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36 Years

Hard Rock Ottawa
4837 Albion Road
Transportation Impact Assessment

Hard Rock Ottawa
4837 Albion Road

Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

Dated: April 2018
Revised: November 2019

Novatech File: 116111
Ref: R-2019-186

NOVATECH
Engineers, Planners & Landscape Architects

November 20, 2019

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Mike Giampa**
Senior Engineer, Infrastructure Applications

Dear Mr. Giampa:

Reference: **4837 Albion Road**
Revised Transportation Impact Assessment
Novatech File No. 116111

We are pleased to submit the following revised Transportation Impact Assessment (TIA) in support of Site Plan Control and Zoning By-Law Amendment applications for the property located at 4837 Albion Road, for your review and signoff. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017).

The original TIA in support of this development was prepared by Parsons and submitted to the City of Ottawa in January 2018, with an addendum prepared by Novatech and Parsons and submitted to the City in April 2018. This revised TIA has been prepared to reflect updates in the site plan and address City comments.

If you have any questions or comments regarding this report, please feel free to contact Jennifer Luong, or the undersigned.

Yours truly,

NOVATECH

Joshua Audia, B.Sc.
E.I.T. | Transportation/Traffic

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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.**

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Dated at Ottawa (City) this 20th day of November, 2019.

Name: Jennifer Luong, P.Eng. (Please Print)

Professional Title: Senior Project Manager, Transportation/Traffic

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

Office Contact Information (Please Print)	
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EXECUTIVE SUMMARY

This revised Transportation Impact Assessment (TIA) has been prepared in support of Site Plan Control and Zoning By-Law Amendment applications for the property located at 4837 Albion Road. The development proposes an expansion of the Rideau Carleton Raceway and Slots (RCRS), now known as Hard Rock Ottawa. A previous TIA was prepared by Parsons in January 2018, with a later TIA Addendum prepared by Novatech and Parsons in April 2018, in support of a Zoning By-Law Amendment application for the above property.

At the time of the TIA Addendum, the proposed expansion consisted of the following:

- Phase 1: 35 gaming tables;
- Phase 2: 20 additional gaming tables, 750 additional slot machines, a number of additional restaurants totalling 700 seats, and a 2,000-seat (2,300 standing capacity) theatre;
- Phase 3: 200 hotel rooms and a parking garage.

It is understood that the first 35 gaming tables have been added to the existing casino, and that the additional gaming tables and slot machines will be added after the casino is expanded. Further, the number of seats in the proposed theatre is still considered to be 2,000. The proposed restaurants are anticipated to total 730 seats at the time of this application (an increase of 30 seats), and the proposed hotel is considered to have 225 rooms (an increase of 25 rooms). It is understood that 1,600 theatre seats and 178 hotel rooms are currently proposed, however the results of this analysis are conservative and relevant.

A total of 2,151 parking spaces will be provided at full buildout. Access to the subject site will continue to be provided via three unsignalized accesses and one signalized access to Albion Road. An access connection to the future extension of Earl Armstrong Road immediately north of the subject site is also proposed. The functional design of the planned Earl Armstrong Road extension shows that this access will be signalized.

The subject site is designated as 'General Rural Area' in Schedule A of the City of Ottawa's Official Plan. The implemented zoning for the subject site is 'Rural Commercial, Subzone 4' (RC4). The proposed expansion is permitted under an exemption for this zoning. However, a Zoning By-Law Amendment is required to address the relocation of the hotel compared to the location approved during the previous Zoning By-Law Amendment application for this development. The location of the hotel was revised to make better use of the existing building and orient the main entrance toward the future Earl Armstrong Road extension.

The subject site is surrounded by the following:

- Leitrim wetland and Findlay Creek to the north;
- Land used for mineral extraction to the east;
- Land used for agriculture and mineral extraction, followed by Rideau Road to the south;
- Albion Road and High Road, followed by the Falcon Ridge Golf Club to the west.

The conclusions and recommendations of the TIA can be summarized as follows:

Forecasting

- After the proposed expansion, the subject site is projected to generate 104 vehicle trips during the weekday morning peak hour, 665 vehicle trips during the weekday afternoon peak hour, and 884 vehicle trips during the Friday evening peak hour.

- Compared to the TIA Addendum, this equates to an increase of one vehicle trip during the weekday morning peak hour, seven vehicle trips during the weekday afternoon peak hour, and seven vehicle trips during the Friday evening peak hour.

Development Design and Parking

- No requirements to modify the existing accesses to Albion Road have been identified. Monitoring of the southbound left turn movement at the signalized Albion Road access can be considered to confirm that a single left turn lane can accommodate the projected volumes. Synchro analysis conducted in the TIA Addendum identifies that the existing 115m left turn lane is sufficient.

- The existing accesses can adequately accommodate the various types of vehicles that access the site (for example, tractor trailers, intercity buses, horse trailers, and passenger vehicles). The existing fire route is located along the existing main north-south drive aisle and in front of the main building entrance. The new fire route will include the main north-south drive aisle, in front of the pick-up and drop-off loops, and along the south side of the casino/theatre. Therefore, there are no requirements for modifications to the existing accesses.

- An 11.0m north-south drive aisle with sidewalks and cycle tracks is proposed to connect to the future Earl Armstrong Road extension. This connection is shown as a planned signal in the Earl Armstrong Extension Environmental Assessment. Concrete sidewalks with a width of 1.8m will be provided on both sides of the drive aisle, while a 3.0m bidirectional cycle track will be provided on the east side of the drive aisle. The cycle track will tie into the cycle track on the south side of the future Earl Armstrong Road extension.

- The porte-cochere to the south of the existing main east-west drive aisle will provide an expanded space near the main entrance for patron pick-ups and drop-offs, valet purposes, and users of the shuttle service. Pedestrians entering and exiting the building from the parking areas to the north will be encouraged to walk around the porte-cochere by either following the eastern sidewalks or crosswalks at the westernmost median break at the east-west drive aisle.

- Providing a cycle track along the north-south drive aisle that will connect to the Earl Armstrong Road extension will create a direct route for cyclists entering and exiting the site. As paved shoulders are provided on Albion Road, the proposed expansion does not seek to provide cycling facilities along the main east-west drive aisle to Albion Road. Bicycle parking will be provided north of the pick-up and drop-off loops, adjacent to the valet parking area.

- The proposed development will meet the minimum requirement for vehicle parking spaces and barrier-free parking spaces.

Access Design

- The signalized site access to Albion Road meets the target pedestrian level of service (PLOS), truck level of service (TkLOS), and vehicular level of service (Auto LOS), and does not meet the target bicycle level of service (BLOS). As the future Earl Armstrong Road extension will include cycle tracks that will connect to the proposed cycle track along the main north-south drive aisle, no recommendations have been made in providing additional cycling facilities on Albion Road beyond the existing paved shoulders.

Transportation Demand Management and Transit

- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

- The proponent will consider a carpooling and/or ridematching service. It should be noted that many current employees already carpool using ridematching service, and therefore continuing to do so will be encouraged by the proponent.

- Cycling facilities are planned along the Earl Armstrong Road extension. On-site cycling facilities are proposed along the internal drive aisle connecting to the future Earl Armstrong Road. Bike parking will be provided, and end-of-trip cycling facilities such as showers, changing facilities, and bike repair stations, will be considered by the proponent.

- The subject site is not within walking distance of any transit stops. The proponent currently provides free half-hour shuttle service to the Greenboro O-Train Station, and confirm that the same or better service will be provided to the Bowesville O-Train Station once the Trillium LRT Line is extended.

Intersection Capacity Analysis

- The analysis of the previous TIA and TIA Addendum stand, as the estimated site-generated traffic changed marginally.

- The 'most likely' future conditions when Earl Armstrong Road is extended includes a four-lane cross-section between Albion Road and Bank Street. Based on this cross-section and the projected volumes anticipated to enter and exit the subject site via the future signalized Earl Armstrong Road access, the intersection is anticipated to operate acceptably and no queueing issues are anticipated on any approaches.

Based on the foregoing, the proposed expansion is recommended from a transportation perspective.

1.0 INTRODUCTION

This revised Transportation Impact Assessment (TIA) has been prepared in support of Site Plan Control and Zoning By-Law Amendment applications for the property located at 4837 Albion Road. The development proposes an expansion of the Rideau Carleton Raceway and Slots (RCRS), now known as Hard Rock Ottawa. A previous TIA was prepared by Parsons in January 2018, with a later TIA Addendum prepared by Novatech and Parsons in April 2018, in support of a Zoning By-Law Amendment application for the above property.

At the time of the TIA Addendum, the proposed expansion consisted of the following:

- Phase 1: 35 gaming tables;
- Phase 2: 20 additional gaming tables, 750 additional slot machines, a number of additional restaurants totalling 700 seats, and a 2,000-seat (2,300 standing capacity) theatre;
- Phase 3: 200 hotel rooms and a parking garage.

The first 35 gaming tables have been added to the existing casino, and the additional gaming tables and slot machines will be added when the casino is expanded. The parking garage is not proposed at this time. For this update, the number of seats in the proposed theatre is still considered to be 2,000. The proposed restaurants are anticipated to total 730 seats at the time of this application (an increase of 30 seats), and the proposed hotel is considered to have 225 rooms (an increase of 25 rooms) It is understood that 1,600 theatre seats and 178 hotel rooms are currently proposed, however the results of this analysis are conservative and relevant. For reference, the previous TIA prepared by Parsons and TIA Addendum prepared by Novatech and Parsons have been included in **Appendix A** and **Appendix B**, respectively.

The subject site is surrounded by the following:

- Leitrim wetland and Findlay Creek to the north;
- Land used for mineral extraction to the east;
- Land used for agriculture and mineral extraction, followed by Rideau Road to the south;
- Albion Road and High Road, followed by the Falcon Ridge Golf Club to the west.

A view of the subject site is provided in **Figure 1**. A copy of Phase 1 and Phase 2 of the conceptual site plan is included in **Appendix C**. Phase 1 demonstrates the site plan prior to construction of the future Earl Armstrong Road extension, and Phase 2 demonstrates the site plan once the Earl Armstrong Road extension is in place.

2.0 PROPOSED DEVELOPMENT

It is anticipated that the proposed expansion will be completed by 2021. The proposed expansion will include 20 additional gaming tables, 750 additional slot machines, additional restaurants with 730 seats, a 2,000-seat theatre, and a 225-room hotel.

A total of 2,151 parking spaces will be provided at full buildout. Access to the subject site will continue to be provided via three unsignalized accesses and one signalized access to Albion Road. An access connection to the future extension of Earl Armstrong Road immediately north of the subject site is also proposed. The functional design of the planned Earl Armstrong Road extension shows that this access will be signalized.

Figure 1: View of the Subject Site

The subject site is designated as 'General Rural Area' in Schedule A of the City of Ottawa's Official Plan. The implemented zoning for the subject site is 'Rural Commercial, Subzone 4' (RC4). The proposed expansion is permitted under an exemption for this zoning. However, a Zoning By-Law Amendment is required to address the relocation of the hotel compared to the location approved during the previous Zoning By-Law Amendment application for this development. The location of the hotel was revised to make better use of the existing building and orient the main entrance toward the future Earl Armstrong Road extension.

3.0 SCREENING

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form, and a copy of the form is included in **Appendix D**. The trigger results are as follows:

- Trip Generation Trigger – The development is anticipated to generate over 60 peak hour person trips; further assessment is required based on this trigger.

- Location Triggers – The development is not located within a Design Priority Area or Transit-Oriented Development zone, and does not propose a new driveway to a boundary street designated as part of the City's Rapid Transit, Transit Priority, or Spine Cycling networks; further assessment is not required based on this trigger.

- Safety Triggers – No safety triggers outlined in the TIA Screening Form are met; further assessment is not required based on this trigger.

4.0 SCOPING

4.1 Existing Conditions

4.1.1 Roadways

All roadways within the study area fall under the jurisdiction of the City of Ottawa.

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 Hard Rock, where the posted speed limit is 60 km/h. It increases to 80 km/h north of Hard Rock (approximately 650m north of High Road) until just south of Lester Road, where the posted speed limit is 50 km/h north through the 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. Lester Road is scheduled to be widened to four-lanes between Bank Street and the Airport Parkway post-2025. Its intersection with Albion Road is signalized.

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 2021. 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-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 Avenue intersection with Albion Road is a three-way stop.

4.1.2 Intersections

Albion Road/Queensdale Avenue

- Unsignalized three-legged intersection
- All-way stop-controlled
- North Approach (Albion Road): one shared left turn/through lane
- South Approach (Albion Road): one shared through/right turn lane
- East Approach (Queensdale Avenue): one shared left turn/right turn lane

Albion Road/Lester Road

- Signalized four-legged intersection
- North/South Approaches (Albion Road): one left turn lane and one shared through/right turn lane
- East Approach (Lester Road): one left turn lane and one shared through/right turn lane
- West Approach (Lester Road): one left turn lane, one through lane, and one right turn lane

Albion Road/Leitrim Road

- Signalized four-legged intersection
- North/South Approaches (Albion Road): one left turn lane and one shared through/right turn lane
- East/West Approaches (Leitrim Road): one left turn lane and one shared through/right turn lane

Albion Road/Findlay Creek Drive

- Signalized three-legged intersection
- North Approach (Albion Road): one left turn lane and one through lane
- South Approach (Albion Road): one through lane and one right turn lane
- East Approach (Findlay Creek Drive): one left turn and one right turn lane

Albion Road/High Road

- Unsignalized three-legged intersection
- Side street stop-controlled
- North Approach (Albion Road): one shared through/right turn lane
- South Approach (Albion Road): one shared left turn/through lane
- West Approach (High Road): one shared left turn/right turn lane

Albion Road/Hard Rock Access
(210m South of High Road)

- Signalized three-legged intersection
- North Approach (Albion Road): one left turn lane and one through lane
- South Approach (Albion Road): one through lane and one right turn lane
- East Approach (Hard Rock Access): one left turn lane and one right turn lane

Albion Road/Rideau Road

- Signalized four-legged intersection
- North/South Approaches (Albion Road): one left turn lane and one shared through/right turn lane
- East/West Approaches (Rideau Road): one left turn lane and one shared through/right turn lane

4.1.3 Driveways

The City of Ottawa's 2017 TIA Guidelines requires a review of driveways on the boundary streets within 200m of any access, which can be described as follows.

Albion Road, East Side:

- One driveway to a residence at 4897 Albion Road

Albion Road, West Side:

- Three driveways to residences at 4730 High Road and 4770 Albion Road

4.1.4 Area Traffic Management

An Area Traffic Management (ATM) study is currently underway for Albion Road between Bank Street and Lester Road. Based on the City's Public Engagement Project Search tool, the purpose of the study is 'to address traffic concerns and recommend solutions to reduce the negative impacts of motor traffic. This study will not be recommending traffic management solutions (e.g. turn restrictions or road closures).' The first public meeting was held on November 7, 2019, and a second public meeting is anticipated in winter 2020.

4.1.5 Transit

The subject site is not within walking distance of any transit stops. The nearest stops to the subject site are approximately 1.8km north, at Findlay Creek Drive. The proponent currently provides free half-hour shuttle service to the Greenboro O-Train Station, and the same or better service will be provided to the Bowesville O-Train Station once the Trillium LRT Line is extended.

4.1.6 Existing Traffic Volumes

Weekday traffic counts completed by the City of Ottawa have been used to determine the existing pedestrian, cyclist, and vehicular traffic volumes at the study area intersections. The traffic counts were completed on the following dates. Traffic count data is included in **Appendix E**.

- Albion Road/Queensdale Avenue — May 18, 2016
- Albion Road/Lester Road — February 10, 2016
- Albion Road/Leitrim Road — September 8, 2016
- Albion Road/Findlay Creek Drive — September 28, 2016
- Albion Road/High Road — April 26, 2016
- Albion Road/Hard Rock Access — September 1, 2015
- Albion Road/Rideau Road — May 4, 2017

A more recent weekday count was conducted by the City at Albion Road/Findlay Creek Drive on June 19, 2018. The volumes between the two counts are relatively comparable, with some movements marginally decreasing (such as the northbound through movement during the weekday morning peak hour) and some marginally increasing (such as the southbound through movement during the weekday morning and afternoon peak hours). Therefore, to maintain consistency with the previous TIA and TIA Addendum, the 2016 count has been carried forward.

In addition, the City conducted continuous turning movement counts at Bowesville Road/Leitrim Road, Albion Road/Leitrim Road, and Albion Road/Rideau Road on the weekends of February 9-11, 2018 (Family Day weekend) and March 23-25, 2018, between 3:00pm Friday and 6:00am Sunday.

Thirty-nine continuous hours of data was recorded for each count. As the traffic volumes at Albion Road/Leitrim Road and Albion Road/Rideau Road were generally higher on the weekend of March 23, these counts were carried forward in the analysis included in the TIA Addendum. The weekday morning, afternoon, and Friday evening peak hour volumes were found to be the 'worst case' of site-generated traffic and adjacent street traffic. Existing traffic volumes at the study area intersections are included in **Figure 2**.

As stated in the previous TIA prepared by Parsons, it should be noted that the City's 2016 count at High Road shows very low peak hour volumes for the High Road/Earl Armstrong Road link (two-way totals between 90 vph and 160 vph).

In June 2017, Parsons conducted peak hour afternoon and evening turning movement counts at the three accesses to the subject site (Thursday evening, Friday evening, Saturday evening, and Friday afternoon). Traffic generated by the existing site was extrapolated throughout the study area, to estimate how much existing site-generated traffic travels on Albion Road. The estimated existing site-generated traffic throughout the study area is shown in **Figure 3**.

4.2 Planned Conditions

Section 5 of the previous TIA prepared by Parsons includes further discussion of the local transportation context, as well as a list of planned road network modifications in South-Central Ottawa. Timing of these projects are listed below based on the City of Ottawa's 2013 Transportation Master Plan (TMP), except in bold, where the City has provided an updated timing.

- Airport Parkway (widening to four lanes): 2014-2031
- Albion Road (widening from Lester Road to realigned Leitrim Road): post-2031
- Albion Road/Leitrim Road (intersection improvements): **2021**
- Bank Street (widening to four lanes from Leitrim Road to Blais Road): 2020-2025
- Bank Street (widening to four lanes from Blais Road to Rideau Road): 2026-2031
- Earl Armstrong Road (widening between Limebank Road and Bowesville Road): post-2031
- Earl Armstrong Road (extension from High Road to Hawthorne Road): post-2031
- Leitrim Road (widening to four lanes and realignment): post-2031
- Lester Road (widening to four lanes): **post-2025**
- Trillium Line LRT (extension to Leitrim, Bowesville, and Limebank stations): **2022**

The following TMP projects have been examined to determine the practicality of accelerating them through the participation of Hard Rock.

Bank Street Widening
The 2013 TMP identifies the widening of Bank Street from Leitrim Road to Blais Road as a Phase 2 affordable project (2020-2025), and from Blais Road to Rideau Road as a Phase 3 affordable project (2026-2031). The widening of Bank Street from Leitrim Road to Findlay Creek Drive is included in the Development Charges (DC) By-Law with a timing of 2020-2024 and a cost of $35M. Widening from Findlay Creek Drive to Blais Road is included in the DC By-Law with a timing of 2030-2031 and a cost of $10M. It is understood that discussions with Leitrim developers to front end the Bank Street/ Leitrim Road intersection are currently on hold while the City conducts a peer review of project costs. As the Bank Street widening is of no benefit to Hard Rock, and the Leitrim Landowners Group have not expressed interest in front ending this project, it is not an appropriate TMP project for the proponent to accelerate.

Figure 2: Existing Traffic Volumes

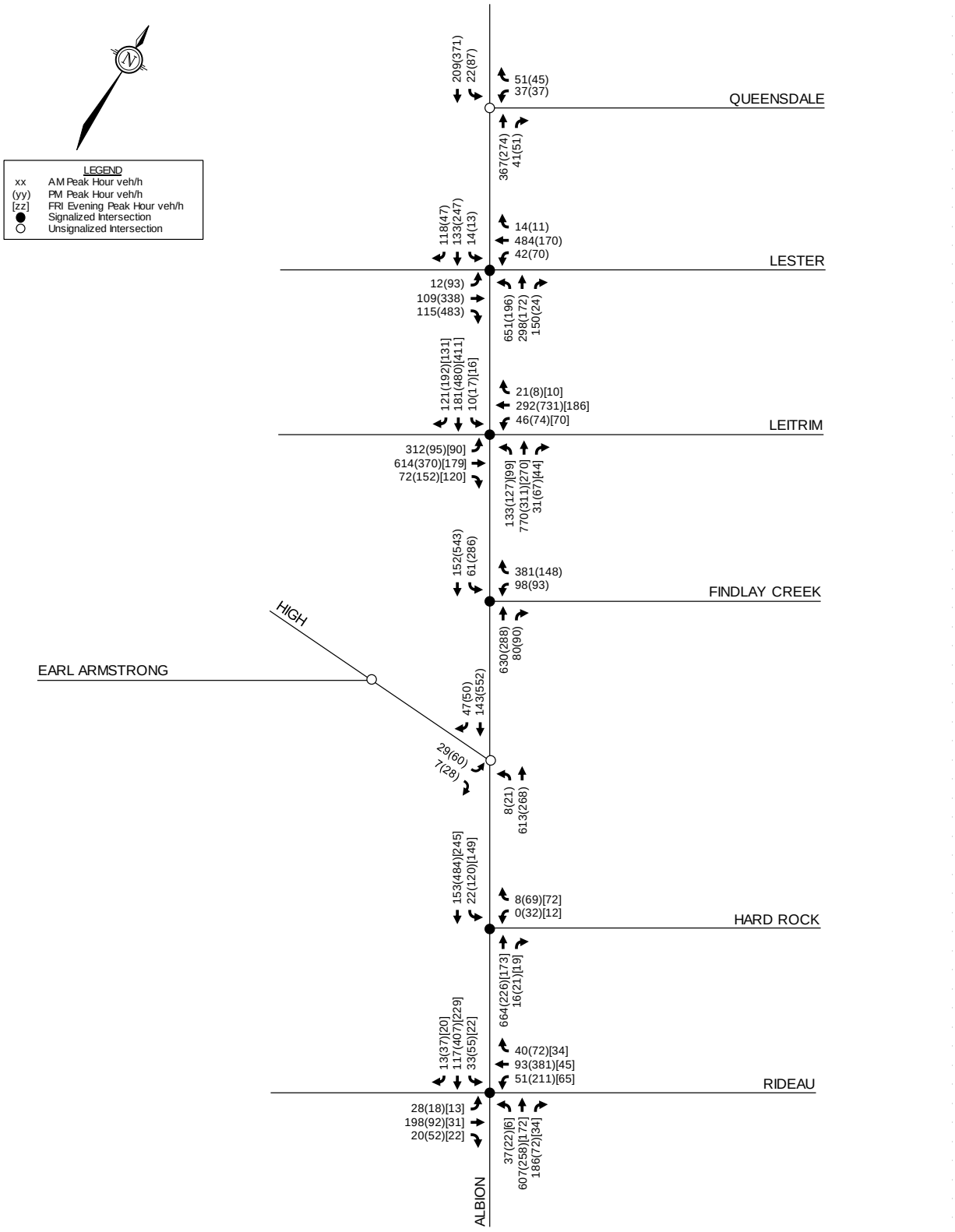
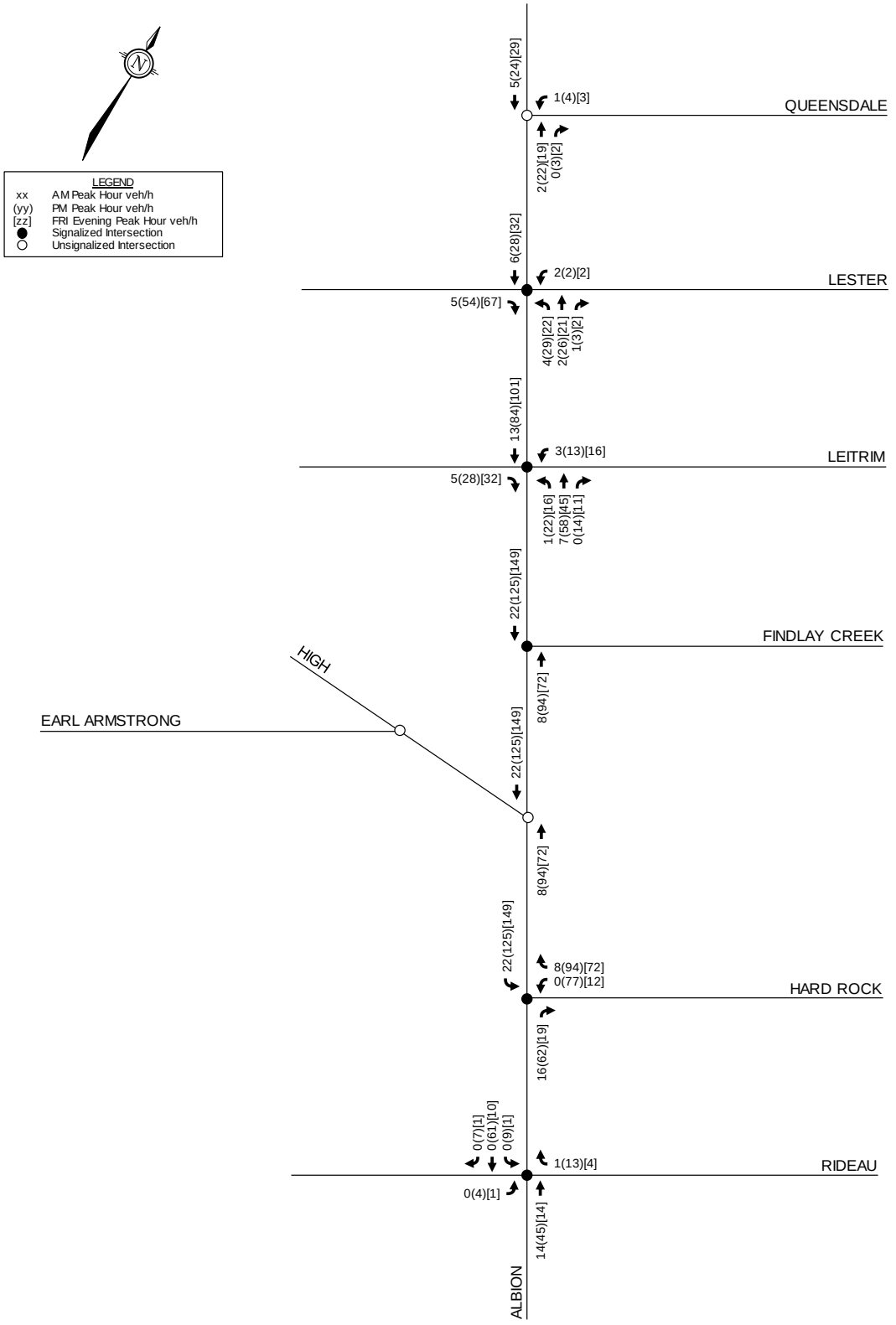


Figure 3: Existing Site-Generated Traffic Volumes



Earl Armstrong Extension
Extension of Earl Armstrong Road between Albion Road and Bank Street is not included in the Affordable Network. In order to be front-ended, the project needs to be included in the Affordable Network and the DC By-Law update. It is understood that the City's real estate group would not proceed with the required land acquisition until the project budget is approved. The proposed expansion is scheduled to open in July 2021, and the DC By-Law update is scheduled for 2022. Without City ownership of the EA corridor, it is unlikely that this is a project Hard Rock could participate in.

Albion Road/Lester Road Intersection Widening
The widening of Lester Road from the Airport Parkway to Bank Street is included in the DC By-Law with a timing of 2025-2029 and a cost of $18.7M. The City has identified a cost of $4.5M for signalized intersection improvements at Albion Road/Lester Road, including widening Lester Road to four lanes for 800m, dual northbound left turn lanes on Albion Road, a channelized eastbound right turn and second southbound receiving lane for 300m, and land acquisition. It is possible that the proponent could participate in accelerating this TMP project.

Another approach to alleviate local congestion could include a financial contribution to some measures identified in the Albion Road (Bank to Lester) ATM Study described in Section 4.1.4. This study is currently underway.

It is understood that the proponent will contribute to the City's preferred TMP project of the identified, or to measures identified in the Albion Road ATM Study upon completion, but not all of the above.

4.3 Study Area and Time Periods

The study area for this report will remain consistent with the previous TIA, and will include the roadways Albion Road, Queensdale Avenue, Lester Road, Leitrim Road, Findlay Creek Drive, High Road, Earl Armstrong Road, and Rideau Road. The study area includes the signalized intersections at Albion Road/Lester Road, Albion Road/Leitrim Road, Albion Road/Findlay Creek Drive, Albion Road/RCRS Access, and Albion Road/Rideau Road, and the unsignalized intersections at Albion Road/Queensdale Avenue and Albion Road/High Road. In the scenario where Earl Armstrong Road is extended, the future access to Earl Armstrong Road east of Albion Road is considered.

The selected time periods for the analysis are the weekday morning, weekday afternoon, and Friday evening peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. Consistent with the previous TIA and TIA Addendum, this study will present analysis for the horizon year 2028. A scenario where the Earl Armstrong Road extension is constructed will also be analyzed.

4.4 Exemptions Review

This module reviews possible exemptions from the final Transportation Impact Assessment, as outlined in the TIA guidelines. The applicable exemptions for this site are shown in **Table 1**.

Table 1: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Status
Design Review Component			
4.1 Development Design	*4.1.2* Circulation and Access	• Only required for site plans	Not Exempt
	4.1.3 New Street Networks	• Only required for plans of subdivision	Exempt
4.2 Parking	*4.2.1* Parking Supply	• Only required for site plans	Not Exempt
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	*All elements*	• Not required for non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time	Not Exempt
4.6 Neighbourhood Traffic Management	*4.6.1* Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept	*All elements*	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

Consistent with the previous TIA, the Neighbourhood Traffic Management module is exempt, however site traffic through the Blossom Park Neighbourhood to the north has been analyzed.

Based on the foregoing, the following modules will be included in the TIA report:

- Module 4.1: Development Design
- Module 4.2: Parking
- Module 4.3: Boundary Streets
- Module 4.4: Access Design
- Module 4.5: Transportation Demand Management
- Module 4.7: Transit
- Module 4.9: Intersection Design

5.0 FORECASTING

5.1 Development-Generated Travel Demand

5.1.1 Trip Generation

In the previous TIA, the proposed expansion included three phases, consisting of Phase 1 (35 gaming tables), Phase 2 (20 additional gaming tables, 750 additional slot machines), and Phase 3 (200-room hotel). The TIA Addendum included the consideration of additional Phase 2 uses (restaurants with 700 seats total, 2,000-seat theatre with a standing capacity of 2,300 people), and the provision of 'special events.' Phase 1 has since been approved and implemented, but is still accounted for in the forecasting section, as traffic counts at the study area intersections were conducted prior to the implementation of Phase 1. It is understood that with the proposed expansion, large special events are no longer planned, and therefore discussion of special events is not included in this TIA as it was in the TIA Addendum.

Section 8 of the previous TIA includes the methodology used to estimate the trips generated by each phase of the proposed expansion. Section 3.1 of the TIA Addendum includes an adjustment to the vehicle occupancy rate assumptions where appropriate (decreasing from 2.5 persons per vehicle to 2.0, per discussions with City staff). The trip generation estimates for all uses of the proposed expansion were derived using first principles. For ease of reference, the methodology has been summarized below.

It is anticipated that, due to the nature of the site, many of the trips generated by this development will be shared. At full buildout, the site will include a race track, hotel, theatre, additional restaurants, and additional gaming tables and slot machines. Further, the layout of the proposed expansion is designed for patrons to participate in as many of the on-site activities as possible in one visit. As one example, accessing the restaurants will require patrons to travel through the casino areas. It should also be noted that since accessing the restaurants will require patrons to pass through the casino areas, patrons must be of legal age. As discussed in the TIA Addendum, anticipated shared use trips include the following:

- Patrons will play both slots and table games during one visit;
- The same patron will visit multiple tables or slot machines during any one visit;
- As the facility expands in both tables and slot machines, some patrons of the expanded facilities will already be existing patrons;
- Existing patrons of the race track, restaurant and slots will also be patrons of the expanded gambling facility, new restaurants, and new theatre.

The trip reductions that have been applied for each use are included in the trip generation methodology discussions below.

Trips generated by the proposed gaming tables were estimated in the previous TIA, assuming five to six seats per table and an average stay of three hours for patrons. Based on these assumptions, along with a vehicle occupancy rate of 2.0 persons per vehicle, the vehicle trip generation rate per gaming table was calculated to be approximately 43.0 vehicles per day. An arrival/departure distribution was developed by Parsons, as the casino provided data of hour by hour patron arrivals and departures. The average arrivals and departures data is included in Section 8.1 of the previous

TIA. A 10% reduction was applied for Phase 1 and a 20% reduction was applied for Phase 2, to account for patrons participating at multiple tables.

Trips generated by the slot machines were estimated in the previous TIA, based on the existing site-generated traffic volumes, as the majority of site-generated traffic on non-race days were attributable to slot machine use. The vehicle trip generation rate per slot machine between 0.26 and 0.34 vehicles per machine were determined for the weekday midday, afternoon, Friday evening, and Saturday evening peak hours. A 25% reduction was applied to the new slot machine-generated trips, to account for existing slot machine users playing at the new slot machines. An additional 25% reduction was applied overall to the existing and new casino-generated trips, to account for existing and future trips that visit both gaming tables and slot machines.

Trips generated by the additional restaurants were estimated in the TIA Addendum. As actual seating capacity of the restaurants will depend on the layout of tables, chairs, etc., it was assumed that the practical capacity may be slightly less than the theoretical capacity. For example, large or unusually shaped tables may make reaching the theoretical capacity impossible to accommodate, and as such, a practical capacity of 95% was assumed (for 700 seats, this results in a practical capacity of 665 seats). Applying a vehicle occupancy rate of 2.0 persons per vehicle, the new restaurants generate approximately 330 vehicles per day. A 70% reduction was applied to account for the fact that most people visiting the restaurants will also participate in casino activities (tables, slots, and horse races). Therefore, the restaurants are not anticipated to generate a significant number of new trips from the surrounding community. With the reduction applied, this resulted in 100 new external vehicle trips per day. The assumed arrival/departure distribution, which anticipates that peak arrivals and departures are expected to occur between 4:30pm and 8:30pm, was described as follows:

- 4:30pm to 5:30pm 20% of arrivals/departures 10 veh in/10 veh out
- 5:30pm to 6:30pm 30% of arrivals/departures 15 veh in/15 veh out
- 6:30pm to 7:30pm 30% of arrivals/departures 15 veh in/15 veh out
- 7:30pm to 8:30pm 20% of arrivals/departures 10 veh in/10 veh out

Trips generated by the proposed theatre were estimated in the TIA Addendum. It was assumed that a 2,000-seat theatre would have a standing capacity of 2,300 people. The standing capacity was used to maintain a conservative analysis. Similar to the restaurant trip estimates, a 95% theoretical capacity and a vehicle occupancy rate of 2.0 persons per vehicle was applied. This resulted in a trip generation estimate of 1,090 vehicles per day. A 30% reduction was applied to account for shared trips with the casino activities, and an additional 30% reduction was applied to account for shared trips with the restaurant. Applying these reductions resulted in 440 new external vehicle trips per day. The assumed arrival/departure distribution was described as follows:

- 4:30pm to 5:30pm 10% of arrivals/departures 35 veh in/5 veh out
- 5:30pm to 6:30pm 40% of arrivals/departures 170 veh in/10 veh out
- 6:30pm to 7:30pm 50% of arrivals/departures 210 veh in/10 veh out
- 7:30pm to 8:30pm 0% of arrivals/departures 0 veh in/0 veh out

Trips generated by the proposed hotel were estimated in the previous TIA. Assuming 70% of hotel rooms are occupied, 70% of trips are external (i.e. not to/from the casino), one vehicle per room, and approximately one two-way vehicle trip per room per day, a 200-hotel room was estimated to generate 198 external vehicle trips per day. Being located in a rural setting, the hotel use is not anticipated to have the same peak hour characteristics as a typical urban hotel. Therefore, the

previous analysis assumed that any of the weekday midday, afternoon, Friday evening, and Saturday evening peak hours may generate up to 25% of the hotel-generated trips, with a nominal amount assigned to the weekday morning peak hour. This is considered a conservative estimate.

- Weekday morning 5% of arrivals/departures 6 veh in/4 veh out
- Weekday afternoon 25% of arrivals/departures 25 veh in/24 veh out
- Weekday midday 25% of arrivals/departures 25 veh in/24 veh out
- Friday evening 25% of arrivals/departures 25 veh in/24 veh out
- Saturday evening 25% of arrivals/departures 25 veh in/24 veh out

Compared to the previous studies, the number of restaurant seats have increased from 700 to 730, and the number of hotel rooms have increased from 200 to 225.

A revised summary table of the estimated site-generated traffic during the weekday morning, afternoon, midday, Friday evening and Saturday evening peak hours (in vph), which compares the results shown in the TIA Addendum and the latest proposed expansion, is shown in **Table 2**.

Table 2: Vehicle Trip Generation

Phase	Use	Weekday Morning			Weekday Afternoon			Weekday Midday			Friday Evening			Saturday Evening		
		IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
TIA Addendum																
	Existing Site Trips	*41*	*22*	*63*	*187*	*170*	*357*	*277*	*54*	*331*	*219*	*128*	*347*	*204*	*221*	*425*
1	35 Gaming Tables	5	3	8	32	40	72	55	28	83	61	41	102	69	47	116
2	20 Gaming Tables	3	1	4	16	20	36	28	14	42	31	21	52	34	24	58
	750 Slot Machines	23	5	28	86	63	149	96	52	148	98	57	155	91	98	189
	25% Reduction	-8	-2	-10	-34	-31	-65	-45	-24	-69	-48	-30	-78	-49	-42	-91
	2,000-seat Theatre	0	0	0	35	5	40	0	0	0	210	10	220	210	10	220
	700-seat Restaurant	0	0	0	10	10	20	0	0	0	15	15	30	15	15	30
3	200-room Hotel	6	4	10	25	24	49	25	24	49	25	24	49	25	24	49
	Future Site Trips	*29*	*11*	*40*	*170*	*131*	*301*	*159*	*94*	*253*	*392*	*138*	*530*	*395*	*176*	*571*
	Total Site Trips	***70***	***33***	***103***	***357***	***301***	***658***	***436***	***148***	***584***	***611***	***266***	***877***	***599***	***397***	***996***

Phase	Use	Weekday Morning			Weekday Afternoon			Weekday Midday			Friday Evening			Saturday Evening		
		IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Latest Proposed Expansion																
	Existing Site Trips	*41*	*22*	*63*	*187*	*170*	*357*	*277*	*54*	*331*	*219*	*128*	*347*	*204*	*221*	*425*
1	35 Gaming Tables	5	3	8	32	40	72	55	28	83	61	41	102	69	47	116
2	20 Gaming Tables	3	1	4	16	20	36	28	14	42	31	21	52	34	24	58
2	750 Slot Machines	23	5	28	86	63	149	96	52	148	98	57	155	91	98	189
2	25% Reduction	-8	-2	-10	-34	-31	-64	-45	-24	-68	-48	-30	-77	-49	-42	-91
2	2,000-seat Theatre	0	0	0	35	5	40	0	0	0	210	10	220	210	10	220
2	730-seat Restaurant	0	0	0	11	10	21	0	0	0	16	15	31	16	15	31
3	225-room Hotel	6	5	11	28	27	55	28	27	55	28	27	55	28	27	55
	Future Site Trips	*29*	*12*	*41*	*174*	*134*	*308*	*162*	*97*	*259*	*396*	*141*	*537*	*399*	*179*	*578*
	Total Site Trips	***70***	***34***	***104***	***361***	***304***	***665***	***439***	***151***	***590***	***615***	***269***	***884***	***603***	***400***	***1003***
	Difference	**0**	**1**	**1**	**4**	**3**	**7**	**3**	**3**	**6**	**4**	**3**	**7**	**4**	**3**	**7**

Compared to the trip generation estimates included in the TIA Addendum, the latest proposed expansion is projected to generate up to seven additional vehicle trips during the peak hours.

5.2 Trip Distribution and Assignment

The previous TIA notes that the trip distribution of the proposed expansion was based on the north-south split at the existing site driveways, and then the existing volume splits at the study area intersections along Albion Road. To maintain a conservative analysis, all 'new' site-generated trips are assigned to the signalized access to Albion Road.

As part of the TIA Addendum, the trip distribution was revised to reflect an afternoon peak hour count undertaken at the Earl Armstrong Road/High Road intersection in April 2018 and the most current count at the Albion Road/High Road intersection. The revised trip distribution resulted in approximately 4% of the two-way total site traffic using this link during the morning peak hour and 8% of the two-way total site traffic using this link during the afternoon peak and Saturday evening peak hours.

The projected traffic generated by the new phases of development is included in **Figure 4**. The traffic generated by the total site once the proposed expansion is complete is included in **Figure 5**.

Figure 4: New Site-Generated Traffic Volumes

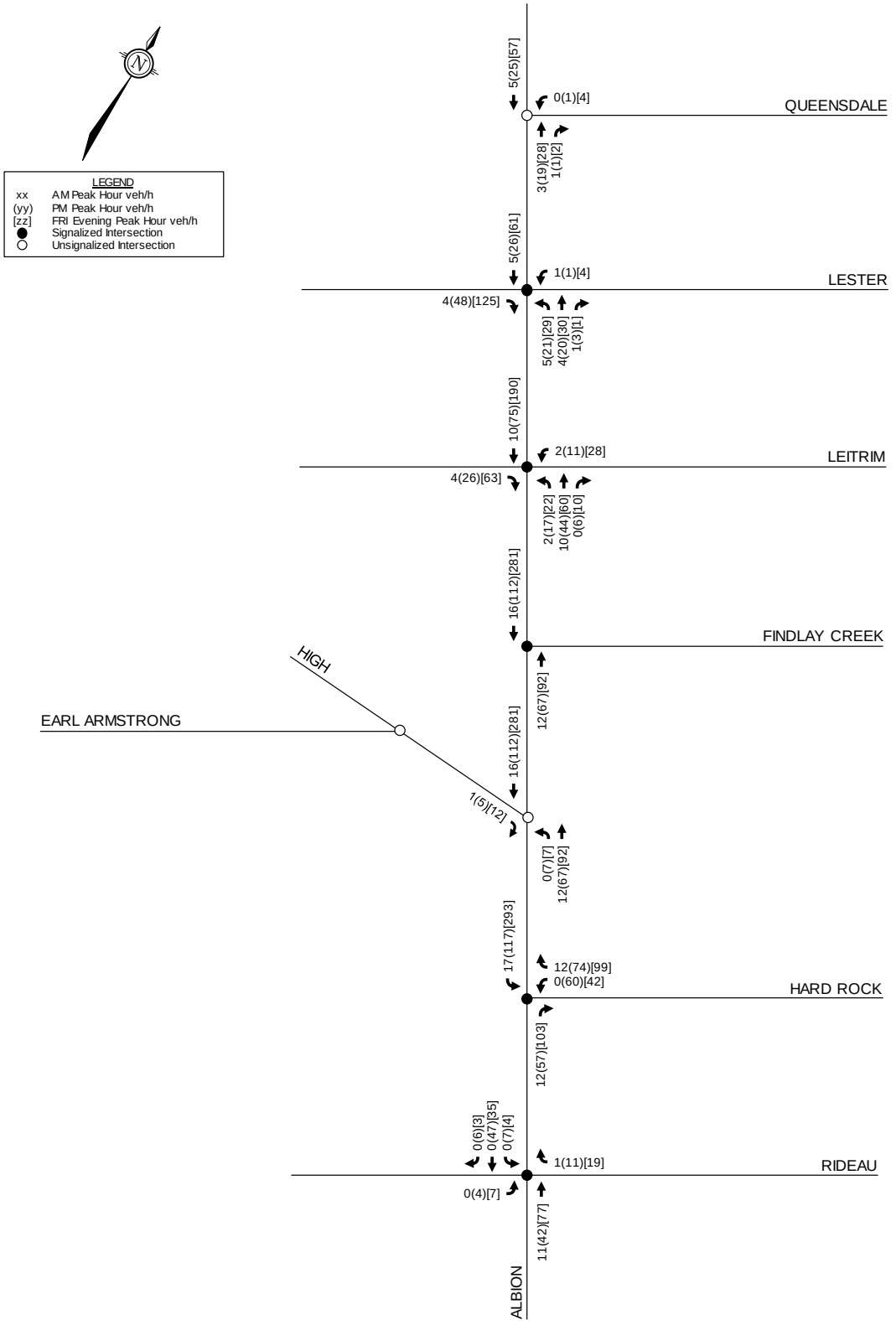
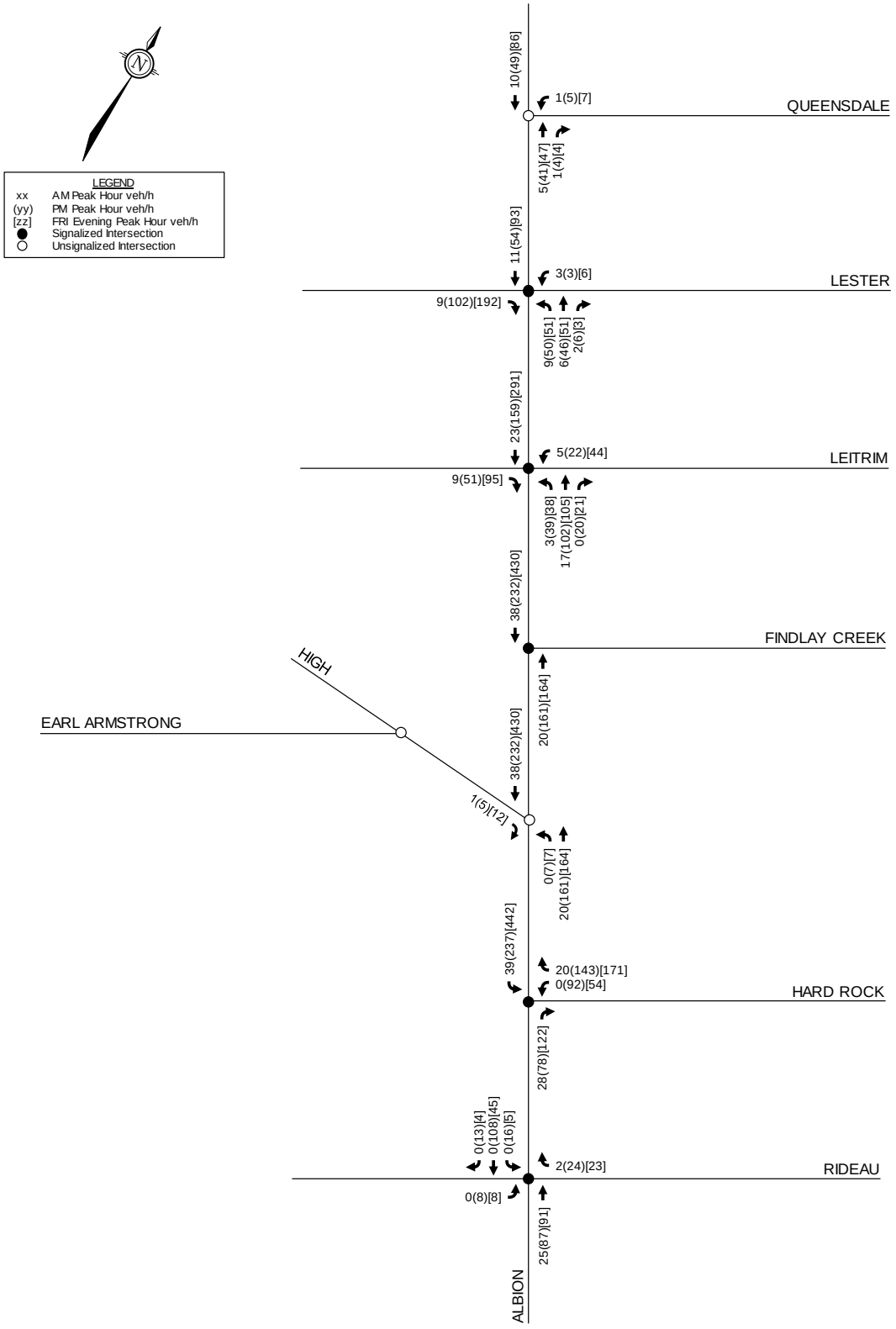


Figure 5: Total Site-Generated Traffic Volumes



Section 9.2 of the previous TIA discusses the possible connection of the site to the future Earl Armstrong Road extension, and the effect that this extension would have on the assumed trip distribution described above. North of the study area, Bank Street bends west and intersects with Albion Road.

