Transportation Impact Assessment – Step 3: Forecasting

4639 Bank Street

Prepared for Glenview Homes
by IBI Group
August 6, 2020

Document Control Page

CLIENT:	Glenview Homes
PROJECT NAME:	4639 Bank Street
REPORT TITLE:	Transportation Impact Assessment
IBI REFERENCE:	125600
VERSION:	Draft
DIGITAL MASTER:	J:\125600_4639BankSt\6.0_Technical\6.23_Traffic\03_Tech-Reports\TTR_4639BankSt_MASTER_2020-05-07.docx
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HISTORY:	TIA Step 1 & 2 Submitted for City Review – May 20, 2020 TIA Step 3 Submitted for City Review – August 6, 2020

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1 Introduction

IBI Group (IBI) was retained by Glenview Homes to undertake a Transportation Impact Assessment (TIA) in support of a combined Zoning By-law Amendment and Site Plan Control application for a proposed residential development to be located at 4639 Bank Street, Ottawa.

In accordance with the City of Ottawa's Transportation Impact Assessment Guidelines, published in June 2017, the following report is divided into four major components:

- **Screening** – Prior to the commencement of a TIA, an initial assessment of the proposed development is undertaken to establish the need for a comprehensive review of the site based on three triggers: Trip Generation, Location and Safety.
- **Scoping** – This component of the TIA report describes both the existing and planned conditions in the vicinity of the development and defines study parameters such as the study area, analysis periods and analysis years of the development. It also provides an opportunity to identify any scope exemptions that would eliminate elements of scope described in the TIA Guidelines that are not relevant to the development proposal, based on consultation with City staff.
- **Forecasting** – The Forecasting component of the TIA is intended to review both the development-generated travel demand and the background network travel demand, and provides an opportunity to rationalize this demand to ensure projections are within the capacity constraints of the transportation network.
- **Analysis** – This component documents the results of any analyses undertaken to ensure that the transportation related features of the proposed development are in conformance with prescribed technical standards and that its impacts on the transportation network are both sustainable and effectively managed. It also identifies a development strategy to ensure that what is being proposed is aligned with the City of Ottawa's city-building objectives, targets and policies.

Throughout the development of a TIA report, each of the four study components above are submitted in draft form to the City of Ottawa and undergo a review by a designated Transportation Project Manager. Any comments received are addressed to the satisfaction of the City's Transportation Project Manager before proceeding with subsequent components of the study. All technical comments and responses throughout this process are included in **Appendix A**.

Dependent on the findings of this report, the complete submission of this Transportation Impact Assessment may also require Functional Design Drawings of recommended roadway improvements to support a Roadway Modification Application (RMA). The submission may also require a post-development Monitoring Plan to track performance of the planned TIA Strategy. The need for these two elements will be confirmed through the analysis undertaken for this report.

2 TIA Screening

An initial screening was completed to confirm the need for a Transportation Impact Assessment by reviewing the following three triggers:

- **Trip Generation**: Based on the proposed number of stacked townhome units, the minimum development size threshold has been exceeded and therefore the Trip Generation trigger is satisfied.
- **Location**: The proposed development is located adjacent to Bank Street which is a spine bicycle route and, as such, the Location trigger is satisfied.
- **Safety**: Boundary street conditions were reviewed to determine if there is an elevated potential for safety concerns adjacent the site. Based on this review, there may be an elevated potential for safety concerns adjacent to the site due to the location of the proposed Bank Street access and therefore the Safety trigger is satisfied.

As the proposed development meets the Trip Generation, Location and Safety triggers, the need to undertake a Transportation Impact Assessment is confirmed.

A copy of the Screening Form is provided in **Appendix B**.

3 Project Scoping

3.1 Description of Proposed Development

3.1.1 Site Location

The proposed development is within the Leitrim Community and is approximately 1.2 hectares in size. It is bound by Bank Street to the west, Rotary Way to the north, the Ottawa Rotary Home to the east and residential dwellings to the south.

The site location is illustrated in **Exhibit 1.**

3.1.2 Land Use Details

Table 1 summarizes the proposed land uses included in this development.

Table 1 - Land Use Statistics

LAND USE	SIZE
Stacked Townhomes	112 units

The site will provide 146 vehicle parking spaces, including 22 visitor parking spaces, and 58 bicycle parking spaces. The configuration of the proposed development is illustrated in **Exhibit 2**. Access to the site will be provided via a full-movement access on Rotary Way.

The subject site is currently an undeveloped greenfield site and is zoned DR – Development Reserve, based on geoOttawa.

3.1.3 Development Phasing & Date of Occupancy

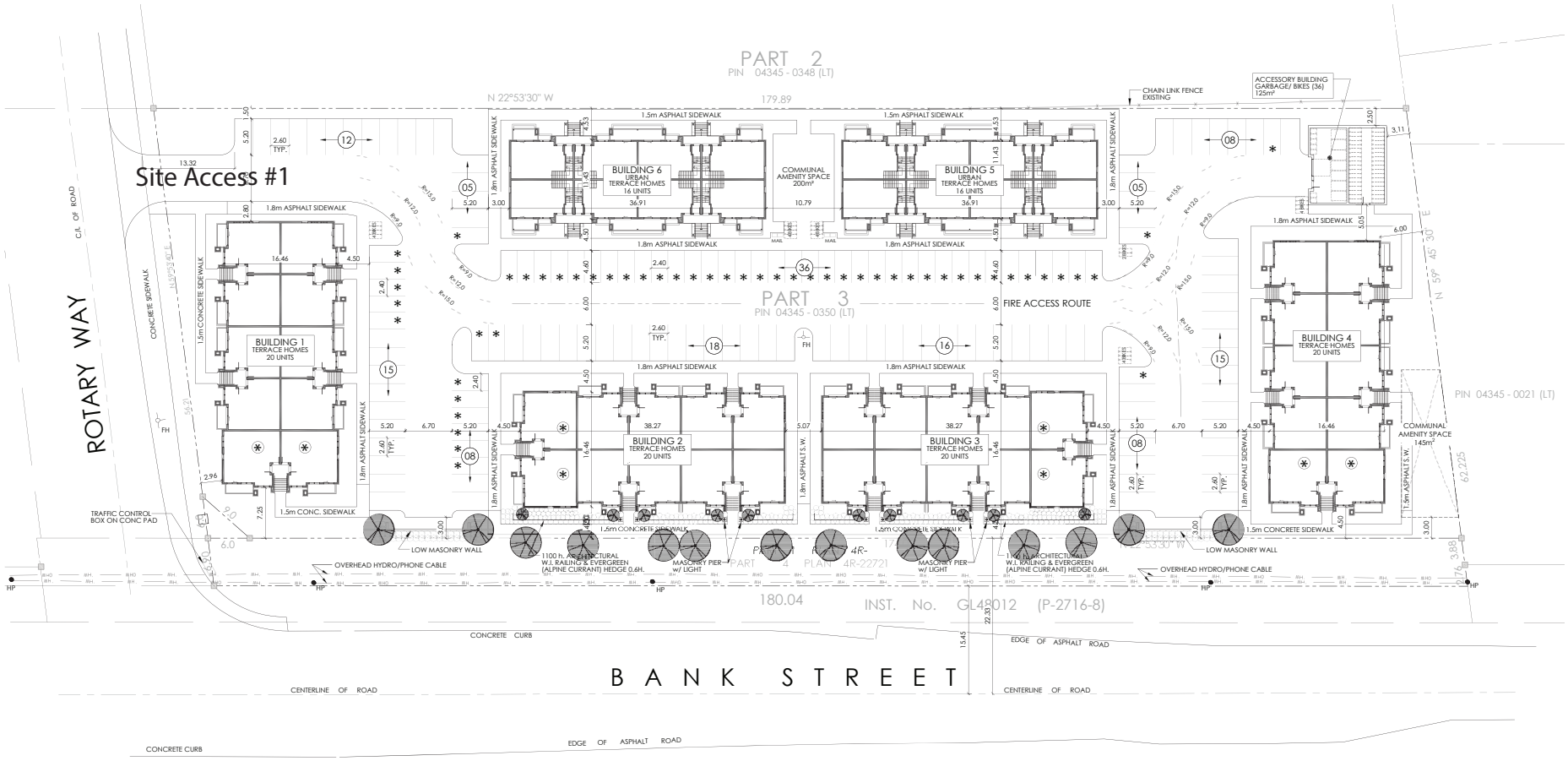
It has been assumed that the proposed development will be fully built out and occupied in a single phase by the end of 2022.

IBI

4639 Bank Street
Transportation Impact Assessment

Exhibit 1:
Site Location

PROJECT No. 125600
DATE: August 2020
SCALE: 0m 125m 250m



PROJECT No. 125600
DATE: August 2020
SCALE: 0m 10m 20m

Exhibit 2:
Proposed Development

4639 Bank Street
Transportation Impact Assessment

| B |

3.2 Existing Conditions

3.2.1 Existing Road Network

3.2.1.1 Roadways

The proposed development is bound by the following street(s):

- **Bank Street** is an arterial road under the jurisdiction of the City of Ottawa that extends north-south through Ottawa from Wellington Street in the north to the urban boundary, where it becomes County Road 31. In the vicinity of the proposed development, Bank Street has a 2-lane rural cross-section with a posted speed limit of 70 km/h and a right-of-way protection of 44.5m.
- **Rotary Way** is an urban collector road under the jurisdiction of the City of Ottawa that extends from Bank Street to Fernside Street. It has a 26m right-of-way and an unposted speed limit of 50 km/h.

Other streets within the context area of the proposed development are as follows:

- **Leitrim Road** is an arterial road under the jurisdiction of the City of Ottawa that extends east-west from River Road to east of Hall Road. Leitrim Road has a 2-lane rural cross-section with a posted speed limit of 60 km/h and a right-of-way protection of 35.5m with an additional 5.0m reserved on the rural side to accommodate a rural cross-section.
- **Analdea Drive** is identified in the Official Plan as urban collector road under the jurisdiction of the City of Ottawa that extends east from Bank Street to a dead-end at Fernside Street. Although designated an urban collector road with a right-of-way protection of 24m, Analdea Drive is currently configured as a two-lane rural road with a 20m right-of-way and a posted speed limit of 50 km/h.
- **White Alder Avenue** is an urban local road under the jurisdiction of the City of Ottawa that extends from Bank Street to Findlay Creek Drive. It has 24m right-of-way and an unposted speed limit of 50 km/h.
- **Findlay Creek Drive** is an urban collector road under the jurisdiction of the City of Ottawa that runs east-west from Albion Road to Bank Street. It has a 30m right-of-way and a posted speed limit of 50 km/h.

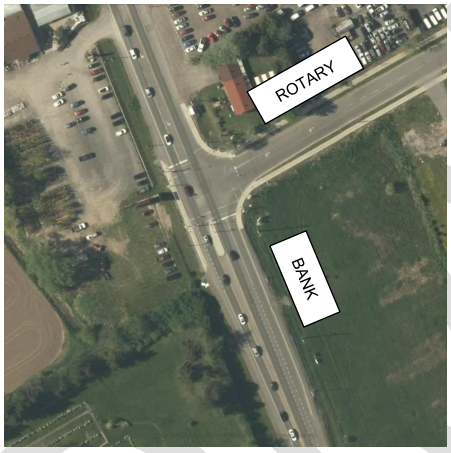
3.2.1.2 Driveways Adjacent to Development Access

The only driveway within 200m of the proposed Rotary Way access is the driveway for the Ottawa Rotary Home.

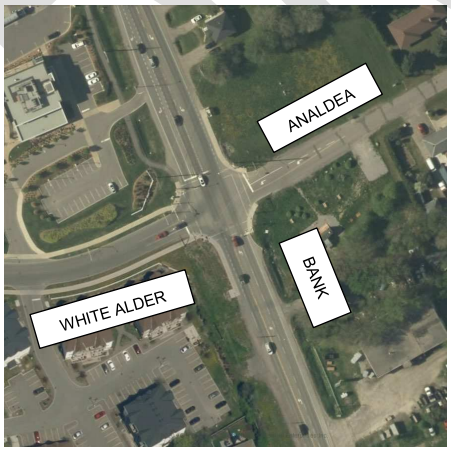
3.2.1.3 Intersections

The following intersections have the greatest potential to be impacted by the proposed development:

- **Bank Street & Leitrim Road** is a four-legged signalized intersection with left-turn lanes on the northbound, southbound and westbound approaches and right-turn lanes on the southbound and westbound approaches. The intersection is located 520m north of the proposed development and has documented capacity issues during weekday peak periods.



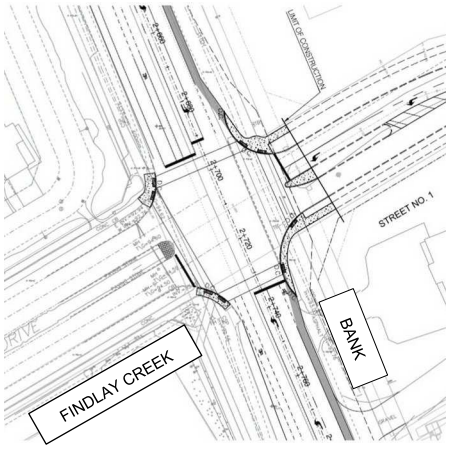
- **Bank Street & Rotary Way** is a 3-legged signalized intersection with auxiliary left-turn lanes on the southbound and westbound approaches, and an auxiliary right-turn lane on the northbound approach. The intersection is located immediately adjacent to the subject site and will be most impacted by the addition of site-generated traffic. The intersection will ultimately be reconfigured as a 4-legged intersection with the planned extension of Barrett Farm Drive.



- **Bank Street & Analdea Drive / White Alder Avenue** is a 4-legged signalized intersection with auxiliary left-turn lanes on all approaches and an auxiliary right-turn lane on the southbound approach. The intersection is located approximately 350m south of the proposed development and may only experience a nominal increase in traffic associated with the proposed development.

The intersection control and lane configurations for the intersections described above are shown in **Exhibit 3**.

One other intersection of significance is located within the context area of the proposed development:



- **Bank Street & Findlay Creek Drive** has recently been reconstructed to accommodate the Lilythorne subdivision via a new road on the east approach which was opened to the public as a signalized intersection in fall 2019. The intersection has auxiliary left-turn lanes on all approaches and an auxiliary right-turn lane on the southbound approach. The intersection is located 730m south of the proposed development.

3.2.1.4 Traffic Management Measures

On-road speed limit pavement markings and flexible centreline signs are currently installed on Rotary Way. These traffic management measures are located east of Fairweather Private, 240m east of Bank Street. There are currently no existing traffic management or traffic calming measures located on Bank Street or at any of the intersections within the context area.

3.2.1.5 Existing Traffic Volumes

As the proposed development will consist of residential land uses, the weekday peak hour traffic conditions will be most affected by any associated increase in traffic. Weekday morning and afternoon peak hour turning movement counts were therefore obtained from the City of Ottawa at the following intersections:

- Bank Street & Leitrim Road (City of Ottawa, December 2019)
- Bank Street & Rotary Way (City of Ottawa, December 2019)
- Bank Street & Analdea Drive / White Alder Avenue (City of Ottawa, December 2019)

Peak hour traffic volumes representative of existing conditions are shown in **Exhibit 4**. Weekday morning and afternoon peak hour turning movement counts have been provided in **Appendix C**.

