Appendix A

NEED AND JUSTIFICATION REPORT

Transportation

City of Ottawa

Need and Justification Report

Prepared by:

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Project Number:

60323982

Date:

July, 2015

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July 10. 2015

Angela Taylor, P. Eng.
Senior Project Engineer
City of Ottawa
110 Laurier Avenue West
Ottawa, Ontario, K1P 1J1

Dear Mrs. Taylor:

Report No: 60323982

Regarding: Need and Justification Report

Our Need and Justification Report for the East LRT Extension is provided for your review. It draws on the work completed for the OR 174-CR 17 EA Study with updates for the 2013 TMP and recent ridership modelling. This report will form the Project Need chapter of the Environmental Project Report.

We would be pleased to respond to any comments you have.

Sincerely,
AECOM Canada Ltd.

Valerie McGirr, P. Eng.
Manager, Ottawa office
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VM:vm
Encl.
cc: Parsons

Distribution List

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
0	MB	March 2015	Draft for review
1	MB/PC	June 2015	Revised draft for review

Signatures

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LIST OF ACRONYMS

CR 17	Prescott-Russell County Road 17
EA	Environmental Assessment
LRT	Light rail transit
MTO	Ministry of Transportation of Ontario
NCC	National Capital Commission
NCR	National Capital Region
OP	Official Plan
OR 174	Ottawa Road 174
pcus	passenger car units
TDM	transportation demand management
TMP	Transportation Master Plan
TOD	Transit-oriented development
v/c	volume to capacity ratio

GLOSSARY

Class Environmental Assessment – a planning process approved under the Environmental Assessment Act for a class or group of undertakings. Projects implemented under the Class EA process may be implemented without further EA approvals if they are undertaken in accordance with the approved process.

Transit Project Assessment Process (TPAP) – a planning process approved under the Environmental Assessment Act and defined in sections 6 through 17 in Ontario Regulation 231/08. It is a focused impact assessment process that includes consultation, assessment of impacts, identification of mitigations measures and documentation

Environmental Assessment (EA) – a decision-making process used to promote good environmental planning by assessing the potential effects of certain activities on the environment.

Modal Share – the ratio of the number of trips by a specific travel mode to the number of trips by all modes.

Screenline – a line that crosses all major transportation facilities in a sector. These lines are typically drawn along a feature (river or railway) that limits the number of crossing points.

Transportation Master Plan (TMP) – Municipal planning document that establishes infrastructure and program needs supporting policies for the municipal transportation system.

TRANS – Joint technical committee on transportation systems planning in the National Capital Region.

1. Introduction

1.1 Background

On 26 November 2013, Council approved the 2013 Transportation Master Plan (TMP) that identifies the Stage 2 Light Rail Transit (LRT) proposal. A significant component to this proposal is the project to extend the Confederation Line east to Orléans, known as the Confederation Line East Extension. The East LRT project limits extend from Blair Station to Trim Road. The City has initiated the Planning and Environmental Assessment (EA) study in accordance with the Province of Ontario's Transit Projects Assessment Process (O. Reg. 231/08).

This report reviews the key findings of the City's 2013 Transportation Master Plan (TMP) as it relates to the East LRT project. Under the province's Transit Project Assessment Process (TPAP), proponents of rapid transit projects can rely on previous planning work to demonstrate the need and justification for a project. In the case of the East LRT, work undertaken as part of the City's 2013 TMP update reviewed alternative rapid transit solutions and corridors to serve projected travel demand in the study area and determined that extending LRT from Blair to Trim Road within the OR 174 corridor is the preferred rapid transit solution. Within the same corridor identified as part of the TMP for LRT, the United Counties of Prescott and Russell and the City of Ottawa are undertaking a Municipal Class EA Study on a proposed widening of OR 174and County Road 17 (CR 17) from Highway 417 to Landry Road.

The East LRT (Blair to Trim) Planning and Environmental Assessment Study will focus on the implications of changing from BRT to LRT technology, developing and evaluating alternative designs for the project, including LRT alignment, station locations and configurations, and multimodal connections. The study will also assess the impact of the project on the natural, cultural and socio-economic environment. This EA Study considers work undertaken previously by the City of Ottawa, the Ministry of Transportation of Ontario (MTO) and the National Capital Commission (NCC) such as the Official Plan, the Greenbelt Master Plan Review, the Transportation Master Plan of the City of Ottawa and EA studies in and adjacent to the Study Area.

1.2 Project Study Area

The study area includes the OR 174 corridor from Blair Station to Trim Road. With the LRT and road widening sharing the same corridor, a coordinated approach to both EA studies is required to develop an optimal solution that fully utilizes the OR174 road corridor, while minimizing overall construction costs. This study area builds upon the corridor identified in the City of Ottawa 2013 Transportation Master Plan and will allow consideration of alternative road and transit alignments that will satisfy the EA as reasonable alternatives. These limits may be adjusted as necessary to comprehensively identify the influences on, and the effects of the undertaking, as alternatives are developed.