It is assumed that trips to/from the north and west would continue to access the subject site via Albion Road even if the Earl Armstrong Road extension is in place, as Albion Road would continue to provide the most direct route. The exception is trips to/from the west via the existing Earl Armstrong Road/High Road link, as the extension will connect directly to the subject site. Trips to/from the south and east may use the Earl Armstrong Road extension to access the site via the future signalized access at Earl Armstrong Road. The previous TIA estimated that 18% of site-generated trips would use the Earl Armstrong Road access, and this has been carried forward in this study. Further discussion of this scenario is included in Section 5.6.

5.3 Background Traffic

Consistent with the previous TIA, a 0.5% per annum growth rate has been applied for the background traffic volumes on Albion Road. Parsons determined that this growth rate is appropriate through a ten-year review of historic traffic counts at Albion Road/Rideau Road and the 2031 TMP model plots provided by the City. The calculations used to determine the background growth rate is included in **Appendix F**.

5.4 Other Area Development

Future area development, which includes discussion of the developing suburban and bedroom communities within the vicinity of the study area, is included in Section 9.3 of the previous TIA.

The total projected traffic volumes for the horizon year 2028 is included in **Figure 7**.

5.5 Demand Rationalization

Within the immediate vicinity of the subject site, there are no road network capacity issues related to the projected 2028 horizon year traffic volumes, and intersections adjacent to the site will continue to operate at an acceptable level of service. As stated in the previous TIA, capacity deficiencies to the north are present, due to growth in suburban and bedroom communities in South-Central Ottawa.

As the proposed expansion has only marginally changed in terms of site-generated traffic when compared to the results of the TIA Addendum, the previous analysis stands. This analysis is included in Section 6.7.2.

5.6 Post-Earl Armstrong Road Extension Trip Distribution and Assignment

As shown in Section 4.2, multiple roadway widenings and improvements are identified in the area. Of these improvements, the eastern extension of Earl Armstrong Road is most relevant to Hard Rock Ottawa. An Environmental Assessment (EA) for the Earl Armstrong Road extension is currently underway. This extension would reduce demand on the roadway network to the north where capacity deficiencies are greatest, and reduce traffic volumes through the Blossom Park neighbourhood.

A draft of the Earl Armstrong Road Extension Environmental Study Report (ESR), being prepared by Parsons, includes traffic projections along Earl Armstrong Road once the extension is

constructed. The projections were made for the year 2048, consistent with the 2048 scenario developed in support of the Trillium Line Rapid Transit extension. A variety of network scenarios were developed by Parsons to isolate the impacts of different road network additions.

The scenario deemed to 'most likely' reflect future conditions includes the following attributes:

- *Earl Armstrong Road* extended to Hawthorne Road, with a four-lane cross-section between Albion Road and Bank Street and a two-lane cross-section between Bank Street and Hawthorne Road, as well as a direct connection to the Findlay Creek subdivision;
- *Leitrim Road* widened to four lanes between Limebank Road and Bank Street;
- *Bank Street* widened to four lanes between Findlay Creek Drive and Earl Armstrong Road.

The ESR includes eastbound and westbound volume projections on Earl Armstrong Road between Albion Road and Bank Street for the weekday morning peak hour. The projections included approximately 1,000 vehicles in the eastbound (peak) direction and 450 vehicles in the westbound direction, which has been carried forward for the weekday morning peak hour analysis. These volumes have been reversed for the purposes of the weekday afternoon peak hour analysis. The Friday evening peak hour volumes have been estimated based on the observed counts at Albion Road/Leitrim Road. At this intersection, east-west volumes during the Friday evening peak hour are approximately 50% of the weekday morning peak hour volumes, and the eastbound/westbound splits are 60%/40%. These percentages have been applied to the projected AM peak hour traffic on Earl Armstrong Road to estimate the Friday evening peak hour traffic. Relevant excerpts of the Earl Armstrong Extension ESR are included in **Appendix G**.

Projected traffic volumes on Earl Armstrong Road and redistributed site-generated traffic volumes are shown in **Figure 6**.

Figure 6: Total Traffic Volumes (post-Earl Armstrong Road Extension)

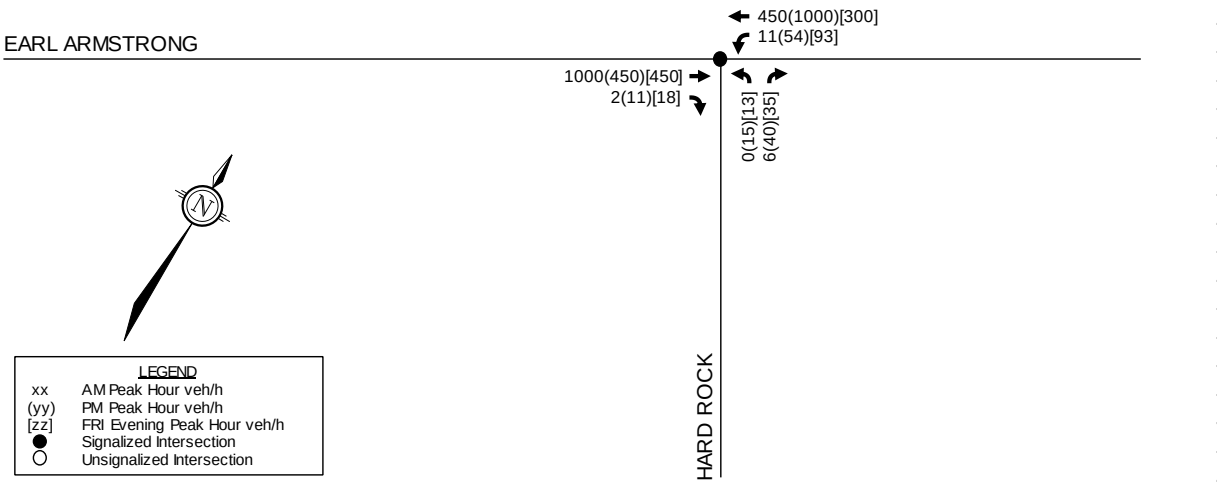
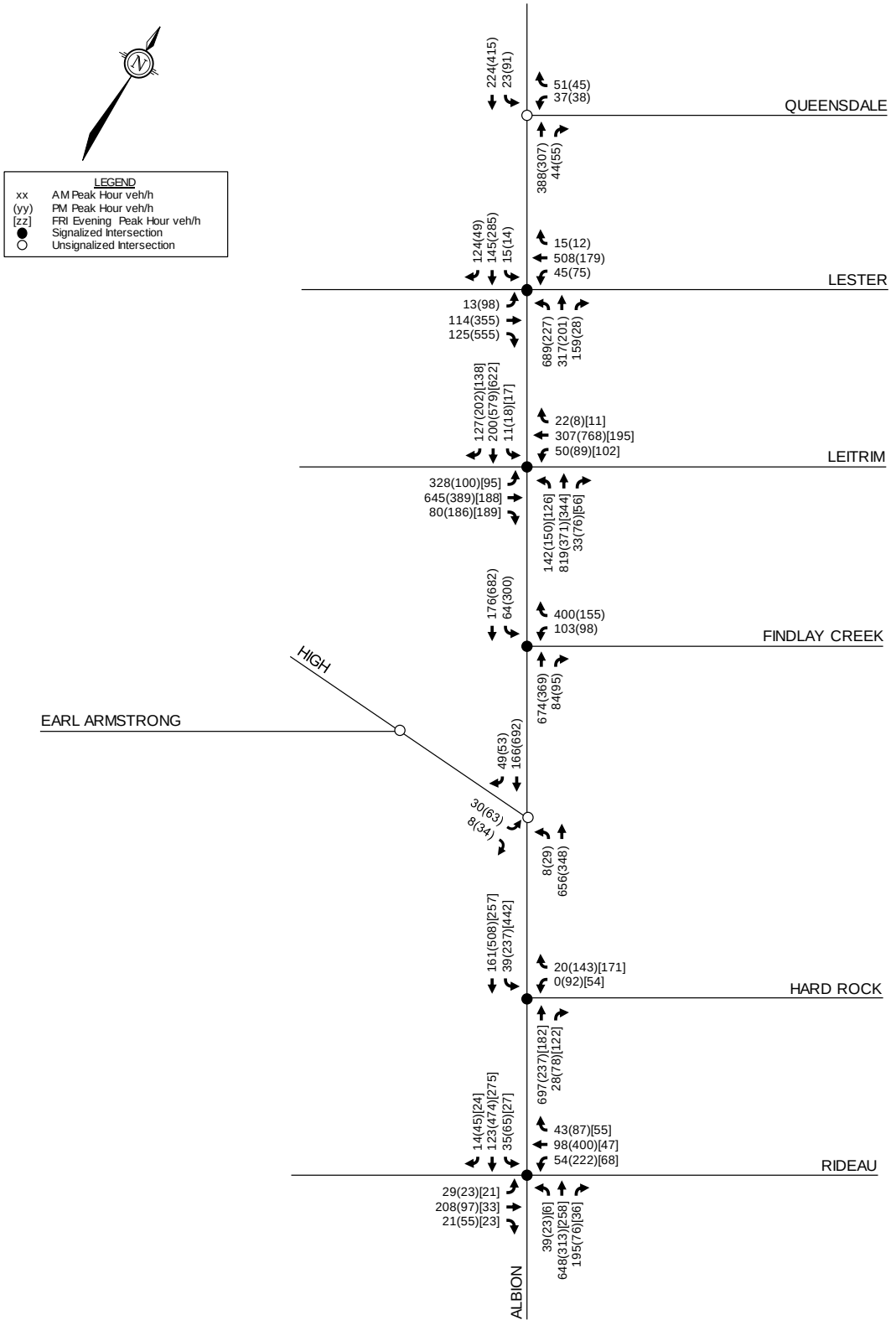


Figure 7: 2028 Total Traffic Volumes



6.0 ANALYSIS

6.1 Development Design

A master development plan of the proposed expansion has been developed, and is shown in **Figure 8**. The figure outlines the locations of all pedestrian passages, cycling infrastructure, loading areas, and existing or proposed buildings.

6.1.1 Circulation and Access

The existing development has one signalized and three unsignalized accesses to Albion Road. No new driveways to Albion Road are proposed. Analysis included in the previous TIA and TIA Addendum indicated that the current access intersections operate at an LOS A and can adequately accommodate the various types of vehicles that access the site (for example, tractor trailers, intercity buses, horse trailers, and passenger vehicles). The existing fire route is located along the existing main north-south drive aisle and in front of the main building entrance. The new fire route will include the main north-south drive aisle, in front of the hotel and drop-off loops, and along the south side of the casino/theatre. There are no requirements for modifications to the existing accesses.

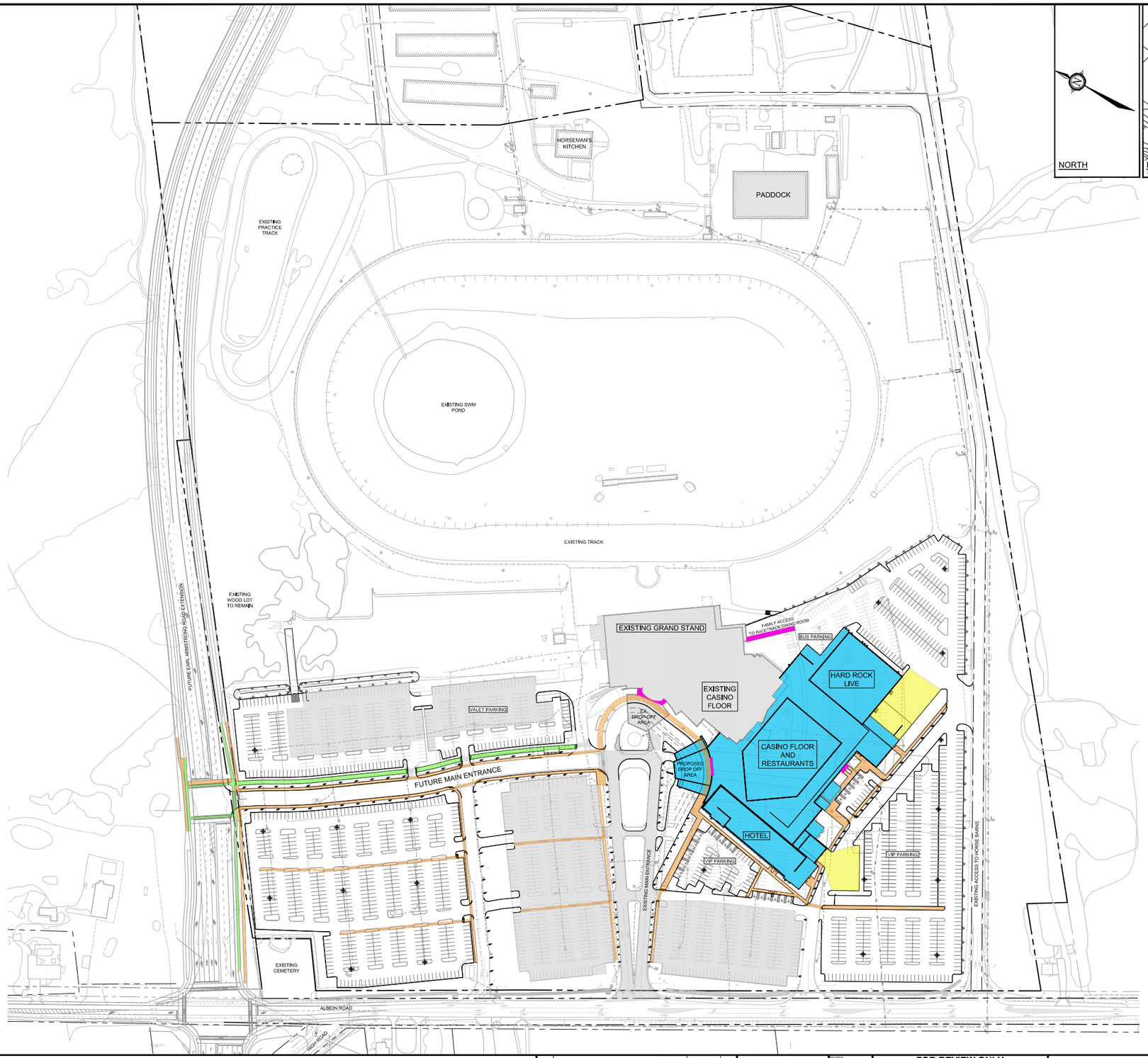
An 11.0m north-south drive aisle with sidewalks and cycle tracks is proposed to connect to the future Earl Armstrong Road extension when it is constructed. This connection is shown as a planned signal in the Earl Armstrong Road Extension EA. Concrete sidewalks with a width of 1.8m will be provided on both sides of the drive aisle, while a 3.0m bidirectional cycle track will be provided on the east side of the drive aisle. The cycle track will tie into the cycle track on the south side of the future Earl Armstrong Road extension.

The porte-cochere to the south of the existing main east-west drive aisle will provide an expanded space near the main entrance for casino and theatre patron pick-ups and drop-offs, valet purposes, and users of the shuttle service. The existing median breaks along the east-west drive aisle will be maintained. In existing conditions, all three median breaks are two-way roadways to allow for vehicles to enter or exit the pick-up/drop-off loop or access any parking area on-site. After the proposed expansion is complete, the westernmost median break will still accommodate two-way traffic, while the middle median break will accommodate one-way traffic southbound toward the main entrance, and the easternmost median break, which will be aligned with the main north-south drive aisle, will accommodate one-way traffic northbound away from the main entrance.

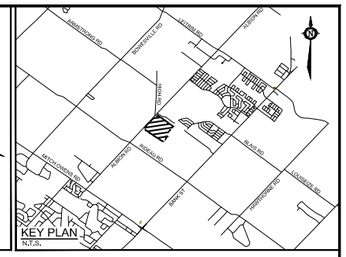
Two loading areas are proposed, with one loading area adjacent to the south side of the theatre, and one loading area adjacent to the south side of the hotel. A bus parking area is proposed east of the theatre, adjacent to the main entrance to the raceway.

6.1.2 Design for Sustainable Modes

Pedestrian facilities will be provided between the building entrances and the parking areas. All adjacent parking areas can currently be accessed by existing sidewalks along the drive aisles, and this will continue once the proposed expansion is complete. Pedestrians entering and exiting the building from the parking areas to the north will be encouraged to walk around the porte-cochere by either following the eastern sidewalks or crosswalks at the westernmost median break at the east-west drive aisle. Pedestrians entering and exiting the building from the parking areas to the south will be provided with sidewalks that are parallel with the exterior walls of the proposed expansion.



NORTH



KEY PLAN
N.T.S.

LEGEND

- PEDESTRIAN PASSAGES
- CYCLING SPINE
- LOADING AREA
- EX. TO REMAIN
- PROPOSED BUILDINGS
- MAIN ENTRANCES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	NOV 20/19	CJR

SCALE
1:1250
1:1250
0 10 20 30 40 50

DESIGN MJH
CHECKED CJR
DRAWN MJH
CHECKED CJR
APPROVED JLS

FOR REVIEW ONLY

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LOCATION
4837 ALBION ROAD, CITY OF OTTAWA
HARD ROCK OTTAWA

DRAWING NAME
MASTER DEVELOPMENT PLAN

PROJECT No. 116111
REV. REV # 1
DRAWING No. FIGURE 8

A 3.0m-wide bidirectional cycle track is proposed on the east side of the north-south drive aisle that will eventually connect to the Earl Armstrong Road extension. As the extension will include cycle tracks on either side of Earl Armstrong Road, providing a cycle track on this drive aisle will create a direct route for cyclists entering and exiting the site. As paved shoulders are provided on Albion Road, the proposed expansion does not seek to provide cycling facilities along the main east-west drive aisle to Albion Road.

Bike racks for 36 bicycles are proposed at the south end of the on-site bidirectional cycle track, adjacent to the valet parking area. Review of the bicycle parking space requirements is included in Section 6.2.

A review of the Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* has been conducted. A copy of the TDM checklist is included in **Appendix H**. All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

6.2 Parking

The subject site is located in Area D of Schedules 1 and 1A of the City's ZBL. Since the subject site is not located within a village in Area D, the ZBL identifies no minimum bicycle parking rates. Minimum vehicular parking rates for the proposed development are identified in the ZBL, and summarized in **Table 3**.

Table 3: Parking Requirements Per Zoning By-Law

Land Use	Rate	GFA or Units	Required
Vehicle Parking			
Casino	10 per 100 m^2 GFA	7,019 m^2	702
Restaurant	10 per 100 m^2 GFA	4,692 m^2	469
Theatre	1 per 4 fixed seats	1,600 seats	400
Hotel	1 per guest unit	178 rooms	178
Retail Store(x)	3.4 per 100 m^2 GFA	105 m^2	4
		Total Required	**1,753**
		Total Provided (Phase 1)(1)	**2,234**
		Total Provided (Phase 2)(2)	**2,151**

x. Includes Hard Rock gift shop inside the casino area
1. Phase 1 does not include connectivity to the planned Earl Armstrong Road Extension
2. Phase 2 includes connectivity to the planned Earl Armstrong Road Extension

Based on the previous table, the vehicular parking proposed for the development will meet the minimum requirements of the ZBL. A total of 36 bicycle parking spaces will be provided on-site, though none are required per the ZBL.

The City's *Accessibility Design Standards* outline minimum requirements for the number of accessible parking spaces that must be provided. Based on the number of parking spaces that will be provided on-site, a total of 33 accessible parking spaces must be provided, consisting of 16 'Type A' spaces and 17 'Type B' spaces. Type A spaces have a minimum width of 3.4m, and accommodate wider vehicles such as vans that may be equipped with transfer ramps or other mobility aids. Type B spaces have a standard parking space width of 2.4m. All accessible parking spaces will be adjacent to a 1.5m-wide access aisle. The 38 proposed accessible parking spaces (21 'Type A' and 17 'Type B') will meet these requirements.

6.3 Boundary Streets

Review of the boundary street Albion Road, including reviews of mobility, road safety, and neighbourhood traffic management, still stands and is included in Section 13 of the previous TIA.

6.4 Access Design

As the number and location of accesses to Albion Road are not proposed to change, the existing accesses are discussed in Section 11 of the previous TIA. Analysis of the intersection MMLOS for the signalized site access to Albion Road was also included in Section 14 of the previous TIA, and found that the access meets the target pedestrian level of service (PLOS), truck level of service (TkLOS) and vehicular level of service (Auto LOS), and does not meet the target bicycle level of service (BLOS). As the future Earl Armstrong Road extension will include cycle tracks that will connect to the proposed cycle track along the north-south drive aisle, no recommendations have been made in providing additional cycling facilities on Albion Road beyond the existing paved shoulders.

6.5 Transportation Demand Management

A review of the *TDM Measures Checklist* has been conducted. A copy of the measures checklist is included in **Appendix H**.

The TIA Addendum also includes that the proponent would consider a carpooling and/or ridematching service. It should be noted that many current employees already carpool using ridematching services, and therefore continuing to do so will be encouraged by the proponent.

Cycling facilities are planned along the future Earl Armstrong Road extension. On-site cycling facilities are proposed along the internal drive aisle connecting to the future Earl Armstrong Road. Bike parking will be provided despite the ZBL identifying no bicycle parking requirements, and end-of-trip cycling facilities such as showers, changing facilities, and bike repair stations, will be considered by the proponent.

6.6 Transit

The subject site is not within walking distance of any transit stops. The nearest stops to the subject site are approximately 1.8km north, at Findlay Creek Drive. The proponent currently provides free half-hour shuttle service to the Greenboro O-Train Station, and confirm that the same or better service will be provided to the Bowesville O-Train Station once the Trillium LRT Line is extended.

Details of the shuttle service and how it will integrate with the future Bowesville O-Train Station will be reviewed throughout the site plan approval process.

6.7 Intersection Design

6.7.1 Existing Intersection Operations

The performance of the study area intersections during the weekday morning and afternoon peak hours is shown below, and taken from Section 4.3 of the previous TIA. The intersections at Albion Road/Lester Road and Albion Road/Leitrim Road were shown to operate at an LOS E during the weekday morning peak hour, and Albion Road/Leitrim Road was also shown to operate at an LOS

F during the weekday afternoon peak hour. All other critical movements at all other intersections were shown to operate at an acceptable LOS D or better. The results of the existing analysis from the previous TIA are included in **Table 4**. Detailed Synchro reports prepared by Parsons are included in **Appendix I**.

Table 4: Intersection Capacity Analysis – Existing Traffic

Intersection	Weekday Morning Peak			Weekday Afternoon Peak		
	Max v/c or delay	LOS	Mvmt	Max v/c or delay	LOS	Mvmt
Albion/Queensdale[1]	12.2 sec	B	NBT	14.8 sec	B	SBT
Albion/Lester	**1.07**	**F**	**NBL**	0.72	C	SBT
Albion/Leitrim	**1.00**	**E**	**EBT**	**1.11**	**F**	**WBT**
Albion/Findlay Creek	0.78	C	WBR	0.48	A	WBR
Albion/High[1]	15.6 sec	C	EB	20.0 sec	C	EB
Albion/Hard Rock	0.43	A	NBT	0.35	A	SBT
Albion/Rideau	0.67	B	NBT	0.83	D	WBT

1. Unsignalized intersection

Planned intersection improvements at Albion Road/Lester Road will address the failing level of service. Widening of Leitrim Road is not included in the Affordable Network, however interim improvements at Albion Road/Leitrim Road include additional through and right turn lanes. These interim improvements are planned as part of the Stage 2 LRT project, and are anticipated to be in place by 2021.

6.7.2 2028 Total Intersection Operations

The performance of the study area intersections during the weekday morning, weekday afternoon, and Friday evening peak hours are shown below, and taken from the previous TIA and TIA Addendum. Analysis of the weekday morning peak has remained unchanged since the previous TIA, while analysis of the weekday afternoon peak was updated and analysis of the Friday evening peak was included in the TIA Addendum. As shown in **Table 2**, the additional 30 restaurant seats and 25 hotel rooms since the previous analysis are anticipated to add as many as seven vehicle trips during the peak hours. Therefore, the previous analysis stands.

All ‘new’ site-generated traffic is assumed to use the signalized Hard Rock access to Albion Road, and the planned roadway modifications at the Albion Road/Leitrim Road and Albion Road/Lester Road intersection are assumed to be in place. In addition, the signal timing at Albion Road/Leitrim Road was adjusted to improve the level of service for the critical movement. The results from the previous TIA and TIA Addendum are shown in **Table 5**. Detailed Synchro reports prepared by Parsons and Novatech are included in **Appendix I**.

Table 5: Intersection Capacity Analysis – 2028 Total Traffic

Intersection	Weekday Morning Peak			Weekday Afternoon Peak			Friday Evening Peak		
	Max v/c or delay	LOS	Mvmt	Max v/c or delay	LOS	Mvmt	Max v/c or delay	LOS	Mvmt
Albion/Queensdale[1]	12.8 sec	B	NBT	17.1 sec	C	SBT	-	-	-
Albion/Lester	0.85	D	SBT	0.77	C	SBT	-	-	-
Albion/Leitrim	0.86	D	EBT	**0.94**	**E**	**WBT**	0.73	C	SBT
Albion/Findlay Creek	0.80	C	WBR	0.50	A	SBT	-	-	-
Albion/High[1]	17.0 sec	C	EB	30.2 sec	D	EB	-	-	-
Albion/Hard Rock	0.51	A	NBT	0.42	A	WBR	0.53	A	SBL
Albion/Rideau	0.72	C	NBT	0.87	D	WBT	0.30	A	WBL

1. Unsignalized intersection

As noted in Section 4.1 of the TIA Addendum, a heavy southbound left turn volume of approximately 440 vph is projected at the signalized access to Albion Road during the Friday evening peak hour. This exceeds the typical threshold of 300 vph for which dual left turn lanes are normally considered. However, as these left turn movements are projected to occur outside of the peak hours of adjacent road traffic, and the above analysis shows no capacity issues at this intersection, a single left turn lane is considered sufficient. The existing storage length of the southbound left turn lane is very long, at 115m. The TAC equation for calculating storage length suggests that a storage length of 130m is required, based on a 100-second cycle length. However, the 95th-percentile queues identified in the analysis of the TIA Addendum are 35m or less, suggesting that the existing storage length will be sufficient.

Monitoring of this movement can be considered after the proposed expansion to confirm the Synchro analysis. As a condition of Site Plan approval, the proponent can provide security to the City of Ottawa for costs to produce Miovision data for the signalized access to Albion Road. Following full buildout, the City would monitor this access for three years. The security identified above would cover the City's costs of collecting and reviewing data for the monitoring period. If the City's monitoring data conclusively shows that the existing storage length is insufficient or that the southbound left turn movement is operating unacceptably, the proponent would be responsible for providing dual southbound left turn lanes.

6.7.3 Intersection Operations of Future Earl Armstrong Road Access

Using the projected volumes at the future signalized access to Earl Armstrong Road shown in **Figure 6**, the performance of the future access intersection during the weekday morning, weekday afternoon, and Friday evening peak hours are included in **Table 6**. Detailed Synchro reports are included in **Appendix I**.

Table 6: Intersection Capacity Analysis – Future Earl Armstrong Access

Movement	Weekday Morning Peak			Weekday Afternoon Peak			Friday Evening Peak		
	v/c	LOS	95th Queue	v/c	LOS	95th Queue	v/c	LOS	95th Queue
NB	0.02	A	1m	0.14	A	7m	0.12	A	6m
EBT	0.37	A	90m	0.20	A	35m	0.21	A	35m
EBR	0.00	A	1m	0.01	A	3m	0.02	A	4m
WBL	0.04	A	4m	0.10	A	12m	0.18	A	21m
WBT	0.15	A	32m	0.44	A	90m	0.14	A	24m

Based on the foregoing table, the future Earl Armstrong Road signalized access will operate acceptably, and no queueing issues are anticipated. The eastbound through queueing during the weekday morning peak hour is approximately 90m, which does not extend to the future upstream intersection of Earl Armstrong Road/Albion Road. The westbound left turn queueing is approximately 25m in the Friday evening peak hour, which represents the peak hour with the most site-generated inbound trips. The TAC equation for calculating storage length suggests that a westbound left turn lane storage length of 35m is required.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this TIA can be summarized as follows:

Forecasting

- After the proposed expansion, the subject site is projected to generate 104 vehicle trips during the weekday morning peak hour, 665 vehicle trips during the weekday afternoon peak hour, and 884 vehicle trips during the Friday evening peak hour.

- Compared to the TIA Addendum, this equates to an increase of one vehicle trip during the weekday morning peak hour, seven vehicle trips during the weekday afternoon peak hour, and seven vehicle trips during the Friday evening peak hour.

Development Design and Parking

- No requirements to modify the existing accesses to Albion Road have been identified. Monitoring of the southbound left turn movement at the signalized Albion Road access can be considered to confirm that a single left turn lane can accommodate the projected volumes. Synchro analysis conducted in the TIA Addendum identifies that the existing 115m left turn lane is sufficient.

- The existing accesses can adequately accommodate the various types of vehicles that access the site (for example, tractor trailers, intercity buses, horse trailers, and passenger vehicles). The existing fire route is located along the existing main north-south drive aisle and in front of the main building entrance. The new fire route will include the main north-south drive aisle, in front of the pick-up and drop-off loops, and along the south side of the casino/theatre. Therefore, there are no requirements for modifications to the existing accesses.

- An 11.0m north-south drive aisle with sidewalks and cycle tracks is proposed to connect to the future Earl Armstrong Road extension. This connection is shown as a planned signal in the Earl Armstrong Extension Environmental Assessment. Concrete sidewalks with a width of 1.8m will be provided on both sides of the drive aisle, while a 3.0m bidirectional cycle track will be provided on the east side of the drive aisle. The cycle track will tie into the cycle track on the south side of the future Earl Armstrong Road extension.

- The porte-cochere to the south of the existing main east-west drive aisle will provide an expanded space near the main entrance for patron pick-ups and drop-offs, valet purposes, and users of the shuttle service. Pedestrians entering and exiting the building from the parking areas to the north will be encouraged to walk around the porte-cochere by either following the eastern sidewalks or crosswalks at the westernmost median break at the east-west drive aisle.

- Providing a cycle track along the north-south drive aisle that will connect to the Earl Armstrong Road extension will create a direct route for cyclists entering and exiting the site. As paved shoulders are provided on Albion Road, the proposed expansion does not seek to provide cycling facilities along the main east-west drive aisle to Albion Road. Bicycle parking will be provided north of the pick-up and drop-off loops, adjacent to the valet parking area.

- The proposed development will meet the minimum requirement for vehicle parking spaces and barrier-free parking spaces.

Access Design

- The signalized site access to Albion Road meets the target pedestrian level of service (PLOS), truck level of service (TkLOS), and vehicular level of service (Auto LOS), and does not meet the target bicycle level of service (BLOS). As the future Earl Armstrong Road extension will include cycle tracks that will connect to the proposed cycle track along the main north-south drive aisle, no recommendations have been made in providing additional cycling facilities on Albion Road beyond the existing paved shoulders.

Transportation Demand Management and Transit

- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

- The proponent will consider a carpooling and/or ridematching service. It should be noted that many current employees already carpool using ridematching service, and therefore continuing to do so will be encouraged by the proponent.

- Cycling facilities are planned along the Earl Armstrong Road extension. On-site cycling facilities are proposed along the internal drive aisle connecting to the future Earl Armstrong Road. Bike parking will be provided, and end-of-trip cycling facilities such as showers, changing facilities, and bike repair stations, will be considered by the proponent.

- The subject site is not within walking distance of any transit stops. The proponent currently provides free half-hour shuttle service to the Greenboro O-Train Station, and confirm that the same or better service will be provided to the Bowesville O-Train Station once the Trillium LRT Line is extended.

Intersection Capacity Analysis

- The analysis of the previous TIA and TIA Addendum stand, as the estimated site-generated traffic changed marginally.

- The ‘most likely’ future conditions when Earl Armstrong Road is extended includes a four-lane cross-section between Albion Road and Bank Street. Based on this cross-section and the projected volumes anticipated to enter and exit the subject site via the future signalized Earl Armstrong Road access, the intersection is anticipated to operate acceptably and no queueing issues are anticipated on any approaches.

Based on the foregoing, the proposed expansion is recommended from a transportation perspective.

NOVATECH

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APPENDIX A

Previous Hard Rock TIA (January 2018, Parsons)

Rideau Carleton Raceway and Slots Expansion

Transportation Impact Assessment Report

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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

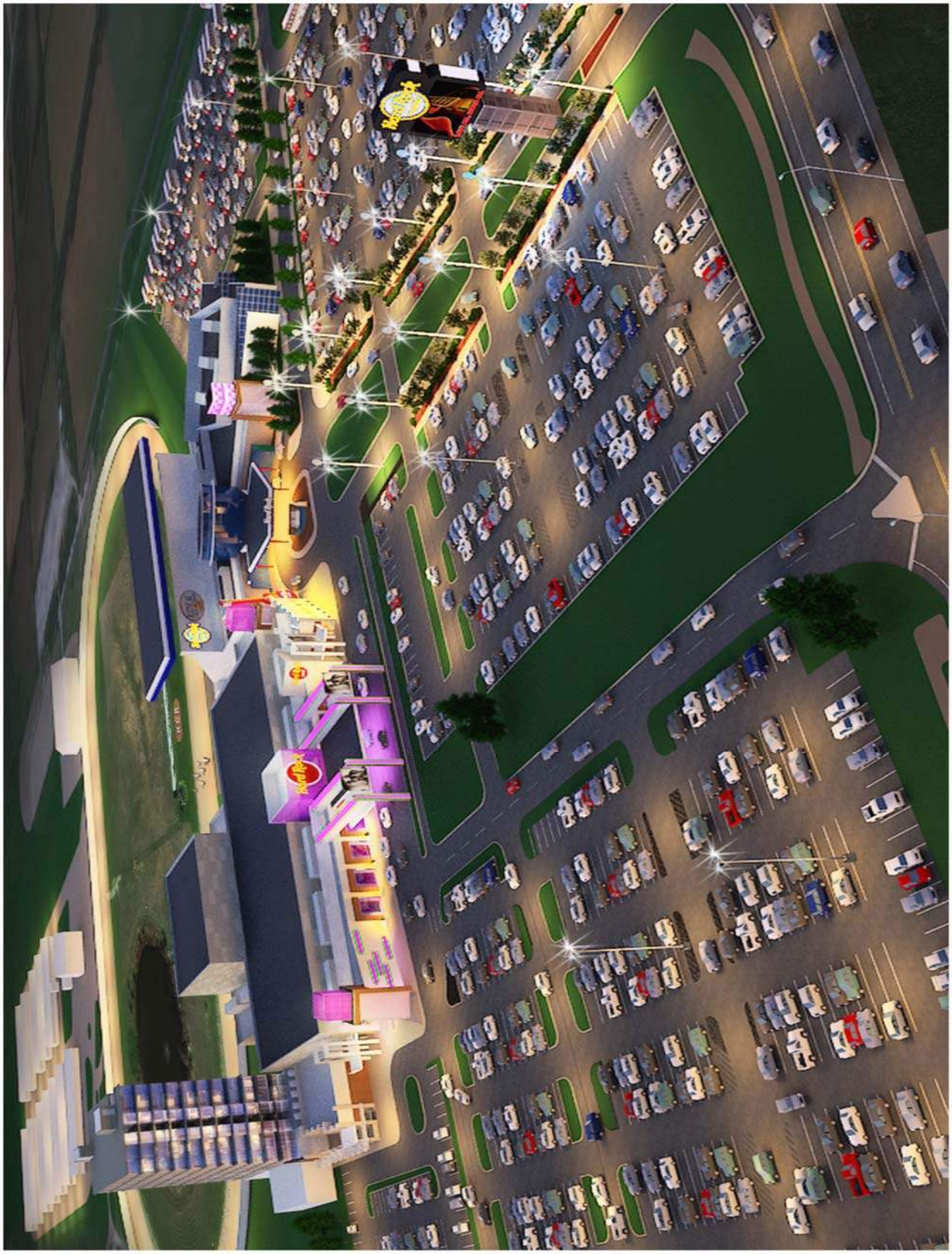


Figure 2: Site Context and Study Area

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

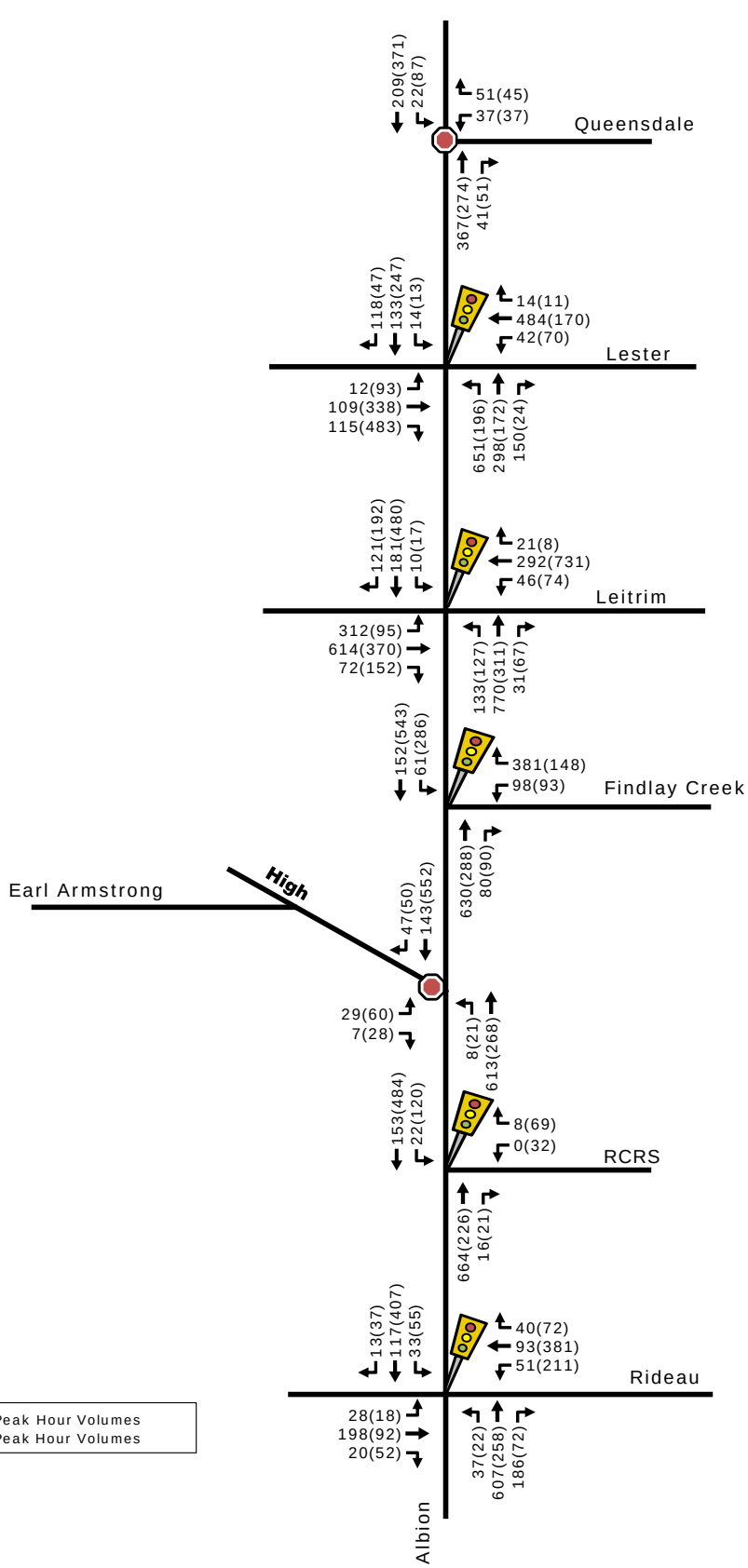
The City has provided the following most current available intersection traffic counts; Albion/Queensdale (2016), Albion/Lester (2016), Albion/Leitrim (2016), Albion/Findlay Creek (2016), Albion/High (2016), Albion/RCRS (2015), and Albion/Rideau (2017) for study area intersections. Weekday peak hour 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

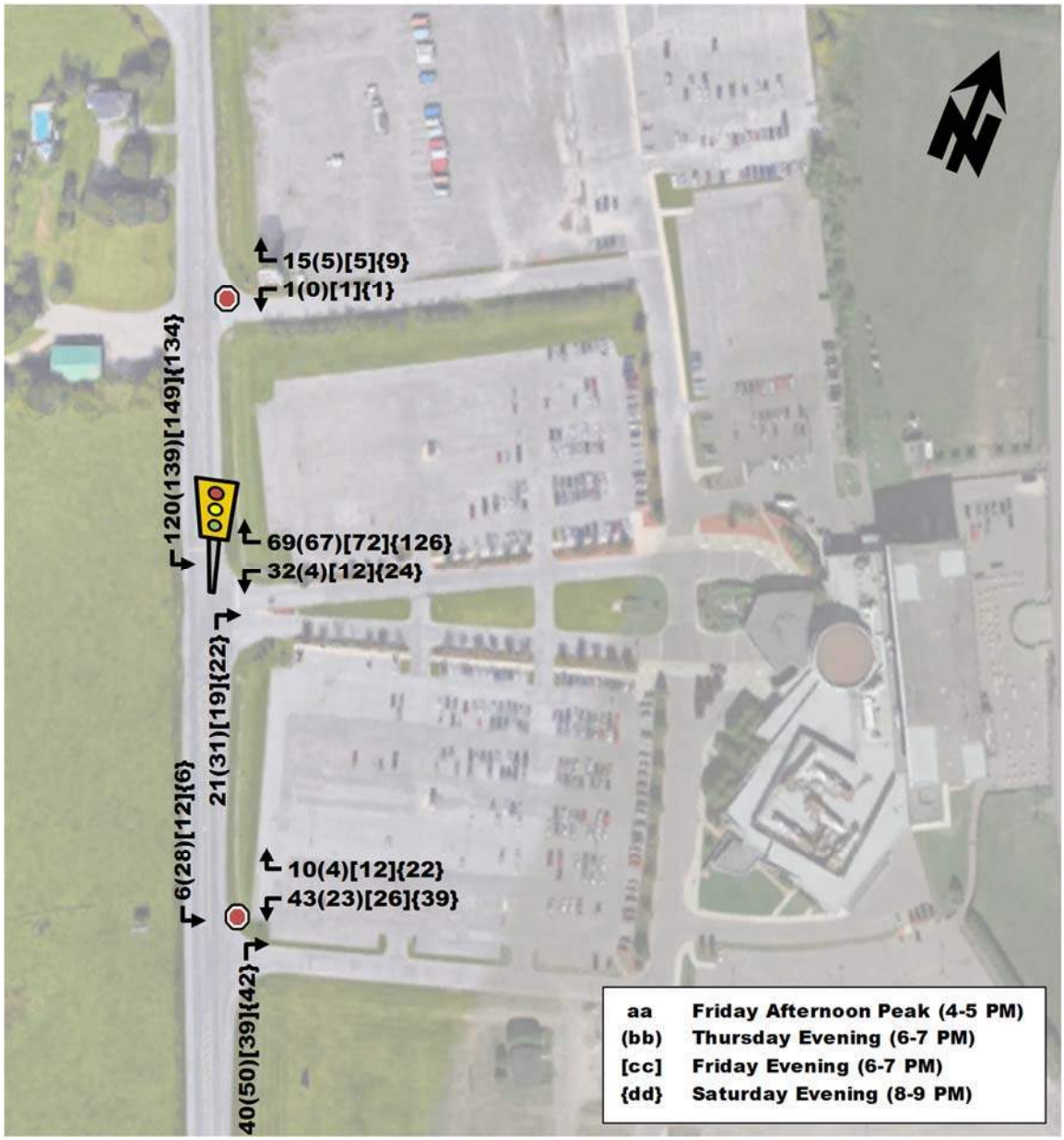


Table 3: Existing Rideau Carleton Raceway Generated Traffic Volumes

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

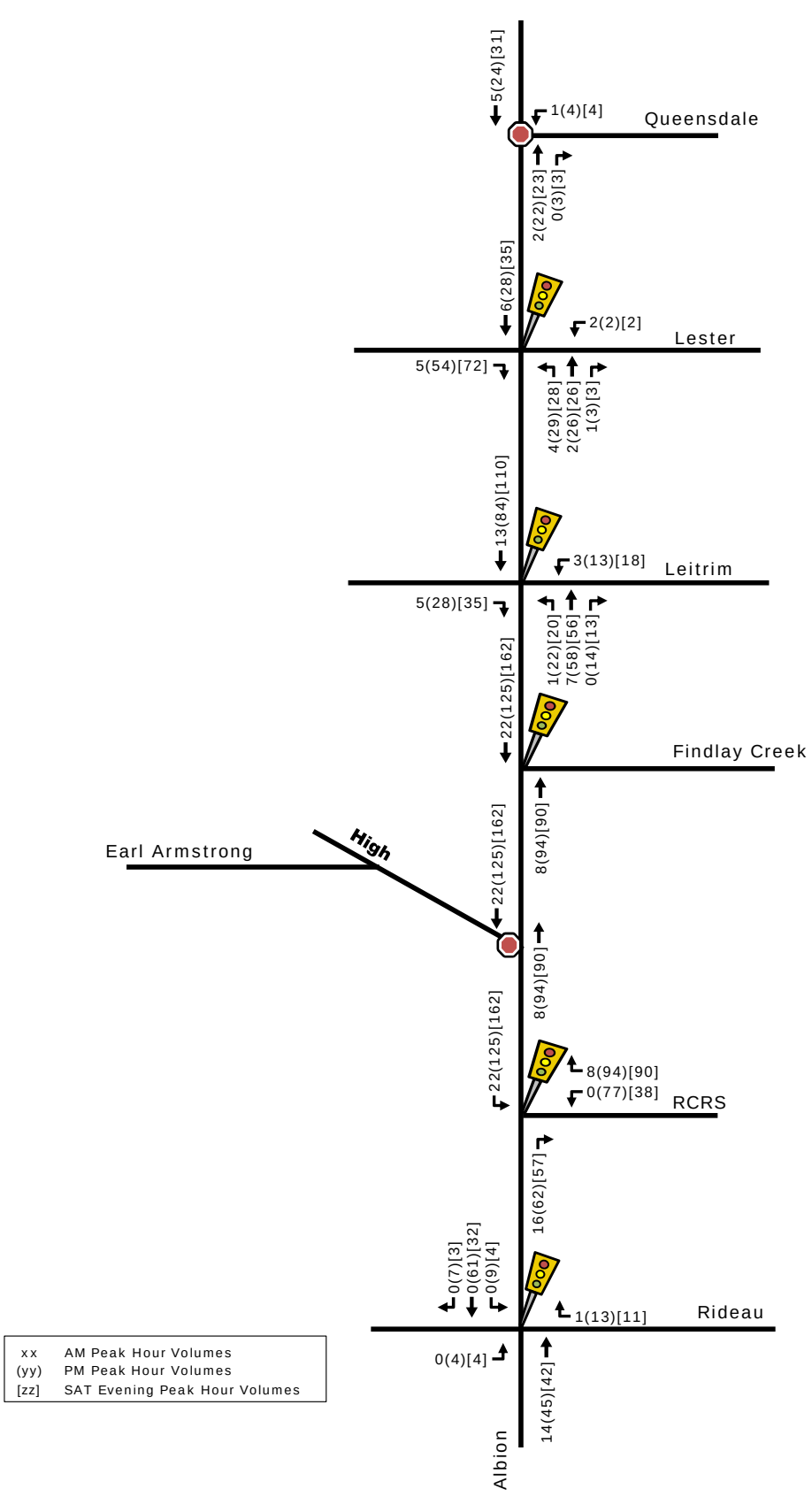
To estimate how much of existing RCRS peak hour traffic travels on Albion Road through the study area intersections and Blossom Park community, the site-generated traffic summarized in Table 6 were extrapolated south through the Rideau Road intersection and north through each of the Leitrim Road, Lester 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

