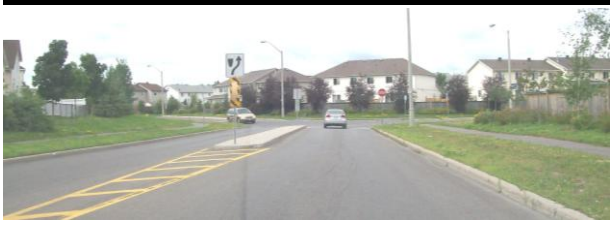
Johnston Road Land Use
Transportation Study Report



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FINAL

Prepared for
City of Ottawa

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1.0 PURPOSE

GENIVAR was retained by the City of Ottawa to examine transportation conditions as part of a larger study (Johnston Road Land Use Study – JRLUS) assessing land use options for the Johnston Road project study area. The intent of the transportation component of this study was to examine the current needs and from a high level, the future transportation requirements of the study area. It is intended that this transportation study will fulfil Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) for the overall JRLUS.

This report outlines the analysis of existing conditions and the transportation assessment undertaken for the potential forecast conditions under the land use concepts presented as part of the study.

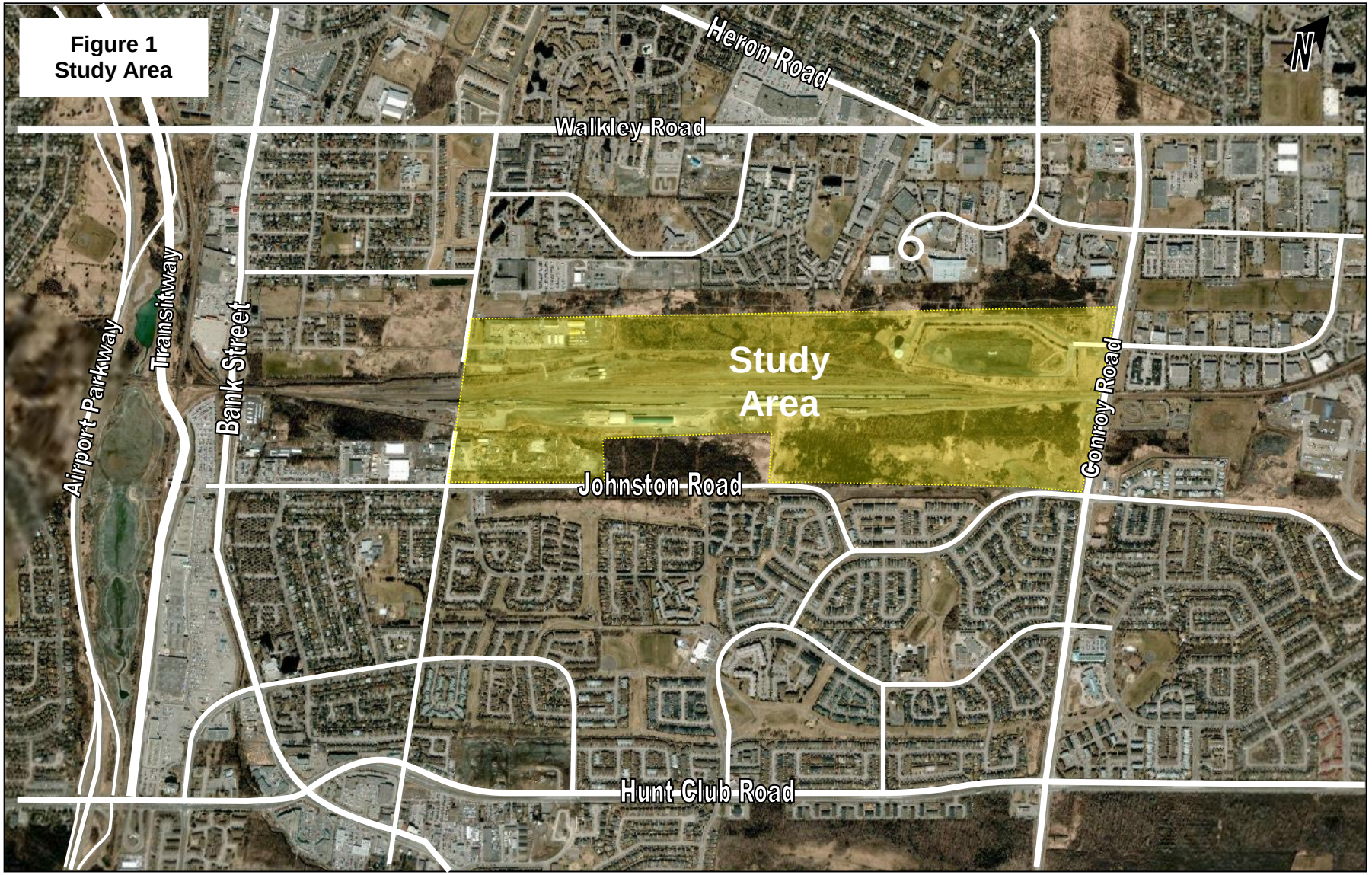
2.0 STUDY AREA

The study area encompasses the lands within the vicinity of the existing east-west rail corridor north of Johnston Road. A large proportion of the study area lands are currently vacant. These lands are surrounded by development on all sides. For the purposes of this study, an existing conditions assessment of the lands beyond the study area including all areas south of Walkley Road, east of Bank Street, north of Hunt Club Road, and west of Conroy Road were included in this report where relevant (See **Figure 1**).

The study area contains a mix of land uses. South of Johnston Road (Hunt Club) consists of a mature residential community of primarily single family housing. Higher density residential development in the area is generally located at the west end of the study area near Bank Street (i.e. row housing, co-op developments, and high-rise apartment/condo complexes). The lands along the south side of Walkley Road are residential between Bank Street and Heatherington Road and commercial (office and retail) from Heatherington Road to Conroy Road. The Ottawa Business Park is located along Don Reid Drive and consists of low-rise office buildings. **Figure 2** illustrates the current land use in the study area.

A major feature of the area is the east-west rail line which divides the Heron Gate and Hunt Club communities. Adjacent to these lands are predominantly light industrial development and pockets of vacant land. Currently, the only crossing locations of the rail corridor in the vicinity of the study lands are located along Bank Street and Conroy Road.

Figure 1
Study Area



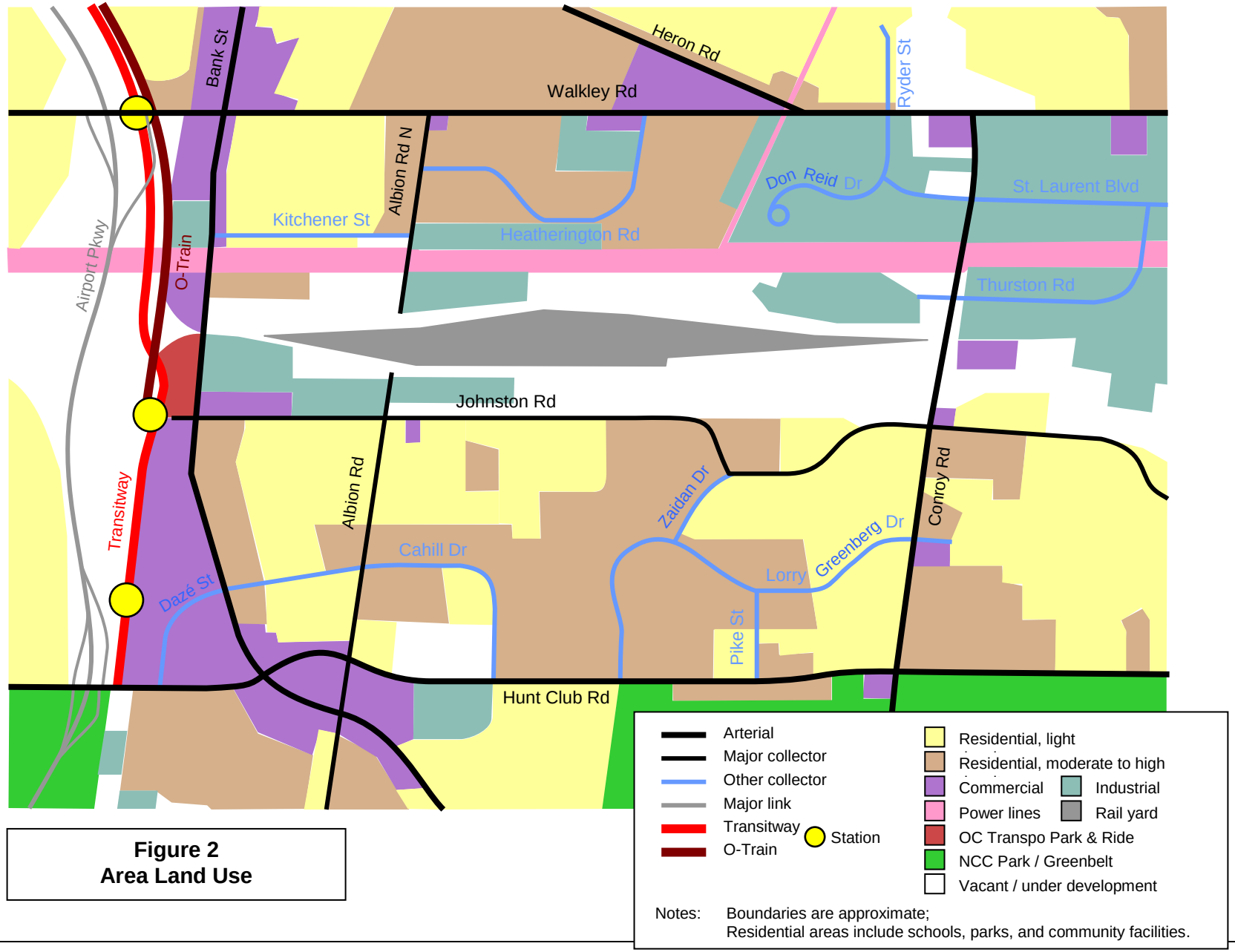
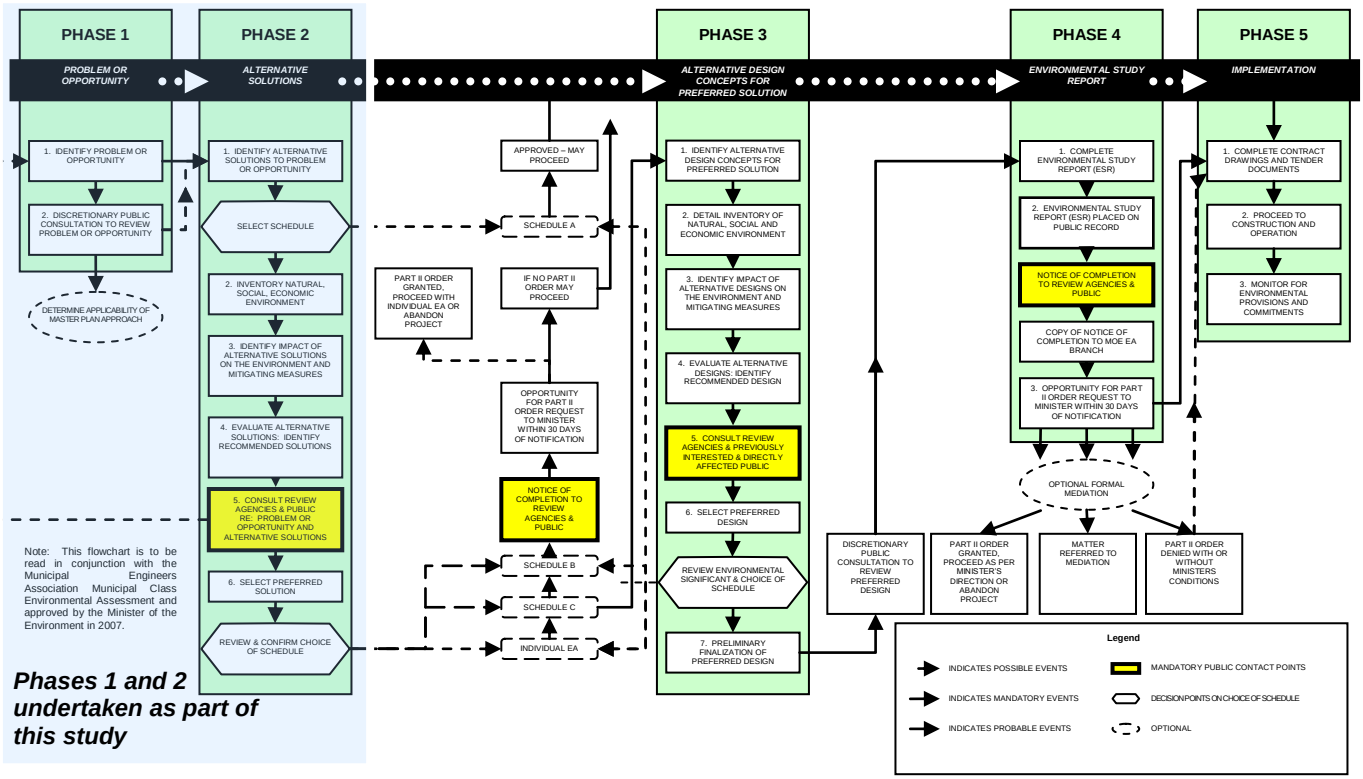


Figure 2
Area Land Use

3.0 PROCESS

The Johnston Road Land Use Study was initiated in June 2008 by the City of Ottawa. As part of this project, the study will meet the requirements of Phases 1 and 2 of the Environmental Assessment (EA) process. GENIVAR provided supplementary consultation with City staff in regard to EA process items in addition to the transportation component of the study; **Figure 3** below summarizes the EA Process as per the Municipal Class Environmental Assessment.

Figure 3
Environmental Assessment Process



Phases 1 and 2 of the EA Process for this study included identifying alternative transportation and municipal solutions to support the preferred land use plan, undertaking existing conditions inventories, determining high-level impacts of each of the alternative land use concept, and selecting a general infrastructure plan to serve the land use concept. The project team undertook preliminary development of land use concepts and ultimately determined a preferred preliminary land use concept based on input from the public and the project team. The public was provided the opportunity to learn about the requirements of the EA process during3 of the 4 public open house meetings held throughout the course of the study.

4.0 EXISTING TRAFFIC AND TRANSPORTATION CONTEXT

The following subsections provide an overview of the existing conditions in regards to traffic and transportation for the study area.

4.1 Roadway Network

The transportation network within the study area consists of a number of 4-lane arterial roadways forming a rectangular grid along the study area boundaries (Bank Street, Walkley Road, Conroy Road, and Hunt Club Road). The study area serviced by this arterial grid also contains a number of 2-lane undivided residential collectors providing access to development. A description of the key arterial and collector roads servicing the study area follows:

- *Bank Street* – A major north-south arterial linking downtown Ottawa to the south-eastern limit of the city. This 4-lane arterial has a posted speed of 50 kilometres per hour (km/h) and provides auxiliary turning lanes at the majority of intersections within the study area. Several unsignalized intersections and closely spaced commercial accesses are present along the corridor. The segment of Bank Street south of Kitchener Street includes signalized accesses to the South Keys shopping centre as well as access to the Greenboro Transit Station and park and ride facility. A grade separated rail crossing exists just north of Johnston Road.

- *Walkley Road* – An east-west arterial linking Riverside Drive to Highway 417. This 4-lane arterial has a posted speed of 60 km/h between Bank Street and Conroy Road and provides for auxiliary turning lanes at the majority of intersections. Intersections are sparsely distributed (average spacing: 300 metres); however numerous accesses to residential and commercial buildings are present along the south side of the roadway.

- *Conroy Road* – A north-south arterial connecting Walkley Road, Hunt Club Road, and Bank Street. North of Hunt Club Road (in the study area lands), Conroy Road is posted at 60 km/h and consists of a 4-lane roadway with a large median and auxiliary turn lanes at each intersection. Intersections along this corridor are all signalized and spaced at approximately 300 metres. An at-grade rail crossing exists between Thurston Drive and Johnston Road.

- *Hunt Club Road* – A major 4-lane east-west regional arterial linking Hawthorne Road in the east to Richmond Road in the west. The roadway is posted at 80 km/h in the majority of the study area with a large median and auxiliary turn lanes provided at each intersection, all of which are signalized and spaced 500 metres apart on average. West of Cahill Drive (near Bank Street), the posted speed decreases to 60 km/h. Private / commercial accesses exist on the south side of the road near the Bank Street / Hunt Club Road intersection.