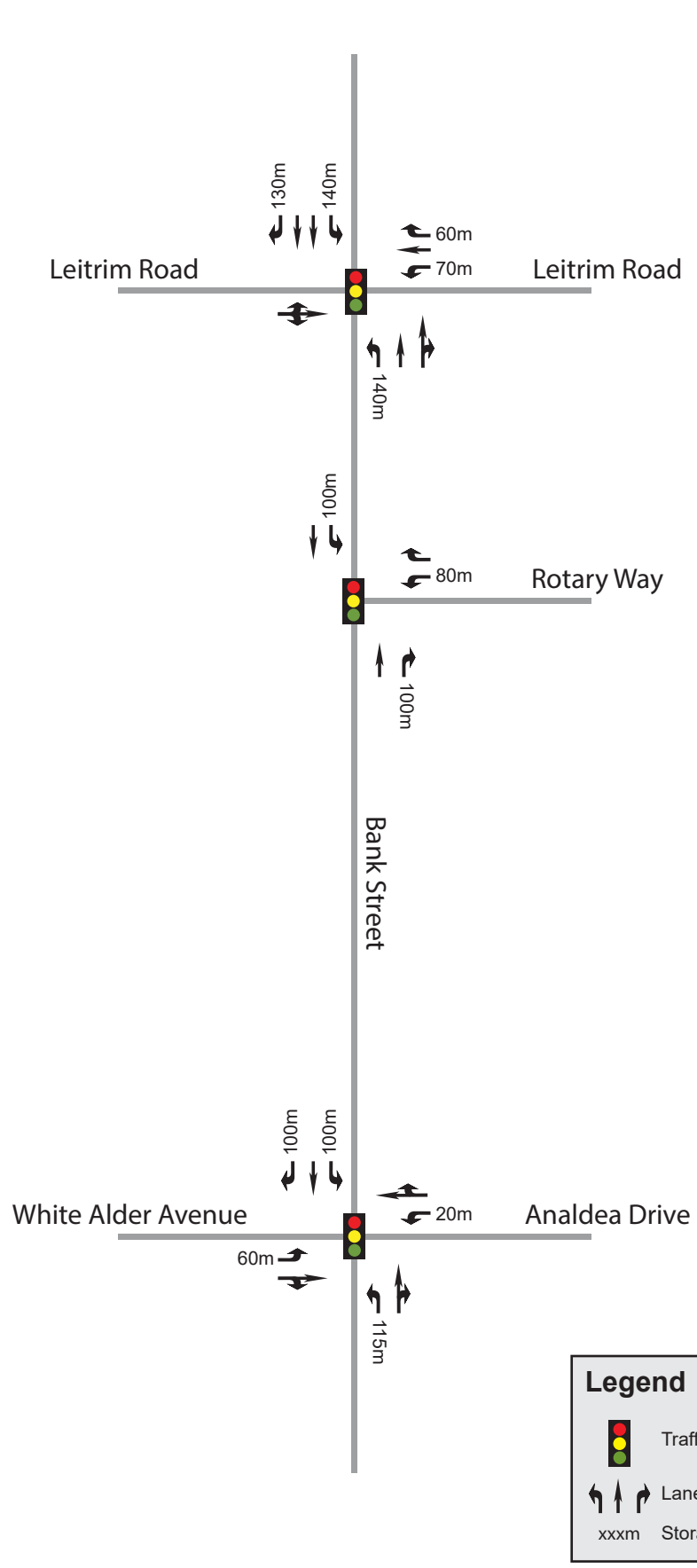


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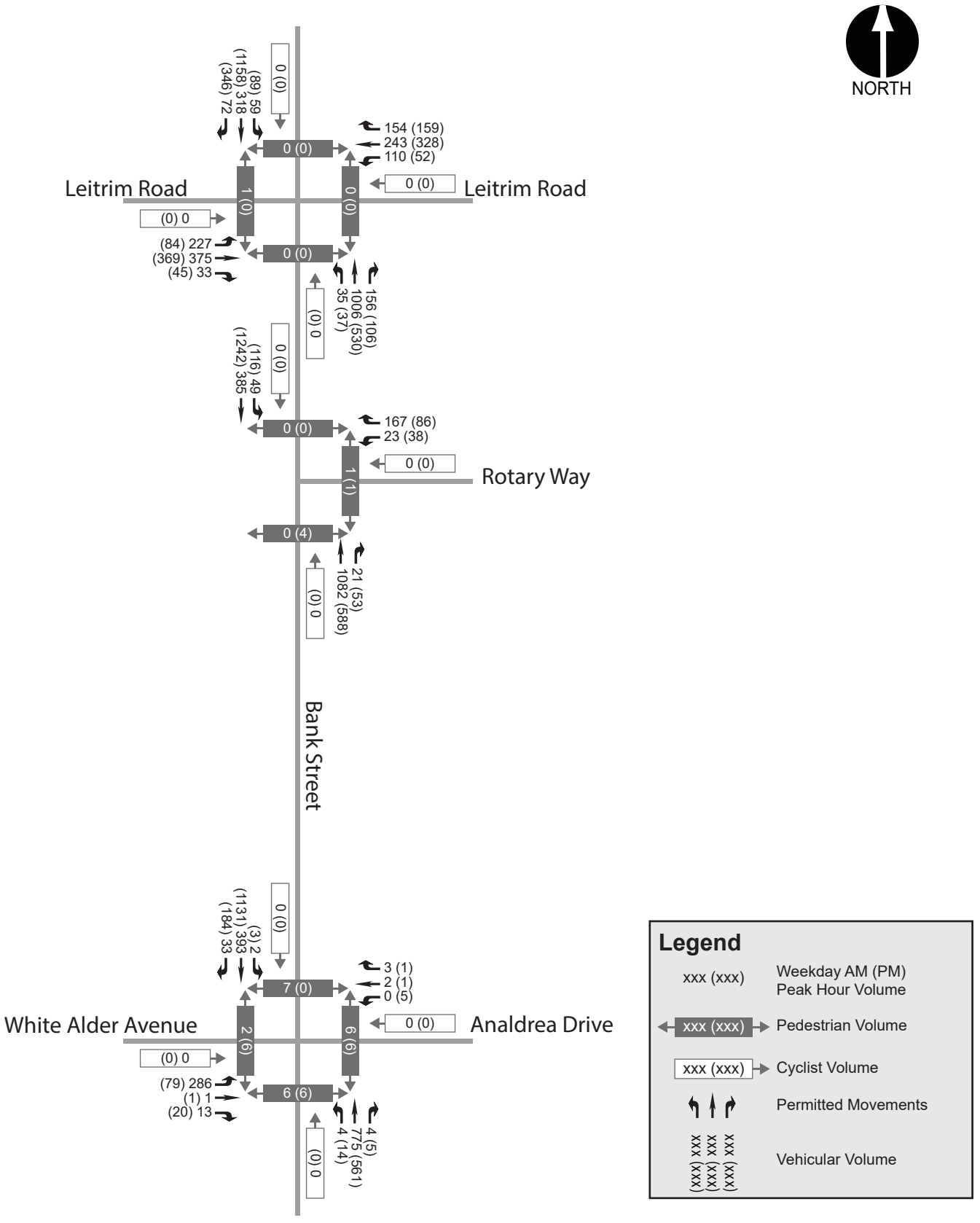
Exhibit 4:
Existing (2020) Lane Configurations and Intersection Control

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.



4639 Bank Street
Transportation Impact Assessment

Exhibit 4:
Existing (2020)
Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.

3.2.2 Existing Bicycle and Pedestrian Facilities

Pedestrian facilities are presently limited to concrete sidewalks on both sides Rotary Way, White Alder Avenue and Findlay Creek Drive. Along Bank Street, pedestrian facilities are only present at signalized intersections.

Cycling facilities along Bank Street are also limited, with paved shoulders on both sides of Bank Street and pocket bike lanes at the following locations:

- Northbound approach of the Bank Street & Rotary Way intersection;
- Southbound approach of the Bank Street & Analdea Drive / White Alder Avenue intersection; and
- Southbound approach of the Bank Street & Findlay Creek Drive intersection.

3.2.3 Existing Transit Facilities and Service

The following transit routes, operated by OC Transpo, exist within the vicinity of the site:

- **Route #93** provides regular, all-day service between Leitrim Station and Greenboro Station and operates on 15- to 30-minute headways during peak periods. On weekends service is reduced to 30-minute headways.
- **Route #294** provides weekday peak period service between Hurdman Station and the Findlay Creek community and operates on 30-minute headways.
- **Route #304** provides Thursday-only service between Metcalfe, Greely and Osgoode, and Billing's Bridge shopping centre.

Transit service maps for the individual routes above are provided in **Appendix D**. The bus stops located within the vicinity of the proposed development are shown below in **Figure 1**. The nearest bus stops are presently located immediately adjacent to the proposed development near the Hope Cemetery and at the Bank Street & Rotary Way intersection.

Figure 1 - Bus Stops

Source: OC Transpo

3.2.4 Collision History

A review of historical collision data has been undertaken for the boundary streets with the vicinity of the proposed development. The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. **Table 2** summarizes all reported collisions between January 1, 2014 and December 31, 2018.

Table 2 – Reported Collisions within Vicinity of Proposed Development

LOCATION	# OF REPORTED COLLISIONS
INTERSECTIONS	
Bank Street & Leitrim Road	58
Bank Street & Rotary Way	9
Bank Street & Analdea Drive / White Alder Avenue	23
SEGMENTS	
Bank Street – Leitrim Road to Rotary Way	35
Bank Street – Rotary Way to Analdea Drive / White Alder Avenue	1

Based on a preliminary review of the collision history noted above, intersection and road segments with more than six collisions over the five-year period may require further review.

Detailed collision records are provided in **Appendix E**.

Another method of evaluating the relative magnitude of collision frequency at one intersection compared to another is to quantify the average historical number of collisions against the daily volume of traffic entering the intersection. This is commonly expressed in terms of Million Vehicles Entering (MVE) and a rate of greater than 1.0 is considered significant.

The above noted intersections are therefore calculated as having average collision frequencies per MVE values:

- Bank Street & Leitrim Road – 0.94
- Bank Street & Rotary Way – 0.22
- Bank Street & Analdea Drive / White Alder Avenue – 0.60

Of the three intersections evaluated above, none have a collision frequency in excess of 1.0 and therefore are not considered significant. The road segment of Bank Street between Leitrim Road and Rotary Way has experienced a significant amount of collisions and therefore will require further review.

3.3 Planned Conditions

3.3.1 Transportation Network

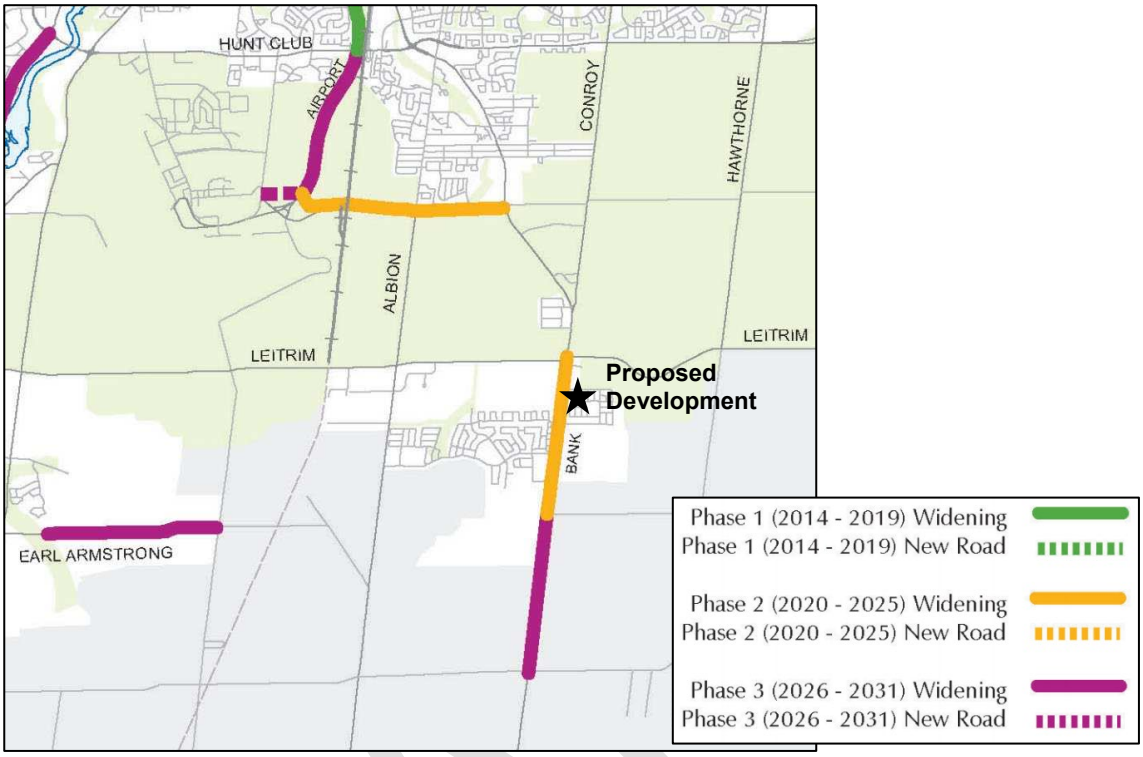
3.3.1.1 Future Road Network Projects

The 2013 Transportation Master Plan (TMP) outlines future road network modifications required in the 2031 'Affordable Network'. The following project was noted that may have an impact on area traffic within the vicinity of the site:

- **Bank Street** – Planned widening from two to four lanes between Leitrim Road and Blais Road by 2025 (Phase 2: 2020-2025) and from two to four lanes between Blais Road and Rideau Road by 2031 (Phase 3: 2026-2031).

Figure 2 illustrates the planned changes to the arterial road network in the broader area, as per the TMP Affordable Plan, however it should be noted that the timelines and phasing limits indicated in the TMP have since been refined.

Figure 2 - Future Road Network Projects



Source: 2013 Transportation Master Plan – Map 11 '2031 Affordable Network'

The Bank Street widening project timeline and extents have been updated several times since the TMP was published. Based on recent discussions with City of Ottawa staff, the current staging plan for the Bank Street widening in the vicinity of the proposed development is as follows:

- Widening of Bank Street from two to four lanes from south of Leitrim Road to Dun Skipper Drive is scheduled to be completed by end of 2022.
- The reconstruction of the Bank Street & Leitrim Road intersection is scheduled to be completed by end of 2023.

It is understood that the Bank Street widening and the reconstruction of the Bank Street & Leitrim Road intersection will be completed in accordance with the complete streets philosophy to accommodate all travel modes within the vicinity of the proposed development.

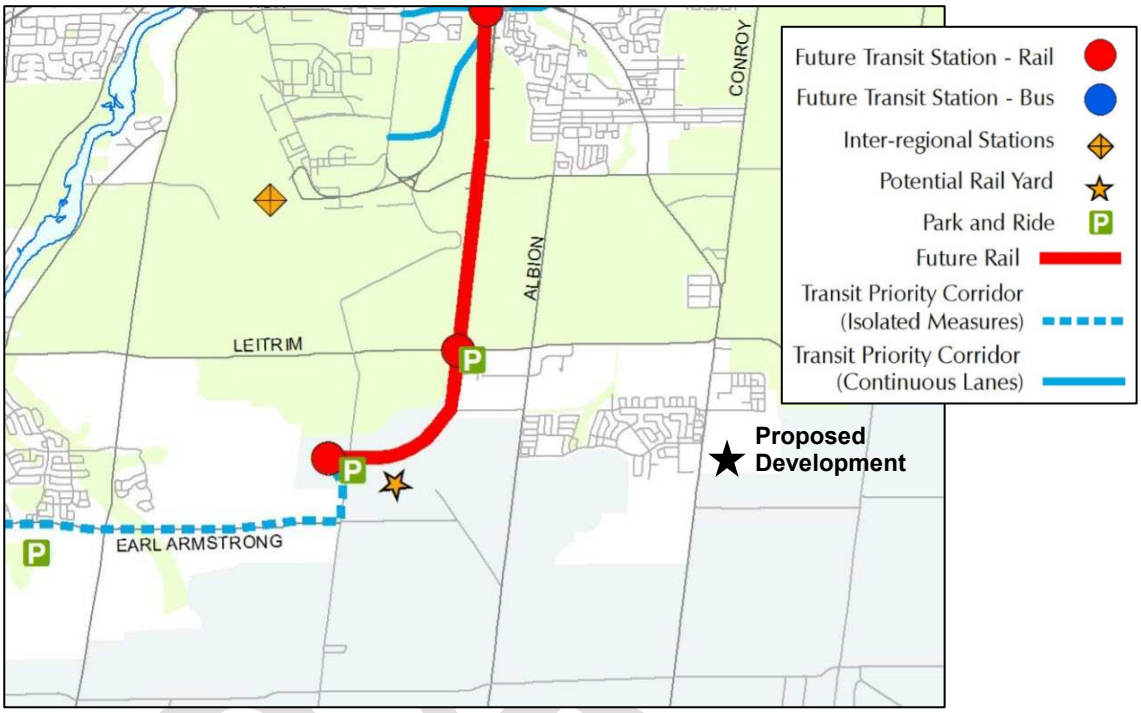
3.3.1.2 Future Transit Facilities and Services

The 2013 TMP outlines the future rapid transit and transit priority (RTTP) network. The following projects were noted in the 'Affordable RTTP Network' that may have a future impact on study area traffic:

- **Trillium Line Extension** – Extension of the Trillium Line from its current terminus at Greenboro Station to Bowesville Station. The *Trillium Line Extension Planning and Environmental Assessment (EA) Study (January 2016)* and the *Trillium Line Light Rail Transit Extension Addendum (September 2018)* both expand upon the TMP. The Trillium Line will now extend to Limebank Road with a spur line to the Ottawa International Airport. Based on the official City of Ottawa Stage 2 LRT website, the Trillium Line extension is expected to begin revenue service by the end of 2022.

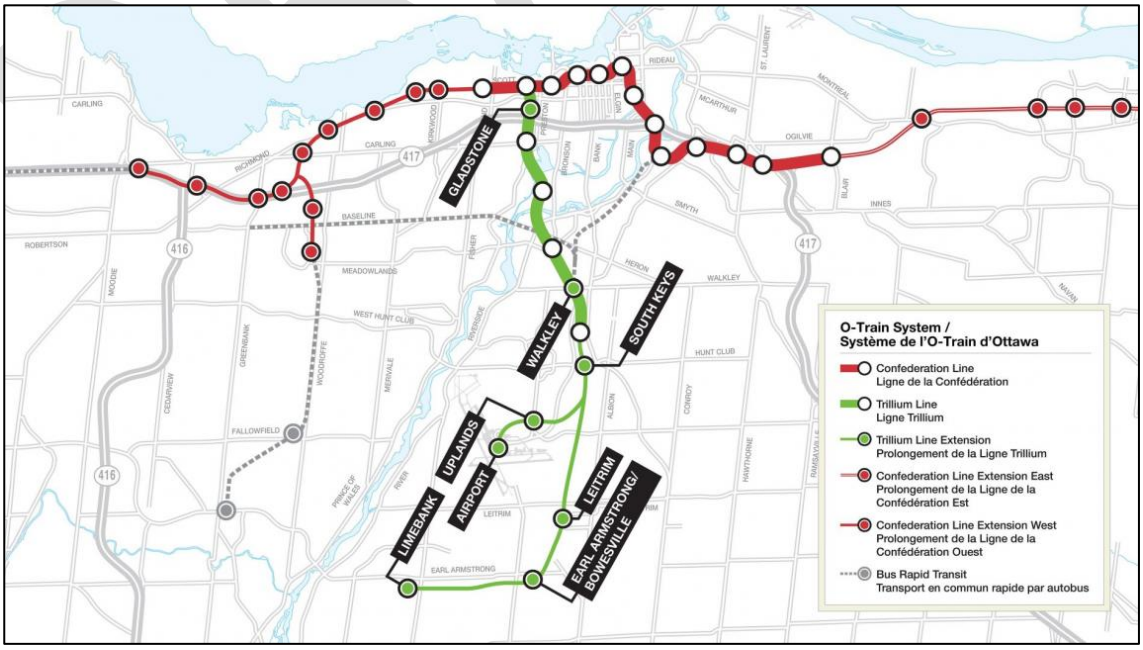
Figure 3 shows the transit infrastructure projects in the vicinity of the proposed development that are part of the TMP's 2031 Affordable Network. **Figure 4** below illustrates the proposed Trillium Line extension, including the recommendations from the EA study and the Addendum.

Figure 3 - Future 'Affordable RTTP Network Projects'



Source: 2013 Transportation Master Plan – Map 5 '2031 Affordable Network'

Figure 4 - Stage 2 LRT - Trillium Line Extension



Source: City of Ottawa Stage 2 LRT Project Website – Trillium Line South Extension

3.3.1.3 Future Cycling and Pedestrian Facilities

The 2013 Ottawa Cycling Plan (OCP) designates Bank Street and Leitrim Road as 'Spine Routes'. Spine Routes form the primarily cycling network, linking the commercial, employment, institutional, residential and educational nodes throughout the City of Ottawa. Additionally, the OCP designates Findlay Creek Drive as a 'Local Route'. Local Routes are implemented at a neighbourhood level to connect residential and commercial areas to Spine routes.

The Bank Street EA recommended the implementation of sidewalks and cycle tracks on both sides of Bank Street within the urban area, multi-use pathways (MUP) within the Greenbelt and paved shoulders separated from the travel lane by a rumble strip within the rural area. The detailed design for the four-lane widening of Bank Street includes concrete sidewalks and cycle tracks on both sides of Bank Street as well as protected intersections.

3.3.2 Future Adjacent Developments

The City of Ottawa Transportation Impact Assessment (TIA) Guidelines specify that all significant developments proposed within the surrounding area which are likely to occur within the study's horizon year must be identified and taken into consideration in the development of future background traffic projections.

