



Tamarack (Queen Street) Corporation

CARDINAL CREEK VILLAGE COMMUNITY TRANSPORTATION STUDY



SECOND SUBMISSION

NOVEMBER 7, 2012



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Originator:	Justin Date/ Austin Shih/ David Hook
Reviewer:	Justin Date
Authorization:	David Hatton
Circulation List:	Asad Yousfani – City of Ottawa Ted Phillips – Tamarack Michelle Taggart – Tamarack Richard Harrison – Richard W. Harrison & Associates
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EXECUTIVE SUMMARY

This report presents the methodology, findings and conclusions of a Community Transportation Study (CTS) prepared in support of the Official Plan Amendment (OPA) application for the proposed Cardinal Creek Village development by Tamarack Homes.

The subject lands are generally located to the east of Cardinal Creek and south of Ottawa Road 174 and are currently designated in the Official Plan as Urban Expansion Study Area. The OPA application requests the City to adopt a Secondary Plan detailing the urbanization of these lands.

A land use concept plan is still being developed at this stage, but it is envisioned that the proposed Cardinal Creek Village community will include approximately 4,800 residential units, institutional land uses and mixed-use commercial areas. It is anticipated that the development could be fully built-out by 2031.

This CTS will present preliminary details of the proposed transportation network in the development in terms of proposed intersection locations on the existing road network. Details of the internal road network, pedestrian and cycling facilities and potential transit route options will be provided upon completion of the concept plan. The focus of this report will be an assessment of the traffic impact of the development on the adjacent road network.

The study has followed the City of Ottawa Transportation Impact Assessment Guidelines (October 2006). Prior to the commencement of the study, the study parameters and assumptions were discussed with and confirmed by City staff. These assumptions relate to the following:

- Background Traffic Growth Rate
- Future Road Network
- Future Transit Network
- Trip Generation Rates
- Screenline Methodology
- Transit Modal Split
- Future Traffic Distribution
- Intersection Capacity Analysis Methodology

Successive sections of this report describe the proposed development, traffic analyses, and findings and conclusions associated with the study. A series of appendices provide details of background traffic information, traffic generation factors and intersection capacity analyses.

Based on the traffic analyses undertaken in this Community Transportation Study, the main findings, conclusions and recommendations are as follows:

- The horizon years for the study have been established as 2021, representing a 50% build-out scenario; and 2031, the anticipated full build-out year of the development.

- At full build-out in 2031, it is estimated that the Cardinal Creek Village development will generate 1,924 total new vehicular trips during the weekday morning peak hour and 2,938 new trips during the afternoon peak hour.
- It has been assumed that the transit modal split (TMS) in the development will be 35% at the 2021 and 2031 study horizon years, which is in line with the existing level of transit use in Orleans.
- Screenline analysis indicates that there will be sufficient capacity at the Ottawa Road 174 and St. Joseph Boulevard/ Montreal Road crossings of the Bilberry Creek Screenline (SL45) and Green's Creek Screenline (SL 16) to accommodate future background traffic growth plus site generated traffic at the 2021 and 2031 horizon years, provided the infrastructure improvements identified in the TMP are implemented.

Trim Road and Ottawa Road 174

- The Trim Road and Ottawa Road 174 intersection is presently operating at close to capacity during the weekday morning and afternoon peak hours.
- By 2021, the intersection will exceed its capacity during the morning peak hour under background traffic conditions. The critical movement at the intersection in the morning peak hour is the left-turn on the northbound approach.
- Additional interim capacity could be provided at the intersection in the form of triple left-turn lanes on the northbound approach by converting the shared through-right lane to a left-through-right configuration and running split north-south signal timing phases. As well, widening of Ottawa Road 174 to six lanes would provide additional capacity to the intersection in the interim.
- By 2031, traffic volumes are projected to increase to a level at which traffic signal controls will be unable to adequately process the traffic demand at the intersection, even with the interim modifications described above; and ultimately the intersection will need to be converted to a grade-separated interchange.

Trim Road and Dairy Drive/ Taylor Creek Drive

- The proposed roundabout that will be constructed at the intersection of Trim Road and Dairy Drive/ Taylor Creek Drive, as part of the Trim Road Widening project, will operate at acceptable levels of service at the 2021 horizon year but will reach its theoretical capacity by 2031 under background traffic conditions.
- The intersection will operate at acceptable levels of service at the 2031 horizon year with conversion of the roundabout to a traffic signal controlled intersection.

Trim Road and St. Joseph Boulevard/ Old Montreal Road

- The proposed roundabout at the Trim Road and St. Joseph Boulevard/ Old Montreal Road intersection will operate at acceptable overall levels of service under 2021 total traffic conditions. It is recommended that the channelized westbound right-turn lane be converted to a free-flow condition and a northbound merge lane constructed on Trim Road, to provide additional capacity to accommodate the increased traffic volumes on this movement.

- By 2031, the roundabout will exceed its capacity during the weekday morning and afternoon peak hours under total traffic conditions. Conversion of the roundabout to a traffic signal controlled intersection will improve the operating condition to acceptable levels of service during the peak hours.

Ottawa Road 174 and Collector Road

- At the 2021 horizon year, the intersection of Ottawa 174 and the proposed Collector Road in Cardinal Creek Village will operate above capacity during the weekday peak hours with the existing two-lane cross-section on Ottawa Road 174.
- To accommodate the future background traffic volumes derived from the City's traffic model plus the traffic generated by the Cardinal Creek Village development, the results of the analysis indicate that the cross-section of Ottawa Road 174 will need to be widened to four lanes by 2021 and to six lanes by 2031.
- The requirement to widen Ottawa Road 174 to six lanes along the frontage of the proposed development by 2031 is based on traffic projections derived from the latest information available from the City traffic model. It is anticipated that the recently initiated Ottawa Road 174/ County Road 17 (highway 417/ Split to Rockland) EA study and the upcoming TMP Update in 2013 by the City of Ottawa will assess future travel demand in the area on a regional scale and will provide updated estimates of peak hour traffic volumes along the Ottawa Road 174.

Ottawa Road 174 and Right-in/ Right-Out Access #1

- The proposed Right-in/ Right-out Access #1 to the commercial development along Ottawa Road 174 will operate at acceptable levels of service during the peak hours under 2031 traffic conditions.

Ottawa Road 174 and Right-in/ Right-Out Access #2

- The proposed Right-in/ Right-out Access #2 to the commercial development along Ottawa Road 174 will operate at acceptable levels of service during the peak hours under 2031 traffic conditions.

Old Montreal Road and Collector Road

- The new intersection of Old Montreal Road and the Cardinal Creek Village Collector Road will operate at acceptable levels of service at the 2021 horizon year as either a roundabout or stop-controlled intersection.
- By 2031 there will be a requirement to widen Old Montreal Road to four lanes to accommodate the increase in background traffic and site generated traffic. Under 2031 traffic conditions, the intersection is expected to meet the minimum warrants for signalization and will function at acceptable levels of service as either a traffic signal controlled intersection or as a multi-lane roundabout.

Old Montreal Road and Local Road 'A'

- The new intersection of Old Montreal Road and Local Road 'A' will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

Old Montreal Road and Local Road 'B'

- The new intersection of Old Montreal Road and Local Road 'B' will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

Old Montreal Road and Frank Kenny Road

- The existing intersection of Old Montreal Road and Frank Kenny Road will continue to operate at acceptable levels of service as an unsignalized intersection under 2031 total traffic conditions.

Frank Kenny Road and Collector Road

- The new intersection of Frank Kenny Road and the Cardinal Creek Collector Road will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

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1. INTRODUCTION

This report presents the methodology, findings and conclusions of a Community Transportation Study (CTS) prepared in support of the Official Plan Amendment (OPA) application for the proposed Cardinal Creek Village development by Tamarack Homes.

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A land use concept plan is still being developed at this stage, but it is envisioned that the proposed Cardinal Creek Village community will include approximately 4,800 residential units, institutional land uses and mixed-use commercial areas. It is anticipated that the development could be fully built-out by 2031.

This CTS will present preliminary details of the proposed transportation network in the development in terms of proposed intersection locations on the existing road network. Details of the internal road network, pedestrian and cycling facilities and potential transit route options will be provided upon completion of the concept plan. The focus of this report will be an assessment of the traffic impact of the development on the adjacent road network.

The study has followed the City of Ottawa Transportation Impact Assessment Guidelines (October 2006). Prior to the commencement of the study, the study parameters and assumptions were discussed with and confirmed by City staff. These assumptions relate to the following:

- Background Traffic Growth Rate
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- Future Transit Network
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- Intersection Capacity Analysis Methodology

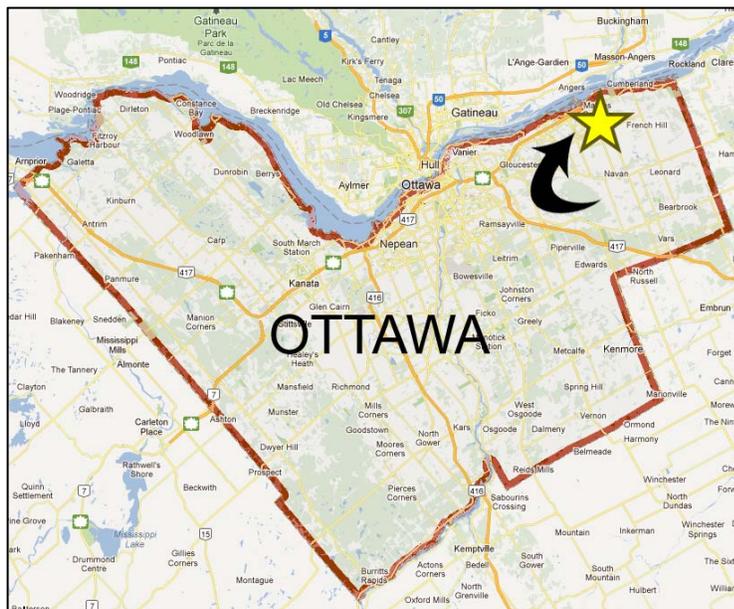
Successive sections of this report describe the proposed development, traffic analyses, and findings and conclusions associated with the study. A series of appendices provide details of background traffic information, traffic generation factors and intersection capacity analyses.

2. PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development is located in the east end of the City of Ottawa as indicated on EXHIBIT 1 – SITE LOCATION. The subject lands are located east of Cardinal Creek, west of the estate residential development along Ted Kelly Lane, south of Ottawa Road 174 and north of lands currently designated Agricultural Resource Area in the City’s Official Plan.

EXHIBIT 1 – SITE LOCATION



2.2 Land Uses

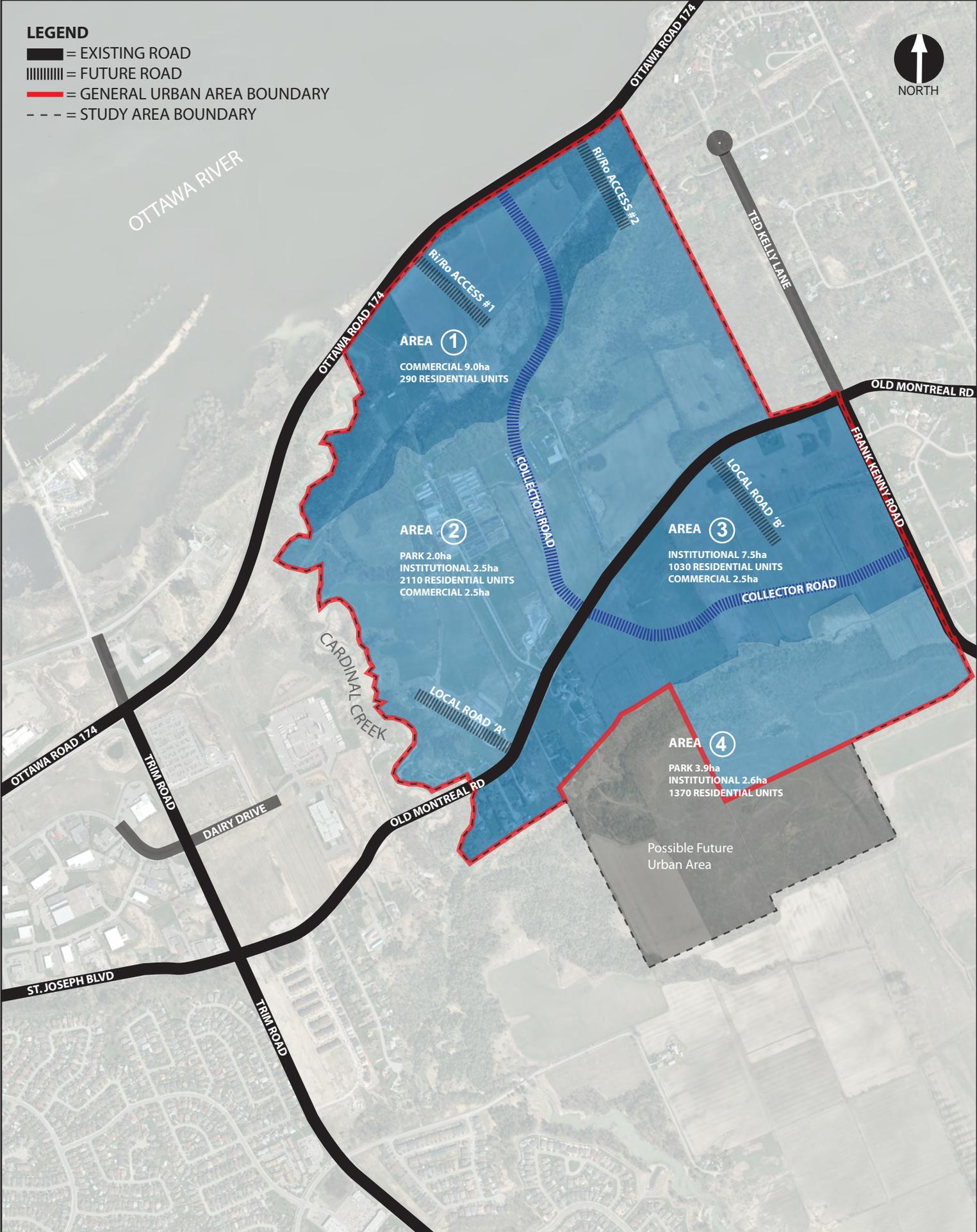
The proposed community will consist primarily of single-family residential dwellings, but will also incorporate a mix of higher density residential units such as townhouses and apartments, as well as mixed-use commercial land uses.