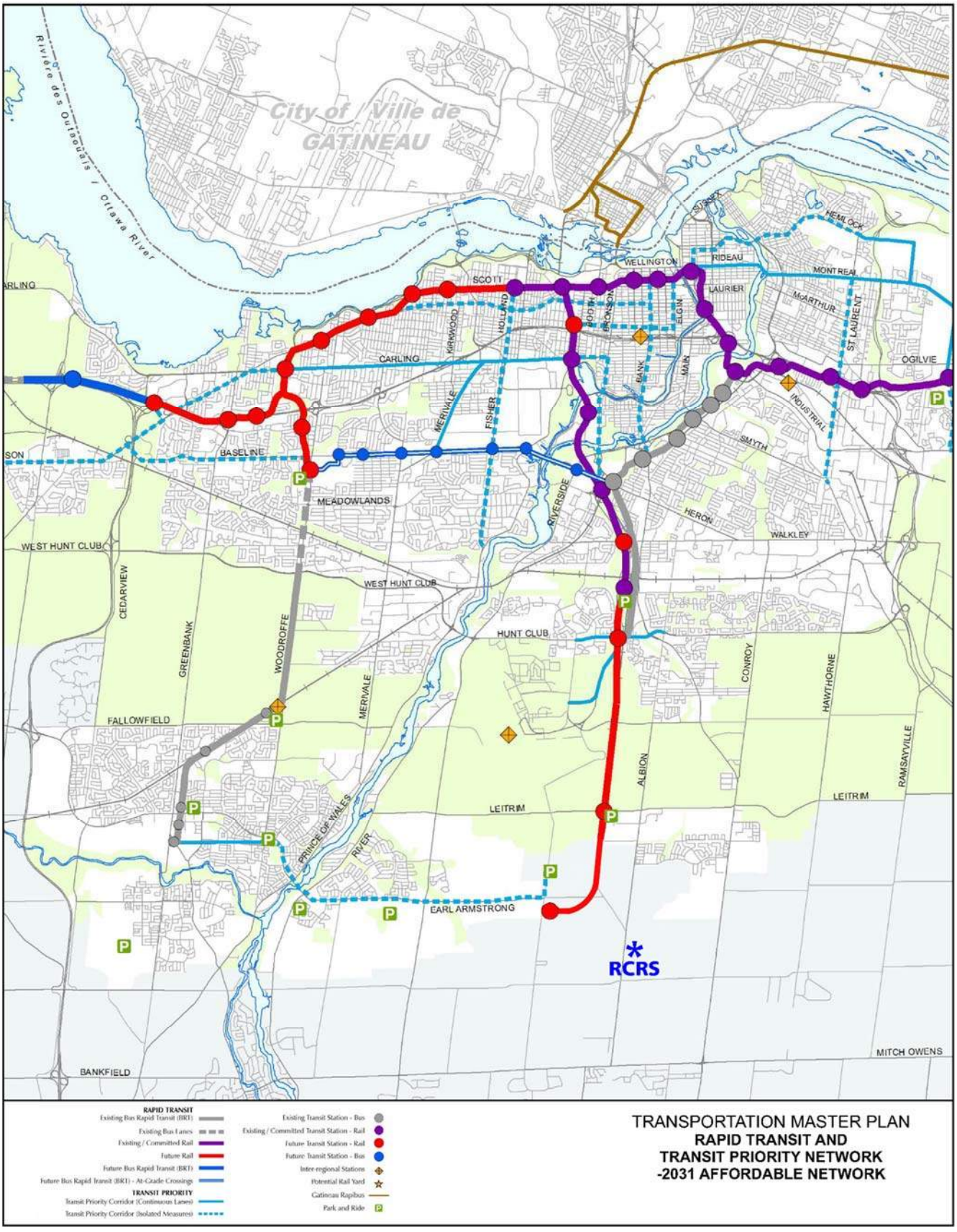
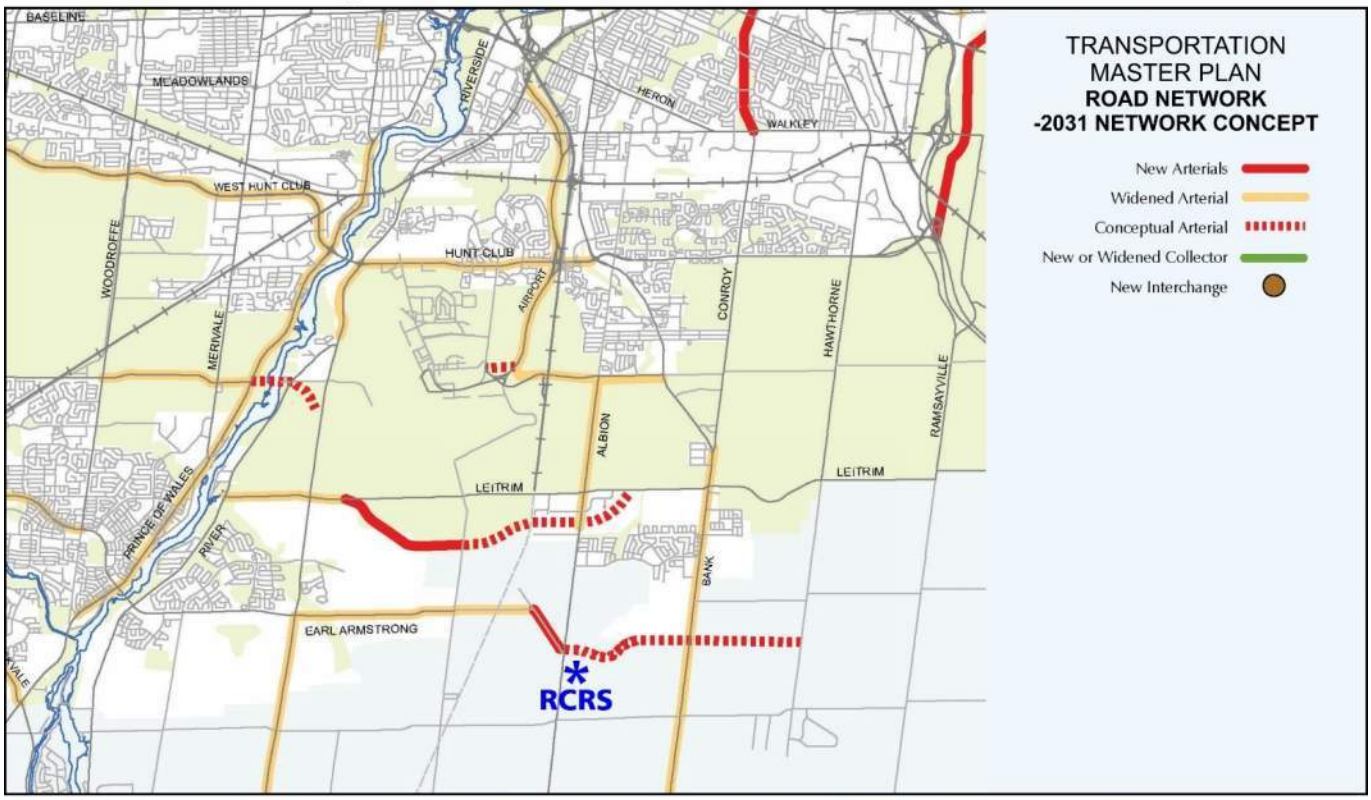
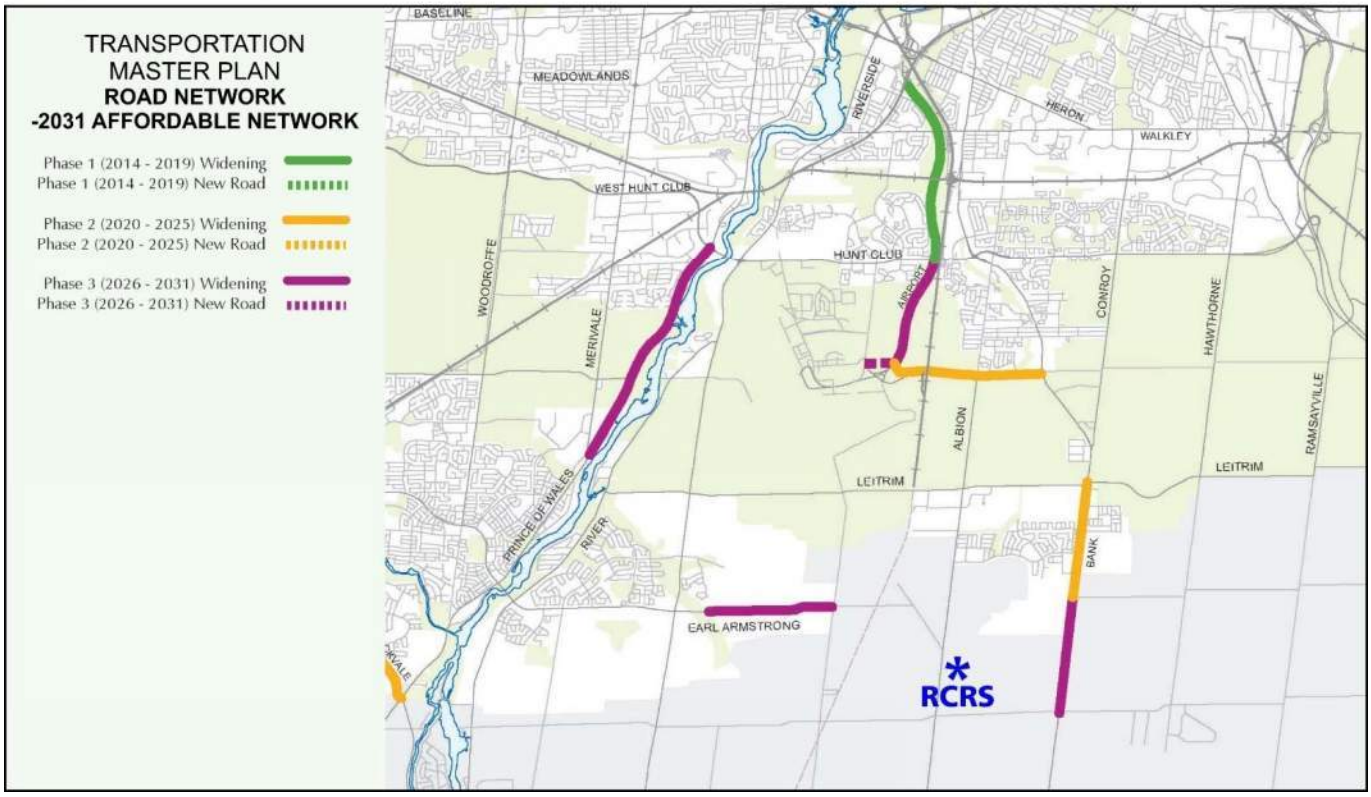


Figure 7: TMP 2031 Road Network – Concept and Affordable Networks





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**

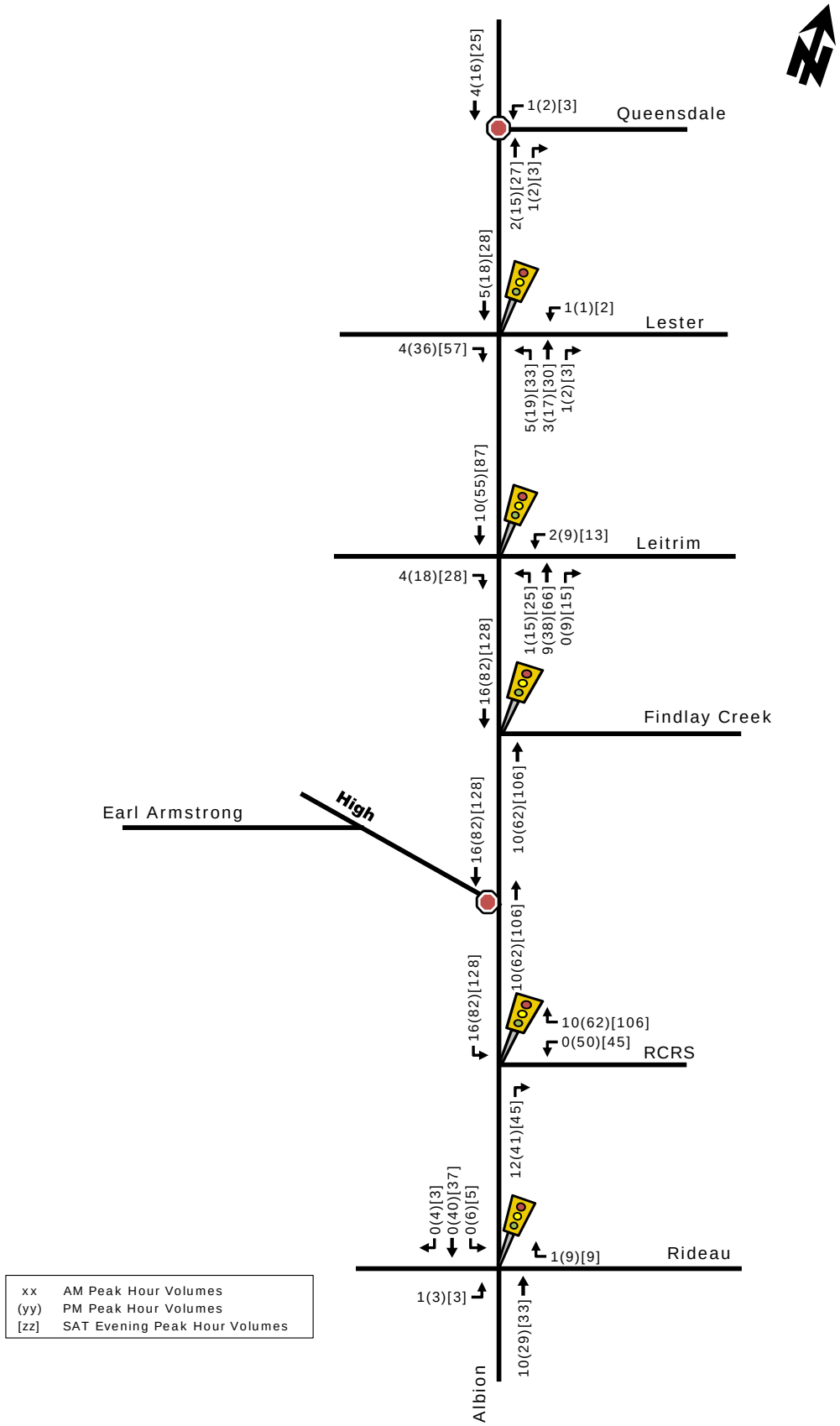


Table 20: Projected Performance of Study Area Intersections at Full RCRS Buildout

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.

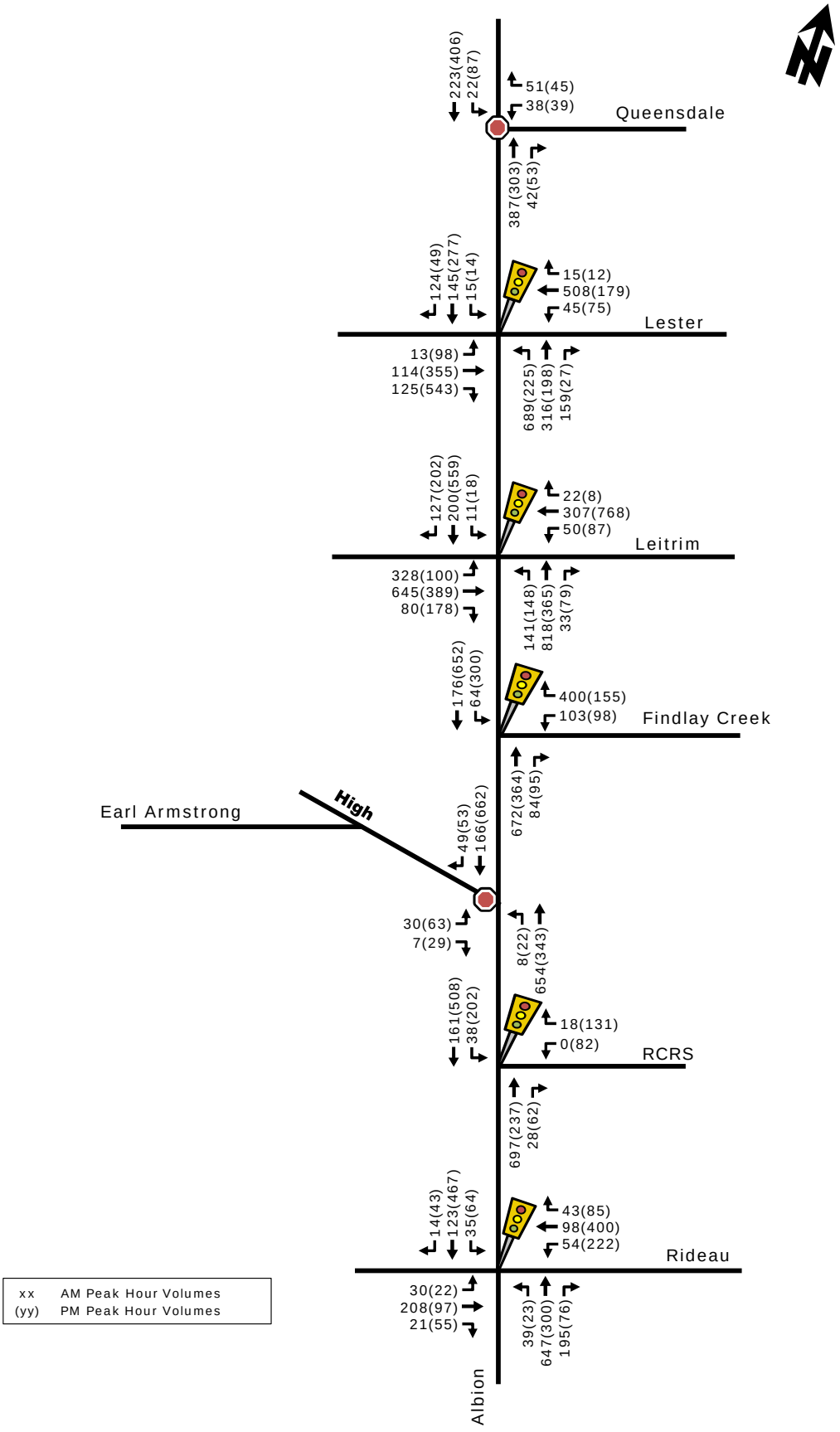
9. BACKGROUND NETWORK TRAFFIC

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

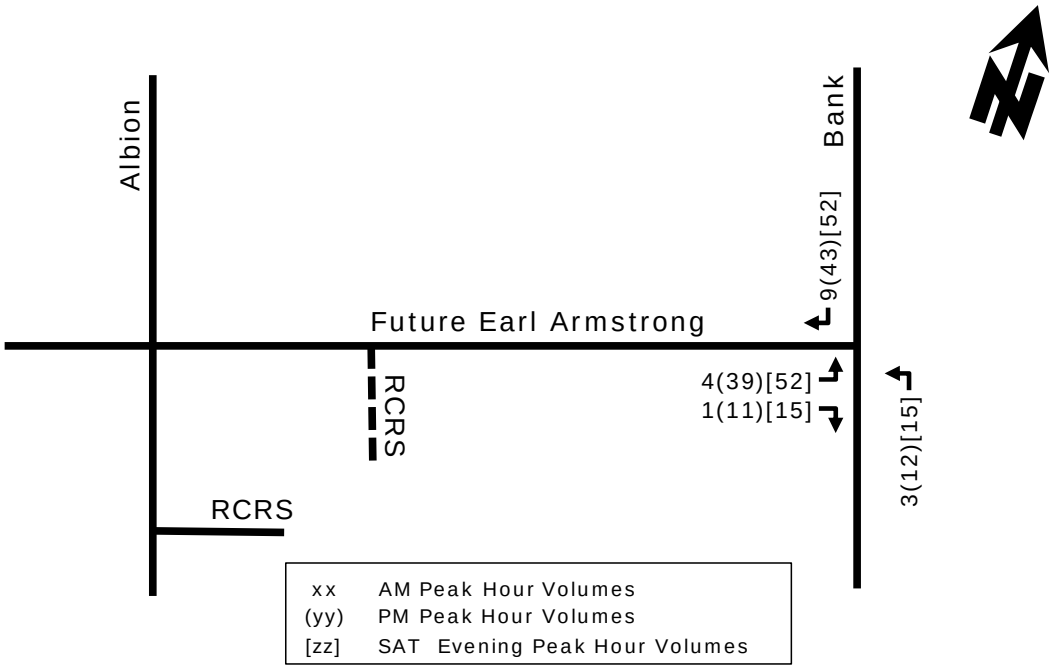
This section estimates the potential for RCRS traffic to use an Earl Armstrong link from Albion Road to Bank Street. The projected redistribution of traffic to/from a site connection to Bank Street is based on the existing site-generated traffic travelling to/from the east on study area roads, as shown 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

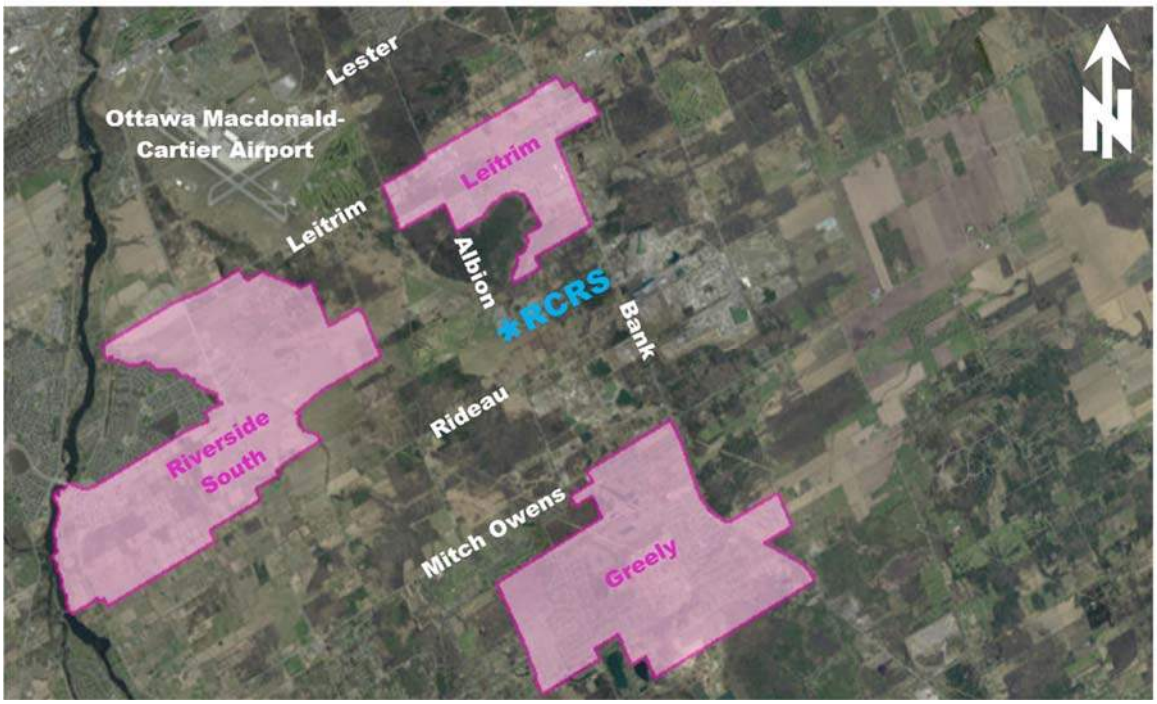


Table 22: Projected Growth in Riverside South, Leitrim and Greely CDPs

Community	Date of CDP	Projected Growth			
		Residents	Dwelling Units	Jobs	Retail (m²)
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 B

Hard Rock TIA Addendum (April 2018, Novatech)

NOVATECH
Engineers, Planners & Landscape Architects

23 April 2018

Hard Rock Ottawa
4837 Albion Road
Ottawa, ON K1X 1A3

Attention: Richard Gardner

Dear Richard:

Reference: 4837 Albion Road (Hard Rock Expansion) Transportation Impact Assessment Addendum #1

1.0 INTRODUCTION

The Transportation Impact Assessment (TIA) for the proposed expansion of the Rideau Carleton Raceway and Slots, located at 4867 Albion Road (now called Hard Rock Ottawa), was prepared by Parsons and was submitted to the City in January 2018. Comments on the TIA have been provided/received from the City of Ottawa (March 12, 2018) and from Councillor Deans. Addendum # 1 has been prepared by Novatech to address these comments.

A Technical Memorandum dated April 23, 2018 (**Attachment 1**), has been prepared by Novatech, in conjunction with Addendum # 1 to provide comprehensive responses as required. Relevant sections of the Technical Memorandum are referenced below, where appropriate.

2.0 CITY COMMENTS (Dated March 12, 2018)

Traffic Signals

1. *Future considerations:*
   a. *If there are any future proposed changes in the existing roadway geometry for the purpose of construction of a new Traffic Control Signal(s) or modifications to existing TCS(s) (Albion Road/Leitrim Road and Albion Road/Lester Road intersections), the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re-design drawings.*
   b. *If an RMA is approved, please forward the approved geometry detail design drawings (dwg digital format in NAD 83 coordinates) including base mapping, existing and new underground utilities and sewers, new/existing catch basins locations, Turn-Radius Modeling and approved pavement marking drawings in separate files for detail traffic plant design lay out.*

   Response *(Provided by Novatech)*: Noted and the proponent has been advised.

2. *Please send all digital (CADD) design files to* Peter.Grajcar@ottawa.ca *613-580-2424 extension 23035.*

   Response *(Provided by Novatech)*: Noted and the proponent has been advised.

Traffic Engineering

3. *If special events are planned for this site, provide the proposed trip generation numbers expected. Indicate if these events are planned outside of gaming operations times or peak traffic times.*

   Response *(Provided by Novatech)***:** The Technical Memorandum (**Attachment 1**) identifies the trip generation for regular events at the proposed theatre however it does not address occasional special events including large outdoor concerts, as this is considered beyond the scope of a TIA as explained below.

   Special event permits accompanied by a Traffic Management Plan may be required for occasional special events. If required, the Traffic Management Plan could be unique from one event to another, depending on the size of the event, expected attendance and proposed access arrangements. Proposed traffic management plans are reviewed by the City's Event Central and Special Event Advisory Team (SEAT) in accordance with the Special Events By-law 2013-232. The SEAT facilitates cross-organizational coordination of events logistics and meets regularly to review and provide recommendations in relation to proposed special events. Core members are involved in the review of most applications, and supplemental members are called in to participate in reviews that require the expertise, knowledge or direct involvement of other agencies. Core team members consist of several agencies including the Mayor and Council, Ottawa Police Services, Ottawa Paramedic Services, Ottawa Public Health, Ottawa Fire Services, OC Transpo/Transit, National Capital Commission, and Royal Canadian Mounted Police. Supplemental SEAT members include National Defence, Ottawa Hotel Association, Business Improvement Areas (BIAs), Ottawa Tourism and others.

   Large special events at Hard Rock Ottawa are expected to occur outside the peak hours of the adjacent road traffic (weekdays 7:00am to 8:00am and 4:30pm to 5:30pm, and weekends 11:00am to 2:00pm), however, they may occur during peak gaming hours (weekdays and weekends 6:00pm to 10:00pm).

Street Lighting

4. *Future considerations:*
   a. *If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.*
   b. *Alterations and/or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider.*

      Response *(Provided by Novatech)***:** Noted and the architect has been advised.

Transportation Engineering Services

5. *Council directives from the September 13, 2017 meeting indicated that a primary entrance to the facility from Bank Street should be considered as a mitigation measure to community impacts. Parsons is recommending that the extension of Earl Armstrong Road from Albion Road/High Road to Bank Street will be a preferred connection and are willing to front end the construction of 2 lanes. Currently, the front ending of this project is not a viable solution, as the extension of Earl Armstrong Road is not identified in the City's 2013 TMP Affordable Plan. Furthermore, the Earl Armstrong Road Extension Environmental Assessment (EA) Study is currently in progress and the preferred alignment has not yet been developed. The evaluation of alternative corridors and designs will take place in coming months. The EA study is scheduled to be completed by summer 2019.*

   Response *(Provided by Parsons)***:** As identified in the TIA, a road link from the proposed Hard Rock facility to Bank Street would be of benefit in reducing Hard Rock traffic on Albion Road through Blossom Park. As the distance from the site to Bank Street is lengthy at approximately 1.8 km, construction of a road link will be expensive. As such, a more appropriate/responsible solution is one that is permanent and not temporary or ultimately redundant. The best solution, therefore, and assuming the alignment for the Earl Armstrong Road Extension will be in relatively close proximity to the north boundary of the Hard Rock site, would be to build the first two lanes of the Earl Armstrong Extension from Albion to Bank, as identified in the TIA. This option would result in no throw-away cost and would benefit both Hard Rock traffic flow and regional traffic flow.

   A suggested alternative of constructing a new 1.8 km road within the RCRS site out to Bank Street along the existing road would be of no benefit to regional traffic flow, and would be redundant once the Earl Armstrong Extension is in place. It has also been suggested that a temporary two-lane road located within the chosen alignment for the Earl Armstrong Road Extension (once it is approved) could be a solution. It is noteworthy that there would be significant throw-away cost and we are not sure how the City would secure the land to allow the temporary road to be built. If this challenge can be overcome and if the throw-away road could be built with minimum expense, this option may have some merit.

   As Hard Rock Ottawa has indicated that they would front end the cost of the first two lanes of the Earl Armstrong Extension from Albion to Bank, it is likely the most financially responsible, cost effective and technically preferred solution. The only challenge is that the facility is currently not in the City's TMP Affordable Plan. The solution, therefore, is that during the upcoming OP and TMP Updates, the City would have to include the Earl Armstrong Road Extension in the new Affordable Plan. As the Hard Rock expansion will happen over a number of years, there is time for the subject EA to be completed and for the subject link to be included in the new Affordable Road Plan.

6. *The second directive from Council was to financially contribute to the following:*
   a. *accelerating the timing of any TMP projects that could alleviate the traffic impacts of the development. There was no support in the study for any TMP projects identified in the Affordable Plan. The applicant is indicating that they are interested in front ending the cost of the first two lanes of the extension of Earl Armstrong Road from Albion Road to Bank Street.*

b. *funding an Area Traffic Management plan for Blossom Park or other impacted neighbourhoods. This was only addressed by the recommendation to extend Earl Armstrong Road to Bank Street as an alternative route for clients. Albion Road between Bank Street and Lester Road is identified as a collector road. There is an existing peak hour traffic issue and additional site generated traffic will aggravate the issue. Further review is required.*
c. *maintaining a free shuttle to the nearest transit station. There was no definitive commitment to provide a shuttle to the future LRT station at Bowesville station. Please add language to the recommendations that indicates a firm commitment.*
d. *develop a transit service plan. There was no submission of a transit service plan.*

Response *(Provided by Parsons)***:**

a. As noted, the proponent has expressed interest in front ending the cost of the first two lanes of the Earl Armstrong Extension for Albion to Bank as this link will have the most impact in removing Hard Rock traffic from Albion Road (and Blossom Park) north of the site. With the exception of the planned widening through the Albion/Leitrim intersection (now advanced by the City to 2021), the area projects in the TPM Affordable Plan benefit primarily regional and residential commuter traffic flow. The proponent has expressed interest in having discussions with the city about financially contributing to the cost of providing the aforementioned additional capacity at the Albion/Leitrim intersection.

b. Traffic Management through Blossom Park has been studied by the City for decades. They have done traffic counts, speed surveys and through traffic counts. They have implemented through movement and turning movement restrictions at the Albion/Lester intersection, which were effective for a number of years, only to have Council eventually reverse this decision and open up the intersection again to all movements. More recently they studied different alignments for the Albion, Lester, Airport Parkway Link to see if there was a better way to accommodate regional commuter peak hour flow, and eliminate non-local use of Albion Road through Blossom Park. No viable alternatives were found, and the recently completed and adopted EA for the Airport Parkway and Lester Road (August 2016) identified widening of the existing facilities (Airport Parkway and Lester) in their existing corridors as the preferred solution. Based on this background, and as we are not aware of any through traffic issue through Findlay Creek and based on the above noted effective funding opportunities identified by the proponent, the proponent is not interested in funding further Traffic Management Studies for Blossom Park.

c. We are advised by the proponent that they currently provide free ½ hour shuttle service to the Greenboro O-Train station, and that when the O-Train gets extended to the Bowesville station, the same, or better shuttle service will be provided.

d. OC Transpo has prepared/submitted a Transit Service Plan to Hard Rock for their consideration. This Plan, dated July 26, 2017 proposes a certain frequency of OC Transpo bus service to the site and the related cost. The proposal is under review.

7. *An overview of Transportation Demand Management strategies was completed and although the City acknowledges that there is a large modal share for automobiles, further review and commitment to encourage other modes is required. Cycling end of trip facilities such as showers as well as bike parking must be included in the TDM checklist at site plan submission.*

   Response *(Provided by Parsons)***:** The proponent has been advised that employee shower facilities and on-site bicycle parking needs to be identified in the Site Plan Application. The proponent advises that they currently provide free ½ hour shuttle service to the Greenboro O-Train Station and that they will provide free shuttle service to the planned Bowesville LRT station once it is in operation. See Response 6 regarding the Transit Service Plan.

8. *The TIA report did not include the theatre. The impact of future special events needs to be completed for the 2500 seat theatre. This review should look at both a typical special event and a significant event. As well, both Friday evening and Saturday peak period times need to be reviewed. Consider an onsite TDM Coordinator to support transportation requirements related to special events. As an example, the cost of additional shuttle or transit service could be included in the ticket price of special events.*

   Response *(Provided by Novatech)***:** As noted in the response to Comment 3 above, the trip generation for typical theatre events are addressed in the Technical Memorandum (**Attachment 1**). However, the traffic generated by significant special events apart from the theatre will be unique depending on the event, and will be addressed through a traffic management plan (if required), as part of any required special event permits.

   Typical theatre events are expected to occur during the evening, outside of the weekday and weekend peak hours of adjacent road traffic. The Technical Memorandum identifies the evening peak traffic generated by the theatre/restaurant uses. The Technical Memorandum presents new analysis of the Friday evening peak condition (6:00pm to 7:00pm), as this is the worst-case combination of gaming table/slot/hotel traffic, restaurant/theatre traffic, and projected background traffic. Recent turning movement traffic counts completed by the City of Ottawa on March 23 to 25, 2018 have been used to establish the background traffic condition for Friday/Saturday evenings. These counts are included as an appendix to the Technical Memorandum (**Attachment 1**).

   Subject to the provision of transit service to the site, the transit fare could be included in special event ticket prices. Event tickets could be valid for transit fare for two to three hours prior to the event start time, to encourage transit as a viable option. The provision of free off-site parking by shuttle service could be another component of the TDM plan to reduce the number of vehicles accessing the site and the immediate area. Event goers who wish to park on-site for special events could be required to purchase parking passes. The foregoing approach is being used very successfully for large events at Lansdowne Park.

9. *Continued shuttle service should be confirmed and a future transit service plan is required. Consider the possibility of reducing parking in the future when LRT extension is complete and either a shuttle service or transit plan is in place to encourage a modal shift. Engage with the City's O Train Planning (Special Projects Unit, Marc Magierowicz at 613-580-2400 extension 27820) to discuss details of integrating the service into the LRT extension and provide this information in the TIA submission.*

Response *(Provided by Novatech)***:** As noted in the response to Comment 6 above, the proponent advises that they currently provide free ½ hour shuttle service to the Greenboro O-Train Station and that they will provide the same or better free shuttle service to the planned Bowesville LRT station once it is in operation.

The possibility of a future parking reduction and the details of integrating shuttle service into the LRT extension will be reviewed further at the Site Plan stage.

10. *Employee transportation needs should also be considered, especially providing carpool parking as well as promoting carpooling through a carpool matching site such as OttawaRideMatch.*

Response *(Provided by Novatech)***:** Hard Rock Ottawa would consider a car pooling service for its employees. We are advised that many of the current employees already car pool with friends using ride match services. This would be encouraged by the proponent.

11. *With changes to the zoning and significant increases in traffic volumes, a network concept review is required and Section 7 of the report should be changed to reflect this requirement. This review could indicate if changes to transit planning or road networks are required as part of the rezoning application.*

Response *(Provided by Novatech)***:** A Network review is required when the traffic generated by the proposed zoning exceeds the traffic that is permitted by the established zoning by more than 200 peak hour person trips. As there is no cap on the number of slot machines that are permitted under the current zoning, the traffic permitted under the established zoning could be far greater than the traffic generated by the current proposal. Therefore, a Network review is not required under the City's new TIA Guidelines.

12. *What are the impacts on High Road and existing Earl Armstrong Road at each phase of development without the extension of Earl Armstrong Road? Provide the forecasted volumes at the stop-controlled intersections of Earl Armstrong Road with High Road, and High Road with Albion Road. Review the impact of increased volumes with regard to any potential road safety concerns.*

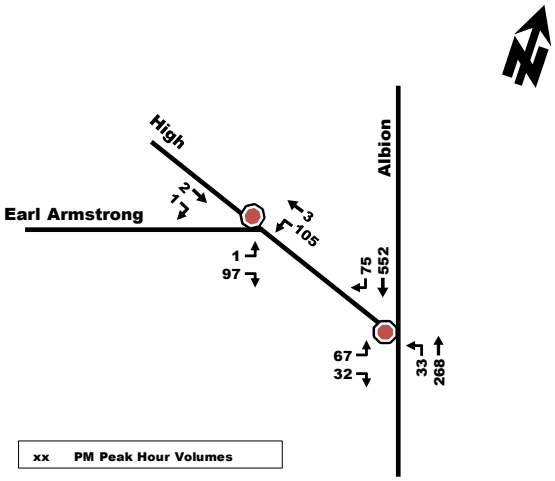
Response *(Provided by Parsons)***:** An April 2018 afternoon peak hour traffic count has been undertaken at the High Road/Earl Armstrong intersection and it is summarized in **Figure 1** along with the most current count at the adjacent Albion/High intersection. The volumes have been balanced as necessary. The High/Earl Armstrong intersection is unsignalized and currently operates at LOS A during the afternoon peak hour.

In review of these counts it can be seen that the High-Earl Armstrong link carries only 20% of the traffic volume carried by Albion Road at their intersection during the afternoon peak hour. When looking at the proportionate turn movements at the High/Albion intersection, it can be assumed that of the existing Hard-Rock-generated traffic during the afternoon peak hour, 11% (6 veh/h) of the northbound traffic leaving the site and 5% (6 veh/h) of the southbound traffic approaching the site uses the High-Earl Armstrong link.

When the site's total projected traffic generation is revised to reflect a reduced vehicle occupancy and traffic generation from the proposed new restaurant and theatre (both Phase 2), the future projected use of the High-Earl Armstrong Link will be identified along with

all other intersections along Albion from Rideau Road north to Lester Road. This will be addressed in the Technical Memorandum (**Attachment 1**).

Figure 1: Existing Peak Hour Counts



13. *Trip generation values were determined through first principles and then compared to ITE values. These first principle numbers should also be compared to the 2015 TRANS report (National Capital Region Special Generators Survey: Sports, Entertainment and Event Venues) provided to Parsons.*

    Response *(Provided by Parsons)***:** A summary of the relevant findings of the above-noted 2015 Trans report is provided in the TIA in Chapter 8. Consideration was given to these findings in deriving generation rates for proposed Hard Rock development, but we also had to be cognizant of the site's existing trip generation characteristics and the fact that one site is a very urban site (Lac Lemay) and the other is a very rural site (Hard Rock).

    It was our understanding that as the TIA was prepared/submitted under the City's new TIA Guidelines, all traffic generation questions, like those above and in Comment 15 below, likely should have been provided by the City in their review/response to the Trip Generation Module and not after the Final TIA was submitted. Doing so would follow the City's new process and avoid costly and time-consuming redo's of analysis, figures and report writing. Regardless, responses are provided herein.

14. *There is no mention of a new restaurant or the trips generated from patrons visiting just to use the restaurant. In our opinion, given the location of the site the new restaurants would likely generate trips.*

    Response *(Provided by Novatech)***:** Several restaurants are proposed as part of the Phase 2 development. The trip generation of the proposed restaurants is addressed in **Section 3.1** of the attached Technical Memorandum.

15. *There are too many trip reduction factors being applied (reductions are being double-counted)*
    a. *Phase 1 Gaming Tables - 10% reduction for playing at multiple tables (If you visit more tables, you end up staying a shorter time at each table, which opens up spots for other*

players - unless the implication is that the tables are less well-used the more tables you have)

b. *Phase 2 Gaming Tables - 20% reduction for playing at multiple tables (inconsistent with Phase 1 total number of tables should not have a big impact on how many different tables you play at – but even if it does, see comment above re Phase 1)*
c. *Phase 2 Slot Machines - 25% reduction since existing customers likely to use new machines as well (implies that overall, the utilization of the casino's slot machines will be less once Phase 2 is implemented – is this realistic?)*
d. *PLUS an additional 25% reduction to account for people already using the site and accounted for elsewhere (either in the existing traffic or other phases of development)*

Response *(Provided by Parsons)***:** As traffic is being generated from first principles and as the combined facility is a very unique land use, a number of assumptions need to be made to estimate site-generated traffic. As a starting point, each use is assessed independently, and then adjustments are made to account for shared trips between other existing and projected on-site land uses. As, at full development, there will be a race track and restaurant, a theatre, a Hard Rock restaurant, additional slot machines, staged gaming tables and a hotel, facility patrons will patronize many of these uses/venues during their one trip to the facility. It is our opinion, that there will be shared-use trips as follows : the same patron visiting multiple tables or slot machines during any one visit ; as the facility expands in both tables and slots, some patrons of the expanded facilities will already be patrons of the existing facilities ; patrons will play both slots and tables during one visit ; existing patrons of the race track, existing restaurant and the existing slots will also be patrons of the expanded gambling facility, the new restaurant and the new theatre. Based on the diversity of projected on-site uses and the intent to have patrons participate in as many of the on-site activities as possible during one visit, we are comfortable that the above shared-use trip reduction factors are appropriate.

16. *Reduction "d" on its own (without the other suggested reductions) as an "internalization" factor would be a reasonable reduction in the trips.*

Response *(Provided by Parsons)***:** See above response to Comment 15.

17. *As well, there needs to be a better explanation as to how the trip generation rate for the gaming tables was derived. There is currently not enough information to assess whether the assumption is reasonable. Provide the average length of time people are expected to stay at the casino. In addition, provide the rationale for the average auto occupancy. An occupancy of 2.5 is used in the trip generation calculation, but an occupancy of 1.8 is used in the mode share/person trip calculations. The two values must be consistent. Since the 1.8 factor is based on local data for the Casino de Lac-Lemay, it would seem more appropriate. Provide justification if a different value is used as an occupancy rate.*

Response *(Provided by Parsons)***:** We are advised that the average stay at a gaming table facility is 3 hours. When this stay is accounted for (it was in the TIA calculations, but not noted), the trip generation calculations are quite straight forward.

Based on a combination of the initial vehicle occupancy rate provided by the proponent (2.5), the vehicle occupancy of the more urban Casino Lac Leamy (1.78), recent counts conducted by Parsons (1.6 to 2.0) and the planned new Hard Rock restaurant and theatre, a vehicle

occupancy of 2.0 will be used where appropriate in all ongoing analysis/traffic generation for this project.

It should be noted, however, that in the TIA Report vehicle occupancy was only used in projecting new vehicle trips for the proposed gaming tables. It was not used in projecting vehicle trips for the additional slot machines or the hotel. Reducing the vehicle occupancy from 2.5 down to 2.0 for the gaming table patrons will increase the proposed development's peak hour traffic generation slightly. The trip rate per table will increase from 34.29 to approximately 43.0 which is a 25% increase. As such, applying this increase to the projected traffic from 55 gaming tables (Table 14 of the TIA) will result in the following two-way increases in site-generated traffic during the morning, afternoon and Saturday peak hours respectively (2 veh/h, 15 veh/h and 25 veh/h two-way total). This additional two-way traffic, when distributed north and south of the site and when assigned to the appropriate turn movements along Albion Road will have negligible impact on intersection operation.

Included as **Attachment 2** to this addendum is the updated trip generation analysis, distribution and assignment for the phased development addressed in the TIA. Novatech will be using this material as a base onto which they will add the projected traffic from the proposed (Phase 2) theatre and restaurant. They will also provide the projected study area intersection operation, for the new total projected traffic volumes.

18. *Provide justification for all of the hotel trips being distributed over the 4 peak hours. The analysis does not account for trips arriving by intercity bus.*

Response *(Provided by Parsons)***:** Being located at this rural entertainment centre location, the hotel will not have the same peak hour characteristics as a typical urban hotel. As such, the TIA analysis assumed that as a maximum, any of the typical peak hours might generate up to 25% of the facilities daily vehicle trips. This is likely an over-estimation.

With regard to charter bus service, Hard Rock Ottawa has advised of the following:

i. 8 buses/week from Ottawa
ii. 3 buses/week from Pembroke
iii. 1 buses/week from Kingston
iv. 2 buses/week from Cornwall/Alexandria

On an annual basis the foregoing totals 728 buses/year. Add to this 80 to 100 ad-hoc buses from Quebec and the total increases to approximately 825 charter buses per year, or an average of approximately 70 buses/month or 16 buses/week. While the charter bus activity is very important to its passengers and the facility, when broken down to a daily afternoon or evening peak hour basis, its volume will have no impact on the operation of off-site roads or intersections.

19. *Clarify the direction of trips in Table 4 (inbound/outbound).*

Response *(Provided by Parsons)***:** Table 4 is not properly labelled. The volumes shown are two-way volumes and NB means two-way site generated traffic to/from the north of the site connections to Albion and SB means two-way site-generated traffic to/from the south of the site connections to Albion. For example, the first number in the table of 30 veh/h is comprised of 8 veh/h turning left out of the site in the morning peak hour to go north and 22 southbound vehicles on Albion turning left into the site (refer to Figure 3).

20. *Correct the error in reported travel modes in Section 8 from NCC's report. Also, peak arrival = 5 to 8 pm; peak departure = 9-11 pm*

    Response *(Provided by Parsons)***:** These required corrections are acknowledged.

21. *The report still identifies the future alignment of Earl Armstrong Road as being adjacent to the site (section 13.1 Boundary Streets – Mobility). This is not determined and must be removed from the report. Review the report for other references to this alignment.*

    Response *(Provided by Parsons)***:** This Addendum 1 to the TIA supplements and supersedes the TIA, and acknowledges that the preferred alignment for Earl Armstrong Extension has not yet been determined. The City's TMP does show the facility's conceptual alignment in the approximate 500 m wide corridor between the Hard Rock site and the Leitrim Wetlands. The EA Study, now underway, should result in an approved corridor and functional plan by the middle of 2019.

22. *Validate the assumption that no site generated traffic will utilize High Road to Earl Armstrong Road prior to the extension of Earl Armstrong Road. It would be expected that many patrons from Barrhaven and Riverside South will use the Earl Armstrong Road – High Road - Albion Road corridor to access the site. (Note also that the shuttle from/to the site may utilize this corridor).*

    Response *(Provided by Parsons)***:** Refer to Response 12 above, and yes, it is likely that shuttle service from the site to the Barrhaven O-Train station will most likely use this link.