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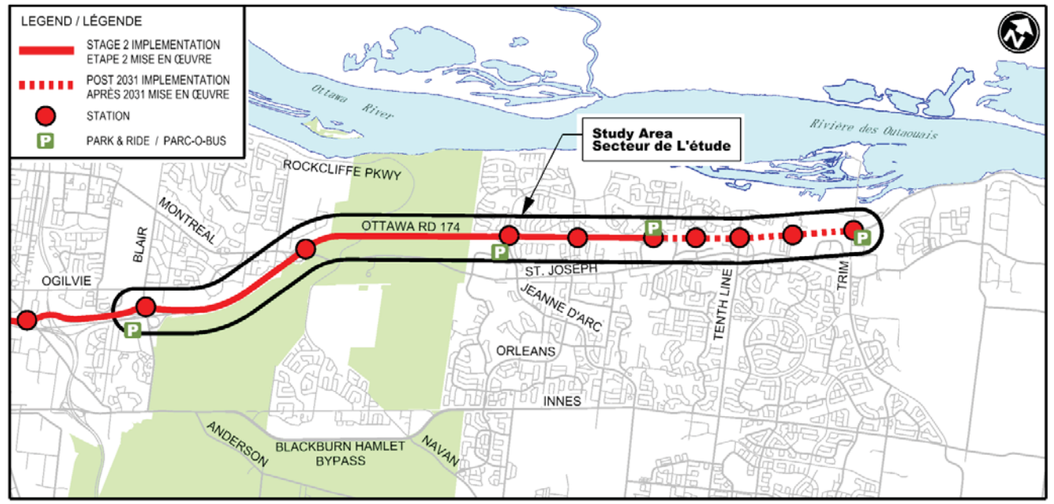
Figure 1-1: Eastern LRT Project Study Area



2. Planning Context

Recognized planning documents such as the City's Official Plan and Transportation Master Plan provide a foundation for the EA processes by defining municipal policies and describing anticipated growth areas and associated infrastructure requirements. The EA study uses this information along with more site-specific data to examine problems and opportunities as well as alternatives.

2.1 National Capital Commission (NCC)

The NCC manages federal lands in the National Capital Region including the Ottawa Greenbelt. OR 174 passes adjacent to and through the Greenbelt between Blair Road and the community of Orléans. The following work by the NCC is of interest to this EA Study.

A Strategic Transportation Initiative for Canada's Capital Region, 2005: This document describes the NCC's interest in being involved in the planning and design of transportation infrastructure, recognizing that there are federal interests in terms of planning sustainable cities and transportation networks beyond federal land and infrastructure ownership. It acknowledges the predominant role of the automobile and that this will likely continue for many years. However, it notes that issues of pollution, congestion, noise and safety mean that continued expansion of the transportation network is not feasible in the long-term. These issues have impacts on health and quality of life. The strategies described in this document, of interest to transportation infrastructure in the Greenbelt, include NCC support for:

- public transit and roadway network upgrades and rapid transit systems
- transportation management measures, including public transit and alternative modes
- designation of a core network of strategic regional and interprovincial rapid transit systems and roadways
- a sustained and integrated approach to urban transportation funding
- identification of principal routes and gateways to the Capital region and the core area

The Greenbelt Master Plan, 2013, follows from the Horizon 2067 Plan For Canada's Capital. It provides more specific policy directions to guide the National Capital Commission (NCC) in the planning, development, management, preservation and evolution of the Greenbelt. The 2013 Greenbelt Master Plan is an update to the 1996 plan, reflecting changes in urban development since the previous plan, as well as the directions for its future as expressed through recent community and stakeholder consultations. The final revised Greenbelt Master Plan was approved in November 2013 and will be reviewed every 10 years to ensure the continued protection of the Greenbelt.

Consultations on the 1996 Greenbelt Master Plan revision held in 2009 brought certain concerns to light with regards to transportation impacts on the Greenbelt. Road and infrastructure expansion were viewed as major impacts to Greenbelt lands. Should they occur, road widening is preferred to new corridors. The importance of enhancing public transit, walking and cycling access to the Greenbelt and to clearly establish the location of future LRT stations and associated parking facilities in the Greenbelt were also raised.

The Greenbelt Master Plan (2013) seeks to protect natural systems, agriculture and opportunities for outdoor recreation and education. The plan seeks to contribute to sustainability and quality of life in the Capital. The Plan notes that the facilities accommodated within the Greenbelt must operate and perform sustainably, and in harmony with natural, cultural and social features.