All current development applications within the context area of the proposed development have been identified. With the exception of the Cowan's Grove Mid-Density Residential Block (4791 Bank Street), all of these developments were either accounted for explicitly in the Leitrim Master Transportation Study (MTS), undertaken by IBI Group in March 2017, or would contribute a negligible volume of traffic to the adjacent road network. **Table 3** summarizes all developments noted in the MTS.

Table 3 - Leitrim Master Transportation Study Developments

DEVELOPMENT	LAND USE	SIZE
Remaining Findlay Creek	Residential	152 units
Remaining Lemay and Sundance	Residential	158 units
Barrett Lands	Residential	797 units
Barrett Extension Lands	Residential	150 units
OPA Areas 9A & 9B	Residential	1,319 units
	Commercial	15,450 m^2
Findlay Creek Stage 2 Phase 4C	Residential	240
Transport Canada Lands	Residential	231
Remer and Idone	Residential	1,155
	Commercial	24,187 m^2

In addition to the developments in the Leitrim MTS, IBI Group recently completed a Transportation Impact Assessment for the Cowan's Grove Mid-Density residential development at 4791 Bank Street, located approximately 870m south of the subject site and consisting of 102 stacked townhome dwellings.

3.3.3 Network Concept Screenline

A network screenline analysis is not expected to be necessary for this development, as it does not trigger the threshold prescribed by the TIA of 200 person-trips during the peak hour beyond what is otherwise permitted by the current zoning. Detailed trip generation will be provided in the Forecasting section of this report.

3.4 Study Area

With consideration of the information presented thus far, the following intersections have been identified as being most impacted by the proposed development and will be assessed for vehicular capacity as part of this study:

- Bank Street & Leitrim Road
- Bank Street & Rotary Way
- Rotary Way & Site Access #1
- Bank Street & Analdea Drive / White Alder Avenue

Multi-Modal Level of Service (MMLOS) will be conducted for all intersections listed above with the exception of the stop-controlled intersections as no methodology currently exists for evaluating MMLOS at unsignalized intersections. The need to provide alternative means of traffic control (i.e. signals) at the stop-controlled intersections will be reviewed in the Analysis component of this study to determine whether traffic signals are warranted or required operationally within the study horizon year.

Segment-based MMLOS analysis is required for boundary roadways which do not currently have a 'Complete Street' design concept. A detailed design following the 'Complete Street' philosophy has been prepared for the segment of Bank Street adjacent to the subject site therefore a review of the proposed development's impact on the design will be completed instead. Segment-based

MMLOS analysis will therefore be limited to the segment of Rotary Way adjacent to the proposed development.

3.5 Time Periods

Based on the proposed residential land use, traffic generated during the weekday morning and afternoon peak hours is expected to result in the most significant impact to traffic operations on the adjacent road network in terms of combined development-generated and background traffic. These two time periods will therefore be considered for operational analysis in this study.

3.6 Study Horizon Year

Based on the anticipated build-out year of the proposed development, the following two analysis years will be considered in this TIA:

- Year 2022 – Full Build-Out of the Proposed Development
- Year 2027 – 5 Years Beyond Full Build-out / Occupancy

3.7 Exemptions Review

The TIA Guidelines provide exemption considerations for elements of the Design Review and Network Impact components. **Table 4** summarizes the TIA modules that are not applicable to this study.

Table 4 - Exemptions Review

TIA MODULE	ELEMENT	EXEMPTION CONISDERATIONS	REQUIRED
DESIGN REVIEW COMPONENT			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	✓
	4.1.3 New Street Networks	• Only required for plans of subdivision	✗
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	✓
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	✗
NETWORK IMPACT COMPONENT			
4.5 Transportation Demand Management	All Elements	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	✓
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	✓
4.8 Network Concept	n/a	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	✗

4 Forecasting

4.1 Development Generated Traffic

4.1.1 Trip Generation Methodology

Peak hour site-generated traffic volumes were developed using the 2009 TRANS Trip Generation Residential Trip Rates Study Report. The TRANS trip generation rates are based on a blended rate derived from 17 trip generation studies undertaken in 2008, the ITE Trip Generation Manual and the 2005 TRANS Origin-Destination (O-D) Travel Survey. Separate trip generation rates exist for each of the four general geographic areas in Ottawa: Core, Urban (Inside the Greenbelt), Suburban (Outside the Greenbelt) and Rural. These trip generation rates reflect existing travel behavior by dwelling type and geographic area. The TIA Guidelines recommends that the TRANS trip generation rates be converted to person-trips based on the vehicular mode share proportions detailed in the TRANS Trip Generation study.

The person-trips were then subdivided based on representative mode share percentages applicable to the study area to determine the number of vehicle, transit, pedestrian, cycling and other trip types.

Target mode shares were developed based on the local mode shares from the O-D Survey and the Leitrim Community Master Transportation Study (MTS).

4.1.2 Trip Generation Results

4.1.2.1 Vehicle Trip Generation

Peak hour vehicular traffic volumes associated with the 4639 Bank Street development were determined using the peak hour trip generation rates in the TRANS Trip Generation study.

The vehicular trip generation results for the proposed development have been summarized in **Table 5**.

Table 5 - Base Vehicular Trip Generation Results

LAND USE	SIZE	PERIOD	GENERATED TRIPS (VPH)		
			IN	OUT	TOTAL
Townhomes	112 units	AM	22	39	61
		PM	42	37	81

Notes: vph = Vehicles Per Hour

4.1.2.2 Person Trip Generation

The person-trip to vehicle-trip conversion factors for TRANS trip generation rates vary depending on the peak hour, geographic location and land use considered. The vehicular trip generation results for the residential land uses from the previous section were divided by the vehicle mode shares to determine the number of person-trips generated.

The results after applying the appropriate conversion factors have been summarized in **Table 6**.

Table 6 - Person-Trip Results

LAND USE	VEH MODE SHARE	PERIOD	PERSON TRIPS (PPH)		
			IN	OUT	TOTAL
Townhomes	55%	AM	41	70	111
	61%	PM	69	61	130

Notes: pph = persons per hour

4.1.2.3 Mode Share Proportions

The 2011 TRANS Origin-Destination (O-D) Survey provides approximations of the existing modal share within the South Gloucester / Leitrim Traffic Assessment Zone (TAZ). Relevant extracts from the 2011 O-D Survey are provided in **Appendix F**.

A weighted average of 'AM From', 'AM Within', 'PM To' and 'PM Within' mode share distributions from 2011 was used to estimate the existing weekday morning and afternoon mode share. Based on the Leitrim MTS, the transit mode share from the Riverside South / Leitrim area was indicated as being 10% in 2016 and projected to increase to 16% by 2031. The MTS assumed that the transit mode share would not begin to increase until 2022, in conjunction with the Trillium Line South Extension, and would then increase linearly until 2031. Recognizing that some 'transit' trips may be apparent within the study as vehicular trips en-route to the Leitrim Park & Ride, the 'other' mode share has been proportionally-reduced to increase the existing transit mode share to 10%. Consistent with the MTS, it is anticipated that the transit mode share will remain at 10% until 2022 then increase linearly to 13% in 2027. This increase in transit mode share is expected to result in a corresponding decrease in the automobile mode shares.

Table 7 summarizes the 2011 O-D Survey mode share as well as the 2022 and 2027 mode share targets.

Table 7 - 2011 O-D Survey Mode Shares and Proposed Mode Share Targets

TRAVEL MODE	2011 MODE SHARE[1]	ADJUSTED MODE SHARE	2022 MODE SHARE TARGETS	2027 MODE SHARE TARGETS
Auto Driver	58%	59%	59%	57%
Auto Passenger	20%	21%	21%	20%
Transit	8%	10%	10%	13%
Cycling	1%	1%	1%	1%
Walking	7%	7%	7%	7%
Other	6%	2%	2%	2%

Notes:

[1] – Weighted average of 'AM From', 'AM Within', 'PM To' and 'PM Within' mode share distributions from the 2011 O-D Survey.

4.1.2.4 Trip Reduction Factors

Deduction of Existing Development Trips

Not Applicable: The proposed development lands are currently undeveloped, and do not generate any traffic volumes.

Pass-by Traffic

Not Applicable: The proposed development will not generate pass-by traffic.

Synergy/ Internalization

Not Applicable: The proposed development will include only residential land uses; therefore, internalization reduction factors are not required for this study.

4.1.2.5 Trip Generation by Mode

The 2022 and 2027 mode share targets (Table 7) were applied to the number of development-generated person-trips to determine the number of trips per travel mode, as summarized in **Table 8**.

Table 8 - Peak Hour Person Trips by Mode

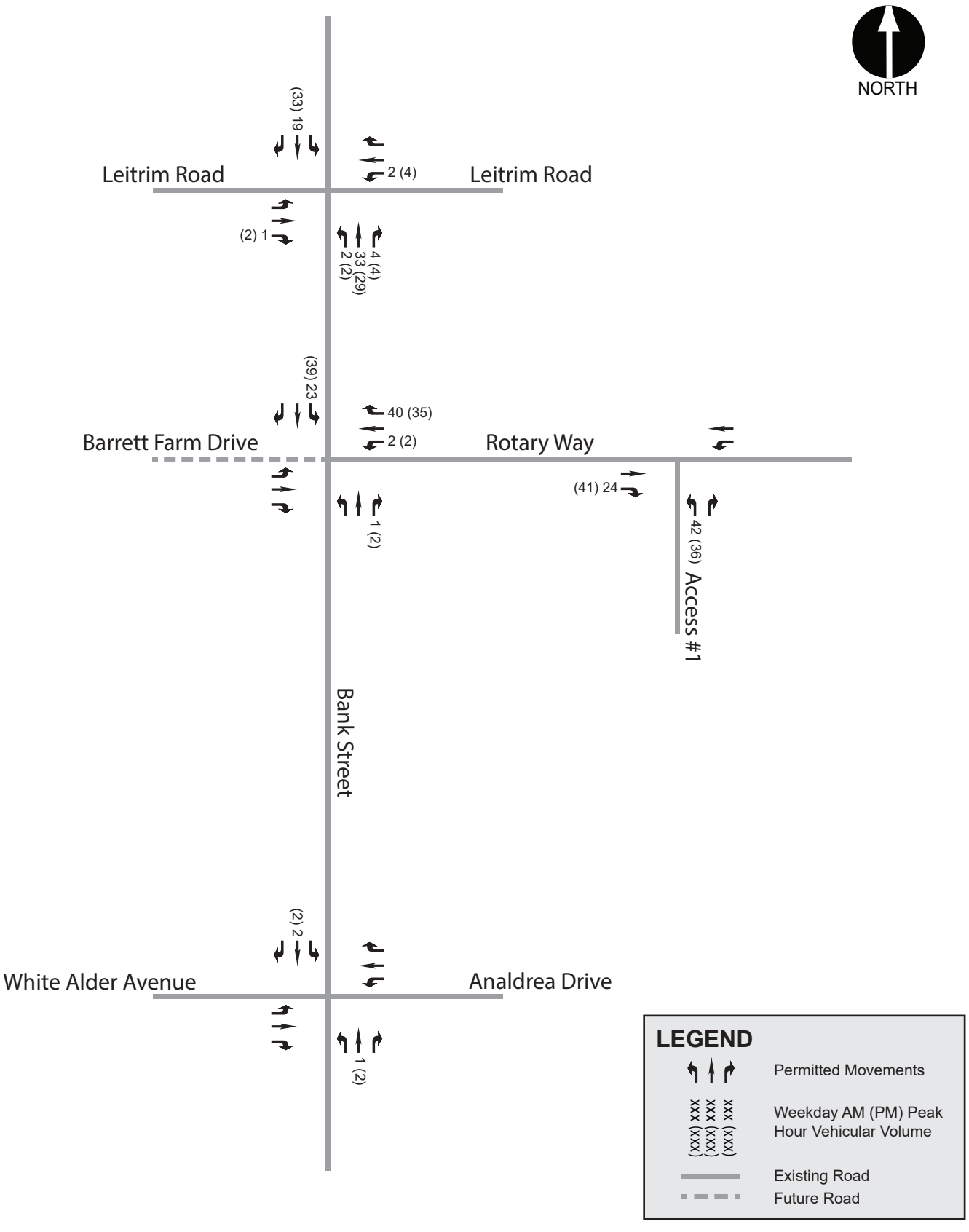
MODE	2022				2027			
	AM		PM		AM		PM	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Auto Driver	24	42	41	36	23	40	39	35
Auto Passenger	8	14	14	13	8	14	14	12
Transit	4	7	7	6	5	9	9	8
Cycling	1	1	1	1	1	1	1	1
Walking	3	5	5	4	3	5	5	4
Other	1	1	1	1	1	1	1	1
Total	**111**		**130**		**111**		**130**	

4.1.3 Trip Distribution and Assignment

Consistent with the Leitrim MTS and proportions derived from existing traffic count data, trips generated by the proposed development were distributed to the adjacent road network as follows:

- 90% to/from the North
    - 80% on Bank Street
    - 10% on Hawthorne Road via Leitrim Road
- 5% to/from the West
    - 5% west on Leitrim Road to Leitrim Park and Ride
- 5% to/from the South
    - 5% on Bank Street

Utilizing the estimated number of new auto trips and applying the above distribution, future site-generated traffic volumes for the 2022 and 2027 analysis years are illustrated for each of the study area intersections in **Exhibit 5** and **Exhibit 6**, respectively.

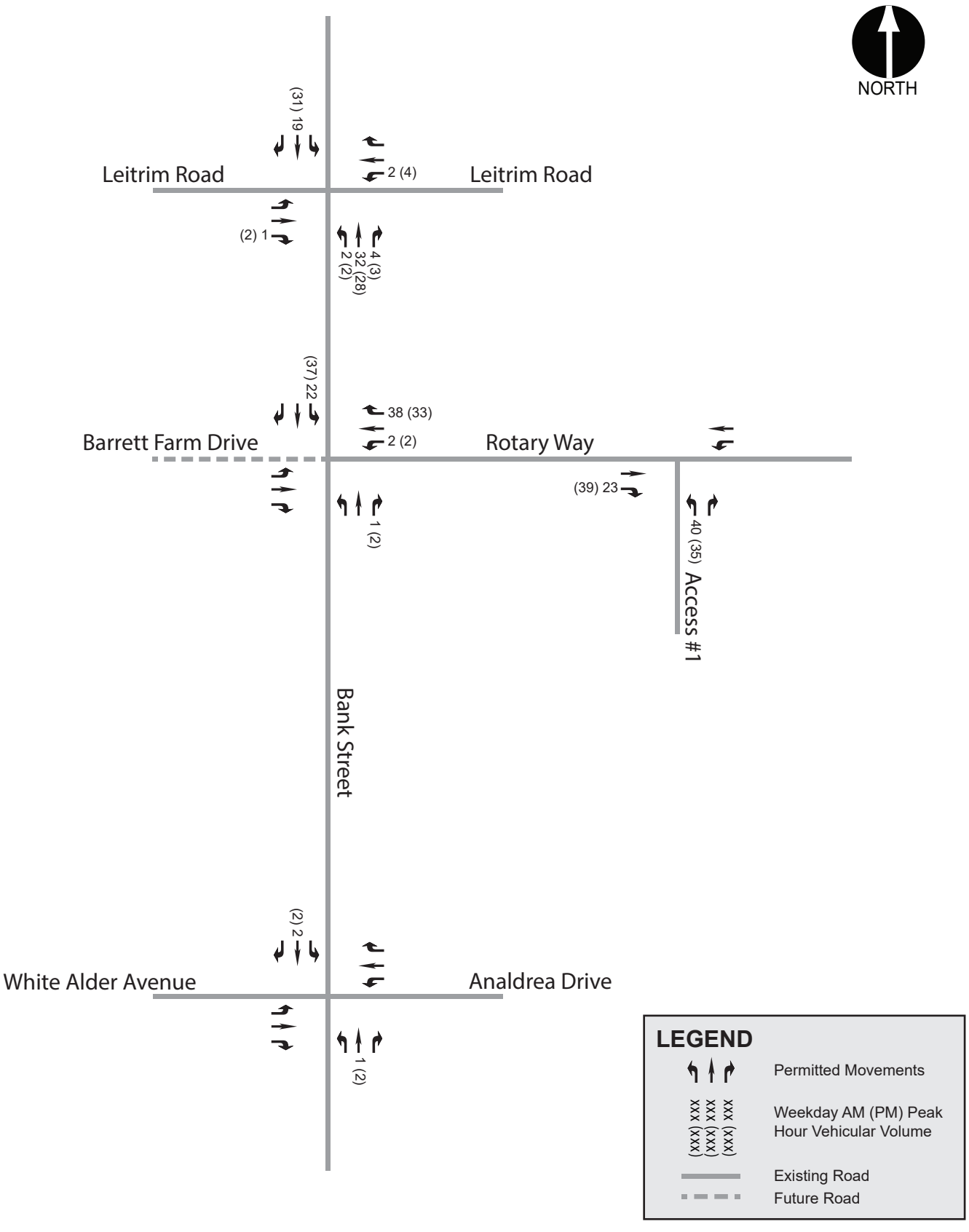


IBI

4639 Bank Street
Transportation Impact Assessment

Exhibit 5:
2022 Site Generated Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.



IBI

4639 Bank Street
Transportation Impact Assessment

Exhibit 6:
2027 Site Generated Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.

4.2 Background Network Traffic

4.2.1 Changes to the Background Transportation Network

To properly assess future traffic conditions, planned modifications to the transportation network that may impact travel patterns or demand within the study area have been considered. The Scoping section of this report reviewed the anticipated changes to the study area transportation network based on the Transportation Master Plan (TMP) as well as recent discussions with City of Ottawa staff.

Based on discussions with City staff, it is understood that the implementation timing of the Bank Street widening is as follows:

- Widening of Bank Street from two to four lanes from south of Leitrim Road to Dun Skipper Drive is slated for completion by the end of 2022.
- The reconstruction of the Bank Street & Leitrim Road intersection is scheduled for completion by the end of 2023.

This study therefore assumes that by the 2022 buildout of the proposed development, Bank Street will have a four-lane, divided cross-section along the frontage of the site, while the intersection of Bank Street & Leitrim Road will maintain its current configuration. By the 2027 horizon year, it is expected that the four-lane widening and intersection reconstruction will have been completed.

4.2.2 General Background Growth Rates

The background growth rate is intended to represent regional growth from outside the study area that will travel along the adjacent road network. Consistent with the Leitrim Master Transportation Study (MTS), a 1.0% rate of linear growth per annum was applied to through movements on Bank Street, as well as all movements at the intersection of Bank Street & Leitrim Road, for the calculation of future background traffic.