The Cardinal Creek Village development area is indicated on EXHIBIT 2 – PROPOSED DEVELOPMENT. The Conceptual Plan for the area is currently being developed, but a preliminary breakdown of land uses anticipated within each of the four sub-areas identified on Exhibit 2 has been derived assuming a minimum residential density of 34 units per hectare.

TABLE 1 – PROPOSED DEVELOPMENT LAND USES presents a preliminary breakdown of proposed land uses in Cardinal Creek Village.

LEGEND

-  = EXISTING ROAD
-  = FUTURE ROAD
-  = GENERAL URBAN AREA BOUNDARY
-  = STUDY AREA BOUNDARY



**TABLE 1
PROPOSED DEVELOPMENT LAND USES**

AREA	RESIDENTIAL UNITS				COMMERCIAL		INSTITUTIONAL (Ha)	PARK (Ha)
	Total	Singles	Townhouses	Apartments	Total Area (Ha)	GFA (ft ²)		
1	290	160	102	28	9.0	305,000	-	-
2	2,110	1,161	739	210	2.5	67,500	2.5	2.0
3	1,030	567	361	102	2.5	67,500	7.5	-
4	1,370	754	480	136	-	-	2.6	3.9
Total	4800	2642	1682	476	14.0	440,000	12.6	5.9

2.3 Phasing

The details of construction phasing for the development have not yet been determined but it is anticipated that the development will be fully built-out by 2031. This study will analyse the traffic impact of the fully built-out development at 2031 and a 50% build-out scenario at 2021. The development areas to the north of Old Montreal Road (Area 1 and Area 2 on Exhibit 1) will be constructed first and it is estimated that they will be completed by 2021.

2.4 Development Access

The details of the internal road layout are being developed as part of ongoing work on the conceptual plan for the development. The conceptual plan will propose a north-south collector road which will run roughly through the centre of the development between Ottawa Road 174 and Frank Kenny Road with a four-legged intersection at Old Montreal Road, as indicated on Exhibit 2. Two local road intersections along Old Montreal Road are proposed in the general locations indicated on Exhibit 2. In addition, two right-in/ right-out access driveways for the multi-use commercial component of Area 1 are proposed along Ottawa Road 174. The following new intersections will be analysed in this CTS:

- Ottawa Road 174 and Collector Road
- Ottawa Road 174 and Right-In/ Right-Out Access #1
- Ottawa Road 174 and Right-In/ Right-Out Access #2
- Old Montreal Road and Collector Road
- Old Montreal Road and Local Road A
- Old Montreal Road and Local Road B
- Frank Kenny Road and Collector Road

3. TRANSPORTATION NETWORK

3.1 Existing Road Network



Ottawa Road 174/ County Road 17

Ottawa Road 174 is a four-lane divided freeway between Highway 417 and Trim Road, under the jurisdiction of the City of Ottawa with a posted speed limit of 100 km/h. Ottawa Road 174 serves as the primary east-west transportation link between the suburb of Orleans and central Ottawa. East of Trim Road, Ottawa Road 174 becomes County Road 17, a rural arterial road with a two-lane cross-section and a posted speed limit of 90 km/h.



Old Montreal Road

Old Montreal Road is a two-lane rural arterial road under the jurisdiction of the City of Ottawa which runs in an east-west direction between Trim Road and Cumberland Village. The posted speed limit on the section of Old Montreal Road adjacent to the proposed development is 80 km/h. The speed limit on Old Montreal Road is reduced to 60 km/h along sections where individual properties access directly onto the roadway and along sections where the existing horizontal and vertical alignment of the roadway cannot support higher speeds.



St. Joseph Boulevard

St Joseph Boulevard is an east-west arterial road under the jurisdiction of the City of Ottawa which forms the west leg of the Trim Road/ Old Montreal Road intersection. St. Joseph Boulevard has a two-lane rural cross-section with a posted speed limit of 60 km/h along the section from Trim Road to east of Tenth Line Road.



Trim Road

Trim Road is a two lane roadway under the jurisdiction of the City of Ottawa that is classified as an arterial road with a posted speed limit of 70 km/h to the south of Ottawa Road 174 and as a major collector road to the north. Trim Road is the nearest north-south arterial road to the proposed development and is an important corridor connecting the developing communities in south Orleans to Ottawa Road 174.



Frank Kenny Road

Frank Kenny Road is a two-lane rural road under the jurisdiction of the City of Ottawa. The section of Frank Kenny Road between Old Montreal Road and Innes Road is classified as a major collector road.

3.2 Protected Rights-of-Way

TABLE 2 – EXISTING RIGHTS-OF-WAY, indicates the Right-of-Way widths that are to be protected along the roadways referenced above, as identified in the Official Plan.

TABLE 2
EXISTING RIGHTS-OF-WAY

ROADWAY	RIGHT-OF-WAY TO BE PROTECTED ¹
Old Montreal Road from Trim Road to Cardinal Creek	37.5m
Old Montreal Road, from Cardinal Creek to Chevalier Court	34m
Trim Road, from Ottawa Road 174 to proposed Trim Road/ Frank Kenny Road Extension	46m
St. Joseph Boulevard, from Tenth Line Road to Trim Road	37.5m
Frank Kenny Road, from Old Montreal Road to Innes Road	20m

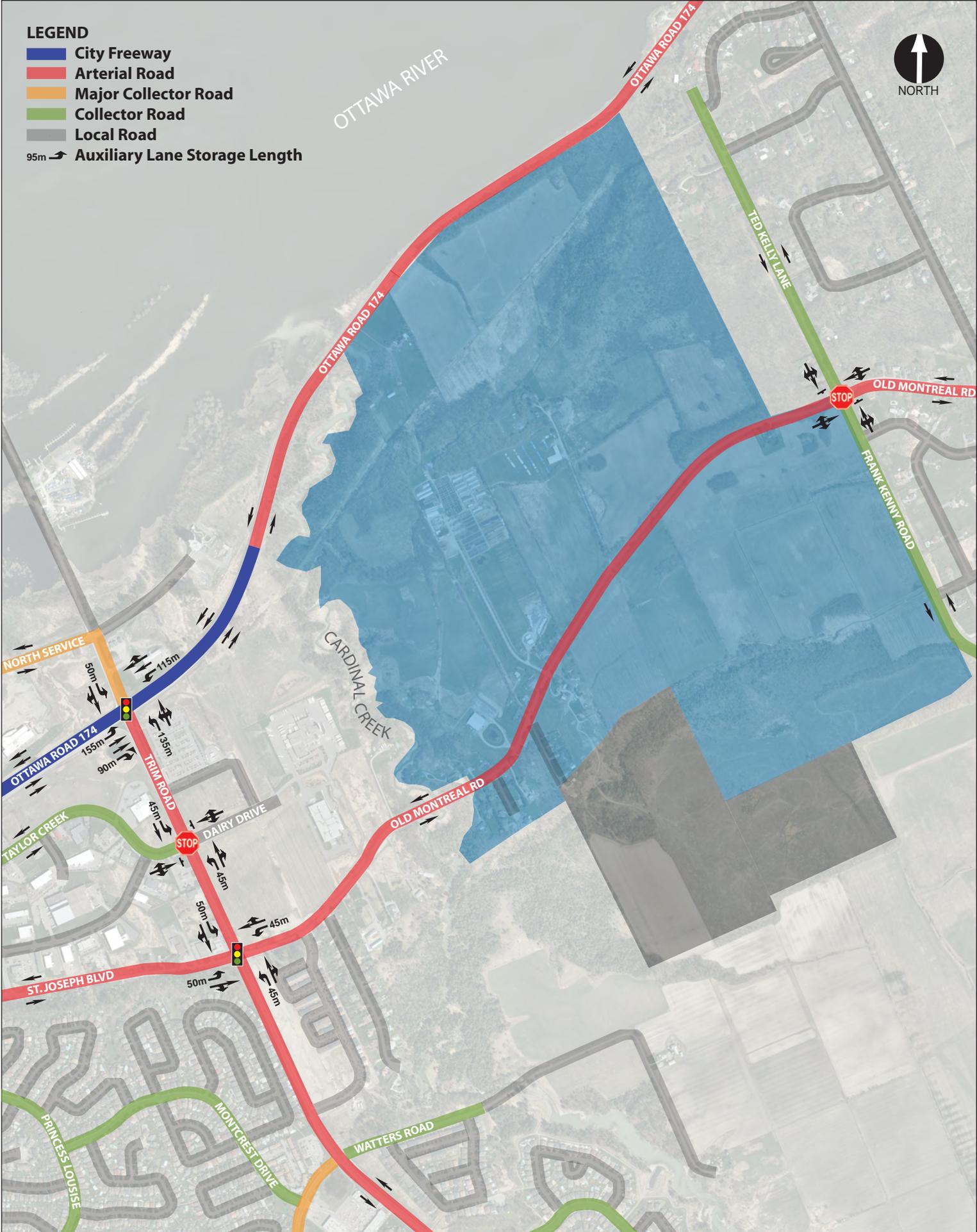
¹Source: City of Ottawa Official Plan

EXHIBIT 3 – EXISTING ROAD NETWORK, presents the existing road classifications, lane configurations, auxiliary lane storage lengths and the type of traffic control for intersections analysed in this report.

APPENDIX A – PHOTOS, presents photographs of the existing road network adjacent to the proposed site.

LEGEND

- City Freeway
- Arterial Road
- Major Collector Road
- Collector Road
- Local Road
- 95m Auxiliary Lane Storage Length



3.3 Existing Bicycle & Pedestrian Facilities

There is an existing 1.5km long off-road multi-use pathway that runs along Cardinal Creek from Watters Road to the realigned Trim Road corridor. There are currently no other specific facilities for pedestrians or cyclists along the major road corridors within the study area.

3.4 Existing Transit Service

Transit service is provided to the study area via the following OC Transpo bus routes:

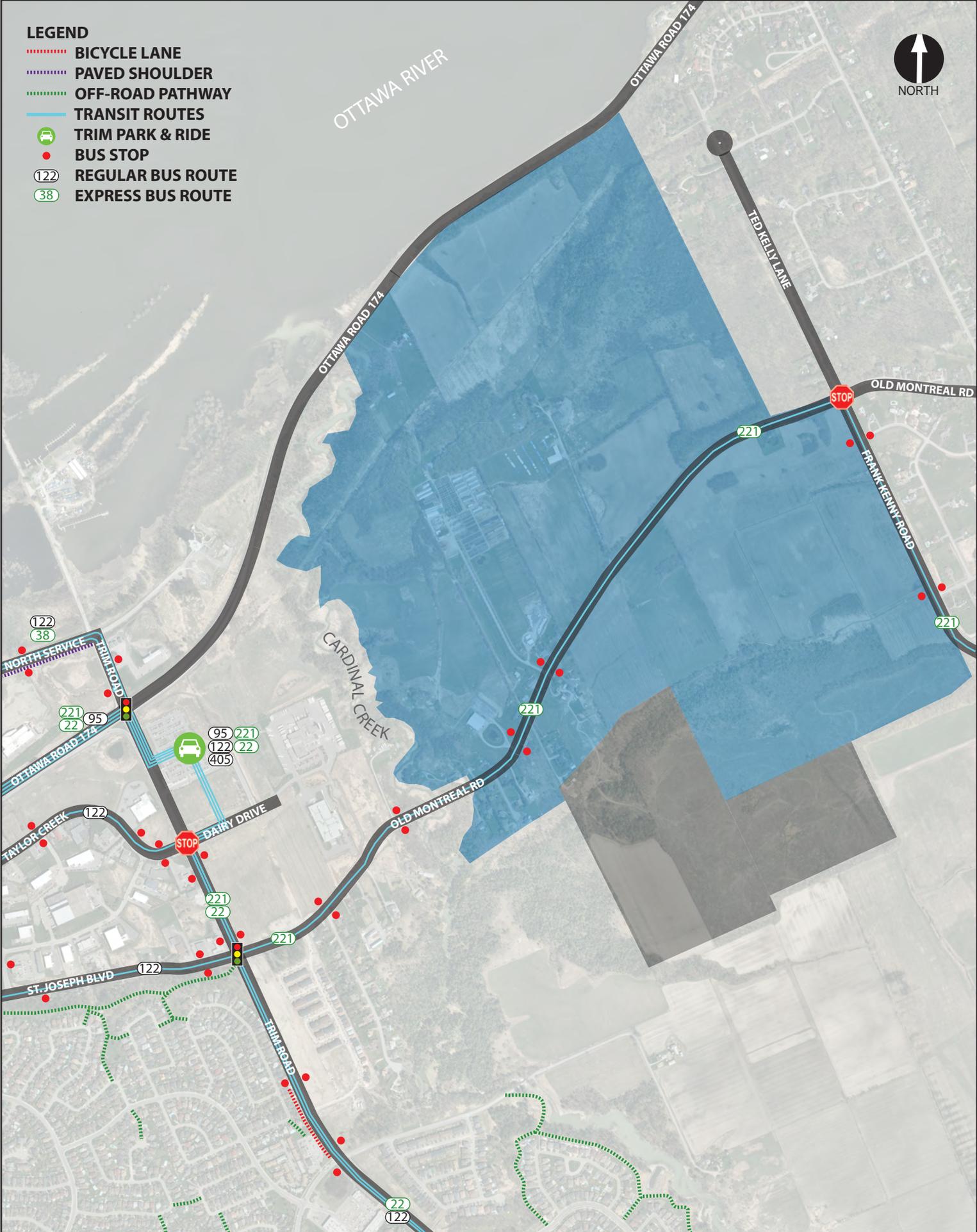
- **Route 95** – Route 95 is one of the Rapid Transit Network Routes operated by OC Transpo and provides all-day rapid transit service between Trim Park & Ride and the suburb of Barrhaven via downtown Ottawa. Route 95 operates on 10 min headways from the Trim Station during the weekday morning and afternoon peak periods.
- **Route 22** – Peak period express service between the Millennium Park and Ride and the Lebreton Transitway Station via downtown Ottawa. Route 22 stops at the Trim Park & Ride facility and operates on a 15-minute and 20-minute headway during the weekday morning and weekday afternoon peak periods, respectively.
- **Route 122** – Route 122 provides all-day service between the Millennium Park and Ride facility and Place d’Orleans Transitway Station via the Taylor Creek Business Park and St. Joseph Boulevard, with a stop at the Trim Park and Ride facility. Route 122 operates on a 30-minute headway during the weekday morning and afternoon peak periods.
- **Route 221** – Route 221 is a weekday peak period rural express route providing service between Cumberland Village and Lebreton Transitway Station via downtown Ottawa. Route 221 travels along Frank Kenny Road and Old Montreal Road and is the only existing transit service provided in the proposed development area. At present, Route 221 is a very limited transit service with only two buses provided per peak period on this route.
- **Route 38** – Route 38 provides weekday peak period service between Ottawa Road 174/Trim Road and the Lebreton Transitway Station via the Jeanne d’Arc Boulevard. Service between Tenth Line Road and Trim Road, however, is limited. Route 38 operates on a 30-minute and 40-minute headway during the weekday morning and afternoon peak periods, respectively.