- *Johnston Road* – A 50 km/h east-west undivided 2-lane major collector connecting Bank Street and Conroy Road and continues east of Conroy Road to connect with Blohm Drive in Hunt Club Park. All intersections between these limits are unsignalized (i.e. stop-controlled) with intersection spacing ranging between 100 and 800 metres. The segment between Bank Street and Albion Road contains a few commercial and industrial accesses along the north side. Johnston Road continues westward, crossing Bank Street to provide access to the South Keys Shopping Centre and the Greenboro transit station.

- *Albion Road* – Posted at 50 km/h, this north-south undivided 2-lane collector located between Walkley Road and Hunt Club Road is discontinuous at the rail corridor (the corridor is separated into Albion Road North and Albion Road South by the rail line).

Intersections are all unsignalized with the exception of the intersections at Walkley Road and Hunt Club Road. Albion Road South continues to Mitch Owens Drive in the south-eastern part of the city.

Figure 4 illustrates the context of the existing area transportation infrastructure including the arterial and collector road network within the study area.

A review of the figure indicates that the east-west routes of Walkley Road and Hunt Club Road have a number of traffic signals between Conroy Road and Bank Street (particularly along Walkley Road). Only 2 local north-south routes crossing the rail corridor are currently available to motorists (Bank Street and Conroy Road). Regional north-south connections are located both east and west of the study area (Highway 417 and Airport Parkway respectively).

It should also be noted that truck routes[1] in the Study Area are restricted to the Bank Street Walkley Road, Conroy Road, and Hunt Club Road arterials, all of which are designated for full loads.

4.2 Origin-Destination Survey – Johnston Road

As part of a community traffic study, the City conducted an origin-destination survey to determine the extent of traffic using Johnston Road which originates from outside of the community (See **Appendix "A"**). For the purpose of this traffic study, the community was defined as the area bounded by Bank Street in the west, Conroy Road in the east, Hunt Club in the South and Walkley Road in the North. Refer to Figure 4 for a map including the whole community area.

The information provided indicated approximately 11 percent of the total traffic along Johnston Road between Conroy Road and Albion Road consists of motorists that originate from and are destined to locations outside of the community.

[1] Rural Truck Routes. City of Ottawa – Traffic and Parking Operations. January 2007.

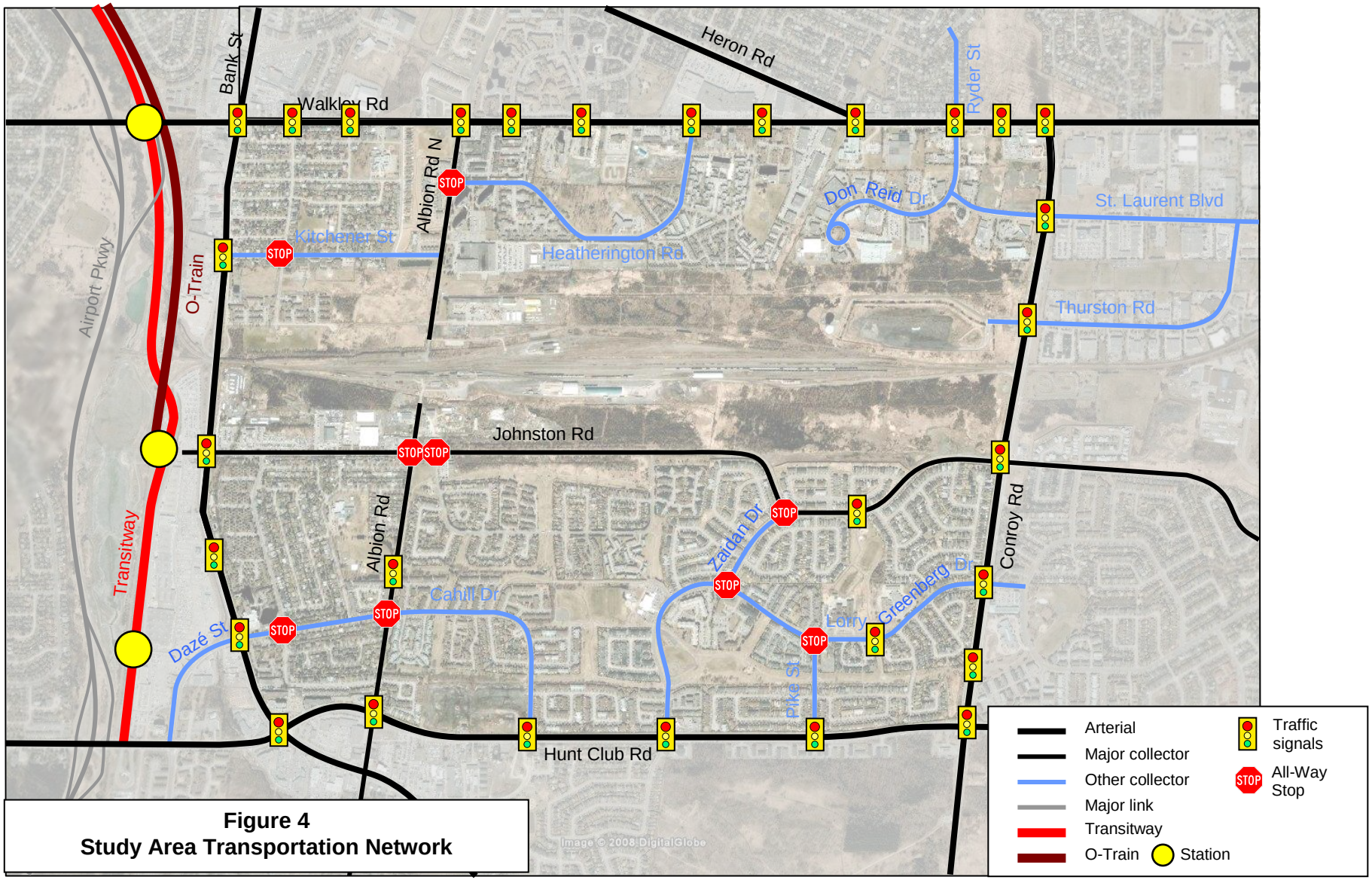


Figure 4
Study Area Transportation Network

4.3 Traffic Volumes

Traffic information was obtained from the City of Ottawa for all signalized intersections within the study area. These counts were all completed within the last 3 years for the weekday peak periods of travel demand, in which time no significant changes to the surrounding land use and transportation networks have occurred. Additional count information along Johnston Road was obtained from the Hunt Club Gate Residential Subdivision traffic impact assessment (traffic count information can be found in **Appendix "B"**). The counts provided information for the following intersections:

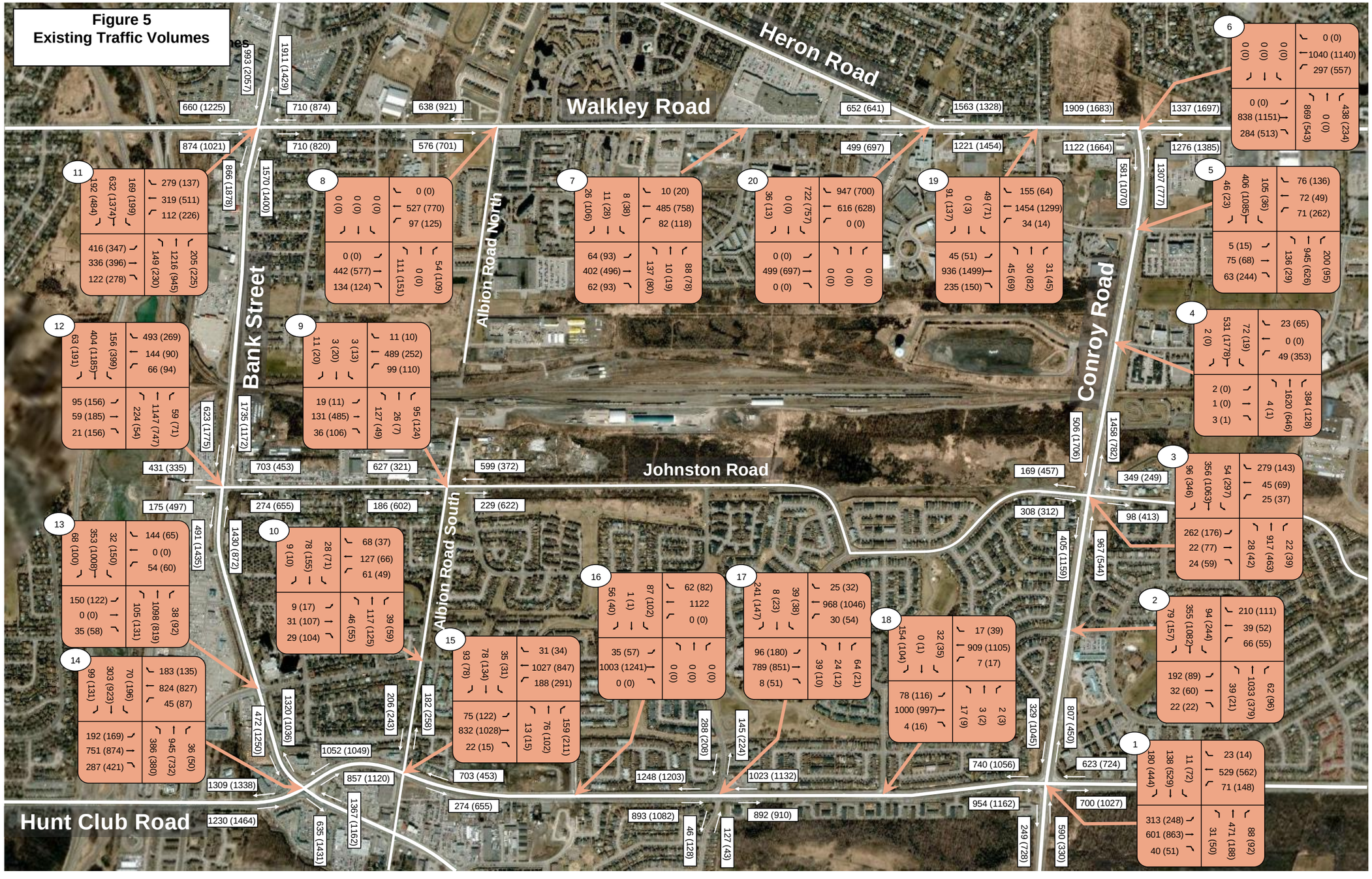
1. Conroy Road / Hunt Club Road
2. Conroy Road / Lorry Greenberg Drive
3. Conroy Road / Johnston Road
4. Conroy Road / Thurston Drive
5. Conroy Road / St. Laurent Boulevard
6. Conroy Road / Walkley Road
7. Heatherington Road / Walkley Road
8. Albion Road North / Walkley Road
9. Albion Road South / Johnston Road
10. Albion Road South / Cahill Drive
11. Bank Street / Walkley Road
12. Bank Street / Johnston Road
13. Bank Street / Cahill Drive
14. Bank Street / Hunt Club Road
15. Albion Road South / Hunt Club Road
16. Cahill Drive / Hunt Club Road
17. Lorry Greenberg Drive / Hunt Club Road
18. Pike Street / Hunt Club Road
19. Don Reid Drive / Walkley Road

City staff collected additional count information to help understand the extent of through traffic along Johnston Road (See **Appendix "A"**).

Figure 5 presents the study area traffic volumes at the aforementioned intersections. A review of the turning movement volumes indicates the following notable characteristics:

- The peak direction of travel during the morning peak hour is northbound toward the Ottawa city core and reverses to southbound during the afternoon peak hour;
- The majority of traffic destined westbound along Walkley Road during both peak hours continue northward onto Heron Road;
- Westbound left turn movements during the PM peak hour along Conroy Road (at the Walkley Road, St. Laurent Boulevard, and Thurston Road intersections) are considerable (over 1,170 vph in total);
- Southbound traffic from Conroy Road to Johnston Road is upwards of 350 vph during the afternoon peak hour;
- Traffic from Conroy Road southbound to Hunt Club Road westbound is over 440 vph during the afternoon peak hour – eastbound traffic traveling from Hunt Club Road to Conroy Road northbound during the morning is approximately 310 vph;

Figure 5
Existing Traffic Volumes



- Approximately 210 vph (PM peak hour) complete the northbound right turn movement from Albion Road South onto Hunt Club Road eastbound and over 290 make the westbound left turn from Hunt Club Road to Albion Road South;
- Traffic between Johnston Road and Bank Street is approximately 490 vph (i.e. vehicles that make a westbound right turn during the morning peak hour and 400 vph make the reverse southbound left turn during the afternoon peak hour); and
- Turning movement volumes in all directions at the Bank Street / Walkley intersection are above 100 vph.

In addition, heavy vehicle percentages for each turning movement were calculated (See **Appendix "C"**). Heavy vehicles are vehicles which are generally larger than typical passenger vehicles. They generally either possess more than 2 axles (i.e. truck/tractor-trailer combination) or are longer than an average half-ton pick-up truck (i.e. busses, utility trucks, etc.). During the morning peak hour, heavy vehicles were found to represent between 3 and 8 percent of the total traffic in the area. In the afternoon peak hour, heavy vehicle percentages are lower, ranging between 1 and 5 percent.

4.4 Trip Distribution

A review of the City of Ottawa's traffic modeling output was undertaken to gain insight into trip distribution patterns for the study area. The information provided by the City included an Origin-Destination (O-D) matrix showing all automobile trips to and from the general study area during the morning and afternoon peak periods of travel demand. This included the locations to which these trips were going to and from (See **Appendix "D"**). Assumptions for future trip distribution were approximated based on this information.

Figure 6 indicates approximate trip distribution percentages for the study area.

The figure indicates that during the peak hours of travel demand, the majority of traffic will likely travel to and from the lands to the north (60%). Lands to the northwest, northeast, and west / southwest of the site will accommodate approximately 10% to 15% of site trips. The remaining 5% of trips will travel to and from the lands to the south and southeast.

Figure 6
Auto Trip Distribution Approximation

4.5 Network Performance

An assessment of the existing roadway network was undertaken to gain an understanding of the operating conditions at key locations within the study area.

Key intersections were evaluated using Synchro™. Performance levels were assessed in terms of overall intersection performance (under existing signal timing – See **Appendix "E"**) and individual movements of concern were identified. **Table 1** summarizes the intersection capacity analysis results under the existing traffic volume scenario (See **Appendix "F"** for Intersection Capacity Analysis Reports).

A review of the analysis indicates that:

- Overall intersection levels of service are satisfactory during the morning peak hour (range between LOS "A" and "C");
- During the afternoon peak hour, the intersection at Bank Street and Walkley Road is experiencing congestion;
- The southbound through-right movement at Conroy Road / Thurston Drive (PM Peak), the eastbound through movement at Conroy Road / Walkley Road (AM Peak), and the westbound through movement at the Bank Street / Hunt Club Road (AM and PM Peak) all experience congestion; and
- The Albion Road South / Johnston Road intersection operates at LOS "D" and "E" during the morning and afternoon peak hours of travel demand respectively.

In general, while the majority of intersections along the study area arterial grid provide high levels of service during the typical weekday peak periods, key locations (Bank Street / Walkley Road, Bank Street / Hunt Club Road, and Albion Road South / Johnston Road are experiencing some level of periodic congestion.