4.2.3 Other Area Development

As discussed previously, all current adjacent development applications within the study area that would potentially impact travel demand during the weekday morning and afternoon peak hours were previously accounted for in the development of background traffic volume projections for the Leitrim MTS. These volumes were accounted for explicitly in the development of future background traffic volumes for this study.

4.3 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and its ability to effectively accommodate the additional demand generated by a new development.

4.3.1 Description of Capacity Issues

4.3.1.1 Bank Street & Leitrim Road

The Leitrim Master Transportation Study (MTS) noted that the Bank Street and Leitrim Road intersection was exceeding its theoretical capacity during the weekday morning peak hour in 2016. The MTS recommended reconstructing the intersection per the Interim Design from the Bank Street Environmental Assessment (EA) by 2019 to address this capacity issue. The Interim Design from the Bank Street EA proposed the following geometrical changes to the Bank and Leitrim intersection:

- Widen Leitrim Road to four lanes through the intersection;
- Double eastbound and westbound left-turn lanes;
- Single northbound and southbound left-turn lanes;
- Northbound and southbound right-turn lanes; and
- Channelized right-turns on all approaches.

The above intersection configuration is expected to be implemented in 2023.

4.3.1.2 Bank Street & Rotary Way

The MTS identified that, in 2016, the intersection of Bank Street & Rotary Way was beginning to approach its theoretical capacity during the weekday afternoon peak hour. Once Bank Street is widened to four lanes, however, the intersection is anticipated to operate an acceptable Level of Service (LOS 'D' or better) during both the weekday morning and afternoon peak hour.

4.3.1.3 Bank Street & Analdea Drive / White Alder Avenue

The MTS indicated that by 2022 this intersection would exceed its theoretical capacity during both the weekday morning and afternoon peak hour without the four-lane widening of Bank Street. Once Bank Street is widened to four lanes, however, no capacity issues are expected through to 2031. As Bank Street is anticipated to be widened to four lanes by 2022, no capacity issues are foreseen at this intersection within the horizon year of this study.

4.3.2 Adjustment to Development Generated Demands

As discussed previously, the mode share targets for the proposed development were derived from a blend of the mode shares from the O-D Survey and adjusted to align with the mode shares assumed in the Leitrim MTS. Consistent with the Leitrim MTS, it was assumed that the transit mode share would remain at 10% until 2022 then increase linearly to 13% by 2027.

It has been noted above that the intersection of Bank Street & Leitrim Road is expected to continue operating above its theoretical capacity (i.e. LOS 'F') until it is modified in 2023. However, this is not likely to impact the distribution of site-generated traffic as Bank Street represents the most direct corridor to and from the Leitrim Community. By 2027, with the intersection of Bank Street & Leitrim Road reconstructed, it is expected that these capacity issues will have been resolved.

4.3.3 Adjustment to Background Network Demands

Similar to the development-generated demands, adjustments to transit mode share were applied to the background network demands. These adjustments however were previously accounted for in the development of the traffic volumes projections for the Leitrim MTS, therefore no further adjustments were necessary for this study.

4.4 Traffic Volume Summary

4.4.1 Future Background Traffic Volumes

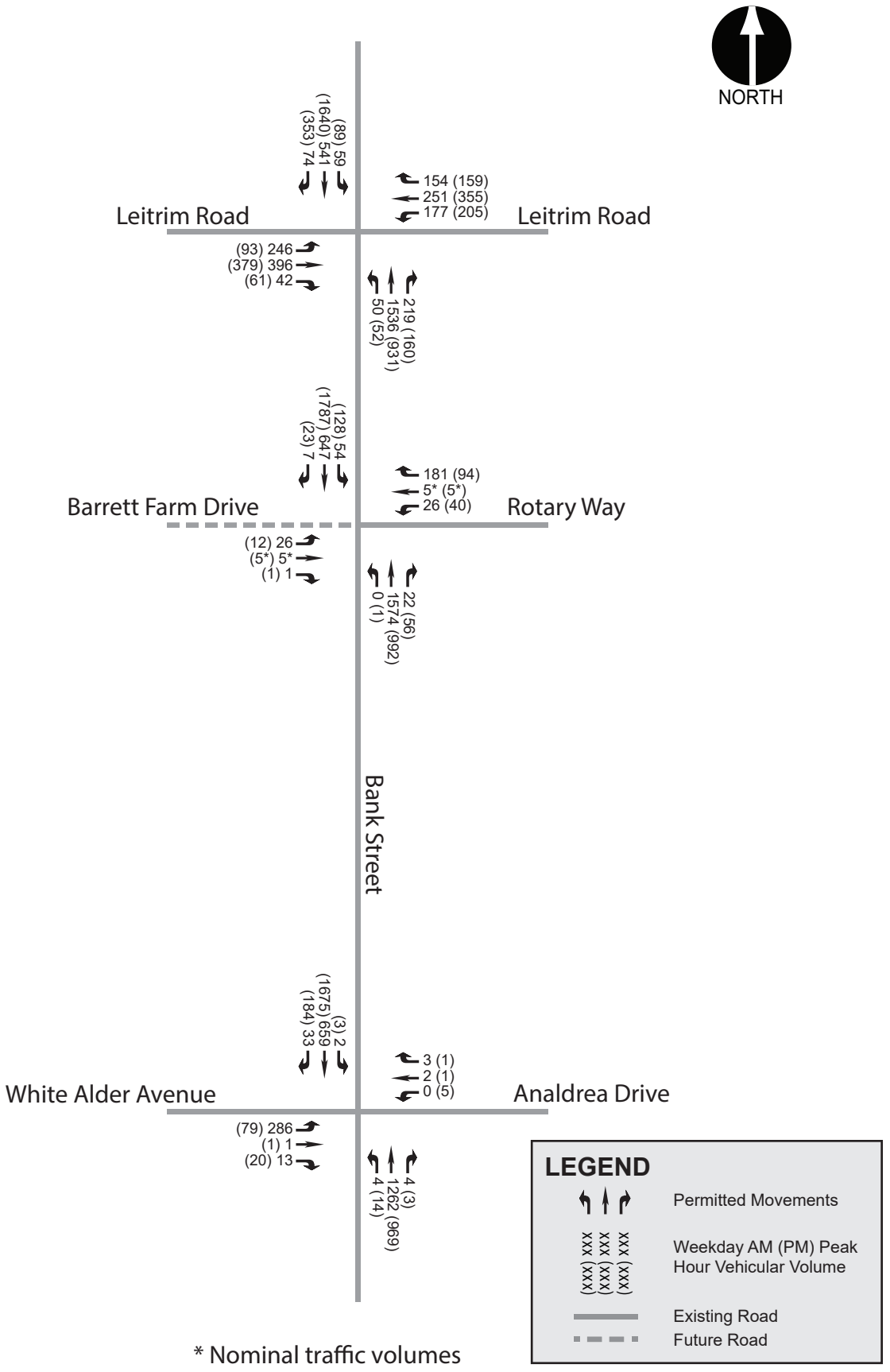
Future background traffic volumes have been established through the application of growth rates to through movements on Bank Street as well as all movements at the intersection of Bank Street & Leitrim Road, and by superimposing these adjusted traffic volumes with future adjacent development traffic volumes.

Exhibit 7 and **Exhibit 8** present the future background traffic volumes anticipated for the 2022 and 2027 analysis years, respectively.

4.4.2 Future Total Traffic Volumes

Future total traffic volumes have been established by combining the site-generated traffic volumes with future background traffic volumes.

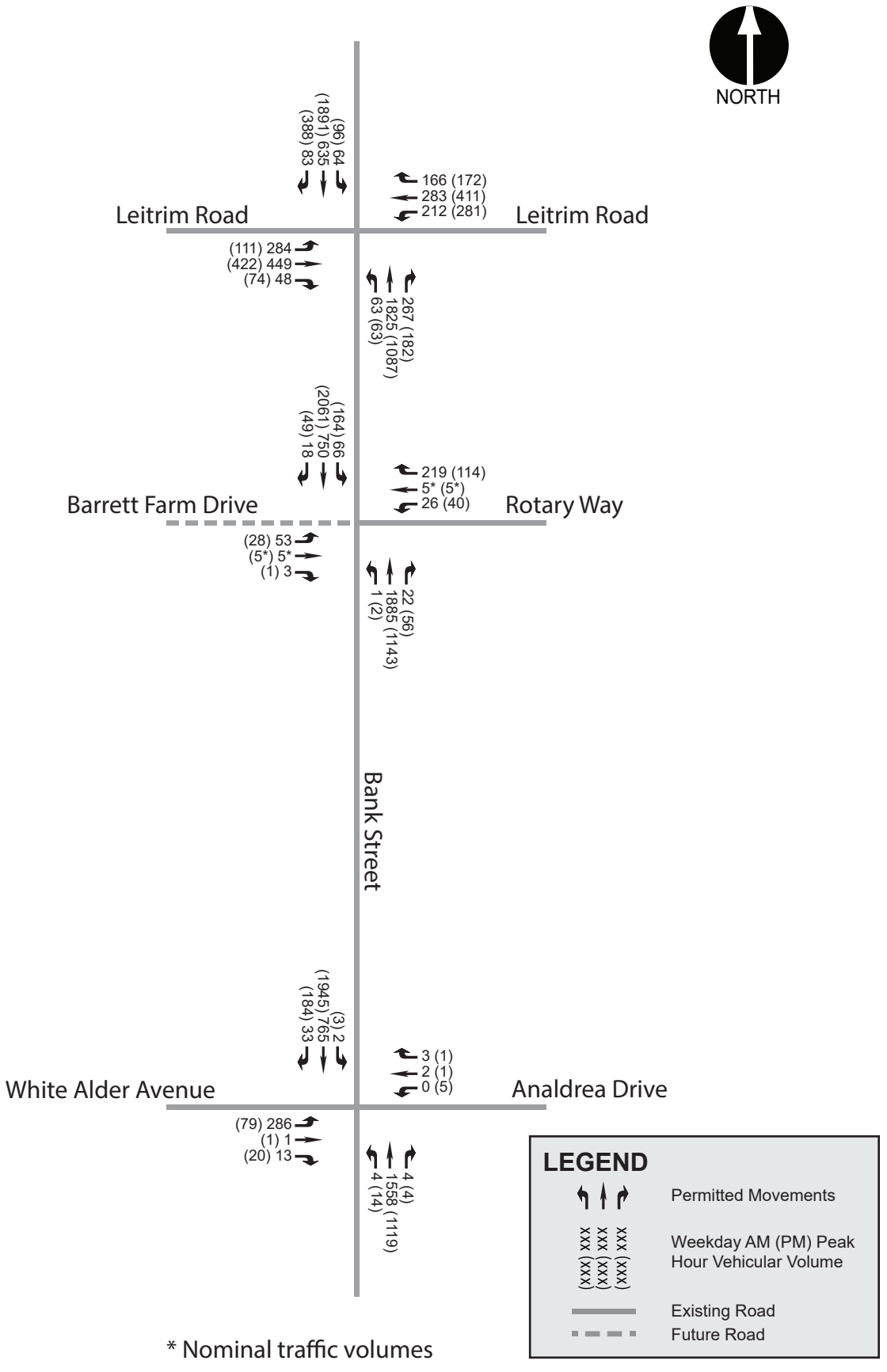
Exhibit 9 and **Exhibit 10** present the future total traffic volumes anticipated for the 2022 and 2027 analysis years, respectively.



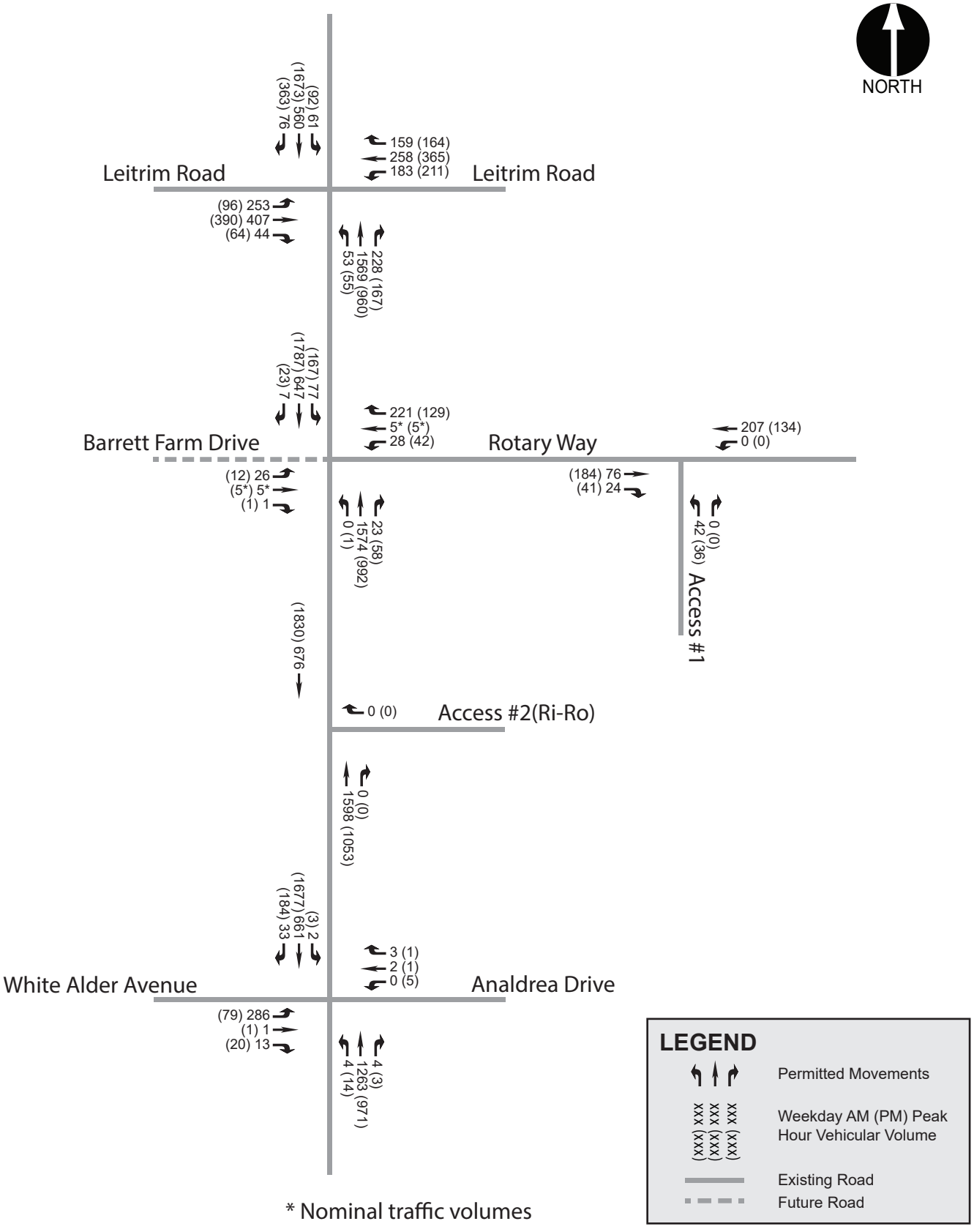
4639 Bank Street
Transportation Impact Assessment

Exhibit 7:
Future (2022)
Background Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.



* Nominal traffic volumes

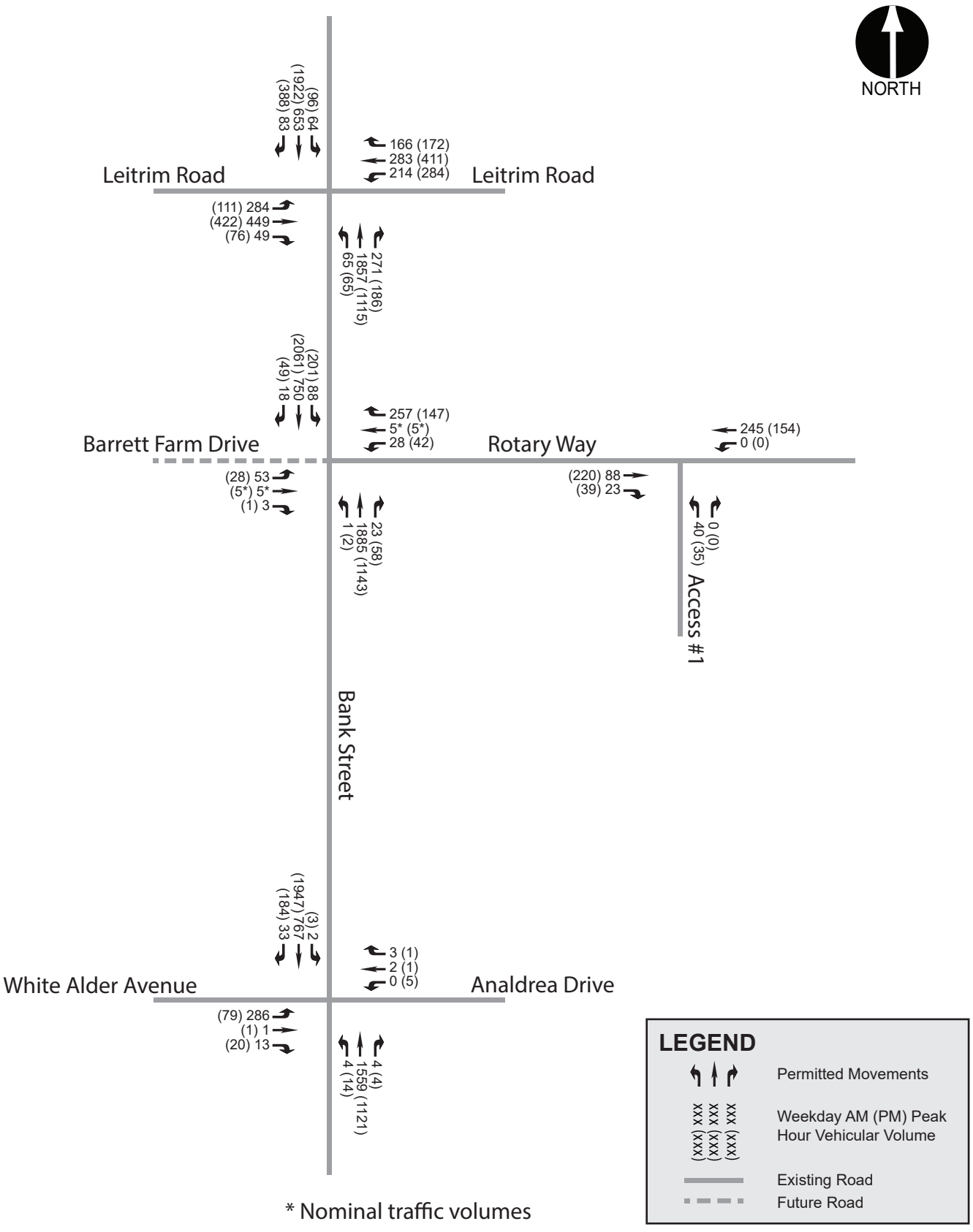


* Nominal traffic volumes

4639 Bank Street

Exhibit 9:
Future (2022) Total Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.