Within the 2013 Greenbelt Master Plan it is noted that transportation is more than just about moving people swiftly between destinations, it is also a key component of the Capital experience, providing travellers with the opportunity

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to enjoy and explore the diversity of the natural environments and settings. The Plan indicates that transportation infrastructure alignments should avoid severing the most highly vulnerable Core Natural Areas and habitats, and that land removals and disturbance of adjacent habitats should be minimized. The NCC will promote and give preference to sustainable, safe and active transportation infrastructure that is consistent with the vision, roles, goals and policies as outlined in the Plan.

Policies related to transportation further discourage the placement of park-and-ride facilities within the Greenbelt, and give priority to transport demand management measures with priority given to sustainable low-carbon and non-carbon transportation initiatives over schemes that create more capacity for vehicles.

Assessment of Cumulative Effects of Transportation Infrastructures on the National Capital Greenbelt, a joint study of the NCC and City of Ottawa, developed and implemented a cumulative effects framework and made recommendations for the study of future transportation projects. Thirty projects (transit and roads) within and/or adjacent to the Greenbelt were identified over the planning horizon to 2031. The projects were placed into two categories with Category 1 projects having the greatest potential contribution to cumulative effects, especially within Core Natural Areas and Natural Area Linkages. The study named 14 Category 1 projects and 16 Category 2 projects and provided a management plan for the treatment of each category along with suggested supporting activities to further minimize adverse cumulative effects.

At the conclusion of this study, the City and the NCC reviewed the rationale and status of each project and determined the final categories to be assigned. The widening of OR 174 through the Greenbelt is considered a Category 2 project. It requires measures that minimize, compensate or off-set contributions to cumulative effects on the Greenbelt, particularly the elimination/minimization of adverse effects in the Green's Creek Core Natural Area. The Eastern LRT was not planned at the time of the review and is therefore not included in the assessment specifically.

2.2 Province of Ontario

The **Provincial Policy Statement (PPS)**, issued under Section 3 of the Planning Act, provides policy direction on matters of public interest related to guiding growth and development in Ontario. The PPS provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural environment. The Planning Act states that planning decisions "shall be consistent with" policy statements issued under the Act. The 2014 PPS policies set out the government's land use vision for how we settle the landscape, create built environments, and manage land and resources over the long term to achieve livable and resilient communities. The 2014 PPS includes the following with particular regard to transportation systems:

- A coordinated and integrated approach to planning shall include other levels of government, agencies and boards
- Planning for infrastructure should be coordinated with land use planning so that they are financially viable over the life cycle and available to meet current and projected needs
- Efficient use shall be made of existing planning infrastructure including the use of transportation demand management where feasible
- Infrastructure should be viewed in the context of a multi-modal transportation system
- Land use patterns should give consideration to active transportation modes
- Major goods movement facilities and corridors shall be protected for the long term

When planning for corridors and rights-of-way for significant transportation and infrastructure facilities, consideration will be given to the significant resources in Section 2 of the PPS: Wise Use and Management of Resources. These

include the protection of natural heritage, water, agricultural, mineral and cultural heritage and archaeological resources for their economic, environmental and social benefits to Ontario's long-term prosperity.

New development proposed on adjacent lands to existing or planned corridors and transportation facilities should be compatible with, and supportive of, the long-term purposes of the corridor and should be designed to avoid, mitigate or minimize negative impacts on and from the corridor and transportation facilities.

Highway 417 from Highway 416 easterly to Anderson Road, Transportation Environmental Study Report, 2007: As noted earlier, the MTO undertook projects in the 1990's for improvements to OR174 and CR17 when those roadways were part of the provincial highway network. Those studies concluded that widening was needed. In 2007, a Transportation Environmental Study Report for 26 km of Highway 417 through Ottawa was provided for public review and subsequently received environmental clearance. The recommended plan included four lanes in each direction from the split westerly to Metcalfe Street and three lanes in each direction from the split easterly to the new interchange at Hunt Club Road (completed 2014). In addition, the recommended plan modified the connection between OR174, Highway 417 and St. Laurent Boulevard to improve traffic flow in this area (completed). Two westbound lanes on OR174 continue onto Highway 417 while the third lane exits to St. Laurent Boulevard and Highway 417 eastbound ramp. The weaving movement from westbound Highway 417 to St. Laurent Boulevard has been eliminated.

2.3 City of Ottawa

In July 2012, Council's approval of the Statement of Work to review and update the Transportation Master Plan, Ottawa Pedestrian Plan and Ottawa Cycling Plan included a motion directing the new Transportation Master Plan assess the feasibility and priority of a rapid transit rail solution to Orléans. Specifically, the motion directed staff to "fully assess the feasibility and relative priority of rapid transit investment in the east and develop an option to provide a rapid transit rail solution to Orléans at the earliest opportunity, respecting the affordability model established with the 2011 Long Range Financial Plan for Transit and that this work inform the 2013 Transportation Master Plan Update."