Table 1
Existing Intersection Capacity Analysis Results

Intersection			Performance Characteristics									
ID No.	*North-South*	*East-West*	*Overall*				*Critical Movement*					
Signalized			*V/C*[1]		*LOS*[2]		*Movement*		*V/C*[1]		*LOS*[2]	
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
1	Conroy Road	Hunt Club Road	0.47	0.63	A	B	NBT	SBT	0.65	0.68	B	B
2	Conroy Road	Lorry Greenberg Drive	0.64	0.49	B	A	EBL	EBL	0.96	0.67	E	B
3	Conroy Road	Johnston Road	0.54	0.54	A	A	EBL	EBL	0.77	0.65	C	B
4	Conroy Road	Thurston Drive	0.56	0.89	A	D	NBT	SBT/R	0.61	0.92	B	**E**
5	Conroy Road	St. Laurent Boulevard	0.32	0.59	A	A	WBL	WBL	0.50	0.77	A	C
6	Conroy Road	Walkley Road	0.73	0.80	C	D	NBL	EBT	0.91	0.81	**E**	D
7	Heatherington Road	Walkley Road	0.31	0.41	A	A	NBL	NBL	0.53	0.44	A	A
8	Albion Road North	Walkley Road	0.31	0.40	A	A	NBL	NBL	0.53	0.55	A	A
11	Bank Street	Walkley Road	0.61	0.94	B	**E**	EBL	SBT	1.04	0.99	**F**	**E**
12	Bank Street	Johnston Road	0.56	0.76	A	C	EBL	SBL	0.79	0.77	C	C
13	Bank Street	Cahill Drive	0.48	0.46	A	A	EBL	EBL	0.63	0.56	B	A
14	Bank Street	Hunt Club Road	0.82	0.89	D	D	WBT	WBT	0.96	0.95	**E**	**E**
15	Albion Road	Hunt Club Road	0.54	0.73	A	C	NBT/R	NBT/R	0.71	0.78	C	C
16	Cahill Drive	Hunt Club Road	0.45	0.52	A	A	SBL	SBL	0.50	0.53	A	A
17	Lorry Greenberg Drive	Hunt Club Road	0.46	0.51	A	A	NBL	WBT/R	0.67	0.59	B	A
18	Pike Street	Hunt Club Road	0.38	0.46	A	A	EBT	WBT/R	0.39	0.48	A	A
19	Don Reid Drive	Walkley Road	0.64	0.72	B	C	WBT/R	NBL	0.65	0.76	B	C
20	Heron Road	Walkley Road	0.47	0.50	A	A	SBL/R	SBL/R	0.57	0.58	A	A
Unsignalized			*Delay (s)*[3]		*LOS*[2]		*Movement*		*Delay (s)*[3]		*LOS*[2]	
9	Johnston Road	Albion Road	25	44	C	**E**	WB	EB	35	73	D	**F**
10	Cahill Drive	Albion Road	10	11	B	B	WB	SB	11	11	B	B

NOTE: Existing Signal Timing Systems

NOTE 2: Format AM Peak (PM Peak)

1. Volume to Capacity Ratio (V/C) – compares intersection approach volumes with approach capacity (0.50 – at half capacity, 1.00 – at capacity).

2. Level of Service (LOS) – Intersection Performance Rating (A – excellent conditions, F – congested conditions)

3. Average delay in seconds – average delay experienced by drivers at intersection

4.6 Transit Route Provisions and Ridership Characteristics

The study area is well served by transit. In September 2008, OC Transpo updated their transit route provisions throughout the city to better serve communities. A review of the route updates in September 2009 indicated that the routes provided in the study area remain as in 2008 with no major schedule adjustments. A number of local routes and region-wide routes run through and around the study area (See **Figure 7**). The major transit route hubs servicing the study area include South Keys and Greenboro transit stations. These stations are located at the south and north ends of the South Keys Shopping centre, respectively. The Greenboro transit station provides a park-and-ride facility where commuters can park their vehicles and transfer to either the Transitway or the O-Train.

Table 2 below provides a summary of all the transit routes and corresponding route paths, service frequencies, and hours of operation. A review of the table indicates that the study area is well serviced by transit (See **Appendix "G"** for additional route information).

4.7 Other Transit Considerations

The City currently operates a Park-and-Ride facility at Greenboro station. In total, there are approximately 680 parking stalls and usage is currently at capacity. **Figure 8** provides an illustration of Greenboro station along with the station platform.

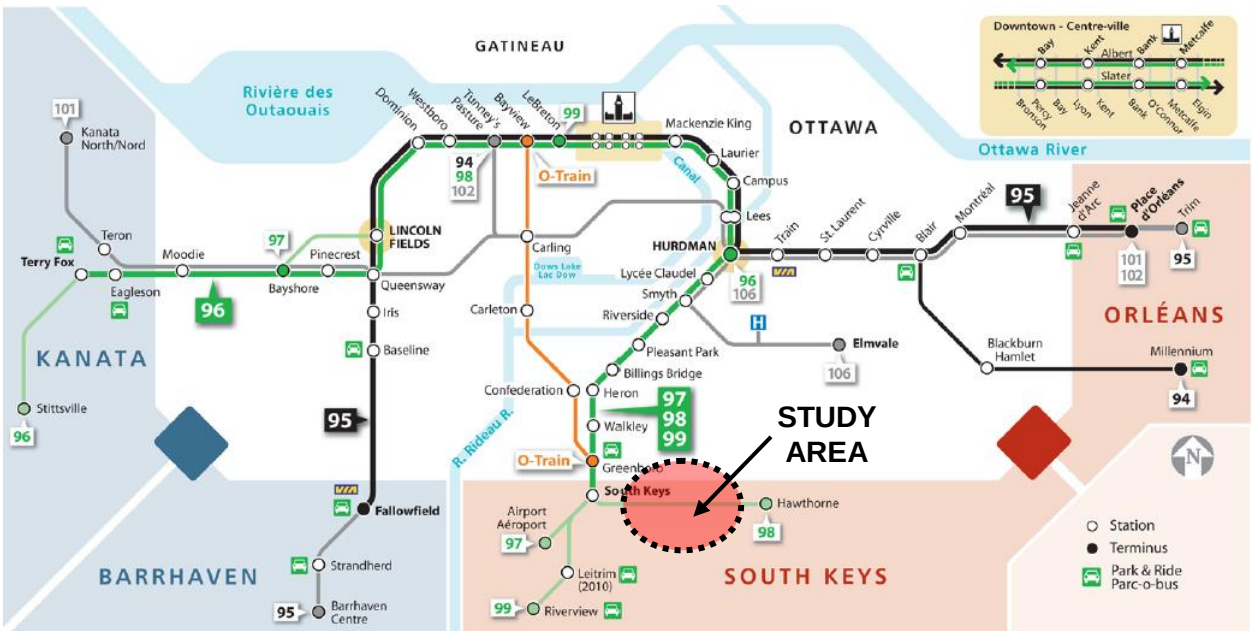
4.8 Pedestrian and Cycling Facilities

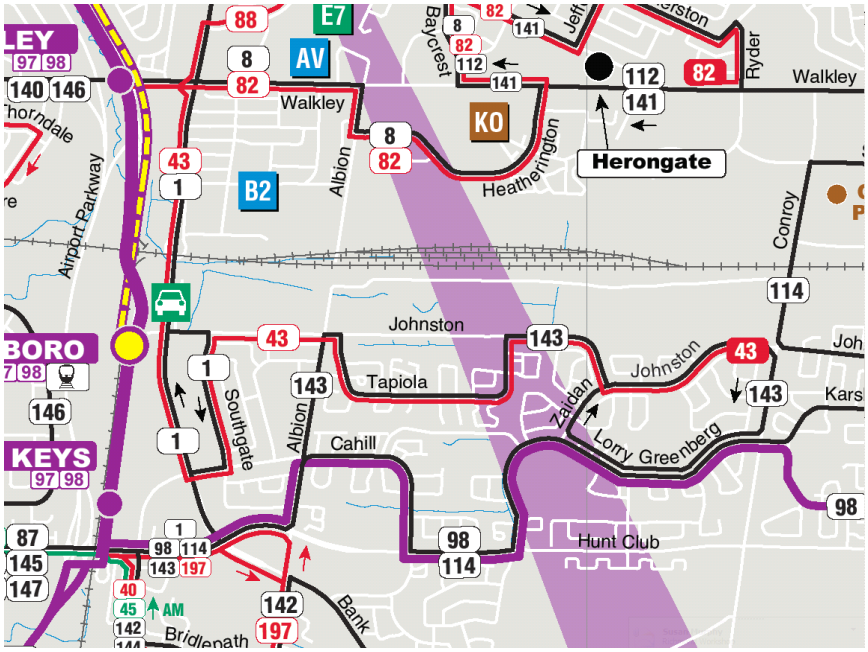
Sidewalks are generally provided along the arterial and collector roads in the study area. In some areas along Johnston Road there is no sidewalk, but a multi-use path is available. Along local streets within residential areas, sidewalks are generally not present. Bicycle lanes are present along Bank Street, Hunt Club Road, and Conroy Road (each designated as part of the on-road cycling routes[2]).

The existing paved pathway network in the Hunt Club community provides a number of access (or secondary) pathways that link to a main east-west path which extends between Hawthorne Road and Albion Road (See **Figure 9**). It is evident that the central part of the community is well serviced by pathways; however there is currently no connection between the community and Bank Street.

[2] Map 3 – Primary Urban Cycling Transportation Network. Transportation Master Plan. City of Ottawa. September 2003.

Figure 7
Hunt Club Area Transit Service





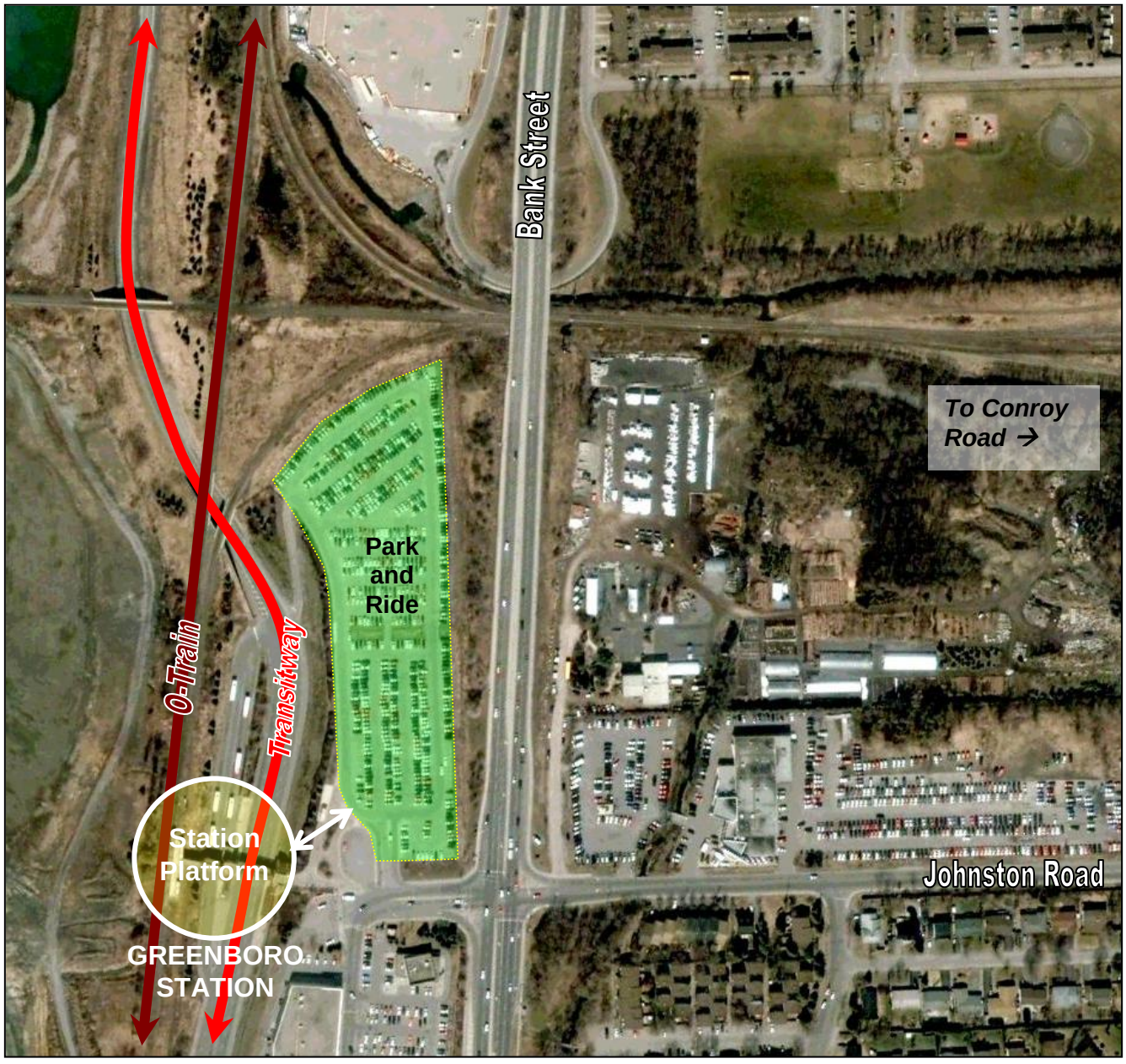
[Source: OC Transpo – www.octranspo.com]

Table 2
Transit Route Information Summary (as of September 2009)

Transit Route	General Route Path	Service Frequency (Peak Period – Peak Direction)[2]	General Hours of Operation
Rapid Transit Network			
➢ O-Train	From Greenboro (South Keys area) to Bayview (west of downtown core)	15-min	6:30am – 12am
➢ 97	From Ottawa International Airport to Bayshore Shopping Centre via the Transitway	5-min	4:30am – 3:30am
➢ 98	From Hawthorne Road (at Hunt Club Road) to Tunney's Pasture Station	20-min	5:30am – 12:30am
Primary Transit Routes			
➢ 1	Major north-south route between South Keys / Greenboro and Vanier. This route travels mainly along Bank Street, Wellington Street, and St. Patrick Street.	15-min	5am – 12am
➢ 8	This route provides connection between Ottawa (Billings Bridge) and Gatineau (Place du Portage / Museum of Civilization) using a combination of city arterials, collectors, and Transitway segments.	10 to 15-min	5am – 1am
Other Notable Transit Routes			
➢ 43	Provides connection between the Hunt Club community, downtown core, and Lebreton Flats by way of Johnston Road, Bank Street, and the Transitway.	20-min	6am – 9am 4pm – 7pm
➢ 82	Connects Heron Gate community to Tunney's Pasture via Walkley Road and the Transitway.	15-min	6am – 9am 4pm – 7pm
➢ 114	Connects the community to major rapid transit hubs at South Keys, Greenboro, and Hurdman Stations.	30-min	5am – 1:30am
➢ 141	Connects Heron Gate community to Billings Bridge Plaza. This route travels along Walkley Road, Heron Road, and Bank Street.	30-min	6am – 7pm
➢ 143	Short route connecting the Hunt Club community to South Keys / Greenboro.	60-min	6:30am – 11pm

NOTES: 1. Source: City of Ottawa – www.octranspo.com.
2. Frequencies are approximate – based on route schedule information.
NOTE: Red text represents new routes that were implemented in September 2008