* Nominal traffic volumes

IBI

4639 Bank Street
Transportation Impact Assessment

Exhibit 10:
Future (2027) Total Traffic

PROJECT No. 125600
DATE: August 2020
SCALE: N.T.S.

Appendix A – City Circulation Comments

Step 1 & 2 Submission (Screening & Scoping) – Circulation Comments & Response

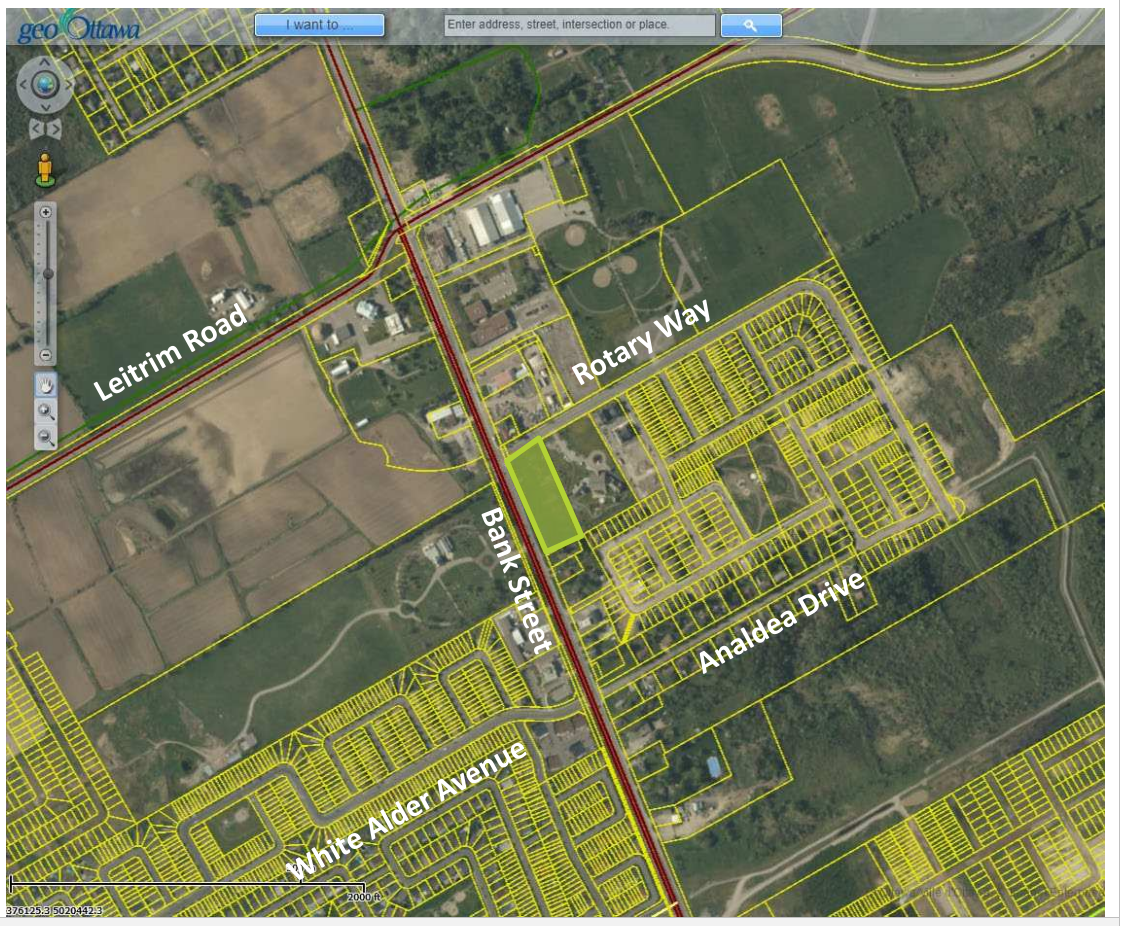
Report Submitted: May 20, 2020
Comments Received: May 25, 2020
Transportation Project Manager: Josiane Gervais

- Element 2.1.1 - Proposed Development
  - Indicate the number of bicycle spaces.
    - IBI Response: Section 3.1.2 has been updated and now includes the number of proposed bike parking spaces.
- Element 2.1.2 - Existing Conditions
  - The cycling network within the area includes paved shoulders along Bank St.
    - IBI Response: Section 3.2.2 has been updated and now mentions the presence of paved shoulders along Bank Street.
  - The review of collision history must include identification of relevant patterns, this can be provided within Scoping or Strategy.
    - IBI Response: Further review of historical collisions will be provided in Step 4: Analysis.

Appendix B – Screening Form

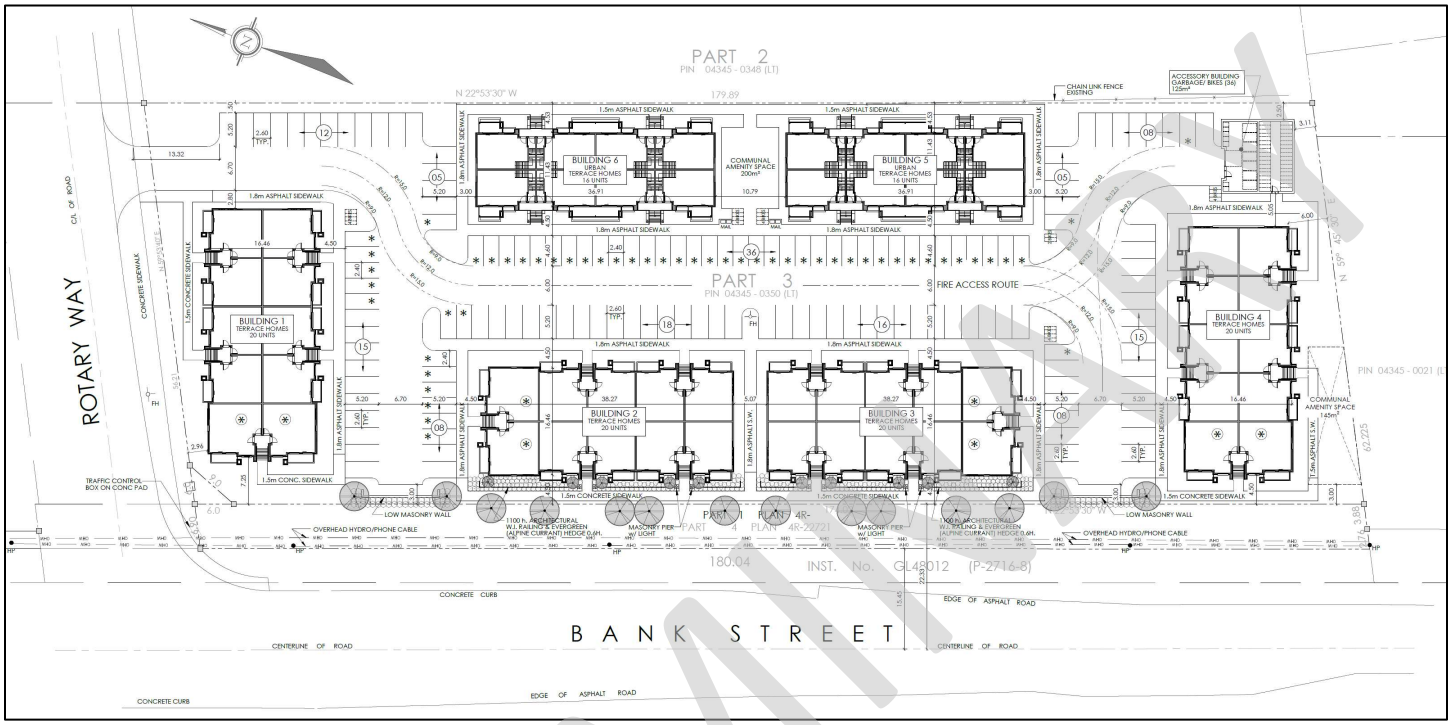
City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	4639 Bank Street
Description of Location	Leitrim – East of Bank Street and south of Rotary Way 
Land Use Classification	Residential
Development Size (units)	112 Stacked Townhouses
Development Size (m^2)	N/A
Number of Accesses and Locations	One (1) access via Rotary Way
Phase of Development	Single Phase
Buildout Year	2022

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

Proposed Development:



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.*

Based on the results 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).*

Based on the results above, 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 limits 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?		✓

Based on the results above, 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?	✓	

CONCLUSION: One or more of the above triggers was satisfied, therefore a TIA will be required.

Appendix C – Turning Movement Counts

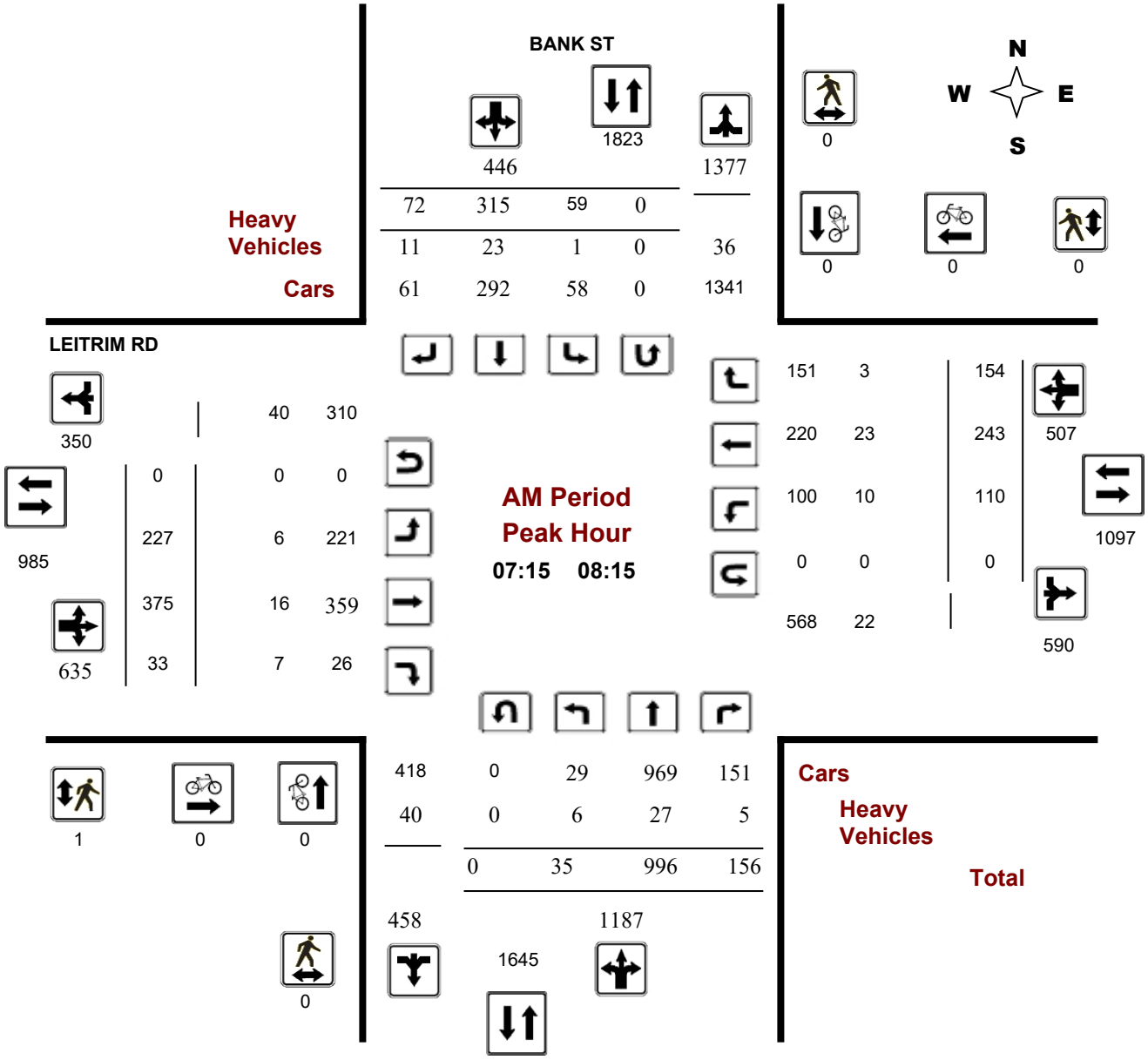
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ LEITRIM RD

Survey Date: Wednesday, December 04, 2019 **WO No:** 39159

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



Comments

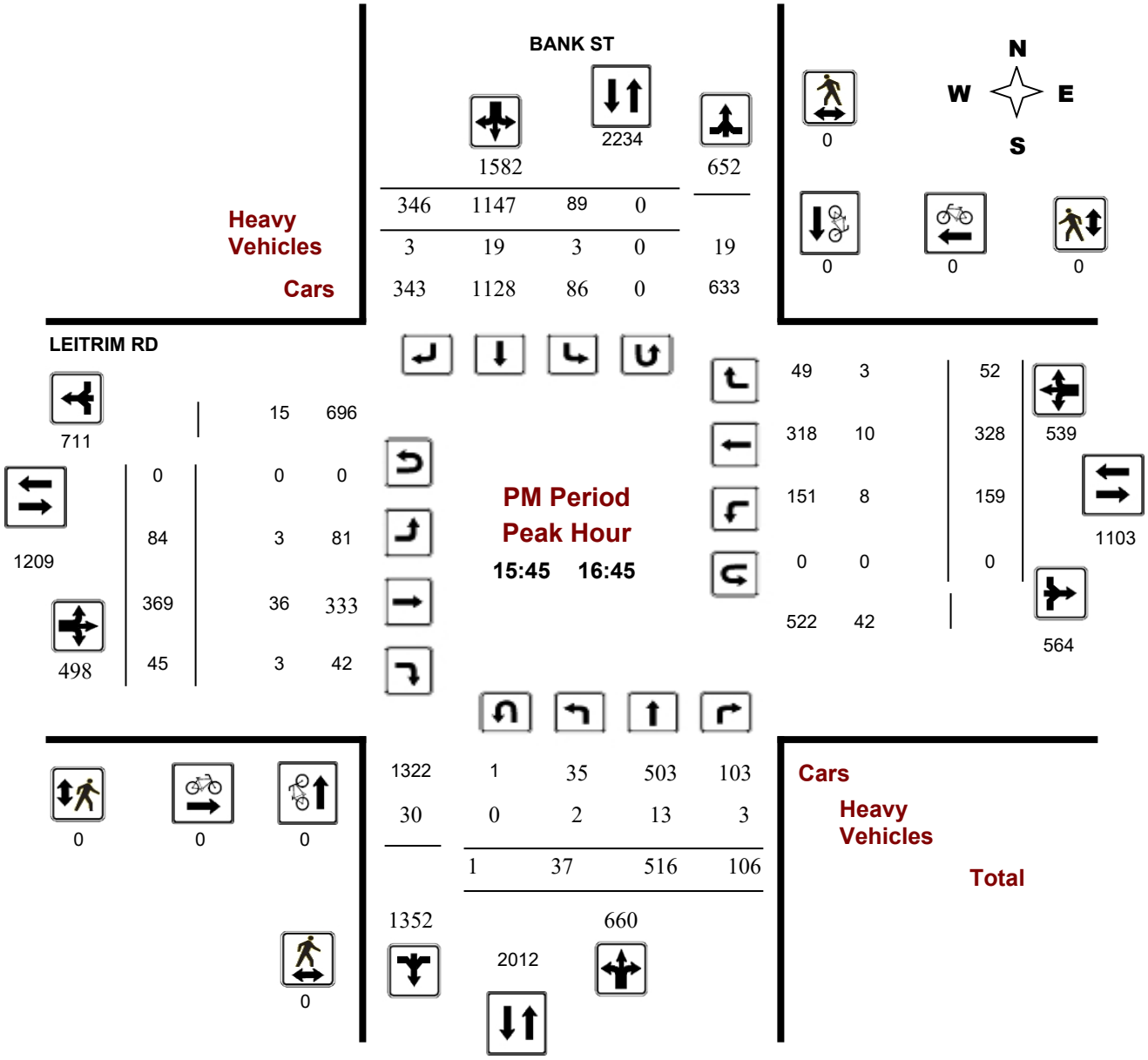
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ LEITRIM RD

Survey Date: Wednesday, December 04, 2019 **WO No:** 39159

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



Comments

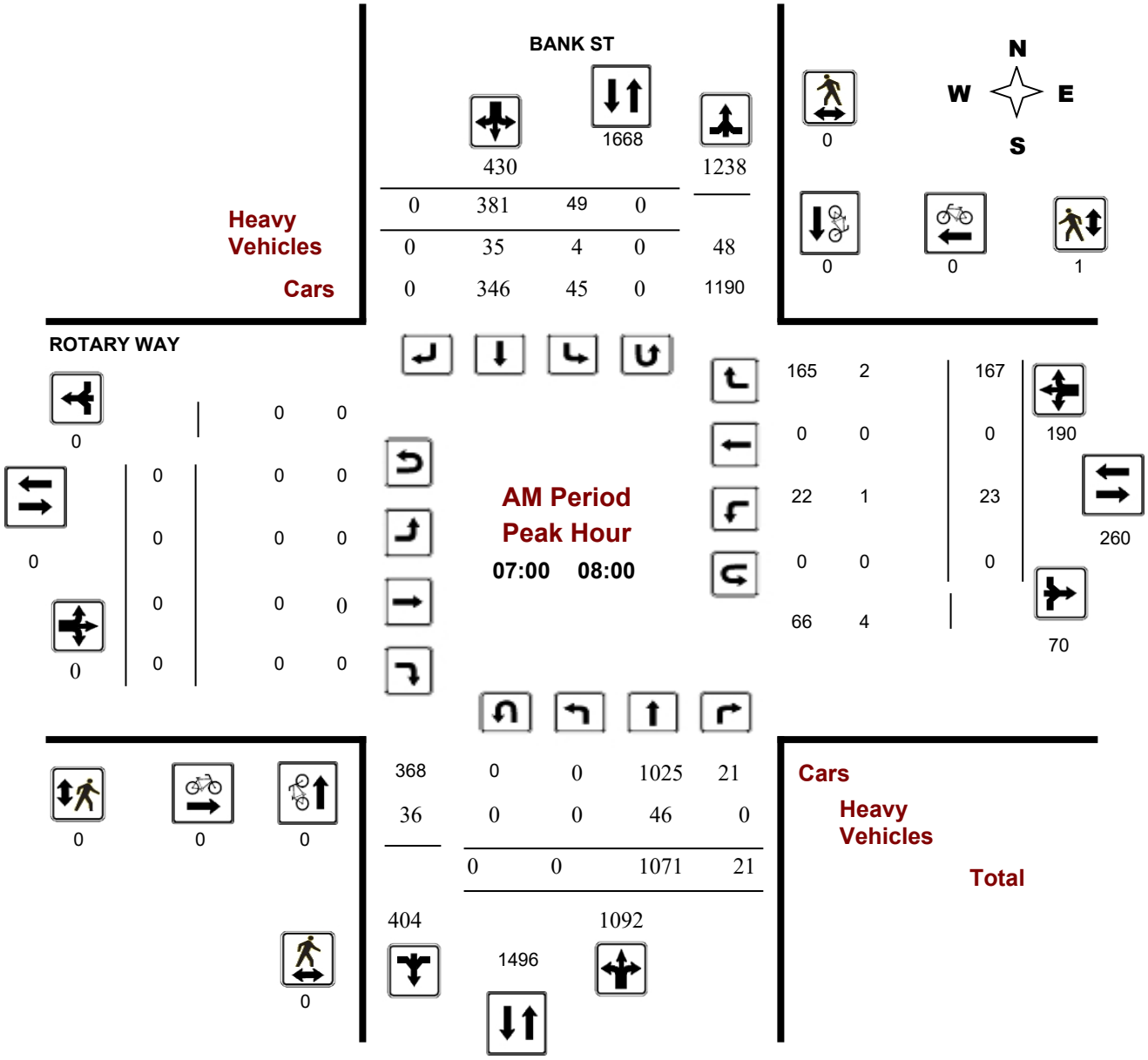
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ ROTARY WAY