The City of Ottawa's **Official Plan (OP)**, 2013, provides the policy framework that guides its physical development to the year 2031. The OP sets direction for the **Transportation Master Plan (TMP)**, 2013, by expressing Council's strategic policies on transportation, such as transit modal split targets. The TMP enhances the OP's policy framework and describes the infrastructure and transportation networks needed. The plan for intensification and increased population densities is designed to focus on giving priority to public transit and to integrate transportation and land use.

The TMP outlines the goals to transform Ottawa's transit system. Recommended actions include expanding the rapid transit and transit priority network and integrating these facilities into the community. Actions may include encouraging quality development close to rapid transit stations; making rapid transit stations convenient, comfortable and accessible to all users including pedestrians and cyclists; and meeting or exceeding municipal, provincial, and federal guidelines and legislation for people with disabilities.

The successful implementation of an expanded rapid transit and transit priority (RTTP) network will include LRT and BRT facilities in addition to the on-road transit priority measures. The 2013 TMP notes the City's strategic approach to expanding its RTTP network in response to future transportation needs and towards the goal of achieving an ultimate RTTP network.

The TMP focuses on the need to limit growth in automobile use, the use of average peak period (rather than peak hour) demand to plan future infrastructure, the prioritization of capital projects, the use of best practices in

establishing capital project estimates, and limiting future investments to those that are reasonably affordable for the City to fund. This has resulted in less planned new roadway infrastructure compared to the previous 2008 TMP. Table 1 provides a summary of the notable changes in the planned transportation infrastructure within the study area. Included as Annex A-1 are relevant maps from the 2013 TMP.

Table 1: Summary of Changes in Planned Transportation Infrastructure

Transit/Road Infrastructure	2031 Transportation Network		
	Previous 2008 TMP	Updated 2013 TMP (Affordable)	Updated 2013 TMP (Ultimate)
East Transitway (Blair Rd to Trim Rd via OR174)	BRT interim bus shoulder lanes on OR174	LRT to Place d'Orléans	LRT extended to Trim Rd
Cumberland Transitway (Blair Station to Trim Rd)	BRT	Transit Priority Corridor (Innes Road and Blackburn Hamlet By-pass/Brian Coburn Blvd)	BRT extended to Frank Kenny
OR174	Widen to 6 lanes (Jeanne d'Arc to Split)	-	Widen to 4 lanes (City boundary to Trim) Widen to 6 lanes (Trim to Split)
Brian Coburn Blvd	New 2-lane arterial (Frank Kenny Rd to Navan Rd)	New 2-lane arterial (Mer Bleue Rd to Navan Rd)	New 2-lane arterial (Frank Kenny Rd to Navan Rd)
Navan Rd	Widen to 4 lanes (Mer Bleue Rd to Blackburn Hamlet Bypass (BHBP))	Widen to 4 lanes (Brian Coburn Blvd to BHBP)	Widen to 4 lanes (Mer Bleue Rd to BHBP)
Blackburn Hamlet Bypass	Widen to 6 lanes (Innes Rd to Navan Rd)	-	Widen to 6 lanes (Innes Rd to Navan Rd)
Old Montreal Rd	-	-	Widen to 4 lanes (Trim Rd to edge of urban boundary)
Innes-Walkley-Hunt Club Link	New 4-lane arterial (Hunt Club/417 I/C to Innes Rd)	-	New 4-lane arterial (Hunt Club/417 I/C to Innes Rd)
Trim Rd - Frank Kenny Rd	Re-align/widen to 4 lanes (Brian Coburn Blvd to N Service Rd)	(Portions of Trim widening completed)	New 4-lane arterial: Frank Kenny Rd Extension (realigned Trim Rd to south of Innes Rd)

The City of Ottawa's **Cycling Plan (OCP)**, 2013, is a long-term strategy to strengthen and support cycling within the city. It identifies a comprehensive cycling network and supportive operational activities and recommends policies to guide cycling facility planning, design, implementation and maintenance. The Plan has as a vision to develop a city-wide, connected network of cycling facilities actively used by all types and ages of cyclists to meet their transportation needs. The 2013 Plan identifies a target for city-wide cycling mode share in 2031 of 8% inside the Greenbelt and 5% city-wide.

Currently, there are no bike facilities along OR 174 within the Ottawa City limits. Several paths do, however, cross OR 174.

- In Beacon Hill, there is one City-owned pathway crossing just west of the Blair interchange (using the pedestrian bridge to Blair Transit Station), while a shared-use lane crosses at Blair and a bicycle lane crosses at the Montreal Road interchange.

- In the Greenbelt, an NCC-owned Capital Pathway crosses the OR 174 on the Sir George-Étienne Cartier (formerly Rockcliffe) Parkway overpass.
- In Orléans, a shared-use lane crosses OR 174 on Orléans Boulevard overpass, while a few City-owned pathways are located in the vicinity of OR 174 on both sides, but do not cross it.

