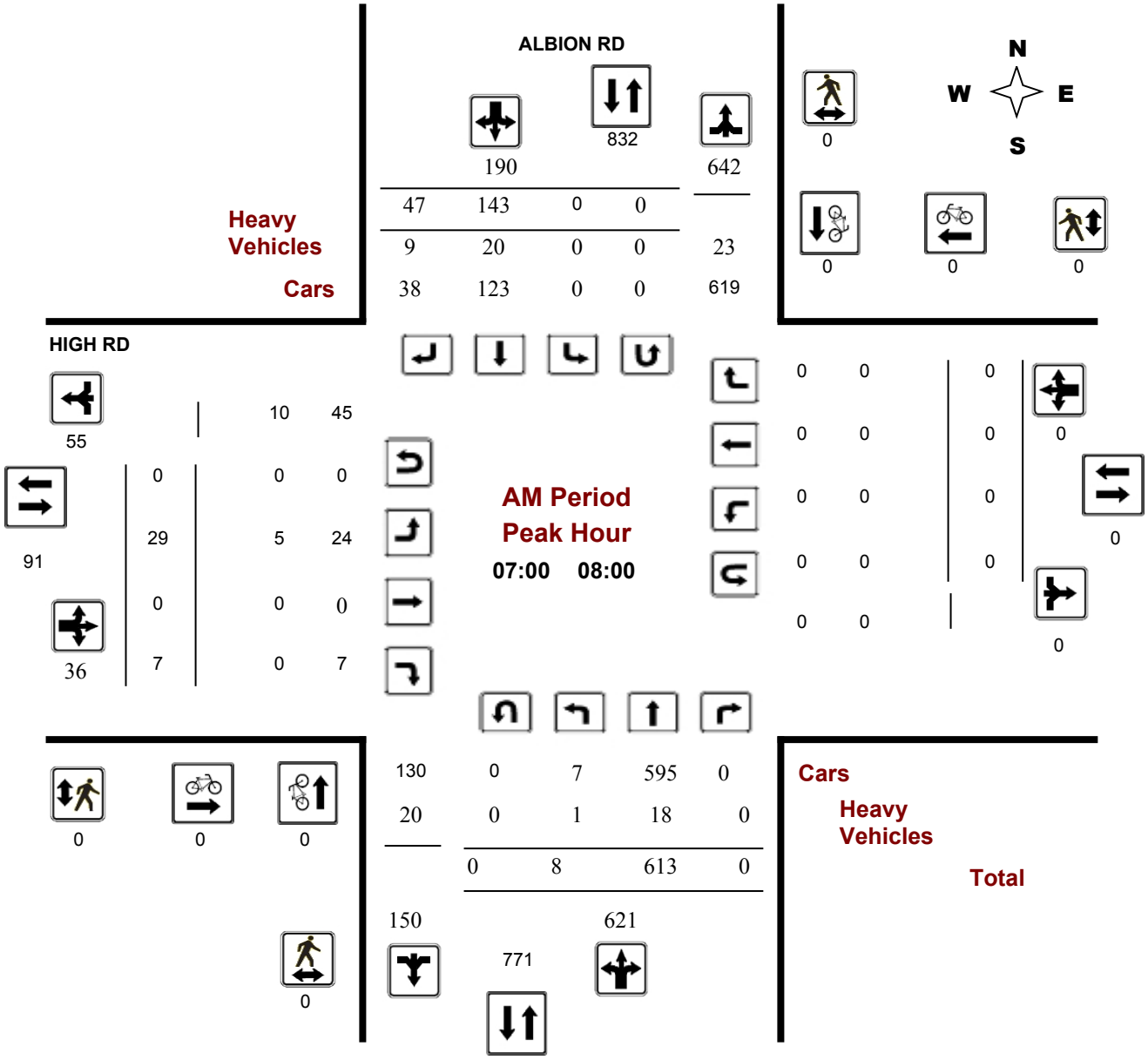
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ HIGH RD

Survey Date: Tuesday, April 26, 2016
Start Time: 07:00

WO No: 35887
Device: Miovision



Comments

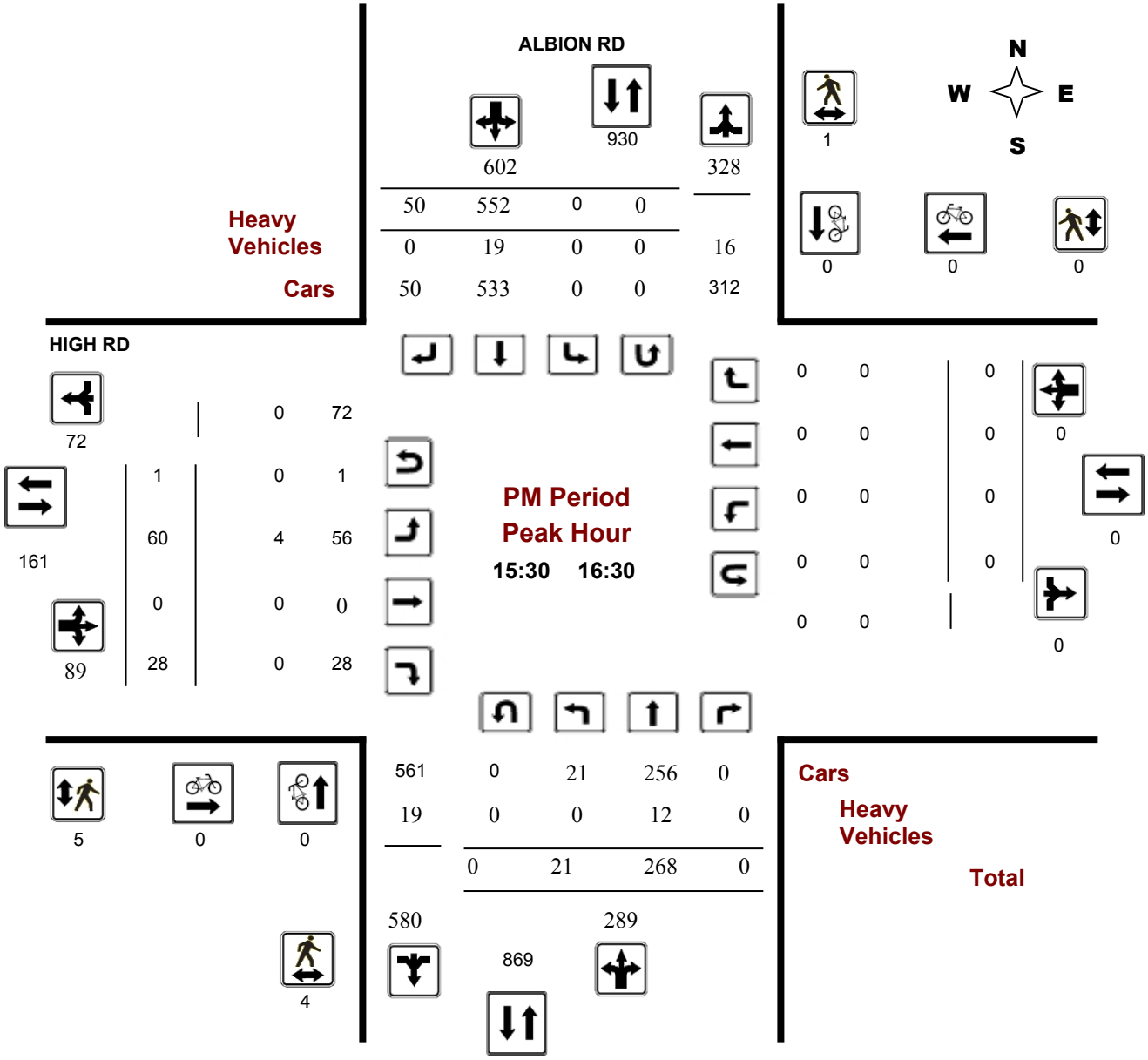
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ HIGH RD