23. *The report notes that Findlay Creek is fully built out, but that is not the case. Consult with Wendy Tse, Planner, for more information regarding the Leitrim Community Design Plan as well as approved and ongoing development applications.*

    Response *(Provided by Parsons)***:** Wendy Tse, the City Planner for the area has been consulted. It is acknowledged that Findlay Creek is not built out (only 45%) and that significant development potential remains along Leitrim Road between Bank and Albion, and along Bank Street at the south end of Findlay Creek. It is the historic and projected growth in Findlay Creek and of the lands on the east side of Bank Street that are significant factors in the need for additional road capacity in the Bank, Albion and Lester Road corridors.

24. *Assess the impacts to the Findlay Creek community and the potential for increased volumes and cut-through traffic using Findlay Creek Drive to avoid intersections of Albion Road/Leitrim Road and Albion Road/Lester Road and cut through the community between Albion Road and Bank Street.*

    Response *(Provided by Parsons)***:** We have not been made aware that there is a cut-through traffic problem through Findlay Creek or of a completed license plate survey that would quantify the amount of existing cut-through traffic, if any. It is noteworthy that the City has advanced the timing of the widening of the Albion/Leitrim intersection to 2021 (only 3 years away) so as to reduce delay at this intersection and make both Albion and Leitrim more attractive commuter peak hour routes. It is not the intention, or within the City approved Scoping Module for this study to conduct a cut-through traffic study of Findlay Creek or to do any traffic analysis of the future build out of Findlay Creek.

25. *Improvements to pedestrian facilities for future transit and accommodation for future cycling facilities should be provided at the signalized access. The report must identify that the paved shoulders serve as a cycling facility and that Albion Road is designated as a spine route. Both the sidewalk and cycling facility should also connect to internal facilities. Figure 1 in the report did not illustrate the accesses sufficiently.*

    Response *(Provided by Novatech)***:** These details will be addressed in the Site Plan Application and not as part of the Rezoning.

26. *Page 6 lists the TMP-approved timing for Lester Road widening, which has recently been delayed to post-2025. Note that Table 7 on page 11 has the correct timing.*

    Response *(Provided by Parsons)***:** The correction to the widening to 'post 2025' is acknowledged.

27. *Page 6, last paragraph before section 4.4, it is stated that "…..the Albion Road/Leitrim Road intersection for construction by approximately year 2023." The current plan is to modify this intersection by year 2021.*

    Response *(Provided by Parsons)***:** This update to the timing of this intersection modification is acknowledged.

28. *Statements regarding the existing and future Earl Armstrong Road need to be checked for accuracy. For example, on pages 26 and 31, the following is stated: "When City extends Earl Armstrong Road from Bowesville Road to Albion Road…" Note that the existing Earl Armstrong Road ends at High Road, which is east of Bowesville Road. High Road connects to Albion Road.*

    Response *(Provided by Parsons)***:** This correction is acknowledged. Earl Armstrong currently extends east to High Road and the plan is to extend it further east to Bank Street and to Hawthorne Road, likely in stages, at some point in time.

3.0 COUNCILLOR DEANS' COMMENTS

29. *The TIA doesn't account for a restaurant.*

    Response *(Provided by Novatech)***:** As noted in the response to Comment 14 above, several restaurants are proposed as part of the Phase 2 development. The trip generation of the proposed restaurants is addressed in **Section 3.1** of the attached Technical Memorandum.

30. *The TIA doesn't account for a 2500 seat theatre.*

    Response *(Provided by Novatech)***:** As per the response to Comment 3, the Technical Memorandum (**Attachment 1**) identifies the trip generation for the proposed theatre.

31. The TIA assumes 2.2 people per car – way too high.

Response *(Provided by Parsons)***:** As per the response to Comment 17, it is proposed to use a 2.0 vehicle occupancy rate in all updated traffic analysis where appropriate and not the initial 2.5 used in the TIA Study.

The main conclusions of the Technical Memorandum (**Attachment 1**) are summarized as follows:

- The net increase in vehicle trips resulting from the lower vehicle occupancy rate (2 persons/veh) is 2 vph in the weekday a.m. peak, 15 vph in the weekday p.m. peak, and 25 vph in the Friday/Saturday evening peaks.
- The revised distribution of trips to the High Road – Earl Armstrong link at full site development results in approximately:
    - 4% of the two-way total site traffic using Earl Armstrong/High Road in the a.m. peak (1 vph); and
    - 8% of the two-way total site traffic using Earl Armstrong/High Road in each of the p.m. (10 vph) and Saturday evening peaks (13 vph).
- The increase in vehicle traffic through the Blossom Park community, located north of Lester Road, is projected to be 10 to 40 vph two-way total during the morning and afternoon peak hours, at full site development.
- Consistent with the original TIA, this represents an approximate 1% to 5% increase in vehicle traffic on Albion Road through Blossom Park during the commuter peak hours as a result of Phases 1 - 3 of the expansion.
- During the Friday and Saturday evening peak hours, the projected increase in traffic on Albion Road through Blossom Park is 90 to 95 veh/h (two-way total), which equates to approximately 1 new vehicle every 40 seconds.
- Based on the lower vehicle occupancy rate for the gaming tables, and the addition of peak theatre/restaurant site traffic, the revised analysis shows marginal increases in the volume to capacity ratios of critical movements at the study area intersections, compared to the results identified in the original TIA.
- The new Friday evening peak analysis suggests that there will be sufficient capacity to accommodate the projected 2028 total traffic volumes, assuming that the planned roadway modifications are in place at the Albion/Leitrim intersection.
- Detailed design of any required road modifications at the site's signalized driveway connection to Albion will be completed as part of the Site Plan process.
- During the review of the Site Plan Application for the Phase Two expansion of Hard Rock, the proponent will consider the option of constructing a driveway within the alignment of the future Earl Armstrong extension (as determined by the Environmental Assessment), with no connection to Albion Road. The cost of the driveway would be non-recoverable, however the cost of any required roadway modifications at the Bank Street/Site Access intersection would be eligible for Development Charges funding. The details of an access connection to Bank Street, and any associated roadway modifications, will be determined as part of the Site Plan process.
- Further consideration could be given to front-ending the planned improvements at the Albion/Lester intersection to improve the capacity and level of service at this location.

Based on the foregoing, the proposed 4837 Albion Road development continues to be recommended from a transportation perspective.

Yours truly,

NOVATECH

Jennifer Luong, P. Eng.
Senior Project Manager | Transportation/Traffic

Attachments:

Attachment 1 – Technical Memorandum, dated April 23, 2018
Attachment 2 – Updated Trip Generation, Distribution, and Assignment for the Original TIA

Attachment 1

Technical Memorandum, dated April 23, 2018

NOVATECH
Engineers, Planners & Landscape Architects

M E M O R A N D U M

DATE: **APRIL 23, 2018**

TO: **RICHARD GARDNER, HARD ROCK OTTAWA**

FROM: **JENNIFER LUONG**

RE: **4837 ALBION ROAD TIA ADDENDUM #1 – RESTAURANT/THEATRE USES**

CC: **FILE**

The Transportation Impact Assessment (TIA) for the proposed expansion of the Rideau Carleton Raceway and Slots located at 4867 Albion Road (now called Hard Rock Ottawa) was prepared by Parsons and was submitted to the City in January 2018. Comments on the TIA have been provided/received from the City of Ottawa (March 12,2018) and from Councillor Deans. Addendum # 1 has been prepared by Novatech to address these comments.

This Technical Memorandum is prepared in conjunction with Addendum # 1 and addresses the additional transportation impacts of the restaurant and theatre uses that are proposed as part of the Phase 2 development as these two uses were not identified to Parsons at the time of the TIA preparation.

1.0 PROPOSED RESTAURANT AND THEATRE USES

A number of new restaurants are proposed as part of the Phase 2 development, with a total of 700 seats in addition to the existing 500 seat buffet dining room. Among others, the new restaurants will include the Hard Rock Café with 200 seats, the Steakhouse Restaurant with 150 seats, and the Sports Book Restaurant with 120 seats. The peak traffic generated by the restaurants will overlap with the the peak hours of the adjacent road traffic, and extend into the evening.

A 2,000 seat theatre (2,300 standing capacity) is also proposed as part of Phase 2. The peak traffic generated by the theatre will occur during the evening, outside of the weekday and weekend peak hours of adjacent road traffic. Afternoon shows are not expected.

Revised analysis of the weekday peak traffic is presented in this Technical Memorandum, as well as new analysis of the evening peak traffic. New counts that were recently conducted by the City of Ottawa have been used to determine whether Friday evening peak traffic or Saturday evening peak traffic is more critical. A review of the new counts is provided in **Section 2.0**, as follows.

2.0 EXISTING EVENING TRAFFIC

The City of Ottawa conducted continuous turning movement counts at Leitrim/Bowesville, Leitrim/Albion, and Albion/Rideau on the weekends of February 9th to 11th (family day weekend) and

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March 23rd to 25th, from Friday 3pm to Sunday 6am. Thirty-nine continuous hours of data were recorded for each count. The results of the counts are summarized in **Appendix A**.

It is noted that the traffic at the Albion/Leitrim and Albion/Rideau intersections are generally higher on the weekend of March 23rd, than on family day weekend (February 9th to 11th). The weekend volumes of March 23rd will be used as the basis for the analysis in this Technical Memorandum, as this data is considered more typical and will produce conservative results.

The peak traffic generated by the theatre/restaurant uses will occur between 6:00pm and 7:00pm on weekdays and weekends. The existing traffic at the Albion/Leitrim and Albion/Rideau intersections on Friday and Saturday evenings during this time period is shown in **Figure 1**.

3.0 ADDITIONAL PHASE 2 SITE TRAFFIC

3.1 Trip Generation

3.1.1 Restaurants

The new restaurants will have a combined seating capacity of 700 seats. Actual seating capacity of the restaurants will depend on the layout of tables and chairs, etc. and it is assumed that the practical capacity may be slightly less than the theoretical capacity. For example, a large or unusually-shaped table might make it impossible to fit enough chairs to accommodate the theoretical seating capacity. A practical capacity of 95% is assumed for this analysis, which results in a total of 665 seats.

As noted in the TIA Addendum #1, a vehicle occupancy rate of 2.0 persons/vehicle is proposed for all updated traffic analysis where appropriate. Applying this rate to the practical seating capacity of the new restaurants results in a total of approximately 330 veh/day.

Most people visiting the restaurants will also participate in the other casino activities including the slots, gaming tables, and horse races. A conservative reduction of 70% shared trips has been applied for this analysis. This results in a total of 100 new external vehicle trips per day.

Peak arrivals and departures at the proposed restaurants are expected to occur between 4:30pm and 8:30pm. This coincides with the weekday p.m. peak hour of the adjacent roads (4:30pm to 5:30pm), the peak gaming period (6:00pm to 10:00pm), and the peak theatre traffic (6:30pm to 7:30pm).

The assumed arrival profile and peak hour vehicle trips are summarized in the following table.

Table 1: Restaurant Vehicle Trips

Time	Arrival/Departure Distribution	Total (veh/hr)	In/Out (veh/hr)
4:30pm to 5:30pm	20%	20	10 / 10
5:30pm to 6:30pm	30%	30	15 / 15
6:30pm to 7:30pm	**30%**	**30**	**15 / 15**
7:30pm to 8:30pm	20%	20	10 / 10

By comparison, the ITE rates for a Quality Restaurant (LU Code 931) identify approximately 25% less vehicle trips in both the weekday pm and Saturday peak hours, assuming 700 seats and a 70%

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reduction for shared trips. This suggests that the practical capacity and vehicle occupancy rate assumptions are conservative.

3.1.2 Theatre

The theatre will have a seating capacity of 2,000 seats and a standing capacity of 2,300. The standing capacity has been used for this analysis, for conservative results. Similar to the restaurant use, a practical capacity of 95% has been applied for the theatre use to account for cancellations etc., which results in a practical standing capacity of approximately 2,180.

Applying the vehicle occupancy rate of 2.0 persons/vehicle to the practical standing capacity of the theatre results in a total of approximately 1,090 veh/day.

Many people visiting the theatre will also participate in the other casino activities including the slots, gaming tables, and horse races, as well as the proposed/existing restaurants. A conservative reduction of 30% shared trips has been applied for the slots/gaming/racing uses, and an additional reduction of 30% has been applied for the existing/proposed restaurants. This results in a total of 440 new external vehicle trips per day.

Peak arrivals and departures at the theatre are expected to occur between 4:30pm and 7:30pm. This coincides with the weekday p.m. peak hour of the adjacent roads (4:30pm to 5:30pm), the peak gaming period (6:00pm to 10:00pm), and the peak restaurant traffic (6:30pm to 7:30pm).

The assumed arrival profile and peak hour vehicle trips are summarized in the following table.

Table 2: Theatre Vehicle Trips

Time	Arrival/Departure Distribution	Total (veh/hr)	In/Out (veh/hr)
4:30pm to 5:30pm	10%	40	35 / 5
5:30pm to 6:30pm	40%	180	170 / 10
6:30pm to 7:30pm	**50%**	**220**	**210 / 10**
7:30pm to 8:30pm	0%	-	-

The ITE Trip Generation Manual (9th Edition) includes a Live Theatre land use (LU Code 441) however the data is based on only one observation (4,400 seats) in suburban New York City, NY in 1979 and is not considered relevant.

The trip generation identified in the above tables is in addition to the Phase 1, 2 and 3 trip generation identified in Tables 1 and 2 of TIA Addendum #1 Attachment 2. There will be occasional special events including large outdoor concerts which are discussed separately (**Section 3.1.3**) for which a detailed traffic assessment has not been carried out.

In response to City comments, the site traffic shown in the TIA Tables 14 and 18 has been revised as shown in the TIA Addendum Tables 1 and 2 (Attachment 2) to reflect a lower vehicle occupancy rate of 2.0 persons/vehicle for the gaming tables (compared to 2.5 persons/vehicle as identified in the TIA). It should be noted that there is a summing error in Table 18 of the original TIA and the Total Phase 1, 2 and 3 traffic should read as follows:

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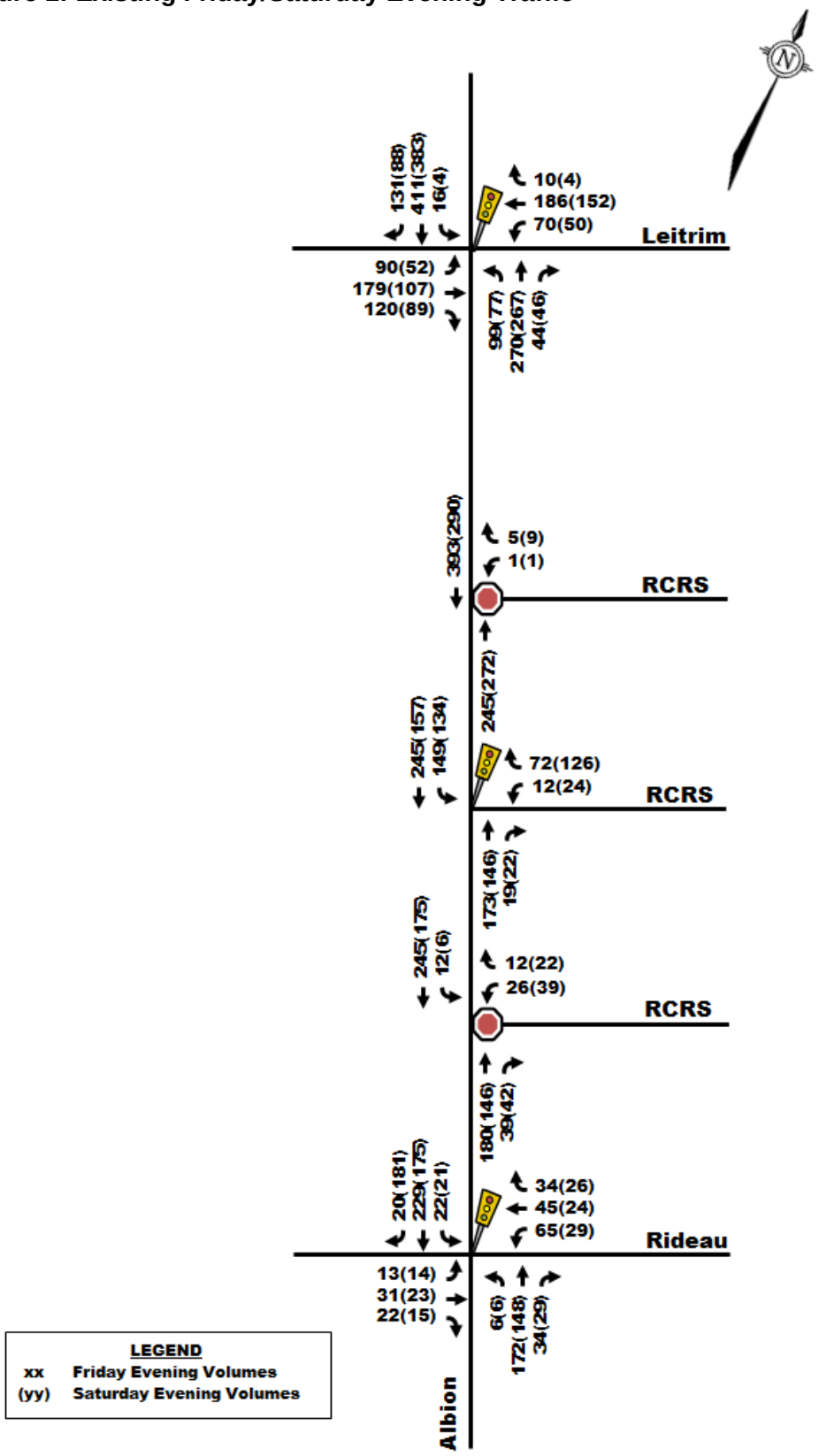
Figure 1: Existing Friday/Saturday Evening Traffic



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- 225 vph for the p.m. peak,
- 258 vph for the Friday evening peak, and
- 296 vph for the Saturday evening peak.

The net increase in vehicle trips resulting from the lower vehicle occupancy rate is 2 vph in the weekday a.m. peak, 15 vph in the weekday p.m. peak, and 25 vph in the Friday/Saturday evening peaks.

The theatre and restaurant uses will generate little to no trips during the weekday a.m. peak. The increase in vehicle trips in the a.m. peak due to the lower vehicle occupancy rate is negligible. Revised analysis of the weekday a.m. peak has not been completed as the results identified in the original TIA will be essentially unchanged.

Revised analysis of the weekday p.m. peak has been completed to reflect the increase in site traffic due to the lower vehicle occupancy rate (15 vph) and the addition of trips generated by the theatre and restaurant land uses (60 vph).

Based on the existing Friday/Saturday evening traffic shown in **Figure 1**, Friday evening represents the worst-case combination of evening background traffic, restaurant/theatre traffic, and the revised existing/proposed Phase 1, 2 and 3 traffic identified in Table 2 of the TIA Addendum (Attachment 2). New analysis of the Friday evening peak has been completed to reflect the increase in site traffic due to the lower vehicle occupancy rate (25 vph) and the addition of trips generated by the theatre and restaurant land uses (250 vph).

3.1.3 Special Events

Special event permits accompanied by a traffic management plan may be required for occasional special events such as large outdoor concerts. If required, the traffic management plan could be unique from one event to another, depending on the size of the event, expected attendance and proposed access arrangements.

Special event permits accompanied by a Traffic Management Plan may be required for occasional special events. If required, the Traffic Management Plan could be unique from one event to another, depending on the size of the event, expected attendance and proposed access arrangements. Proposed traffic management plans are reviewed by the City's Event Central and Special Event Advisory Team (SEAT) in accordance with the Special Events By-law 2013-232. The SEAT facilitates cross-organizational coordination of events logistics and meets regularly to review and provide recommendations in relation to proposed special events. Core members are involved in the review of most applications, and supplemental members are called in to participate in reviews that require the expertise, knowledge or direct involvement of other agencies. Core team members consist of several agencies including the Mayor and Council, Ottawa Police Services, Ottawa Paramedic Services, Ottawa Public Health, Ottawa Fire Services, OC Transpo/Transit, National Capital Commission, and Royal Canadian Mounted Police. Supplemental SEAT members include National Defence, Ottawa Hotel Association, Business Improvement Areas (BIAs), Ottawa Tourism and others.

Large special events are expected to occur outside the peak hours of the adjacent road traffic (weekdays 7:00am to 8:00am and 4:30pm to 5:30pm, and weekends 11:00am to 2:00pm), however, they may occur during peak gaming hours (weekdays and weekends 6:00pm to 10:00pm).

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3.2 Trip Distribution

The TIA dated January 2018 notes that the trip distribution for Phases 1 to 3 of the proposed expansion was based on the north-south split at the existing site driveways and then the existing volume splits at the study area intersections along Albion Road.

In response to City comments, the trip distribution has been revised to reflect an afternoon peak hour count undertaken at the High Road/Earl Armstrong intersection in April 2018 and the most current count at the Albion/High intersection. The revised trip distribution results in approximately:

- 4% of the two-way total site traffic using Earl Armstrong/High Road in the a.m. peak (1 vph); and
- 8% of the two-way total site traffic using Earl Armstrong/High Road in each of the p.m. (10 vph) and Saturday evening peaks (13 vph).

The revised trip distribution of 8% of the two-way total site traffic using Earl Armstrong/High Road has been applied for the revised weekday p.m. peak analysis and the new Friday evening analysis presented in this Technical Memorandum.

The revised weekday a.m. and p.m. peak trips generated by Phases 1, 2 and 3 (including the theatre/restaurants) are shown in **Figure 2**.

The new Friday evening peak trips generated by Phases 1, 2 and 3 (including the theatre/restaurants) are shown in **Figure 3**.

As shown in **Figures 2** and **3**, the increase in vehicle traffic through the Blossom Park community, located north of Lester Road, is projected to be 10 to 40 veh/h two-way total during the morning and afternoon peak hours. Consistent with the original TIA, 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 Phases 1 - 3 of the expansion. During the Friday and Saturday evening peak hours, the projected increase in traffic on Albion Road through Blossom Park is 90 to 95 veh/h (two-way total), which equates to approximately 1 new vehicle every 40 seconds.

4.0 REVISED 2028 TOTAL TRAFFIC PROJECTIONS

Revised/new total projected peak hour traffic associated with Phases 1, 2 and 3 of the proposed expansion was calculated by combining the revised site traffic (**Figure 2**) with existing traffic volumes that have been increased by a factor of 1.05 to account for background traffic growth, consistent with the approach outlined in the TIA.

Revised 2028 total traffic volumes for the weekday peak hours are shown in **Figure 4**. New 2028 total traffic volumes for the Friday evening peak are shown in **Figure 5**.

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Figure 2: Phases 1, 2 and 3 Weekday Peak Trips (Revised)

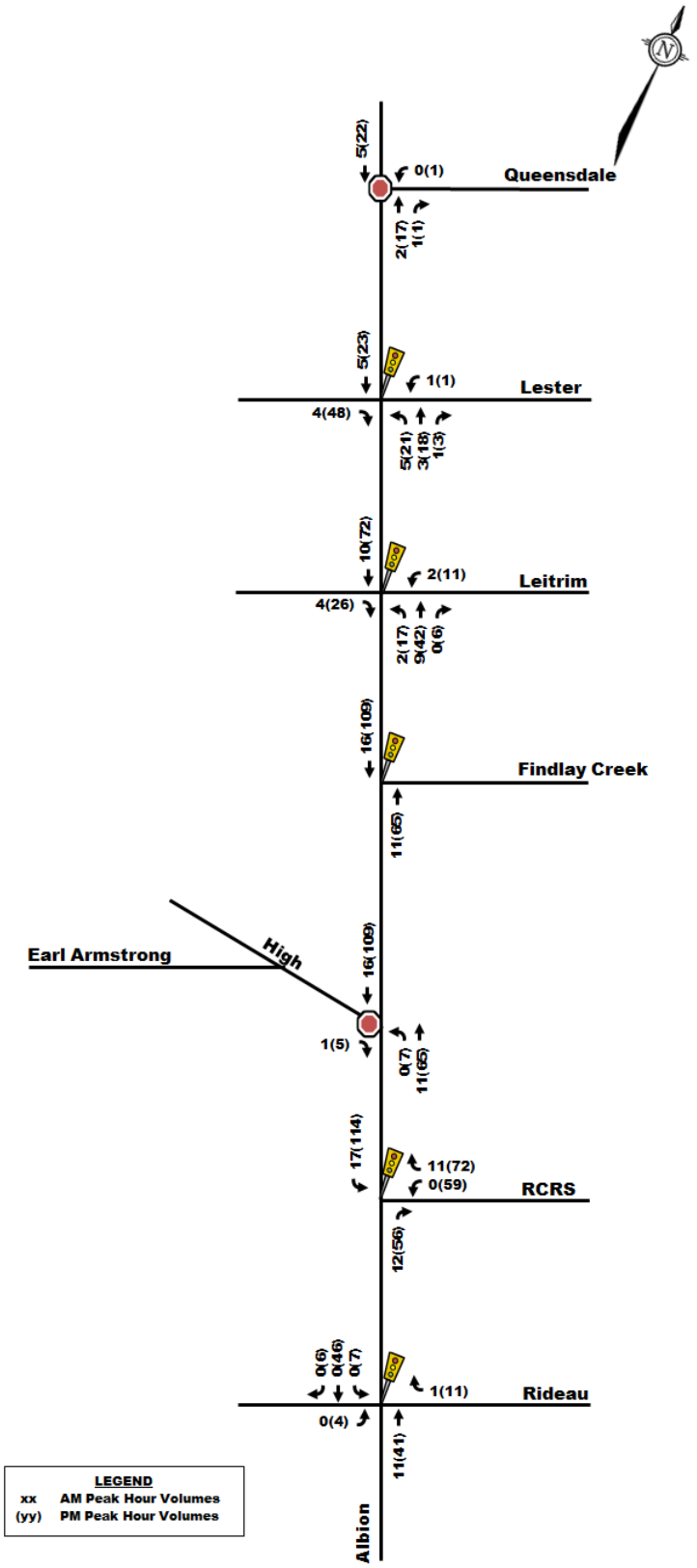

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Figure 3: Phases 1, 2 and 3 Friday Evening Peak Trips

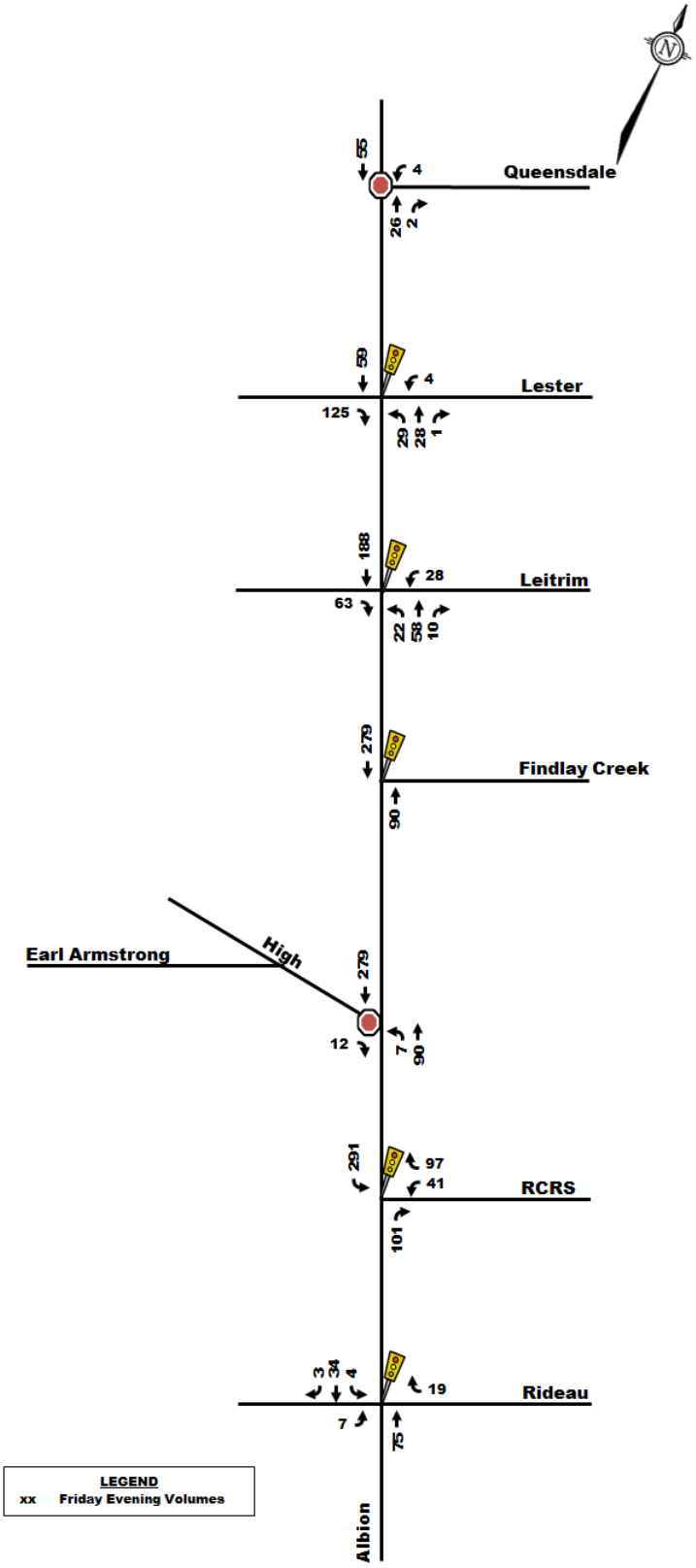

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Figure 4: Total 2028 Weekday Peak Traffic (Revised)

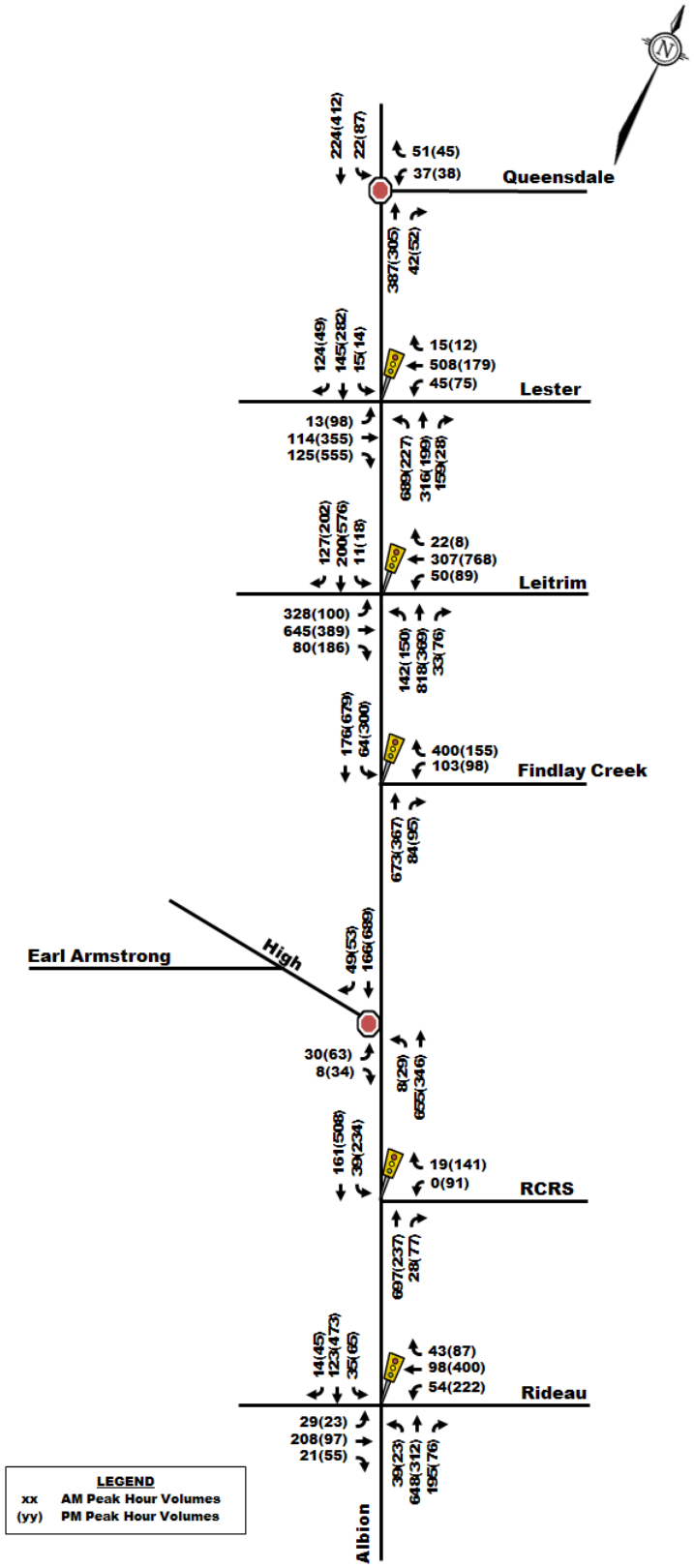

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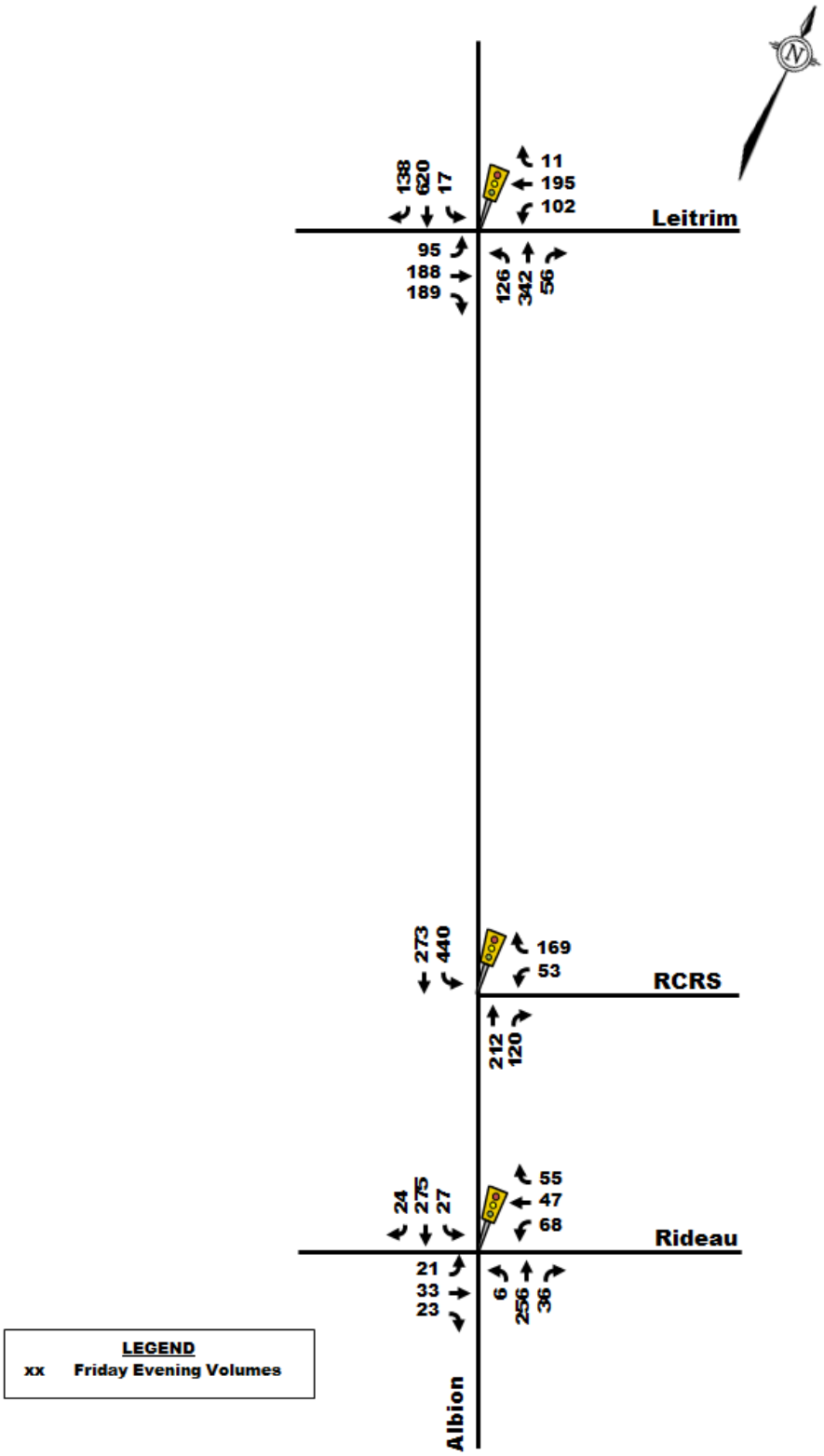
Figure 5: Total 2028 Friday Evening Peak Traffic



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4.1 Intersection Capacity Analysis

Intersection capacity analysis has been completed for the revised/new 2028 total traffic volumes for the weekday p.m. and Friday evening peak hours. 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 assumed to be in place. In addition, to improve the level of service for the critical movement at the Albion/Leitrim intersection, signal timing was adjusted.

The results of the analysis are summarized in the following table for the weekday p.m. and Friday evening peak hours. Detailed reports are included in **Appendix B**.

Table 3: Intersection Capacity Analysis – 2028 Total Traffic

Intersection	Weekday PM Peak			Friday Evening Peak		
	max. v/c or delay	LOS	movement	max. v/c or delay	LOS	movement
Albion/Queensdale[1]	17.1 sec	C	SBT	-	-	-
Albion/Lester	0.77	C	SBT	-	-	-
Albion/Leitrim	0.94	E	WBT	0.73	C	SBT
Albion/Findlay Creek	0.50	A	SBT	-	-	-
Albion/High[1]	30.2 sec	D	EB	-	-	-
Albion/RCRS	0.42	A	WBR	0.53	A	SBL
Albion/Rideau	0.87	D	WBT	0.30	A	WBL

1. Unsignalized Intersection

Based on the lower vehicle occupancy rate for the gaming tables, and the addition of peak theatre/restaurant site traffic, the above results show marginal increases in the volume to capacity ratios of critical movements at the study area intersections, compared to the results identified in the original TIA.

The results of the new Friday evening peak analysis suggest that there will be sufficient capacity to accommodate the projected 2028 total traffic volumes, assuming that the planned roadway modifications are in place at Albion/Leitrim. The analysis of the future Friday evening traffic conditions is limited to the Albion/Leitrim and Albion/Rideau intersections, as these are the only intersections where recent evening traffic count data is available. The impact at other arterial intersections is expected to be less, as Albion/Leitrim and Albion/Rideau are the closest signalized arterial intersections, with the highest volumes of projected site traffic.

It is noted that a heavy southbound left turn volume of 440 vph is projected at the signalized site access. This exceeds the typical threshold of 300 vph for which dual left turn lanes are normally considered. However, as the left turn volume is projected to occur outside of the peak hours of the adjacent road traffic, and the above analysis shows no capacity issues, a single left turn lane is considered sufficient. The existing storage length of the southbound left turn lane is very long, at 115m. The TAC equation for calculating storage length suggests that a storage length of 130m is

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required, based on a 100 second cycle length. However, the 95th projectile queues identified in the Synchro analysis are 35m or less, which suggests that the existing storage length is sufficient. Additional storage length is not recommended.

Detailed design of any required road modifications at the signalized site access to Albion will be completed as part of the Site Plan process.

4.2 Bank Street Connection

The City has suggested that a site access be provided to Bank Street to alleviate the development-related traffic on Albion Road through Blossom Park.

During the review of the Site Plan Application for the Phase Two expansion of Hard Rock, the proponent will consider the option of constructing a driveway within the alignment of the future Earl Armstrong extension (as determined by the Environmental Assessment), with no connection to Albion Road. The cost of the driveway would be non-recoverable, however the cost of any required roadway modifications at the Bank Street/ Site Access intersection would be eligible for Development Charges funding. The details of an access connection to Bank Street, and any associated roadway modifications, will be determined as part of the Site Plan process.

It is acknowledged that there are capacity constraints on Bank Street, that will be addressed by the planned Bank Street Widening project. If a driveway connection to Bank Street is provided, then any site traffic using this driveway will use Bank Street out of necessity. The regional commuter traffic will be able to adjust their routes accordingly and choose alternative north-south corridors if required, or choose from other travel modes during peak hours. In our opinion, acceleration of the Bank Street Widening project is not required to accommodate a site access connection to Bank Street.

The City has requested that the proponent consider contributing towards projects that are currently identified in the City's Transportation Master Plan, including:

- Additional north/south through lanes on Albion at the Albion/Leitrim intersection, and
- Improvements at the Albion/Lester intersection, in accordance with the Airport Parkway and Lester Widening Environmental Assessment Study.

Staff have confirmed that the Albion/Leitrim modifications are to be completed as part of the Stage 2 LRT project, and that there would be no value in unbundling these intersection modifications.

Further consideration could be given to front-ending the planned improvements at the Albion/Lester intersection.

5.0 CONCLUSIONS

Based on the foregoing, the main conclusions of this Technical Memorandum are summarized as follows:

- The net increase in vehicle trips resulting from the lower vehicle occupancy rate (2 persons/veh) is 2 vph in the weekday a.m. peak, 15 vph in the weekday p.m. peak, and 25 vph in the Friday/Saturday evening peaks.

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- The revised distribution of trips to the High Road – Earl Armstrong link at full site development results in approximately:
    - 4% of the two-way total site traffic using Earl Armstrong/High Road in the a.m. peak (1 vph); and
    - 8% of the two-way total site traffic using Earl Armstrong/High Road in each of the p.m. (10 vph) and Saturday evening peaks (13 vph).
- The increase in vehicle traffic through the Blossom Park community, located north of Lester Road, is projected to be 10 to 40 vph two-way total during the morning and afternoon peak hours, at full site development.
- Consistent with the original TIA, this represents an approximate 1% to 5% increase in vehicle traffic on Albion Road through Blossom Park during the commuter peak hours as a result of Phases 1 - 3 of the expansion.
- During the Friday and Saturday evening peak hours, the projected increase in traffic on Albion Road through Blossom Park is 90 to 95 veh/h (two-way total), which equates to approximately 1 new vehicle every 40 seconds.
- Based on the lower vehicle occupancy rate for the gaming tables, and the addition of peak theatre/restaurant site traffic, the revised analysis shows marginal increases in the volume to capacity ratios of critical movements at the study area intersections, compared to the results identified in the original TIA.
- The new Friday evening peak analysis suggests that there will be sufficient capacity to accommodate the projected 2028 total traffic volumes, assuming that the planned roadway modifications are in place at the Albion/Leitrim intersection.
- Detailed design of any required road modifications at the site's signalized driveway connection to Albion will be completed as part of the Site Plan process.
- During the review of the Site Plan Application for the Phase Two expansion of Hard Rock, the proponent will consider the option of constructing a driveway within the alignment of the future Earl Armstrong extension (as determined by the Environmental Assessment), with no connection to Albion Road. The cost of the driveway would be non-recoverable, however the cost of any required roadway modifications at the Bank Street/Site Access intersection would be eligible for Development Charges funding. The details of an access connection to Bank Street, and any associated roadway modifications, will be determined as part of the Site Plan process.
- Further consideration could be given to front-ending the planned improvements at the Albion/Lester intersection to improve the capacity and level of service at this location.