The Ottawa **Pedestrian Plan (OPP)**, 2013, aims to make walking year-round a viable, comfortable and realistic means of travel and an integral part of the transportation system in Ottawa. To achieve its vision, it provides guidelines for targeted improvements and recognizes achievements in improving walkability since the 2009 Pedestrian Plan.

The OPP has contributed to setting targets for increased levels of pedestrian activity in 2031. The Plan includes development and definition of proposed projects to expand Ottawa's pedestrian network by completing high-priority missing links, providing pedestrian linkages in transit oriented development (TOD) areas and adding new multi-use pathways to the network.

The Plan defines the current City priorities for links to transit, schools and parks. Regardless of population or employment, ensuring good walking facilities to promote safe trips to parks and schools and to encourage the use of rapid transit is a main priority. In the determination of project priority, the city valued facilities that connect to transit or rapid transit stations, and transit intensive corridors.

The 2013 OPP includes a map that provides a measure of walkability of all areas within the city's urban boundary. Given its comprehensive scale, the Walkability Map can act as a tool for guiding the focus for improvements to the walking mode. Areas with low walkability could be used as candidates for improvements to community infrastructure or improvements to the mix of land uses.

Walkability around OR174 is higher at the eastern and western extents of the study area, with a walkability gap in the center. Between the Split and Trim Road there are no proposed sidewalks or affordable multi-use pathway structures identified within the Plan. The need to provide for pedestrian access to LRT station locations may provide an opportunity to improve walkability in parts of the study area, with key linkages identified for consideration as part of other projects.

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3. Project Purpose and Need

3.1 Transportation Master Plan

3.1.1 2031 RTTP Network Concept

The 2013 TMP identifies an expected growth rate in peak period transit trips by 2031. The 2031 RTTP Network Concept was developed to both accommodate the growing demand and provide a level of service that will attract it. While the entire network concept may not be fully implemented by 2031, it is important for the City to protect lands that would be required for this eventual implementation, such as through the transfer of transit corridor rights of way as a part of planning application approvals, or the purchase of surplus lands such as railway ROW and utility corridors as they become available.

The ELRT (from Blair Station to Trim Road) is identified as part of the 2031 Rapid Transit Network in the City's TMP (Annex A-1, Map 1), and as such is considered a transit project in accordance with Ontario Regulation 231/08 Transit Projects and Metrolinx Undertakings.

3.1.2 Affordable RTTP Network

The 2013 TMP recommends the implementation of a subset of the 2031 RTTP Network Concept, called the Affordable RTTP Network (Annex A-1, Map 2) that will provide as many of the identified benefits as possible within the City's projected funding envelope. These projects were strategically selected to maximize gains in transit ridership within available funds.

The Affordable RTTP network includes both LRT and BRT projects. Instead of phasing these extensions over time to 2031, a single project, called Stage 2, is proposed. Stage 2 will extend LRT to the west (from Tunney's Pasture to Baseline and Bayshore Stations), to the east (from Blair Station to Place d'Orléans Station), and to the south (from Bayview Station to Bowesville Station) by 2023, well in advance of the previous schedule proposed in the 2008 TMP.

Within our study area, the extension of the Confederation Line LRT (currently under construction) from its eastern terminus at Blair Station to Place d'Orléans Station has been identified in the 2031 Affordable RTTP Network.

The extended LRT will provide fast, reliable and high capacity transit service between Place d'Orléans and downtown Ottawa and will reduce bus vehicle hours (and thus operational costs). The RTTP Network Concept plans for the extension of LRT further east to Trim Road. The estimated costs to implement the LRT facility, according to the TMP, is $500 million from Blair to Place d'Orléans. The cost estimate to extend the ELRT from Place d'Orléans to Trim Road is $305 million, and is not included in the Stage 2 Affordable RTTP Network.

The eastern extension of LRT to Orléans is based on several factors:

- Currently, the Orléans community exhibits high transit use during weekday peak periods, with 25% of all motorized trips in the morning peak period being made by transit. This figure increases to 62% for trips to downtown.
- Given the constraints in road capacity, rapid transit is essential for meeting future travel demand.
- While, from a business case perspective, LRT has a higher initial capital cost than BRT, it offers a greater potential for operating and maintenance savings over the longer term. Savings accrue from longer infrastructure lifespans, longer vehicle replacement cycles and reduced throw-away costs when corridors are converted from BRT to LRT. Added benefit is provided by lower operating costs per passenger-km, and the

ability to repurpose existing bus hours spend on the highway to providing more service within local communities in Orléans. LRT also has the advantage of buffering the City from potential fluctuations in diesel fuel costs.

In accordance with the goal to protect lands that would be required for this eventual implementation of the 2031 RTTP Network Concept, the ELRT EA will plan for the entire ELRT Corridor from Blair Station to Trim Road.