Survey Date: Wednesday, December 04, 2019 **WO No:** 39158

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



Comments

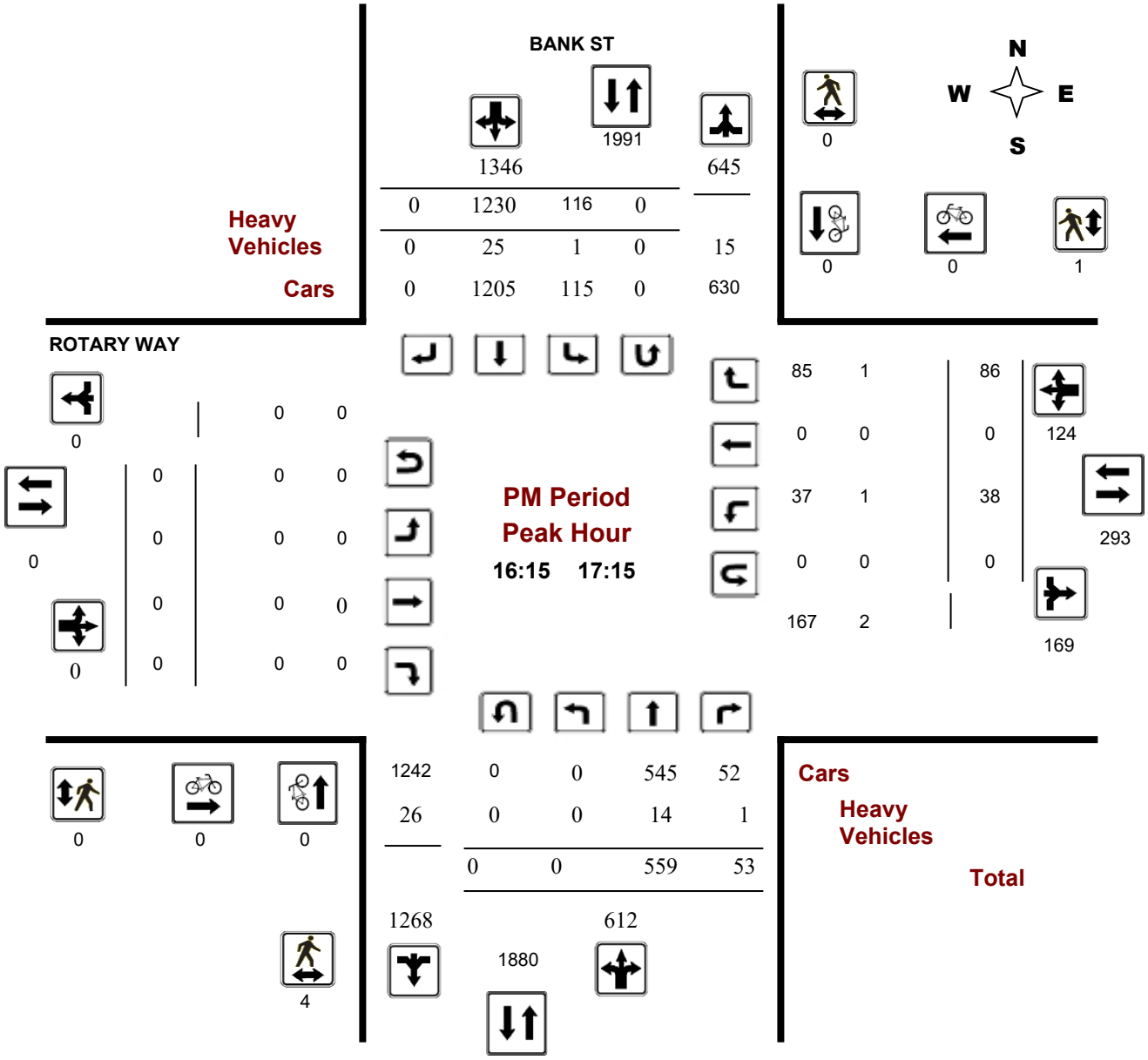
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ ROTARY WAY

Survey Date: Wednesday, December 04, 2019 **WO No:** 39158

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



Comments

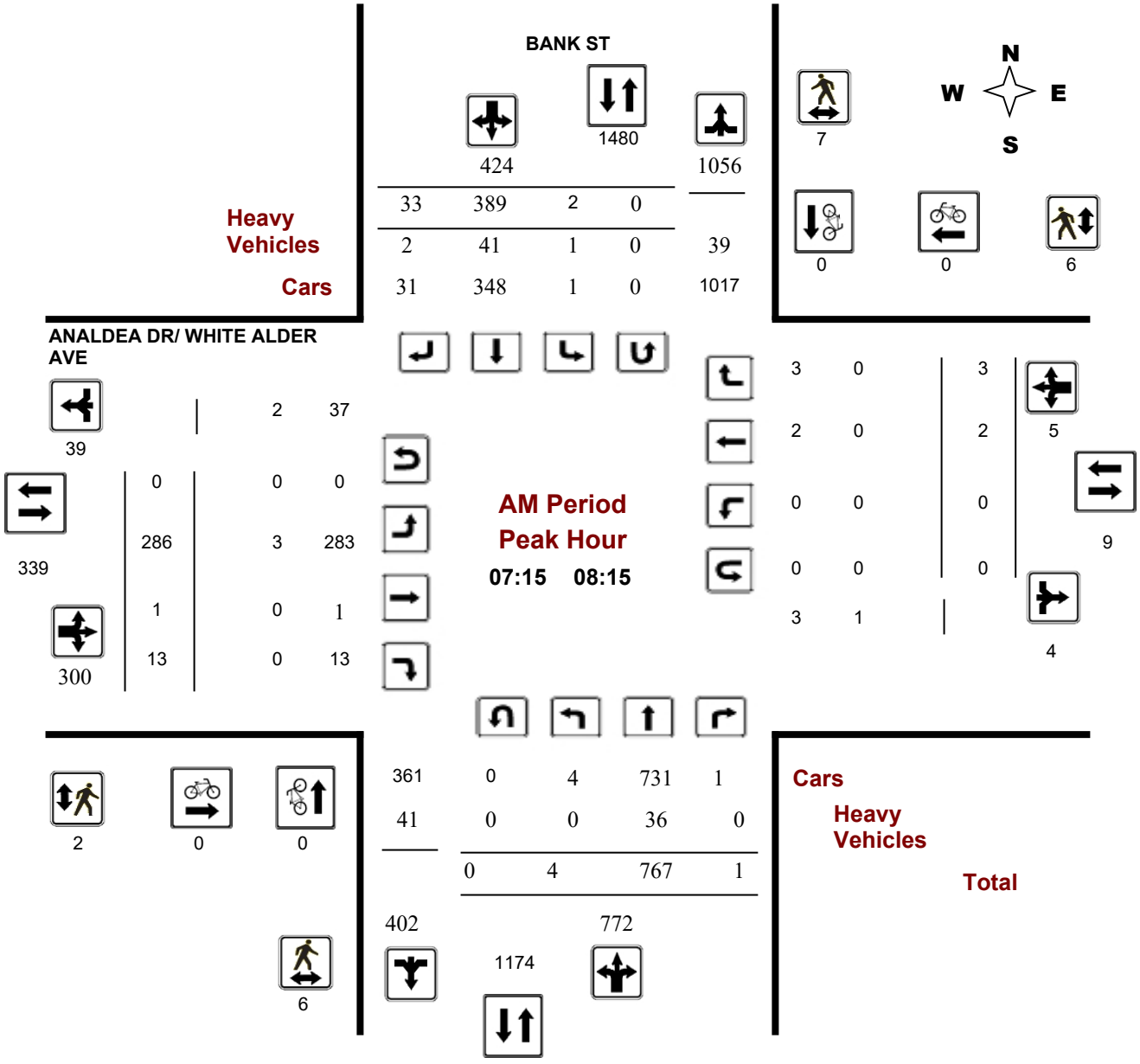
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ANALDEA DR/ WHITE ALDER AVE @ BANK ST

Survey Date: Wednesday, December 04, 2019 **WO No:** 39157

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



Comments

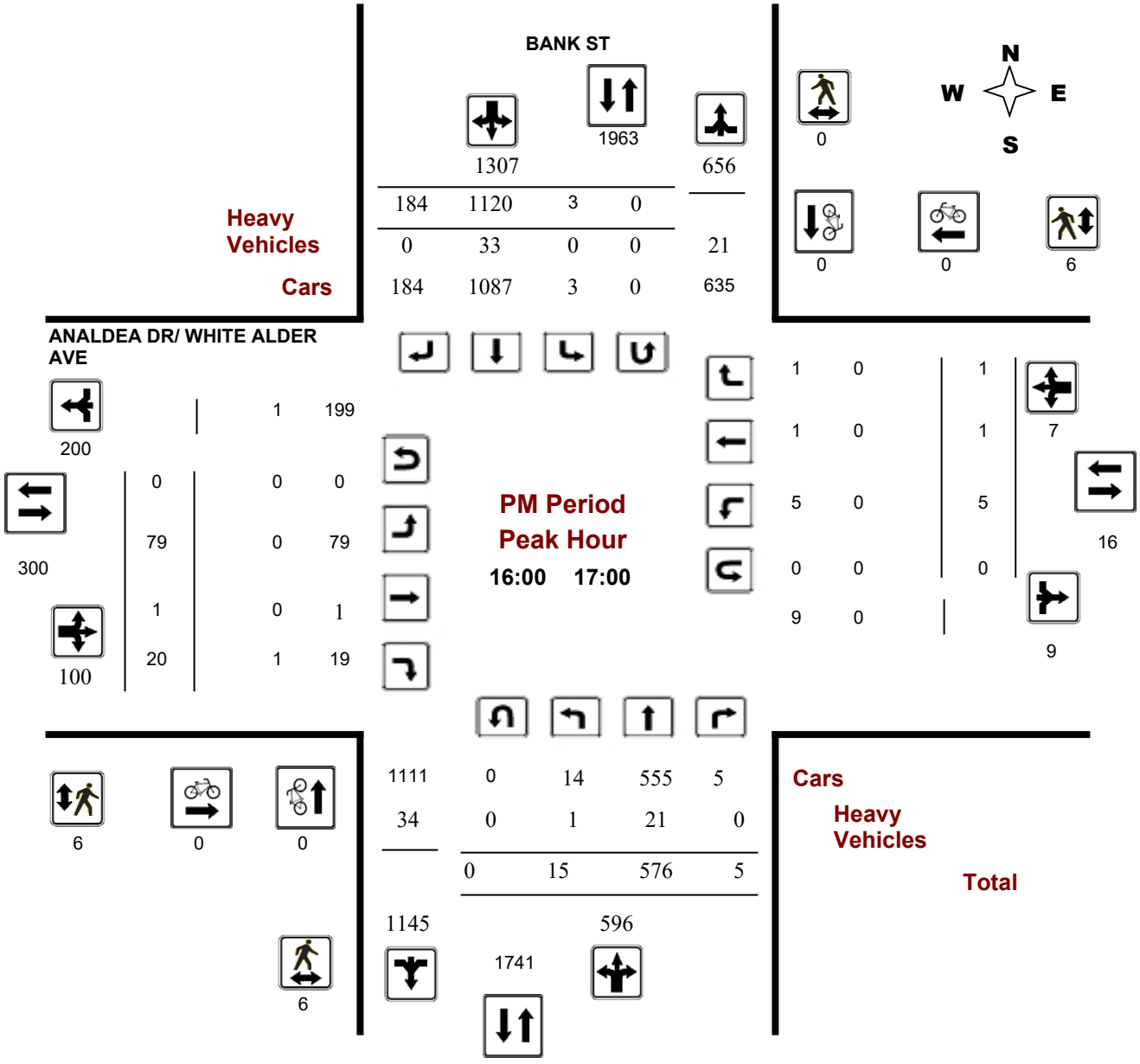
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ANALDEA DR/ WHITE ALDER AVE @ BANK ST

Survey Date: Wednesday, December 04, 2019 **WO No:** 39157

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



Comments

Appendix D – OC Transpo Routes

93

Local

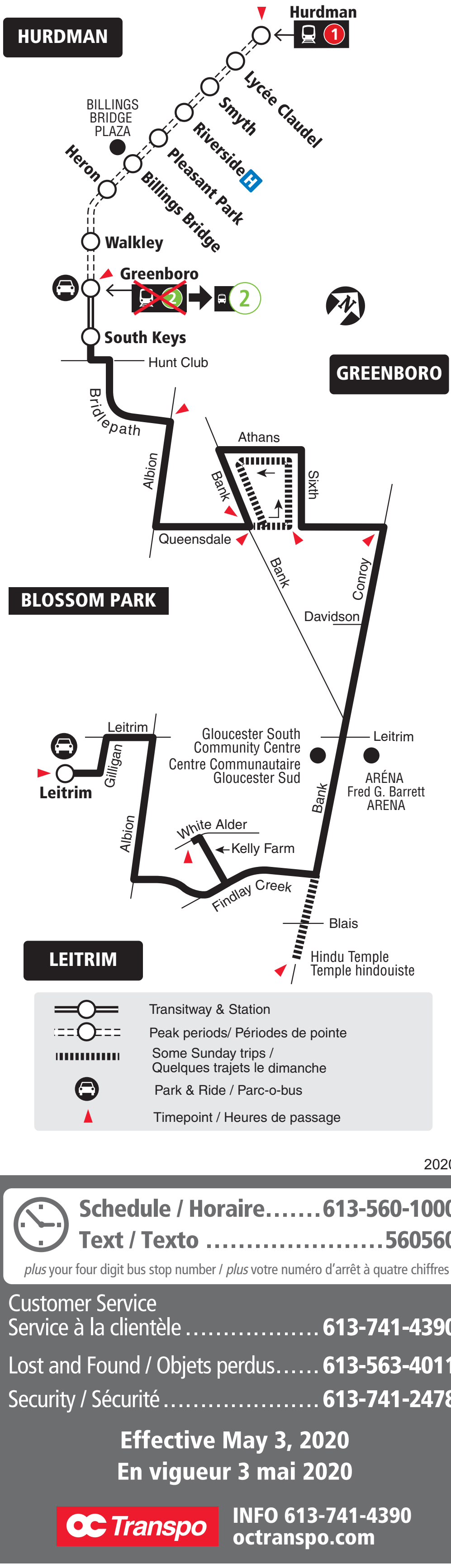
LEITRIM BLOSSOM PARK

GREENBORO HURDMAN

7 days a week / 7 jours par semaine

All day service

Service toute la journée



Transitway & Station

Peak periods/ Périodes de pointe

Some Sunday trips / Quelques trajets le dimanche

Park & Ride / Parc-o-bus

Timepoint / Heures de passage

2020.04

Schedule / Horaire.....613-560-1000

Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-741-4390**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective May 3, 2020