APPENDIX B – OC TRANSPO MAPS, presents details of the current transit routes described above.

EXHIBIT 4 – EXISTING PEDESTRIAN, CYCLING & TRANSIT FACILITIES indicates the existing transit routes, bus stop locations, multi-use pathways, etc. within the study area.

LEGEND

- ⋯ BICYCLE LANE
- ⋯ PAVED SHOULDER
- ⋯ OFF-ROAD PATHWAY
- TRANSIT ROUTES
- TRIM PARK & RIDE
- BUS STOP
- 122 REGULAR BUS ROUTE
- 38 EXPRESS BUS ROUTE



Cardinal Creek Village
Community Transportation Study

EXHIBIT 4
Existing Pedestrian, Cycling
& Transit Facilities

PROJECT No. 31539
DATE: 2012-11-07
SCALE:
0m 200m 400m

3.5 Existing Traffic Volumes

Existing traffic volumes within the study area have been derived from weekday traffic counts undertaken by the City of Ottawa at the following intersections:

- Trim Road / Ottawa Road 174 (2012)
- Trim Road / Dairy Drive (2011)
- St. Joseph Boulevard / Trim Road (2011)
- Old Montreal Road / Frank Kenny (2012)

Details of the traffic data indicated above are included in APPENDIX C – TRAFFIC DATA.

EXHIBIT 5 – EXISTING (2012) TRAFFIC presents details of the representative traffic volumes for the intersections indicated above, during the weekday morning and afternoon peak hours.

3.6 Collision Records

A review of collision records has been carried out for the study area. The City of Ottawa Transportation Impact Assessment Guidelines (October 2006) indicate that further analysis may be warranted when there have been either 33 or more total collisions reported at a particular location or at least 6 collisions for any one movement, over a three year period.

TABLE 3 – REPORTED COLLISIONS WITHIN THE STUDY AREA presents a summary of the total collisions recorded at various locations in the study area during the period between January 1, 2008 and January 1, 2011.

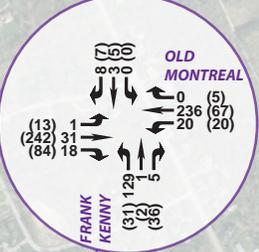
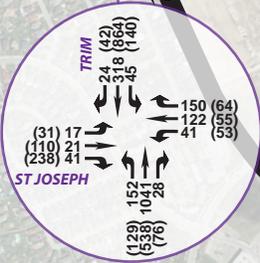
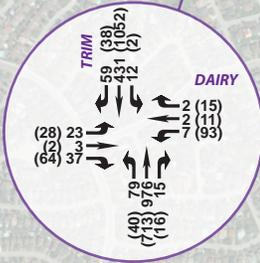
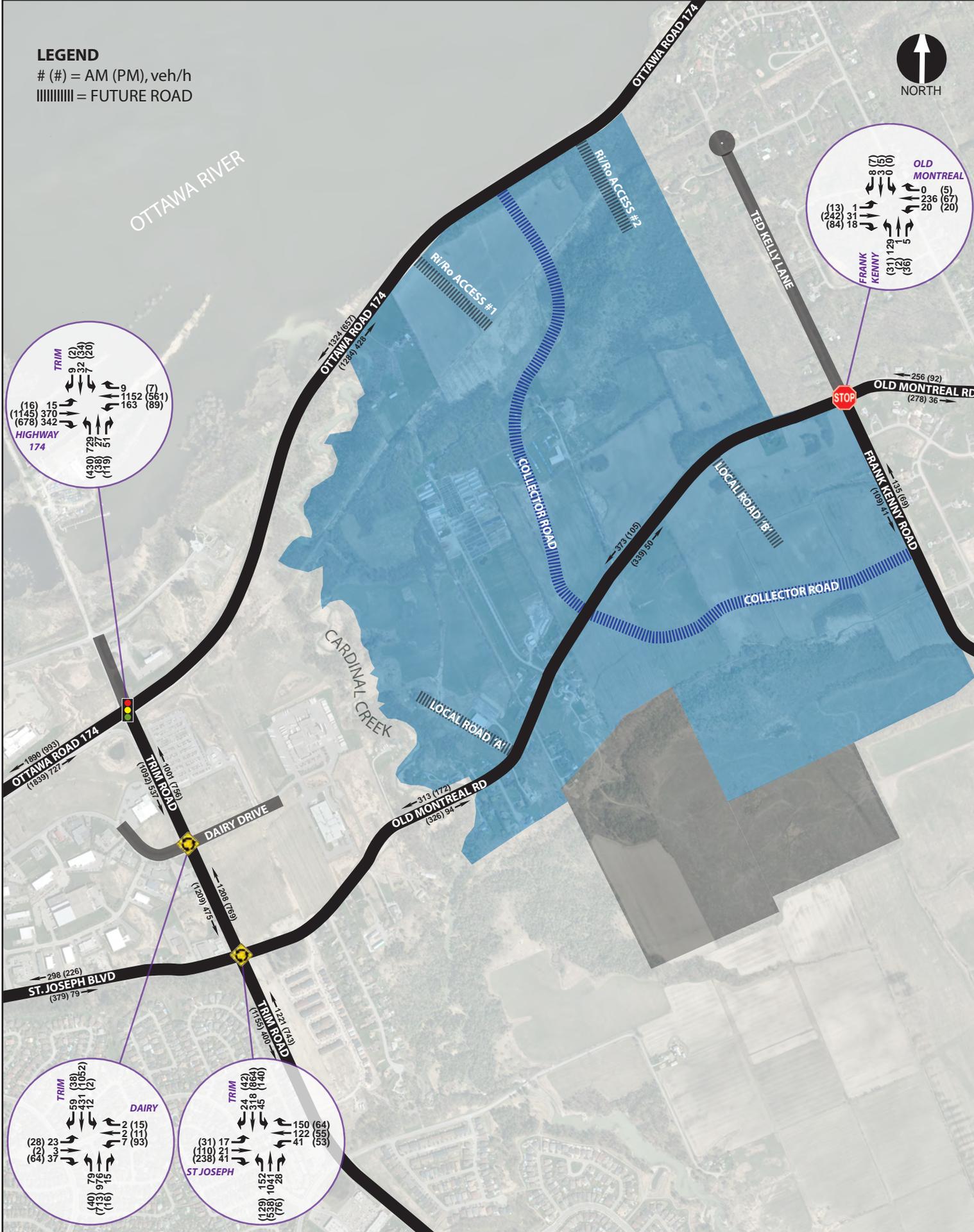
TABLE 3
SUMMARY OF REPORTED COLLISIONS WITHIN THE STUDY AREA

LOCATION	# OF REPORTED COLLISIONS
Ottawa Road 174 & Trim Road	33
St. Joseph Boulevard & Trim Road	31
Old Montreal Road & Frank Kenny Road	1
Trim Road & Dairy Road	0
Old Montreal Road (Trim to Frank Kenny)	23
Trim Road (Ottawa Road 174 to St. Joseph)	16

LEGEND

(#) = AM (PM), veh/h

||||||| = FUTURE ROAD



Based on the reported collisions summarized in Table 3 above, the following location meets the City's minimum warrant for further analysis with respect to total collisions reported during the three-year period:

Ottawa Road 174 & Trim Road

- 6/33 Collisions occurred during snow/rain conditions (18%)
- 11/33 Collisions occurred at night (33%)
- 10 Eastbound Rear-End Collisions (30%)
 - Visibility: Daylight (10 of 10)
 - Weather: Clear (10 of 10)
 - Time of Day: Peak Hour (2 of 10)
- 6 Westbound Rear-End Collisions (18%)
 - Visibility: Daylight (5 of 6)
 - Weather: Clear (5 of 6)
 - Time of Day: Variable

A review of the reported collisions at the Ottawa Road 174/Trim Road intersection indicates that of the 33 total collisions recorded at the intersection, 51% occurred at night or in poor weather conditions. At present, streetlights are provided at the intersection but not on the mainline approaches. A review of lighting requirements at the intersection should be carried out as part of the Ottawa Road 174/ County Road 17 EA.

Old Montreal Road (Trim Road to Frank Kenny Road)

- 9/23 (39%) Collisions occurred during snow/rain conditions.
- 13/23 (57%) Collisions occurred at night.

A review of the collision records along Old Montreal Road indicates that the majority of the reported collisions (96%) occurred at night or in poor weather conditions.

St. Joseph Boulevard & Trim Road

- 12/31 (39%) Collisions occurred during snow/rain conditions
- 6/31 (19%) Collisions occurred at night
- 19/31 (61%) Collisions involved northbound vehicles
 - 13/19 (68%) of these were rear-end collisions
 - 3/13 (23%) of these were during snow/rain events
 - 1/13 (8%) of these were at night

A review of the collision records at the intersection of St. Joseph Boulevard and Trim Road has found that 58% of recorded collisions occurred during inclement weather or poor roadway surface conditions. More than half of the collisions reported at the intersection involved northbound vehicles and were primarily rear-end collisions. The relatively steep (approx. 8%) downhill grade on the northbound approach may be a contributing factor to the higher incidence of rear-end collisions. The frequency and severity of collisions at the intersection should decrease with the proposed construction of a multi-lane roundabout at the intersection. Traditionally roundabouts are safer intersections than traffic signal controlled intersections. APPENDIX D – COLLISION DATA, presents the detailed collision records for the study area.

3.7 Future Road Network

Ottawa Road 174/ County Road 17

The City of Ottawa Transportation Master Plan (TMP), approved by City Council in November 2008, indicates that Ottawa Road 174 will be widened from five to six lanes between Highway 417 and Blair Road, by 2015. Further widening of the highway to six lanes is proposed for the section between Blair Road and Jeanne d'Arc Boulevard by 2022.

The United Counties of Prescott and Russell in partnership with the City of Ottawa have initiated a multi-jurisdictional Class Environmental Assessment (EA) Schedule C Study for improvements to Ottawa Road 174 from the Highway 417/ Ottawa Road 174 interchange (the "Split") to Canaan Road in the City of Ottawa, and improvements to County Road 17 from Canaan Road to County Road 8 (Landry Road) in the United Counties of Prescott and Russell.

Growth in Orleans, Cumberland and Rockland has increased traffic volumes along the Ottawa Road 174/ County Road 17 corridor which has led to congestion during the weekday peak periods. In addition, road safety concerns related to the many at-grade intersections, lower geometric design standards of the two-lane roadway section as well as high traffic demand have prompted the need for a study to develop improvements to address these deficiencies.

City staff have indicated that the EA will evaluate improvement alternatives that may include widening of the two-lane section of Ottawa Road 174/ County Road 17, but will also evaluate other potential east-west corridors; either existing or new, located in the area between the Ottawa River and Innes Road.

For the purpose of this CTS, the operational analysis of the proposed development intersections will assume two lanes along Ottawa Road 174 initially, but will also evaluate the operating condition of the intersections with a widened four-lane cross-section in place.

Trim Road

The TMP has identified the future widening/ realignment of Trim Road from two to four lanes from North Service Road, north of Ottawa Road 174, to the future Blackburn Hamlet By-Pass Extension, south of Innes Road. This project will provide network continuity and additional capacity that will be required to accommodate on-going development in Orleans.

Construction on the Trim Road Widening/ Frank Kenny Road Extension project is scheduled to start in Fall 2012. For the purpose of this CTS, the existing conditions analysis of Trim Road has assumed the proposed design for the widened roadway, since this project is imminent.

Old Montreal Road

Old Montreal Road is not included in the list of required infrastructure improvements in the current TMP. However, City staff have indicated a desire to widen and urbanize the section of Old Montreal Road between Dairy Road and Frank Kenny Road, now that the City urban boundary has been expanded. It is understood that this widening will be included as required infrastructure in the update to the TMP in 2013. The section of Old Montreal Road from Trim Road to Dairy Drive will be reconstructed and urbanized as part of the Trim Road Widening project.

St. Joseph Boulevard

The TMP has identified future widening of St. Joseph Boulevard from two to four lanes from east of Tenth Line Road to Dairy Road. This project has been included as part of the Trim Road Widening project.

Frank Kenny Road

The TMP has included the Frank Kenny Road Extension in the list of road infrastructure projects required by 2022. The extension of Frank Kenny Road will consist of a new four-lane roadway between the realigned Trim Road and Innes Road. This new roadway will be constructed as part of the Trim Road Widening project.

3.8 Future Bicycle & Pedestrian Facilities

The Ottawa Cycling Plan (OCP) prepared by the City of Ottawa in January 2008, classifies Old Montreal Road, St. Joseph Boulevard, Ted Kelly Drive and Frank Kenny Road as Spine or City-wide Cycling Routes in the City of Ottawa cycling network and proposes that paved shoulders be provided along those roads in the future.

Trim Road is designated as a Spine or City-Wide Cycling Route in the OCP. Exclusive bicycle lanes will be provided along the widened section of Trim Road.

The TMP indicates that an off-road multi-use pathway will be constructed from Petrie Island to Innes Road alongside Cardinal Creek. A 1.5km long segment of this proposed path already exists south of the study area from Watters Road to the realigned Trim Road corridor.

Connections from the proposed development to the future cycling/pedestrian facilities along Ottawa Road 174, Old Montreal Road and Cardinal Creek will be provided. The locations and details of these connections are still being developed as part of the Conceptual Plan for Cardinal Creek Village.

3.9 Future Transit Service

Community Transit Service

The introduction of efficient and convenient transit service to Cardinal Creek Village will be important to the success of the development. At present the immediate area is served only by peak period transit service along Old Montreal Road. Modification of the existing transit routes as well as the implementation of new routes will be required to service the proposed development area.

Typically OC Transpo requires that as development progresses in an area to a point at which there are more than 250 new housing units located beyond a five-minute walk (or 400m) from an existing route, a separate peak-period bus route may need to be introduced. Similarly, when there are at least 500 new housing units beyond a ten-minute walk (or 800m) from the adjacent transit routes, a separate all-day transit route will be required to service the area.