Survey Date: Tuesday, April 26, 2016 **WO No:** 35887

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



Comments

Appendix D

Existing SYNCHRO Analysis

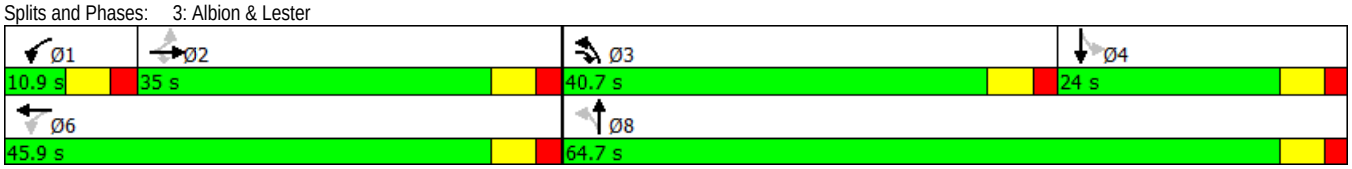
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	12	109	115	42	484	651	298	14	133
Future Volume (vph)	12	109	115	42	484	651	298	14	133
Lane Group Flow (vph)	13	115	121	44	524	685	472	15	264
Turn Type	Perm	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases		2	3	1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	3	1	6	3	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	34.9	34.9	10.7	10.9	34.9	10.7	29.7	29.7	29.7
Total Split (s)	35.0	35.0	40.7	10.9	45.9	40.7	64.7	24.0	24.0
Total Split (%)	31.6%	31.6%	36.8%	9.9%	41.5%	36.8%	58.5%	21.7%	21.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2	2.0	2.2	2.2	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.9	-1.9	-1.7	-1.9	-1.9	-1.7	-1.7	-1.7	-1.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead		Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes		Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	Min	Min	Min
Act Effct Green (s)	33.3	33.3	74.0	41.9	41.9	60.8	60.8	20.0	20.0
Actuated g/C Ratio	0.30	0.30	0.67	0.38	0.38	0.55	0.55	0.18	0.18
v/c Ratio	0.09	0.21	0.11	0.10	0.78	1.07	0.50	0.09	0.80
Control Delay	33.2	32.4	1.8	23.7	40.2	83.2	16.2	38.7	56.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	32.4	1.8	23.7	40.2	83.2	16.2	38.7	56.4
LOS	C	C	A	C	D	F	B	D	E
Approach Delay		17.6			38.9		55.9		55.5
Approach LOS		B			D		E		E
Queue Length 50th (m)	2.1	19.1	0.0	6.0	98.0	~145.8	55.4	2.7	48.1
Queue Length 95th (m)	7.5	36.0	6.8	14.5	#161.3	#224.9	81.1	8.5	77.1
Internal Link Dist (m)		493.2			627.8		1982.9		768.6
Turn Bay Length (m)	95.0		100.0	85.0		90.0		55.0	
Base Capacity (vph)	143	536	1054	436	674	641	962	167	344
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.21	0.11	0.10	0.78	1.07	0.49	0.09	0.77

Intersection Summary	
Cycle Length: 110.6	
Actuated Cycle Length: 110.7	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 47.3	Intersection LOS: D
Intersection Capacity Utilization 90.9%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Albion & Lester



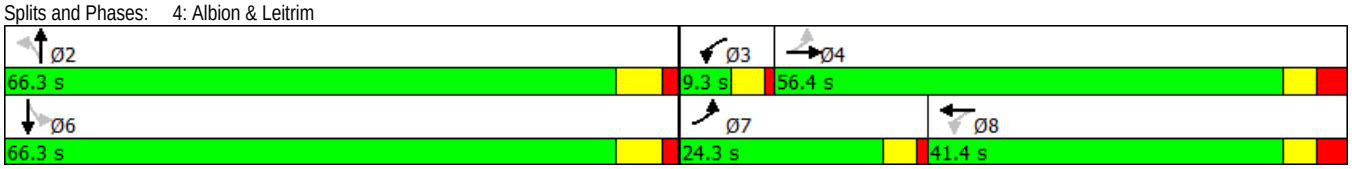
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	312	614	46	292	133	770	10	181
Future Volume (vph)	312	614	46	292	133	770	10	181
Lane Group Flow (vph)	328	722	48	329	140	844	11	318
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.3	29.4	9.3	29.4	29.3	29.3	29.3	29.3
Total Split (s)	24.3	56.4	9.3	41.4	66.3	66.3	66.3	66.3
Total Split (%)	18.4%	42.7%	7.0%	31.4%	50.2%	50.2%	50.2%	50.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	1.0	3.1	1.0	3.1	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	-0.3	-2.4	-0.3	-2.4	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Max	None	Max	Min	Min	Min	Min
Act Effct Green (s)	61.1	53.7	42.7	37.4	62.3	62.3	62.3	62.3
Actuated g/C Ratio	0.46	0.41	0.32	0.28	0.47	0.47	0.47	0.47
v/c Ratio	0.81	1.00	0.39	0.65	0.35	1.00	0.21	0.39
Control Delay	40.7	73.2	30.6	48.2	25.3	66.4	32.2	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	73.2	30.6	48.2	25.3	66.4	32.2	21.6
LOS	D	E	C	D	C	E	C	C
Approach Delay		63.1		45.9		60.6		21.9
Approach LOS		E		D		E		C
Queue Length 50th (m)	55.2	~200.4	6.7	74.9	22.6	~219.1	1.6	46.6
Queue Length 95th (m)	#83.0	#275.1	14.0	107.8	39.7	#306.8	6.8	69.6
Internal Link Dist (m)		361.8		426.5		1270.2		1982.9
Turn Bay Length (m)	115.0		175.0		100.0		100.0	
Base Capacity (vph)	410	720	124	504	395	842	53	813
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	0.80	1.00	0.39	0.65	0.35	1.00	0.21	0.39

Intersection Summary	
Cycle Length: 132	
Actuated Cycle Length: 131.4	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 54.9	Intersection LOS: D
Intersection Capacity Utilization 109.3%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Albion & Leitrim



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	381	630	80	61	152
Future Volume (vph)	98	381	630	80	61	152
Lane Group Flow (vph)	103	401	663	84	64	160
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	30.6	22.1	16.6	16.6
Total Split (s)	41.1	41.1	68.6	41.1	68.6	68.6
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	3.3	3.3	4.6	3.3	4.6	4.6
All-Red Time (s)	2.8	2.8	2.0	2.8	2.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.6	-2.1	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Max	None	Max	Max
Act Effct Green (s)	19.2	19.2	65.0	92.3	65.0	65.0
Actuated g/C Ratio	0.21	0.21	0.70	1.00	0.70	0.70
v/c Ratio	0.29	0.78	0.53	0.06	0.15	0.13
Control Delay	31.9	23.4	9.7	0.1	7.4	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	23.4	9.7	0.1	7.4	6.0
LOS	C	C	A	A	A	A
Approach Delay	25.2		8.6			6.4
Approach LOS	C		A			A
Queue Length 50th (m)	15.4	24.2	44.4	0.0	3.0	7.4
Queue Length 95th (m)	28.5	56.7	109.5	0.0	11.6	21.3
Internal Link Dist (m)	438.4		1541.0			1270.2
Turn Bay Length (m)		50.0		65.0	140.0	
Base Capacity (vph)	685	763	1256	1517	424	1256
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.53	0.53	0.06	0.15	0.13

Intersection Summary		
Cycle Length: 109.7		
Actuated Cycle Length: 92.3		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.78		
Intersection Signal Delay: 13.9	Intersection LOS: B	
Intersection Capacity Utilization 66.6%	ICU Level of Service C	
Analysis Period (min) 15		

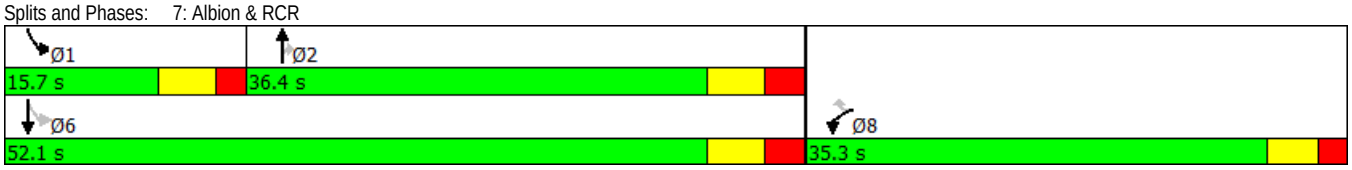
Splits and Phases: 5: Albion & Findaly Creek