Yours truly,

NOVATECH

Jennifer Luong, P. Eng.
Senior Project Manager | Transportation/Traffic

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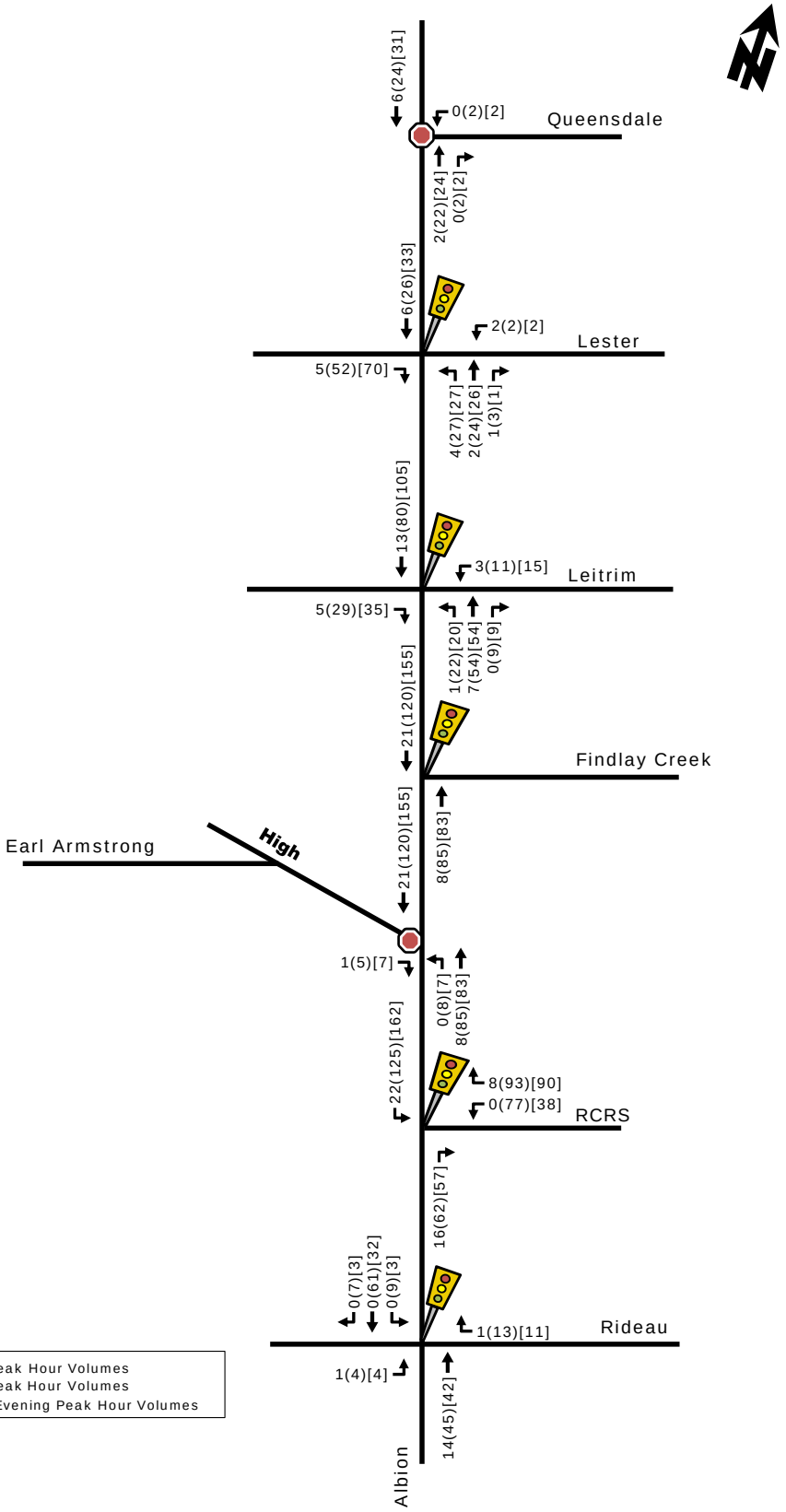
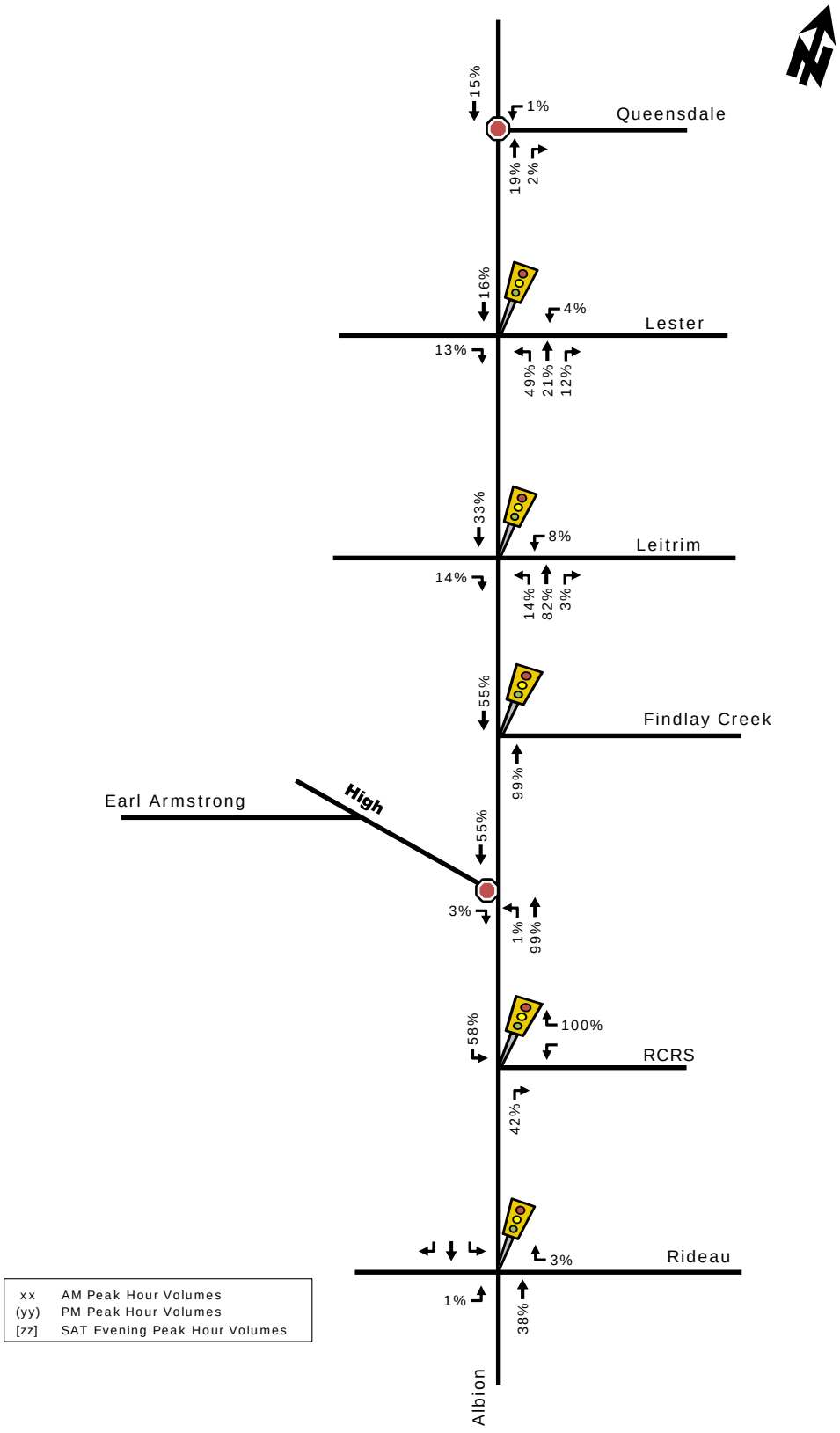
Attachment 2

Updated Trip Generation, Distribution, and Assignment for the Original TIA

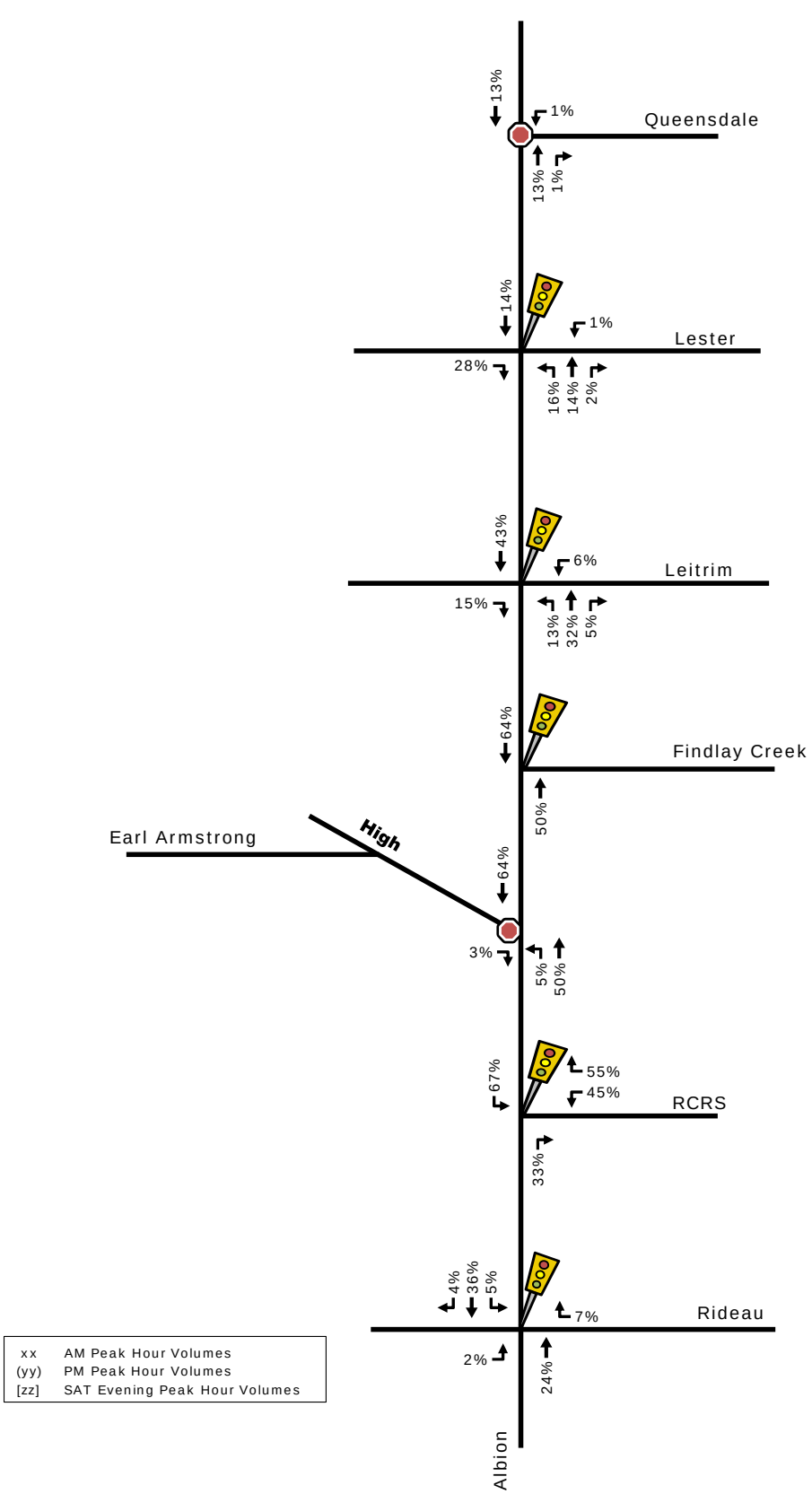
Existing Peak Hours RCRS Traffic Distribution



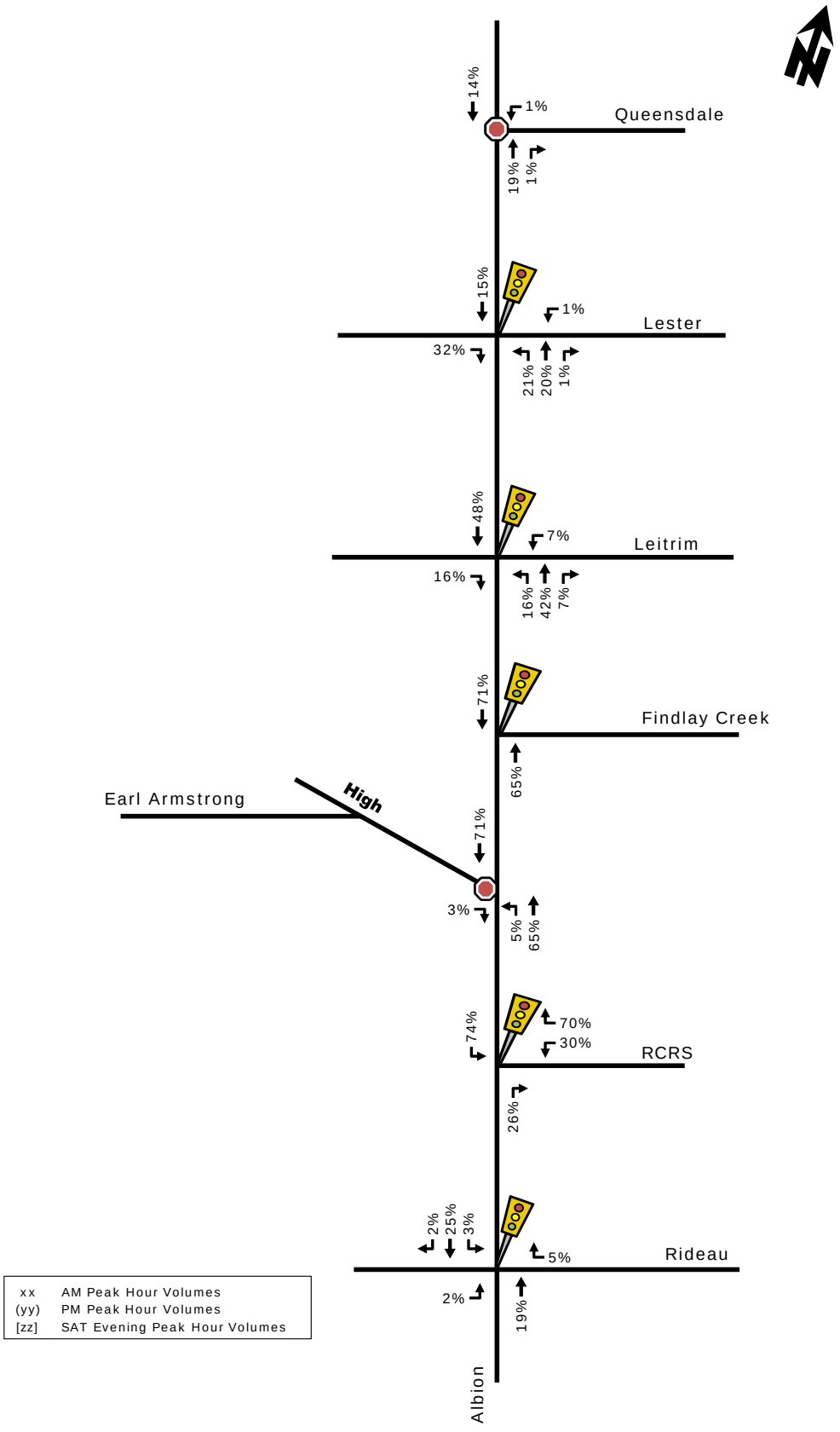
AM Peak Hours Distribution Percentage:



PM Peak Hours Distribution Percentage:



SAT Peak Hours Distribution Percentage:



New Trips – Phase 1, 2 and 3

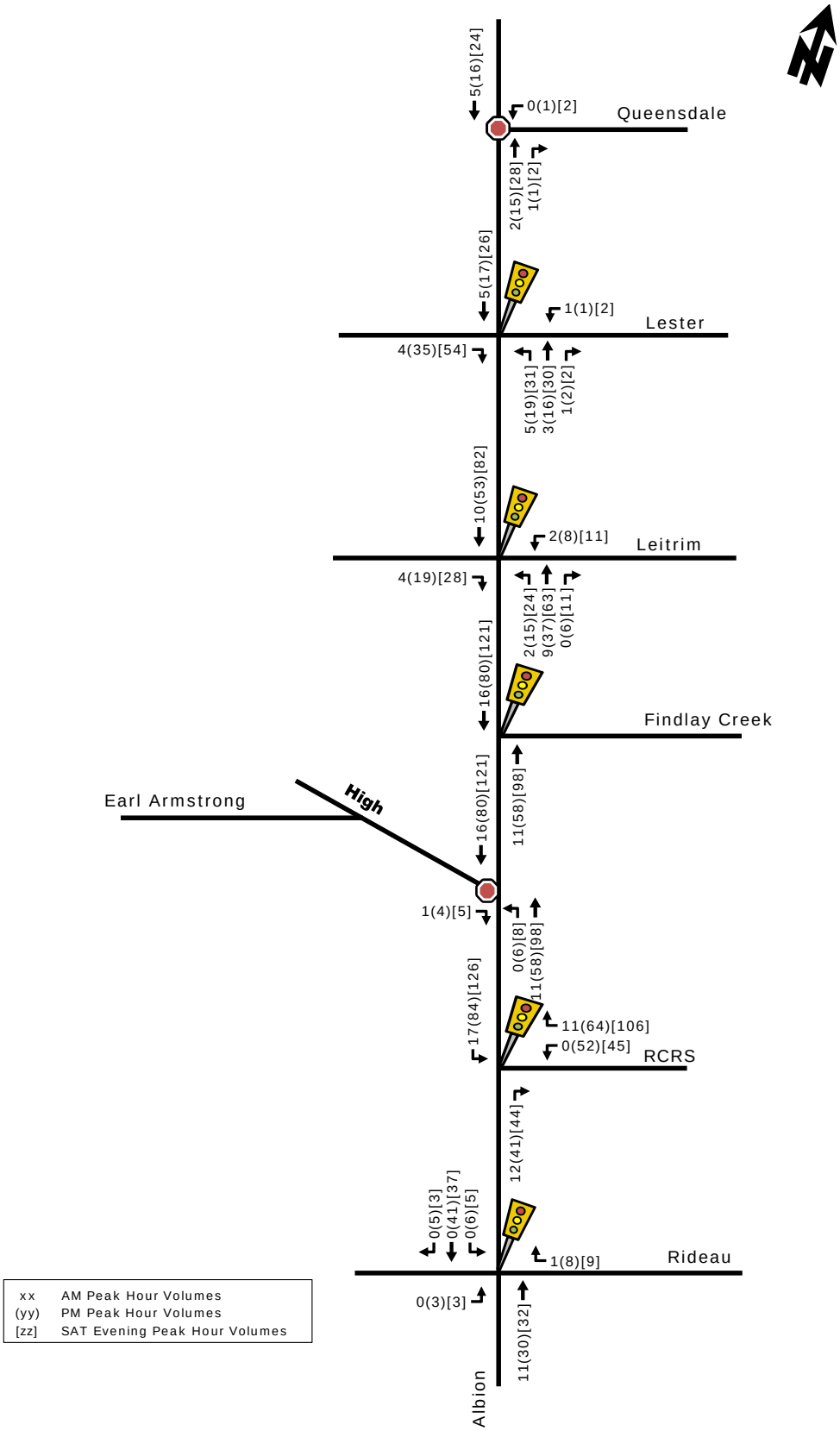


Table 1: Revised Phase 1 and 2 Trip Generation Summary

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	5	3	**8**	32	40	**72**	55	28	**83**	61	41	**102**	69	47	**116**
2	20 Gaming Tables	3	1	**4**	16	20	**36**	28	14	**42**	31	21	**52**	34	24	**58**
	750 Slot Machines	23	5	**28**	86	63	**149**	96	52	**148**	98	57	**155**	91	98	**189**
Phase 1 and 2 New Trips		**31**	**9**	**40**	**134**	**123**	**257**	**179**	**94**	**273**	**190**	**119**	**309**	**194**	**169**	**363**
Reduction for patrons at Slots and Tables (25%)		-8	-2	-10	-34	-31	-64	-45	-24	-68	-48	-30	-77	-49	-42	-91
TOTAL NEW TRIPS		**23**	**7**	**30**	**100**	**92**	**193**	**134**	**70**	**205**	**142**	**89**	**232**	**145**	**127**	**272**
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		64	29	**93**	287	262	**550**	411	124	**536**	361	217	**579**	349	348	**697**
NET INCREASE		23	7	**30**	100	92	**193**	134	70	**205**	142	89	**232**	145	127	**272**

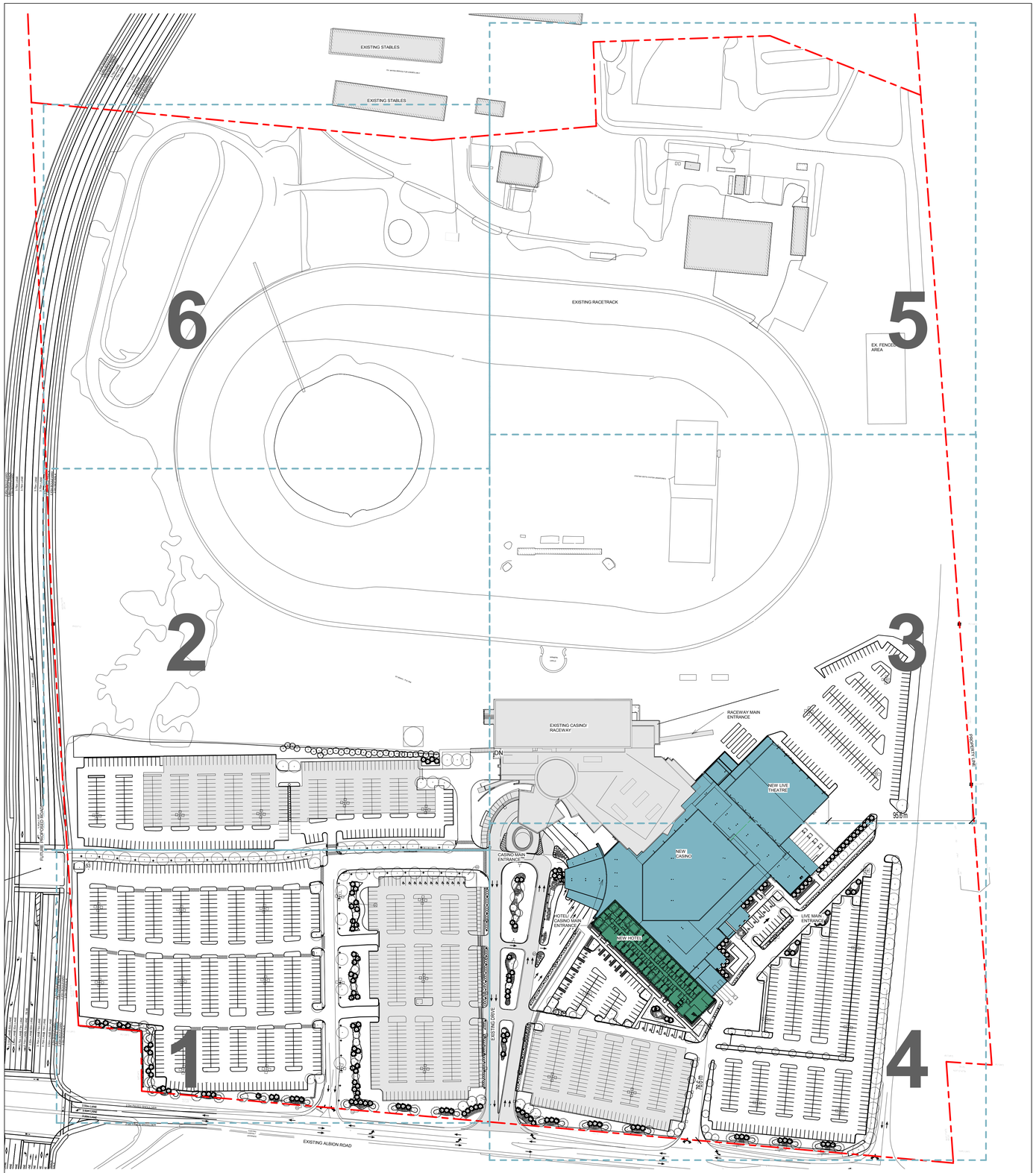
Table 2: Revised Summary of Phases 1, 2 and 3 Vehicle Trip Generation

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	5	3	**8**	32	40	**72**	55	28	**83**	61	41	**102**	69	47	**116**
Phase 2	20 Gaming Tables	3	1	**4**	16	20	**36**	28	14	**42**	31	21	**52**	34	24	**58**
	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%)		*-8*	*-2*	***-10***	*-34*	*-31*	*-64*	*-45*	*-24*	*-68*	*-48*	*-30*	*-77*	*-49*	*-42*	*-91*
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		**29**	**11**	**40**	**125**	**116**	**242**	**159**	**94**	**254**	**167**	**113**	**281**	**170**	**151**	**321**
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		**70**	**33**	**103**	**312**	**286**	**599**	**436**	**148**	**585**	**386**	**241**	**628**	**374**	**372**	**746**

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.

APPENDIX C

Conceptual Site Plan



PROPERTY ARIEL VIEW - NTS.

****REFER TO DRAWINGS SP-002 FOR PHASE 2 SITE PLAN RENOVATION.****

KEY PLAN LEGEND

- PHASE 2C - EXISITNG CASINO RENOVATION - DECEMBER 15, 2021
- EXISTING PARKING LOT/ ASPAHLT DRIVE
- PHASE 2A - CASINO/ LIVE THEATRE JULY 01, 2021
- PHASE 2B - HOTEL SEPTEMBER 01, 2021

SYMBOLS/ LANDSCAPE LEGEND

	EVERGREEN SHRUB
	CONIFEROUS SHRUB
	DECIDUOUS TREE
LP	DECORATIVE LAMP POST, REFER TO ELECTRICAL PHOTOMETRIC PLAN
	LIGHTING BOLLARD
PC-E	NEW 3.0 M WIDE PAINTED CROSSWALK - EXTERIOR
APLD	NEW LIGHT DUTY ASPHALT PAVING, SEE CIVIL.
CC	EXTERIOR CONCRETE CURB, SEE CIVIL
EXCC	EXISTING CONCRETE CURB
EXSW	EXISTING SIDEWALK
CS	CONCRETE SIDEWALK, SEE CIVIL
HC	HANDICAP PARKING SIGN
STOP	STOP SIGN
PS	PLANTING STRIP
AG	AUTOMATIC GATE
CS-DC	CONCRETE SIDEWALK WITH DEPRESSED CURB WHERE SIDEWALK INTERSECTS WITH ASPHALT PARKING AT PATH
PLE	WHITE PAINTED LINE - EXTERIOR
TI	TACTILE INDICATOR (TYPICAL AT ALL INTERSECTION BETWEEN PEDESTRIAN PATH OF TRAVEL AND VEHICLE LANE
RPC	RAISED CONCRETE PARKING CURB - 6"-0" LENGTH

DRAWING INDEX

SHEET NO.	DESCRIPTION
SP - 001	ARCHITECTURAL SITE PLAN PHASE 1 KEY PLAN
SP - 001- 1	SITE PLAN PHASE 1 ZONE 1
SP - 001 -2	SITE PLAN PHASE 1 ZONE 2
SP - 001-3	SITE PLAN PHASE 1 ZONE 3
SP - 001-4	SITE PLAN PHASE 1 ZONE 4
SP - 001-5	SITE PLAN PHASE 1 ZONE 5
SP - 001-6	SITE PLAN PHASE 1 ZONE 6
SP - 002	ARCHITECTURAL SITE PLAN PHASE 2 KEY PLAN
SP - 002-1	SITE PLAN PHASE 2 ZONE 1
SP - 002-2	SITE PLAN PHASE 2 ZONE 2
SP - 003	DESIGN PLAN - MAIN FLOOR
SP - 004	BUILDING ELEVATIONS

SITE PLAN DATA

LEGAL DESCRIPTION:
4837 ALBION ROAD
CONSESSION 4 RF PT LOT 23 & 24 RP Gloucester,
City of Ottawa
Parts 1 to 4 and 16 to 27
Plan 4R - 312303

ZONING	RC4 (RURAL COMMERCIAL) RC4 [528r] S381-h
USE OF BUILDING	CASINO / ENTERTAINMENT CENTRE/ HOTEL

	PROVIDED	REQUIRED
MINIMUM LOT AREA	404539 M²	20 000 M²
MAXIMUM LOT COVERAGE	2.8 %	15% MAX.
GROSS FLOOR AREA	23686.1 M²	N/A
MAXIMUM BUILDING HEIGHT	37 M	AREA A: 151.1 M easl AREAS B + C: 15 M
NUMBER OF FLOORS	7	N/A
MINIMUM FRONT YARD SETBACK	76 M	10 M
MINIMUM INTERIOR SIDE YARD SETBACK	101.7 M	6 M
REAR YARD SET BACK	372 M	10 M

VEHICLE PARKING	REQUIRED	PROVIDED
CASINO	10 per 100 m² of GFA = 701.88	
HOTEL	1 per guest unit = 178	
RESTAURANT	10 per 100 m2 of GFA = 469.17	
THEATRE	1 per 4 fixed seats = 400	
RETAIL STORE	3.4 per 100 m2 of GFA = 3.59	
TOTAL	**1753**	**2234**

LOADING SPACE	REQUIRED	PROVIDED
THEATRE: 2000 - 4999 m² GFA	1	
RESTAURANT: 2000 - 4999 m² GFA	2	
CASINO: 5000 - 9999 m² GFA	2	
HOTEL: 5000 - 9999 m² GFA	2	
TOTAL	**7**	**6**

ACCESSIBLE PARKING SPACES	REQUIRED	PROVIDED
PARKING LOT WITH 2234 SPACES	11 + 1% OF TOTAL = 32	38
	16 TYPE A SPACES	21
	16 TYPE B SPACES	17

OVA SITE PLAN KEY PLAN- PHASE 1 | SCALE 1" = 100'-0" | 1

BIM 360://Hard Rock Ottawa/HR Ottawa Phase 2.rvt 19/11/2019 5:45:34 PM

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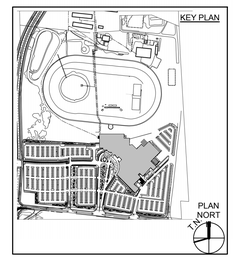
ONTARIO ASSOCIATION OF ARCHITECTS
LICENSE



Hard Rock CASINO

HARD ROCK HOTEL CASINO

4837 ALBION ROAD, GLOUCESTER, OTTAWA, ON, CANADA

4837 ALBION RD,
GLOUCESTER, OTTAWA
ONTARIO, CANADA

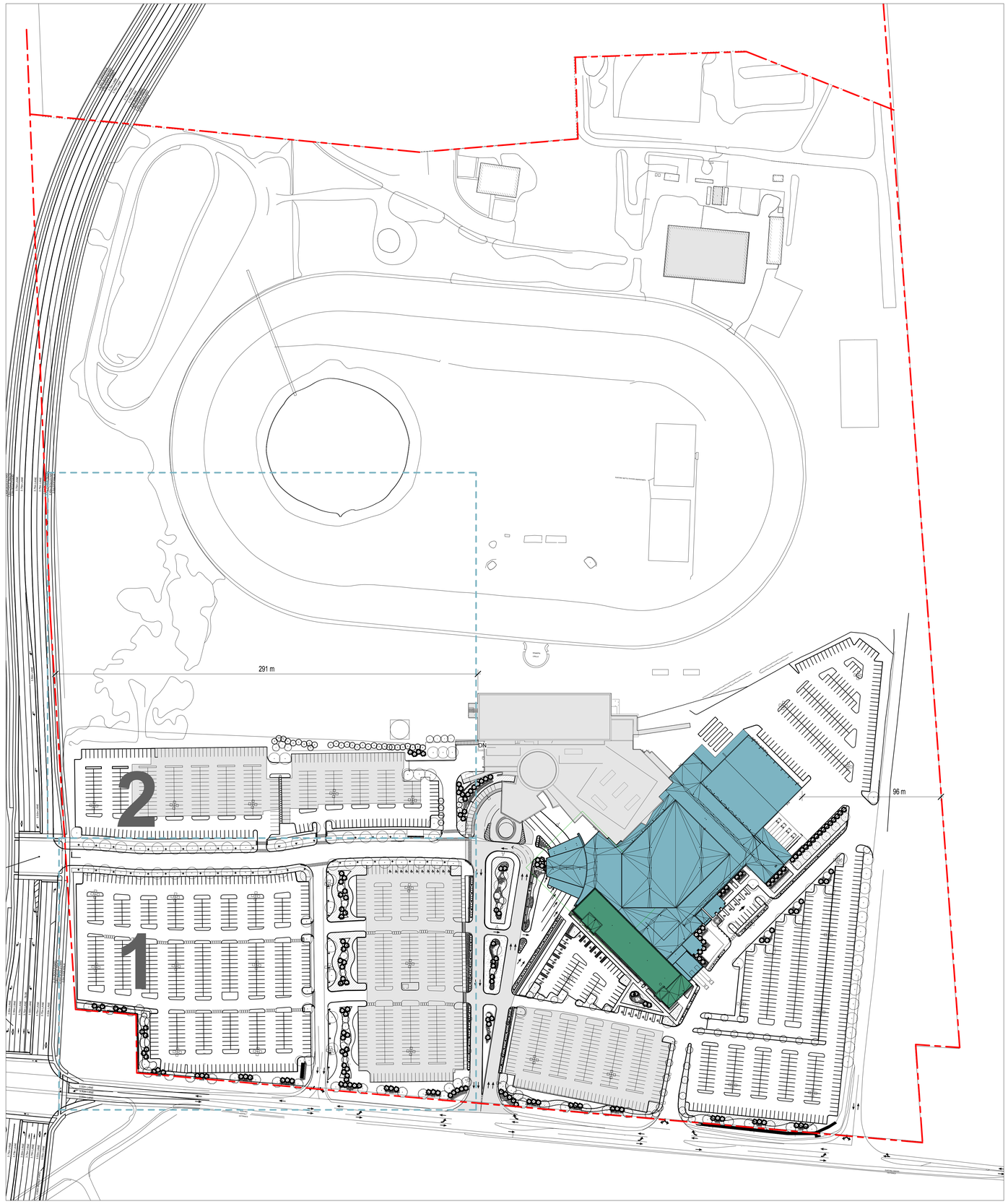
ISSUED FOR SITE PLAN AGREEMENT NOV. 20, 2019

SUBMISSIONS

NO.	DATE	DESCRIPTION
	2019 11 20	ISSUED FOR SITE PLAN AGREEMENT

DRAWING
ARCHITECTURAL SITE PLAN PHASE 1

DRAWN BY: Author REVIEWED BY: Checker	DATE: 10/31/19
SCALE: As indicated	DRAWING NO. SP - 001
PROJECT NO. 19072.00	



KEY PLAN LEGEND

- PHASE 2C - EXISITNG CASINO RENOVATION - DECEMBER 15, 2021
- EXISTING PARKING LOT/ ASPAHLT DRIVE
- PHASE 2A - CASINO/ LIVE THEATRE JULY 01, 2021
- PHASE 2B - HOTEL SEPTEMBER 01, 2021

NOTE:
PHASE 2 SITE PLAN RENOVATION INVOLVES THE ALTERATION OF ZONES 1 + 2 ONLY. THE ALTERATION WILL BE IN RESPONSE TO A FUTURE PROPOSED ROAD BY DEVELOPER IN WHICH THE HARDROCK CASINO SITE WILL PROVIDE A SECONDARY MAIN DRIVE FROM THE CASINO ENTRANCE TO THE NEW ROAD.

PARKING COUNT FOR PHASE 2:
TOTAL = 2151
NUMBER OF ACCESSIBLE PARKING SPACES REMAINS UNALTERED FROM PHASE 1.

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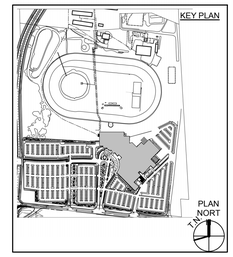
ONTARIO ASSOCIATION OF ARCHITECTS
YALLOWEGA BELANGER SALACH
LICENCE
MEMBER

KEY PLAN



Hard Rock CASINO

HARD ROCK HOTEL CASINO

4837 ALBION ROAD, GLOUCESTER, OTTAWA, ON, CANADA

4837 ALBION RD,
GLOUCESTER, OTTAWA
ONTARIO, CANADA

ISSUED FOR SITE PLAN AGREEMENT NOV. 20, 2019

SUBMISSIONS

NO.	DATE	DESCRIPTION
	2019 11 20	ISSUED FOR SITE PLAN AGREEMENT

DRAWING
ARCHITECTURAL SITE PLAN PHASE 2

DRAWN BY: Author REVIEWED BY: Checker	DATE: 10/08/19
SCALE: As indicated	DRAWING NO. SP - 002
PROJECT NO. 19072.00	

OVA SITE PLAN PHASE 2 | SCAL E 1" = 100'-0" | 1

BIM 360://Hard Rock Ottawa/HR Ottawa Phase 2.rvt 19/11/2019 5:46:23 PM

APPENDIX D

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**4837 Albion Road**
Description of Location	**Located east of Albion Road, approximately 630m north of Rideau Road**
Land Use Classification	**Rural Commercial**
Development Size (units)	**20 gaming tables, 750 slot machines, 730 restaurant seats, 2,000 theatre seats, and 225 hotel rooms**
Development Size (m^2)	**-**
Number of Accesses and Locations	**Three unsignalized accesses and one signalized access to Albion Road currently exist. One access connection is proposed to the future Earl Armstrong Road extension.**
Phase of Development	**1**
Buildout Year	**2021**

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

2. Trip Generation Trigger

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

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

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

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

3. Location Triggers

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

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

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

4. Safety Triggers

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

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

5. Summary

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

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

APPENDIX E

Traffic Count Data

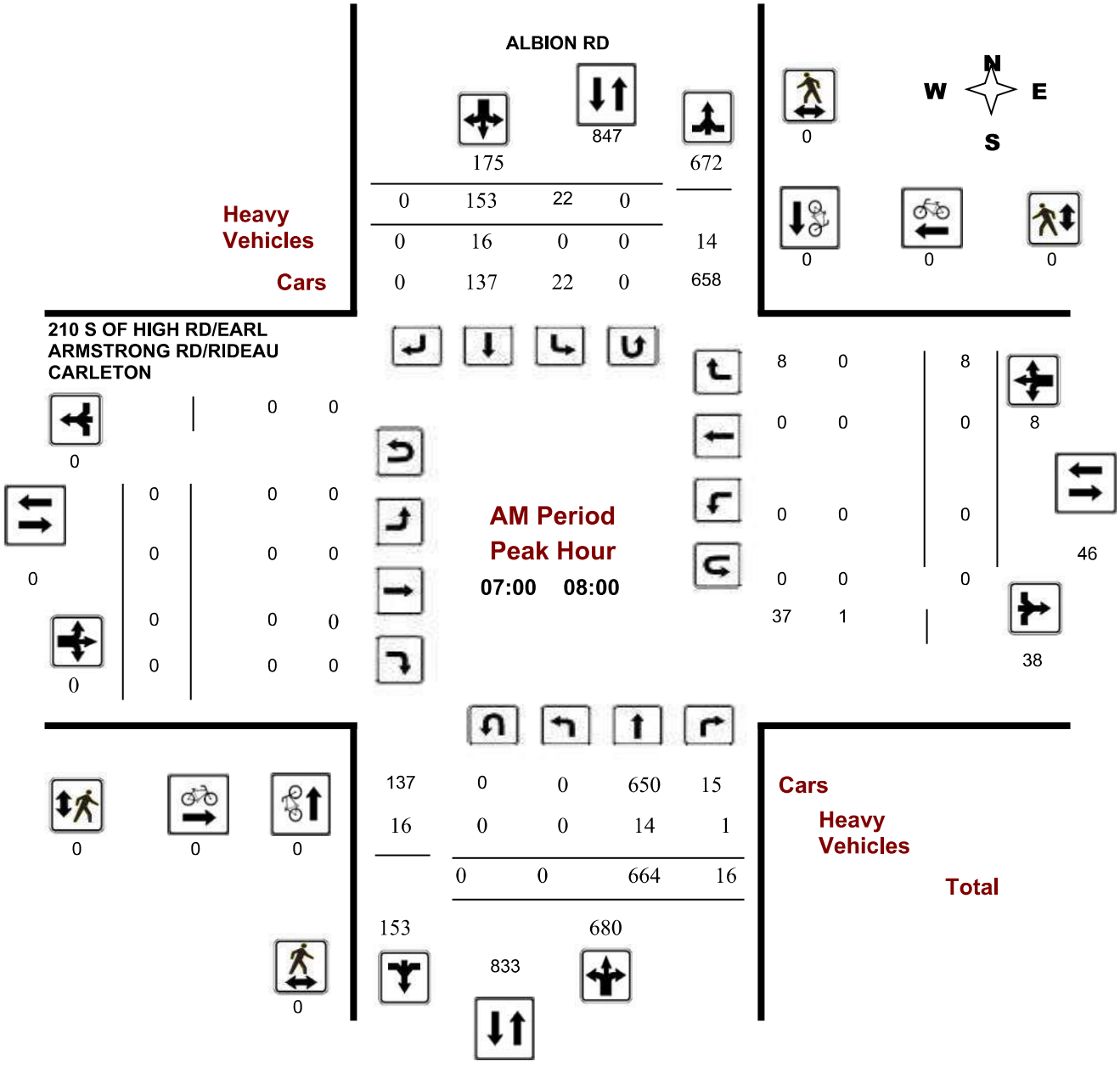
Transportation Services - Traffic Services

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

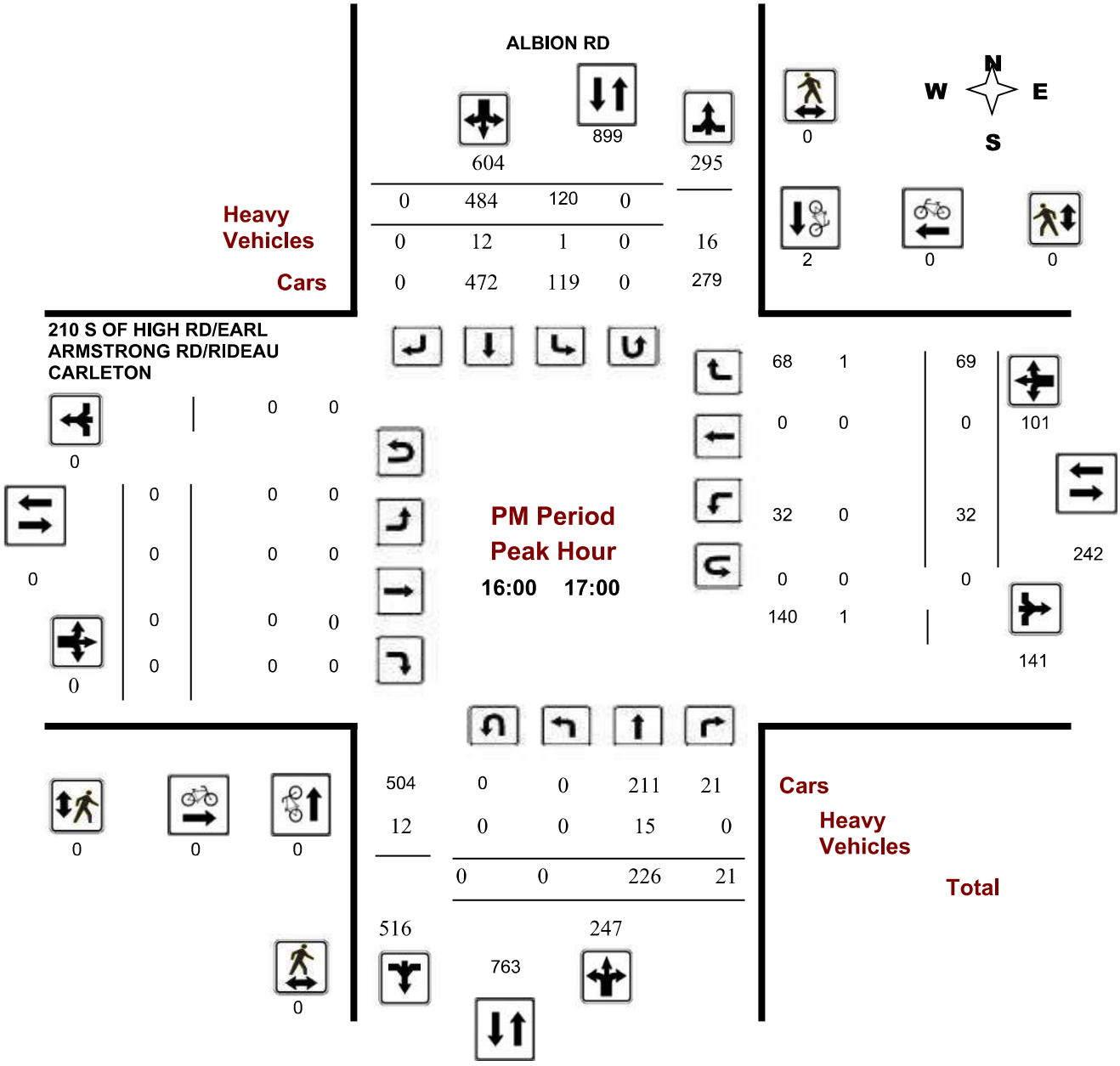
Transportation Services - Traffic Services

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

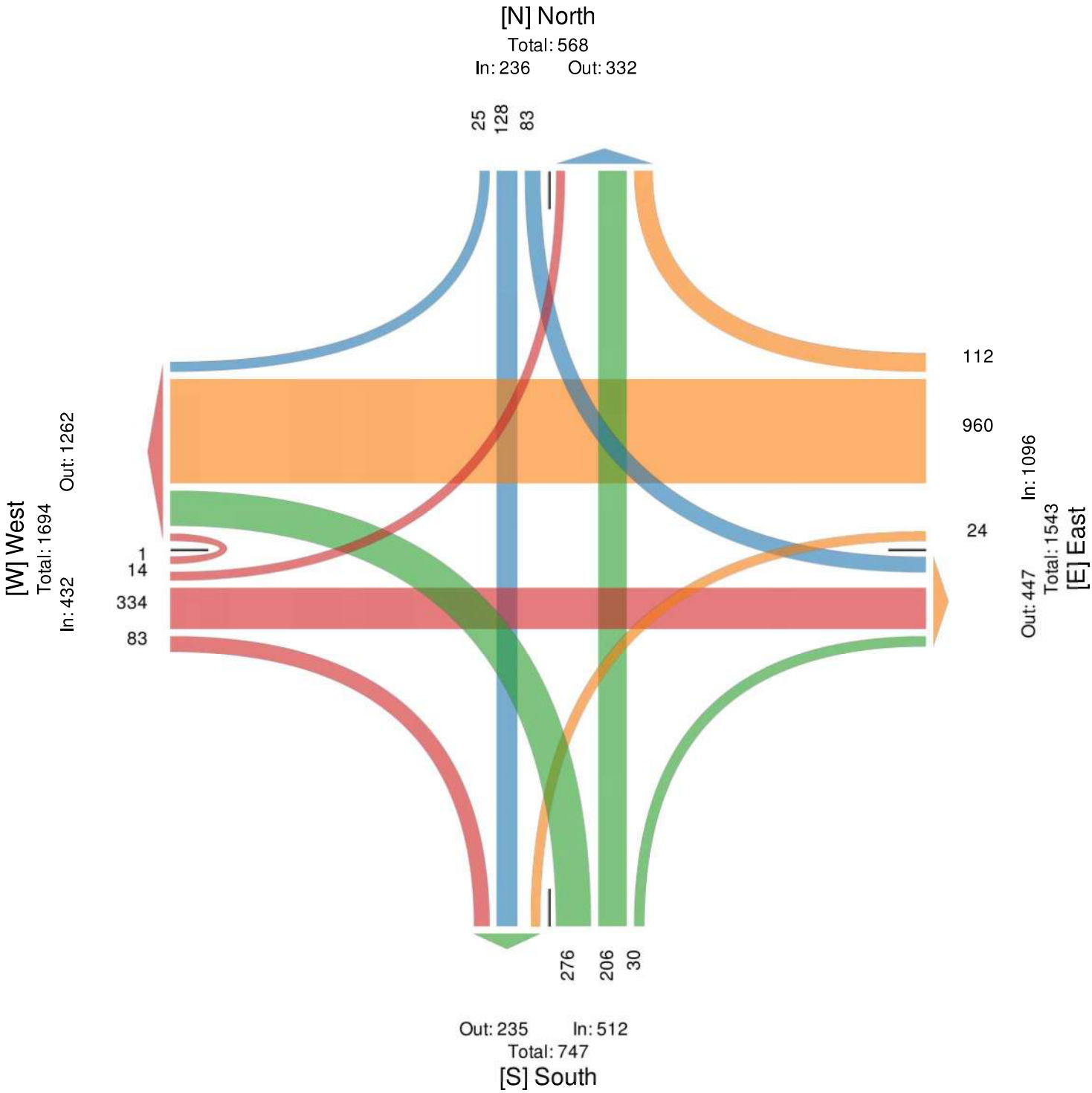
Start Time: 07:00 **Device:** Miovision



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

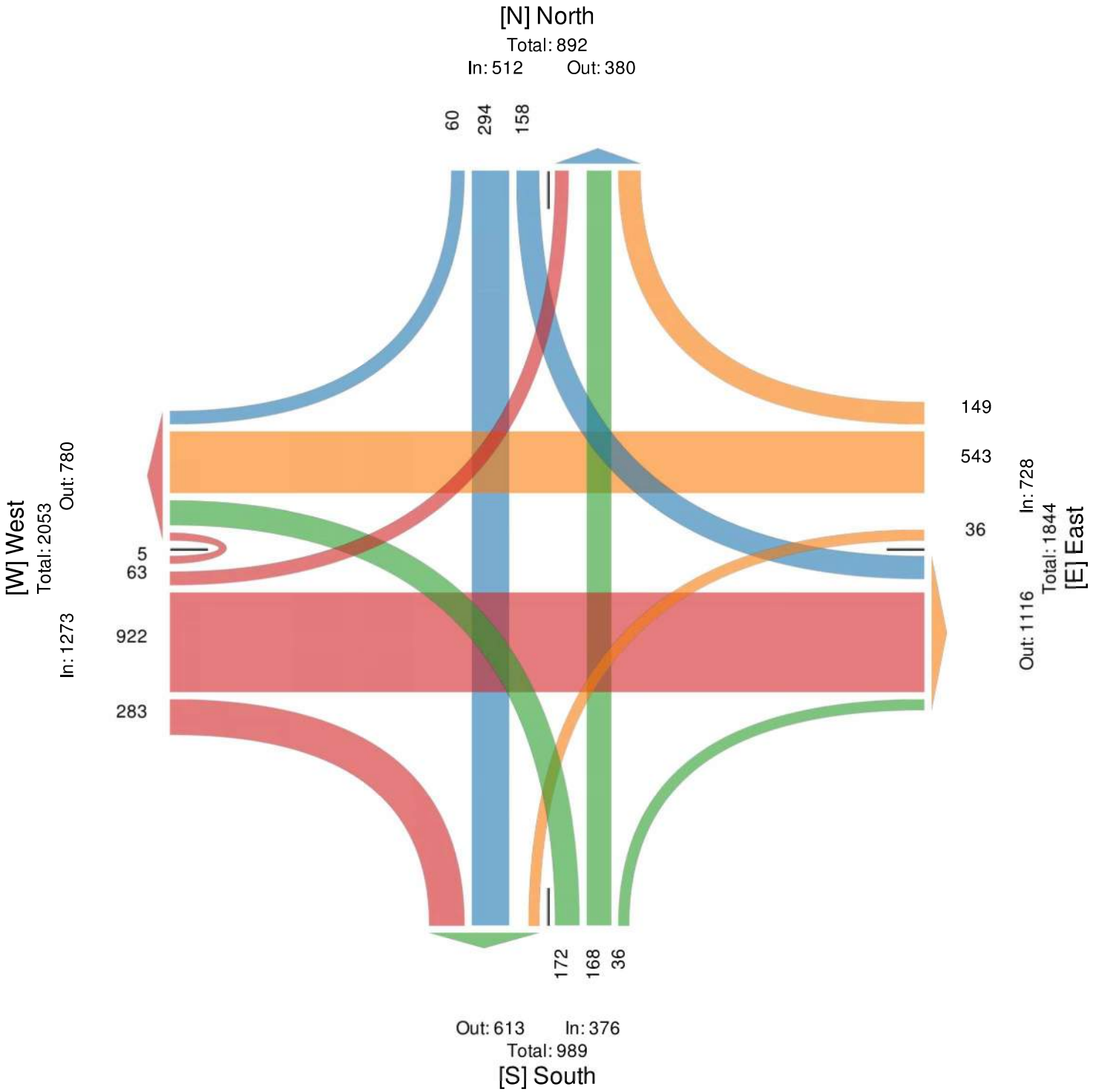
PM Peak (4:15PM - 5:15PM) - Overall Peak Hour