The details of the implementation of transit service to Cardinal Creek Village will be developed with OC Transpo staff as work on the conceptual plan for the development is advanced. Tamarack (Queen Street) Corporation has offered the temporary use of land along the north side of Old Montreal Road for the purpose of providing an interim Park & Ride facility, if required by OC Transpo.

Rapid Transit Network

The City of Ottawa Transportation Master Plan identifies plans to incrementally establish a city-wide light rail transit (LRT) network and expand on the current bus rapid transit (BRT) network.

East Transitway

The East Transitway (BRT) will be extended along the Ottawa Road 174 corridor from Place d'Orleans to Trim Road as part of Phase 2 of the implementation plan for required transit Infrastructure projects in the TMP. As such, it has been assumed that the extension of the East Transitway as a BRT facility to Trim Road will be in place by the 2031 horizon year of this CTS. The TMP ultimately proposes LRT to extend to Trim Road; however the timing is beyond the 2031 horizon year of the TMP and this study.

Cumberland Transitway

The Cumberland Transitway is a proposed rapid transit corridor between Blair Station and Frank Kenny Road, providing rapid transit service to Blackburn Hamlet and the developing communities south of Innes Road in Orleans.

East-Cumberland Transitway Connecting Link

The City is considering a future connection between the East Transitway and the Cumberland Transitway as part of the long term strategic planning for transit in Ottawa. City staff have directed IBI Group to conduct a preliminary evaluation of potential corridors for this transit connecting link, including options through Cardinal Creek Village, as part of the ongoing development of the Conceptual Plan.

3.10 Transportation Demand Management

The City of Ottawa is committed to implementing Transportation Demand Management (TDM) measures on a City-wide basis in an effort to reduce the automobile dependence of Ottawa residents, particularly during the weekday peak travel periods. TDM initiatives are aimed at encouraging individuals to use non-auto modes of travel during the peak periods.

The proposed development will conform to the City's TDM principles by providing easy access to non-auto modes of travel in terms of direct connections to adjacent pedestrian, cycling and transit facilities.

4. TRAFFIC ANALYSES

4.1 Future Background Traffic

The horizon years for this study were established as 2021 and 2031, representing approximately 50% build-out and full build-out of the development, respectively. Future weekday morning peak hour traffic projections for the years 2021 and 2031 were obtained from the City of Ottawa traffic modelling group. These projections were used as the base traffic volumes from which representative traffic volumes for each of the study area intersections were derived.

Future background traffic volumes at 2021 and 2031 for the weekday morning peak hour were established for each of the study area intersections by using the projected link volumes along the major arterial roads from the City model. The model data was calibrated to the existing traffic counts to account for under-representations of a few link volumes in the model data. Representative traffic projections at the intersection level were then derived by applying distribution proportions to the link volumes at each intersection approach according to the existing proportions recorded in the traffic counts. Traffic volumes were then balanced between intersections where deemed appropriate.

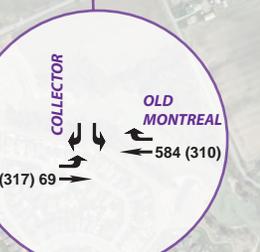
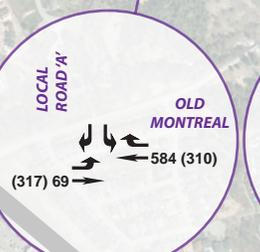
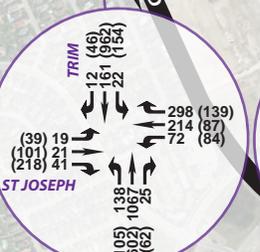
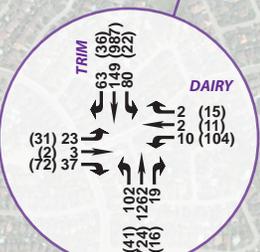
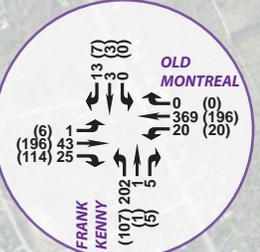
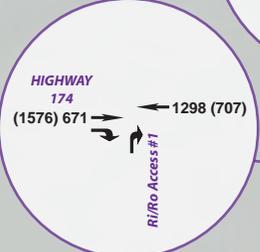
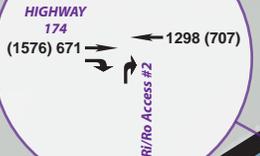
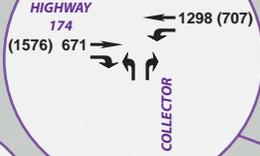
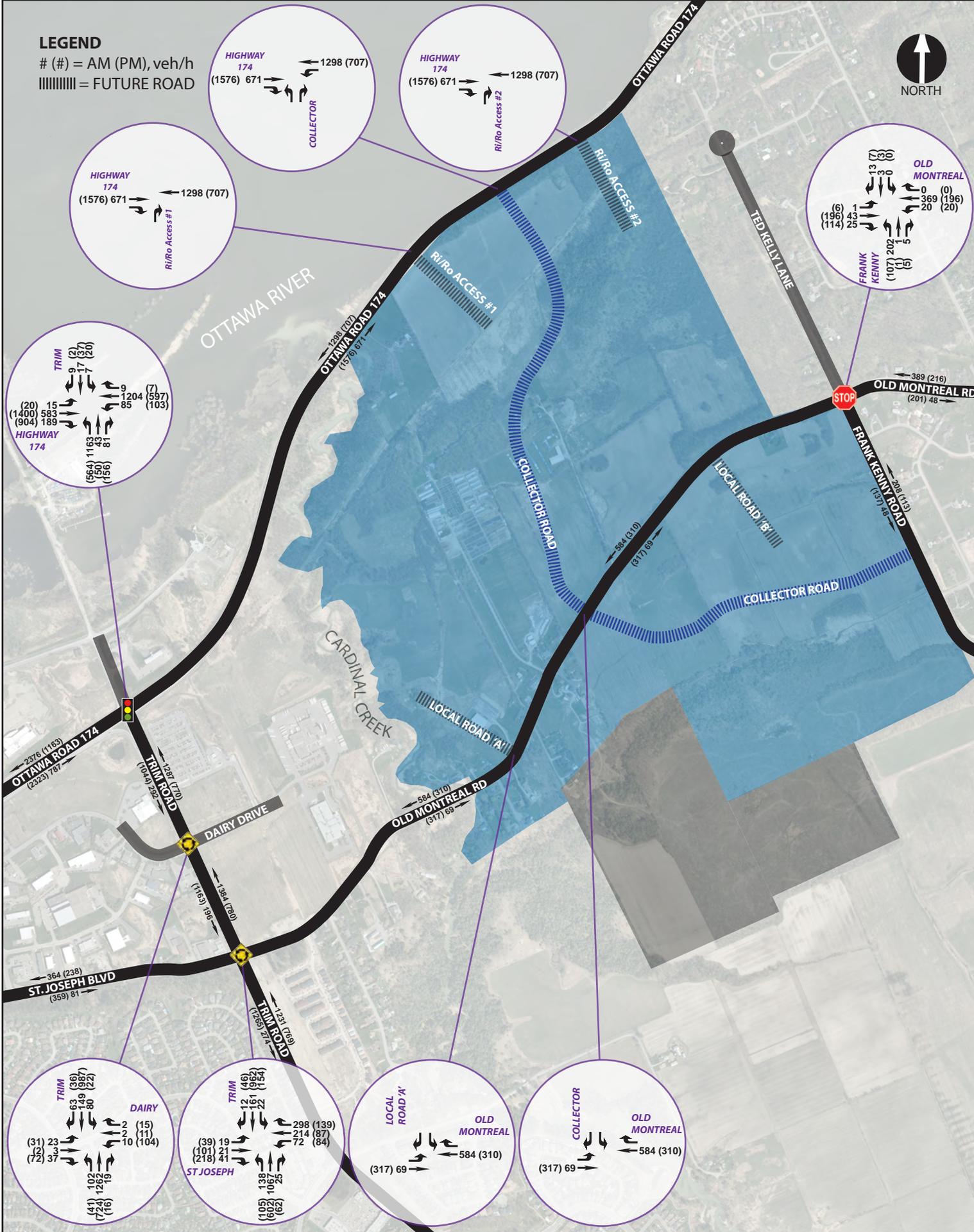
The City of Ottawa traffic modelling group maintains an up-to-date model of future traffic volumes for the weekday morning peak hour. This AM peak hour model is continuously updated and refined between TMP revisions to account for amendments to the Official Plan, new assumptions on demographics and changes to the timing and/or scope of major transportation infrastructure projects. A corresponding future traffic model for the weekday afternoon peak hour is typically developed every five years by the City at the time of each update to the TMP. However, the PM peak hour traffic model is not updated between TMP revisions to account for changes to land use assumptions and infrastructure timing in the interim period, as is currently done for the AM peak hour model. As it has been four years since the last update to the PM peak hour model in 2008, City staff have advised that traffic projections from the 2021 and 2031 models for the PM peak hour can no longer be considered sufficiently accurate for deriving future traffic volumes in this study. Consequently, an alternative method for deriving future background traffic volumes for the afternoon peak hour was jointly developed and agreed to by City staff. Future background traffic volumes at 2021 and 2031 for the weekday afternoon peak hour were derived by applying a conversion factor to the corresponding AM peak hour City model data. The conversion factor was established by comparing AM and PM traffic volumes from the existing traffic counts.

EXHIBIT 6 – FUTURE (2021) BACKGROUND TRAFFIC presents details of the projected future background traffic volumes on the adjacent road network for the weekday morning and afternoon peak hours, at the 2021 horizon year.

EXHIBIT 7 – FUTURE (2031) BACKGROUND TRAFFIC presents details of the projected future background traffic volumes on the adjacent road network for the weekday morning and afternoon peak hours, at the 2031 horizon year.

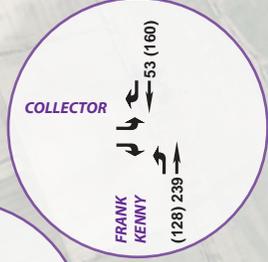
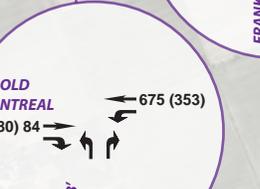
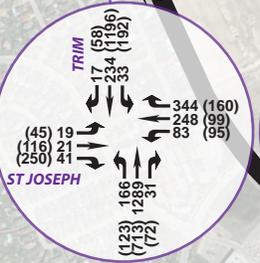
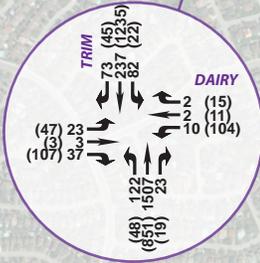
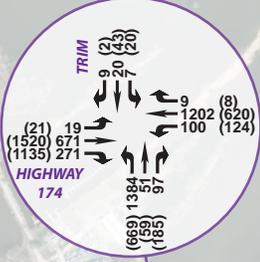
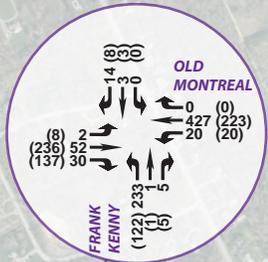
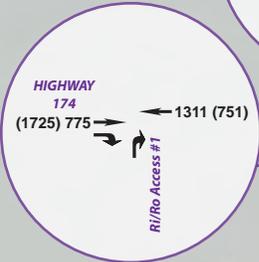
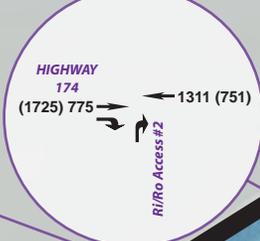
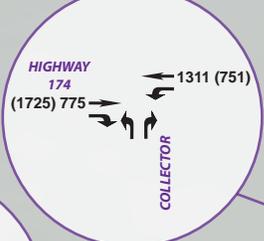
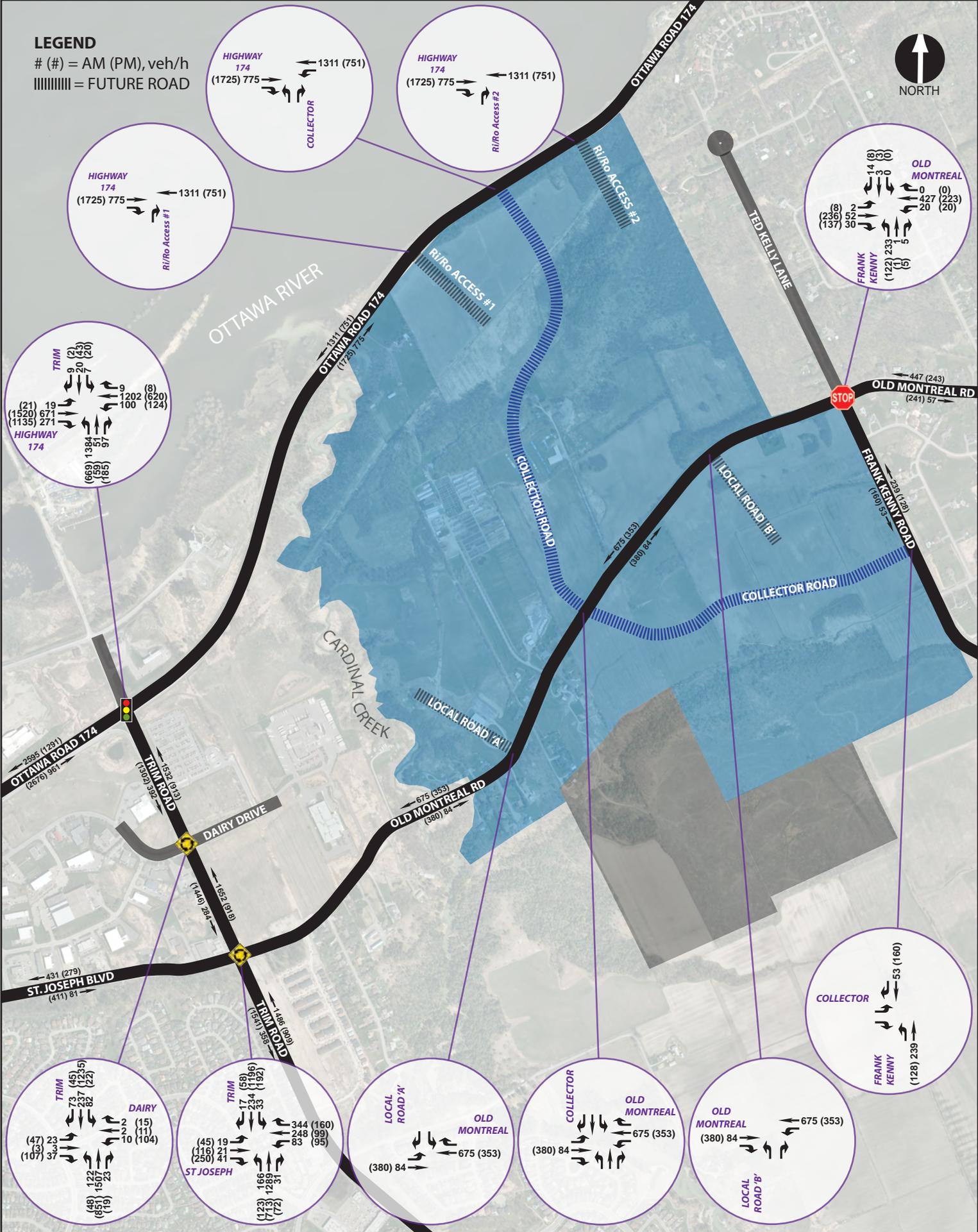
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4.2 Trip Generation

Traffic generation associated with the Cardinal Creek Village development has been estimated based on data included in the publication, "Trip Generation", 8th Edition, 2008, published by the Institute of Transportation Engineers (ITE), Washington. Traffic generation for the weekday morning and afternoon peak hours has been derived for the land uses referenced above. APPENDIX E – TRIP GENERATION DATA, presents relevant extracts from the ITE publication.