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	8	664	16	22	153
Future Volume (vph)	8	664	16	22	153
Lane Group Flow (vph)	8	699	17	23	161
Turn Type	Perm	NA	Perm	pm+pt	NA
Protected Phases		2		1	6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	19.3	31.4	31.4	10.7	16.4
Total Split (s)	35.3	36.4	36.4	15.7	52.1
Total Split (%)	40.4%	41.6%	41.6%	18.0%	59.6%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	2.0	2.7
Lost Time Adjust (s)	-1.3	-2.4	-2.4	-1.7	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	
Recall Mode	None	Max	Max	None	Max
Act Effct Green (s)	12.2	58.6	58.6	57.4	60.8
Actuated g/C Ratio	0.19	0.90	0.90	0.88	0.94
v/c Ratio	0.01	0.43	0.01	0.04	0.10
Control Delay	0.0	6.1	4.1	2.1	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	6.1	4.1	2.1	1.7
LOS	A	A	A	A	A
Approach Delay		6.0			1.7
Approach LOS		A			A
Queue Length 50th (m)	0.0	0.0	0.0	0.2	0.0
Queue Length 95th (m)	0.0	#115.6	3.4	2.7	12.1
Internal Link Dist (m)		925.2			182.6
Turn Bay Length (m)			20.0	115.0	
Base Capacity (vph)	913	1607	1367	708	1667
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.43	0.01	0.03	0.10

Intersection Summary	
Cycle Length: 87.4	
Actuated Cycle Length: 65	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 5.1	Intersection LOS: A
Intersection Capacity Utilization 51.9%	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: 7: Albion & RCR



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	198	51	93	37	607	33	117
Future Volume (vph)	28	198	51	93	37	607	33	117
Lane Group Flow (vph)	29	229	54	140	39	835	35	137
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.1	25.1	25.1	25.1	28.3	28.3	28.3	28.3
Total Split (s)	36.1	36.1	36.1	36.1	76.3	76.3	76.3	76.3
Total Split (%)	32.1%	32.1%	32.1%	32.1%	67.9%	67.9%	67.9%	67.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6
All-Red Time (s)	2.4	2.4	2.4	2.4	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	20.0	20.0	20.0	20.0	72.4	72.4	72.4	72.4
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.72	0.72	0.72	0.72
v/c Ratio	0.14	0.65	0.40	0.40	0.05	0.67	0.11	0.11
Control Delay	34.0	44.8	44.1	33.0	5.2	11.5	6.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	44.8	44.1	33.0	5.2	11.5	6.3	4.9
LOS	C	D	D	C	A	B	A	A
Approach Delay		43.6		36.1		11.2		5.2
Approach LOS		D		D		B		A
Queue Length 50th (m)	4.7	40.3	9.2	20.5	1.9	72.1	1.8	6.4
Queue Length 95th (m)	12.2	64.1	21.1	37.4	5.9	143.3	6.2	15.1
Internal Link Dist (m)		511.6		550.0		662.3		925.2
Turn Bay Length (m)	75.0		135.0		120.0		140.0	
Base Capacity (vph)	328	566	215	558	860	1249	326	1270
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	0.09	0.40	0.25	0.25	0.05	0.67	0.11	0.11

Intersection Summary	
Cycle Length: 112.4	
Actuated Cycle Length: 100.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Albion & Rideau

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	37	51	367	41	22	209
Future Volume (vph)	37	51	367	41	22	209
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	39	54	386	43	23	220

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	93	429	243
Volume Left (vph)	39	0	23
Volume Right (vph)	54	43	0
Hadj (s)	-0.23	-0.03	0.05
Departure Headway (s)	5.2	4.4	4.7
Degree Utilization, x	0.13	0.53	0.32
Capacity (veh/h)	618	798	740
Control Delay (s)	9.0	12.2	9.8
Approach Delay (s)	9.0	12.2	9.8
Approach LOS	A	B	A

Intersection Summary			
Delay	11.0		
Level of Service	B		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	7	8	613	143	47
Future Volume (Veh/h)	29	7	8	613	143	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	31	7	8	645	151	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				207		
pX, platoon unblocked	0.84					
vC, conflicting volume	836	176	200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	707	176	200			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	99	99			
cM capacity (veh/h)	334	868	1372			

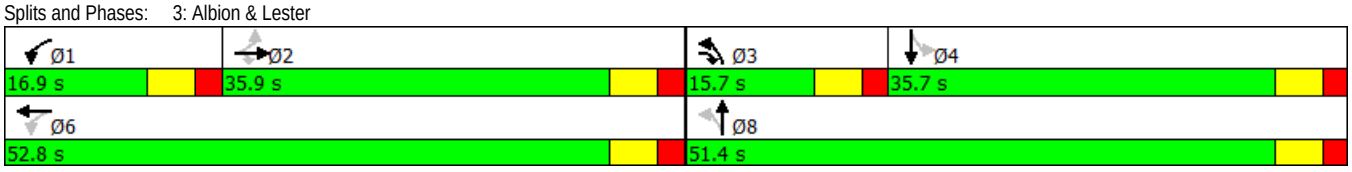
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	653	200
Volume Left	31	8	0
Volume Right	7	0	49
cSH	377	1372	1700
Volume to Capacity	0.10	0.01	0.12
Queue Length 95th (m)	2.5	0.1	0.0
Control Delay (s)	15.6	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	15.6	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	93	338	483	70	170	196	172	13	247
Future Volume (vph)	93	338	483	70	170	196	172	13	247
Lane Group Flow (vph)	98	356	508	74	191	206	206	14	309
Turn Type	Perm	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases		2	3	1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	3	1	6	3	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	34.9	34.9	10.7	10.9	34.9	10.7	29.7	29.7	29.7
Total Split (s)	35.9	35.9	15.7	16.9	52.8	15.7	51.4	35.7	35.7
Total Split (%)	34.5%	34.5%	15.1%	16.2%	50.7%	15.1%	49.3%	34.3%	34.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2	2.0	2.2	2.2	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.9	-1.9	-1.7	-1.9	-1.9	-1.7	-1.7	-1.7	-1.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead		Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes		Yes	Yes
Recall Mode	Max	Max	None	None	Max	None	Min	Min	Min
Act Effct Green (s)	37.9	37.9	53.4	49.0	49.0	38.7	38.7	23.1	23.1
Actuated g/C Ratio	0.40	0.40	0.56	0.51	0.51	0.40	0.40	0.24	0.24
v/c Ratio	0.22	0.50	0.48	0.17	0.21	0.63	0.29	0.05	0.72
Control Delay	25.0	28.1	4.0	14.7	14.5	27.9	19.1	27.2	42.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	28.1	4.0	14.7	14.5	27.9	19.1	27.2	42.4
LOS	C	C	A	B	B	C	B	C	D
Approach Delay		15.0			14.5		23.5		41.8
Approach LOS		B			B		C		D
Queue Length 50th (m)	12.3	51.1	3.6	6.7	18.1	25.2	23.8	2.0	51.1
Queue Length 95th (m)	28.7	92.1	24.5	16.1	36.1	40.9	39.3	6.6	78.7
Internal Link Dist (m)		493.2			627.8		1982.9		768.6
Turn Bay Length (m)	95.0		100.0	85.0		90.0		55.0	
Base Capacity (vph)	450	706	1054	470	907	332	876	373	585
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.50	0.48	0.16	0.21	0.62	0.24	0.04	0.53

Intersection Summary	
Cycle Length: 104.2	
Actuated Cycle Length: 95.7	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 64.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Albion & Lester