En vigueur 3 mai 2020

OC Transpo

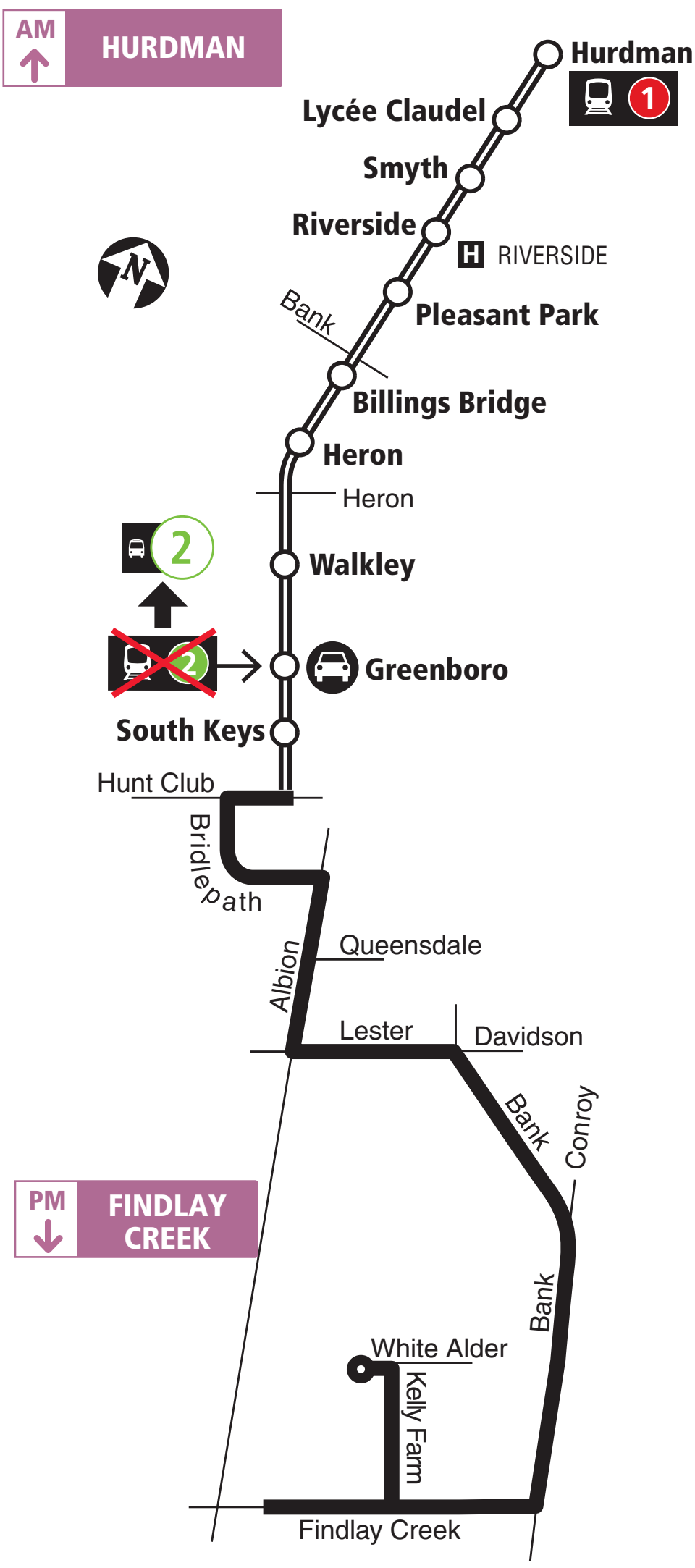
INFO 613-741-4390
octranspo.com

294 Connexion

HURDMAN
FINDLAY CREEK

Monday to Friday / Lundi au vendredi

Peak periods only
Périodes de pointe seulement



Transitway & Station

Park & Ride / Parc-o-bus

2020.04

Schedule / Horaire.....613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective May 3, 2020
En vigueur 3 mai 2020

OC Transpo

INFO 613-741-4390
octranspo.com

304

BILLINGS BRIDGE

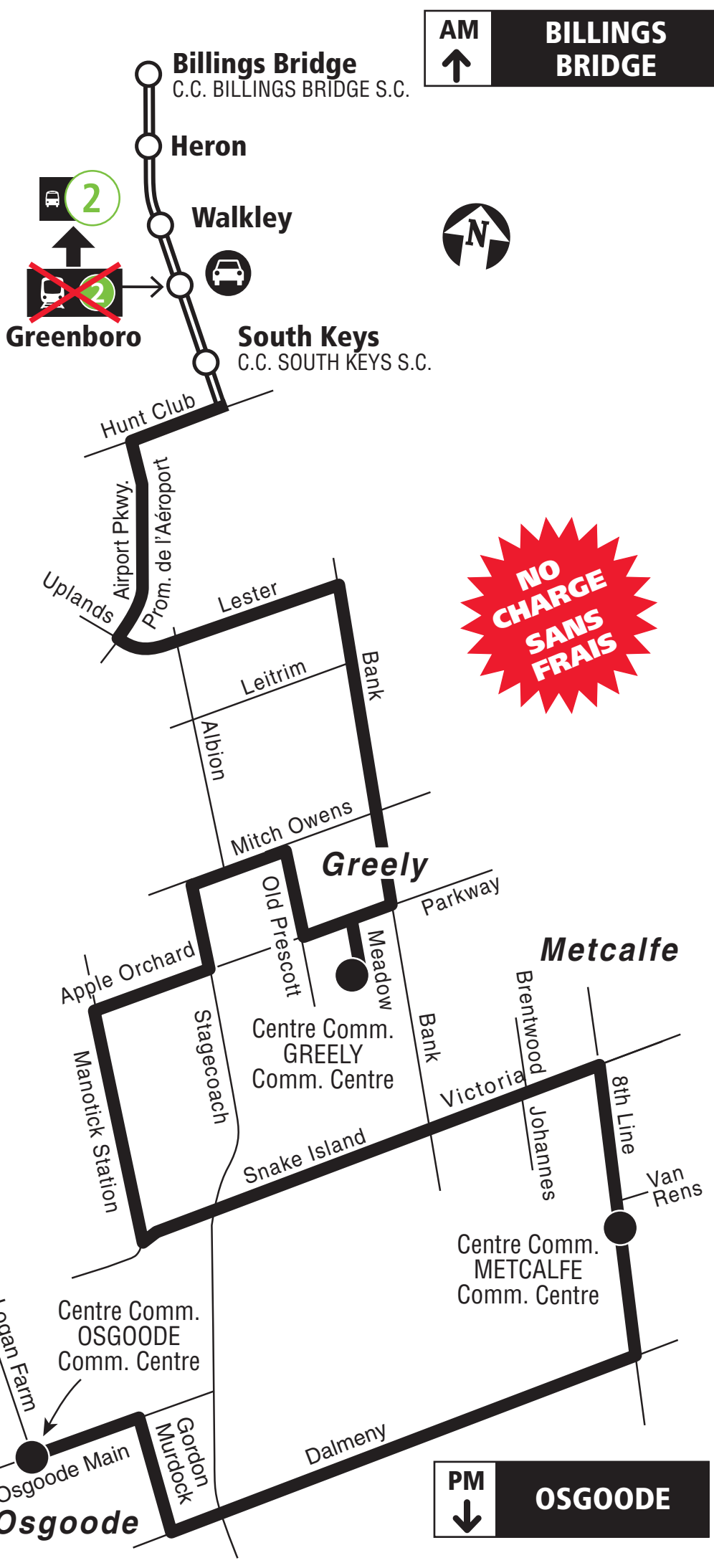
METCALFE, GREELY OSGOODE

Local

Thursday only / Jeudi seulement

Selected time periods

Périodes sélectionnées



NO CHARGE
SANS FRAIS

Transitway & Station

Park & Ride / Parc-o-bus

2020.04

Schedule / Horaire.....613-560-1000

Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective May 3, 2020

En vigueur 3 mai 2020

OC Transpo

INFO 613-741-4390
octranspo.com

Appendix E – Collision Data

City Operations - Transportation Services

Collision Details Report - Public Version

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

Location: ANALDEA DR/ WHITE ALDER AVE @ BANK ST

Traffic Control: Stop sign

Total Collisions: 23

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-18, Tue,10:30	Clear	Angle	P.D. only	Ice	South	Turning right	Pick-up truck	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Apr-23, Wed,07:44	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Oct-04, Sat,16:04	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Sep-15, Mon,17:46	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
					South	Slowing or stopping	Passenger van	Other motor vehicle	
2014-Oct-07, Tue,09:58	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Delivery van	Other motor vehicle	

2014-Oct-25, Sat,18:43	Freezing Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Skidding/sliding
					South	Slowing or stopping	Pick-up truck	Other motor vehicle
2014-Sep-03, Wed,12:00	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2014-Dec-01, Mon,16:20	Snow	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Jan-08, Fri,18:04	Clear	Sideswipe	P.D. only	Loose snow	North	Unknown	Unknown	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2016-Oct-18, Tue,20:18	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jun-14, Sun,10:37	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Pick-up truck	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Dec-02, Wed,11:20	Unknown	Rear end	Non-fatal injury	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Sep-27, Tue,15:30	Clear	Rear end	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Turning left	Automobile, station wagon	Other motor vehicle
2017-Aug-25, Fri,17:00	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-01, Fri,08:24	Clear	Rear end	Non-fatal injury	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Dec-18, Sun,19:17	Clear	Rear end	Non-fatal injury	Ice	North	Slowing or stopping	Unknown	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Mar-18, Sat,16:13	Clear	SMV other	P.D. only	Dry	North	Going ahead	Unknown	Ran off road
2017-Mar-18, Sat,10:31	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-May-27, Sat,13:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle

					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-23, Fri,17:53	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Sep-08, Fri,17:30	Rain	Rear end	P.D. only	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2017-Dec-12, Tue,18:34	Snow	Sideswipe	P.D. only	Loose snow	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Turning right	Automobile, station wagon	Other motor vehicle
2017-Nov-08, Wed,10:48	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle

Location: ARENA PL @ BANK ST

Traffic Control: Stop sign

Total Collisions: 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Apr-23, Wed,08:50	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-10, Thu,09:10	Clear	Angle	P.D. only	Wet	West	Turning left	Delivery van	Other motor vehicle	

					North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2015-Sep-07, Mon,13:34	Clear	Angle	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Passenger van	Other motor vehicle
2017-Jan-19, Thu,07:39	Clear	Angle	P.D. only	Wet	West	Turning left	Police vehicle	Other motor vehicle
					North	Overtaking	Automobile, station wagon	Other motor vehicle
2017-Oct-11, Wed,07:00	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2016-Nov-19, Sat,16:02	Clear	SMV other	P.D. only	Dry	South	Unknown	Unknown	Other

Location: BANK ST @ LEITRIM RD

Traffic Control: Traffic signal

Total Collisions: 58

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-03, Fri,09:12	Freezing Rain	SMV other	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
2014-Aug-13, Wed,21:39	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

2014-Aug-21, Thu,08:14	Rain	Rear end	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2014-Aug-13, Wed,07:47	Rain	Turning movement	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Aug-22, Fri,13:00	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Automobile, station wagon	Other motor vehicle
					West	Unknown	Automobile, station wagon	Other motor vehicle
2014-Oct-21, Tue,21:31	Clear	Rear end	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2014-Dec-01, Mon,23:10	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-04, Tue,16:30	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Oct-20, Mon,16:15	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle

2014-Nov-20, Thu,15:52	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Apr-18, Sat,09:22	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-18, Wed,08:37	Strong wind	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Sep-29, Tue,16:20	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Skidding/sliding
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Jan-06, Tue,18:00	Clear	Rear end	Non-fatal injury	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Feb-12, Thu,06:50	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Pick-up truck	Curb
2015-Jan-09, Fri,10:51	Clear	Angle	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
					East	Turning left	Truck - closed	Other motor vehicle

2015-Jan-06, Tue,05:46	Other	Turning movement	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2015-Feb-21, Sat,14:19	Snow	Rear end	P.D. only	Loose snow	North	Unknown	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Aug-31, Mon,17:30	Clear	Turning movement	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2015-Jun-09, Tue,18:29	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2015-Aug-26, Wed,17:15	Rain	Rear end	Non-fatal injury	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jun-30, Tue,11:19	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Jun-26, Fri,15:41	Clear	Rear end	P.D. only	Dry	East	Going ahead	Truck - dump	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle

2015-Jan-13, Tue,16:20	Clear	Rear end	P.D. only	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Passenger van	Other motor vehicle
2016-Mar-09, Wed,10:46	Clear	Turning movement	Non-fatal injury	Wet	North	Turning left	Delivery van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Sep-22, Thu,10:44	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2016-Jun-15, Wed,08:22	Clear	Turning movement	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Turning left	Automobile, station wagon	Other motor vehicle
2015-Dec-14, Mon,07:08	Rain	Rear end	P.D. only	Wet	West	Turning left	Passenger van	Skidding/sliding
					West	Turning left	Automobile, station wagon	Other motor vehicle
2015-Nov-20, Fri,17:10	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-20, Wed,16:15	Clear	Rear end	P.D. only	Dry	North	Turning left	Unknown	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle

2016-Jan-07, Thu,14:17	Clear	Rear end	P.D. only	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Dec-22, Tue,17:52	Rain	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jun-28, Tue,21:31	Rain	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-May-29, Sun,18:48	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					North	Turning left	Pick-up truck	Other motor vehicle
2017-Jan-09, Mon,07:15	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2017-Jan-11, Wed,09:37	Clear	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Dec-30, Fri,17:03	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2017-Jan-06, Fri,07:55	Clear	Turning movement	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Turning left	Pick-up truck	Other motor vehicle
					West	Stopped	Passenger van	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Oct-31, Mon,21:19	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-Nov-25, Fri,05:20	Clear	SMV other	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Animal - wild
2016-Dec-05, Mon,07:54	Snow	Turning movement	P.D. only	Packed snow	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Turning left	Truck - tractor	Other motor vehicle
2017-Mar-14, Tue,12:36	Snow	Sideswipe	P.D. only	Loose snow	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jul-12, Wed,21:09	Rain	Sideswipe	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-May-05, Fri,15:54	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle

2017-May-18, Thu,20:30	Rain	Rear end	P.D. only	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2017-Oct-04, Wed,12:25	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-Apr-05, Thu,09:38	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-27, Wed,16:07	Clear	Turning movement	P.D. only	Wet	North	Turning left	Truck - tractor	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-07, Wed,15:21	Snow	Rear end	P.D. only	Slush	South	Going ahead	Passenger van	Other motor vehicle
					South	Stopped	School bus	Other motor vehicle
2018-May-07, Mon,08:25	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-May-04, Fri,16:12	Clear	Rear end	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2018-May-11, Fri,22:47	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Jun-01, Fri,16:26	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Bicycle	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-Jul-10, Tue,14:50	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Passenger van	Other motor vehicle
2018-Oct-18, Thu,16:40	Clear	Other	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2018-Sep-15, Sat,18:27	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Oct-30, Tue,14:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2018-Aug-16, Thu,21:00	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

Location: BANK ST @ ROTARY WAY

Traffic Control: Traffic signal

Total Collisions: 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-22, Thu,04:13	Clear	SMV other	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Pole (sign, parking meter)	
2015-Apr-09, Thu,09:16	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Municipal transit bus	Other motor vehicle	
2015-Jul-29, Wed,17:22	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Sep-14, Wed,07:25	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	School bus	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-09, Fri,08:43	Snow	Rear end	P.D. only	Ice	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	School bus	Other motor vehicle	
2017-Nov-17, Fri,07:45	Clear	Rear end	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-11, Mon,16:40	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Unknown	Other motor vehicle	
2018-May-16, Wed,15:23	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jul-05, Thu,00:18	Clear	SMV other	P.D. only	Dry	North	Turning left	Passenger van	Curb	

Location: BANK ST btwn ANALDEA DR/ WHITE ALDER AVE & ROTARY WAY

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-26, Thu,17:41	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	

Location: BANK ST btwn ARENA PL & WHITE ALDER AVE

Traffic Control: No control

Total Collisions: 28

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-29, Sat,03:12	Clear	SMV other	P.D. only	Dry	South	Going ahead	Pick-up truck	Ran off road	
2014-Aug-12, Tue,17:35	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	

2014-Sep-18, Thu,12:25	Clear	Approaching	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Truck - dump	Other motor vehicle
2015-Feb-19, Thu,16:42	Clear	Turning movement	Non-fatal injury	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2014-Nov-10, Mon,07:34	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Delivery van	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2014-Oct-03, Fri,11:33	Clear	Other	P.D. only	Dry	North	Going ahead	Pick-up truck	Other
					South	Going ahead	Automobile, station wagon	Debris falling off vehicle
2015-Apr-13, Mon,08:12	Clear	Turning movement	P.D. only	Dry	South	Making "U" turn	Automobile, station wagon	Other motor vehicle
					North	Going ahead	School bus	Other motor vehicle
2015-May-14, Thu,14:05	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-May-23, Sat,15:01	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle

2016-Oct-29, Sat,16:08	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Oct-19, Mon,06:24	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Turning right	Pick-up truck	Other motor vehicle
2015-Oct-10, Sat,15:55	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-06, Wed,17:24	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Nov-11, Fri,13:18	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Truck-other	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Sep-30, Fri,07:42	Clear	Rear end	Non-fatal injury	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Feb-02, Thu,18:03	Clear	Angle	P.D. only	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle

2017-Mar-08, Wed,16:03	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Apr-27, Thu,16:25	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-07, Wed,15:44	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-10, Sun,00:58	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Ran off road
2017-Sep-18, Mon,16:10	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2017-Dec-24, Sun,13:16	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Nov-25, Sat,00:46	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Animal - wild
2018-Jan-06, Sat,14:25	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Other motor vehicle

					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Feb-03, Sat,14:05	Clear	Angle	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jun-19, Tue,15:35	Clear	Rear end	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Jun-15, Fri,16:08	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jul-27, Fri,16:25	Rain	SMV other	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Curb	

Location: BANK ST btwn LEITRIM RD & ARENA PL

Traffic Control: No control

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-08, Wed,16:09	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Skidding/sliding	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

2014-May-16, Fri,16:37	Rain	Rear end	Non-fatal injury	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2014-Aug-25, Mon,15:15	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Apr-02, Thu,17:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2016-Oct-21, Fri,16:00	Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle
					South	Changing lanes	Automobile, station wagon	Other motor vehicle
2017-Oct-25, Wed,16:12	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-May-15, Tue,17:29	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

Appendix F – Trip Generation Data

Table 3.12: Person Trip Generation Rates – (all households with residents not older than 55 years of age)

Person Trip Generation Rates
All Households with persons 55 years of age or less
AM and PM Peak Hours

Dwelling Unit Types \ Geographic Areas		Core Area Person Trip Rate	Core Area %▽	Urban Area (Inside the greenbelt) Person Trip Rate	Urban Area %▽	Suburban (Outside the greenbelt) Person Trip Rate	Suburban %▽	Rural Person Trip Rate	Rural %▽	All Areas Person Trip Rate
Single detached:	AM	0.85	- 7%	0.99	+ 9%	0.94	+ 3%	0.78	- 14%	0.91
	PM	0.74	- 3%	0.75	- 1%	0.79	+ 4%	0.71	- 7%	0.76
Semi-detached:	AM	0.79	- 10%	0.97	10%	0.89	+ 1%	0.64	- 27%	0.88
	PM	0.74	- 1%	0.68	- 9%	0.82	+ 9%	0.60	- 20%	0.75
Row Townhouse:	AM	0.71	- 3%	0.78	+ 7%	0.67	- 8%	0.74	+ 1%	0.73
	PM	0.62	- 3%	0.60	- 6%	0.69	+ 8%	0.56	- 13%	0.64
Apartment:	AM	0.48	- 4%	0.51	+ 2%	0.53	+ 6%	0.36	- 28%	0.50
	PM	0.45	0%	0.42	- 7%	0.52	+ 16%	0.52	+ 16%	0.45
All Types:	AM	0.62	- 23%	0.82	+ 2%	0.86	+ 8%	0.76	- 5%	0.80
	PM	0.57	- 16%	0.63	- 7%	0.75	+ 10%	0.69	+ 1%	0.68

Note: 5 % (+ or -) represents the percentage delta change in trip rate when compared against the average trip rate across all geographic areas

Table 3.13: Mode Shares - (all households with residents not older than 55 years of age)

Reported Mode Shares
All Households with persons 55 years of age or less
AM and PM Peak Hours

Dwelling Unit Types \ Geographic Areas		Core Area Vehicle Trips	Core Area Transit Share	Core Area Non-Motorised	Urban Area (Inside the greenbelt) Vehicle Trips	Urban Area Transit Share	Urban Area Non-Motorised	Suburban (Outside the greenbelt) Vehicle Trips	Suburban Transit Share	Suburban Non-Motorised	Rural * Vehicle Trips	Rural * Transit Share	Rural * Non-Motorised	All Areas Vehicle Trips	All Areas Transit Share	All Areas Non-Motorised
Single - Detached:	AM	35%	20%	33%	51%	26%	11%	55%	25%	9%	60%	27%	4%	54%	25%	10%
	PM	45%	11%	32%	58%	19%	13%	64%	19%	6%	73%	13%	2%	63%	17%	8%
Semi-Detached:	AM	38%	30%	26%	44%	35%	10%	52%	24%	12%	64%	27%	5%	49%	28%	12%
	PM	36%	20%	34%	51%	27%	13%	62%	17%	7%	77%	12%	1%	58%	20%	10%
Row / Townhouse:	AM	33%	22%	40%	45%	34%	10%	55%	27%	8%	73%	15%	3%	49%	30%	11%
	PM	39%	15%	42%	53%	28%	8%	61%	22%	6%	74%	15%	1%	57%	24%	9%
Apartment:	AM	27%	27%	43%	37%	41%	14%	44%	34%	13%	76%	8%	16%	36%	35%	23%
	PM	23%	29%	42%	40%	37%	14%	44%	33%	9%	48%	4%	17%	35%	33%	23%
All Types:	AM	32%	24%	38%	47%	31%	11%	54%	26%	9%	61%	26%	4%	51%	27%	11%
	PM	34%	21%	38%	53%	24%	12%	62%	20%	6%	73%	13%	2%	59%	20%	10%

Note: Percentages do not necessarily sum to 100% as the proportion of automobile passengers have not been tabulated. Vehicle trips reflect the percentage of vehicle drivers.
* - Rural area sample size is extremely low and mode shares are highly influenced by school types where public transportation levels are high during the AM versus the PM peaks.