Site generated traffic volumes were derived for both the 2021 and 2031 analysis years. It was assumed that in 2021 all of the land north of Old Montreal Road would be built out, representing approximately half of the total development of Cardinal Creek Village. By 2031, the community is expected to be fully built-out.

TABLE 4 – TRIP GENERATION (2031 BUILD-OUT) – ITE RATES presents a summary of the trips that can be expected to be generated by the full build-out of the development in 2031, based on ITE data.

TABLE 4
TRIP GENERATION (2031 BUILD-OUT) – ITE RATES

LAND USE	CODE	QUANTITY	AM PEAK HOUR			PM PEAK HOUR		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Detached Home	210	2,641 units	465	1,394	1,859	1,260	740	2,000
Townhouse	230	1,680 units	84	409	493	407	201	608
Apartment	220	478 units	48	190	238	182	98	280
Shopping Centre	820	440,000 ft ²	293	188	481	1,039	1,082	2,121
TOTAL			890	2181	3071	2888	2121	5009

The ITE trip generation rates are based on data collected from traffic surveys conducted across North America, but mostly in suburban areas of the U.S. where transit use is traditionally very low. In order to obtain an estimate of trip generation that reflects the level of transit use in Ottawa, the trip generation volumes in table 4 have been reduced by the application of a Transit Modal Split (TMS) reduction factor.

Similarly, the total trips generated by the commercial component of the development have been separated into new trips and pass-by trips by the application of a pass-by proportion, as described below.

4.2.1 TRANSIT MODAL SPLIT

The TMP states that the Transit Modal Split (TMS) (ie. the percentage of person-trips made by transit relative to the number of person-trips made by automobile and transit combined) at the nearby Bilberry Creek Screenline is currently at 35% and is projected to increase to 40% by 2031. It is anticipated that transit use in the Cardinal Creek Village community will reach a TMS level of 35% as a minimum at the 2021 and 2031 horizon years. This is in line with current levels of transit use in Orleans and is considered to be an achievable target for the study horizon years in view of the introduction of early transit service to the community; the construction of planned rapid transit

infrastructure such as the extension of the East Transitway; and wider improvements to the rapid transit network such as the Downtown LRT tunnel, which will contribute to making transit an attractive option for commuters.

The trip generation volumes for the residential land uses in Cardinal Creek Village summarized in Table 4 above, have been reduced by 35% to account for the expected level of transit use during the weekday peak periods.

4.2.2 COMMERCIAL PASS-BY TRIPS

Pass-by trips are trips made as an intermediate stop on the way from an origin to a primary destination. They are assumed to enter the site and then resume travel in the same direction. Pass-by trips differ from new trips in that they are an alteration of the travel paths of background traffic as a result of a traffic generator within a development (e.g retail, service, etc.).

Based on information in the publication "Transportation and Land Development", 2nd Edition, published by ITE in 2006, approximately 50% of the traffic generated by the commercial shopping centres in the development is estimated to be pass-by traffic.

4.2.3 COMMERCIAL INTERNAL TRIPS

Some of the new trips generated by the commercial areas within Cardinal Creek Village will originate from the adjacent residential areas of the development. It has been assumed that 25% of the new trips generated by the commercial development in Area 1 will originate from within Cardinal Creek Village. Similarly, it has been assumed that approximately 50% of the new trips generated by the commercial component of Areas 2 and 3 will be internal trips from within the community.

4.2.4 TRIP GENERATION SUMMARY

TABLE 5 – TRIP GENERATION SUMMARY (2021) – ADJUSTED, presents a summary of the estimated traffic generation expected at the interim period (2021) and full build-out (2031) of Cardinal Creek Village with the adjustments for transit use and commercial pass-by traffic. Values have been separated between trips that remain internal to the proposed development and those that enter/exit the study area.

TABLE 6 – TRIP GENERATION SUMMARY (2031) – ADJUSTED, presents the adjusted site generated traffic volume estimates at the 2031 horizon year.

TABLE 5
TRIP GENERATION SUMMARY (2021) – ADJUSTED

LAND USE		AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Residential	▪ New, External Trips	194	648	842	601	338	939
Commercial	▪ Pass-By Trips	97	97	105	433	433	866
	▪ New Trips	119	76	195	424	442	866
	- Internal	34	22	56	123	128	252
	- External	82	52	134	294	306	601
TOTAL NEW TRIPS (External Only)		276	700	976	896	644	1540
TOTAL NEW TRIPS		312	724	1,036	1,026	779	1,805

TABLE 6
TRIP GENERATION SUMMARY (2031) – ADJUSTED

LAND USE		AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Residential	▪ New, External Trips	387	1,296	1,683	1,202	675	1,878
Commercial	▪ Pass-By Trips	120	120	241	530	530	1,060
	▪ New Trips	147	94	241	520	541	1,060
	- Internal	51	32	83	178	185	362
	- External	96	61	157	342	356	698
TOTAL NEW TRIPS (External Only)		484	1,357	1,841	1,544	1,031	2,576
TOTAL NEW TRIPS		534	1,390	1,924	1,722	1,216	2,938

4.3 Traffic Distribution

Traffic generated by the proposed development has been assigned to the adjacent road network according to distribution proportions identified in the 2005 Origin-Destination (O-D) Survey, conducted by the TRANS Committee. The distribution of residential (commuter) development-generated traffic, as approved by City staff, is as follows:

- **To/From Ottawa Inner Area: 65%**
 - 60% via Ottawa Road 174/Collector Road
 - 35% via Ottawa Road 174/Trim Road
 - 5% via Ottawa Road 174/Tenth Line Road
- **To/from Orleans: 35%**
 - 25% via Ottawa Road 174

- 25% via St. Joseph Boulevard
- 35% via Frank Kenny Road
- 15% via Trim Road

The commercial components of the development have been assigned separate distributions due to the fact that they will generate internal trips from Cardinal Creek Village as well as external trips to/from the adjacent road network. Commercial trips have been assigned the following distribution:

Area 1 Commercial Traffic Distribution

- **External (Outside Study Area): 75%**
 - 50% to/from East via Ottawa Road 174
 - 10% to/from North via Trim Road
 - 10% to/from West via Highway 174
 - 10% to/from West via St. Joseph Boulevard
 - 20% to/from South via Trim Road
- **Internal (Within Development Boundaries): 25%**
 - Distributed proportionally according to number of residential units in each traffic zone within the development

Areas 2 & 3 Commercial Traffic Distribution

- **External (Outside Study Area): 50%**
 - 10% to/from East via Ottawa Road 174
 - 40% to/from East via Old Montreal Road
 - 10% to/from North via Trim Road
 - 0% to/from West via Highway 174
 - 10% to/from West via St. Joseph Boulevard
 - 20% to/from South via Trim Road
 - 10% to/from South via Frank Kenny Road
- **Internal (Within Development Boundaries): 50%**

- Distributed proportionally according to number of residential units in each traffic zone within the development

EXHIBIT 8 – FUTURE (2021) SITE GENERATED TRAFFIC presents the distribution and assignment of traffic generated by the proposed development at 2021(50% build-out) for the weekday morning and afternoon peak hours.

EXHIBIT 9 – FUTURE (2031) SITE GENERATED TRAFFIC presents the distribution and assignment of traffic generated by the proposed development at 2031 (full build-out) for the weekday morning and afternoon peak hours.

The 2021 traffic volumes generated by the proposed development were applied to the future (2021) background traffic volumes indicated in Exhibit 6 above, to obtain future (2021) background plus site generated traffic volumes.

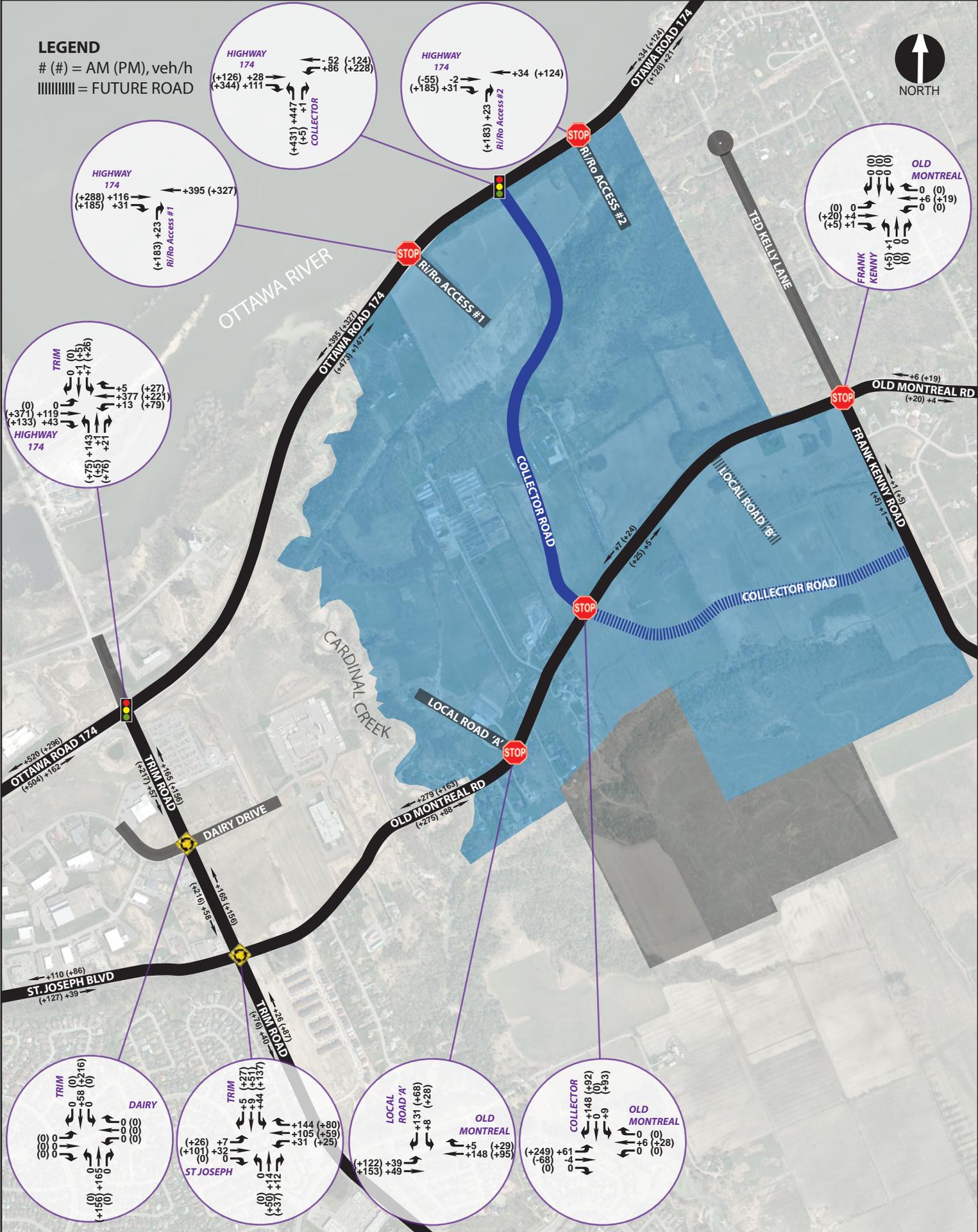
EXHIBIT 10 – FUTURE (2021) BACKGROUND PLUS SITE GENERATED TRAFFIC presents the total traffic volumes projected for the mid-way point of the development period in the year 2021.

The 2031 traffic volumes generated by the proposed development were applied to the future (2031) background traffic volumes indicated in Exhibit 7 above, to obtain future (2031) background plus site generated traffic volumes.

EXHIBIT 11 – FUTURE (2031) BACKGROUND PLUS SITE GENERATED TRAFFIC presents the total traffic volumes projected for the 2031 horizon year.