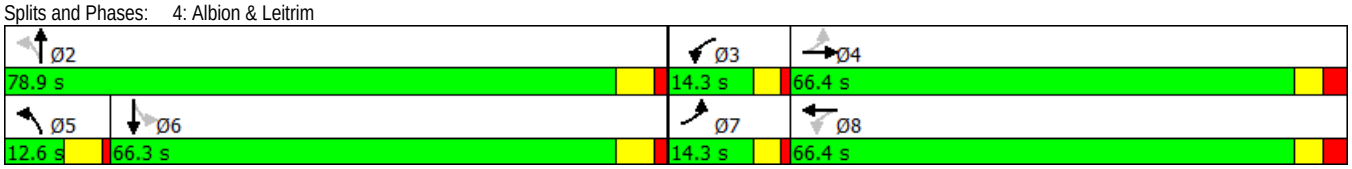
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	95	370	74	731	127	311	17	480
Future Volume (vph)	95	370	74	731	127	311	17	480
Lane Group Flow (vph)	100	549	78	777	134	398	18	707
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	3	8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	9.3	29.4	9.3	29.4	10.6	29.3	29.3	29.3
Total Split (s)	14.3	66.4	14.3	66.4	12.6	78.9	66.3	66.3
Total Split (%)	9.0%	41.6%	9.0%	41.6%	7.9%	49.4%	41.5%	41.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	1.0	3.1	1.0	3.1	1.0	1.7	1.7	1.7
Lost Time Adjust (s)	-0.3	-2.4	-0.3	-2.4	-1.6	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	Min	None	Min	None	Min	Min	Min
Act Effct Green (s)	73.0	63.1	71.6	62.4	74.9	74.9	62.3	62.3
Actuated g/C Ratio	0.46	0.40	0.45	0.39	0.47	0.47	0.39	0.39
v/c Ratio	0.66	0.80	0.36	1.11	0.99	0.48	0.06	1.04
Control Delay	50.3	51.8	27.4	113.9	107.9	30.7	31.2	92.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	51.8	27.4	113.9	107.9	30.7	31.2	92.1
LOS	D	D	C	F	F	C	C	F
Approach Delay		51.6		106.0		50.2		90.6
Approach LOS		D		F		D		F
Queue Length 50th (m)	17.2	150.3	13.3	~281.8	28.0	83.7	3.6	~239.7
Queue Length 95th (m)	#38.5	201.8	23.3	#360.0	#73.2	114.1	9.4	#317.6
Internal Link Dist (m)		361.8		426.5		1270.2		1982.9
Turn Bay Length (m)	115.0		175.0		100.0		100.0	
Base Capacity (vph)	156	685	231	698	136	821	324	677
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	0.64	0.80	0.34	1.11	0.99	0.48	0.06	1.04

Intersection Summary	
Cycle Length: 159.6	
Actuated Cycle Length: 159.2	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 78.4	Intersection LOS: E
Intersection Capacity Utilization 106.4%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

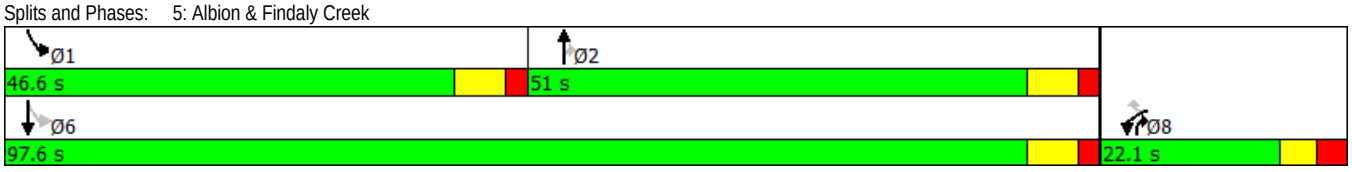
Splits and Phases: 4: Albion & Leitrim



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	148	288	90	286	543
Future Volume (vph)	93	148	288	90	286	543
Lane Group Flow (vph)	98	156	303	95	301	572
Turn Type	Prot	Perm	NA	pm+ov	pm+pt	NA
Protected Phases	8		2	8	1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.1	22.1	30.6	22.1	16.0	16.6
Total Split (s)	22.1	22.1	51.0	22.1	46.6	97.6
Total Split (%)	18.5%	18.5%	42.6%	18.5%	38.9%	81.5%
Yellow Time (s)	3.3	3.3	4.6	3.3	4.6	4.6
All-Red Time (s)	2.8	2.8	2.0	2.8	2.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.6	-2.1	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Max	None	None	Max
Act Effct Green (s)	14.5	14.5	76.5	95.0	93.6	93.6
Actuated g/C Ratio	0.12	0.12	0.66	0.82	0.81	0.81
v/c Ratio	0.46	0.48	0.26	0.08	0.36	0.40
Control Delay	54.6	12.3	9.5	0.6	4.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	12.3	9.5	0.6	4.1	4.3
LOS	D	B	A	A	A	A
Approach Delay	28.6		7.4			4.3
Approach LOS	C		A			A
Queue Length 50th (m)	21.0	0.0	25.4	0.0	12.4	28.7
Queue Length 95th (m)	37.6	18.4	46.5	2.9	23.1	50.1
Internal Link Dist (m)	438.4		1541.0			1270.2
Turn Bay Length (m)		50.0		65.0	140.0	
Base Capacity (vph)	264	368	1175	1302	1027	1438
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.42	0.26	0.07	0.29	0.40

Intersection Summary	
Cycle Length: 119.7	
Actuated Cycle Length: 116.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 51.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Albion & Findaly Creek



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	69	226	21	120	484
Future Volume (vph)	32	69	226	21	120	484
Lane Group Flow (vph)	34	73	238	22	126	509
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	19.3	19.3	31.4	31.4	10.7	16.4
Total Split (s)	35.3	35.3	46.4	46.4	20.7	67.1
Total Split (%)	34.5%	34.5%	45.3%	45.3%	20.2%	65.5%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.0	2.7	2.7	2.0	2.7
Lost Time Adjust (s)	-1.3	-1.3	-2.4	-2.4	-1.7	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	12.1	12.1	50.8	50.8	63.6	64.5
Actuated g/C Ratio	0.15	0.15	0.63	0.63	0.79	0.81
v/c Ratio	0.13	0.25	0.21	0.02	0.15	0.35
Control Delay	32.2	10.7	8.2	3.8	3.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	10.7	8.2	3.8	3.1	4.0
LOS	C	B	A	A	A	A
Approach Delay	17.5		7.8			3.9
Approach LOS	B		A			A
Queue Length 50th (m)	4.8	0.0	15.1	0.1	3.8	20.1
Queue Length 95th (m)	12.5	10.8	30.5	3.1	9.3	39.6
Internal Link Dist (m)	243.8		925.2			182.6
Turn Bay Length (m)				20.0	115.0	
Base Capacity (vph)	667	641	1131	969	937	1437
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.11	0.21	0.02	0.13	0.35

Intersection Summary	
Cycle Length: 102.4	
Actuated Cycle Length: 80.1	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 41.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Albion & RCR

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	18	92	211	381	22	258	55	407
Future Volume (vph)	18	92	211	381	22	258	55	407
Lane Group Flow (vph)	19	152	222	477	23	348	58	467
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.1	25.1	25.1	25.1	28.3	28.3	28.3	28.3
Total Split (s)	36.1	36.1	36.1	36.1	56.3	56.3	56.3	56.3
Total Split (%)	39.1%	39.1%	39.1%	39.1%	60.9%	60.9%	60.9%	60.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6
All-Red Time (s)	2.4	2.4	2.4	2.4	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	29.1	29.1	29.1	29.1	52.4	52.4	52.4	52.4
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.59	0.59	0.59	0.59
v/c Ratio	0.17	0.27	0.61	0.83	0.05	0.34	0.11	0.45
Control Delay	25.7	18.1	33.6	41.3	9.5	10.6	9.9	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	18.1	33.6	41.3	9.5	10.6	9.9	12.6
LOS	C	B	C	D	A	B	A	B
Approach Delay		19.0		38.8		10.5		12.3
Approach LOS		B		D		B		B
Queue Length 50th (m)	2.3	14.6	31.8	73.5	1.7	28.8	4.5	44.8
Queue Length 95th (m)	8.0	28.8	55.6	#120.1	5.1	45.9	10.2	68.0
Internal Link Dist (m)		511.6		550.0		662.3		925.2
Turn Bay Length (m)	75.0		135.0		120.0		140.0	
Base Capacity (vph)	122	628	400	633	428	1020	523	1034
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	0.16	0.24	0.56	0.75	0.05	0.34	0.11	0.45