Figure 8
Greenboro Transit Station and Park-and-Ride Facility



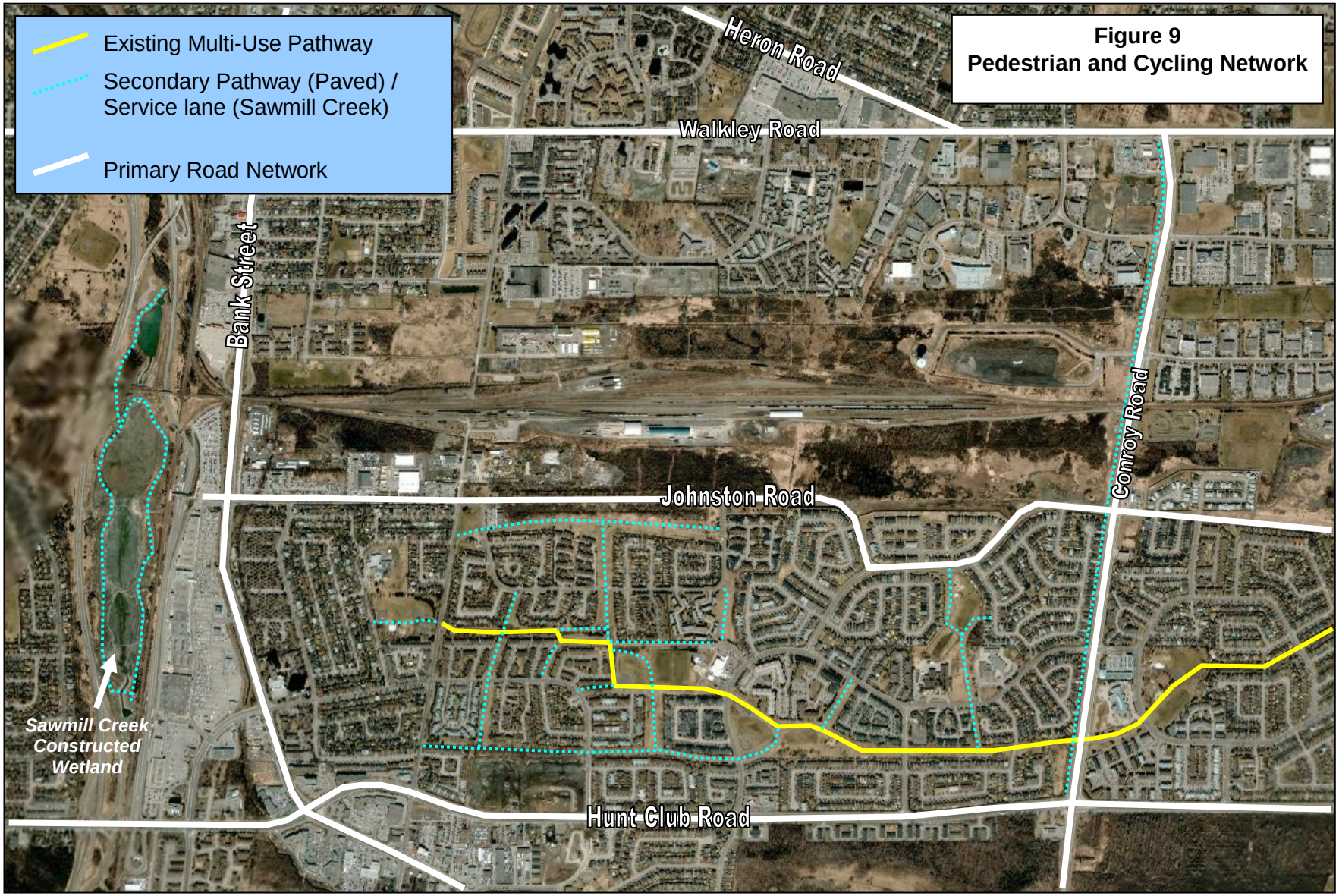


Figure 9
Pedestrian and Cycling Network

5.0 FUTURE CONSIDERATIONS

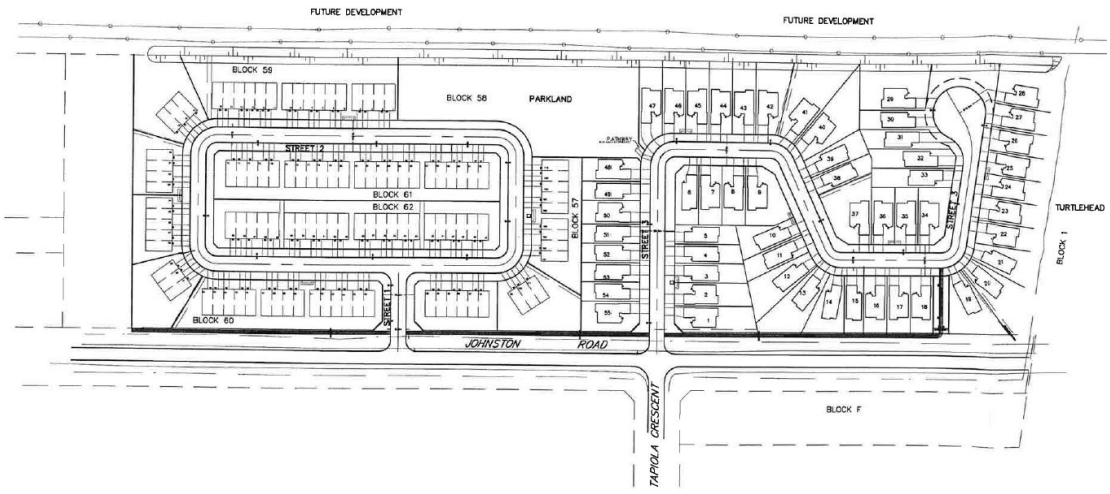
A number of considerations related to recent development and planning initiatives are notable to the study area context. The following sub-sections provide a summary of these items.

5.1 Recent Developments

A review of the study area was undertaken to determine the extent of recent area development activity. The review indicated marginal activity. The Solera Subdivision (Larco Homes) currently being constructed at the Cahill Drive / Hunt Club Road intersection will consist of approximately 120 residential dwelling units when completed. In addition, a new retail / self storage development has been constructed along the west side of Bank Street. Ultimately, these developments will have nominal impact to the Johnston Road study corridor.

With regard to the future residential area along the north side of Johnston Road currently under development, a review of the *Hunt Club Gate Residential Subdivision Transportation Brief* was undertaken to understand the future magnitude and transportation impact adjacent to the study area. **Figure 10** illustrates the context of the site which includes a total of 165 dwelling units (110 townhouses and 55 single family units).

Figure 10
Hunt Club Gate Site Plan



Based on the review of the brief, it is understood that the traffic impacts associated with this site (at completion) will be marginal from a traffic perspective along Johnston Road with only 36 vph outbound during the morning peak hour and 40 vph inbound to the site during the PM peak hour. Regardless, the collective impact of this site should be considered as part of any future traffic impact assessment for new development in the subject lands.

5.2 Transportation Planning Initiatives

The City of Ottawa approved the Transportation Master Plan (TMP) update in November 2008 and the Ottawa Cycling Plan (OCP) in January 2008. The following items as per the aforementioned plans will have an impact on the future of area transportation trends:

Transit (See **Figure 11**)

- *North-South LRT* – In Phase 2, the City plans to implement the first phase of the Rapid Transit Network which includes a north-south LRT line connecting the Airport with the downtown core.

Roads (See **Figure 12**)

- *Hunt Club Extension to Highway 417* – This extension will connect Hunt Club Road with Highway 417 providing greater east-west connectivity. This facility is scheduled to be implemented in Phase 1 (2009 to 2015).
- *Innes / Walkley / Hunt Club Connection* – This facility (planned for Phase 2) will connect the primary east-west corridor in the east end with Hunt Club Road.
- *Airport Parkway Widening* – In Phase 2 (2016 to 2022), the City plans to widen the Airport Parkway between Ottawa International Airport and Heron Road.
- *Hunt Club Road Widening* – West of Bank Street, Hunt Club Road will be widened to Highway 416. This facility is scheduled to be implemented in Phase 3 (2023 to 2031).

Pedestrians and Cycling (See **Figure 13**)

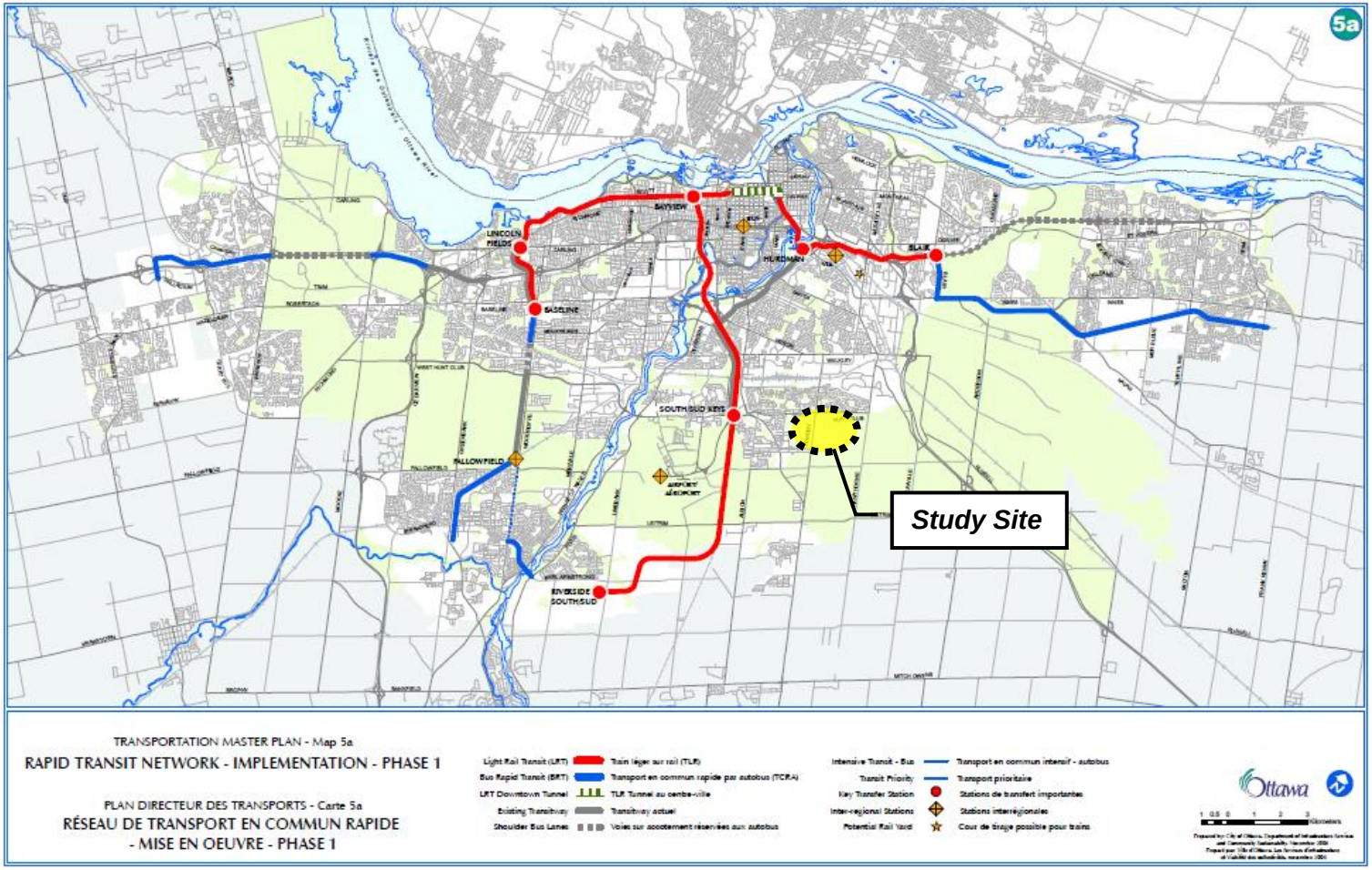
- *Johnston Road Shared Lane* – A shared lane signed route is proposed for the segment of Johnston Road between Tapiola Crescent and Bank Street.
- *Hunt Club Community North-South Route* – A shared lane signed route is proposed to connect the lands north and south of Hunt Club Road (i.e. using primarily Lorry Greenberg Drive.
- *Proposed Off-Road Pathway*- Along the northern edge of the study area runs a hydro corridor through which will run an off-road pathway. The Ottawa Cycling Plan lists this as a spine or city-wide cycling route that is scheduled for implementation in the long term, (2018-2028)

  NOTE: The city of Ottawa recently issued a request for proposal to complete an Environmental Assessment for a pathway connection between the Hunt Club community (west of the Airport Parkway) and the rapid transit stations at South Keys Shopping Centre. This connection will ultimately set the stage to implement a final pedestrian / cycling pathway segment that will provide continuous east-west pedestrian linkage from Hawthorne Road to the networks in the west end of the city.

Transportation Demand Management (TDM)

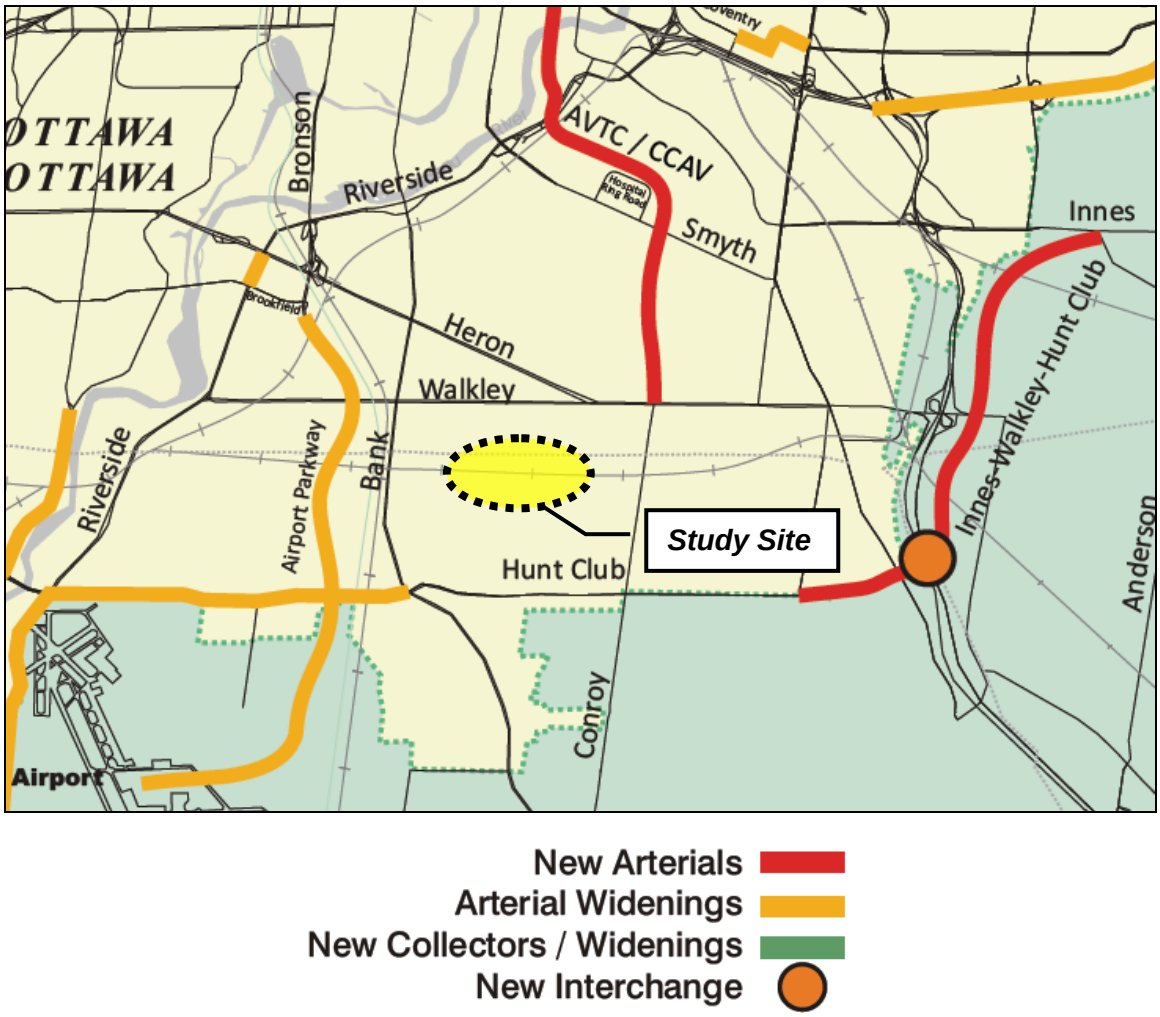
- Transportation Demand Management (TDM) is a method of channelling trip demand on the transportation network to use the system more efficiently.
- The City of Ottawa's TMP indicates that the City will *"work with the Ministry of Transportation Ontario, the City of Gatineau, the ministere des transports du Quebec, the National Capital Commission and other federal departments and agencies to implement and coordinate TDM initiatives across the National Capital Region"*. Ultimately, a plan will be developed which outlines strategies and a performance measurement framework. TDM initiatives could include:
  - *Ridesharing* - Increasing vehicle occupancy to reduce the number of automobile trips on the transportation network;
  - *Parking Supply strategies* – Adjusting parking rate costs and supply to discourage use of automobiles and promote other modes such as walking, cycling, and transit; and
  - *Peak "Rush" Period Modification* – Implementing offset work hour schedules to distribute peak period traffic more efficiently.