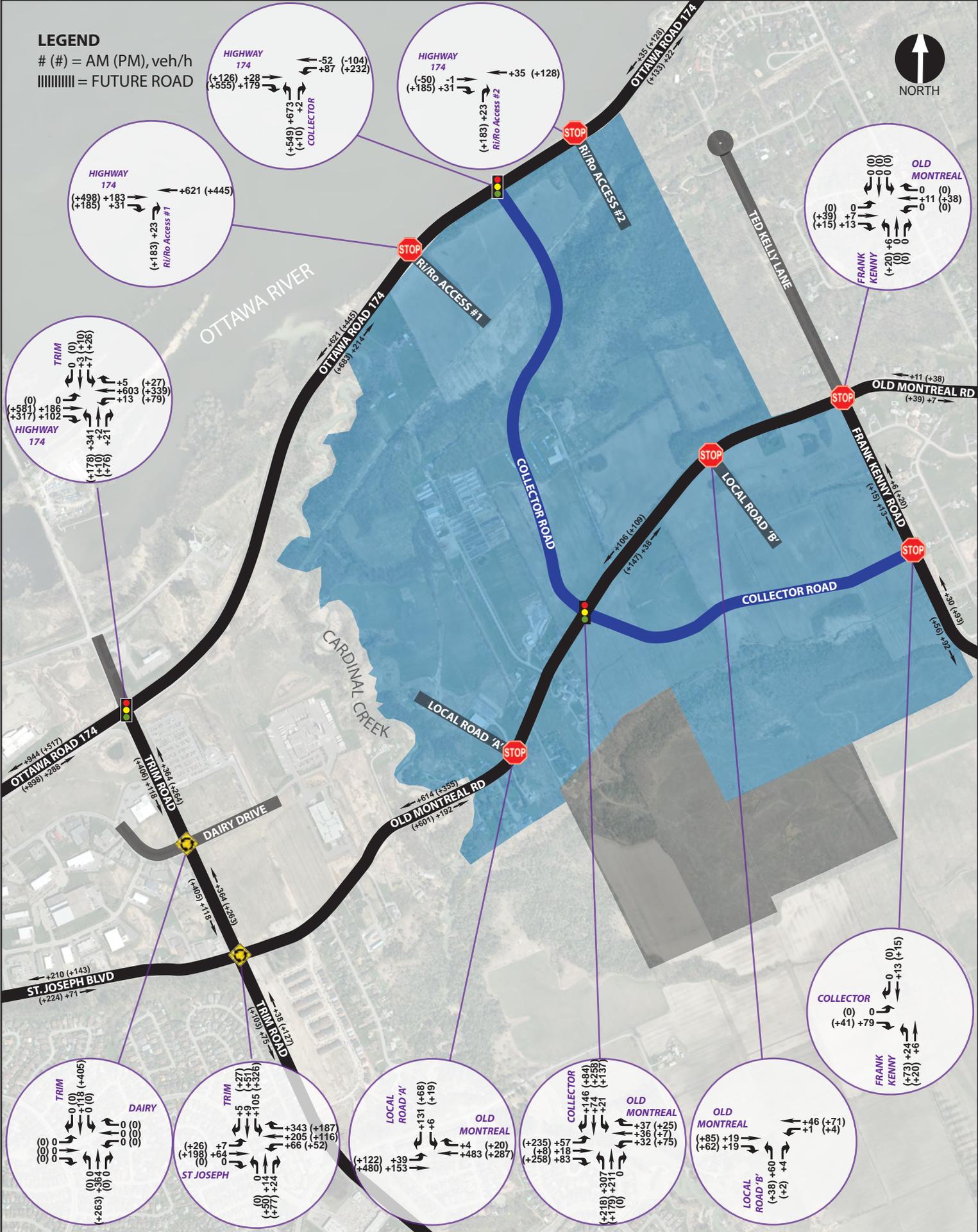
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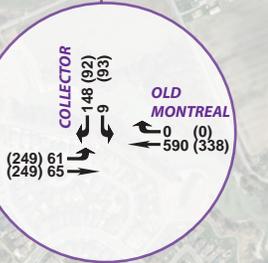
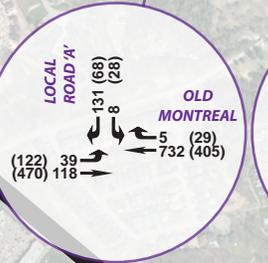
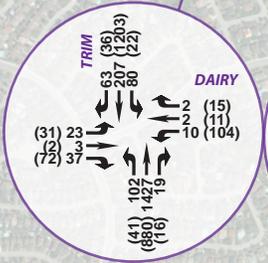
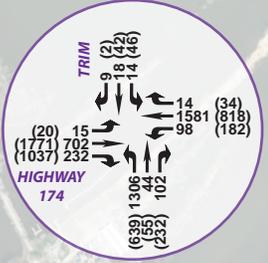
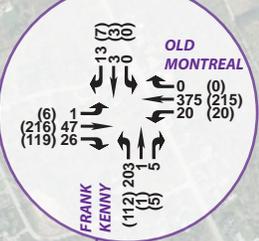
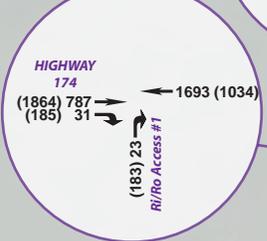
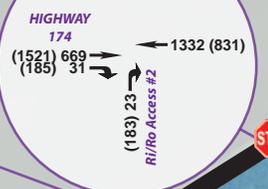
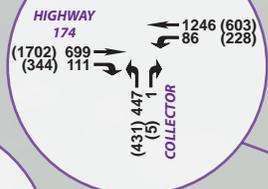
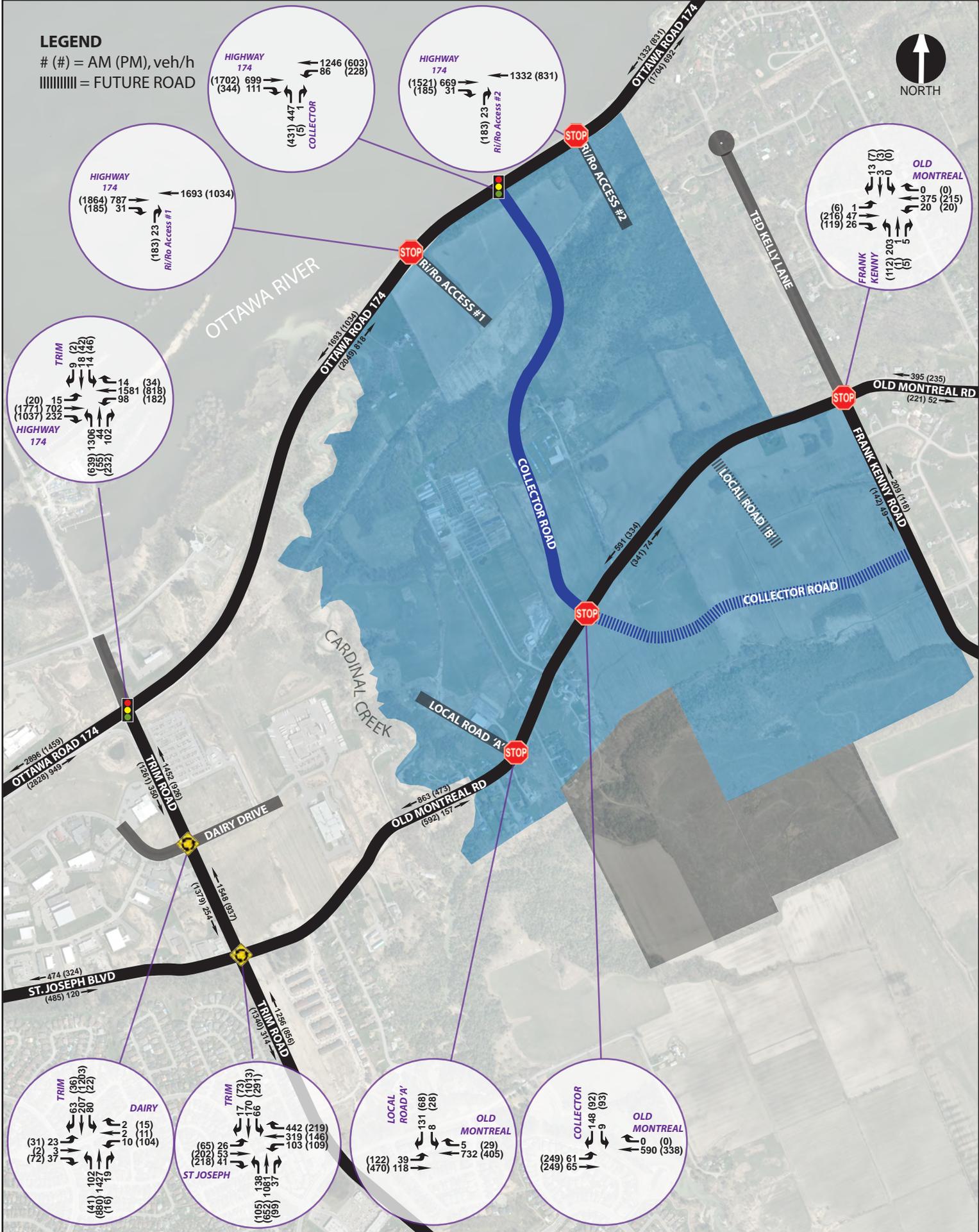
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4.4 Intersection Capacity Analyses

Intersection capacity analyses have been carried out for the intersections indicated in Exhibit 3 above, under the following weekday morning and weekday afternoon peak hour traffic conditions:

Existing Traffic (2012)

Future Background Traffic (2021 & 2031)

Future Background plus Site Generated Traffic (2021 & 2031)

The intersection capacity of a **traffic signal controlled** intersection, is commonly expressed by the manner in which an intersection functions in terms of the “Level of Service” it provides.

In qualitative terms, the Level of Service defines operational conditions within a traffic stream and their perception by motorists. A level-of-service definition generally describes these conditions in terms of such factors as delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. Level of Service can also be related to the ratio of the volume to capacity (v/c), which is simply the relationship of the traffic volume (either measured or forecast) to the capability of the intersection or road section to accommodate a given traffic volume. This capability varies depending on the factors described above.

Levels of Service are given letter designations from A to F. Level of Service “A” represents the best operating conditions and Level of Service “E” represents the level at which the intersection or an approach to the intersection is carrying the maximum traffic volume that can, practicably, be accommodated. Level of Service F indicates that the intersection is operating beyond its theoretical capacity.

4.4.1 SIGNALIZED INTERSECTIONS

The City of Ottawa has developed criteria as part of the Transportation Impact Assessment Guidelines, which directly relate the volume to capacity (v/c) ratio of a signalized intersection to a Level of Service designation.

LEVEL OF SERVICE CRITERIA – SIGNALIZED INTERSECTIONS

Level of Service	Volume to Capacity (v/c) Ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

The intersection capacity analysis technique provides an indication of the Level of Service for each movement at the intersection under consideration and for the intersection as a whole. The overall

v/c ratio for an intersection is defined as the sum of equivalent volumes for all critical movements at the intersection divided by the sum of capacities for all critical movements.

4.4.2 UNSIGNALIZED INTERSECTIONS

The capacity of an **unsignalized** intersection can also be expressed in terms of the “Level of Service” it provides. For an unsignalized intersection, the Level of Service is defined in terms of the average movement delays at the intersection. This is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line, this includes the time required for a vehicle to travel from the last – in – queue position to the first – in – queue position. The average delay for any particular minor movement at the unsignalized intersection is a function of the capacity of the approach and the degree of saturation.

The Highway Capacity Manual 2010 (HCM), prepared by the Transportation Research Board, includes the following Levels of Service criteria for unsignalized intersections, related to average movement delays at the intersection.

TABLE 5 – LOS Criteria for Unsignalized Intersections

LOS	Delay (s)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The unsignalized intersection capacity analysis technique included in the HCM and used in the current study, provides an indication of the Level of Service for each movement of the intersection under consideration. By this technique, the performance of the unsignalized intersection can be compared under varying traffic conditions, using the Level of Service concept in a qualitative sense. One unsignalized intersection can be compared with another unsignalized intersection using this concept. Level of Service “E” represents the capacity of the movement under consideration and generally, in large urban areas, Level of Service “D” is considered to represent an acceptable operating condition (Level of Service “E” is considered an acceptable operating condition for planning purposes for intersections located in Ottawa’s Urban Core – the downtown and its vicinity). Level of Service “F” indicates that the movement is operating beyond its design capacity.

Roundabout capacity analysis has been carried out using the HCM 2010 methodology.

4.4.3 INTERSECTION CAPACITY DETAILS

Intersection capacity analyses have been undertaken for the major intersections within the study area for the weekday morning and afternoon peak hours, under both existing and future traffic conditions. The analysis has incorporated the most current traffic signal timing plans provided by the City of Ottawa.

Capacity analysis of the signalized and stop-controlled intersections was carried out using Synchro Version 7 software. Roundabout capacity analysis was conducted using SIDRA INTERSECTION

Version 5.1 software. Detailed output from Synchro and SIDRA is included in APPENDIX F – INTERSECTION CAPACITY ANALYSES.

4.5 Existing (2012) Traffic

Intersection capacity analysis has been conducted for the intersections referenced above under existing traffic conditions, during the weekday morning and afternoon peak hours, utilizing traffic volumes presented in Exhibit 5.

For the Trim Road intersections, the analysis has incorporated the geometry proposed in the Trim Road Widening project since construction is scheduled to commence in Fall 2012.

The results of the intersection capacity analyses under existing traffic conditions are presented in Table 7 below.

TABLE 7 – INTERSECTION CAPACITY ANALYSIS, EXISTING TRAFFIC, presents the results of the intersection capacity analyses for the weekday morning and weekday afternoon peak hours.

**TABLE 7
INTERSECTION CAPACITY ANALYSIS
EXISTING TRAFFIC**

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Trim Road and Ottawa Road 174	Traffic Signal	AM	0.91	0.91	E	E
		PM	0.91	0.91	E	E
Trim Road and Taylor Creek Dr/ Dairy Dr	Roundabout*	AM	0.60	0.60	B	B
		PM	0.69	0.69	C	B
Trim Road and St. Joseph Blvd/ Old Montreal Road	Roundabout*	AM	0.70	0.70	C	B
		PM	0.68	0.68	C	B
Old Montreal Road and Frank Kenny Road	E/S Stop	AM	0.25	-	B	-
		PM	0.13	-	B	-

Notes:

* - Roundabout design proposed in imminent Trim Road Widening project.

The results of the intersection capacity analysis under existing (2012) traffic conditions indicate that the intersection of Trim Road and Ottawa Road 174 is presently operating at close to its theoretical capacity at (Level of Service E) during both the weekday morning and afternoon peak hours.

The other intersections within the study area operate at acceptable Levels of Service under existing (2012) traffic conditions.

4.6 Future (2021) Background Traffic

Intersection capacity analysis has been conducted for the intersections referenced above under the 2021 background traffic conditions presented in Exhibit 6.

TABLE 8 – INTERSECTION CAPACITY ANALYSIS, FUTURE (2021) BACKGROUND TRAFFIC, presents the results of the intersection capacity analyses for the weekday morning and weekday afternoon peak hours. Results indicating a Level of Service 'F' or v/c ratio equal to or greater than 1.00 have been highlighted in red.