Intersection Summary	
Cycle Length: 92.4	
Actuated Cycle Length: 89.5	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 80.8%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Albion & Rideau

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	37	45	274	51	87	371
Future Volume (vph)	37	45	274	51	87	371
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	39	47	288	54	92	391

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	86	342	483
Volume Left (vph)	39	0	92
Volume Right (vph)	47	54	0
Hadj (s)	-0.20	-0.06	0.07
Departure Headway (s)	5.5	4.6	4.6
Degree Utilization, x	0.13	0.44	0.62
Capacity (veh/h)	569	752	762
Control Delay (s)	9.4	11.2	14.8
Approach Delay (s)	9.4	11.2	14.8
Approach LOS	A	B	B

Intersection Summary			
Delay	13.0		
Level of Service	B		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	60	28	21	268	552	50
Future Volume (Veh/h)	60	28	21	268	552	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	29	22	282	581	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				207		
pX, platoon unblocked	0.99					
vC, conflicting volume	934	608	634			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	925	608	634			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	94	98			
cM capacity (veh/h)	287	496	949			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	304	634
Volume Left	63	22	0
Volume Right	29	0	53
cSH	331	949	1700
Volume to Capacity	0.28	0.02	0.37
Queue Length 95th (m)	8.4	0.5	0.0
Control Delay (s)	20.0	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	20.0	0.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E

Determination of Background Traffic Growth on Albion Road

Historic City Traffic Count

The following Table D-1, summarizes the historic traffic growth on Albion Road at the Rideau Road intersection using five City counts dating from 2007 to 2017.

Table D-1: Historic Traffic Growth on Albion Road at Rideau Road

Time Period	Percent Annual Change		
	North Leg	South Leg	Overall
8 hrs	-0.05%	1.38%	**0.66%**
AM Peak	-0.30%	1.22%	**0.46%**
PM Peak	-1.76%	0.38%	**-0.69%**

City's 2031 Transportation Master Plan Traffic Growth Projections

The following Table D-2 summarizes the 2031 TMP model plots for northbound traffic on Albion Road during the morning peak hour. These projections include only the network changes identified in the TMP's affordable road and transit networks.

Table D-2: TMP's 2031 Albion Road Traffic Projections

Northbound AM Peak Hour	2011	2011 + VB + HC	2031	Annual Growth
Rideau to Findlay Creek	673	740	731	**-0.06%**
Findlay Creek to Leitrim	709	767	998	**1.33%**
Leitrim to Lester	707	799	952	**0.88%**

Based on the foregoing a background traffic growth rate of 0.5% per year will be used up to the selected horizon year of 2027, resulting in a 1.05 growth factor.

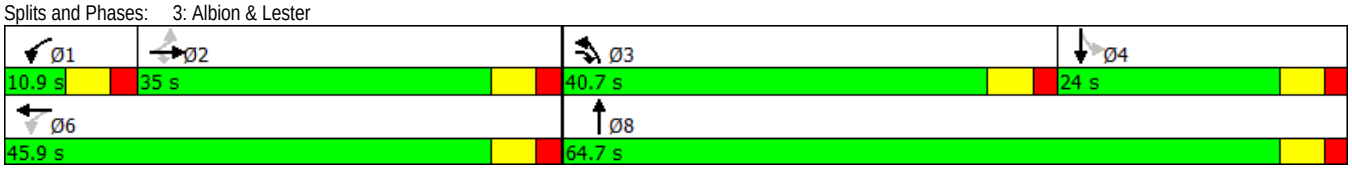
Appendix F

Horizon Year (2028) Intersection Capacity Analysis (SYNCHRO)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	13	114	125	45	508	689	316	15	145
Future Volume (vph)	13	114	125	45	508	689	316	15	145
Lane Group Flow (vph)	14	120	132	47	551	725	500	16	284
Turn Type	Perm	NA	pm+ov	pm+pt	NA	Prot	NA	Perm	NA
Protected Phases		2	3	1	6	3	8		4
Permitted Phases	2		2	6				4	
Detector Phase	2	2	3	1	6	3	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	34.9	34.9	10.7	10.9	34.9	10.7	29.7	29.7	29.7
Total Split (s)	35.0	35.0	40.7	10.9	45.9	40.7	64.7	24.0	24.0
Total Split (%)	31.6%	31.6%	36.8%	9.9%	41.5%	36.8%	58.5%	21.7%	21.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2	2.0	2.2	2.2	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.9	-1.9	-1.7	-1.9	-1.9	-1.7	-1.7	-1.7	-1.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead		Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes		Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	Min	Min	Min
Act Effct Green (s)	33.3	33.3	74.0	41.9	41.9	36.7	61.3	20.5	20.5
Actuated g/C Ratio	0.30	0.30	0.67	0.38	0.38	0.33	0.55	0.18	0.18
v/c Ratio	0.06	0.12	0.13	0.11	0.43	0.67	0.53	0.10	0.85
Control Delay	31.6	30.5	1.7	23.8	27.3	36.0	16.8	38.9	61.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	30.5	1.7	23.8	27.3	36.0	16.8	38.9	61.8
LOS	C	C	A	C	C	D	B	D	E
Approach Delay		16.3			27.0		28.2		60.5
Approach LOS		B			C		C		E
Queue Length 50th (m)	2.2	10.2	0.0	6.4	45.6	68.7	60.3	2.9	53.4
Queue Length 95th (m)	7.6	18.5	7.0	15.2	65.4	95.4	88.0	9.1	#83.9
Internal Link Dist (m)		493.2			627.8		1511.5		768.6
Turn Bay Length (m)	95.0		100.0	85.0		90.0		55.0	
Base Capacity (vph)	238	1014	1053	444	1275	1086	958	162	342
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.12	0.13	0.11	0.43	0.67	0.52	0.10	0.83

Intersection Summary	
Cycle Length: 110.6	
Actuated Cycle Length: 111.2	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 30.6	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

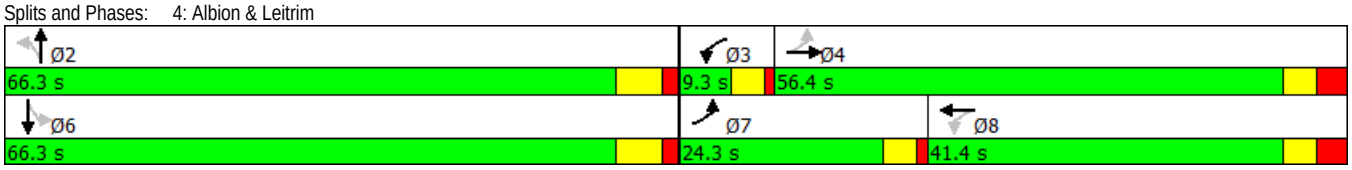
Splits and Phases: 3: Albion & Lester



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	328	645	50	307	141	818	11	200
Future Volume (vph)	328	645	50	307	141	818	11	200
Lane Group Flow (vph)	345	763	53	346	148	896	12	345
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.3	29.4	9.3	29.4	29.3	29.3	29.3	29.3
Total Split (s)	24.3	56.4	9.3	41.4	66.3	66.3	66.3	66.3
Total Split (%)	18.4%	42.7%	7.0%	31.4%	50.2%	50.2%	50.2%	50.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	1.0	3.1	1.0	3.1	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.3	-2.4	0.3	-2.4	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.6	4.0	4.6	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Max	None	Max	Min	Min	Min	Min
Act Effct Green (s)	59.6	53.1	43.7	39.5	37.1	37.1	37.1	37.1
Actuated g/C Ratio	0.57	0.50	0.41	0.37	0.35	0.35	0.35	0.35
v/c Ratio	0.68	0.86	0.30	0.52	0.48	0.75	0.14	0.29
Control Delay	21.3	36.9	18.9	31.3	32.6	34.4	27.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	36.9	18.9	31.3	32.6	34.4	27.1	14.9
LOS	C	D	B	C	C	C	C	B
Approach Delay		32.1		29.7		34.2		15.4
Approach LOS		C		C		C		B
Queue Length 50th (m)	36.8	138.3	4.6	55.1	24.0	86.0	1.7	16.0
Queue Length 95th (m)	68.8	#252.3	12.3	98.8	42.6	107.6	6.2	26.1
Internal Link Dist (m)		361.8		426.5		449.7		447.3
Turn Bay Length (m)	115.0		175.0		100.0		100.0	
Base Capacity (vph)	550	886	176	664	522	2017	150	1964
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	0.63	0.86	0.30	0.52	0.28	0.44	0.08	0.18