3.1.3 Road Network

The TMP points to the need to build new roads or widen existing ones to avoid unacceptable levels of congestion. For OR 174 specifically, the Network Concept Plan identifies the following road network projects that are required to address local capacity, operational and safety issues:

- Widen OR174 from four to six lanes between Highway 417 and Trim Road; and
- Widen OR174 from two to four lanes between Trim Road and the City boundary.

These facilities are not included in the affordable network plan, however coordination between the ELRT EA and the ongoing OR174/CR17 widening EA is required to identify and assess a functional design that can accommodate both facilities.

3.2 Existing Transportation Issues

3.2.1 Transit Issues

The urban areas east of Blair Station, primarily Orléans, are served by a number of Transitway express and local routes, which provide a combination of all-day and peak period services focussed on the downtown and connections within the local community. The routes provide frequent peak period service routed primarily to the major bus terminal at Place d'Orléans and along the highway shoulder lanes. These shoulder lanes move buses efficiently to the current eastern terminus of the Transitway at Blair Station where they then travel on the bus-only facility into the downtown core.

Service is provided by:

- Transitway Route 95 – provides frequent all-day service along OR174 and the Transitway through downtown allowing local route connections at major stations
- Transitway Route 94 – provides frequent all-day service along Blair and Innes Road (similar to the future Cumberland Transitway route) through downtown allowing local route connections at major stations and stops
- Express Routes – a series of routes provide peak period service on a limited stop basis allowing residents a more direct route to and from downtown and the Transitway station east of downtown
- Local Routes – a series of routes provides all-day service connecting points within Orléans allowing for more local trip making and augmenting other services. Convenient connections to Transitway routes are made primarily at Place d'Orléans station.
- Limited Service Routes – several low frequency routes provide additional service for special trip connections or events. These routes augment the other routes in the area.
- Clarence-Rockland Transit (CRT) – limited regional transit service within the corridor, primarily focused on weekday peak period trips between Clarence-Rockland and downtown Ottawa.

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While these routes provide good coverage and a mix of services matching current needs there are some issues with service frequency and reliability, including the impact of pinch points along OR 174 at several locations (e.g. on/off-ramps) where buses must interact with general purpose traffic. Unplanned incidents (e.g. traffic collisions) on the roadway can impact transit service, reducing the advantage that dedicated lanes provide in terms of travel speed and reliability.

Transit operating costs are increasing as additional buses and drivers are required to support ridership. Work undertaken as part of the 2013 TMP Update has estimated substantial operational cost savings through extension of LRT. A substantial number of bus-kilometres are expended outside Orléans, either on the highway or the Transitway. Conversion of the shoulder bus lanes from Blair to Place d'Orléans, and eventually Trim, to LRT will reduce the number of bus-kilometres operated and provide a higher quality service.

While the current express bus system provides a good quality "one-seat ride" to/from downtown that has greatly contributed to the existing high peak period transit modal share to/from Orléans, the resultant transit network is heavily focused on peak period, peak direction service. This network does not sufficiently support counter-peak/off-peak travel needs. The objective of the City of Ottawa is to transform its rapid transit network to *make rapid transit stations convenient, comfortable and accessible to all users including pedestrians and cyclists* (TMP Action 4-4). For those accessing current Transitway routes at stops along the OR 174, facilities are basic and do not provide for an attractive experience for people who choose to take transit.

The implementation of the first phase of LRT, between Blair and Tunney's Pasture will require that the existing bus service from Orléans be modified to terminate at Blair Station. This will be a major change for people travelling to and from Orléans. Passengers will be required to transfer at Blair Station from bus to LRT for westbound trips and from the LRT to buses for the eastbound trip. While adequate space has been provided at Blair Station to facilitate these transfers, as ridership grows and additional services are added, the operation at Blair Station will become more congested and less reliable. Extending the LRT line will alleviate this issue while providing other benefits.

3.2.2 Traffic Issues

Previous work undertaken as part of the *OR 174/CR 17 EA Study* has indicated a significant issue with roadway congestion through the study area, particularly in the section through which the ELRT would operate. Furthermore, the findings from previous in-service road safety review studies (ISRSRs) have identified opportunities for safety improvements within the corridor.

With regards to **safety** of the urban freeway section of the OR174 Corridor (west of Trim), the most recent ISRSR, 2009, considered conditions between the Split and Trim Road. The following observations were noted:

- merge and diverge locations associated with interchange ramps identified as areas with more collisions
- some cross-median collisions occurred
- there were more fatal collisions than expected at the Montreal Road and Jeanne d'Arc interchanges
- injury collisions were over-represented at the Blair Road interchange
- Blair Road interchange was identified as the area with the greatest potential for safety improvement
- property damage only (PDO) collisions were over-represented at the Trim Road intersection

The identified contributors to the collision history included:

- speed (implications for clear zone)
- roadside characteristics (slopes, presence of fixed objects, condition of the barrier)
- transit accommodation (speed differential with adjacent vehicles, complexity of interchange operations, signage and pavement markings, locations of bus stops)

- interchange configuration (length of speed change lanes, merging operations, pedestrian crossings of ramp terminals, sight line obstructions)
- positive guidance (design and condition of signage including font size and location, lack of illumination)

A more recent assessment of the collision history within the freeway section of the Corridor, also included as part of the OR 174 *EA Study*, revealed that there were 830 collisions on the urban freeway section of OR 174 (west of Trim) within the three year period prior to 2012, and of these, 586 collisions were on the freeway, 54 were along ramps and 190 were at ramp terminal intersections.