Figure 11
Rapid Transit Network Implementation – Phase 1



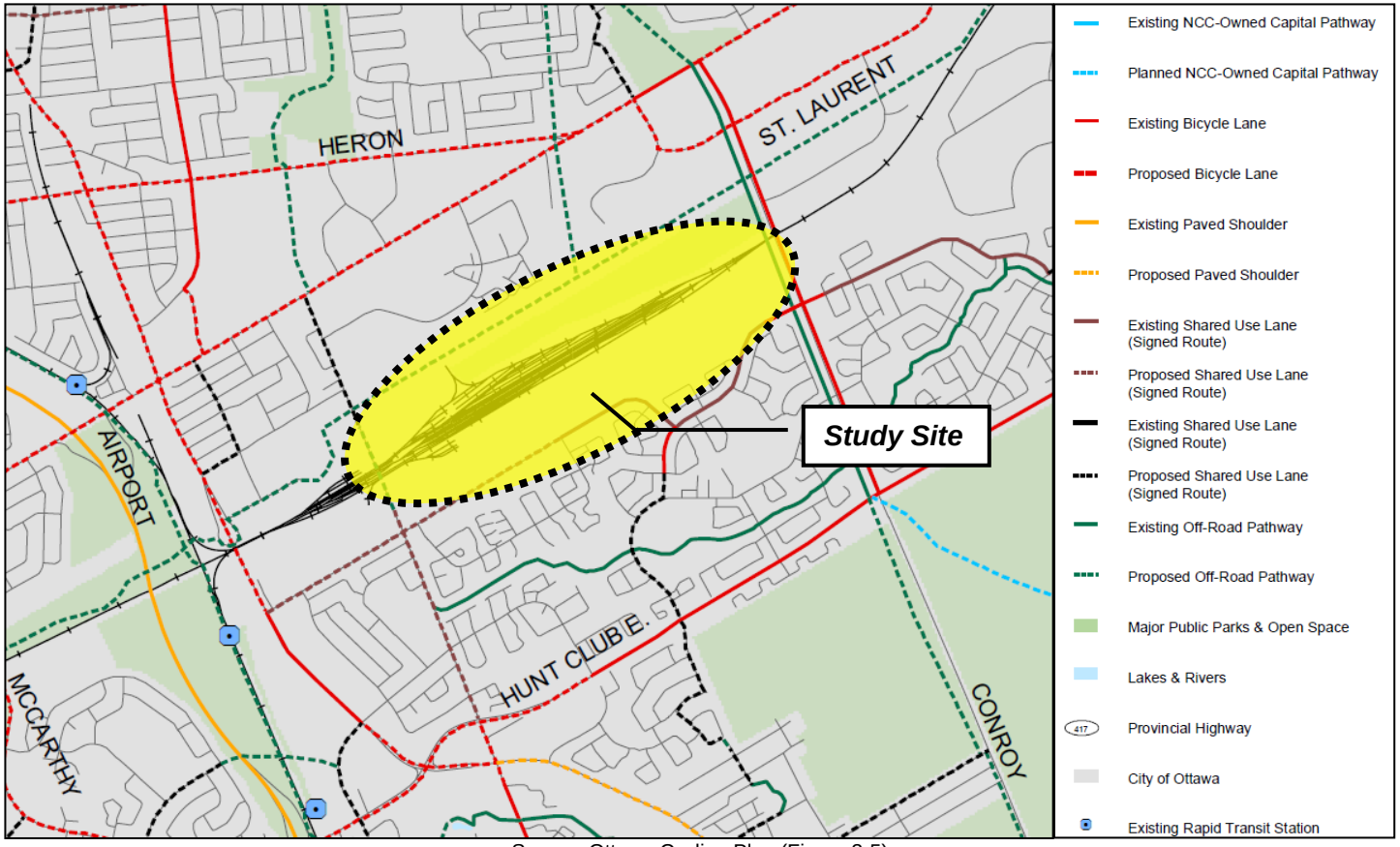
Source: City of Ottawa TMP

Figure 12
Planned Roadway Improvements (up to 2031)



Source: City of Ottawa TMP

Figure 13
Planned Cycling Provisions



Source: Ottawa Cycling Plan (Figure 3-5)

6.0 PRELIMINARY ALTERNATIVE LAND USE CONCEPT TRANSPORTATION ASSESSMENT

As part of the JRLUS study, City Staff developed three preliminary alternative land use concepts. For each concept, a high level assessment of transportation conditions was undertaken with the intention of determining opportunities and constraints, to aid in the decisions related to developing a preferred land use concept plan. The transportation component of the study included input from public consultation and the study team.

The following sub-sections outline the three preliminary concepts and the associated transportation assessment.

6.1 Preliminary Alternative Land Use Concepts

In March 2009, preliminary land use concepts were developed by the City of Ottawa for the Johnston Road study site. Full illustrations of these concepts are included in **Appendix "H"**. A general summary of each concept is included below with regard to the lands which are considered as to have development potential (i.e. only those lands which are currently vacant or unused – the heavy industrial rail corridor, Conroy Woods, open space, elevated water tank, snow disposal facility, city works yard, parkland, and Greenboro Turtlehead nature area have been excluded from the land use quantities indicated below):

Concept A

Highlights include a large component of industrial use with residential, parkland, and office located in proximity of Conroy Road. Total land use zoning area inclusions are as follows:

- Industrial Use – 46 ha
- Residential Use – 7 ha
- Commercial Use – 0 ha
- Office Use – 5 ha

Concept B

Highlights include a large component of industrial use along with residential, office, commercial, and parkland use focused on Johnston Road. In addition, the Turtlehead Nature Area is expanded to abut the rail corridor. Total land use zoning area inclusions are as follows:

- Industrial Use – 51 ha
- Residential Use – 3 ha
- Commercial Use – 2 ha
- Office Use – 3 ha

Concept C

Highlights include a large component of industrial use adjacent to the rail corridor along with residential and office use at the southwest end of the site. A large commercial area is included in this concept at the northwest corner of the Conroy Road / Johnston Road intersection. Total land use zoning area inclusions are as follows:

- Industrial Use – 44 ha
- Residential Use – 5 ha
- Commercial Use – 15 ha
- Office Use – 1 ha

6.2 Assumptions for Site Trip Forecasting Purposes

Land use concepts provided by the City included total zoning areas. For forecasting purposes, it is important that the study team approximate levels of development to undertake forecasts. The following assumptions detail development level approximations as well as trip mode share:

- *Development Level Approximation / Building Footprint* – For trip generation purposes, it is necessary to approximate potential building floor area, unit totals, and/or employment levels as these are variables which are typically included within trip generation studies (i.e. Institute of Transportation Engineers Trip Generation). As such, the following assumptions were developed based on a combination of existing development examples and discussions with City staff:
    - Industrial Land Use Build-Out – It was assumed that lands designated for industrial use would build-out with footprint area occupying 30% of the total land area. In addition, all buildings were assumed to consist of two storey facilities as per discussions with City staff.
    - Commercial Land Use Build-Out – Development of commercial lands was assumed to occupy approximately 35% of the total land area (based on an existing nearby commercial area at the Conroy Road / Lorry Greenberg Drive intersection.
    - Residential Land Use Build-Out – Based on an existing example, it was assumed that build-out densities would be approximately 40 units / hectare for townhouses and 72 units / hectare for apartments.
    - Other Land Uses – Other land uses within the preliminary land use concepts were considered to be negligible trip generators or were omitted from the exercise as they currently are developed.
- *Development Assumptions for various Land Use Categories*
    - Light Industrial Use – Based on discussions with planning staff, it is understood that light Industrial use can contain a certain amount of office use. Considered a conservative approach, it was assumed that this use would be 50% office use and 50% light industrial use.
    - Apartment Land Use – It was assumed that all apartment land use areas would build-out as low-rise apartment complexes.

Based on the above, **Table 3** below summarizes the build-out approximations carried as part of the forecasting exercise.

Table 3
Build-Out Quantity Approximations

Preliminary Alternative Concept	Land Use Designation (New Traffic Generators)	Total Land Area (ha)	Build-Out Approximation		
			Assumptions	Resulting Build-Out	
				Quantity	Units
Concept A	Light Industrial	22.80	2-storey buildings occupying 30% of the total land area[1]	1,473	Gross Floor Area (1,000 ft^2)
	Industrial	23.00	2-storey buildings occupying 30% of the total land area[1]	1,485	Gross Floor Area (1,000 ft^2)
	Townhouse	0.60	40 units per ha^2	24	dwelling units
	Stacked Townhouse	2.70	60 units per ha^2	162	dwelling units
	Apartments	3.70	75 units per ha^2	278	dwelling units
	Office	4.60	2-storey buildings occupying 30% of the total land area[1]	297	Gross Floor Area (1,000 ft^2)
	Commercial	0.00	1-storey buildings occupying 35% of the total land area[3]	0	Gross Floor Area (1,000 ft^2)
Concept B	Light Industrial	27.90	2-storey buildings occupying 30% of the total land area[1]	1,802	Gross Floor Area (1,000 ft^2)
	Industrial	23.00	2-storey buildings occupying 30% of the total land area[1]	1,485	Gross Floor Area (1,000 ft^2)
	Townhouse	0.00	40 units per ha^2	0	dwelling units
	Stacked Townhouse	3.20	60 units per ha^2	192	dwelling units
	Apartments	0.00	75 units per ha^2	0	dwelling units
	Office	2.60	2-storey buildings occupying 30% of the total land area[1]	168	Gross Floor Area (1,000 ft^2)
	Commercial	1.80	1-storey buildings occupying 35% of the total land area[3]	68	Gross Floor Area (1,000 ft^2)
Concept C	Light Industrial	21.00	2-storey buildings occupying 30% of the total land area[1]	1,356	Gross Floor Area (1,000 ft^2)
	Industrial	23.00	2-storey buildings occupying 30% of the total land area[1]	1,485	Gross Floor Area (1,000 ft^2)
	Townhouse	0.00	40 units per ha^2	0	dwelling units
	Stacked Townhouse	4.80	60 units per ha^2	288	dwelling units
	Apartments	0.00	75 units per ha^2	0	dwelling units
	Office	1.10	2-storey buildings occupying 30% of the total land area[1]	71	Gross Floor Area (1,000 ft^2)
	Commercial	15.20	1-storey buildings occupying 35% of the total land area[3]	573	Gross Floor Area (1,000 ft^2)

1. Industrial and Office build-out assumptions based on discussions with city land use planning staff.
2. Residential build-out assumptions based on existing residential examples (i.e. Claridge - New Edinborough Common development) and the assumption of low rise apartments.
3. Commercial build-out assumptions based on existing commercial (retail) complex on the southeast corner of the Lorry Greenberg / Conroy intersection.

- *Mode Share* – Trips are generally divided into 4 types including transit, walking, cycling, and personal vehicle modes. Based on planning forecasts within the City of Ottawa, the following assumptions were carried as part of this study:
    - *30% Transit mode share* – This 30% projection included in the TMP is in reference to city-wide transit mode share – this rate was applied to site trip generation to determine future transit demand for the site. [it should be noted however that central areas of the City typically experience higher mode shares than outlying areas];
    - *10% Walking mode share* – this component includes all individuals walking to and from the site between nearby transit stations and land use beyond the study site;
    - *3% Cycling mode share* – this includes cyclists that will use the future multi-use pathway network and the adjacent roadway network to access the site; and
    - *57% Auto mode share* – the majority of traffic accessing the site is anticipated to be from personal vehicles, however due to the sites proximity to a major rapid transit link, this estimate may be considered conservative.

6.3 Trip Generation Rate Approximations

Trip generation estimates for each preliminary concept were prepared based on the Institute of Transportation Engineers (ITE) *Trip Generation* (8th Edition). Land uses were approximated based on the following ITE land use codes:

- Land Use 110 – General Light Industrial
- Land Use 221 – Low Rise Apartment
- Land Use 230 – Residential Condominium / Townhouse
- Land Use 720 – Medical-Dental Office
- Land Use 770 – Business Park
- Land Use 850 – Supermarket
- Land Use 851 – Convenience Market
- Land Use 880 – Pharmacy / Drugstore without Drive-Through
- Land Use 912 – Drive-In Bank

Table 4 lists the land use approximations (some were based on averages as per the assumptions in Section 6.2) and trip rates for the morning and afternoon peak hours of travel demand as well as the percentage of inbound trips entering the site and outbound trips leaving the site during those time periods.

Table 4
ITE Land Use Approximations and Trip Generation Rates

Land Use (as per Preliminary Alternative Concepts labeling)	ITE Land Use Approximation (ITE Trip Generation, 8th Ed. - Code - Land Use Type)	Trip Generation Rates						
		Units	AM Peak Hour			PM Peak Hour		
			Trip Rate	% Inbound	% Outbound	Trip Rate	% Inbound	% Outbound
Light Industrial	Land Use 110, 770 (average)	1,000 SF GFA	1.18	86%	14%	1.13	18%	83%
	110 - General Light Industrial	1,000 SF GFA	0.92	88%	12%	0.97	12%	88%
	770 - Business Park	1,000 SF GFA	1.43	84%	16%	1.29	23%	77%
Industrial	Land Use 110, 770 (average)	1,000 SF GFA	1.18	86%	14%	1.13	18%	83%
	110 - General Light Industrial	1,000 SF GFA	0.92	88%	12%	0.97	12%	88%
	770 - Business Park	1,000 SF GFA	1.43	84%	16%	1.29	23%	77%
Townhouse	Land Use 230 - Residential Condominium/Townhouse	Dwelling Units	0.44	17%	83%	0.52	67%	33%
Stacked Townhouse	Land Use 230 - Residential Condominium/Townhouse	Dwelling Units	0.44	17%	83%	0.52	67%	33%
Apartments	Land Use 221 - Low Rise Apartment	Dwelling Units	0.46	21%	79%	0.58	65%	35%
Office	Land Use 770 - Business Park	1,000 SF GFA	1.43	84%	16%	1.29	23%	77%
Commercial	Land Use 834, 836, 850, 851, 880 and 912 (average - see below)	1,000 SF GFA	17.69	61%	39%	20.12	46%	54%
	720 - Medical-Dental Office	1,000 SF GFA	2.30	79%	21%	3.46	27%	73%
	850 - Supermarket	1,000 SF GFA	3.59	61%	39%	10.50	51%	49%
	851 - Convenience Marktet	1,000 SF GFA	67.03	50%	50%	52.41	51%	49%
	880 - Pharmacy/Drugstore without Drive-Through	1,000 SF GFA	3.20	59%	41%	8.42	50%	50%
	912 - Drive-in Bank	1,000 SF GFA	12.35	56%	44%	25.82	50%	50%

6.4 Trip Generation Estimates

Based on the context of the land use concepts and assumptions indicated above, trip generation estimates were developed for the site as a whole for each concept. While the site is likely to develop in separate stages, for the purposes of this study, trip generation estimates for the site were developed assuming a full build-out scenario.

Table 5
Trip Generation Estimates
Preliminary Alternative Concepts

Preliminary Alternative Concept	Land Use Designation (New Traffic Generators)	Build-Out Approximation		Trips					
				AM Peak Hour			PM Peak Hour		
		Quantity	Units	Total	In	Out	Total	In	Out
Concept A	Light Industrial	1,473	Gross Floor Area (1,000 ft2)	1,730	1,488	242	1,664	303	1,427
	Industrial	1,485	Gross Floor Area (1,000 ft2)	1,745	1,501	244	1,679	305	1,440
	Townhouse	24	dwelling units	11	2	9	12	7	3
	Stacked Townhouse	162	dwelling units	71	12	59	84	48	24
	Apartments	278	dwelling units	128	27	101	161	83	45
	Office	297	Gross Floor Area (1,000 ft2)	425	357	68	383	98	327
	Commercial	0	Gross Floor Area (1,000 ft2)	0	0	0	0	0	0
	TOTALS			*4,110*	*3,387*	*724*	*3,984*	*844*	*3,266*
Concept B	Light Industrial	1,802	Gross Floor Area (1,000 ft2)	2,117	1,821	296	2,036	371	1,747
	Industrial	1,485	Gross Floor Area (1,000 ft2)	1,745	1,501	244	1,679	305	1,440
	Townhouse	0	dwelling units	0	0	0	0	0	0
	Stacked Townhouse	192	dwelling units	84	14	70	100	57	28
	Apartments	0	dwelling units	0	0	0	0	0	0
	Office	168	Gross Floor Area (1,000 ft2)	240	202	38	217	55	185
	Commercial	68	Gross Floor Area (1,000 ft2)	1,200	732	468	1,365	550	650
	TOTALS			*5,387*	*4,270*	*1,117*	*5,396*	*1,337*	*4,050*
Concept C	Light Industrial	1,356	Gross Floor Area (1,000 ft2)	1,594	1,370	223	1,533	279	1,315
	Industrial	1,485	Gross Floor Area (1,000 ft2)	1,745	1,501	244	1,679	305	1,440
	Townhouse	0	dwelling units	0	0	0	0	0	0
	Stacked Townhouse	288	dwelling units	127	22	105	150	85	42
	Apartments	0	dwelling units	0	0	0	0	0	0
	Office	71	Gross Floor Area (1,000 ft2)	102	85	16	92	23	78
	Commercial	573	Gross Floor Area (1,000 ft2)	10,132	6,181	3,952	11,523	4,641	5,492
	TOTALS			*13,700*	*9,159*	*4,540*	*14,975*	*5,333*	*8,366*

A review of the tables indicated that Concept A would produce the least peak hour trips among each of the concepts with Concept B producing a moderate increase in volume in comparison with Concept A. Concept C would be expected to produce a significant number of trips in comparison to Concepts A and C. The primary reason for the comparatively high number of trips under Concept C is due to the inclusion of a large commercial land use component which was assumed to be associated with future retail development.

Based on the mode share assumptions described above, **Table 6** below provides an estimate of the trips generated per travel mode.