**TABLE 8
INTERSECTION CAPACITY ANALYSIS
FUTURE (2021) BACKGROUND TRAFFIC**

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Trim Road and Ottawa Road 174	Traffic Signal	AM	1.15	1.15	F	F
		PM	1.04	1.04	F	F
	Traffic Signal *	AM	1.04	1.04	F	F
		PM	0.98	0.97	E	E
	Traffic Signal †	AM	0.88	0.88	D	D
		PM	0.96	0.96	E	E
	Roundabout €	AM	1.95	1.95	F	F
		PM	1.80	1.80	F	F
Trim Road and Taylor Creek Dr/ Dairy Dr	Roundabout	AM	0.84	0.84	C	C
		PM	0.67	0.67	C	B
Trim Road and St. Joseph Blvd/ Old Montreal Road	Roundabout	AM	0.72	0.72	C	C
		PM	0.77	0.77	C	C
Old Montreal Road and Frank Kenny Road	E/S Stop	AM	0.53	-	C	-
		PM	0.44	-	C	-

Notes:

* - Modified signal timing plan to maximize green time at critical movements

† - Triple Left Turn on northbound approach

€ - Roundabout option

The results of the analysis under 2021 background traffic conditions indicate the following:

Trim Road/ Ottawa Road 174

The Trim Road/ Ottawa Road 174 intersection will operate above its theoretical capacity (LOS F) during the weekday morning and afternoon peak hours.

Optimization of the traffic signal timing plan produces a marginal improvement in the operating condition of the intersection, but the intersection will continue to operate above capacity (LOS F) during the morning peak hour.

The northbound left-turn is the critical movement at the intersection during the morning peak hour, with 1163 veh/h projected to make the left-turn from Trim Road to Ottawa Road 174. Conversion of the northbound shared through-right lane to a shared left-through-right configuration to provide additional left-turn capacity on the approach would improve the operating condition to LOS D and LOS E during the morning and afternoon peak hours, respectively. The introduction of a third left-turn lane would require split traffic signal phases on the northbound and southbound approaches. As well, widening along the north side of Ottawa Road 174, west of Trim Road, would be required to provide a third receiving lane.

The other existing intersections in the study area will continue to operate at acceptable levels of service under 2021 background traffic conditions.

4.7 Future (2031) Background Traffic

Intersection capacity analysis has been conducted for the intersections referenced above under the 2031 background traffic conditions presented in Exhibit 7.

TABLE 9 – INTERSECTION CAPACITY ANALYSIS, FUTURE (2031) BACKGROUND TRAFFIC presents the results of the intersection capacity analyses for the weekday morning and weekday afternoon peak hours.

**TABLE 9
INTERSECTION CAPACITY ANALYSIS
FUTURE (2031) BACKGROUND TRAFFIC**

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Trim Road and Ottawa Road 174	Traffic Signal	AM	1.57	1.16	F	F
		PM	1.20	1.14	F	F
	Traffic Signal *	AM	1.20	1.15	F	F
		PM	1.12	1.10	F	F
	Traffic Signal †	AM	0.96	0.96	E	E
		PM	1.00	1.00	F	F
Trim Road and Taylor Creek Dr/ Dairy Dr	Roundabout	AM	1.00	1.00	F	E
		PM	0.84	0.84	D	C
Trim Road and St. Joseph Blvd/ Old Montreal Road	Roundabout	AM	0.99	0.99	F	D
		PM	0.99	0.99	F	D
	Roundabout*	AM	0.85	0.85	D	C
		PM	0.99	0.99	F	D
	Traffic Signal €	AM	0.87	0.87	D	D
		PM	0.86	0.86	D	D
Old Montreal Road and Frank Kenny Road	NB/SB Stop	AM	0.40	-	B	-
		PM	0.22	-	B	-

Notes:

- * - Modified signal timing plan to maximize green time at critical movements
- † - Three NB auxiliary left-turn lanes
- € - Convert roundabout back to Traffic Control Signal, required intersection configuration: 4-lane cross-section on both Trim Road and Old Montreal Road

- Single auxiliary left-turn lane on all NB, WB and EB approaches
- Dual auxiliary left-turn lanes on SB approach
- Auxiliary right turn lane on EB and WB approaches.
- Channelized and free flow WB right-turn lane with NB merge lane on Trim Road
- % - Convert WB channelized right-turn lane to free-flow with NB merge lane on Trim Road.

The results of the analysis under 2031 background traffic conditions indicate the following:

Trim Road/ Ottawa Road 174

The existing configuration of the intersection will operate above capacity (LOS F) during the weekday morning and afternoon peak hours under 2031 background traffic conditions.

The modified intersection option with triple northbound left-turn lanes will operate at close to capacity (LOS E and v/c ratio 0.96) during the weekday morning peak hour and at capacity during the afternoon peak hour (LOS F and v/c ratio 1.00).

Trim Road/ Dairy Drive/ Taylor Creek Drive

The Trim Road/ Dairy Drive/ Taylor Creek Drive roundabout will operate at an overall intersection level of service E under 2031 background traffic conditions during the morning peak hour. However, the critical northbound approach will operate above capacity at LOS F.

The roundabout will continue to operate at an acceptable level of service during the afternoon peak hour.

Trim Road/ St. Joseph Boulevard/ Old Montreal Road

The Trim Road/ St. Joseph Boulevard/ Old Montreal Road roundabout will operate at an acceptable overall level of service (LOS D) during the weekday morning peak hour.

However, the westbound right-turn movement will operate above capacity (LOS F) during the morning peak hour. This is due to the delay that will be experienced by the projected 344veh/h making the westbound right-turn from Old Montreal Road to Trim Road as they yield to approximately 1300 northbound vehicles.

Further analysis indicates that the operating condition of the westbound right-turn lane can be improved by removing the yield requirement and converting the channelized right-turn lane to a free-flow condition. This would require widening along the east side of Trim Road, north of the roundabout, to provide a northbound merge lane.

The roundabout will operate at an acceptable overall level of service (LOS D) during the afternoon peak hour, but the southbound left-turn movement is indicated to operate at LOS F during this period. Adding an additional lane to the southbound approach to provide more capacity to the critical left-turn would create a complicated roundabout configuration that might prove difficult for motorists to navigate.

Further analysis indicates that with the introduction of traffic signals at the intersection, the operating condition will improve to an acceptable level of service (LOS D) during the morning and afternoon peak hours.

Old Montreal Road/ Frank Kenny Road

The results of the analysis indicate that the Old Montreal Road and Frank Kenny Road intersection will continue to operate at an acceptable level of service as an unsignalized intersection during both peak hours, under 2031 background traffic conditions.

4.8 Future (2021) Background plus Site Generated Traffic

Intersection capacity analysis has been conducted for the intersections referenced above under the 2021 background plus site generated traffic conditions presented in Exhibit 10.

TABLE 10 – INTERSECTION CAPACITY ANALYSIS, FUTURE (2021) BACKGROUND PLUS SITE GENERATED TRAFFIC presents the results of the intersection capacity analyses for the weekday morning and weekday afternoon peak hours.

**TABLE 10
INTERSECTION CAPACITY ANALYSIS
FUTURE (2021) BACKGROUND PLUS SITE GENERATED TRAFFIC**

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Trim Road and Ottawa Road 174	Traffic Signal	AM	1.49	1.26	F	F
		PM	1.41	1.40	F	F
	Traffic Signal †	AM	0.90	0.87	D	D
		PM	0.92	0.92	E	E
Trim Road and Taylor Creek Blvd/ Dairy Road	Roundabout	AM	0.94	0.94	E	D
		PM	0.80	0.80	C	C
Trim Road and St. Joseph Blvd/ Old Montreal Road	Roundabout	AM	1.08	1.08	F	D
		AM%	0.60	0.76	D	B
		PM	0.98	0.98	F	D
		PM%	0.98	0.98	F	D
Old Montreal Road and Frank Kenny Road	NB/SB Stop	AM	0.33	-	B	-
		PM	0.20	-	B	-
Old Montreal Road and Collector Road	SB Stop	AM	0.38	-	B	-
		PM	0.48	-	C	-
	Roundabout	AM	0.78	0.78	C	C
		PM	0.62	0.62	B	B
Old Montreal Road and Local Road A	SB Stop	AM	0.47	0.47	B	B
		PM	0.28	0.28	B	B
Ottawa Road 174 and Collector Road	Traffic Signal @ £	AM	1.19	1.18	F	F
		PM	1.78	1.67	F	F
	Traffic Signal	AM	0.71	0.71	C	C

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
	€#	PM	1.02	0.96	F	E
	Traffic Signal ^#	AM	0.60	0.60	A	A
		PM	0.86	0.85	D	D
	Roundabout @	AM	2.24	2.24	F	F
		PM	2.12	2.12	F	F
	Roundabout €	AM	0.98	0.98	F	D
		PM	1.05	1.05	F	E
	Ottawa Road 174 and RI/RO Access #1	NB Stop	AM	0.54	-	A
PM			0.60	-	C	-
Ottawa Road 174 and RI/RO Access #2	NB Stop	AM	0.43	-	A	-
		PM	0.49	-	B	-

Notes:

- † - Three auxiliary NB left-turn lanes and 6-lane Highway 174
- @ - 2-Lane Highway 174
- € - 4-Lane Highway 174
- ^ - 6-Lane Highway 174
- £ - Auxiliary WB and NB left-turn lanes; auxiliary NB and EB right-turn lanes
- # - Auxiliary WB and NB left-turn lane; shared auxiliary NB left-right-turn lane, and auxiliary EB right-turn lane

The results of the analysis indicate that the following intersections will operate at acceptable levels of service during the weekday morning and afternoon peak hours, under 2021 background plus site generated traffic conditions:

- Trim Road and Dairy Drive/ Taylor Creek Drive
- Old Montreal Road and Frank Kenny Road
- Old Montreal Road and Collector Road
- Old Montreal Road and Local Road 'A'
- Old Montreal Road and Local Road 'B'
- Ottawa Road 174 and Right-in/ Right-out Access #1
- Ottawa Road 174 and Right-in/ Right-out Access #2

Trim Road/ Ottawa Road 174

The results of the analysis under 2021 background plus site generated traffic conditions indicate that the intersection will operate above capacity (LOS F) in its current configuration.

Further analysis indicates that the operating condition of the intersection can be improved to acceptable levels of service with the widening of Ottawa Road 174 from 4 to 6 lanes and the introduction of triple left-run lanes on the northbound approach.

Trim Road/ St. Joseph Boulevard/ Old Montreal Road

The Trim Road/ St. Joseph Boulevard/ Old Montreal Road roundabout will operate at an acceptable overall level of service (LOS D) during the weekday morning and afternoon peak hours.

Introduction of a free-flow condition to the westbound right-turn, as discussed above, will improve the operating condition of the roundabout to LOS B during the weekday morning peak hour.

Ottawa Road 174 and Collector Road

The results of the analysis indicate that the intersection would operate above capacity (LOS F) during the morning and afternoon peak hours as either a single lane or two-lane roundabout.

With traffic signal control in place, the intersection will operate above capacity during the weekday morning and afternoon peak hours with the existing two lane cross-section on Ottawa Road 174. Widening of Ottawa Road 174 to four-lanes will improve the operating condition to an acceptable level of service (LOS C during the morning peak hour, but the intersection would operate at close to capacity (LOS E) during the afternoon peak hour. Further analysis indicates that the operating condition of the intersection can be improved to acceptable levels of service (LOS A and D, respectively) during both weekday peak hours with a 6-lane cross-section on Ottawa Road 174.

4.9 Future (2031) Background plus Site Generated Traffic

Intersection capacity analysis has been conducted for the intersections referenced above under the 2031 background plus site generated traffic conditions presented in Exhibit 11.

TABLE 11 – INTERSECTION CAPACITY ANALYSIS, FUTURE (2031) BACKGROUND PLUS SITE GENERATED TRAFFIC presents the results of the intersection capacity analyses for the weekday morning and weekday afternoon peak hours.

**TABLE 11
INTERSECTION CAPACITY ANALYSIS
FUTURE (2031) BACKGROUND PLUS SITE GENERATED TRAFFIC**

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Trim Road and Ottawa Road 174	Traffic Signal	AM	1.99	1.59	F	F
		PM	1.62	1.53	F	F
	Traffic Signal †	AM	1.12	1.08	F	F
		PM	1.14	1.10	F	F
Trim Road and Taylor Creek Blvd/ Dairy Road	Roundabout	AM	1.22	1.22	F	F
		PM	1.10	1.10	F	F
	Traffic Signal	AM	0.89	0.89	D	D
		PM	0.90	0.90	D	D
Trim Road and St. Joseph Blvd/ Old Montreal Road	Roundabout	AM%	1.05	1.05	F	F
		PM%	1.44	1.44	F	F
	Traffic Signal €	AM	0.89	0.89	D	D
		PM	0.92	0.91	E	E

INTERSECTION	INTERSECTION CONTROL	PEAK HOUR	V/C RATIO		LEVEL OF SERVICE	
			CRITICAL MOVEMENT	INTERSECTION	CRITICAL MOVEMENT	INTERSECTION
Old Montreal Road and Frank Kenny Road	NB/SB Stop	AM	0.43	-	B	-
		PM	0.29	-	B	-
	NB/SB Stop Ω	AM	0.33	-	B	-
		PM	0.25	-	B	-
Collector Road and Frank Kenny Road	EB Stop	AM	0.09	-	A	-
		PM	0.11	-	A	-
Old Montreal Road and Collector Road	All-Way Stop	AM	2.71	-	F	-
		PM	Error	-	F	-
	Traffic Signal † * &	AM	0.92	0.92	E	E
		PM	0.87	0.81	D	D
	Traffic Signal Ω *	AM	0.68	0.66	B	B
		PM	0.81	0.68	D	B
	Roundabout	AM	1.53	1.53	F	F
		PM	1.52	1.52	F	F
Roundabout Ω	AM	0.78	0.78	D	C	
	PM	0.82	0.82	D	D	
Old Montreal Road and Local Road A	SB Stop	AM	0.74	-	C	-
		PM	0.49	-	B	-
	SB Stop Ω	AM	0.42	-	C	-
		PM	0.37	-	B	-
Old Montreal Road and Local Road B	SB Stop	AM	0.14	-	B	-
		PM	0.34	-	B	-
	SB Stop Ω	AM	0.31	-	B	-
		PM	0.20	-	B	-
Ottawa Road 174 and Collector Road	Traffic Signal £ #	AM	0.84	0.84	D	D
		PM	1.12	1.06	F	F
	Traffic Signal ^ #	AM	0.74	0.74	C	C
		PM	0.89	0.88	D	D
	Roundabout £	AM	1.19	1.19	F	F
		PM	1.14	1.14	F	F
Ottawa Road 174 and RI/RO Access #1	NB Stop	AM	0.62	-	B	-
		PM	0.71	-	D	-
Ottawa Road 174 and RI/RO Access #2	NB Stop	AM	0.43	-	A	-
		PM	0.54	-	C	-

Notes:

- † - Triple NB left turn lane and 6-lane Highway 174
- ‡ - 2-Lane Old Montreal Road
- Ω - 4-Lane Old Montreal Road
- * - Auxiliary left-turn lanes on all approaches
- & - Auxiliary EB right-turn lane
- £ - 4-Lane Highway 174
- ^ - 6-Lane Highway
- # - Auxiliary WB and NB left-turn lane; shared auxiliary NB left-right-turn lane, and auxiliary EB right-turn lane
- % - Convert WB channelized right-turn lane to free-flow with NB merge lane on Trim Road.