All Classes (Pedestrians, Bicycles on Road, Lights)

All Movements

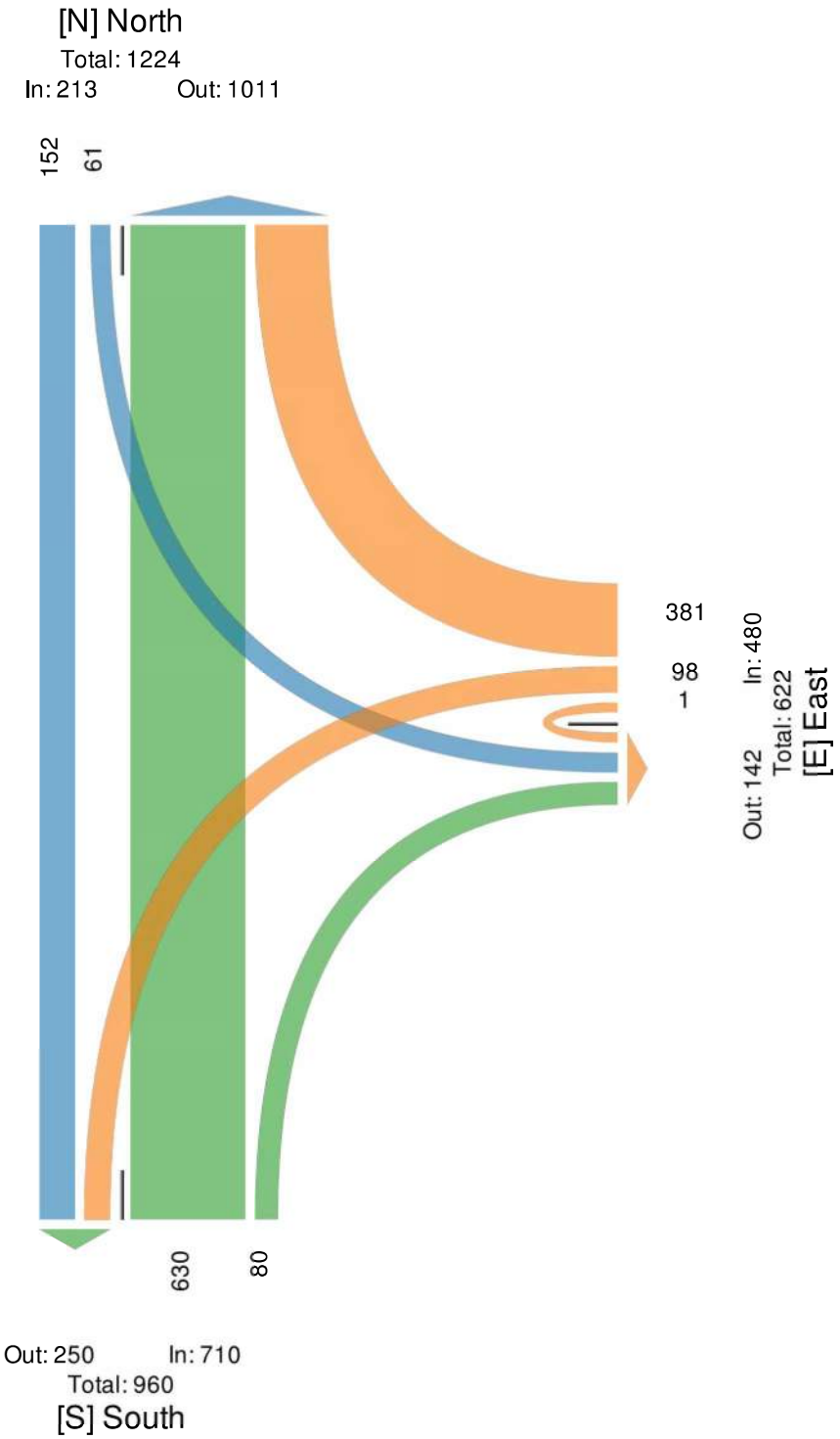
ID: 266564, Location: 45.35392, -75.643018, Site Code: 35458103

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



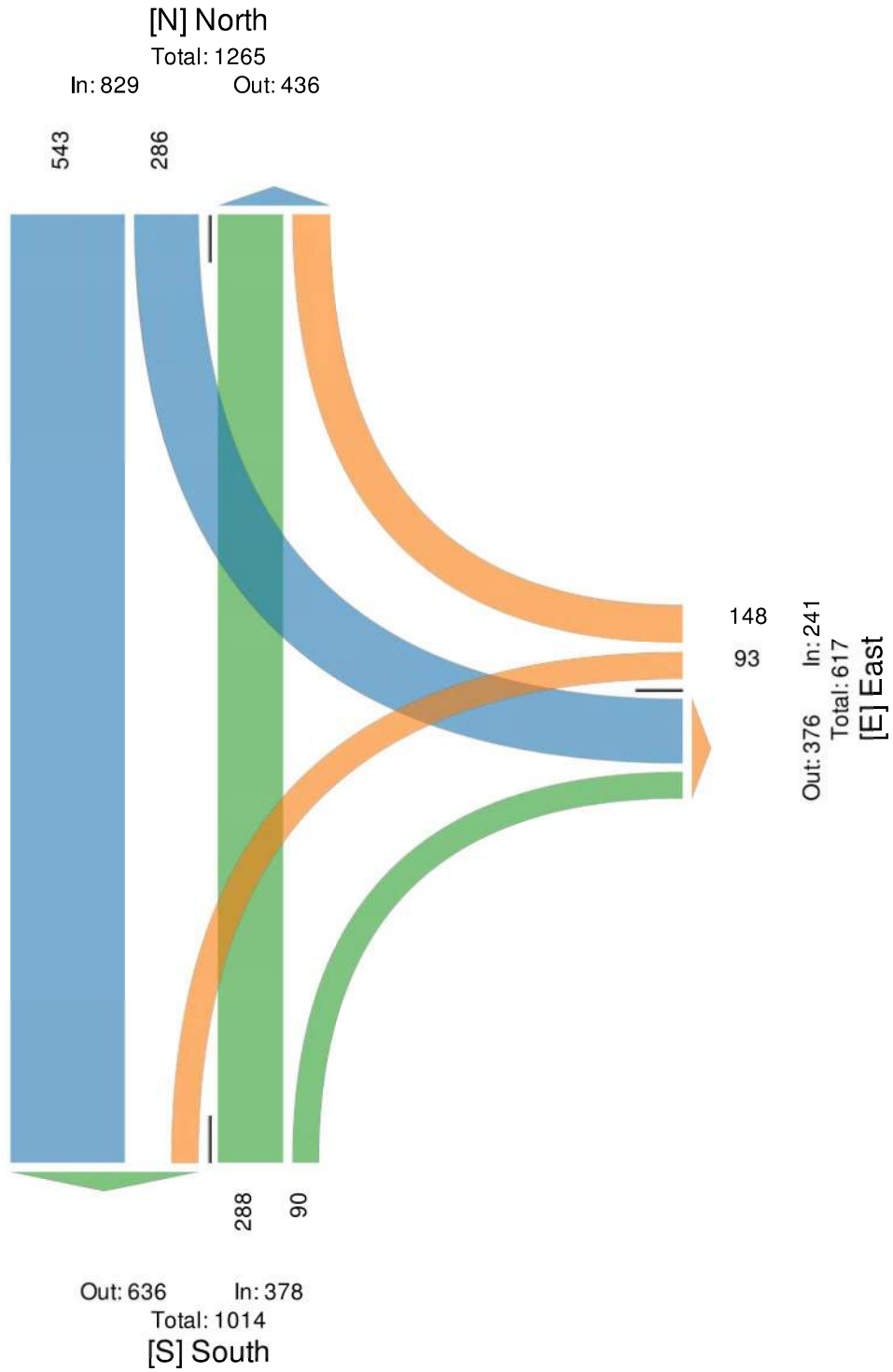
5273860 - Albion and Findlay Creek - Sept - 28th - TMC
Wed Sep 28, 2016
AM Peak (7AM - 8AM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 350246, Location: 45.309444, -75.617398, Site Code: 36300103

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



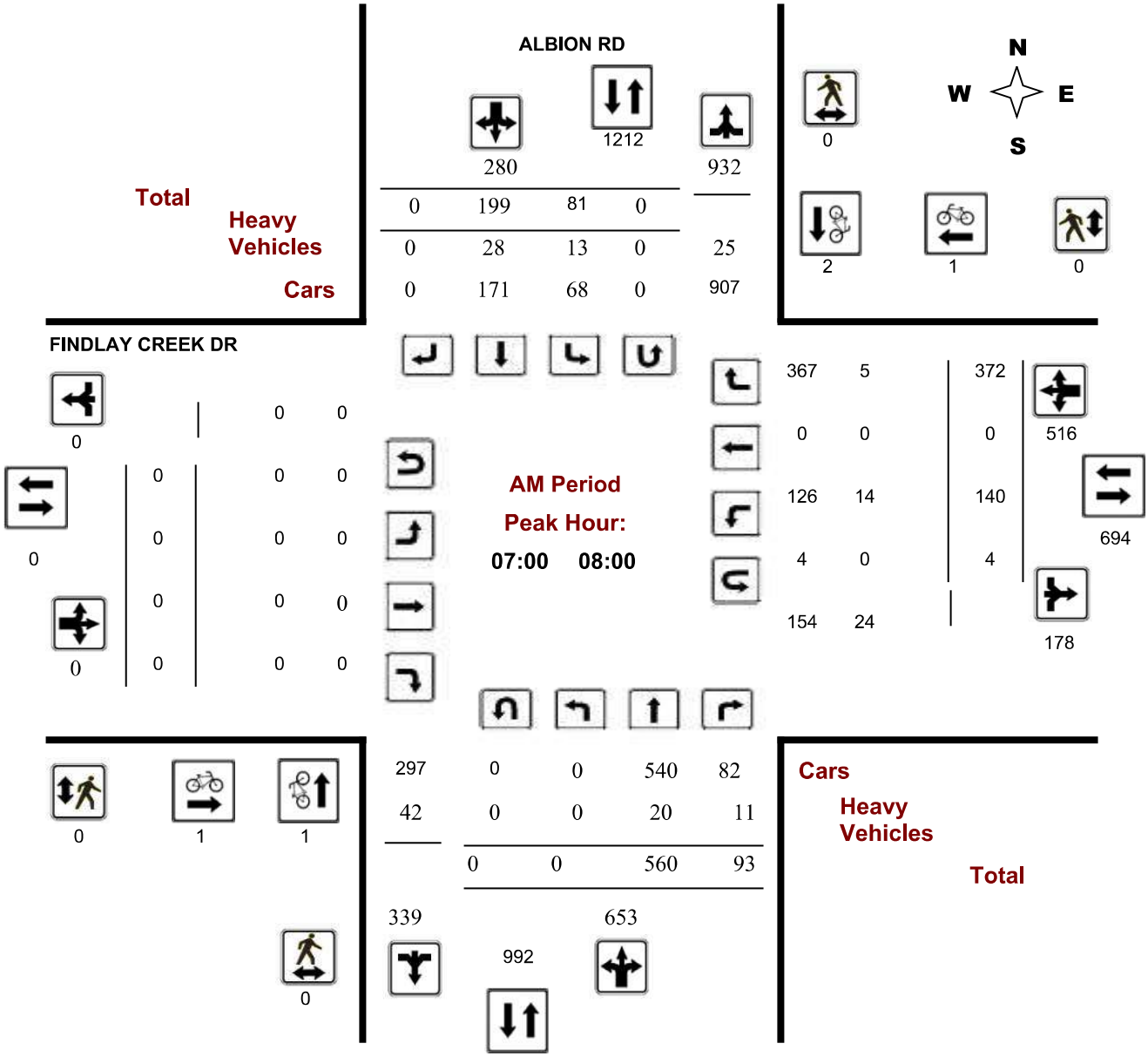
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

ALBION RD @ FINDLAY CREEK DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37874

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



Comments

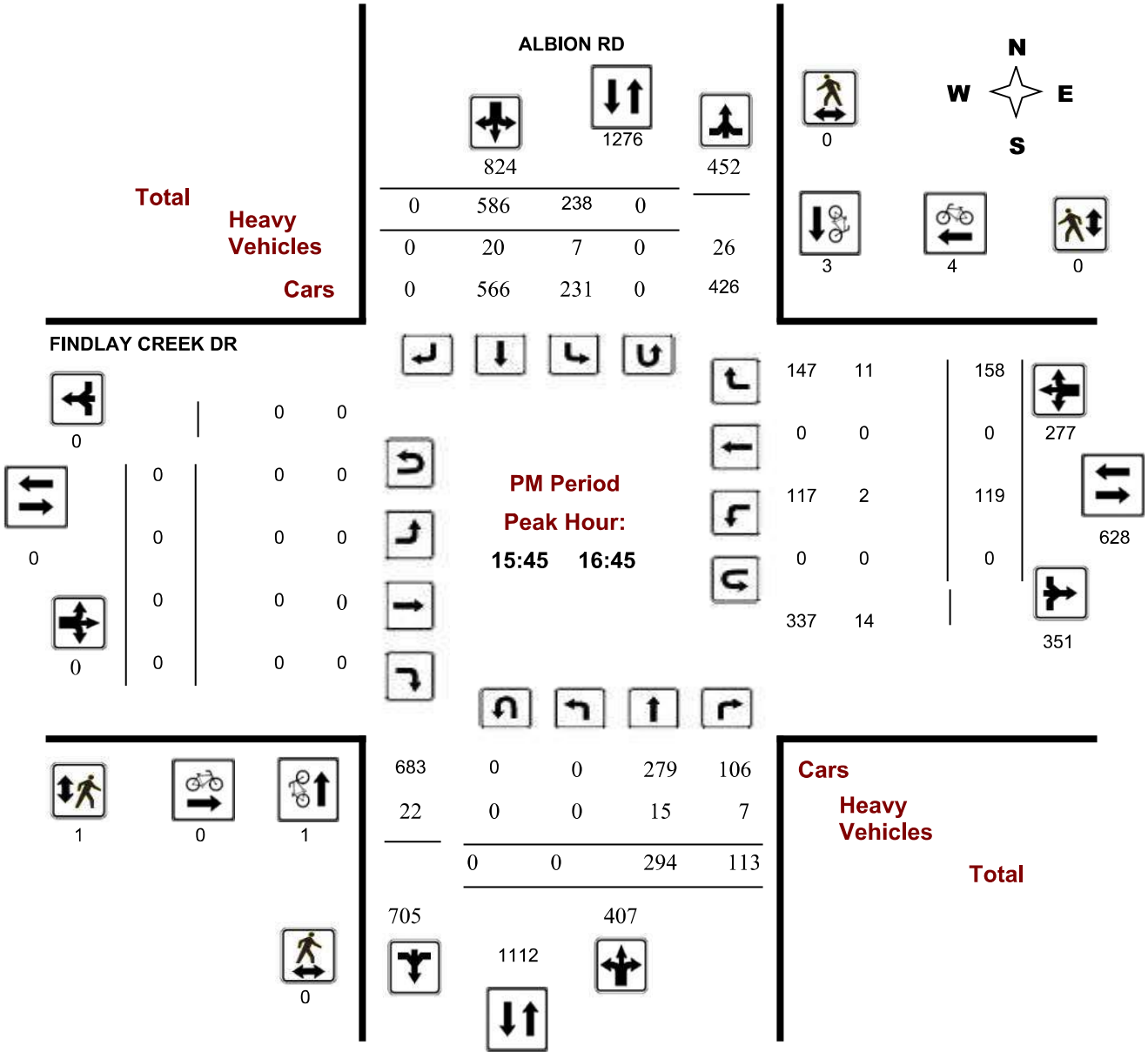
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

ALBION RD @ FINDLAY CREEK DR

Survey Date: Tuesday, June 19, 2018 **WO No:** 37874

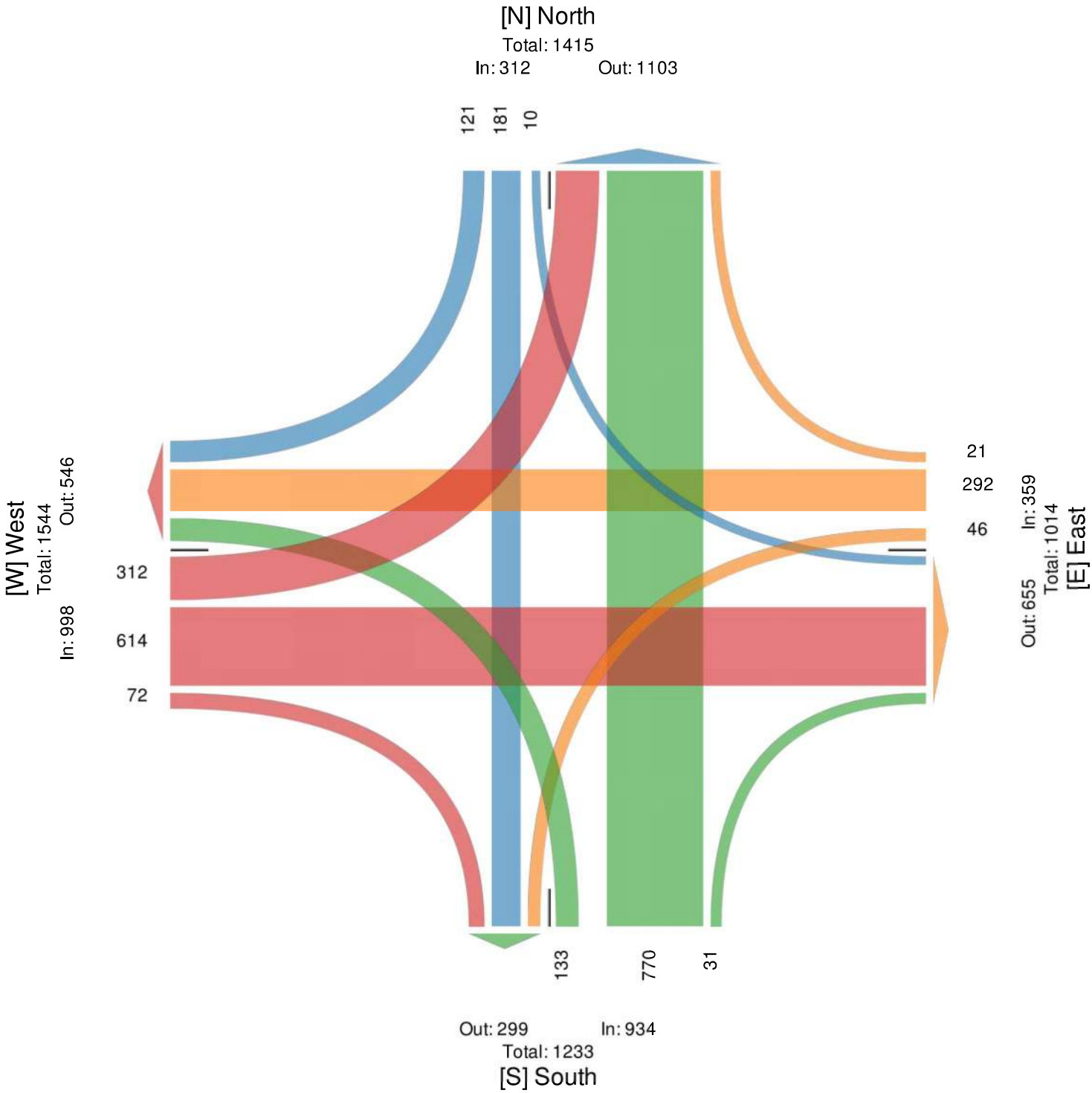
Start Time: 07:00 **Device:** Miovision



Comments

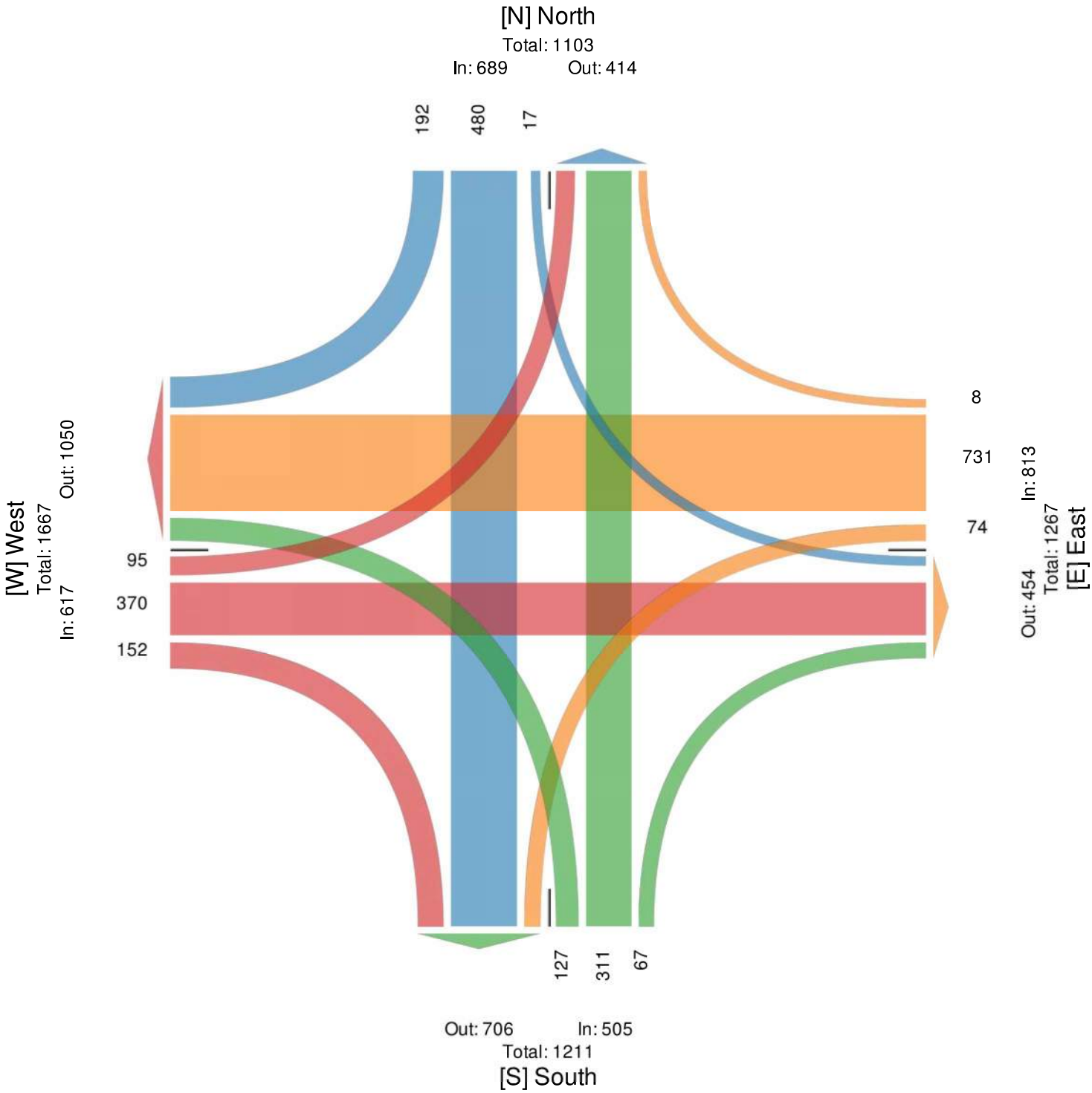
5269526 - Albion and Leitrim - Sept - 8th - TMC
Thu Sep 8, 2016
AM Peak (7:15AM - 8:15AM)
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 342730, Location: 45.320391, -75.623724, Site Code: 36286103

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



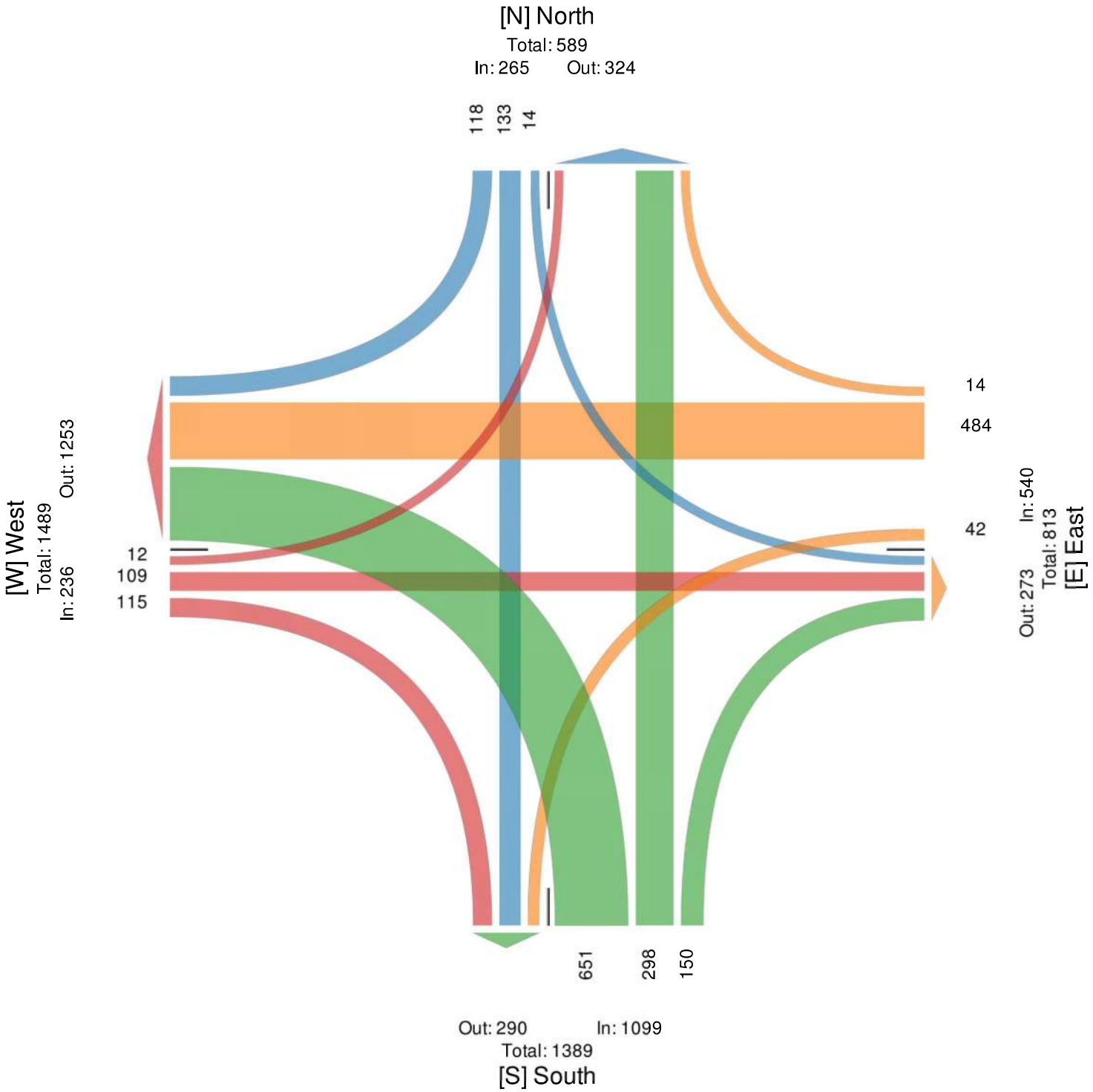
5269526 - Albion and Leitrim - Sept - 8th - TMC
Thu Sep 8, 2016
PM Peak (4PM - 5PM) - Overall Peak Hour
All Classes (Pedestrians, Bicycles on Road, Lights)
All Movements
ID: 342730, Location: 45.320391, -75.623724, Site Code: 36286103

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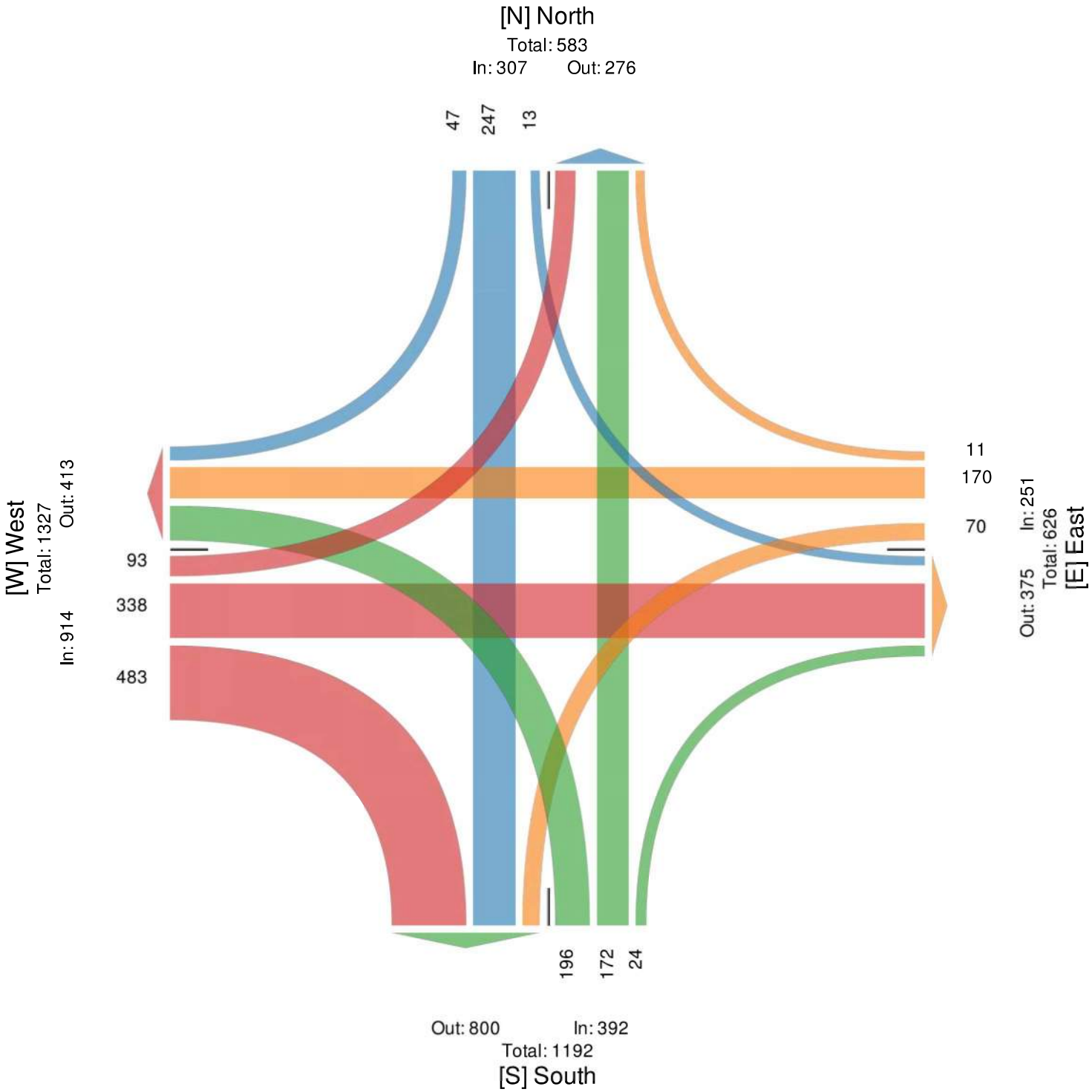
Provided by: City of Ottawa
110 Laurier Ave West, Ottawa, ON, K1P 1J1, CA



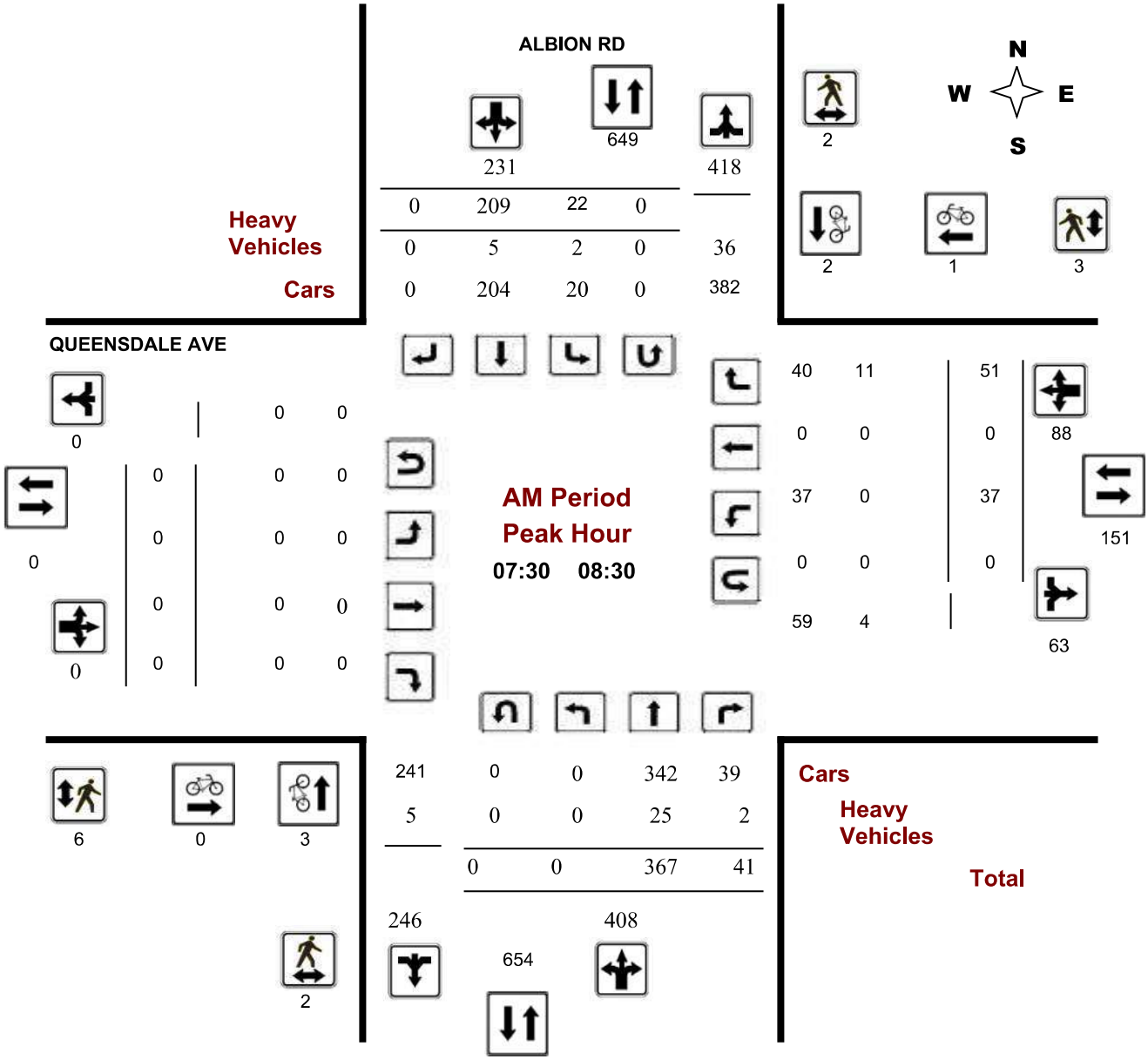
Transportation Services - Traffic Services

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

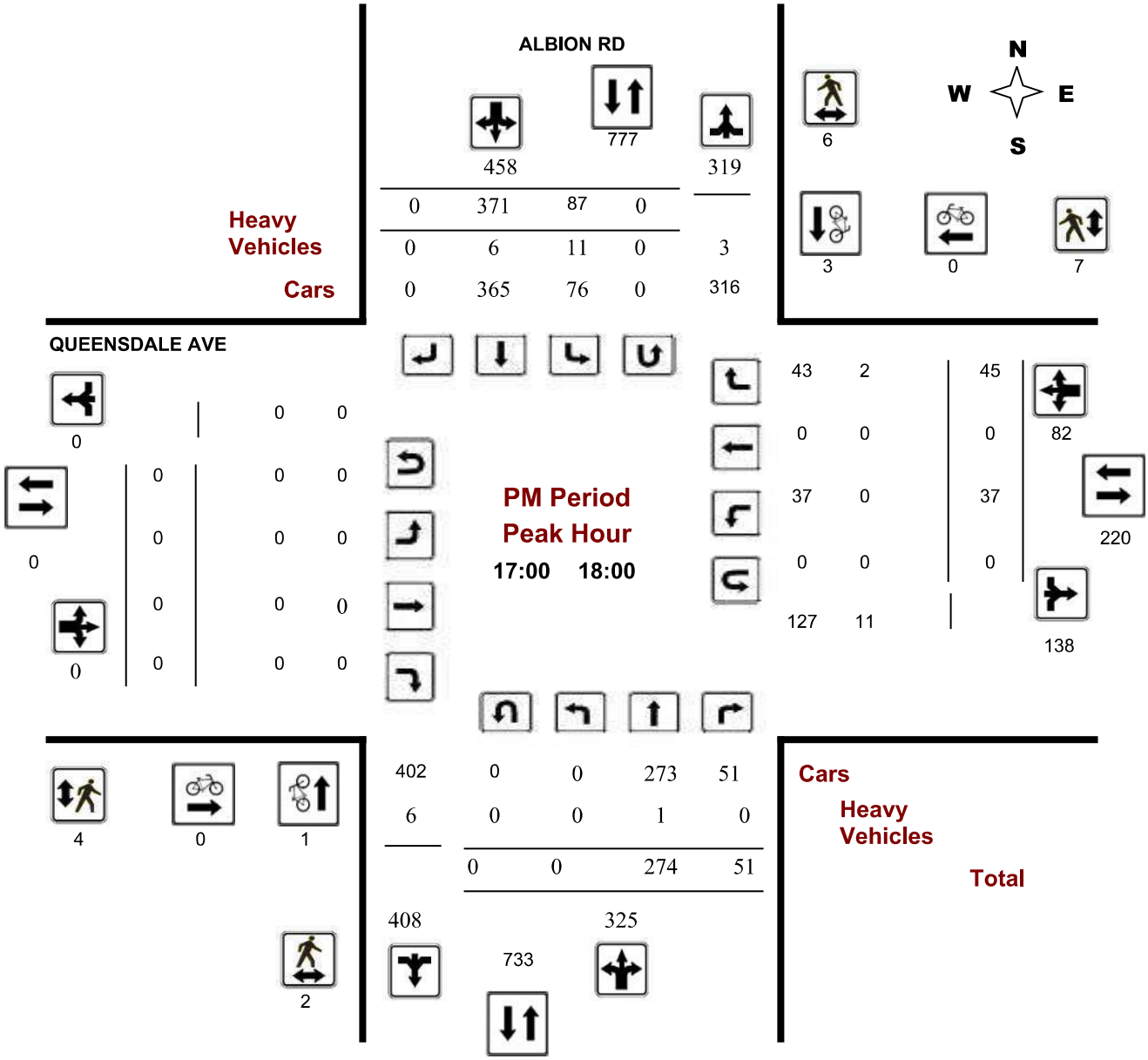
Transportation Services - Traffic Services

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

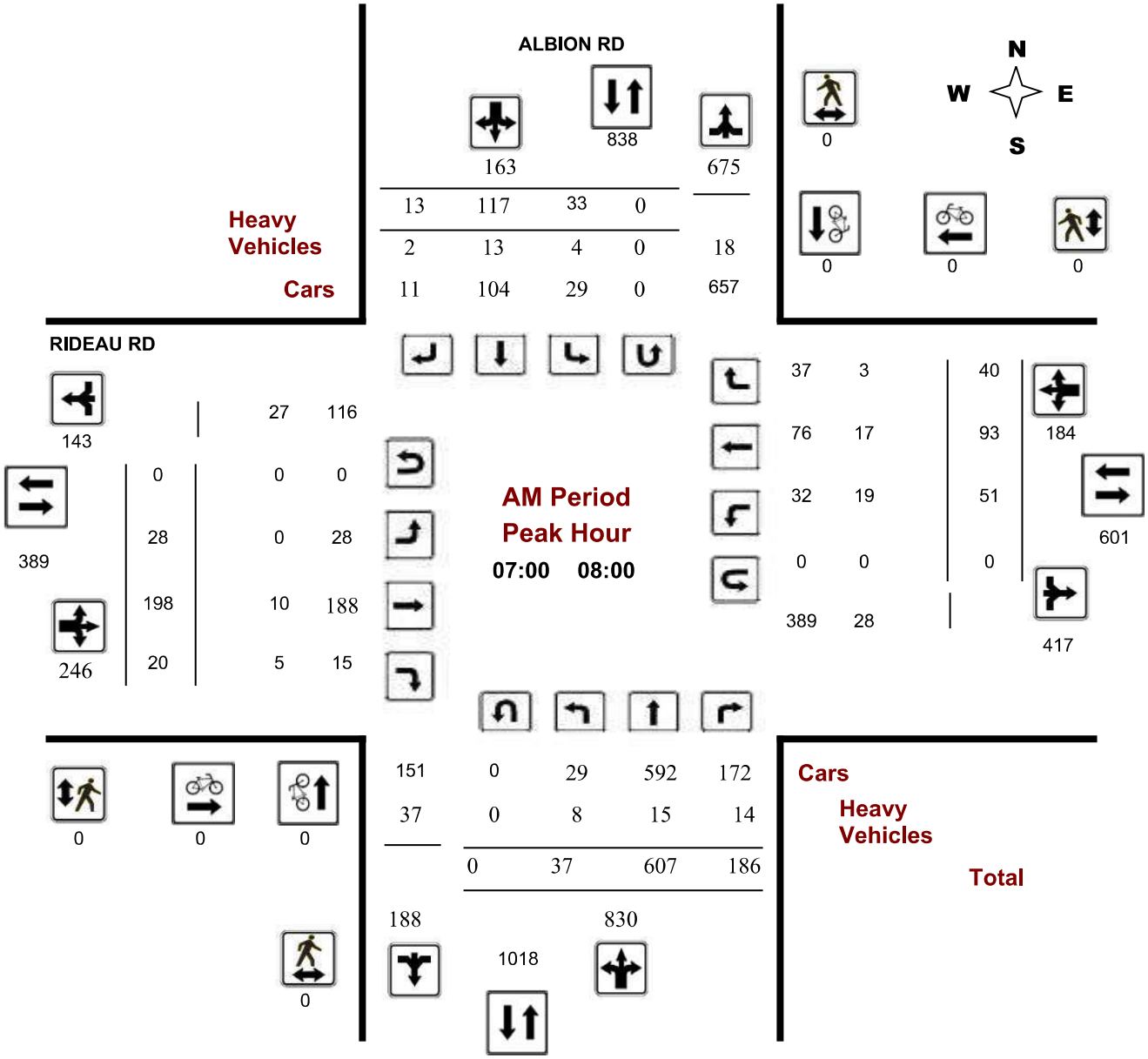
Transportation Services - Traffic Services

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

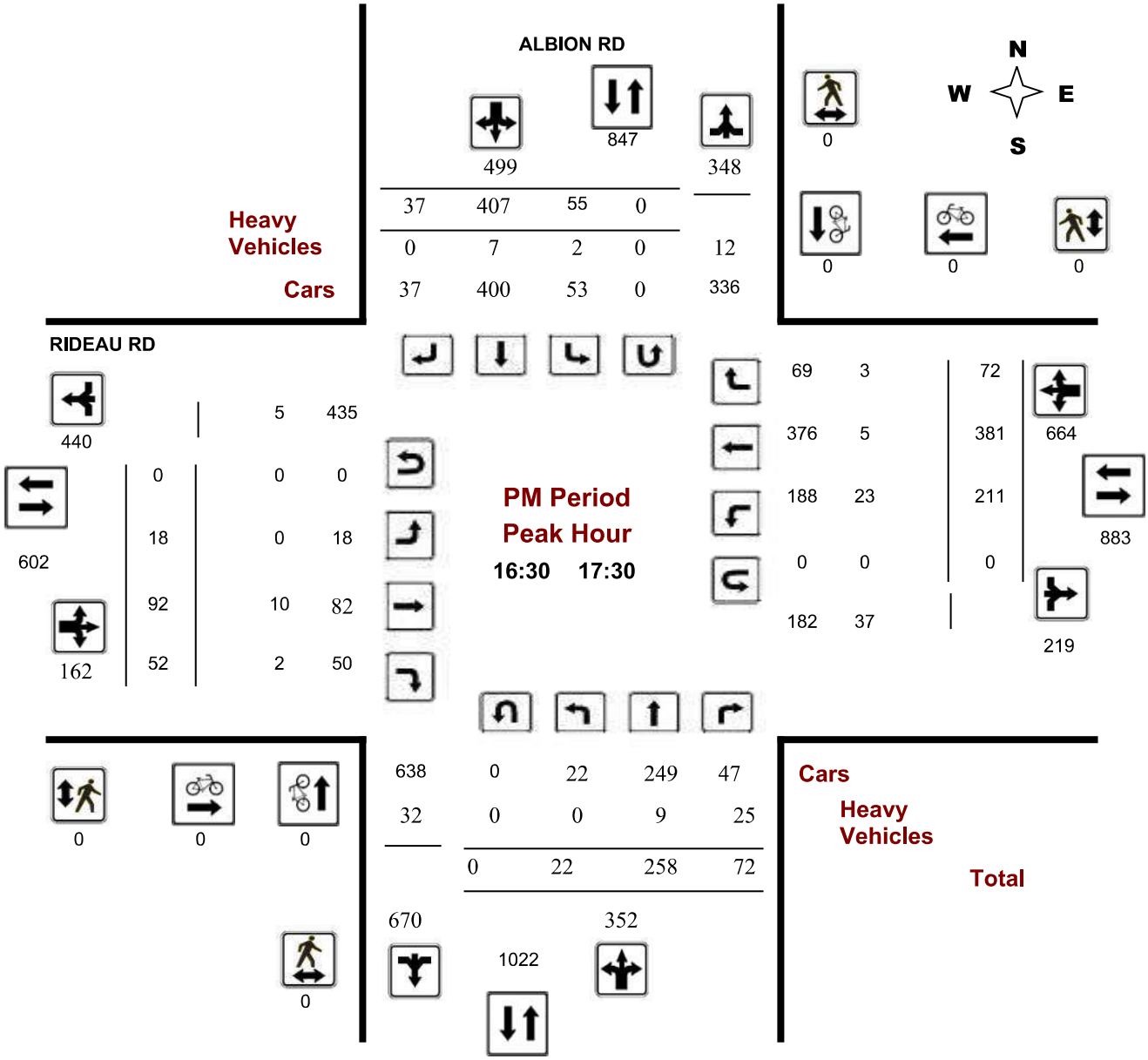
Transportation Services - Traffic Services