The review of traffic volumes and travel times indicated that there is a problem with traffic **congestion** through many parts of the study area. Congestion is noted to occur in both the AM and PM peak hours within the OR 174 corridor, with major hotspots located between Place d'Orléans and Jeanne d'Arc Boulevard, and between Blair Road and Montreal Road. As part of the *OR 174/CR 17 EA Study*, traffic data were obtained and used to calculate volume to capacity (v/c) ratios for OR174 Corridor, as well as a number of competing routes such as Montreal Road-St. Joseph Boulevard, Innes Road, Sir George-Étienne Cartier (Rockcliffe) Parkway. The major findings for the OR 174 corridor and two competing corridors are summarized below. Note that although the TMP no longer makes specific reference to a target volume-to-capacity ratio (as an indicator of a road's ability to accommodate the traffic demand), a v/c ratio in excess of 0.90 indicates unstable flow, and a v/c ratio exceeding 1.0 indicates excessive delay and queuing. Historically, the City of Ottawa has strived to achieve a v/c ratio of less than 0.90, which is equivalent to a Level of Service of 'D', as a measure of desired screenline performance for planning purposes.

Ottawa Road 174
West of Trim Road and east of Blair Road, OR 174 has two lanes for vehicles in each direction. In addition buses operate on a widened shoulder, allowing them to by-pass much of the congestion in the peak periods, thereby increasing the average speed of transit trips to make them more competitive with automobile travel times.

Generally, the AM and PM traffic was found to be stable between Trim Road and the Jeanne d'Arc Boulevard interchange with v/c ratios less than 0.70 due to the metering effect of traffic signal control at Trim Road. Between Jeanne d'Arc Boulevard and Montreal Road, OR 174 is currently congested in both the AM and PM peak period with v/c ratios greater than 0.90 and 1.00 respectively.

Between the Highway 417 Split and Blair Road, traffic on OR174 was found to be generally congested. The AM inbound (downtown-bound) v/c ratio is currently approaching 0.90, with travel speeds less than 30km/h. Inbound traffic benefits from the lane increase from two to three lanes west of Blair Road; however only two lanes continue to Highway 417. The PM outbound (Orléans-bound) v/c ratio is greater than 0.90, and speeds were between 30km/h and 80km/h. Outbound traffic has a lane reduction from three to two lanes east of Blair Road, further contributing to congestion on OR 174.

Montreal Road/St. Joseph Boulevard/Old Montreal Road
This corridor was included in the analysis as it is a viable alternative to the OR174 for some trips from Orléans to the east end of Ottawa inside the Greenbelt. Within the Study Area, this east-west route has three names, namely Montreal Road west of OR174; St. Joseph Boulevard east of OR174 and west of Trim Road; and Old Montreal Road east of Trim Road.

Old Montreal Road was found to have stable, free flowing traffic in the AM and PM peak periods with v/c ratios less than 0.70. St. Joseph Boulevard was also found to exhibit good traffic flow between Trim Road and Jeanne d'Arc Boulevard. However, west of Jeanne d'Arc Boulevard, traffic on St. Joseph Boulevard was heavily congested with an AM v/c ratio greater than 1.00 and a PM v/c ratio greater than 0.90. It is through this section of roadway that the posted speed limit changes from 60km/h to 70km/h. In our study area, Montreal Road had stable traffic flows

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characterized by low speeds. The v/c ratio is less than 0.70 and speeds were good when not interrupted by traffic signals.

Innes Road
This corridor was also included in the analysis as it is another viable alternative to the OR174 for some trips to/from Orléans, and it provides direct connectivity to Highway 417.

The traffic on Innes Road east of Tenth Line Road flows freely in both the AM and PM peak periods with a v/c ratio less than 0.70. In the AM peak period, inbound traffic is considered unstable from Orléans Boulevard to Highway 417. Along this 7 kilometre segment of road, the v/c ratio is greater than 0.90 with speeds less than 30km/h. AM inbound travel times along Innes Road from Trim Road to Highway 417 are generally higher than travel times along St. Joseph Boulevard. In the PM peak period, outbound traffic is unstable from Anderson Road to Tenth Line Road. Along this 9 kilometre segment of Innes Road, the v/c ratio is greater than 0.90 with speeds less than 55km/h.