Table 6.1: Vehicle Trip Generation Rates

Vehicle Trip Generation Rates AM and PM Peak Hours						
ITE Land Use Code	Dwelling Unit Type / Data Source		Vehicle Trip Generation Rate			
			2008 Count Data	ITE	OD Survey	Blended Rate
210	Single-detached dwellings	AM	0.66	0.75	0.56	0.66
		PM	0.89	1.01	0.53	0.81
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.40	0.70	0.46	0.52
		PM	0.64	0.72	0.46	0.61
231	Low-rise condominiums (1 or 2 floors)	AM	0.53	0.67	0.21	0.47
		PM	0.41	0.78	0.18	0.46
232	High-rise condominiums (3+ floors)	AM	0.53	0.34	0.21	0.36
		PM	0.41	0.38	0.18	0.32
233	Luxury condominiums	AM	0.53	0.56	0.21	0.43
		PM	0.41	0.55	0.18	0.38
221	Low-rise apartments (2 floors)	AM	0.19	0.46	0.21	0.29
		PM	0.21	0.58	0.18	0.32
223	Mid-rise apartments (3-10 floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.39	0.18	0.26
222	High-rise apartments (10+ floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.35	0.18	0.25

Table 6.2: Recommended Vehicle Trip Directional Splits

Comparison of Directional Splits (Inbound/Outbound) AM and PM Peak Hours								
ITE Land Use Code	Area Dwelling Unit Type / Data Source		2008 Count Data		ITE		Blended Rate	
			Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
210	Single-detached dwellings	AM	33%	67%	25%	75%	29%	71%
		PM	60%	40%	63%	37%	62%	39%
224	Semi-detached dwellings, townhouses, rowhouses	AM	40%	60%	33%	67%	37%	64%
		PM	55%	45%	51%	49%	53%	47%
231	Low-rise condominiums (1 or 2 floors)	AM	36%	64%	25%	75%	31%	70%
		PM	54%	46%	58%	42%	56%	44%
232	High-rise condominiums (3+ floors)	AM	36%	64%	19%	81%	28%	73%
		PM	54%	46%	62%	38%	58%	42%
233	Luxury condominiums	AM	36%	64%	23%	77%	30%	71%
		PM	54%	46%	63%	37%	59%	42%
221	Low-rise apartments (2 floors)	AM	22%	78%	21%	79%	22%	79%
		PM	62%	38%	65%	35%	64%	37%
223	Mid-rise apartments (3-10 floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%
222	High-rise apartments (10+ floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%

Table 6.3: Recommended Vehicle Trip Generation Rates for Residential Land Uses with Transit Bonus

Recommended Vehicle Trip Generation Rates with Transit Bonus AM and PM Peak Hours									
ITE Land Use Code	Dwelling Unit Type / Geographic Area		Vehicle Trip Rate						
			Core		Urban (Inside the Greenbelt)		Suburban (Outside the Greenbelt)		Rural
			Base Rate	< 600m to Rapid Transit	Base Rate	< 600m to Rapid Transit	Base Rate	< 600m to Rapid Transit	Base Rate
210	Single-detached dwellings	AM	0.40	0.31	0.67	0.50	0.70	0.49	0.62
		PM	0.60	0.33	0.76	0.57	0.90	0.63	0.92
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.34	0.34	0.51	0.50	0.54	0.39	0.62
		PM	0.39	0.38	0.51	0.51	0.71	0.51	0.67
231	Low-rise condominiums (1 or 2 floors)	AM	0.34	0.34	0.50	0.50	0.60	0.60	0.71
		PM	0.29	0.29	0.49	0.49	0.66	0.66	0.72
232	High-rise condominiums (3+ floors)	AM	0.26	0.26	0.38	0.38	0.46	0.46	0.54
		PM	0.20	0.20	0.34	0.34	0.46	0.46	0.50
233	Luxury condominiums	AM	0.31	0.31	0.45	0.45	0.55	0.55	0.65
		PM	0.24	0.24	0.40	0.40	0.55	0.55	0.59
221	Low-rise apartments (2 floors)	AM	0.21	0.21	0.31	0.31	0.37	0.37	0.44
		PM	0.20	0.20	0.34	0.34	0.46	0.46	0.50
223	Mid-rise apartments (3-10 floors)	AM	0.17	0.17	0.24	0.24	0.29	0.29	0.35
		PM	0.16	0.16	0.28	0.28	0.37	0.37	0.41
222	High-rise apartments (10+ floors)	AM	0.17	0.17	0.24	0.24	0.29	0.29	0.35
		PM	0.16	0.16	0.27	0.27	0.36	0.36	0.39
Note: The transit bonus was only applied to geographic areas and dwelling unit types where the reported transit mode shares were less than the transit mode share reported for residential development located within the 600m proximity to a rapid transit station. It is noted that condominium and apartment housing categories reported similar levels of transit mode shares independent of location to rapid transit stations.									

6.5 Future Data Collection

While the rates presented in were prepared by blending the vehicle trip rates from ITE, the OD Survey and the 2008 local trip generation studies, it is important to stress the importance and need for ongoing local trip generation surveys to monitor changes in travel behaviour. The 2008 trip generation studies undertaken to support this study provide insight into local travel patterns and a well organized ongoing annual data collection program aimed at trip generation surveys of key land uses or requirement for data collection by local developers will continue to provide recent and accurate local trip generation rates. For example the high-rise apartment category of dwelling units reported the lowest peak hour vehicle trip rates.

Orleans

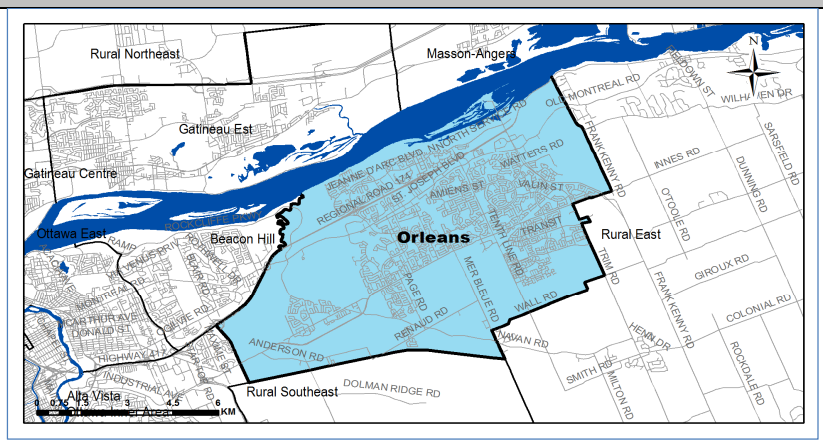
Demographic Characteristics

Population	117,440	Actively Travelled	95,100
Employed Population	57,400	Number of Vehicles	70,160
Households	42,950	Area (km^2)	88.6

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	27,630	24,540	52,170
Part Time Employed	2,040	3,200	5,240
Student	14,100	14,710	28,800
Retiree	8,240	9,820	18,060
Unemployed	890	790	1,670
Homemaker	110	2,990	3,090
Other	630	1,030	1,660
Total:	53,630	57,060	110,690

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	11,690	13,440	25,130
Licensed Drivers	41,780	42,490	84,270
Telecommuters	270	260	530
Trips made by residents	147,960	163,290	311,250

Selected Indicators	
Daily Trips per Person (age 5+)	2.81
Vehicles per Person	0.60
Number of Persons per Household	2.73
Daily Trips per Household	7.25
Vehicles per Household	1.63
Workers per Household	1.34
Population Density (Pop/km2)	1330

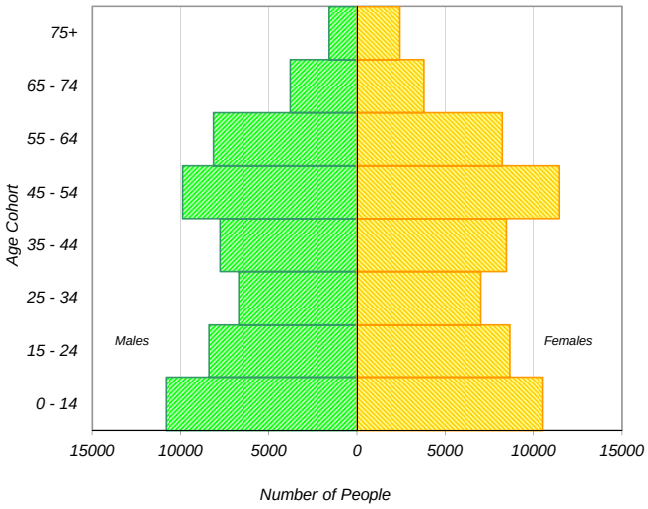


Household Size		
1 person	6,490	15%
2 persons	14,600	34%
3 persons	8,630	20%
4 persons	9,090	21%
5+ persons	4,130	10%
Total:	42,950	100%

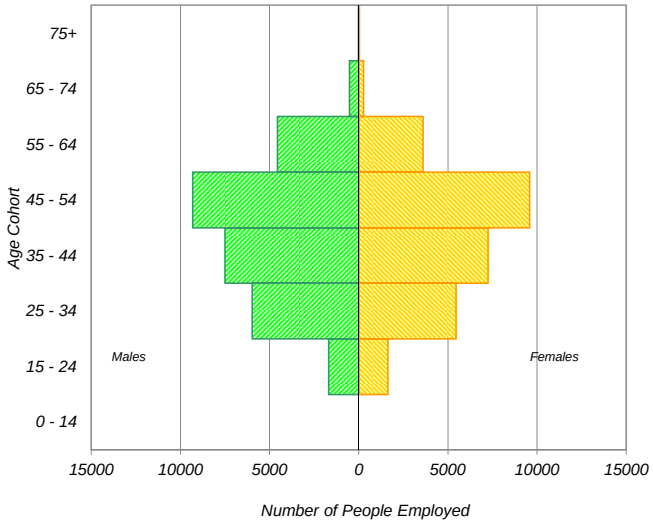
Households by Vehicle Availability		
0 vehicles	1,390	3%
1 vehicle	18,250	42%
2 vehicles	19,080	44%
3 vehicles	3,330	8%
4+ vehicles	890	2%
Total:	42,950	100%

Households by Dwelling Type		
Single-detached	25,970	60%
Semi-detached	3,250	8%
Townhouse	10,730	25%
Apartment/Condo	3,010	7%
Total:	42,950	100%

Population



Employed Population

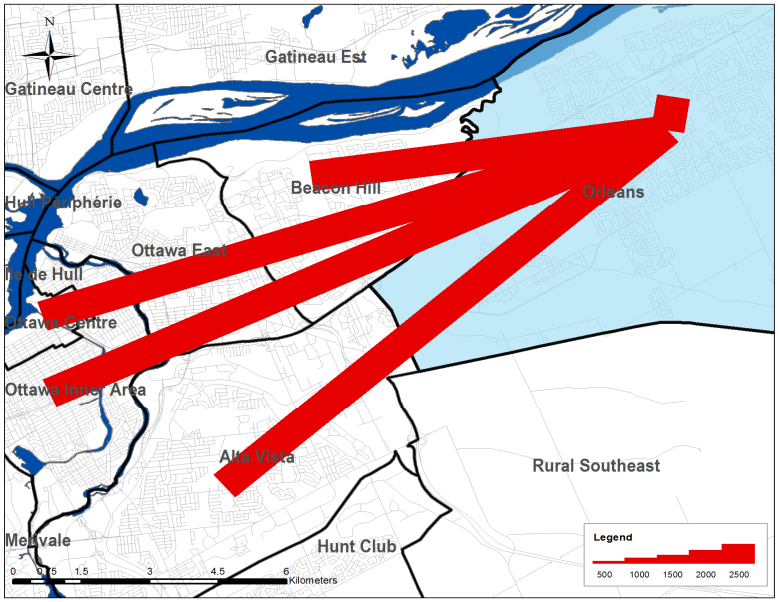


* In 2005 data was only collected for household members aged 11$^+$ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from Orleans

AM Peak Period



Summary of Trips to and from Orleans

AM Peak Period (6:30 - 8:59)	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Districts				
Ottawa Centre	7,330	11%	130	0%
Ottawa Inner Area	4,800	7%	630	2%
Ottawa East	2,840	4%	600	2%
Beacon Hill	4,180	6%	760	2%
Alta Vista	5,890	9%	1,050	3%
Hunt Club	950	1%	630	2%
Merivale	1,940	3%	460	1%
Ottawa West	1,460	2%	220	1%
Bayshore / Cedarview	1,210	2%	310	1%
Orléans	29,900	46%	29,900	78%
Rural East	1,000	2%	1,970	5%
Rural Southeast	70	0%	290	1%
South Gloucester / Leitrim	170	0%	50	0%
South Nepean	200	0%	330	1%
Rural Southwest	70	0%	70	0%
Kanata / Stittsvile	500	1%	290	1%
Rural West	70	0%	0	0%
Île de Hull	1,530	2%	80	0%
Hull Périphérie	460	1%	200	1%
Plateau	10	0%	80	0%
Aylmer	60	0%	90	0%
Rural Northwest	50	0%	40	0%
Pointe Gatineau	200	0%	70	0%
Gatineau Est	40	0%	60	0%
Rural Northeast	10	0%	20	0%
Buckingham / Masson-Angers	0	0%	30	0%
Ontario Sub-Total:	62,580	96%	37,690	98%
Québec Sub-Total:	2,360	4%	670	2%
Total:	64,940	100%	38,360	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	38,220	40%	7,250	8%	9,470	6%
School	9,890	10%	2,120	2%	15,080	10%
Shopping	7,210	8%	7,770	8%	23,480	16%
Leisure	8,640	9%	6,050	6%	15,650	10%
Medical	2,450	3%	1,950	2%	2,610	2%
Pick-up / drive passenger	6,060	6%	5,730	6%	12,910	9%
Return Home	18,630	20%	60,820	64%	65,050	43%
Other	3,880	4%	2,890	3%	6,970	5%
Total:	94,980	100%	94,580	100%	151,220	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	25,310	72%	3,910	46%	4,740	16%
School	5,870	17%	1,940	23%	13,930	47%
Shopping	240	1%	240	3%	840	3%
Leisure	470	1%	400	5%	1,190	4%
Medical	560	2%	310	4%	230	1%
Pick-up / drive passenger	1,780	5%	550	7%	4,540	15%
Return Home	210	1%	710	8%	2,160	7%
Other	630	2%	400	5%	2,280	8%
Total:	35,070	100%	8,460	100%	29,910	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	970	8%	370	1%	660	2%
School	420	3%	10	0%	30	0%
Shopping	1,090	9%	1,910	5%	4,480	13%
Leisure	2,110	17%	1,300	4%	3,470	10%
Medical	250	2%	520	1%	470	1%
Pick-up / drive passenger	1,220	10%	2,850	8%	3,080	9%
Return Home	5,530	46%	26,920	77%	20,320	60%
Other	470	4%	870	3%	1,190	4%
Total:	12,060	100%	34,750	100%	33,700	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	340,780		44%
AM Peak Period	73,440	22%	41%
PM Peak Period	80,510	24%	42%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	57,110	60%	57,360	61%	82,890	55%
Auto Passenger	14,260	15%	13,790	15%	30,320	20%
Transit	21,040	22%	20,690	22%	6,650	4%
Bicycle	400	0%	400	0%	1,600	1%
Walk	70	0%	30	0%	18,160	12%
Other	2,110	2%	2,320	2%	11,590	8%
Total:	94,990	100%	94,590	100%	151,210	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	19,140	55%	5,160	61%	11,450	38%
Auto Passenger	2,970	8%	1,080	13%	5,840	20%
Transit	12,140	35%	870	10%	2,170	7%
Bicycle	230	1%	0	0%	490	2%
Walk	30	0%	10	0%	4,780	16%
Other	550	2%	1,340	16%	5,170	17%
Total:	35,060	100%	8,460	100%	29,900	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	7,680	64%	19,440	56%	18,250	54%
Auto Passenger	2,580	21%	3,680	11%	7,810	23%
Transit	1,420	12%	11,050	32%	1,130	3%
Bicycle	0	0%	230	1%	380	1%
Walk	0	0%	20	0%	3,660	11%
Other	380	3%	320	1%	2,460	7%
Total:	12,060	100%	34,740	100%	33,690	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.25	1.24	1.37
AM Peak Period	1.16	1.21	1.51
PM Peak Period	1.34	1.19	1.43

Transit Modal Split	From District	To District	Within District
24 Hours	23%	23%	6%
AM Peak Period	35%	12%	11%
PM Peak Period	12%	32%	4%