Intersection Summary	
Cycle Length: 132	
Actuated Cycle Length: 105.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 30.4	Intersection LOS: C
Intersection Capacity Utilization 92.3%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Albion & Leitrim



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	103	400	672	84	64	176
Future Volume (vph)	103	400	672	84	64	176
Lane Group Flow (vph)	108	421	707	88	67	185
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	30.6	22.1	16.6	16.6
Total Split (s)	41.1	41.1	68.6	41.1	68.6	68.6
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	3.3	3.3	4.6	3.3	4.6	4.6
All-Red Time (s)	2.8	2.8	2.0	2.8	2.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.6	-2.1	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Max	None	Max	Max
Act Effct Green (s)	22.2	22.2	65.1	95.4	65.1	65.1
Actuated g/C Ratio	0.23	0.23	0.68	1.00	0.68	0.68
v/c Ratio	0.27	0.80	0.58	0.06	0.18	0.15
Control Delay	30.5	26.9	12.2	0.1	9.4	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	26.9	12.2	0.1	9.4	7.3
LOS	C	C	B	A	A	A
Approach Delay	27.6		10.9			7.8
Approach LOS	C		B			A
Queue Length 50th (m)	16.2	33.8	57.4	0.0	3.8	10.1
Queue Length 95th (m)	29.2	68.0	136.4	0.0	14.0	27.4
Internal Link Dist (m)	438.4		1541.0			796.4
Turn Bay Length (m)		50.0		65.0	140.0	
Base Capacity (vph)	664	732	1217	1507	368	1217
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.58	0.58	0.06	0.18	0.15

Intersection Summary			
Cycle Length: 109.7			
Actuated Cycle Length: 95.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 70.1%		ICU Level of Service C	
Analysis Period (min) 15			

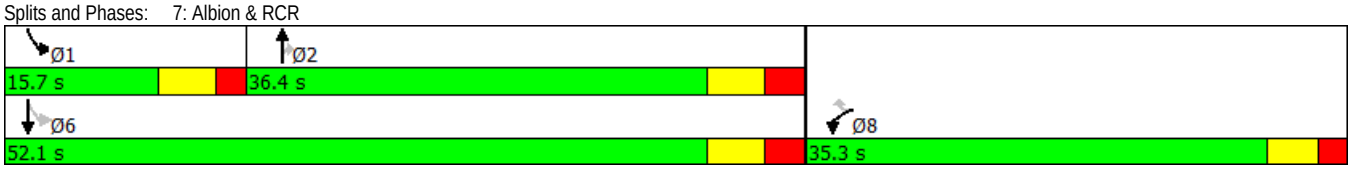
Splits and Phases: 5: Albion & Findaly Creek

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	18	697	28	38	161
Future Volume (vph)	18	697	28	38	161
Lane Group Flow (vph)	19	734	29	40	169
Turn Type	Perm	NA	Perm	pm+pt	NA
Protected Phases		2		1	6
Permitted Phases	8		2	6	
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	19.3	31.4	31.4	10.7	16.4
Total Split (s)	35.3	36.4	36.4	15.7	52.1
Total Split (%)	40.4%	41.6%	41.6%	18.0%	59.6%
Yellow Time (s)	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	2.0	2.7
Lost Time Adjust (s)	-1.3	-2.4	-2.4	-1.7	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	
Recall Mode	None	Max	Max	None	Max
Act Effct Green (s)	12.2	52.5	52.5	54.5	57.0
Actuated g/C Ratio	0.19	0.81	0.81	0.84	0.88
v/c Ratio	0.03	0.51	0.02	0.07	0.11
Control Delay	0.1	10.3	5.8	2.9	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	10.3	5.8	2.9	2.5
LOS	A	B	A	A	A
Approach Delay		10.1			2.6
Approach LOS		B			A
Queue Length 50th (m)	0.0	0.0	0.0	0.3	0.0
Queue Length 95th (m)	0.0	#142.5	4.9	4.0	12.7
Internal Link Dist (m)		925.2			182.6
Turn Bay Length (m)			20.0	115.0	
Base Capacity (vph)	908	1440	1226	632	1565
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.51	0.02	0.06	0.11

Intersection Summary	
Cycle Length: 87.4	
Actuated Cycle Length: 65	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 53.7%	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: 7: Albion & RCR



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	208	54	98	39	647	35	123
Future Volume (vph)	30	208	54	98	39	647	35	123
Lane Group Flow (vph)	32	241	57	148	41	886	37	144
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.1	25.1	25.1	25.1	28.3	28.3	28.3	28.3
Total Split (s)	36.1	36.1	36.1	36.1	76.3	76.3	76.3	76.3
Total Split (%)	32.1%	32.1%	32.1%	32.1%	67.9%	67.9%	67.9%	67.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6
All-Red Time (s)	2.4	2.4	2.4	2.4	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	20.8	20.8	20.8	20.8	72.5	72.5	72.5	72.5
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.72	0.72	0.72	0.72
v/c Ratio	0.16	0.66	0.43	0.41	0.05	0.72	0.13	0.11
Control Delay	34.1	45.2	45.4	33.0	5.5	13.3	7.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	45.2	45.4	33.0	5.5	13.3	7.0	5.1
LOS	C	D	D	C	A	B	A	A
Approach Delay		43.9		36.4		13.0		5.5
Approach LOS		D		D		B		A
Queue Length 50th (m)	5.2	42.8	9.8	21.7	2.0	84.1	2.0	7.0
Queue Length 95th (m)	13.1	67.2	21.9	39.2	6.4	169.1	7.1	16.4
Internal Link Dist (m)		511.6		550.0		662.3		925.2
Turn Bay Length (m)	75.0		135.0		120.0		140.0	
Base Capacity (vph)	317	562	205	554	849	1239	287	1259
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	0.10	0.43	0.28	0.27	0.05	0.72	0.13	0.11

Intersection Summary		
Cycle Length: 112.4		
Actuated Cycle Length: 101.3		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 20.5	Intersection LOS: C	
Intersection Capacity Utilization 79.7%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 8: Albion & Rideau

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	38	51	387	42	22	223
Future Volume (vph)	38	51	387	42	22	223
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	40	54	407	44	23	235

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	94	451	258
Volume Left (vph)	40	0	23
Volume Right (vph)	54	44	0
Hadj (s)	-0.23	-0.02	0.05
Departure Headway (s)	5.3	4.4	4.7
Degree Utilization, x	0.14	0.56	0.34
Capacity (veh/h)	606	794	735
Control Delay (s)	9.1	12.8	10.1
Approach Delay (s)	9.1	12.8	10.1
Approach LOS	A	B	B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	7	8	654	166	49
Future Volume (Veh/h)	30	7	8	654	166	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	7	8	688	175	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				207		
pX, platoon unblocked	0.78					
vC, conflicting volume	905	201	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	201	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	99	99			
cM capacity (veh/h)	299	840	1341			