[Note: no reductions were made to account for future TDM initiatives which could reduce the trip generation during the peak hours. The City's TMP indicates that the City will develop a comprehensive TDM strategy in the future to indicate objectives and action items]

Table 6
Mode Share Trip Estimate
Preliminary Alternative Concepts

Preliminary Alternative Concept	Land Use Designation (New Traffic Generators)	Trips					
		AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Concept A	Automobile	2,343	1,930	412	2,271	481	1,862
	Transit	1,233	1,016	217	1,195	253	980
	Walking	411	339	72	398	84	327
	Cycling	123	102	22	120	25	98
	TOTAL	*4,110*	*3,387*	*724*	*3,984*	*844*	*3,266*
Concept B	Automobile	3,071	2,434	637	3,076	762	2,308
	Transit	1,616	1,281	335	1,619	401	1,215
	Walking	539	427	112	540	134	405
	Cycling	162	128	34	162	40	121
	TOTAL	*5,387*	*4,270*	*1,117*	*5,396*	*1,337*	*4,050*
Concept C	Automobile	7,809	5,221	2,588	8,536	3,040	4,769
	Transit	4,110	2,748	1,362	4,493	1,600	2,510
	Walking	1,370	916	454	1,498	533	837
	Cycling	411	275	136	449	160	251
	TOTAL	*13,700*	*9,159*	*4,540*	*14,975*	*5,333*	*8,366*

The full extent of the traffic generation estimates is provided in **Appendix "I"**.

6.5 Trip Distribution Assumptions and General Auto Trip Assignment

Approximation of trip distribution for each preliminary concept was based on the existing origin-destination information (See Section 4.4). The following presents an approximation of general trip assignment proportions for each concept. **Table 7** summarizes the trip distribution assumptions and **Table 8** shows the general assignment of automobile trips.

Table 7
Trip Distribution Assumptions

Direction	Assumed Proportion of Total Trips
Northwest	10%
North	60%
East / Northeast	10%
South / Southeast	5%
West / Southwest	15%
TOTAL	*100%*

Table 8
General Auto Trip Assignment

To / From	Concept A		Concept B		Concept C	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour	1,930	412	2,434	637	5,221	2,588
West (Albion Road and Bank Street)	1,062	227	1,339	350	2,871	1,423
East (Conroy Road)	869	186	1,095	287	2,349	1,165
PM Peak Hour	481	1,862	762	2,308	3,040	4,769
West (Albion Road and Bank Street)	265	1,024	419	1,270	1,672	2,623
East (Conroy Road)	216	838	343	1,039	1,368	2,146

1. Assumed half of North O-D pair would split equally between Bank Street and Conroy Road.

6.6 General Forecast (Auto Trips)

Based on the general auto trip assignment in Section 6.5, the assigned trips were superimposed with existing traffic volumes to gain insight into potential downstream transportation solutions. **Table 9** summarizes the existing traffic volumes at key locations in the study area influence and provides a general forecast of auto traffic conditions.

Table 9
General Traffic Forecast

To / From	Existing Traffic		Potential Total Traffic Volume					
			Concept A		Concept B		Concept C	
	Inbound[1]	Outbound[1]	Inbound[2, 3]	Outbound[2, 3]	Inbound[2, 3]	Outbound[2, 3]	Inbound[2, 3]	Outbound[2, 3]
AM Peak Hour								
West (Bank / Johnston Int)	274	703	805	816	943	878	1,710	1,415
East (Conroy / Johnston Int)	169	308	820	447	990	523	1,931	1,181
PM Peak Hour								
West (Bank / Johnston Int)	655	453	787	965	865	1,088	1,491	1,764
East (Conroy / Johnston Int)	457	312	619	940	714	1,091	1,483	1,921

1. Volumes extracted from Existing Traffic Volume Figure (Inbound considered toward the study area).
2. Assumed traffic to / From west would split between Albion Road and Bank Street (50% / 50%).
3. Assumed traffic to / from east would split - 75% Johnston, 25% east-west access road (north of Johnston Road)

6.7 Discussion of City of Ottawa Transportation Master Plan Inclusions

The City of Ottawa Transportation Master Plan (TMP – 2008) indicates no plans for major improvements to Conroy Road, Bank Street, or Johnston Road within the Official Plan time horizon (2031). However, it is of particular note that a staged implementation of the Alta Vista Transportation Corridor is included in plans with the link being fully completed by 2031. With regard to the study area, this will result in a shift in regional trip distribution which would likely result in increased use of Conroy Road. As such, the long term implications of placing significant traffic generators along Conroy Road should be considered a constraint in future development approvals.

6.8 Public Consultation Summary – Transportation Component

The public consultation component of this study included 4 public open houses of which 3 included transportation and process consultation components. The city project manager provided GENIVAR with the transportation related comments. The results of the comment review are summarized in

Table 10.

Table 10
Summary of Transportation Related Public Commentary

Transit
• More bus service desired
Pedestrian and Cycling:
• Pedestrian provisions desired (i.e. sidewalks, continuation of multi-use pathway network)
• Bike lanes desired (Bank Street between Johnston and Walkley)
• Desire to cross train tracks (pedestrian link)
• Albion Road connection needed (pedestrian link desired)
Traffic
• Roundabout wanted at Albion / Johnston and Tapiola / Johnston
• Albion to Walkley connection over the rail corridor?
• What is the residual traffic capacity in the area?
• Increased traffic is a concern
• Intersection traffic control at Allanford / Johnston intersections (east and west)
• Intersection traffic control at new Claridge development site
• Traffic a concern
• Traffic Control along Johnston
• Johnston / Tapiola intersection… traffic bad, roundabout suggested
• Realignment of Johnston not desired
• Safety concerns for the Johnston and Pennard intersection
Noise and Vibration
• Johnston Road should have berm run adjacent
• Noise a concern
• Traffic related noise and vibration (both vehicle traffic and rail traffic) – what will be the impact be?
Rail corridor
• CN Rail traffic (will it increase in future)?
• Dangerous goods restrictions and corresponding land use impact?
• Desire to mitigate increase in train traffic along rail corridor
• Rail corridor should be used for commuter / light rail
Other
• Specific transportation related comments to related individual concerns outside of study scope:
○ Allanford / Ballymore intersection
○ Parking for Winterwood Park should be moved
○ Additional walking / biking paths to connect across Albion / Airport Parkway

6.8.1 Discussion of Potential Transportation Effects and Requirements

The following potential impacts and required improvements are considered strong possibilities based on the above general distribution of forecast trips under the preliminary alternative concepts:

- ***Concept A*** – Minor improvements to the existing network along Johnston Road would likely be sufficient to accommodate this land use concept. This may include optimizing timing provisions at signalized intersections, auxiliary lane provisions, and implementation of improved intersection control measures in key locations such as the Albion Road / Johnston Road intersection. As a supporting feature, an east-west through access road could be considered to mitigate traffic impacts to Johnston Road. Should an access road of this nature intersect Conroy Road, a right-in-right-out configuration should be considered.

- ***Concept B*** – Similar to Concept A, minor improvements to the Johnston Road corridor would be required. With regard to the east end of the study area, improvements to the segment of Conroy Road between the CN rail corridor and Johnston Road would likely be required based on the moderate forecast traffic levels. This could be in the form of coordinated traffic signals at Johnston Road and a new access intersection north of Johnston Road. As an alternative option, a new right-in-right-out access north of Johnston Road along with improvements to auxiliary lane configuration and signal timing provisions at the Conroy Road / Johnston Road intersection could also be explored.

- ***Concept C*** – This concept presents similar potential requirements with Concepts A and B with regard to the west end of the study area. The proposed commercial land use at the east end of the study area could have a potentially significant traffic impact to the study area. Proposed improvements to accommodate the development and mitigate the potential impact could require significant investment in the improvement of the Conroy Road segment between the Rail corridor and Johnston Road. This concept would likely require a new signalized intersection north of Johnston Road and improvements to the Conroy Road / Johnston Road intersection (including auxiliary lane and signal timing improvements). In addition, options for grade separating the CN rail line over Conroy Road may need to be explored as potential traffic and queuing concerns may trigger warrants. As well, an east-west access road between Johnston Road and the CN corridor that extends from Albion Road to Conroy Road should be included in any future site plans under this zoning configuration. This would serve to allow for balancing of through traffic volumes using both the new access road and Johnston Road as it provides through traffic with alternative routes. Despite these improvements, the potential requirement of 4-laning Johnston Road exists due to the levels of anticipated traffic.

In summary, it is anticipated that all of the preliminary alternative land use concepts would require transportation improvements with Concept A having minimal requirements in comparison to other alternatives and Concept C potentially requiring significant improvements to the transportation network at the east end of the study area.

7.0 PREFERRED LAND USE CONCEPT TRANSPORTATION ASSESSMENT

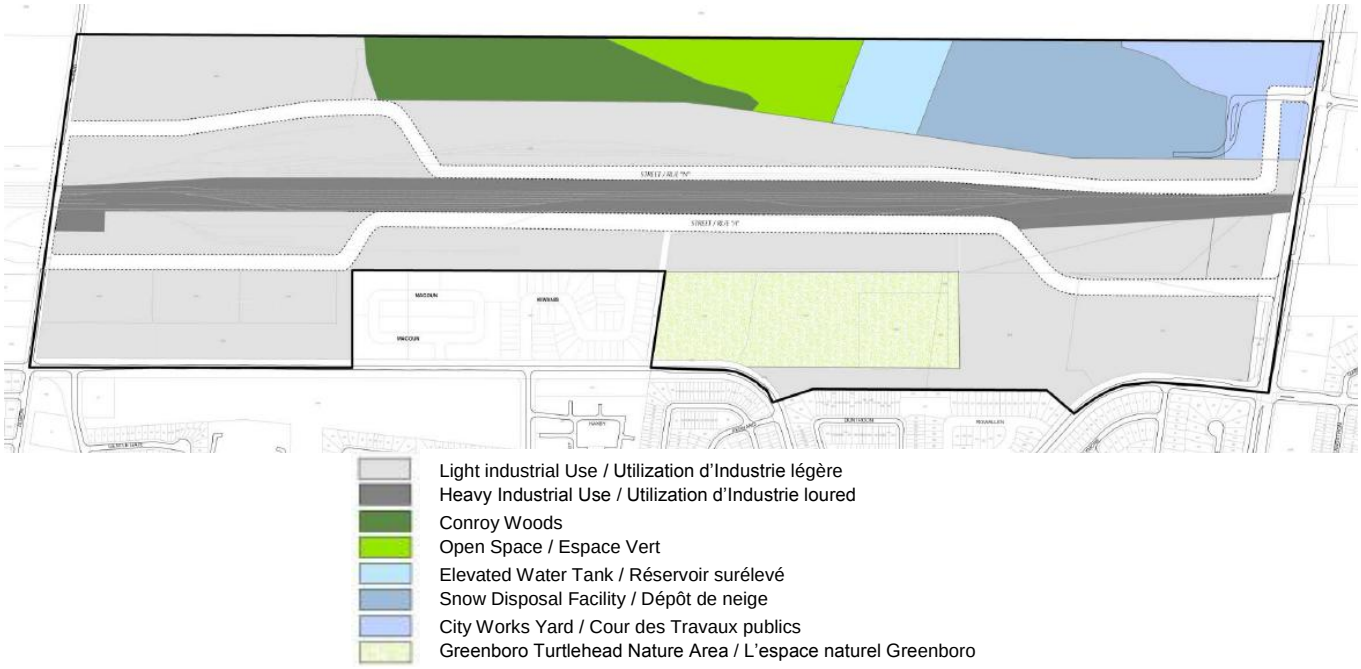
The project management team undertook a review of the concepts and produced a preferred land use concept based on high level technical input from transportation, geotechnical, servicing, and land use perspectives as well as input from the public consultation effort throughout the study. Materials provided to and activities undertaken with the City's project management team to help with their evaluation included providing information on background requirements associated with the EA process and evaluation methods. Evaluation examples of transportation environmental assessments were provided by GENIVAR to the City. In addition, a list of transportation evaluation criteria was provided to the City for evaluation purposes.

The following subsections describe the preferred concept and corresponding transportation assessment.

7.1 Preferred Land Use Concept

The preferred land use concept is illustrated in **Figure 14** below. This concept designates all vacant or unused lands in the study area as light industrial.

Figure 14
Preferred Land Use Concept



In total, there are approximately 65 ha of future light industrial use indicated in the preferred concept.

7.2 Estimated Trip Generation and Assignment

A trip generation estimate was undertaken for this concept as per the assumptions in Sections 6.2, 6.3, and 6.4. **Table 11,** summarizes the result of the trip generation estimate (See **Appendix "I"** for further details) and **Table 12** indicates the trip assignments for the preferred concept.

Table 11
Preferred Land Use Concept - Summary of Trip Generation Estimate

Preliminary Alternative Concept	Land Use Designation (New Traffic Generators)	Total Land Area (ha)	Build-Out Approximation		
			Assumptions	Resulting Build-Out	
				Quantity	Units
Preferred Concept	Light Industrial	65.10	2-storey buildings occupying 30% of the total land area[1]	4,204	Gross Floor Area (1,000 ft^2)
	Industrial	0.00	2-storey buildings occupying 30% of the total land area[1]	0	Gross Floor Area (1,000 ft^2)
	Townhouse	0.00	40 units per ha^2	0	dwelling units
	Stacked Townhouse	0.00	60 units per ha^2	0	dwelling units
	Apartments	0.00	75 units per ha^2	0	dwelling units
	Office	0.00	2-storey buildings occupying 30% of the total land area[1]	0	Gross Floor Area (1,000 ft^2)
	Commercial	0.00	1-storey buildings occupying 35% of the total land area[3]	0	Gross Floor Area (1,000 ft^2)

Table 12
Preferred Land Use Concept - Summary of Auto Trip Assignment

Preliminary Alternative Concept	Land Use Designation (New Traffic Generators)	Trips					
		AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Preferred Concept	Automobile	2,816	2,422	394	2,708	474	2,234
	Transit	1,482	1,275	207	1,425	249	1,176
	Walking	494	425	69	475	83	392
	Cycling	148	127	21	143	25	118
	TOTAL	*4,940*	*4,249*	*692*	*4,751*	*831*	*3,920*

To / From	Preferred Concept	
	Inbound	Outbound
AM Peak Hour	2,422	394
West (Albion Road and Bank Street)	1,332	217
East (Conroy Road)	1,090	177
PM Peak Hour	474	2,234
West (Albion Road and Bank Street)	261	1,229
East (Conroy Road)	213	1,005

To / From	Potential Total Traffic Volume	
	Preferred Concept	
	Inbound[2, 3]	Outbound[2, 3]
AM Peak Hour		
West (Bank / Johnston Int)	940	811
East (Conroy / Johnston Int)	986	441
PM Peak Hour		
West (Bank / Johnston Int)	785	1,067
East (Conroy / Johnston Int)	617	1,066

1. Volumes extracted from Existing Traffic Volume Figure (Inbound considered toward the study area).
2. Assumed traffic to / From west would split between Albion Road and Bank Street (50% / 50%).
3. Assumed traffic to / from east would split - 75% Johnston, 25% east-west access road (north of Johnston Road)

In summary, the preferred land use concept is anticipated to produce approximately the same number of trips as preliminary alternative Concept B with a total of 4,940 trips during the morning peak hour and 4,750 trips during the afternoon peak hour.

7.3 Comparison to Preliminary Alternatives

While trip generation levels are comparable to preliminary alternative Concepts A and B, the preferred concept offers the potential to maximize use of the existing network capacity as the residential lands south of the study area have an opposite peak-hour-peak-direction of traffic flow from the proposed light industrial land use in the proposed concept. As a result, excess capacity in the existing non-peak traffic direction will be of somewhat higher magnitude than if the proposed concept was designated with residential use.

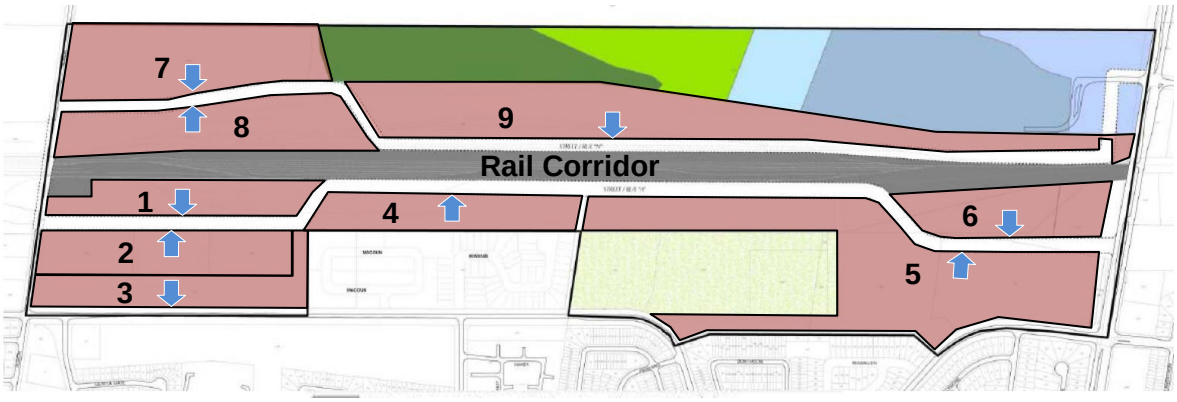
7.4 Traffic Volume Forecast

Initially, forecast traffic was assigned based on high level travel distribution assumptions outlined in **Table 12** of the Transportation Study Report which assumed that:

- Traffic to / from the west would split between Albion Road and Bank Street (50% / 50%); and
- Traffic to / from the east would split between Johnston Road and the future east-west access road north of Johnston Road (75% / 25%).