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

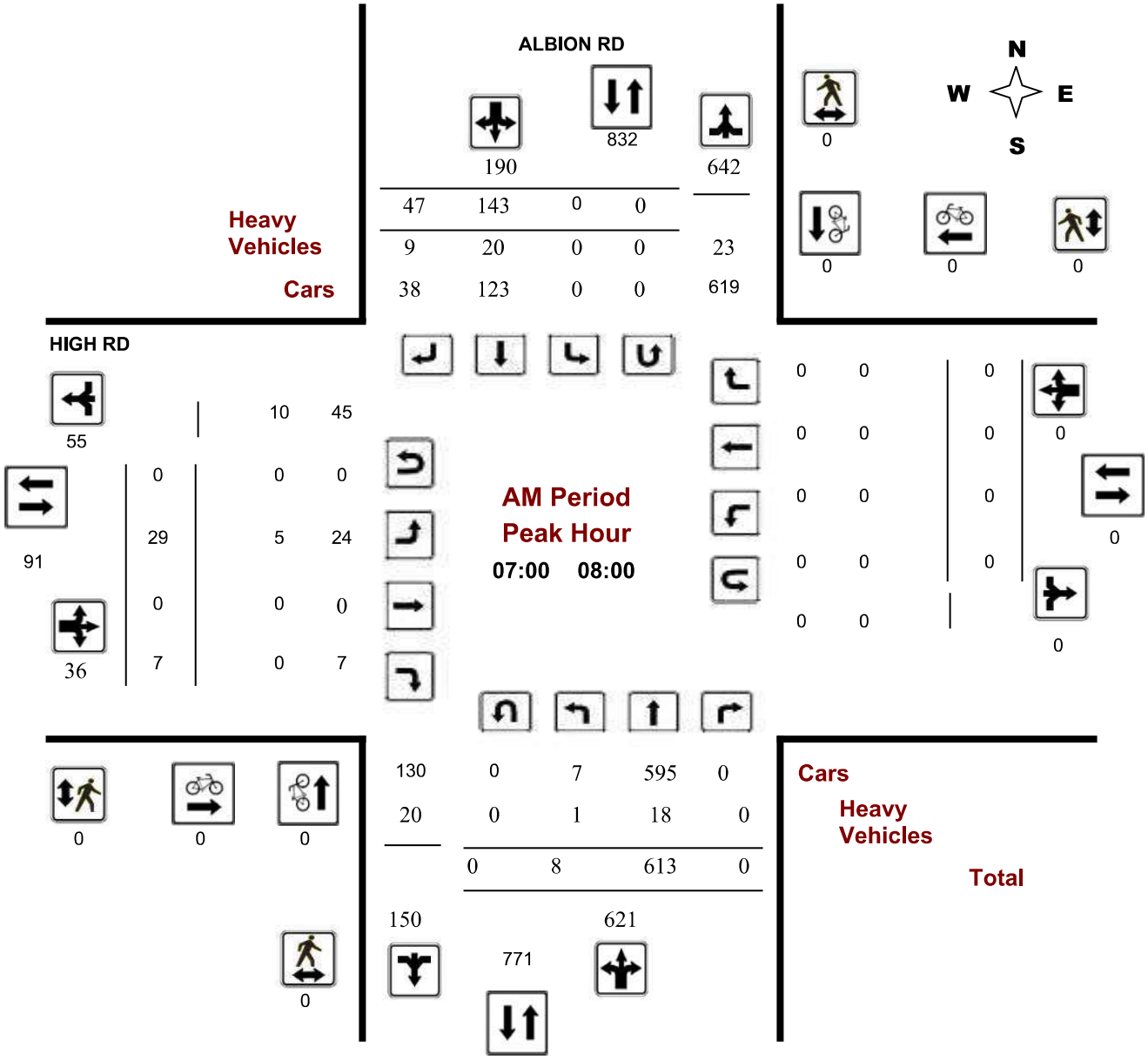
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ HIGH RD

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

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



Comments

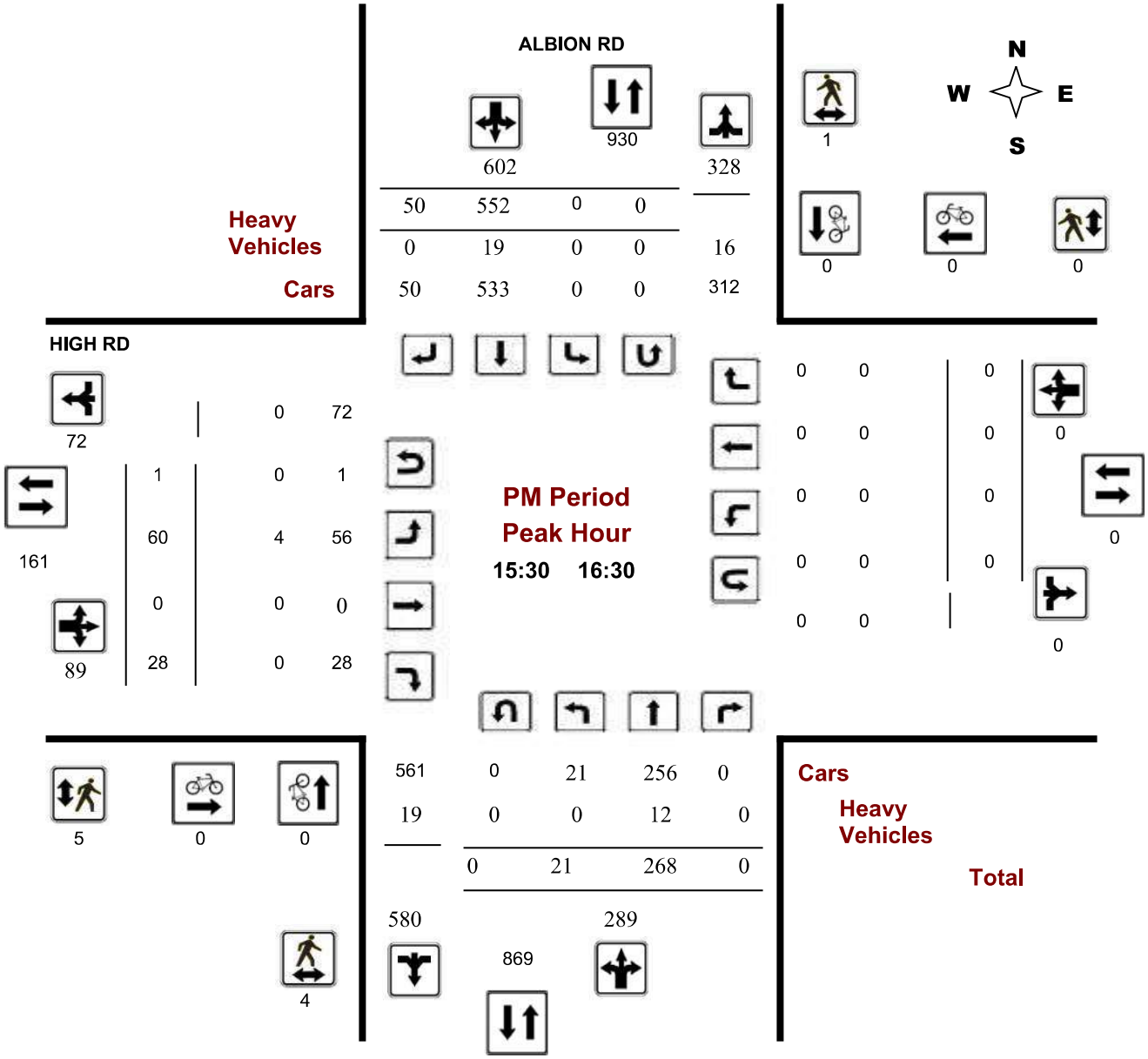
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALBION RD @ HIGH RD

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

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



Comments

Hard Rock Rideau Carleton Raceway - Traffic Count Data

Bowesville and Leitrim

	Volume Total		Volume Total	% Change
Friday, Feb 9, 2018		Friday, March 23, 2018		
3pm - 6pm	3514	3pm - 6pm	4379	19.75%
6pm - 12am	2533	6pm - 12am	2905	12.81%
Saturday, February 10, 2018		Saturday, March 24, 2018		
12am - 6am	403	12am - 6am	422	4.50%
6am - 6pm	6489	6am - 6pm	7424	12.59%
6pm -12am	1902	6pm -12am	2311	17.70%
Sunday, February 11, 2018		Sunday, March 25, 2018		
12am - 6am	434	12am - 6am	388	-11.86%

Albion and Rideau

	Volume Total		Volume Total	% Change
Friday, Feb 9, 2018		Friday, March 23, 2018		
3pm - 6pm	3705	3pm - 6pm	3854	3.87%
6pm - 12am	2225	6pm - 12am	2539	12.37%
Saturday, February 10, 2018		Saturday, March 24, 2018		
12am - 6am	412	12am - 6am	434	5.07%
6am - 6pm	5838	6am - 6pm	6930	15.76%
6pm -12am	1729	6pm -12am	2164	20.10%
Sunday, February 11, 2018		Sunday, March 25, 2018		
12am - 6am	433	12am - 6am	420	-3.10%

Leitrim and Albion

	Volume Total		Volume Total	% Change
Friday, Feb 9, 2018		Friday, March 23, 2018		
3pm - 6pm	6838	3pm - 6pm	7458	8.31%
6pm - 12am	5602	6pm - 12am	6077	7.82%
Saturday, February 10, 2018		Saturday, March 24, 2018		
12am - 6am	1206	12am - 6am	1156	-4.33%
6am - 6pm	13560	6am - 6pm	15209	10.84%
6pm -12am	4439	6pm -12am	5447	18.51%
Sunday, February 11, 2018		Sunday, March 25, 2018		
12am - 6am	1216	12am - 6am	1179	-3.14%

Teitnm / Albion - March 23, 2018

Total Volume

Leg	North							East							South							West							
Direction	Southbound							Westbound							Northbound							Eastbound							
Start Time	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Int Total
2018-03-23 15:00:00	216	561	27	0	804	1	0	15	483	92	0	590	0	11	70	391	137	0	598	0	0	111	310	112	0	533	0	1	2525
2018-03-23 16:00:00	234	506	14	0	754	0	3	9	608	48	0	665	0	5	55	351	133	0	539	0	0	153	308	130	0	591	0	1	2549
2018-03-23 17:00:00	285	517	16	0	818	0	0	5	465	83	0	553	0	1	56	327	113	0	496	0	0	134	252	131	0	517	0	0	2384
2018-03-23 18:00:00	131	411	16	0	558	0	0	10	188	70	0	286	0	0	44	270	99	0	413	0	0	120	179	90	0	389	0	1	1628
2018-03-23 19:00:00	86	380	10	0	456	0	0	8	146	49	0	203	1	2	37	194	70	0	301	0	0	77	127	61	0	265	0	1	1225
2018-03-23 20:00:00	66	286	13	0	365	0	0	4	120	41	0	165	0	0	42	177	61	0	280	0	0	91	91	52	0	234	0	1	1044
2018-03-23 21:00:00	85	283	8	0	356	1	0	3	102	39	0	144	0	0	31	184	48	0	243	0	0	65	71	42	0	178	1	0	921
2018-03-23 22:00:00	51	183	3	0	237	0	0	2	77	27	0	106	0	0	34	168	51	0	253	0	0	41	56	39	0	136	0	0	732
2018-03-23 23:00:00	21	188	2	0	189	0	0	2	49	24	0	75	0	0	28	138	21	0	187	0	0	22	31	25	0	78	0	0	529
2018-03-24 00:00:00	13	86	3	0	102	0	0	1	37	9	0	47	0	0	15	101	22	0	138	0	0	20	21	20	0	61	0	0	348
2018-03-24 01:00:00	16	56	2	0	74	0	0	0	23	3	0	26	0	0	21	72	17	0	110	0	0	7	10	11	0	28	0	0	238
2018-03-24 02:00:00	10	45	2	0	57	0	0	1	16	3	0	20	0	0	10	43	12	0	65	0	0	10	5	4	0	19	0	0	161
2018-03-24 03:00:00	10	32	1	0	43	0	0	0	7	3	0	10	0	0	10	60	7	0	77	0	0	3	3	8	0	14	0	0	144
2018-03-24 04:00:00	3	30	3	0	36	0	0	1	4	1	0	6	0	0	12	46	12	0	70	0	0	6	7	10	0	23	0	0	135
2018-03-24 05:00:00	5	30	0	0	35	0	0	0	8	5	0	11	0	0	3	41	7	0	51	0	0	7	17	9	0	33	0	0	130
2018-03-24 06:00:00	14	38	1	0	53	0	0	1	22	9	0	32	0	0	15	105	17	0	137	0	1	12	51	7	0	70	0	1	292
2018-03-24 07:00:00	28	73	2	0	103	0	0	4	39	12	0	55	0	0	14	128	42	0	184	0	0	18	100	35	0	153	0	0	495
2018-03-24 08:00:00	46	114	3	0	163	0	0	4	77	16	0	97	0	0	25	218	81	0	302	0	0	44	122	86	0	232	0	0	794
2018-03-24 09:00:00	57	171	8	0	236	0	0	7	139	25	0	171	1	0	43	381	96	0	500	0	0	37	175	92	0	304	0	0	1211
2018-03-24 10:00:00	77	243	12	0	332	0	0	9	118	45	0	172	0	0	31	387	79	0	497	0	0	81	173	113	0	347	0	0	1348
2018-03-24 11:00:00	94	313	12	0	419	0	0	9	153	46	0	208	0	0	25	357	80	0	462	0	0	68	170	85	0	321	0	0	1410
2018-03-24 12:00:00	126	334	7	0	467	0	0	19	183	44	0	246	0	1	44	371	101	0	516	0	0	77	214	99	0	390	0	0	1819
2018-03-24 13:00:00	113	389	20	0	522	0	0	16	171	58	0	245	0	1	57	341	98	0	496	1	0	87	239	112	0	438	0	0	1701
2018-03-24 14:00:00	130	391	11	0	532	1	0	11	225	45	0	281	0	1	41	369	74	0	484	0	0	86	173	125	0	384	0	0	1681
2018-03-24 15:00:00	118	355	19	0	490	0	0	15	209	60	0	284	1	0	41	327	87	0	455	0	0	88	161	89	0	328	0	0	1557
2018-03-24 16:00:00	131	399	16	0	546	0	0	2	187	65	0	254	0	0	46	317	87	0	450	0	0	77	161	69	1	308	0	0	1558
2018-03-24 17:00:00	115	398	10	0	523	0	0	12	180	80	0	272	0	0	49	300	112	0	461	0	0	79	134	74	0	287	0	1	1543
2018-03-24 18:00:00	88	383	4	0	475	0	0	4	152	50	0	206	0	0	46	267	77	0	390	0	0	89	107	52	0	248	0	0	1319
2018-03-24 19:00:00	80	328	12	0	420	0	0	6	95	54	0	154	0	0	38	212	56	0	306	0	0	77	76	65	0	218	0	0	1098
2018-03-24 20:00:00	54	272	6	0	332	0	0	6	72	42	0	120	0	0	44	209	51	0	304	0	0	71	64	32	0	167	0	0	923
2018-03-24 21:00:00	49	226	5	0	280	0	0	2	79	26	0	107	0	0	38	164	51	0	253	0	0	63	37	36	0	136	0	0	776
2018-03-24 22:00:00	40	186	3	0	229	0	0	4	64	29	0	97	0	0	44	199	59	0	302	0	0	55	46	37	0	138	0	0	766
2018-03-24 23:00:00	25	141	5	0	171	0	0	4	37	17	0	58	0	0	33	168	42	0	243	0	0	40	35	18	0	93	0	0	565
2018-03-25 00:00:00	13	99	3	0	115	0	0	4	38	12	0	52	0	0	23	101	28	0	150	0	0	19	22	20	0	61	0	0	378
2018-03-25 01:00:00	7	82	3	0	72	0	0	0	21	9	0	30	0	0	16	83	20	0	119	0	0	11	15	14	0	40	0	0	261
2018-03-25 02:00:00	7	46	1	0	54	0	0	0	11	4	0	15	0	0	13	56	10	0	79	0	0	4	5	7	0	16	0	0	164
2018-03-25 03:00:00	7	37	2	0	46	0	0	2	8	2	0	10	0	0	8	46	4	0	58	0	0	6	5	4	0	15	0	0	129
2018-03-25 04:00:00	3	32	1	0	36	0	0	2	7	2	0	11	0	0	15	56	10	0	81	0	0	3	4	3	0	10	0	0	138
2018-03-25 05:00:00	2	25	3	0	30	0	0	0	9	1	0	10	0	0	8	38	3	0	49	0	0	2	8	10	0	20	0	0	109
Grand Total	2634	8607	289	0	11530	3	3	203	4621	1250	0	6074	3	22	1225	7721	2153	0	11099	1	1	2039	3775	2008	1	7823	1	7	36526
% Approach	22.8%	74.6%	2.5%	0.0%				3.3%	76.1%	20.6%	0.0%				11.0%	69.8%	19.4%	0.0%				26.1%	48.3%	25.7%	0.0%				
% Total	7.2%	23.6%	0.8%	0.0%	31.6%			0.8%	12.7%	3.4%	0.0%	18.6%			3.4%	21.1%	5.9%	0.0%	30.4%			5.6%	10.3%	5.5%	0.0%	21.4%			
Lights and Motorcycles	2566	8544	288	0	11398			202	4582	1230	0	6014			1199	7651	2080	0	10930			1968	3719	1949	1	7637			35979
% Lights and Motorcycles	97.4%	99.3%	99.7%	0.0%	98.9%			99.5%	99.2%	98.4%	0.0%	99.0%			97.9%	99.1%	96.8%	0.0%	98.5%			98.5%	98.5%	97.1%	100.0%	97.8%			98.5%
Heavy	68	63	1	0	132			1	37	20	0	58			28	70	73	0	169			71	56	59	0	186			545
% Heavy	2.6%	0.7%	0.3%	0.0%	1.1%			0.5%	0.8%	1.8%	0.0%	1.0%			2.1%	0.9%	3.4%	0.0%	1.5%			3.5%	1.5%	2.9%	0.0%	2.4%			1.5%
Bicycles on Road	0	0	0	0	0			0	2	0	0	2			0	0	0	0	0			0	0	0	0	0			2
% Bicycles on Road	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	0.0%	0.0%			0.0%
Pedestrians						3	3						3	22						1	1						1	7	
% Pedestrians						100.0%	100.0%						100.0%	100.0%						100.0%	100.0%						100.0%	100.0%	
Bicycles on Crosswalk						0	0						0	0						0	0						0	0	
% Bicycles on Crosswalk						0.0%	0.0%						0.0%	0.0%						0.0%	0.0%						0.0%	0.0%	

Albion / Rideau - March 23, 2018.

Total Volume

Leg	North							East							South							West							
Direction	Southbound							Westbound							Northbound							Eastbound							
Start Time	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Int Total
2018-03-23 15:00:00	28	461	63	0	552	0	0	33	140	131	1	305	0	0	50	191	13	0	254	0	0	49	94	17	0	160	0	0	1271
2018-03-23 16:00:00	49	407	55	0	511	0	0	41	253	148	0	440	0	0	59	200	20	0	279	0	0	68	98	25	0	189	0	0	1419
2018-03-23 17:00:00	30	334	39	0	403	0	0	47	168	121	0	334	0	0	51	221	15	0	287	0	0	44	75	21	0	140	0	0	1164
2018-03-23 18:00:00	20	229	22	0	271	0	0	34	45	85	0	144	0	0	34	172	6	0	212	0	0	22	31	13	0	66	0	0	693
2018-03-23 19:00:00	20	197	22	0	239	0	0	27	39	43	0	109	0	0	12	134	6	0	152	0	0	21	24	13	0	58	0	0	558
2018-03-23 20:00:00	15	159	21	1	196	0	0	18	27	35	0	80	0	0	17	78	2	0	97	0	0	10	20	7	0	37	0	0	410
2018-03-23 21:00:00	10	168	20	0	198	0	0	20	24	30	0	74	0	0	7	59	1	0	67	0	0	11	15	10	0	36	0	0	375
2018-03-23 22:00:00	12	127	22	0	161	0	0	4	20	14	0	38	0	0	9	50	2	0	61	0	0	8	14	8	0	28	0	0	288
2018-03-23 23:00:00	10	111	13	0	134	0	0	5	7	11	0	23	0	0	1	35	2	0	38	0	0	7	10	3	0	20	0	0	215
2018-03-24 00:00:00	8	64	11	0	83	0	0	0	8	8	0	18	0	0	3	30	0	0	33	0	0	0	4	4	0	8	0	0	140
2018-03-24 01:00:00	5	34	13	0	52	0	0	2	2	3	0	7	0	0	2	18	1	0	21	0	0	1	8	1	0	10	0	0	90
2018-03-24 02:00:00	3	32	4	0	39	0	0	2	1	1	0	4	0	0	0	8	0	0	6	0	0	0	1	2	0	3	0	0	52
2018-03-24 03:00:00	2	23	3	0	28	0	0	4	1	1	0	6	0	0	0	10	0	0	10	0	0	1	1	1	0	3	0	0	47
2018-03-24 04:00:00	4	18	2	0	24	0	0	0	0	3	0	3	0	0	0	11	0	0	11	0	0	0	1	0	0	1	0	0	39
2018-03-24 05:00:00	0	16	1	0	17	0	0	4	2	1	0	7	0	0	7	30	1	0	38	0	0	1	2	1	0	4	0	0	66
2018-03-24 06:00:00	4	26	4	0	34	0	0	7	9	2	0	18	0	0	12	54	0	0	66	0	0	1	10	2	0	13	0	0	131
2018-03-24 07:00:00	7	37	5	0	49	0	0	11	17	7	0	35	0	0	25	86	6	0	117	0	0	4	14	4	0	22	0	0	223
2018-03-24 08:00:00	11	60	14	0	85	0	1	23	29	20	0	72	0	0	40	144	18	0	202	0	0	0	47	4	0	51	0	0	410
2018-03-24 09:00:00	4	99	12	0	115	0	0	21	36	26	0	83	0	0	62	244	13	0	319	0	0	4	40	21	0	65	0	0	582
2018-03-24 10:00:00	6	108	22	0	136	0	0	34	50	29	0	113	0	0	36	249	12	0	297	0	0	5	49	10	0	64	0	0	810
2018-03-24 11:00:00	13	161	23	0	197	0	0	23	53	81	0	137	0	0	43	241	9	0	293	0	0	18	37	19	0	74	0	0	701
2018-03-24 12:00:00	20	193	27	0	240	0	0	34	86	45	0	145	0	0	44	229	7	0	280	0	0	13	52	21	0	86	0	0	751
2018-03-24 13:00:00	14	198	28	0	240	0	0	21	47	38	0	106	0	0	42	218	15	0	275	0	1	22	34	20	0	76	0	0	697
2018-03-24 14:00:00	28	224	20	0	272	0	0	32	53	50	0	135	0	0	31	224	16	0	271	0	0	15	38	13	0	66	0	0	744
2018-03-24 15:00:00	27	205	35	0	287	0	0	27	53	43	0	123	0	0	34	234	18	0	286	0	0	22	41	11	0	74	0	0	750
2018-03-24 16:00:00	20	214	32	0	266	0	0	20	47	59	0	126	0	0	29	189	7	0	225	0	0	19	38	13	0	70	0	0	687
2018-03-24 17:00:00	19	212	22	0	253	0	0	34	52	40	0	128	0	0	22	179	8	0	209	0	0	17	31	8	0	56	0	0	644
2018-03-24 18:00:00	18	175	21	0	214	0	0	26	24	29	0	79	0	0	29	148	6	0	183	0	0	15	23	14	0	52	0	0	528
2018-03-24 19:00:00	20	167	20	0	207	0	0	19	22	33	0	74	0	0	25	111	8	0	142	0	0	4	19	12	0	35	0	0	458
2018-03-24 20:00:00	12	188	14	0	192	0	0	12	19	20	0	51	0	0	8	96	2	0	106	0	0	12	9	3	0	24	0	0	373
2018-03-24 21:00:00	11	130	14	0	155	0	0	8	10	28	0	46	0	0	7	70	3	0	80	0	0	7	9	6	0	22	0	0	303
2018-03-24 22:00:00	11	110	21	0	142	0	0	11	16	10	0	37	0	0	10	66	3	0	79	0	0	8	13	4	0	25	0	0	283
2018-03-24 23:00:00	10	95	8	0	113	0	0	8	9	13	0	30	0	0	3	56	3	0	62	0	0	4	7	3	0	14	0	0	219
2018-03-25 00:00:00	8	62	5	0	75	0	0	2	2	3	0	7	0	0	1	25	0	0	26	0	0	1	8	2	0	9	0	0	117
2018-03-25 01:00:00	3	35	13	0	51	0	0	0	7	2	0	9	0	0	5	14	0	0	19	0	0	2	4	4	0	10	0	0	89
2018-03-25 02:00:00	1	35	5	0	41	0	0	1	1	3	0	5	0	0	1	12	1	0	14	0	0	1	2	1	0	4	0	0	64
2018-03-25 03:00:00	1	24	3	0	28	0	0	1	1	3	0	5	0	0	0	9	0	0	9	0	0	0	0	0	0	0	0	0	42
2018-03-25 04:00:00	2	20	4	0	26	0	0	0	0	1	0	1	0	0	0	17	0	0	17	0	0	0	3	0	0	3	0	0	47
2018-03-25 05:00:00	1	15	1	0	17	0	0	3	4	2	0	9	0	0	2	32	0	0	34	0	0	1	0	0	0	1	0	0	61
Grand Total	487	5151	684	1	6323	0	1	619	1362	1180	1	3162	0	0	763	4192	222	0	5177	0	1	436	924	319	0	1679	0	0	16341
% Approach	7.7%	81.5%	10.8%	0.0%				19.8%	43.1%	37.3%	0.0%				14.7%	81.0%	4.3%	0.0%				26.0%	55.0%	19.0%	0.0%				
% Total	3.0%	31.5%	4.2%	0.0%	**38.7%**			3.8%	8.3%	7.2%	0.0%	**19.4%**			4.7%	25.7%	1.4%	0.0%	**31.7%**			2.7%	5.7%	2.0%	0.0%	**10.3%**			
Lights and Motorcycles	485	5116	679	1	6281			606	1343	1136	1	3086			696	4167	217	0	5080			423	884	316	0	1623			16070
% Lights and Motorcycles	99.6%	99.3%	99.3%	100.0%	**99.3%**			97.9%	98.6%	96.3%	100.0%	**97.6%**			91.2%	99.4%	97.7%	0.0%	**98.1%**			97.0%	95.7%	99.1%	0.0%	**96.7%**			**98.3%**
Heavy	2	35	5	0	**42**			13	19	44	0	**76**			**67**	25	5	0	**97**			13	40	3	0	**56**			**271**
% Heavy	0.4%	0.7%	0.7%	0.0%	**0.7%**			2.1%	1.4%	3.7%	0.0%	**2.4%**			8.8%	0.6%	2.3%	0.0%	**1.9%**			3.0%	4.3%	0.9%	0.0%	**3.3%**			**1.7%**
Bicycles on Road	0	0	0	0	**0**			0	0	0	0	**0**			0	0	0	0	**0**			0	0	0	0	**0**			**0**
% Bicycles on Road	0.0%	0.0%	0.0%	0.0%	**0.0%**			0.0%	0.0%	0.0%	0.0%	**0.0%**			0.0%	0.0%	0.0%	0.0%	**0.0%**			0.0%	0.0%	0.0%	0.0%	**0.0%**			**0.0%**
Pedestrians						0	1						0	0						0	1						0	0	
% Pedestrians						0.0%	100.0%						0.0%	0.0%						0.0%	100.0%						0.0%	0.0%	
Bicycles on Crosswalk						0	0						0	0						0	0						0	0	
% Bicycles on Crosswalk						0.0%	0.0%						0.0%	0.0%						0.0%	0.0%						0.0%	0.0%	

APPENDIX F

Background Growth Determination

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

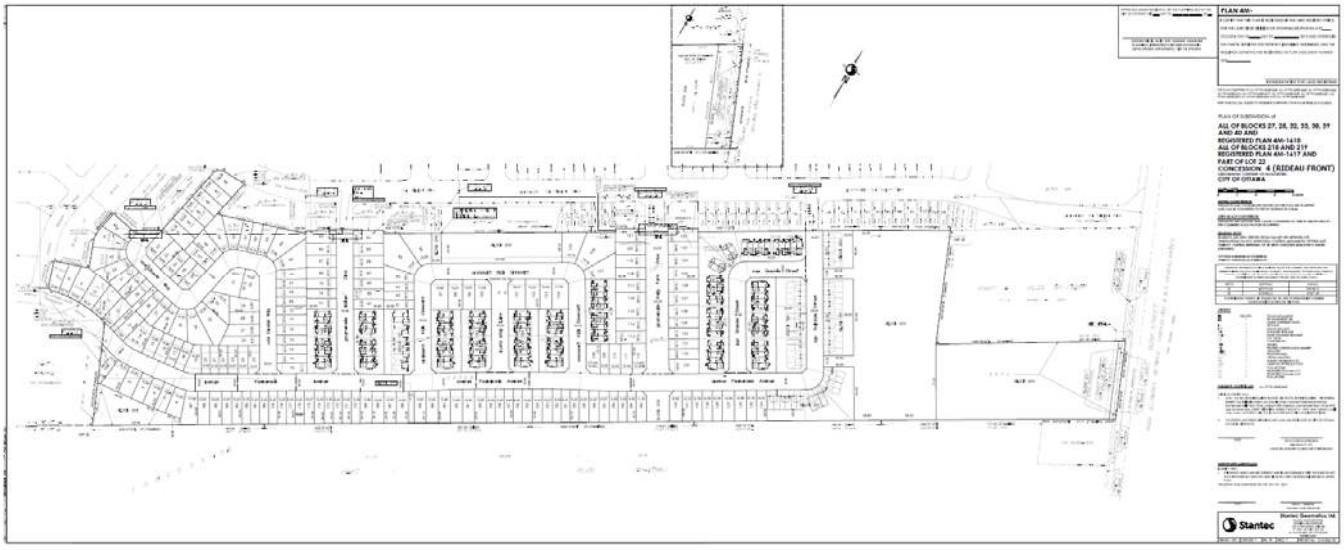
Northbound AM Peak Hour	2011	2011 + VB + HC	2031	Annual Growth
Rideau to Findlay Creek	673	740	731	**-0.06%**
Findlay Creek to Leitrim	709	767	998	**1.33%**
Leitrim to Lester	707	799	952	**0.88%**

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 G

Earl Armstrong Road Extension ESR

Figure 2-29 Proposed Development – 4840 Bank Street (Idone)



2.3 Projected Transportation Conditions

2.3.1 Land Use Assumptions

2.3.1.1 TMP/TRANS MODEL (YEAR 2031)

Population, household and employment data are used as the basis for the travel demand within the TRANS regional model, which helps to inform the infrastructure requirements identified in the TMP at the 2031 planning horizon. The demographic data assumptions made as part of the TMP are summarized in **Table 2-9** for the major Districts in close proximity to Earl Armstrong Road, including Blossom Park, the Airport, Riverside South, Leitrim and south of Leitrim. These are shown in **Figure 2-30**.

Table 2-9 TRANS Model Land Use Assumptions (Districts)

Characteristic	Traffic District	Time Horizon		Difference
		2011	2031	
Total Population	Blossom Park	14,450	15,260	810
	South of Leitrim	1,140	1,200	60
	Airport	4,060	4,100	40
	Riverside South	10,860	20,450	9,590
	Leitrim	5,120	17,100	11,980
Total Households	Blossom Park	5,730	5,950	220
	South of Leitrim	420	490	70
	Airport	1,730	1,790	60
	Riverside South	3,970	7,410	3,440
	Leitrim	1,640	5,950	4,310
Total Employment	Blossom Park	3,580	3,900	320
	South of Leitrim	1,890	3,180	1,290
	Airport	6,490	10,800	4,310
	Riverside South	860	3,160	2,300
	Leitrim	3,160	3,760	600

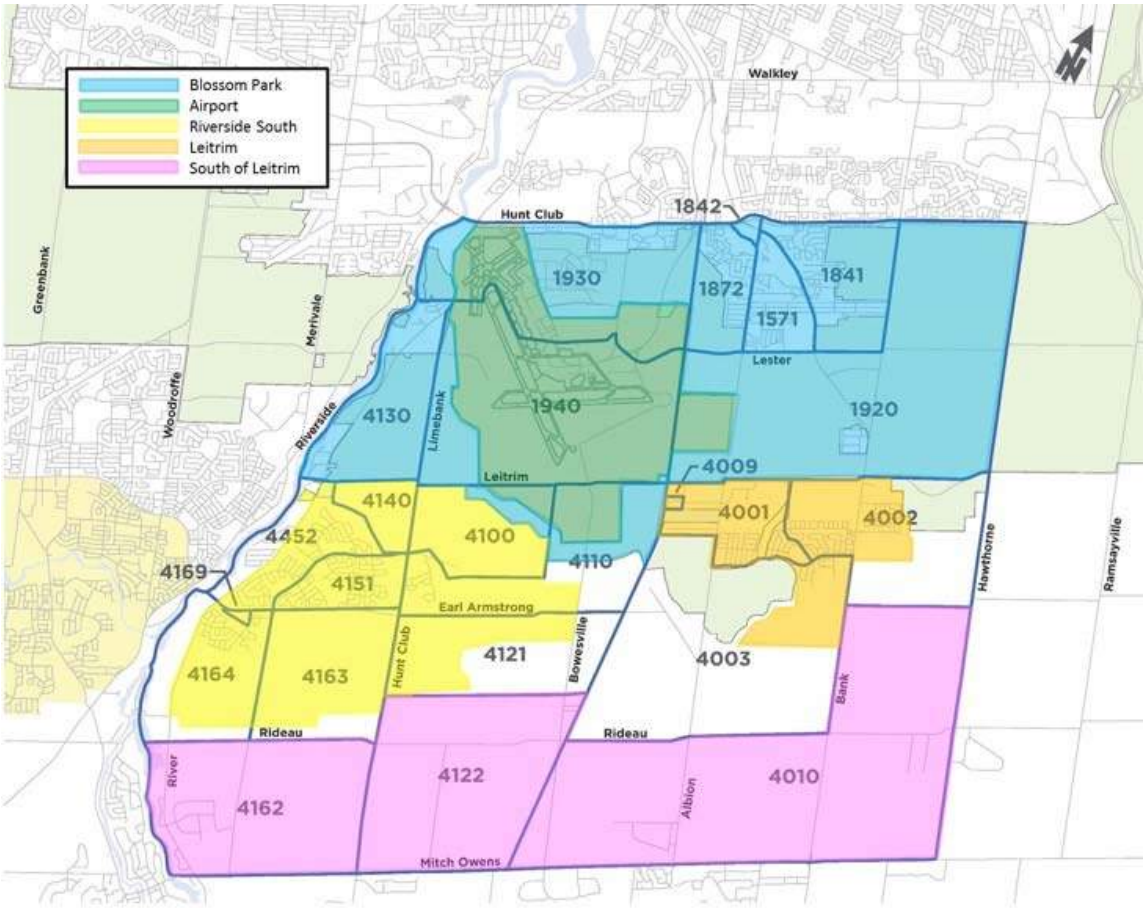
Source: City of Ottawa

As shown in **Table 2-9**, there are notable increases in population/households by year 2031 within the Riverside South and Leitrim Districts, as well as significant increases in employment by 2031 within the Hunt Club and South Gloucester/Leitrim Districts.

There is also considerable growth in population/households and employment within the South Nepean District, which is located adjacent to the Airports Lands and west of the Rideau River. Travel to/from these Districts is considered to have increased relevance to the travel demand on an extended Earl Armstrong Road with the opening of the Strandherd-Armstrong Bridge.

It can be seen in **Table 2-9** that the population in Riverside South and Leitrim is projected to increase by approximately 21,570 persons; the amount of employment is projected to increase by approximately 2,900 jobs, and the housing units are projected to increase by approximately 7,750 units by 2031.

Figure 2-30 TRANS Model Traffic Districts/Zones



2.3.1.2 TRANS MODEL (FULL BUILD-OUT/2048)

The 2031 TRANS model household and employment projections presented in **Table 2-9** are noted as considerably less than the full build-out projections for Riverside South outlined previously. There are also notably more jobs forecasted for the Leitrim community at full build-out.

As part of planning work completed by the City in 2018 in support of the extension of the Trillium Line Rapid Transit, a year 2048 scenario was developed that simulated full build-out of these two communities, as summarized in **Table 2-10**. Barrhaven, Manotick and Greely are also included for reference. It is noted that the 2031 synthesized build-out scenario and 2048 land use scenario for Riverside South are identical, whereas for the Leitrim Community the 2048 land use scenario is characterized by a higher number of households (+2,018 units) and lower employment (-2000 jobs).

Table 2-10 Comparison of TRANS Land Use Assumptions 2031 vs Full Build-Out vs 2048

Characteristic	Traffic District	Land Use Scenario		
		2031	2031 Synthesized Build-out	2048 Full Build-out
Total Households	**Riverside South** (1)	7,499	19,766	19,766
	Leitrim	5,950	5,950	7,968
	Barrhaven	32,370		46,700
	Manotick	2,095		3,800
	Greely	2,240		3,400
Total Employment	**Riverside South** (1)	3,657	17,625	17,625
	Leitrim	3,760	5,760	3,760
	Barrhaven	13,700		19,800
	Manotick	1,550		2,800
	Greely	1,400		2,100

Notes:

(1) includes Airport Lands south of Leitrim

Source: City of Ottawa

The ensuing analysis of network scenarios based on the TRANS model reflect the 2048 land use that is considered to reflect full build-out of Riverside South and Leitrim communities.

2.3.2 Network Scenarios

With the input from staff at the City of Ottawa, a number of scenarios were assembled for evaluation within the TRANS regional model environment. The scenarios, defined in **Table 2-11**, were strategically developed in an attempt to isolate the potential impact of additions to the road network expected to influence travel behavior in the Study Area, as well as demonstrate longer term requirements to satisfy potential demand associated with full build of Riverside South and Leitrim.

Table 2-11: TRANS Model Scenarios Completed for Earl Armstrong EA

Scenario	Network Description	
Land Use - 2011		
S1	2011 Conditions	Network does not include the Strandherd-Armstrong (S-A) Bridge or Hunt Club I/C with Highway 417
S2	2017 Existing Conditions	Existing conditions as of January 2017 with S-A Bridge and Hunt Club I/C added
Land Use - 2031		
S11	S3 (TMP 2031) + Earl Armstrong Extension	Addition of extended Earl Armstrong Road (2-lanes) between Albion Road and Hawthorne Road
S12	S3 (TMP 2031) + Earl Armstrong Extension + Leitrim Widening	Addition of widened Leitrim Road to 4 lanes between Limebank Road and Bank Street
Land Use – 2048 (full build-out of Riverside South and Leitrim)		
S3-a	TMP 2031 Affordable	Planned infrastructure as per the TMP Affordable Network
S9	S3 (TMP 2031) + Leitrim Widening	Reflect the updated 2048 land use scenario developed as part of other work reflecting full build-out; network as per the TMP Affordable Network plus widening of Leitrim Road (4-lanes) between Limebank Road and Bank Street

Scenario	Network Description	
S13	S3 (TMP 2031) + Earl Armstrong Extension	Same as above, but remove widening of Leitrim Road and introduce extension of Earl Armstrong Road (2-lanes) between Albion Road and Hawthorne Road
S13-a	S3 (TMP 2031) + Earl Armstrong Extension + *Direct Connection to/from Findlay Creek*	Same as above, but introduce a new zone connector at Findlay Creek Community that provides direct access to/from the proposed extension of Earl Armstrong Road
S14	S3 (TMP 2031) + Earl Armstrong Extension + Leitrim Widening	Combine Scenario S9 and S13
S15	S3 (TMP 2031) + Earl Armstrong Extension + Leitrim Widening + Albion Widening + Bank Widening	Addition to S14 of a widened Albion Road (4-lanes Leitrim to Lester) and widened Bank Street (4-lanes Findlay Creek to Earl Armstrong)
S16	S3 (TMP 2031) + Earl Armstrong Extension + Leitrim Widening + Albion Widening + Bank Widening + River Crossing	Addition to S15 of a conceptual crossing of the Rideau River to the north of the Vimy Memorial Bridge (linking Fallowfield Drive and a widened/realigned Leitrim Road)
S17	S3 (TMP 2031) + Earl Armstrong Extension (4-lane Albion to Bank; 2-lane Bank to Hawthorne) + *Direct Connection to/from Findlay Creek* + Leitrim Widening + Bank Widening	Reflects current staging plan for Earl Armstrong extension: 4-lanes between Albion Road and Bank Street, 2-lanes between Bank and Hawthorne. Also reflects most likely future conditions.

2.3.3 Volume Projections

2.3.3.1 FULL BUILD-OUT/2048

Table 2-12 provides a summary of performance at the two project screenlines referencing existing, 2017 TRANS, and 2048 TRANS model results. It is noteworthy that projections represent conditions in the AM peak hour only, whereas the ground counts suggest that traffic volumes in the Study Area are higher in the PM peak hour. Considering the unadjusted TRANS model projections for the AM peak hour only, the resulting v/c at 2048 range between 0.49 and 0.78 at PS-1 (Albion to Bank) and between 0.66 and 0.80 at PS-2 (Bank to Hawthorne).

Table 2-12 Projected Project Screenline Performance (TRANS)

Scenario	Peak Directional Demand (veh/h) AM (PM)		Directional Capacity[2] (veh/h) AM (PM)		v/c AM (PM)	
	PS-1	PS-2	PS-1	PS-2	PS-1	PS-2
Existing Ground Counts[1]	2,322 (2,994)	1,256 (1,525)	3,200	2,800	0.73 (0.94)	0.45 (0.56)
2017 TRANS Model[3]	1,700 (n/a)	1,400 (n/a)	3,200	2,800	0.53 (n/a)	0.50 (n/a)
2048 TRANS (S3-a) *TMP Affordable*	2,486 (n/a)	2,178 (n/a)	3,200	2,800	0.78 (n/a)	0.78 (n/a)
2048 TRANS (S9) + *Leitrim*[4]	2,487 (n/a)	2,247 (n/a)	4,200	2,800	0.59 (n/a)	0.80 (n/a)
2048 TRANS (S13) + *Earl Armstrong (2-lanes)*[5]	2,922 (n/a)	2,523 (n/a)	4,200	3,800	0.70 (n/a)	0.66 (n/a)

Scenario	Peak Directional Demand (veh/h) AM (PM)		Directional Capacity[2] (veh/h) AM (PM)		v/c AM (PM)	
	PS-1	PS-2	PS-1	PS-2	PS-1	PS-2
2048 TRANS (S14)[6] *+ Leitrim and EA (2-lanes)*	2,888 (n/a)	2,524 (n/a)	5,200	3,800	0.56 (n/a)	0.66 (n/a)
2048 TRANS (S17)[7] *+ Leitrim and EA (4-lane Albion to Bank; 2-lane Bank to Hawthorne)*	3,046 (n/a)	2,562 (n/a)	6,200	3,800	0.49 (n/a)	0.67 (n/a)

Notes
1. Observed volumes obtained from the Intersection Turning Movement Counts (City of Ottawa)
2. Directional capacities were obtained from the TRANS model; Leitrim, Earl Armstrong and Mitch Owens 1,000 veh/h; Rideau west of Bank 800 veh/h and east of Bank 400 veh/h, Findlay Creek and Blais 400 veh/h
3. Volumes on Findlay Creek have been adjusted to remove pass-by traffic related to the Mall and the Tim Hortons located at 4764 Bank St
4. Additional 1,000 veh/h capacity on PS-1
5. Additional 1,000 veh/h capacity on PS-1 and 1,000 veh/h capacity on PS-2
6. Additional 2,000 veh/h capacity on PS-1 and 1,000 veh/h capacity on PS-2
7. Additional 3,000 veh/h capacity on PS-1 and 1,000 veh/h capacity on PS-2

Should adjustments be made to the forecasts to reflect the approximate 600 veh/h discrepancy in the AM peak hour between the existing ground counts and the baseline 2017 TRANS model, the resulting 2048 v/c ratios range between 0.59 and 0.97 at PS-1 (Albion to Bank). If consideration is given to conditions in the critical PM peak hour, the derived 2048 v/c ratios are estimated to range between 0.670 and 1.18 at PS-1 (Albion to Bank) and between 0.70 and 0.85 at PS-2 (Bank to Hawthorne).

It is important to note that regional models are typically calibrated to the screenline level, and therefore using the model to simulate volumes on individual links (or individual turning movements) must be done with understanding of the model's limitations/constraints. Relative changes in forecasted volumes can be used as good indicator of general trends, however. **Table 2-13** provides a summary of existing traffic volumes and projected traffic volumes on segments of an extended Earl Armstrong Road and Leitrim Road for the series of scenarios outlined previously (**Table 2-11**). These projections are based on the land use assumptions outlined in the previous section and represent AM peak hour forecasts.

Table 2-13 TRANS Model 2048 Projections (AM Peak Hour) – Auto Volumes on Earl Armstrong Road (and Leitrim Road) by Segment

Scenario	Earl Armstrong						Leitrim Road					
	Albion to Bank (PS-1)			*Bank to Hawthorne (PS-2)*			*Albion to Bank (PS-1)*			*Bank to Hawthorne (PS-2)*		
	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)
S2 *Existing Conditions*							870	395	0.87 *(1 Lane)*	783	613	0.78 *(1 Lane)*
S9 *S3 + Leitrim*							1175	240	0.59 *(2 Lanes)*	1113	277	1.11 *(1 Lane)*
S13 *S3 + Earl Armstrong*	861	255	0.86 *(1 Lane)*	763	201	0.76 *(1 Lane)*	949	376	0.95 *(1 Lane)*	882	223	0.88 *(1 Lane)*

Scenario	Earl Armstrong						Leitrim Road					
	Albion to Bank (PS-1)			*Bank to Hawthorne (PS-2)*			*Albion to Bank (PS-1)*			*Bank to Hawthorne (PS-2)*		
	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)
S13-a *S3 + Earl Armstrong (with connection to Findlay Creek)*	928	432	0.93 *(1 Lane)*	765	200	0.77 *(1 Lane)*	968	305	0.97 *(1 Lane)*	868	223	0.87 *(1 Lane)*
S14 *S3 + Leitrim + Earl Armstrong*	791	265	0.79 *(1 Lane)*	722	200	0.72 *(1 Lane)*	1068	458	0.54 *(2 Lanes)*	972	226	0.97 *(1 Lane)*
S15 *S3 + Leitrim + Earl Armstrong + Albion + Bank*	784	251	0.78 *(1 Lane)*	690	200	0.69 *(1 Lane)*	859	595	0.43 *(2 Lanes)*	976	296	0.98 *(1 Lane)*
S16 *S3 + Leitrim + Earl Armstrong + Albion + Bank + River Crossing*	794	231	0.79 *(1 Lane)*	696	197	0.70 *(1 Lane)*	852	670	0.42 *(2 Lanes)*	975	331	0.98 *(1 Lane)*
S17 *S3 + Leitrim + Bank + Earl Armstrong (4-lane Albion to Bank; 2-lane Bank to Hawthorne) + Connection to Findlay Creek*	1022	431	*0.51 (2 Lanes)*	768	199	0.77 *(1 Lane)*	1054	378	0.53 *(2 Lanes)*	951	226	0.95 *(1 Lane)*

Note: (1) Assumes lane capacity of 1,000 veh/h.

As shown in **Table 2-13**, an extended Earl Armstrong Road in year 2048 is expected to operate with projected volumes in the order of 900 to 1000 veh/h between Albion and Bank, and 700 to 800 veh/h between Bank and Hawthorne in the AM peak hour. The resulting v/c ratios on Earl Armstrong in the critical direction are between 0.78 and 0.93 between Albion and Bank (where two lanes were modelled) and are less than 0.8 between Bank and Hawthorne (where two lanes were modelled). The model suggests that the highest volumes on Earl Armstrong Road would be realized if there was an efficient road connection between Albion and Bank to the planned residential subdivision situated to the north of Earl Armstrong Road (see S13-a).