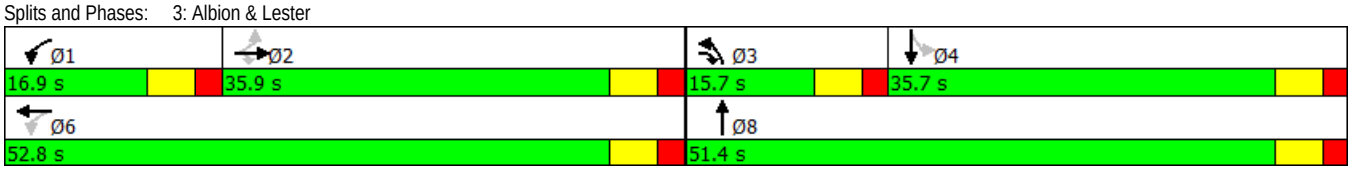
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	696	227
Volume Left	32	8	0
Volume Right	7	0	52
cSH	338	1341	1700
Volume to Capacity	0.12	0.01	0.13
Queue Length 95th (m)	2.9	0.1	0.0
Control Delay (s)	17.0	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	17.0	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	98	355	543	75	179	225	198	14	277
Future Volume (vph)	98	355	543	75	179	225	198	14	277
Lane Group Flow (vph)	103	374	572	79	201	237	236	15	344
Turn Type	Perm	NA	pm+ov	pm+pt	NA	Prot	NA	Perm	NA
Protected Phases		2	3	1	6	3	8		4
Permitted Phases	2		2	6				4	
Detector Phase	2	2	3	1	6	3	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	34.9	34.9	10.7	10.9	34.9	10.7	29.7	29.7	29.7
Total Split (s)	35.9	35.9	15.7	16.9	52.8	15.7	51.4	35.7	35.7
Total Split (%)	34.5%	34.5%	15.1%	16.2%	50.7%	15.1%	49.3%	34.3%	34.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2	2.0	2.2	2.2	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.9	-1.9	-1.7	-1.9	-1.9	-1.7	-1.7	-1.7	-1.7
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead		Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes		Yes	Yes
Recall Mode	Max	Max	None	None	Max	None	Min	Min	Min
Act Effct Green (s)	37.7	37.7	53.1	49.0	49.0	11.4	40.3	24.8	24.8
Actuated g/C Ratio	0.39	0.39	0.55	0.50	0.50	0.12	0.41	0.25	0.25
v/c Ratio	0.24	0.29	0.56	0.16	0.12	0.61	0.32	0.05	0.76
Control Delay	26.2	23.9	6.7	15.1	13.4	49.4	19.5	26.9	44.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	23.9	6.7	15.1	13.4	49.4	19.5	26.9	44.2
LOS	C	C	A	B	B	D	B	C	D
Approach Delay		14.7			13.9		34.5		43.5
Approach LOS		B			B		C		D
Queue Length 50th (m)	13.7	26.6	13.2	7.6	9.7	22.3	28.1	2.1	58.4
Queue Length 95th (m)	30.1	43.5	48.2	17.0	17.7	36.5	45.0	6.9	88.8
Internal Link Dist (m)		493.2			627.8		1384.8		768.6
Turn Bay Length (m)	95.0		100.0	85.0		90.0		55.0	
Base Capacity (vph)	432	1312	1028	513	1693	396	861	357	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.29	0.56	0.15	0.12	0.60	0.27	0.04	0.60

Intersection Summary	
Cycle Length: 104.2	
Actuated Cycle Length: 97.3	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

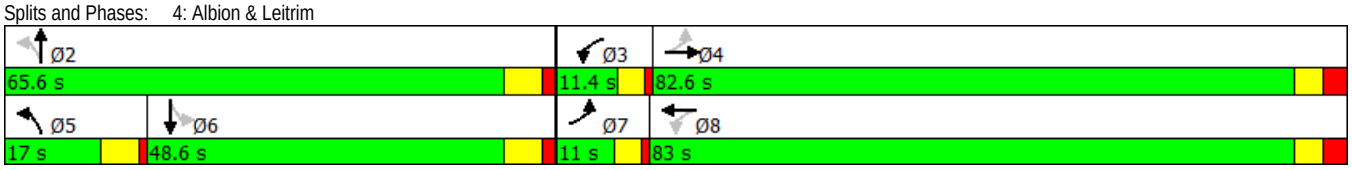
Splits and Phases: 3: Albion & Lester



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	100	389	87	768	148	365	18	559
Future Volume (vph)	100	389	87	768	148	365	18	559
Lane Group Flow (vph)	105	596	92	816	156	467	19	801
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	3	8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	9.3	29.4	9.3	29.4	10.6	29.3	29.3	29.3
Total Split (s)	11.0	82.6	11.4	83.0	17.0	65.6	48.6	48.6
Total Split (%)	6.9%	51.8%	7.1%	52.0%	10.7%	41.1%	30.5%	30.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	1.0	3.1	1.0	3.1	1.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.3	-2.4	0.3	-2.4	-1.6	-2.3	-2.3	-2.3
Total Lost Time (s)	4.6	4.0	4.6	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	Min	None	Min	None	Min	Min	Min
Act Effct Green (s)	79.3	73.4	79.8	73.7	58.6	58.6	41.5	41.5
Actuated g/C Ratio	0.52	0.48	0.53	0.49	0.39	0.39	0.27	0.27
v/c Ratio	0.88	0.71	0.34	0.94	0.80	0.36	0.08	0.88
Control Delay	83.4	35.6	19.9	56.6	65.8	33.2	43.7	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	35.6	19.9	56.6	65.8	33.2	43.7	62.5
LOS	F	D	B	E	E	C	D	E
Approach Delay		42.8		52.9		41.4		62.0
Approach LOS		D		D		D		E
Queue Length 50th (m)	17.3	140.1	13.2	237.1	33.4	53.2	4.5	123.3
Queue Length 95th (m)	#55.3	186.3	22.3	#324.5	#73.3	68.2	11.7	149.6
Internal Link Dist (m)		361.8		426.5		457.1		574.0
Turn Bay Length (m)	115.0		175.0		100.0		100.0	
Base Capacity (vph)	120	899	269	937	194	1363	256	988
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	0.88	0.66	0.34	0.87	0.80	0.34	0.07	0.81

Intersection Summary	
Cycle Length: 159.6	
Actuated Cycle Length: 151.5	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 50.7	Intersection LOS: D
Intersection Capacity Utilization 94.6%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

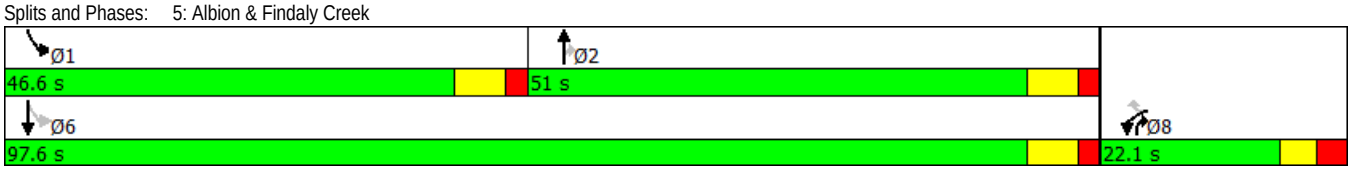
Splits and Phases: 4: Albion & Leitrim



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	155	364	95	300	652
Future Volume (vph)	98	155	364	95	300	652
Lane Group Flow (vph)	103	163	383	100	316	686
Turn Type	Prot	Perm	NA	pm+ov	pm+pt	NA
Protected Phases	8		2	8	1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.1	22.1	30.6	22.1	16.0	16.6
Total Split (s)	22.1	22.1	51.0	22.1	46.6	97.6
Total Split (%)	18.5%	18.5%	42.6%	18.5%	38.9%	81.5%
Yellow Time (s)	3.3	3.3	4.6	3.3	4.6	4.6
All-Red Time (s)	2.8	2.8	2.0	2.8	2.0	2.0
Lost Time Adjust (s)	-2.1	-2.1	-2.6	-2.1	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Max	None	None	Max
Act Effct Green (s)	14.7	14.7	76.2	94.8	93.6	93.6
Actuated g/C Ratio	0.13	0.13	0.66	0.82	0.80	0.80
v/c Ratio	0.48	0.49	0.33	0.08	0.41	0.48
Control Delay	55.1	12.2	10.5	0.6	4.6	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	12.2	10.5	0.6	4.6	5.1
LOS	E	B	B	A	A	A
Approach Delay	28.8		8.4			4.9
Approach LOS	C		A			A
Queue Length 50th (m)	22.1	0.0	34.6	0.0	13.5	38.6
Queue Length 95th (m)	39.6	18.6	61.2	3.0	24.4	66.0
Internal Link Dist (m)	438.4		1541.0			789.1
Turn Bay Length (m)		50.0		65.0	140.0	
Base Capacity (vph)	263	373	1168	1297	982	1436
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.44	0.33	0.08	0.32	0.48

Intersection Summary	
Cycle Length: 119.7	
Actuated Cycle Length: 116.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 56.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Albion & Findaly Creek