For the purposes of this detailed analysis, assignment of traffic to the adjacent network was approximated by dividing the future development area into smaller land use 'blocks'. It was assumed that general access to each land use block would be as indicated in **Figure 15** (the analysis does not require specific locations of access to be defined at this time). In summary, it was assumed that 5 of the 9 land use blocks indicated in the figure would be provided access via the future east-west collector south of the rail corridor, 1 block would be provided access directly to Johnston Road, and 3 of the 9 blocks would be provided access to a new east-west roadway north of the rail corridor. **Appendix "J"** contains the 'block' distribution assumptions and **Appendix "K"** includes all forecast worksheets.

Figure 15
Future Access Assumptions for new land use.



Note: The inclusions in this figure are assumed and may change as the site plan stage.

Based on the above, **Figure 16** presents the 2031 forecast traffic volumes (includes both site generated traffic and annual background growth traffic). Annual background growth factors were assumed as follows:

- Hunt Club Road – 2% (Cross-Town growth assumed to generate a 2% annual background growth rate)
- Bank Street – 1% (growth in south will utilize alternative corridors such as Limebank)
- Walkley Road – 1% (Mature development along this corridor, external growth assumed to utilize Hunt Club Road)
- Conroy Road – 2% (Growth south of Hunt Club Road will increase traffic along the Conroy Road corridor)
- Johnston Road – 0% (no growth expected along Johnston Road from external development)

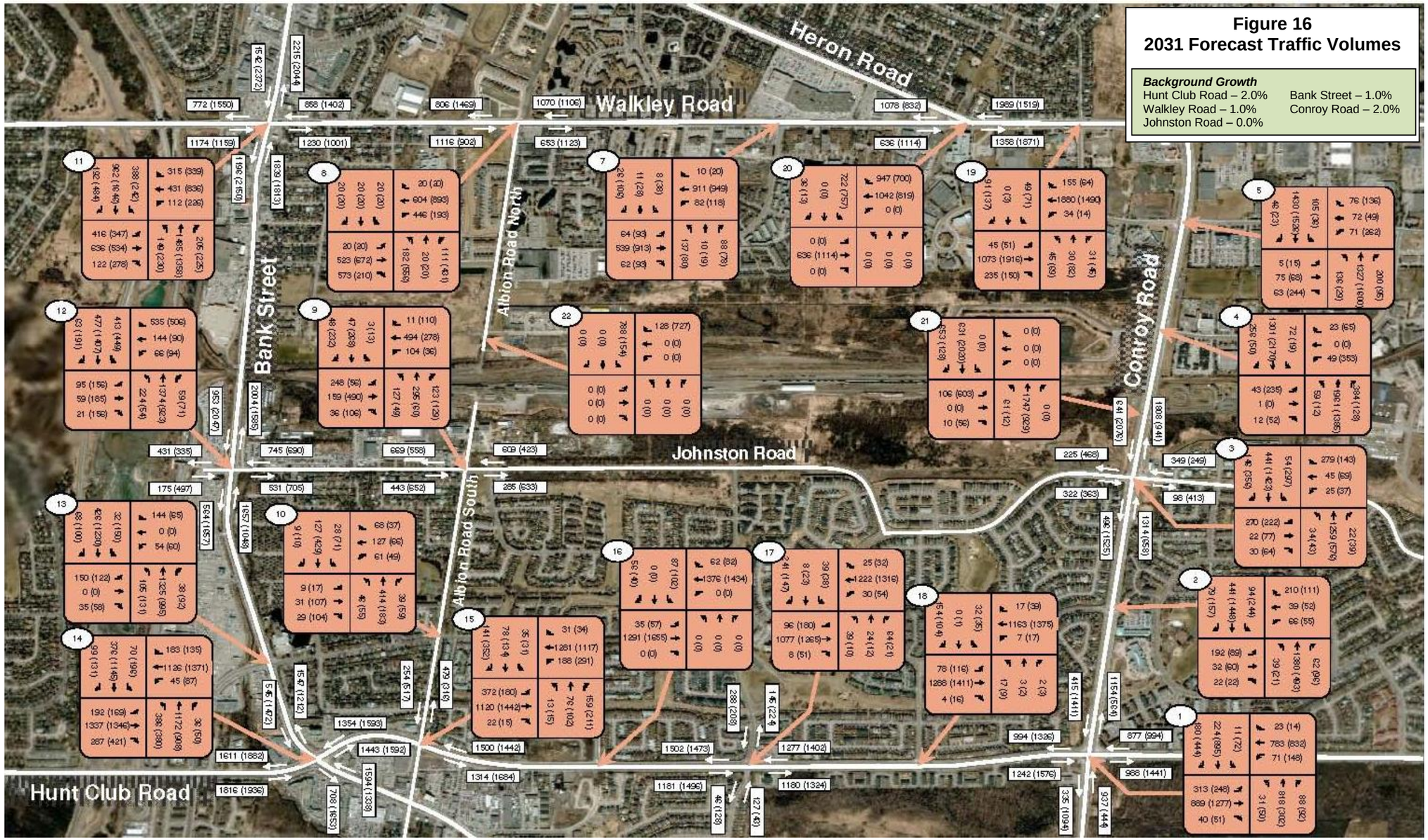


Figure 16
2031 Forecast Traffic Volumes

Background Growth
Hunt Club Road – 2.0%
Walkley Road – 1.0%
Johnston Road – 0.0%
Bank Street – 1.0%
Conroy Road – 2.0%

7.5 Forecast Analysis Results

An analysis was conducted to determine the forecast levels of service as a result of increased traffic from both the fully built Johnston Road site as well as annual background growth in traffic from future land use growth beyond the study area.

Table 13 presents the intersection capacity analysis results for forecast conditions under the existing signal timing and lane configurations.

Table 13
Intersection Capacity Analysis – 2031 Forecast
Existing Signal Timing and Lane Configurations

Intersection			Performance Characteristics									
ID No.	North-South	East-West	Overall				Critical Movement					
Signalized			V/C[1]		LOS[2]		Movement		V/C[1]		LOS[2]	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Conroy Road	Hunt Club Road	0.68	0.91	B	E	NBT	EBT/R	0.88	1.07	D	F
2	Conroy Road	Lorry Greenberg Drive	0.87	0.61	D	B	EBL	EBL	0.96	0.67	E	B
3	Conroy Road	Johnston Road	0.66	0.67	B	B	EBL	EBL	0.78	0.70	C	C
4	Conroy Road	Thurston Drive	0.77	1.03	C	F	SBL	WBL	0.83	1.13	D	F
5	Conroy Road	St. Laurent Boulevard	0.65	0.74	B	C	NBL	WBL	0.68	0.77	B	C
7	Heatherington Road	Walkley Road	0.48	0.51	A	A	NBL	WBT	0.53	0.52	A	A
8	Albion Road North	Walkley Road	0.88	0.97	D	E	WBL	NBL	0.90	0.98	E	E
11	Bank Street	Walkley Road	0.91	1.15	E	F	SBL	WBT	1.99	1.33	F	F
12	Bank Street	Johnston Road	1.38	0.89	F	D	SBL	SBL	1.55	0.94	F	E
13	Bank Street	Cahill Drive	0.55	0.55	A	A	EBL	SBT	0.63	0.57	B	A
14	Bank Street	Hunt Club Road	1.01	1.19	F	F	WBT	WBT	1.27	1.52	F	F
15	Albion Road	Hunt Club Road	1.08	1.02	F	F	EBL	SBT/R	1.18	1.06	F	F
16	Cahill Drive	Hunt Club Road	0.54	0.66	A	B	WBT	EBT	0.54	0.68	A	B
17	Lorry Greenberg Drive	Hunt Club Road	0.58	0.62	A	B	SBT/R	WBT/R	0.71	0.74	C	C
18	Pike Street	Hunt Club Road	0.53	0.68	A	B	SBL/T/R	EBL	0.54	0.73	A	C
19	Don Reid Drive	Walkley Road	0.77	0.80	C	D	WBT/R	EBT/R	0.80	0.84	D	D
20	Heron Road	Walkley Road	0.63	0.64	B	B	WBT	EBT	0.67	0.70	B	C
21	Conroy Road	E-W Collector (S of Rail Corridor)	0.69	1.06	B	F	NBT	SBT	0.89	1.06	D	F
Unsignalized			Delay (s)[3]		LOS[2]		Movement		Delay (s)[3]		LOS[2]	
9	Albion Road South	Johnston Road	157.6	203.9	F	F	WB	EB	229.4	350.6	E	F
10	Albion Road South	Cahill Drive	20.9	32.3	B	D	NB	SB	28.6	52.4	B	F

NOTE: Existing Signal Timing Systems and Lane Configurations

NOTE: Intersection 8 was assessed based on an optimized signal timing plan (existing phases) with an assumed 60 inbound and 60 outbound on the north leg.

1. Volume to Capacity Ratio (V/C) – compares intersection approach volumes with approach capacity (0.50 – at half capacity, 1.00 – at capacity).

2. Level of Service (LOS) – Intersection Performance Rating (A – excellent conditions, F – congested conditions)

3. Average delay in seconds – average delay experienced by drivers at intersection

Appendix L contains the intersection capacity analysis reports.

In summary, a number of intersections are projected to experience congestion under forecast traffic levels. This includes:

- Conroy / Hunt Club
- Conroy / Thurston
- Albion North / Walkley
- Bank / Walkley
- Bank / Johnston
- Bank / Hunt Club
- Albion South / Hunt Club
- Albion South / Johnston

7.6 Recommended Improvements based on Forecast Analysis

An iterative approach was taken to determine the appropriate modifications required to service forecast traffic levels starting with minor intersection adjustments (i.e. signal timing optimization and / or new protective signal phasing for turn movements) and moving to more significant improvements where required (i.e. auxiliary lane implementation to roadway widening to accommodate additional through lanes). This was done for both the AM and PM peak hours of forecast travel demand.

Table 14 provides an overview of the improvements required at each intersection as well as the resulting LOS. The rightmost column of the table "*Intersection Improvements Required to Accommodate Forecast Traffic (includes Annual Background Growth and Site Traffic)*", indicates what improvements from the existing configuration would be required to service the AM peak hour volumes and the PM peak hour volumes separately. As such, the more significant of the two would be the required solution.

Table 14
Intersection Capacity Analysis – 2031 Forecast
Optimized Signal Timing and Improved Lane Configurations

Intersection			Performance Characteristics										Intersection Improvements Required to Accommodate Forecast Traffic (includes Annual Background Growth and Site Traffic)	
ID No.	North-South	East-West	Overall				Critical Movement							
	Signalized		V/C[1]		LOS[2]		Movement		V/C[1]		LOS[2]		AM	PM
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM		
1	Conroy Road	Hunt Club Road	0.68	0.82	B	D	NBT	EBT/R	0.88	0.90	D	E		Lane Configuration Upgrade (add storage to EBR and WBR)
2	Conroy Road	Lorry Greenberg Drive	0.77	0.61	C	B	NBT	EBL	0.82	0.67	D	B	Optimize signal timing	
3	Conroy Road	Johnston Road	0.66	0.67	B	B	EBL	EBL	0.78	0.70	C	C		
4	Conroy Road	Thurston Drive	0.77	0.84	C	D	SBL	EBL	0.83	0.89	D	D	Optimize signal timing	Lane Configuration Upgrade (Add SBT lane)
5	Conroy Road	St. Laurent Boulevard	0.65	0.74	B	C	NBL	WBL	0.68	0.77	B	C		
7	Heatherington Road	Walkley Road	0.48	0.51	A	A	NBL	WBT	0.53	0.52	A	A		
8	Albion Road North	Walkley Road	0.88	0.72	D	C	WBL	WBL	0.90	0.86	E	D	Optimize signal timing	Lane Configuration Upgrade (3-lane NB Approach - NBL, NBT/L, and NBR)
9	Albion Road South	Johnston Road	0.81	0.75	D	C	EBL	EBT/R	0.81	0.77	D	C	Traffic signals and exclusive auxiliary lanes for each approach.	Traffic signals and exclusive auxiliary lanes for each approach.
11	Bank Street	Walkley Road	0.82	0.80	D	D	SBL & EBL	EBL	0.89	0.87	D	D	Optimize signal timing	Lane Configuration Upgrade (Widen EB, WB, and SB approaches by 1 lane for EBT, WBT, SBT. Also add double NBL)
12	Bank Street	Johnston Road	0.86	0.81	D	D	NBT & SBL	SBL	0.90	0.89	E	D	Optimize signal timing	Optimize signal timing
13	Bank Street	Cahill Drive	0.55	0.55	A	A	EBL	SBT	0.63	0.57	B	A		
14	Bank Street	Hunt Club Road	0.85	0.87	D	D	NBT	WBT	0.89	0.88	D	D	Lane Configuration Upgrade (Widen Hunt Club to 6 lanes)	Lane Configuration Upgrade (Widen both Hunt Club and Bank to 6 lanes)
15	Albion Road	Hunt Club Road	0.84	0.84	D	D	EBL	WBL	0.88	0.88	D	D	Optimize signal timing	Lane Configuration Upgrade (Add SBR auxiliary lane)
16	Cahill Drive	Hunt Club Road	0.54	0.66	A	B	WBT	EBT	0.54	0.68	A	B		
17	Lorry Greenberg Drive	Hunt Club Road	0.58	0.62	A	B	SBT/R	WBT/R	0.71	0.74	C	C		
18	Pike Street	Hunt Club Road	0.53	0.68	A	B	SBL/T/R	EBL	0.54	0.73	A	C		
19	Don Reid Drive	Walkley Road	0.77	0.80	C	D	WBT/R	EBT/R	0.80	0.84	D	D		
20	Heron Road	Walkley Road	0.63	0.64	B	B	WBT	EBT	0.67	0.70	B	C		
21	Conroy Road	E-W Collector (S of Rail Corridor)	0.69	0.86	B	D	NBT	SBT	0.89	0.89	D	D	EBL, EBR, NBL, SBR Configuration	Lane Configuration Upgrade (Conroy 3 lanes in SB direction)
	Unsignalized		Delay (s)[3]		LOS[2]		Movement		Delay (s)[3]		LOS[2]			
10	Albion Road	Cahill Drive	20.9	23.1	C	C	NB	SB	28.6	38.4	D	D		Lane Configuration Upgrade (add NBL and SBL) - monitor

NOTE: Existing Signal Timing Systems used where LOS "D" or better could be maintained

1. Volume to Capacity Ratio (V/C) – compares intersection approach volumes with approach capacity (0.50 – at half capacity, 1.00 – at capacity).

2. Level of Service (LOS) – Intersection Performance Rating (A – excellent conditions, F – congested conditions)

3. Average delay in seconds – average delay experienced by drivers at intersection

In summary, the following improvements would be required to allow the intersections to operate at satisfactory levels of service based on the land use and distribution assumptions carried in this study:

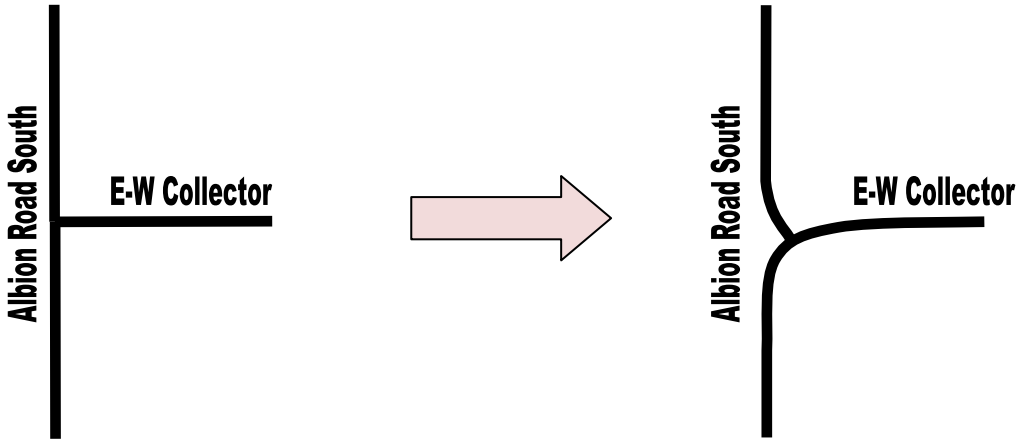
7.6.1 New transportation network items needed to service the Johnston Road site to 2031

- *New East-West Collector (south of the rail corridor)* - A future 2-lane collector road extending from Albion Road South to Conroy Road between Johnston Road and the rail corridor will be required to divert the majority of site traffic away from the Johnston Road collector and mitigate impacts to the Conroy Road / Johnston Road intersection level of service.
- *Conroy Road / New East-West Collector (south of the rail corridor) intersection* – The future New East-West Collector will intersect Conroy Road and ultimately require traffic signals and a lane configuration that includes an eastbound approach with a left turn priority lane and a right turn auxiliary lane. Along Conrory Road, the southbound approach will be required to include new southbound through and right turn lanes and a northbound left turn lane.
- *Albion Road South / New East-West Collector (south of the rail corridor) intersection* – This intersection will ultimately operate more appropriately as a "T" intersection with the southbound approach stemming from a continuous Albion Road South-East-West Collector link (see **Figure 17** below).