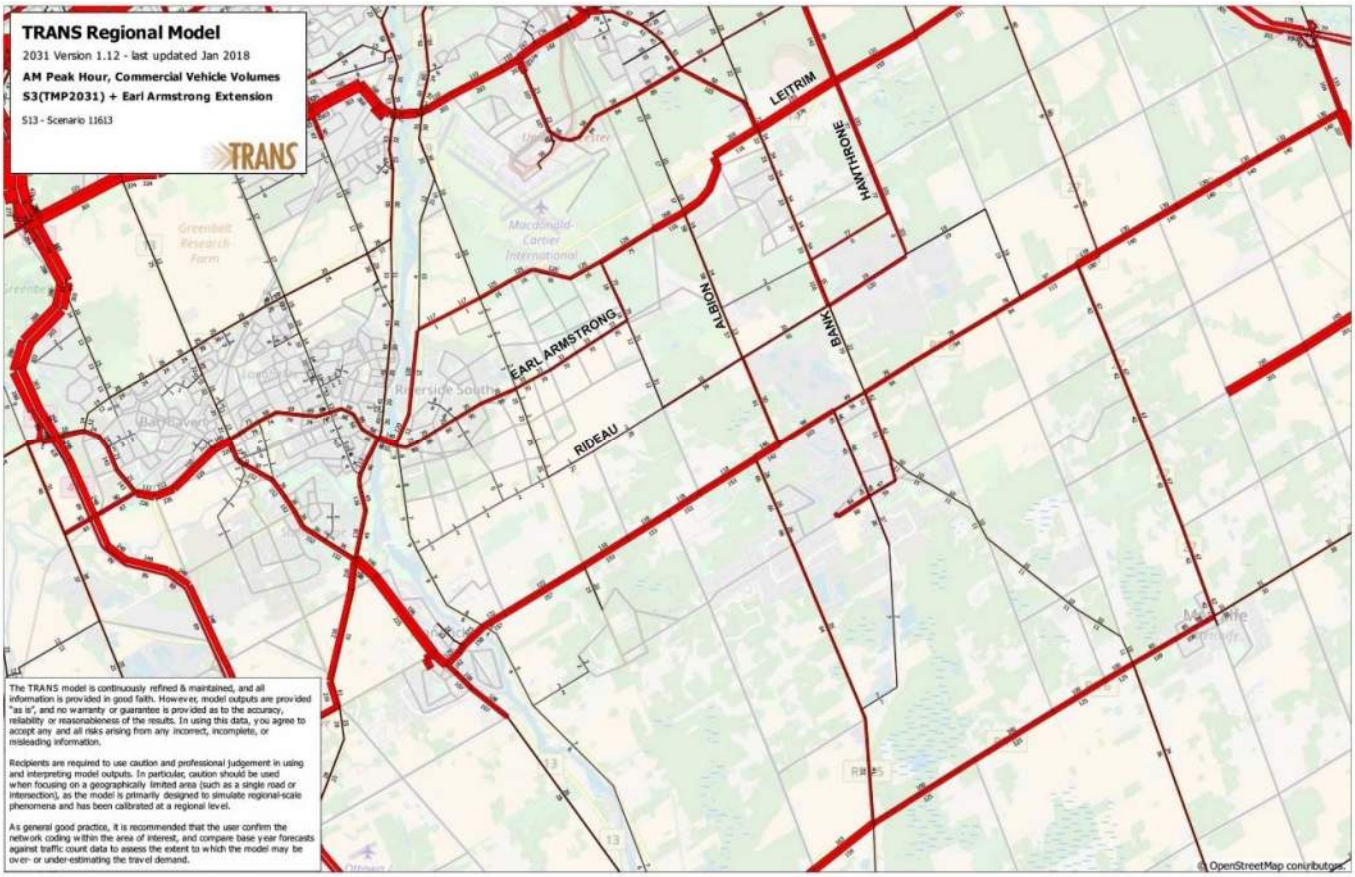
However, if Earl Armstrong were widened to four lanes between Albion and Bank, combined with adjacent roadway widenings, i.e. Leitrim Road, Bank Street, projected volumes would increase to over 1,000 veh/h (S17). Projected volumes on Leitrim Road for year 2048 in this scenario are noted to exceed 1,000 veh/h in the peak direction. It is worth noting that the assumed single lane capacity of 1,000 veh/h is considered very conservative if the road is located within a rural context and there are limited planned intersections that would interrupt traffic flow. The foregoing projections indicate that there is a need for additional east-west capacity by 2048:

- Extend Earl Armstrong between Albion and Bank as a four-lane facility, and between Bank and Hawthorne as a two-lane facility;
- Consideration should be given to protecting the Earl Armstrong corridor between Bank and Hawthorne for four lanes, in the event that the urban boundary is expanded this far south; and
- Widen Leitrim Road to four lanes west of Bank Street.

2.3.3.2 TRUCK VOLUMES

The TRANS model is able to distinguish between passenger vehicles and commercial vehicles, albeit using a simplified representation of commercial vehicle activity. **Figure 2-29** is a plot of projected commercial vehicle volumes within the Study Area for Scenario 13, which includes the Earl Armstrong Extension. The TRANS model analysis indicates that Mitch Owens Road will continue to carry a notable volume of commercial vehicles between Highway 417 and the Rideau River (approximately 150-200 veh/h). However, it is expected that an extended Earl Armstrong Road would carry some truck traffic between Bowesville Road and Hawthorne Road.

Figure 2-31 TRANS Model Commercial Vehicle Activity (S13)



2.3.3.3 PEAK PERIOD TRAFFIC VOLUMES

The concept of peak period assessment has also been included in this analysis, which is consistent with the methodology outlined in the current City of Ottawa TMP. This approach uses volume projections based on the average hour within the 2.5-hour peak period rather than the overall highest hour. It is understood that the peak period volume concept should be used as the basis of long-term network planning decisions, but that the more traditional peak hour analysis is most appropriate when considering geometric design (assuming no right-of-way constraints) and traffic operations.

To roughly estimate average hourly volume over 2.5 peak period, the peak hour volume can be multiplied by a region-wide expansion factor of 2.1 and divided by 2.5 (resulting in a typical factor of 0.84, which represents the relationship between the average hour within the peak period and the busiest peak hour). This relationship represents an average condition and is not necessarily indicative of the relationship within individual corridors. Based on the existing volume count data at nearby Leitrim/Albion, this factor is 0.83 during the morning peak hour.

The result of applying the above-noted factor to the total trips generated in 2031 and at full build-out is displayed in **Table 2-14**.

Table 2-14 TRANS Model Projections (AM Peak Hour) – Auto Volumes on Earl Armstrong Road (and Leitrim Road) by Segment, Scenario 13

Scenario S13	Earl Armstrong						Leitrim Road					
	Albion to Bank			*Bank to Hawthorne*			*Albion to Bank*			*Bank to Hawthorne*		
	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)	EB	WB	Critical v/c (1)
Peak Hour	861	255	0.86	763	201	0.76	949	376	0.95	882	223	0.88
Average Over Peak Period	715	212	0.71	633	167	0.63	788	312	0.79	732	185	0.73
Note: (1) Assumes single lane capacity 1,000 veh/h												

2.4 The Planned Transportation Function of the Earl Armstrong Road Extension

Existing Earl Armstrong Road from the Vimy Memorial Bridge across the Rideau River to just beyond Bowesville Road is designated in the City's Official Plan and TMP as an Arterial Road. The planned extension easterly to Hawthorne Road would maintain the Arterial Road designation, and also emphasize the importance of the road as an east-west travel link serving growing communities in southeast Ottawa.

Once completed, the full extent of Earl Armstrong Road would provide connectivity to several major north-south arterial and collector roads, namely River Road, Limebank Road, Bowesville (collector), Albion Road, Bank Street, and Hawthorne Road (collector south of Leitrim). The Earl Armstrong Road extension would serve as an important east-west travel route with regional significance. It is also aligned with the planned westerly extension of the Trillium Line Light Rail Transit (LRT) into Riverside South, and the easterly extension of the Bus Rapid Transit (BRT) across the Rideau River at the Vimy Memorial Bridge.

Based on this understanding, the planned transportation function of an extended Earl Armstrong Road can be summarized as follows:

- Arterial Connection: provide additional east-west capacity and connectivity with the north-south arterial road network, and strengthen the role of Earl Armstrong Road in distributing travel demand between the Rideau River and Highway 417;
- Connect Communities: link the growing communities of Riverside South and Leitrim for general movements by all modes;
- Support Transit: provide a direct multi-modal connection to the future Earl Armstrong/Bowesville LRT Station and Park & Ride; provide an opportunity for new bus transit service;
- Active Transportation: accommodate an in-corridor cycling spine route, as well as adjacent pathways and crossings of the Arterial Road; and
- Truck Route: provide a more direct truck route that will service the needs of existing and future employment uses.

- Land Use Evolution: Provide connections to existing and future adjacent land uses. Also, connect a possible expansion of the Leitrim community Urban Area to the southeast. It is noted that although this EA acknowledges this possibility, there is no certainty that this would ever occur.

2.4.1 Albion Road to Bank Street

The 2013 TMP identifies the need for the extension from Albion to Bank to "*provide capacity for growth in Riverside South and complete the linkage to Bank Street*." This section of the extension also strengthens the arterial road network by creating new connections to the north-south arterial network at Albion Road and Bank Street. Existing east-west options in this area include Rideau Road, which is a designated collector.

Earl Armstrong is a key east-west travel route in the south end of Ottawa, and it directs travelers across one of the few Rideau River crossings at the Strandherd Bridge.

The Earl Armstrong Road extension will provide direct access to the Trillium Line LRT station and a park and ride facility constructed at Bowesville Road and Earl Armstrong Road which will add demand to the route as this provides a key transit connection linking users from Riverside South, Leitrim, Manotick and Greely communities to the heart of the downtown core and to the overall O-Train system.

The ongoing development of the Leitrim community north of the Study Area will also utilize this section of Earl Armstrong Road as it will provide key access to the destinations mentioned above.

The recommendation is that this segment be constructed as a four-lane urban road.

2.4.2 Bank Street to Hawthorne Road

The 2013 TMP identifies the need for the Earl Armstrong Road extension from Bank Street to Hawthorne Road as a "*continuation of a cross-town route between Highways 416 and 417*". This section of the extension has a somewhat different planned function. As Hawthorne is designated a collector road south of Leitrim Road, the Earl Armstrong Road extension in this section does not directly strengthen the arterial road network. Hawthorne, does, however, provide key north-south access for travelers to Highway 417 via the Hunt Club Road interchange. On this point, it is important to note that it is the Highway 417/Hunt Club Road interchange that is the anticipated/desired route for travelers to and from the Study Area to Highway 417. Limited travel demand is anticipated for the "cross-country" route from Hawthorne Road to the Highway 417/Anderson Road interchange, via Louiseize Road. For travelers destined to the more central locations in Ottawa, that route would entail notable back-tracking. Also, limited travel demand is anticipated between the study area and areas to the east served by Highway 417 (Vars, Casselman, etc.). The development of the Leitrim community will also see demand for this access to Highway 417. Currently, Bank Street, Leitrim Road or back tracking to Albion Road only provide for this.

The existing aggregate resources development and industrial land use in the Study Area would also benefit from an extension of Earl Armstrong in this section because it provides that key connection via the arterial road network to Highway 417 and points beyond.

The recommendation is to implement this segment as a new two-lane road with a rural cross-section. The right-of-way is of sufficient width for a potential conversion to a four-lane urban roadway, if needed in the future.

APPENDIX H

Transportation Demand Management Checklists

TRANSPORTATION DEMAND MANAGEMENT

TDM-Supportive Development Design and Infrastructure Checklist

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

Legend

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☐
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ 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 – no rapid transit in vicinity of site
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑ All sidewalks are private (on-site).

	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)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☐
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☑
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☑
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☑

	TDM-supportive design & infrastructure measures: *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)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☑
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	☑
	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)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☑
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☑

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

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

TRANSPORTATION DEMAND MANAGEMENT

TDM Measures Checklist

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

Legend

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

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

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

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

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

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

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

APPENDIX I

Synchro Analysis

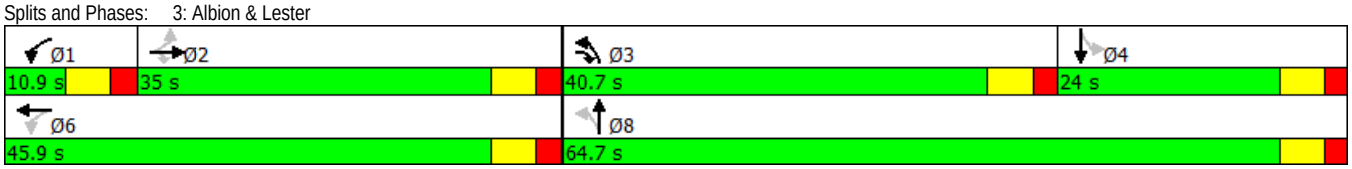
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	12	109	115	42	484	651	298	14	133
Future Volume (vph)	12	109	115	42	484	651	298	14	133
Lane Group Flow (vph)	13	115	121	44	524	685	472	15	264
Turn Type	Perm	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases		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



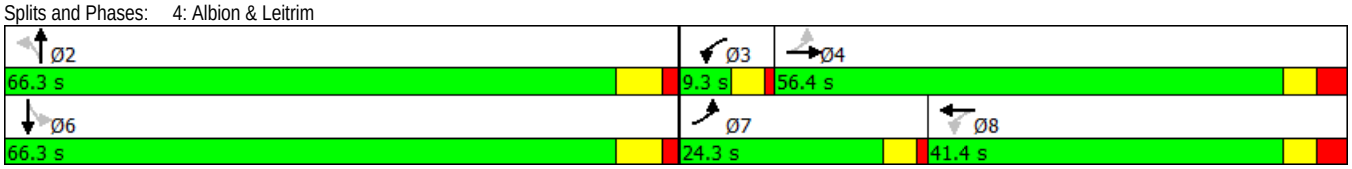
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	312	614	46	292	133	770	10	181
Future Volume (vph)	312	614	46	292	133	770	10	181
Lane Group Flow (vph)	328	722	48	329	140	844	11	318
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted 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		

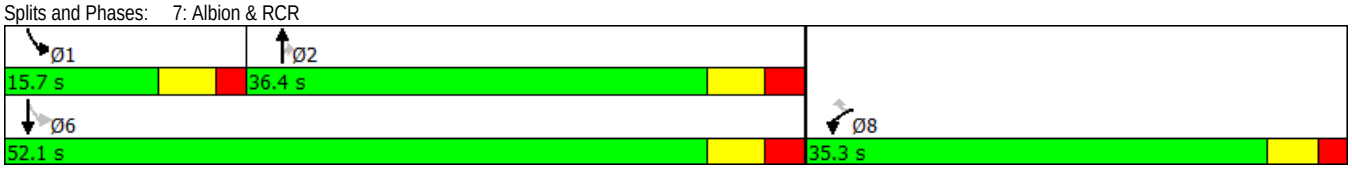
Splits and Phases: 5: Albion & Findaly Creek

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			

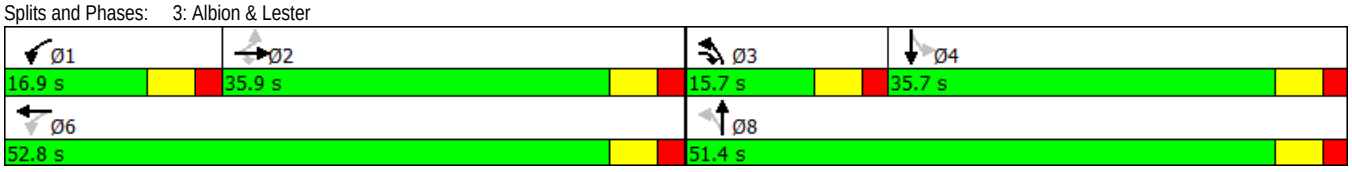
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	653	200
Volume Left	31	8	0
Volume Right	7	0	49
cSH	377	1372	1700
Volume to Capacity	0.10	0.01	0.12
Queue Length 95th (m)	2.5	0.1	0.0
Control Delay (s)	15.6	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	15.6	0.2	0.0
Approach LOS	C		

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



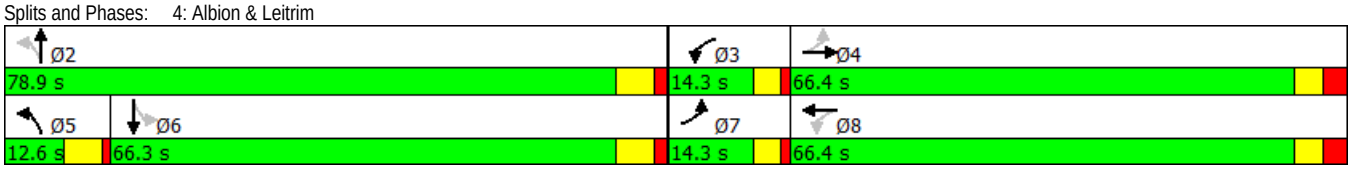
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	95	370	74	731	127	311	17	480
Future Volume (vph)	95	370	74	731	127	311	17	480
Lane Group Flow (vph)	100	549	78	777	134	398	18	707
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	3	8	5	2		6
Permitted 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.

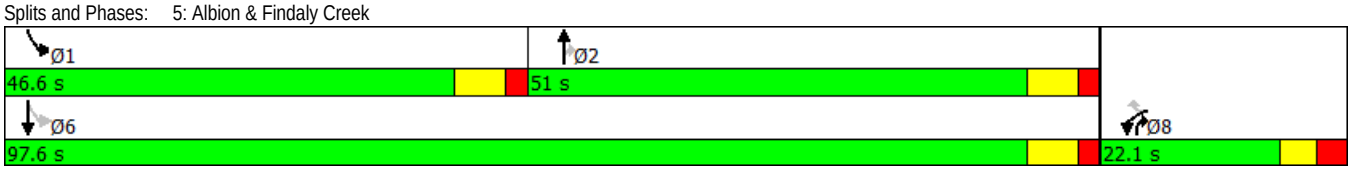
Splits and Phases: 4: Albion & Leitrim



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			

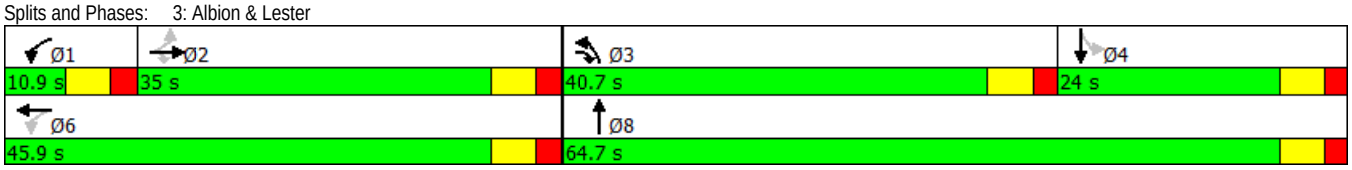
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	304	634
Volume Left	63	22	0
Volume Right	29	0	53
cSH	331	949	1700
Volume to Capacity	0.28	0.02	0.37
Queue Length 95th (m)	8.4	0.5	0.0
Control Delay (s)	20.0	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	20.0	0.9	0.0
Approach LOS	C		

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

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.	

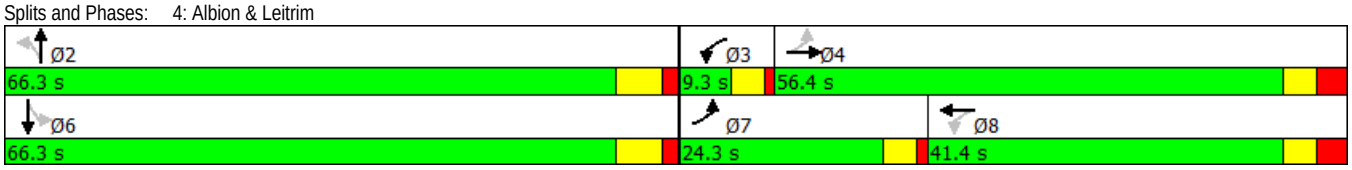
Splits and Phases: 3: Albion & Lester



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			

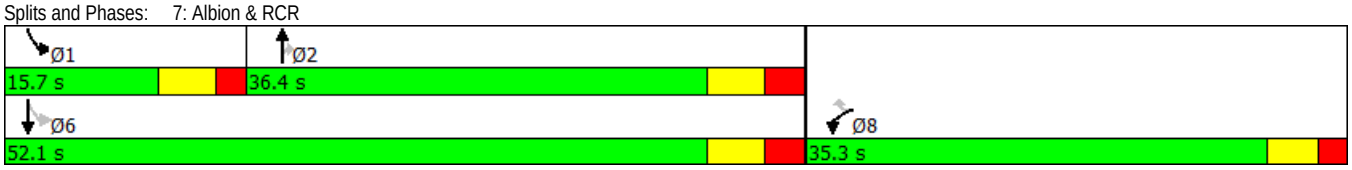
Splits and Phases: 5: Albion & Findaly Creek

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		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	39	45	305	53	87	412
Future Volume (vph)	39	45	305	53	87	412
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	47	321	56	92	434

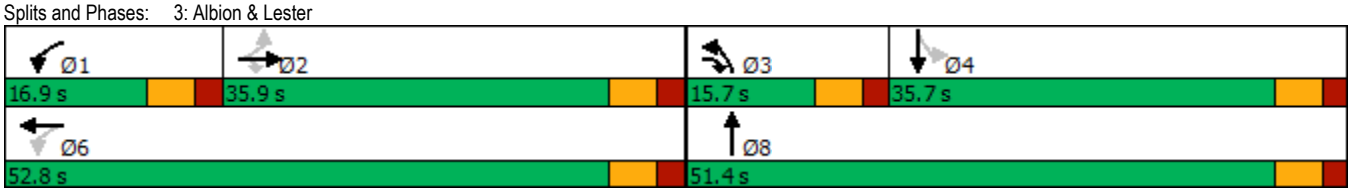
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	88	377	526
Volume Left (vph)	41	0	92
Volume Right (vph)	47	56	0
Hadj (s)	-0.19	-0.06	0.07
Departure Headway (s)	5.7	4.7	4.7
Degree Utilization, x	0.14	0.49	0.68
Capacity (veh/h)	548	741	754
Control Delay (s)	9.7	12.2	17.1
Approach Delay (s)	9.7	12.2	17.1
Approach LOS	A	B	C

Intersection Summary			
Delay	14.6		
Level of Service	B		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	355	555	75	179	12	227	199	28	14	282	49
Future Volume (vph)	98	355	555	75	179	12	227	199	28	14	282	49
Satd. Flow (prot)	1695	3390	1517	1695	3356	0	3288	1752	0	1695	1745	0
Flt Permitted	0.626			0.434			0.950			0.611		
Satd. Flow (perm)	1117	3390	1517	774	3356	0	3288	1752	0	1090	1745	0
Satd. Flow (RTOR)			429		9			9			9	
Lane Group Flow (vph)	103	374	584	79	201	0	239	238	0	15	349	0
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)	37.6	37.6	53.1	49.0	49.0		11.4	40.5		25.1	25.1	
Actuated g/C Ratio	0.39	0.39	0.54	0.50	0.50		0.12	0.42		0.26	0.26	
v/c Ratio	0.24	0.29	0.57	0.16	0.12		0.62	0.32		0.05	0.77	
Control Delay	26.3	24.0	7.2	15.2	13.5		49.7	19.5		26.8	44.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.3	24.0	7.2	15.2	13.5		49.7	19.5		26.8	44.4	
LOS	C	C	A	B	B		D	B		C	D	
Approach Delay		15.0			14.0			34.6			43.7	
Approach LOS		B			B			C			D	
Queue Length 50th (m)	13.7	26.7	15.2	7.6	9.8		22.5	28.3		2.1	59.5	
Queue Length 95th (m)	30.1	43.5	52.9	17.0	17.7		36.7	45.2		6.9	90.3	
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)	431	1309	1025	511	1689		396	859		355	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	0.57	0.15	0.12		0.60	0.28		0.04	0.61	

Intersection Summary	
Cycle Length: 104.2	
Actuated Cycle Length: 97.5	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 69.5%	ICU Level of Service C
Analysis Period (min) 15	

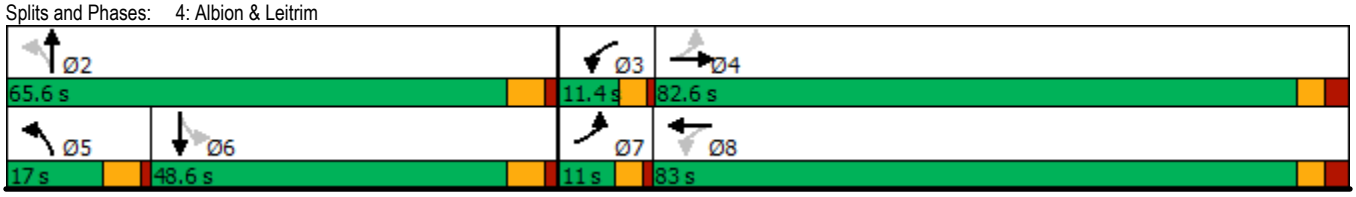
Splits and Phases: 3: Albion & Lester



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	389	186	89	768	8	150	369	79	18	576	202
Future Volume (vph)	100	389	186	89	768	8	150	369	79	18	576	202
Satd. Flow (prot)	1695	1697	0	1695	1783	0	1695	3302	0	1695	3258	0
Flt Permitted	0.056			0.215			0.088			0.482		
Satd. Flow (perm)	100	1697	0	384	1783	0	157	3302	0	860	3258	0
Satd. Flow (RTOR)		21						18			31	
Lane Group Flow (vph)	105	605	0	94	816	0	158	471	0	19	819	0
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)	79.7	73.9		80.3	74.2		59.3	59.3		42.1	42.1	
Actuated g/C Ratio	0.52	0.48		0.53	0.49		0.39	0.39		0.28	0.28	
v/c Ratio	0.88	0.73		0.36	0.94		0.82	0.36		0.08	0.89	
Control Delay	84.5	36.4		20.4	56.9		68.2	33.4		43.7	64.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	84.5	36.4		20.4	56.9		68.2	33.4		43.7	64.0	
LOS	F	D		C	E		E	C		D	E	
Approach Delay		43.5			53.2			42.2			63.5	
Approach LOS		D			D			D			E	
Queue Length 50th (m)	17.3	143.4		13.5	237.1		34.0	53.8		4.5	127.2	
Queue Length 95th (m)	#55.3	190.4		22.8	#324.5		#74.4	69.1		11.7	#155.8	
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)	119	890		260	929		192	1353		253	980	
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	0.68		0.36	0.88		0.82	0.35		0.08	0.84	

Intersection Summary	
Cycle Length: 159.6	
Actuated Cycle Length: 152.6	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 51.5	Intersection LOS: D
Intersection Capacity Utilization 95.3%	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.	

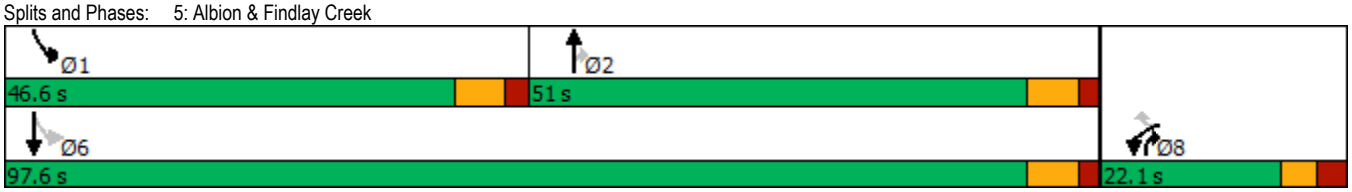
Splits and Phases: 4: Albion & Leitrim

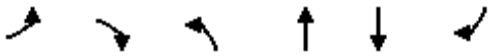


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	155	367	95	300	679
Future Volume (vph)	98	155	367	95	300	679
Satd. Flow (prot)	1695	1517	1784	1517	1695	1784
Flt Permitted	0.950				0.460	
Satd. Flow (perm)	1695	1517	1784	1517	821	1784
Satd. Flow (RTOR)		163		100		
Lane Group Flow (vph)	103	163	386	100	316	715
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	0.50
Control Delay	55.1	12.2	10.5	0.6	4.6	5.3
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	5.3
LOS	E	B	B	A	A	A
Approach Delay	28.8		8.5			5.1
Approach LOS	C		A			A
Queue Length 50th (m)	22.1	0.0	35.0	0.0	13.5	41.4
Queue Length 95th (m)	39.6	18.6	61.8	3.0	24.4	70.5
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	981	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	0.50

Intersection Summary	
Cycle Length: 119.7	
Actuated Cycle Length: 116.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 56.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Albion & Findlay Creek





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	34	29	346	689	53
Future Volume (Veh/h)	63	34	29	346	689	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	36	31	364	725	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	0.96					
vC, conflicting volume	1179	753	781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1167	753	781			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	91	96			
cM capacity (veh/h)	199	410	837			

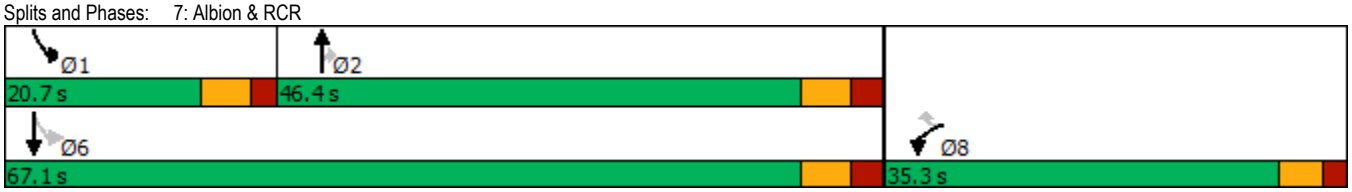
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	395	781
Volume Left	66	31	0
Volume Right	36	0	56
cSH	243	837	1700
Volume to Capacity	0.42	0.04	0.46
Queue Length 95th (m)	14.9	0.9	0.0
Control Delay (s)	30.2	1.2	0.0
Lane LOS	D	A	
Approach Delay (s)	30.2	1.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	91	141	237	77	234	508
Future Volume (vph)	91	141	237	77	234	508
Satd. Flow (prot)	1695	1517	1784	1517	1695	1784
Flt Permitted	0.950				0.539	
Satd. Flow (perm)	1695	1517	1784	1517	962	1784
Satd. Flow (RTOR)		148		71		
Lane Group Flow (vph)	96	148	249	81	246	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)	12.4	12.4	48.4	48.4	63.1	63.1
Actuated g/C Ratio	0.15	0.15	0.58	0.58	0.76	0.76
v/c Ratio	0.38	0.42	0.24	0.09	0.30	0.40
Control Delay	36.8	9.8	10.0	3.3	4.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	9.8	10.0	3.3	4.1	4.7
LOS	D	A	A	A	A	A
Approach Delay	20.4		8.3			4.5
Approach LOS	C		A			A
Queue Length 50th (m)	14.0	0.0	17.0	0.6	8.1	21.5
Queue Length 95th (m)	27.7	14.9	34.9	6.9	17.5	42.4
Internal Link Dist (m)	243.8		925.2			182.6
Turn Bay Length (m)				20.0	115.0	
Base Capacity (vph)	635	661	1033	908	874	1348
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	0.22	0.24	0.09	0.28	0.40

Intersection Summary			
Cycle Length: 102.4			
Actuated Cycle Length: 83.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 45.2%		ICU Level of Service A	
Analysis Period (min) 15			

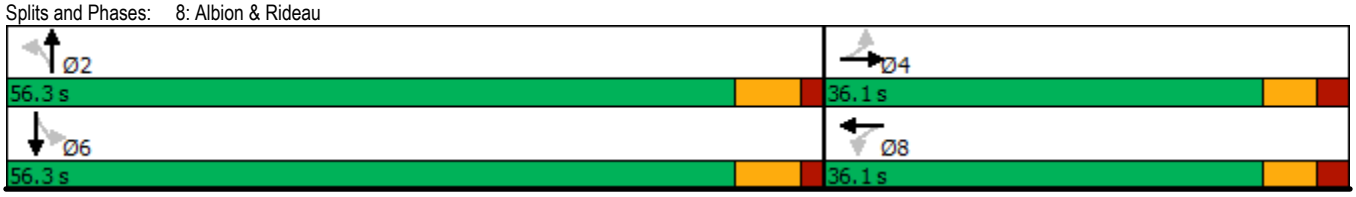
Splits and Phases: 7: Albion & RCR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	97	55	222	400	87	23	312	76	65	473	45
Future Volume (vph)	22	97	55	222	400	87	23	312	76	65	473	45
Satd. Flow (prot)	1695	1688	0	1695	1736	0	1695	1733	0	1695	1761	0
Flt Permitted	0.159			0.615			0.350			0.451		
Satd. Flow (perm)	284	1688	0	1097	1736	0	625	1733	0	805	1761	0
Satd. Flow (RTOR)		34			13			22			8	
Lane Group Flow (vph)	23	160	0	234	513	0	24	408	0	68	545	0
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)	30.2	30.2		30.2	30.2		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	0.40		0.15	0.53	
Control Delay	29.5	18.4		34.7	45.2		9.7	11.8		10.6	14.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.5	18.4		34.7	45.2		9.7	11.8		10.6	14.3	
LOS	C	B		C	D		A	B		B	B	
Approach Delay		19.8			41.9			11.6			13.9	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	2.9	15.6		34.1	81.1		1.8	36.0		5.4	55.9	
Queue Length 95th (m)	9.7	30.3		59.4	#135.2		5.4	55.9		12.0	83.9	
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)	100	621		389	624		361	1011		465	1021	
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	0.82		0.07	0.40		0.15	0.53	

Intersection Summary	
Cycle Length: 92.4	
Actuated Cycle Length: 90.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 24.5	Intersection LOS: C
Intersection Capacity Utilization 87.0%	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.	

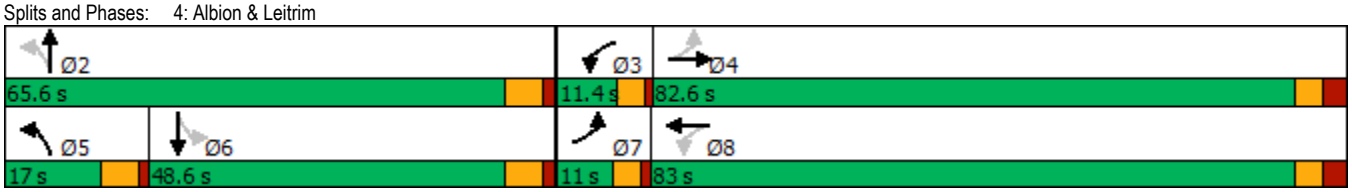
Splits and Phases: 8: Albion & Rideau



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	188	189	102	195	11	126	342	56	17	620	138
Future Volume (vph)	95	188	189	102	195	11	126	342	56	17	620	138
Satd. Flow (prot)	1695	1650	0	1695	1770	0	1695	3319	0	1695	3299	0
Flt Permitted	0.512			0.241			0.151			0.507		
Satd. Flow (perm)	914	1650	0	430	1770	0	269	3319	0	905	3299	0
Satd. Flow (RTOR)		45			3			13			17	
Lane Group Flow (vph)	100	397	0	107	217	0	133	419	0	18	798	0
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)	37.7	31.7		38.3	32.0		49.9	49.9		33.1	33.1	
Actuated g/C Ratio	0.37	0.31		0.38	0.32		0.49	0.49		0.33	0.33	
v/c Ratio	0.26	0.73		0.43	0.39		0.43	0.26		0.06	0.73	
Control Delay	21.4	36.5		25.4	29.6		19.9	15.7		26.2	34.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	36.5		25.4	29.6		19.9	15.7		26.2	34.8	
LOS	C	D		C	C		B	B		C	C	
Approach Delay		33.4			28.2			16.7			34.6	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	11.8	61.5		12.7	32.5		13.8	23.3		2.4	71.2	
Queue Length 95th (m)	25.5	107.4		27.0	59.0		29.7	40.4		8.4	107.8	
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)	390	1317		249	1409		320	2075		408	1499	
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	0.26	0.30		0.43	0.15		0.42	0.20		0.04	0.53	

Intersection Summary	
Cycle Length: 159.6	
Actuated Cycle Length: 101.5	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 72.6%	ICU Level of Service C
Analysis Period (min) 15	

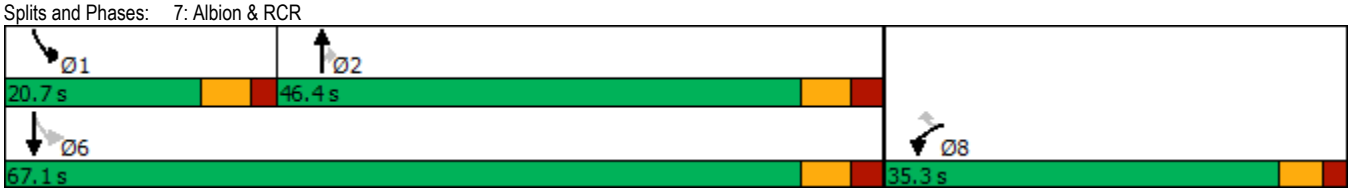
Splits and Phases: 4: Albion & Leitrim



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	169	212	120	440	273
Future Volume (vph)	53	169	212	120	440	273
Satd. Flow (prot)	1695	1517	1784	1517	1695	1784
Flt Permitted	0.950				0.550	
Satd. Flow (perm)	1695	1517	1784	1517	981	1784
Satd. Flow (RTOR)		178		123		
Lane Group Flow (vph)	56	178	223	126	463	287
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	44.9	44.9	63.1	63.1
Actuated g/C Ratio	0.15	0.15	0.54	0.54	0.76	0.76
v/c Ratio	0.23	0.48	0.23	0.14	0.53	0.21
Control Delay	33.8	10.0	11.6	2.9	6.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	10.0	11.6	2.9	6.0	3.5
LOS	C	A	B	A	A	A
Approach Delay	15.7		8.5			5.0
Approach LOS	B		A			A
Queue Length 50th (m)	8.0	0.0	17.1	0.2	17.9	9.7
Queue Length 95th (m)	18.1	16.3	34.3	8.4	35.9	20.1
Internal Link Dist (m)	243.8		925.2			2560.5
Turn Bay Length (m)				20.0	115.0	
Base Capacity (vph)	637	681	962	874	887	1353
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	0.09	0.26	0.23	0.14	0.52	0.21

Intersection Summary			
Cycle Length: 102.4			
Actuated Cycle Length: 83.2			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 7.8		Intersection LOS: A	
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

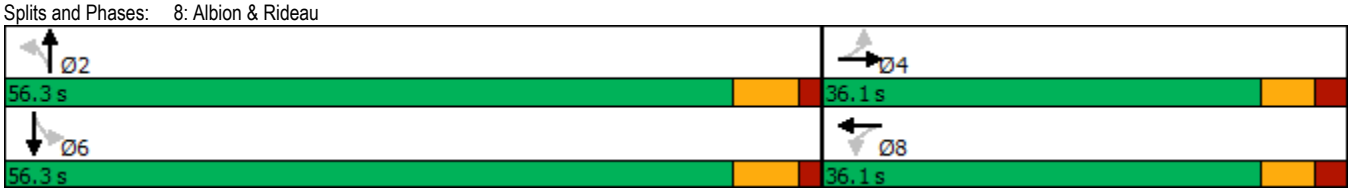
Splits and Phases: 7: Albion & RCR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	33	23	68	47	55	6	256	36	27	275	24
Future Volume (vph)	21	33	23	68	47	55	6	256	36	27	275	24
Satd. Flow (prot)	1695	1675	0	1695	1640	0	1695	1750	0	1695	1763	0
Flt Permitted	0.687			0.719			0.568			0.572		
Satd. Flow (perm)	1226	1675	0	1283	1640	0	1013	1750	0	1021	1763	0
Satd. Flow (RTOR)		24			58			13			8	
Lane Group Flow (vph)	22	59	0	72	107	0	6	307	0	28	314	0
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)	14.0	14.0		14.0	14.0		56.4	56.4		56.4	56.4	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.76	0.76		0.76	0.76	
v/c Ratio	0.10	0.18		0.30	0.30		0.01	0.23		0.04	0.23	
Control Delay	25.4	18.0		29.2	15.7		4.3	4.4		4.3	4.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.4	18.0		29.2	15.7		4.3	4.4		4.3	4.5	
LOS	C	B		C	B		A	A		A	A	
Approach Delay		20.0			21.2			4.4			4.5	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	2.6	4.1		8.8	5.8		0.2	10.5		0.9	11.0	
Queue Length 95th (m)	8.0	12.9		19.3	17.5		1.5	28.5		4.1	29.5	
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)	531	740		556	744		769	1333		776	1342	
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	0.04	0.08		0.13	0.14		0.01	0.23		0.04	0.23	

Intersection Summary	
Cycle Length: 92.4	
Actuated Cycle Length: 74.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 41.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Albion & Rideau

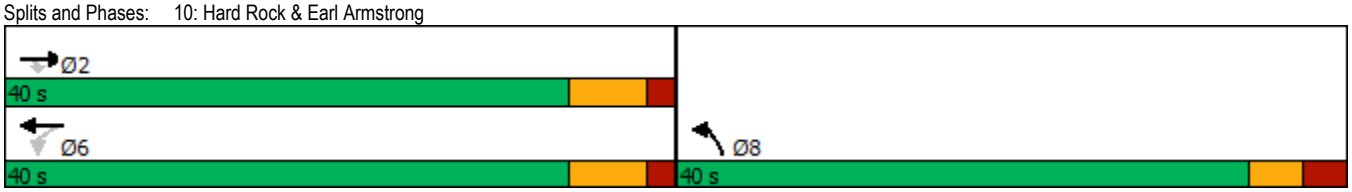


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1000	2	11	450	0	6
Future Volume (vph)	1000	2	11	450	0	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.8	3.5	3.5	3.8	3.8	3.8
Storage Length (m)		25.0	100.0		0.0	0.0
Storage Lanes		1	1		1	0
Taper Length (m)			60.0		5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97	1.00		0.98	
Frt		0.850			0.865	
Flt Protected			0.950			
Satd. Flow (prot)	3427	1483	1658	3427	1532	0
Flt Permitted			0.248			
Satd. Flow (perm)	3427	1432	432	3427	1532	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1			29	
Link Speed (k/h)	80			80	50	
Link Distance (m)	272.2			262.4	227.1	
Travel Time (s)	12.2			11.8	16.4	
Confl. Peds. (#/hr)		5	5		5	5
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1111	2	12	500	0	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1111	2	12	500	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	5.0			5.0	3.8	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.04	1.09	1.09	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	
Detector Template	Thru	Right	Left	Thru	Left	
Leading Detector (m)	93.0	18.6	18.6	93.0	18.6	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	5.5	18.6	18.6	5.5	18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)	87.5			87.5		
Detector 2 Size(m)	5.5			5.5		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	
Minimum Split (s)	26.4	26.4	26.4	26.4	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	33.6	33.6	33.6	33.6	34.0	
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
All-Red Time (s)	1.8	1.8	1.8	1.8	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	Min	Min	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	5	5	
Act Effct Green (s)	49.1	49.1	49.1	49.1	13.8	
Actuated g/C Ratio	0.90	0.90	0.90	0.90	0.25	
v/c Ratio	0.36	0.00	0.03	0.16	0.02	
Control Delay	5.1	6.0	6.3	4.1	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.1	6.0	6.3	4.1	0.0	
LOS	A	A	A	A	A	
Approach Delay	5.1			4.1		
Approach LOS	A			A		
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	
Queue Length 95th (m)	87.0	1.0	3.7	33.3	0.2	
Internal Link Dist (m)	248.2			238.4	203.1	
Turn Bay Length (m)		25.0	100.0			
Base Capacity (vph)	3092	1292	390	3092	1066	
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	0.36	0.00	0.03	0.16	0.01	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 54.4			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 4.8		Intersection LOS: A	
Intersection Capacity Utilization 50.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 10: Hard Rock & Earl Armstrong

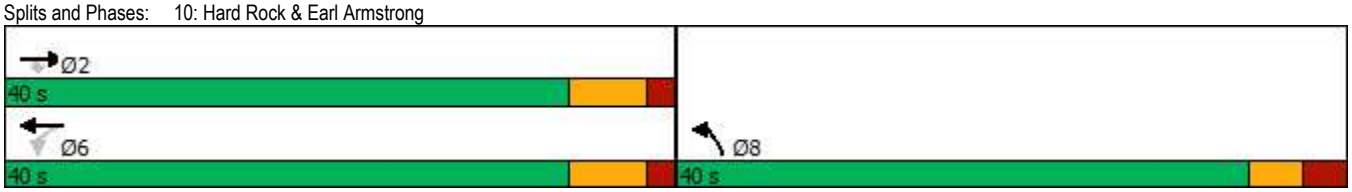


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	450	11	54	1000	15	40
Future Volume (vph)	450	11	54	1000	15	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.8	3.5	3.5	3.8	3.8	3.8
Storage Length (m)		25.0	100.0		0.0	0.0
Storage Lanes		1	1		1	0
Taper Length (m)			60.0		5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97	0.99		0.99	
Frt		0.850			0.903	
Flt Protected			0.950		0.986	
Satd. Flow (prot)	3427	1483	1658	3427	1585	0
Flt Permitted			0.469		0.986	
Satd. Flow (perm)	3427	1432	814	3427	1584	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		12			44	
Link Speed (k/h)	80			80	50	
Link Distance (m)	272.2			262.4	227.1	
Travel Time (s)	12.2			11.8	16.4	
Confl. Peds. (#/hr)		5	5		5	5
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	500	12	60	1111	17	44
Shared Lane Traffic (%)						
Lane Group Flow (vph)	500	12	60	1111	61	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	5.0			5.0	3.8	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.04	1.09	1.09	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	
Detector Template	Thru	Right	Left	Thru	Left	
Leading Detector (m)	93.0	18.6	18.6	93.0	18.6	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	5.5	18.6	18.6	5.5	18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)	87.5			87.5		
Detector 2 Size(m)	5.5			5.5		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	
Minimum Split (s)	26.4	26.4	26.4	26.4	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	33.6	33.6	33.6	33.6	34.0	
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
All-Red Time (s)	1.8	1.8	1.8	1.8	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	Min	Min	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	5	5	
Act Effct Green (s)	42.5	42.5	42.5	42.5	14.2	
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.25	
v/c Ratio	0.20	0.01	0.10	0.44	0.14	
Control Delay	7.2	5.9	9.4	9.1	9.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.2	5.9	9.4	9.1	9.2	
LOS	A	A	A	A	A	
Approach Delay	7.2			9.1	9.2	
Approach LOS	A			A	A	
Queue Length 50th (m)	9.8	0.0	2.1	27.5	1.8	
Queue Length 95th (m)	34.5	2.7	12.3	90.1	7.3	
Internal Link Dist (m)	248.2			238.4	203.1	
Turn Bay Length (m)		25.0	100.0			
Base Capacity (vph)	2533	1061	601	2533	1019	
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	0.20	0.01	0.10	0.44	0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 57.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 10: Hard Rock & Earl Armstrong



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	450	18	93	300	13	35
Future Volume (vph)	450	18	93	300	13	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.8	3.5	3.5	3.8	3.8	3.8
Storage Length (m)		25.0	100.0		0.0	0.0
Storage Lanes		1	1		1	0
Taper Length (m)			60.0		5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97	0.99		0.99	
Frt		0.850			0.901	
Flt Protected			0.950		0.987	
Satd. Flow (prot)	3427	1483	1658	3427	1583	0
Flt Permitted			0.469		0.987	
Satd. Flow (perm)	3427	1432	814	3427	1581	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		20			39	
Link Speed (k/h)	80			80	50	
Link Distance (m)	272.2			262.4	227.1	
Travel Time (s)	12.2			11.8	16.4	
Confl. Peds. (#/hr)		5	5		5	5
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	500	20	103	333	14	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	500	20	103	333	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	5.0			5.0	3.8	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.04	1.09	1.09	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	
Detector Template	Thru	Right	Left	Thru	Left	
Leading Detector (m)	93.0	18.6	18.6	93.0	18.6	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	5.5	18.6	18.6	5.5	18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)	87.5			87.5		
Detector 2 Size(m)	5.5			5.5		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	
Minimum Split (s)	26.4	26.4	26.4	26.4	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	33.6	33.6	33.6	33.6	34.0	
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
All-Red Time (s)	1.8	1.8	1.8	1.8	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	Min	Min	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	5	5	
Act Effct Green (s)	36.0	36.0	36.0	36.0	13.9	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.27	
v/c Ratio	0.21	0.02	0.18	0.14	0.12	
Control Delay	8.3	6.2	11.4	8.2	7.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.3	6.2	11.4	8.2	7.1	
LOS	A	A	B	A	A	
Approach Delay	8.2			8.9	7.1	
Approach LOS	A			A	A	
Queue Length 50th (m)	9.8	0.0	3.8	6.2	1.1	
Queue Length 95th (m)	35.3	3.7	20.7	23.6	5.5	
Internal Link Dist (m)	248.2			238.4	203.1	
Turn Bay Length (m)		25.0	100.0			
Base Capacity (vph)	2605	1093	619	2605	1101	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.02	0.17	0.13	0.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 51.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.21			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 10: Hard Rock & Earl Armstrong