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	82	131	237	62	202	508
Future Volume (vph)	82	131	237	62	202	508
Lane Group Flow (vph)	86	138	249	65	213	535
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	19.3	19.3	31.4	31.4	10.7	16.4
Total Split (s)	35.3	35.3	46.4	46.4	20.7	67.1
Total Split (%)	34.5%	34.5%	45.3%	45.3%	20.2%	65.5%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.0	2.7	2.7	2.0	2.7
Lost Time Adjust (s)	-1.3	-1.3	-2.4	-2.4	-1.7	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	12.3	12.3	48.9	48.9	63.1	63.1
Actuated g/C Ratio	0.15	0.15	0.59	0.59	0.76	0.76
v/c Ratio	0.35	0.41	0.24	0.07	0.26	0.40
Control Delay	36.1	9.9	9.6	3.4	3.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	9.9	9.6	3.4	3.8	4.7
LOS	D	A	A	A	A	A
Approach Delay	19.9		8.3			4.4
Approach LOS	B		A			A
Queue Length 50th (m)	12.5	0.0	16.6	0.5	6.9	21.5
Queue Length 95th (m)	25.3	14.6	34.1	6.0	15.1	42.4
Internal Link Dist (m)	243.8		925.2			182.6
Turn Bay Length (m)				20.0	115.0	
Base Capacity (vph)	636	655	1046	913	876	1350
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.21	0.24	0.07	0.24	0.40

Intersection Summary			
Cycle Length: 102.4			
Actuated Cycle Length: 83.4			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 43.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Albion & RCR

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	22	97	222	400	23	300	64	467
Future Volume (vph)	22	97	222	400	23	300	64	467
Lane Group Flow (vph)	23	160	234	510	24	396	67	537
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.1	25.1	25.1	25.1	28.3	28.3	28.3	28.3
Total Split (s)	36.1	36.1	36.1	36.1	56.3	56.3	56.3	56.3
Total Split (%)	39.1%	39.1%	39.1%	39.1%	60.9%	60.9%	60.9%	60.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6
All-Red Time (s)	2.4	2.4	2.4	2.4	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	-2.1	-2.1	-2.1	-2.1	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	30.0	30.0	52.4	52.4	52.4	52.4
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.58	0.58	0.58	0.58
v/c Ratio	0.24	0.27	0.64	0.87	0.07	0.39	0.14	0.52
Control Delay	29.4	18.4	34.9	44.7	9.7	11.5	10.4	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	18.4	34.9	44.7	9.7	11.5	10.4	14.1
LOS	C	B	C	D	A	B	B	B
Approach Delay		19.8		41.6		11.4		13.7
Approach LOS		B		D		B		B
Queue Length 50th (m)	2.9	15.6	34.1	80.5	1.8	34.5	5.3	54.7
Queue Length 95th (m)	9.7	30.3	59.5	#134.0	5.4	53.7	11.7	82.2
Internal Link Dist (m)		511.6		550.0		662.3		925.2
Turn Bay Length (m)	75.0		135.0		120.0		140.0	
Base Capacity (vph)	101	621	389	626	367	1012	476	1023
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	0.23	0.26	0.60	0.81	0.07	0.39	0.14	0.52

Intersection Summary	
Cycle Length: 92.4	
Actuated Cycle Length: 90.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 86.4%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: Albion & Rideau

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	39	45	303	53	87	406
Future Volume (vph)	39	45	303	53	87	406
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	47	319	56	92	427

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	88	375	519
Volume Left (vph)	41	0	92
Volume Right (vph)	47	56	0
Hadj (s)	-0.19	-0.06	0.07
Departure Headway (s)	5.7	4.7	4.7
Degree Utilization, x	0.14	0.49	0.67
Capacity (veh/h)	550	743	755
Control Delay (s)	9.6	12.1	16.7
Approach Delay (s)	9.6	12.1	16.7
Approach LOS	A	B	C

Intersection Summary			
Delay	14.3		
Level of Service	B		
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	29	22	343	662	53
Future Volume (Veh/h)	63	29	22	343	662	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	66	31	23	361	697	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				207		
pX, platoon unblocked	0.97					
vC, conflicting volume	1132	725	753			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1119	725	753			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	93	97			
cM capacity (veh/h)	215	425	857			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	97	384	753
Volume Left	66	23	0
Volume Right	31	0	56
cSH	255	857	1700
Volume to Capacity	0.38	0.03	0.44
Queue Length 95th (m)	12.9	0.6	0.0
Control Delay (s)	27.5	0.9	0.0
Lane LOS	D	A	
Approach Delay (s)	27.5	0.9	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G

TDM-Supportive Development Design and Infrastructure and Measures Checklists

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

Legend

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☐ N/A
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ On-site sidewalks and shuttle stops
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	☐ N/A
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)	☑ All private on-site sidewalks.

	TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see Official Plan policy 4.3.10)	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see Official Plan policy 4.3.10)	☑
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)	☐ N/A
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑ No routes adjacent to site
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐ N/A
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 no road modifications required
	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	☑ Provided on-site
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: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see Official Plan policy 4.3.6)	☐ To be determined
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)	☐ To be determined
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)	☐ To be determined
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐ To be determined
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐ To be determined
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see Zoning By-law Section 111)	☐ N/A
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐ N/A
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐ To be determined
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐ To be determined
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐ N/A

	TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☑ Bus drop-off/pick-up, not transit stop
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	☑
	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	☐ N/A
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐ N/A
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐ N/A
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (see Zoning By-law Section 94)	☐ N/A
	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	☐ N/A

	TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☐ To be determined
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	☐ N/A
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)	☐ N/A
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☑
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☑

Appendix H

Collision Data on Albion Road Adjacent to RCRS

Collision Main Detail Summary

OnTRAC Reporting System

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

210 S OF HIGH RD & ALBION RD

Former Municipality: **Gloucester** Traffic Control: **Traffic signal** Number of Collisions: **3**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2011-06-22	We	13:00	Clear	Daylight	Single vehicle	P.D. only	V1 N	Dry	Going ahead	Pick-up truck	Skidding/Sliding	0
2	2011-10-07	Fri	16:23	Clear	Daylight	Approaching	Non-fatal	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	
3	2012-09-11	Tue	22:46	Clear	Dark	Rear end	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Slowing or	Automobile, station	Other motor vehicle	

Ottawa

City Operations - Transportation Services

Collision Details Report - Public Version

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

Location: ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Traffic Control: Traffic signal

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-May-06, Tue,17:58	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Truck - dump	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	

Appendix I

Multi-Modal Level of Service Analysis for Albion/RCRS Intersection

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons**	**Project**	**RCRS**
Scenario	**Projected 2028**	**Date**	**Nov-17**
Comments			

INTERSECTIONS		Albion/RCRS			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	3	3	4	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	No left turn / Prohib.	Permissive	Protected/ Permissive	
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR prohibited	RTOR allowed	
	Ped Signal Leading Interval?	No	No	No	
	Right Turn Channel	No Channel	No Channel	No Channel	
	Corner Radius	10-15m	0-3m	10-15m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	**78**	**81**	**53**	
	Ped. Exposure to Traffic LoS	**B**	**B**	**D**	**-**
	Cycle Length	100	100	100	
	Effective Walk Time	23	23	24	
	Average Pedestrian Delay	**30**	**30**	**29**	
	Pedestrian Delay LoS	**D**	**D**	**C**	**-**
	Level of Service	**D**	**D**	**D**	**-**
		D			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m	
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	
	Cyclist relative to RT motorists	**D**	**D**	**F**	**-**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**
	Left Turn Approach	One lane crossed	No lane crossed	One lane crossed	
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	
	Left Turning Cyclist	**F**	**C**	**F**	**-**
	Level of Service	**F**	**D**	**F**	**-**
		F			
Transit	Average Signal Delay				
	Level of Service	**-**	**-**	**-**	**-**
		-			
Truck	Effective Corner Radius		> 15 m	> 15 m	
	Number of Receiving Lanes on Departure from Intersection		≥ 2	1	
	Level of Service	**-**	**A**	**C**	**-**
		C			
Auto	Volume to Capacity Ratio	0.0 - 0.60			
	Level of Service	**A**			