7.6.2 Modifications to primary intersections in the vicinity of the Johnston Road site

- *Conroy Road / Lorry Greenberg Drive* – Optimize signal timing.
- *Conroy Road / Thurston Drive* – Modify intersection approach to include a third southbound through and egress lane.

Figure 17
Albion Road South – Future reconfiguration consideration



- *Albion Road North / Walkley Road* – Modify the northbound approach to include an exclusive left turn lane, a through and left lane, and a right turn lane.
- *Albion Road South / Johnston Road* – It was determined that forecast traffic levels could be accommodated by a single lane roundabout. The City should first undertake an exercise to compare roundabout and traffic signal options. Should traffic signals be found as the preferred solution, the intersection may be required to include auxiliary left turn lanes in each direction (capacity analysis for both roundabout and signalized intersections are included in **Appendix "L"**).
- *Bank Street / Johnston Road* – Optimize signal timing.

- *Albion Road South / Cahill Drive* – This intersection may require the addition of left turn lanes in the northbound and southbound direction or the implementation of traffic signals. It is recommended that the City monitor this intersection nearing the OP horizon to determine the appropriate context of improvements (if required).

7.6.3 Key Intersection and Network Improvements for consideration beyond the site

While site generated impacts at major intersections along Bank Street, Conroy Road, Hunt Club Road, and Walkley Road are considered minimal, the annual background growth accumulation applied to through traffic has raised the following considerations:

Minor Intersection Considerations

- *Conroy Road / Hunt Club Road* – Modify intersection to include eastbound and westbound right turn storage and taper.
- *Albion Road South / Hunt Club Road* – Modify the southbound approach of the intersection to include a new southbound right turn lane.

Major Network Considerations

- *Bank Street / Walkley Road* – Modify the intersection to include 3 eastbound, westbound, and southbound through lanes (up from the current 2 through lanes). In addition, double northbound left turn lanes would be required. This intersection should be monitored over time to determine if these improvements would be required by 2031. Major implementations such as the Strandherd-Armstrong Bridge, Prince of Wales, and Riverside widenings may divert a component of existing and background growth traffic from the lands to the south to utilize other corridor alternatives and reduce the need for improvements along Bank Street.
- *Bank Street / Hunt Club Road* – Modify the intersection to include 3 through and egress lanes in each direction. [This should be considered during the EA for the widening of Hunt Club Road to 6-lanes as part of the TMP Phase 3 implementation.]

8.0 SUMMARY OF TRANSPORTATION CONSIDERATIONS AND POTENTIAL FUTURE REQUIREMENTS

Based on the assessment included in this report, the following presents an overview of the general transportation considerations that should be carried forward to the site plan stage for the Johnston Road Land Use Study lands, based on the preferred land use concept.

8.1 Roadway Network

Figure 18 below depicts a proposed high level transportation solution to accommodate the future development of the Johnston Road study area. The figure demonstrates:

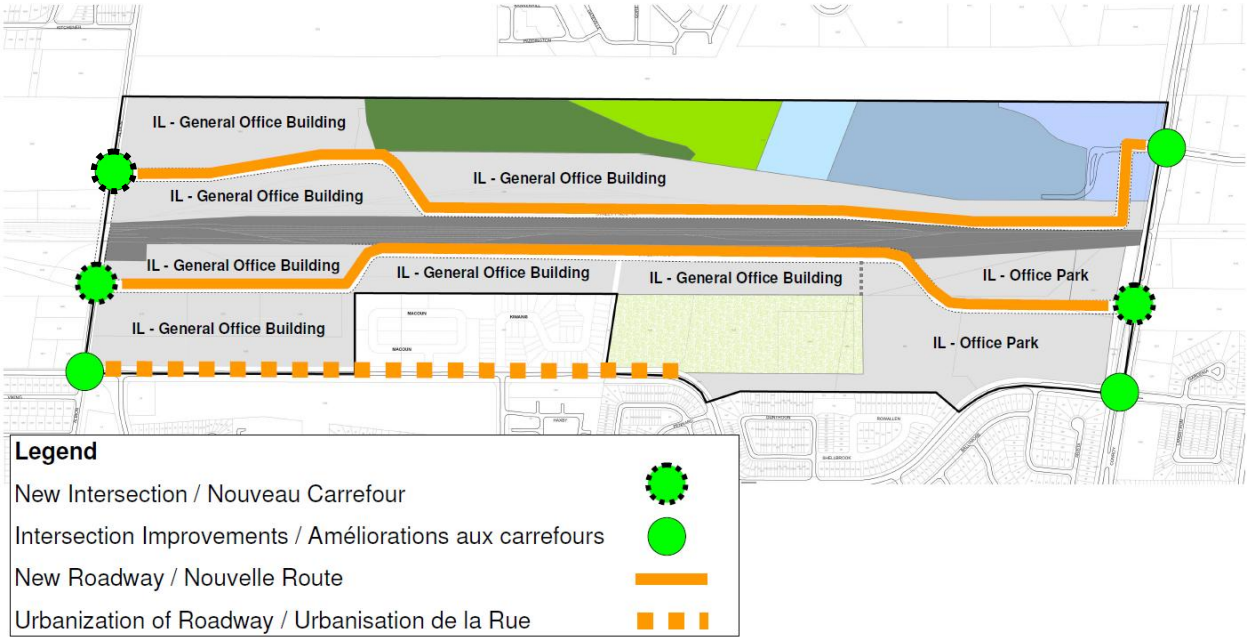
- *East-West Access Roads adjacent to the existing rail corridor* – These links will provide access to adjacent development and allow for redistribution of a component of existing through traffic bypassing Johnston Road to the south. These access roadways will need to be configured to accommodate truck traffic and access driveways. Based on the land use information provided, it is anticipated that these roadways could require a collector standard cross-section. This will be confirmed during the site plan concept stage.
- *Intersection improvements in vicinity of site* – Intersections such as Conroy / Johnston and Albion / Johnston will likely require modifications to accommodate site development. For the Conroy / Johnston intersection, improvements may include LOS improvements such as signal timing adjustments and auxiliary lane modifications / additions. The

analysis for the Albion / Johnston intersection indicated that this intersection could require signalization or the installation of a roundabout. These improvements will be specified in detail upon determination of the specific site development context.

- *Urbanization of existing Johnston Road* – This would include implementation of pedestrian and cycling provisions. This may also include upgrades to minor intersections along Johnston Road. The Albion / Johnston intersection is included as a future City improvement project to provide additional capacity. This will likely be in the form of a signalized intersection or if functional, a roundabout.

The exact context of these improvements will be determined at the site plan stage of the development process and will require the delegated authority approval from the City of Ottawa's Manager of Development Review, Suburban Services.

Figure 18
Proposed Transportation Network Solution



8.1.1 Albion-Walkley Connection

A new Albion Road corridor connection across the east-west rail corridor was discussed as part of this project in the early stages of the study process. From a localized network connectivity perspective, exploring the need and potential solutions are encouraged, however the need for this corridor from a screenline perspective is questionable. Due to the termination of Albion Road at Walkley Road, the proximity of the alignment to the Bank Street corridor, and the high potential cost associated with a grade separated Albion Road, the benefit of including such a facility was not explored further. Should the form of the rail corridor site remain as exists currently, a significant grade separated structure would be required to cross numerous spur lines.

During the course of the study, the City removed the possibility of using the rail corridor for future rapid transit from the Transportation Master Plan.

Any initiative to implement this connection would require a Schedule "C" Environmental Assessment exploring the need of such a facility, a consultation program, and determination of the functional design.

8.1.2 Single Entry Access Road Option

Based on commentary provided during the consultation stage of the study, an analysis based on a proposed network configuration, which includes a single entry access point for the east-west road south of the rail corridor was undertaken.

Table 12 indicates the potential total automobile trips forecast for the future occupied site to be 2,820 vph during the AM peak hour and 2,710 vph during the PM peak hour. Assuming approximately 70% of the study area lands will only be provided access via the east-west access road south of the rail corridor; this would mean the total traffic utilizing the access intersection along Conroy Road would be approximately 1,970 vph and 1,900 vph during the AM and PM peak hours respectively.

Based on the above, **Figure 19** indicates the estimated automobile traffic volumes from the site. An estimate of intersection movement volumes was then conducted based on both a right-in-right-out configuration and a full access intersection. The forecast represents full site build-out traffic superimposed with background traffic.

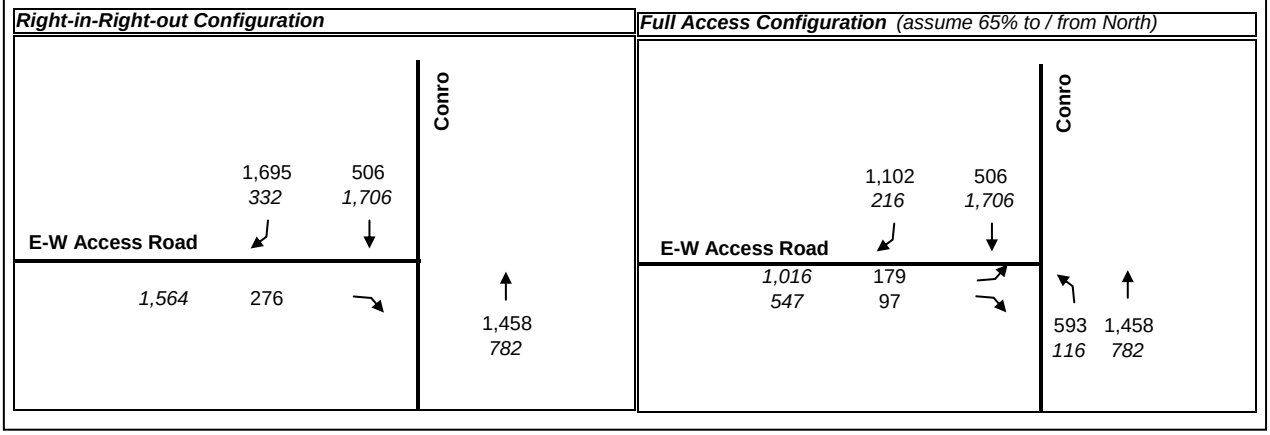
Figure 19
Single Entry East-West Access Intersection Forecast

Total Automobile Site Generated Traffic

Peak Hour	Total	in	out
AM	2,816	2,422	394
PM	*2,708*	*474*	*2,234*

70% Automobile Site Generated Traffic

Peak Hour	Total	in	out
AM	1,971	1,695	276
PM	*1,896*	*332*	*1,564*



An operational assessment using Synchro capacity analysis and Sim Traffic visualization software was then undertaken for both configurations and the following conclusions were drawn based on a review of the initial results:

- *Right-In-Right-Out Intersection* - A right-in-right-out intersection would not be appropriate to serve this access under the forecast volume conditions based on the preferred land use scenario. The magnitude of peak volumes in the peak direction would be too large to be accommodated by this configuration under the land use approximation scenario used in this study.
- *Signalized Intersection* – Analysis using a signalized configuration with double northbound left turn lanes and a protected southbound right turn was found to operate at capacity.

In summary, a single entry access point option is not considered appropriate from an intersection capacity perspective. In addition, a single entry access point is not considered appropriate from a transit and emergency network operations perspective. A single access point for a 2 km segment of roadway significantly reduces the ability of the network to accommodate flexible transit routing and efficient emergency access in comparison to allowing access to the connection through Albion Road.

It should be noted that this is a preliminary conclusion based on the land use assumptions outlined in this study and may have to be revisited at a time when more detailed information on the context of the land use is determined. While the single access option for a right-in-right-out intersection is not considered appropriate for the ultimate build-out scenario, it should be considered as an interim solution if the intersection is implemented prior to the potential grade-separation of Conroy Road over the rail corridor. The potential grade-separation would alter the geometry of Conroy Road for a significant distance on each side of the railway corridor. Altering the area to the extent that this would require will eliminate the single access point option as a possibility.

8.1.3 Potential Johnston Road Widening Requirement

Table 9 identifies the preliminary estimate of future traffic volumes along Johnston Road assuming full build-out of the study area land use concepts. The following considerations should be noted:

- Johnston Road is designated as a major collector road in the TMP. Its primary function is to 'Serve travel between collector and arterial roads';
- Sensitivities were identified during the project consultation stage which indicated the need to mitigate 'cut-through' traffic along Johnston Road; Increasing capacity along Johnston Road could increase the potential for cut-through traffic;
- Forecasts (preliminary estimate) for the Johnston Road corridor as outlined in the Transportation Study Report indicate volumes slightly beyond a 2-lane capacity;
- There are currently no proposed site plans prepared for the study area lands; and
- The City has included a 26m ROW protection for this segment of roadway in the OP, per OPA 76. This will likely be sufficient in the future.

It is recommended that the traffic volume in the region be monitored as site plans and development details are submitted and finalized.

8.2 Transit

The proximity of the study area to the Southeast Transitway provides the potential for bus routes to travel through the future developments. Any possible transit considerations (ie: stops, service hours, elements included in the Transit Oriented Development Guidelines, etc) will require consultation with OC Transpo and possible inclusion in any site plans. Depending on the ultimate development context / density, OC Transpo may wish to pursue opportunities such as transit priority measures to ensure appropriate service levels to this future employment area. During the draft plan stages, considerations for pedestrian connectivity within the development to transit routes should be implemented to achieve the City's target of 30% transit mode share.

8.3 Pedestrians and Cycling

The following measures are felt to be appropriate to accommodate pedestrian and cycling traffic in the study area.

- *Urbanization of Road* – An urbanized cross-section along the new local roads in the development lands would provide for the installation of sidewalks and cycling lanes (or alternatives).
- *Connections to existing pathway/sidewalks* – Consideration should be given to extending pedestrian pathways and sidewalks from the new development sites to the existing infrastructure along Johnston Road.
- *Periodic Easements with pathways connecting to a future access road* – Providing periodic north-south pathway connections to the future east-west access road north of Johnston Road would allow for pedestrian connectivity with the lands adjacent to the rail corridor.

8.4 Transportation Demand Management

The TMP has set the groundwork for moving forward with Transportation Demand Management (TDM) initiatives. This includes working with other public sector stakeholders to implement and coordinate TDM initiatives and moving forward with the development of a strategy for long term city-wide objectives.

From a site specific perspective, future site plans for the Johnston Road study area will be reviewed to ensure non-auto modes are competitive. This could include implementing cycling lanes, pathways, and sidewalks to encourage walking and cycling.

9.0 CONCLUSION

The preferred land use concept proposed can be accommodated without significant additions / modifications to the existing transportation network. The potential improvements included in Section 8.0 should be revisited at the site plan stage of the development process to ensure the appropriate solution is implemented.

The Johnston Road Land Use Study Transportation Study Report was drafted in December 2009, revised in June 2010 and completed in November 2010, meeting the relevant requirements of the City of Ottawa Transportation Impact Assessment Guidelines (October 2006) where applicable to the context sensitive planning process undertaken for this particular study. This study also satisfies Phase 1 and Phase 2 of the Municipal Class Environmental Assessment.

The analysis, findings, and recommendations in the above report have been based on a comprehensive review of the information obtained from various sources including the City of Ottawa, public consultation activities, and field review data. The analysis was completed and reviewed with the approval of an expert in the field of transportation engineering (signed professional engineering seal included below).

Feel free to contact Mr. Christopher Gordon or Mr. Mark Crockford with any inquiries.

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Mark Crockford, EIT
Junior Transportation Engineer