- € - Convert Roundabout to Traffic Control Signal. Required Intersection Configuration:
- 4-lane cross-section on both Trim Road and Old Montreal Road
 - Single auxiliary left-turn lane on all NB, WB and EB approaches
 - Dual auxiliary left-turn lanes on SB approach
 - Auxiliary right turn lane on EB and WB approaches.
 - Channelized and free flow WB right-turn lane with NB merge lane on Trim Road

The results of the analysis indicate that the following intersections will operate at acceptable levels of service during the weekday morning and afternoon peak hours, under 2031 background plus site generated traffic conditions:

- Old Montreal Road and Frank Kenny Road
- Old Montreal Road and Collector Road
- Old Montreal Road and Local Road 'A'
- Old Montreal Road and Local Road 'B'
- Ottawa Road 174 and Right-in/ Right-out Access #1
- Ottawa Road 174 and Right-in/ Right-out Access #2

Trim Road/ Ottawa Road 174

The intersection will operate above capacity as a signalized intersection under 2031 background plus site generated traffic conditions, with 6 lanes on Ottawa Road 174. This result is due to heavy traffic volumes forecasted for Ottawa Road 174 and the northbound approach on Trim Road, which exceed the volumes that the at-grade traffic signal controlled intersection can handle. Under these traffic conditions, grade separation of the intersecting street and conversion of the intersection to an interchange may be required.

A Schedule 'C' Environmental Assessment (EA) for the realignment of Trim Road between Ottawa Road 174 and Innes Road was completed in September 1998 with a subsequent Addendum in August 2002. As part of the EA, a design alternative for an interchange at Trim Road and Ottawa Road 174 was proposed. The proposed design consists of a Parclo A4 configuration on the north side of the interchange; with diamond configuration ramps on the south side. A copy of the interchange schematic taken from the Region of Ottawa-Carleton Transportation Committee report on the EA (April 23, 1998) is provided in Appendix G. This design introduces a freeway condition for the heavy eastbound and westbound volumes on Ottawa Road 174. The design also proposes a free-flow S-W on-ramp to accommodate the heavy northbound to westbound volumes forecasted at the intersection. The W-N/S off-ramp would terminate at an at-grade intersection with Trim Road, with the E-N/S off-ramp terminating at an intersection along North Service Road, east of Trim Road.

Trim Road/ Dairy Drive/ Taylor Creek Drive

The intersection will exceed its capacity as a roundabout under 2031 background plus site generated traffic conditions. An acceptable level of service (LOS D) can be achieved with the conversion of the roundabout to a traffic signal controlled intersection.

Trim Road/ St. Joseph Boulevard/ Taylor Creek Drive

The intersection will exceed its capacity as a roundabout under 2031 background plus site generated traffic conditions. An acceptable level of service (LOS D) can be achieved during the morning peak hour with the conversion of the roundabout to a traffic signal controlled intersection. The traffic signal controlled intersection would operate at close to its capacity (LOS E) during the afternoon peak hour.

Old Montreal Road/ Collector Road

Under 2031 traffic conditions, the intersection will operate above its theoretical capacity (LOS F) as a single lane roundabout and will operate at close to its theoretical capacity (LOS E in the afternoon peak hour) as a signalized intersection, with two lanes on Old Montreal Road.

With a four-lane cross-section on Old Montreal Road, the intersection will operate at acceptable levels of service as either a multi-lane roundabout or with traffic signals.

Ottawa Road 174/ Collector Road

The results of the analysis indicate that the Ottawa Road 174 and Collector Road intersection will operate at an acceptable level of service (LOS D) during the morning peak hour but will exceed its theoretical capacity (LOS F) during the afternoon peak hour, with four lanes on Ottawa Road 174. This is due primarily to the heavy volume on the eastbound approach to the intersection during which is projected to increase to approximately 2400 vehicles in the afternoon peak hour.

Further analysis indicates that the intersection will operate at acceptable levels of service (LOS C and D, respectively) during the morning and afternoon peak hours, with six lanes on Ottawa Road 174.

4.10 Traffic Signal Warrants Analysis

Traffic control signal warrants analysis has been carried out for the new development intersections under future background plus site generated traffic conditions.

The analysis has followed the established procedures outlined in the "Ontario Traffic Manual, Book 12, 2007", published by the Ontario Ministry of Transportation (MTO). The results of the analysis indicate that the Ottawa Road 174 and Collector Road intersection meets the minimum warrants for traffic signals under 2021 traffic conditions. The Old Montreal Road and Collector Road intersection meets the warrants under 2031 traffic conditions.

Details of the signal warrants analyses described above are included in APPENDIX H – TRAFFIC SIGNAL WARRANTS ANALYSES.

4.11 Screenline Analysis

Screenline analysis is a comparison of forecasted demands and lane capacities for the major road network connecting the site to the area transportation network. Lane capacities are based generally on the Official Plan designation of the road classifications and other general characteristics of the roads (e.g. urban or rural cross sections). For this exercise, assumed lane capacities have been

obtained from the 2008 Transportation Master Plan Road Infrastructure Needs Study, conducted by Delcan Corporation on behalf of the City of Ottawa.

The screenline analysis has focussed on the Ottawa Road 174 and St. Joseph Boulevard corridors at the points at which they cross the Bilberry Creek (SL 45) and Green's Creek (SL16) screenlines.

TABLE 12 – SCREENLINE ANALYSIS, presents the results of the screenline analyses for the weekday morning peak hour at the years 2021 and 2031 horizon years based on the traffic model projections provided by the City.

**TABLE 12
SCREENLINE ANALYSIS**

Crossing Road	Assumed Directional Capacity* (veh/h)	Projected Weekday Background Volumes for Analysis Year (AM Peak)					
		Background Traffic		Site Generated Traffic		Background Plus Site Generated Traffic	
		2021	2031	2021	2031	2021	2031
Green's Creek (SL16)							
Ottawa Road 174 (2 lanes per direction / 3 lanes per direction)	4,620 / 6,930	4,537 WB 2,392 EB	4,890 WB 2,849 EB	+400 WB +120 EB	+800 WB +239 EB	4,937 WB 2,512 EB	5,690 WB 3,088 EB
St. Joseph Blvd. (2 lanes/direction)	2,100	2,395 WB 277 EB	1,825 WB 229 EB	+21 WB +6 EB	+42 WB +13 EB	2,416 WB 283 EB	1,867 WB 242 EB
Bilberry Creek (SL45)							
Ottawa Road 174 (2 lanes/direction)	4,260	3,546 WB 1,762 EB	3,443 WB 2081 EB	+400 WB +120 EB	+800 WB +239 EB	3,946 WB 1,882 EB	4,243 WB 2,320 EB
St. Joseph Blvd. (2 lanes/direction)	1,680	738 WB 383 EB	727 WB 396 EB	+21 WB +6 EB	+42 WB +13 EB	759 WB 389 EB	769 WB 409 EB

* Assumed directional capacities obtained from the Road Infrastructure Needs Study (2008)

The results of the screenline analysis indicate that Ottawa Road 174 will approach its theoretical capacity under background traffic conditions by 2021 at the Green's Creek Screenline (SL 16) as a 4-lane roadway. The 2008 Road Infrastructure Needs Study, a supporting document of the 2008 Transportation Master Plan, indicates that Ottawa Road 174 is to be widened to 6 lanes from Blair Road to Jeanne d'Arc Boulevard within the period 2016 to 2022. This widening will significantly increase the capacity of the roadway and allow it to support the increased volume of traffic from background traffic sources and the proposed development.

St. Joseph Boulevard is expected to surpass its theoretical capacity at the Green's Creek screenline by 2021 under background traffic conditions in the peak (westbound) direction. The addition of site generated traffic in 2021 is negligible and represents less than a 1% increase in traffic in the peak direction. Traffic modelling data supplied by the City of Ottawa indicates background traffic through the St. Joseph Boulevard is expected to reduce by 2031 to a level that can support the volume of traffic generated by the proposed development.

5. FINDINGS AND CONCLUSIONS

Based on the traffic analyses undertaken in this Community Transportation Study, the main findings, conclusions and recommendations are as follows:

- The horizon years for the study have been established as 2021, representing a 50% build-out scenario; and 2031, the anticipated full build-out year of the development.
- At full build-out in 2031, it is estimated that the Cardinal Creek Village development will generate 1,924 total new vehicular trips during the weekday morning peak hour and 2,938 new trips during the afternoon peak hour.
- It has been assumed that the transit modal split (TMS) in the development will be 35% at the 2021 and 2031 study horizon years, which is in line with the existing level of transit use in Orleans.
- Screenline analysis indicates that there will be sufficient capacity at the Ottawa Road 174 and St. Joseph Boulevard/ Montreal Road crossings of the Bilberry Creek Screenline (SL45) and Green's Creek Screenline (SL 16) to accommodate future background traffic growth plus site generated traffic at the 2021 and 2031 horizon years, provided the infrastructure improvements identified in the TMP are implemented.

Trim Road and Ottawa Road 174

- The Trim Road and Ottawa Road 174 intersection is presently operating at close to capacity during the weekday morning and afternoon peak hours.
- By 2021, the intersection will exceed its capacity during the morning peak hour under background traffic conditions. The critical movement at the intersection in the morning peak hour is the left-turn on the northbound approach.
- Additional interim capacity could be provided at the intersection in the form of triple left-turn lanes on the northbound approach by converting the shared through-right lane to a left-through-right configuration and running split north-south signal timing phases. As well, widening of Ottawa Road 174 to six lanes would provide additional capacity to the intersection in the interim.
- By 2031, traffic volumes are projected to increase to a level at which traffic signal controls will be unable to adequately process the traffic demand at the intersection, even with the interim modifications described above; and ultimately the intersection will need to be converted to a grade-separated interchange.

Trim Road and Dairy Drive/ Taylor Creek Drive

- The proposed roundabout that will be constructed at the intersection of Trim Road and Dairy Drive/ Taylor Creek Drive, as part of the Trim Road Widening project, will operate at acceptable levels of service at the 2021 horizon year but will reach its theoretical capacity by 2031 under background traffic conditions.

- The intersection will operate at acceptable levels of service at the 2031 horizon year with conversion of the roundabout to a traffic signal controlled intersection.

Trim Road and St. Joseph Boulevard/ Old Montreal Road

- The proposed roundabout at the Trim Road and St. Joseph Boulevard/ Old Montreal Road intersection will operate at acceptable overall levels of service under 2021 total traffic conditions. It is recommended that the channelized westbound right-turn lane be converted to a free-flow condition and a northbound merge lane constructed on Trim Road, to provide additional capacity to accommodate the increased traffic volumes on this movement.
- By 2031, the roundabout will exceed its capacity during the weekday morning and afternoon peak hours under total traffic conditions. Conversion of the roundabout to a traffic signal controlled intersection will improve the operating condition to acceptable levels of service during the peak hours.

Ottawa Road 174 and Collector Road

- At the 2021 horizon year, the intersection of Ottawa 174 and the proposed Collector Road in Cardinal Creek Village will operate above capacity during the weekday peak hours with the existing two-lane cross-section on Ottawa Road 174.
- To accommodate the future background traffic volumes derived from the City's traffic model plus the traffic generated by the Cardinal Creek Village development, the results of the analysis indicate that the cross-section of Ottawa Road 174 will need to be widened to four lanes by 2021 and to six lanes by 2031.
- The requirement to widen Ottawa Road 174 to six lanes along the frontage of the proposed development by 2031 is based on traffic projections derived from the latest information available from the City traffic model. It is anticipated that the recently initiated Ottawa Road 174/ County Road 17 (highway 417/ Split to Rockland) EA study and the upcoming TMP Update in 2013 by the City of Ottawa will assess future travel demand in the area on a regional scale and will provide updated estimates of peak hour traffic volumes along the Ottawa Road 174.

Ottawa Road 174 and Right-in/ Right-Out Access #1

- The proposed Right-in/ Right-out Access #1 to the commercial development along Ottawa Road 174 will operate at acceptable levels of service during the peak hours under 2031 traffic conditions.

Ottawa Road 174 and Right-in/ Right-Out Access #2

- The proposed Right-in/ Right-out Access #2 to the commercial development along Ottawa Road 174 will operate at acceptable levels of service during the peak hours under 2031 traffic conditions.

Old Montreal Road and Collector Road

- The new intersection of Old Montreal Road and the Cardinal Creek Village Collector Road will operate at acceptable levels of service at the 2021 horizon year as either a roundabout or stop-controlled intersection.
- By 2031 there will be a requirement to widen Old Montreal Road to four lanes to accommodate the increase in background traffic and site generated traffic. Under 2031 traffic conditions, the intersection is expected to meet the minimum warrants for signalization and will function at acceptable levels of service as either a traffic signal controlled intersection or as a multi-lane roundabout.

Old Montreal Road and Local Road 'A'

- The new intersection of Old Montreal Road and Local Road 'A' will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

Old Montreal Road and Local Road 'B'

- The new intersection of Old Montreal Road and Local Road 'B' will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

Old Montreal Road and Frank Kenny Road

- The existing intersection of Old Montreal Road and Frank Kenny Road will continue to operate at acceptable levels of service as an unsignalized intersection under 2031 total traffic conditions.

Frank Kenny Road and Collector Road

- The new intersection of Frank Kenny Road and the Cardinal Creek Collector Road will operate at acceptable levels of service as an unsignalized intersection during the weekday peak hours under 2031 traffic conditions.

Prepared By:



IBI GROUP
David Hook, P.Eng.
Project Engineer



IBI GROUP
Austin Shih, M.A.Sc., P.Eng.
Project Engineer



IBI GROUP
Justin Date, P.Eng.
Associate