In summary, the existing traffic conditions indicate that there is a problem with traffic congestion through many parts of the study area. As the City's TMP encourages the use of public transit and has set an aggressive transit modal share target, it is clear that new transit infrastructure will be required to help address the prevailing traffic congestion on area roadways.

3.3 Future Travel Demand

TRANS is the joint technical committee on transportation systems planning in the National Capital Region. The TRANS travel demand forecasting model is used to predict travel patterns in the future, including transit ridership/ modal shares and auto demands. The model is maintained, enhanced and updated by TRANS based on the most recent data available for use in strategic transportation planning studies. It is used as the basis for many of the transit and road infrastructure projects identified in the TMP.

3.3.1 Transit Demand

Based on analysis of September, 2012 data provided by OC Transpo, transit ridership is approximately 12,000 persons per direction per day, with about 4,000 persons travelling in the peak direction (inbound to downtown) during the weekday morning peak hour. West of Trim Road, ridership is 1,500 persons per direction per day (with 575 persons travelling in the peak direction during the weekday morning peak hour.

Future transit demand is based on assigning transit trips to a future network of LRT and bus routes. As part of the 2008 TMP a long term (post-2031) rapid transit network was developed. The 2013 TMP update modified the timing of implementation of the network, but did not significantly alter the complete long term network. The major change in the 2013 TMP update was the adoption of an affordability lens to identify an affordable network. A central element of the 2031 Affordable Network is the extension of LRT east of Blair to Place d'Orléans, replacing the shoulder lane bus operation that currently provides transit priority for bus trips to and from Orléans. The analysis used in the 2013 TMP had a local bus network focussed on Place d'Orléans, resulting in high ridership volumes west of Place d'Orléans and substantially lower volumes to the east.

The 2013 TMP network analysis indicates that ridership on an enhanced BRT or LRT (which are functionally similar in terms of priority, average operating speed and capacity) in the OR 174 corridor will result in a peak transit demand of approximately 6,200 people per hour in the peak direction (west of Place D'Orléans). This level of ridership roughly matches the capacity of a 2-car Confederation Line train running every 6 minutes (10 trains/hour), although more frequent service will likely be needed to balance loading further west along the line. Additional work is required to determine expected ridership (boardings and alightings) by station, including anticipated transfer volumes.

3.3.2 Auto Demand

Transportation planners examine transportation need using forecasted trips across a "screenline", which is an imaginary or real boundary used to evaluate travel demand and supply issues. Typically physical barriers (rail lines/ rivers/greenbelts) are used since they tend to limit the number of crossing opportunities. For this particular EA, the relevant screenlines are Greens Creek, Bilberry Creek, and Frank Kenny. While the Frank Kenny Screenline is located east of the study area, it is considered useful for assessing the percentage of demand that is arriving from areas outside the City and therefore more challenging to shift to public transit.

TRANS model traffic projections for autos, representing conditions in the AM peak period at the three subject screenlines, were provided by the City of Ottawa and are summarized in Table 2. Note that the volumes represent the average hourly auto demand during the 2.5 hour peak period, and therefore should be considered slightly lower volumes than would be experienced during the peak hour. The distinction between peak hour and average hourly volume during the peak period was introduced as part the 2013 TMP, with the implication of this change being that the design hour volumes for the majority of the city roads will be lower than in previous TMPs, resulting in less pressure to increase roadway capacity where vehicle volumes peak for a shorter length of time.

Table 1 TRANS Projections – AM Peak Hour (average peak period demand)

2011 TRANS Model Projections			
	Greens Creek Screenline #16	**Bilberry Creek** Screenline #45	**Frank Kenny** Screenline #46
Volume	9,512	6,179	2,224
Capacity	8,800	8,000	7,800
V/C ratio	1.08	0.77	0.29
Notes: Existing conditions			
2031 TRANS Model Projections [Baseline Scenario]			
	Greens Creek Screenline #16	**Bilberry Creek** Screenline #45	**Frank Kenny** Screenline #46
Volume	10,739	7,871	3,678
Capacity	8,800	8,400	10,200
V/C ratio	1.22	0.94	0.36
Notes: Baseline Scenario assumes completion of a number of committed projects including Confederation Line LRT, Highway 417 widening, Trim Road widening and St. Joseph Boulevard widening.			
2031 TRANS Model Projections [Preferred Scenario]			
	Greens Creek Screenline #16	**Bilberry Creek** Screenline #45	**Frank Kenny** Screenline #46
Volume	10,897	7,681	3,880
Capacity	10,600	11,600	9,800
V/C ratio	1.03	0.66	0.40
Notes: Preferred Scenario assumes completion of those projects identified in the TMP as the Network Concept including the extension of LRT to Place d'Orléans, widening of the OR174 Corridor between the Split and Clarence-Rockland.			

Source: Road Network Development Report, City of Ottawa (September 2013)

In reviewing the foregoing model projections, there is a notable increase in auto travel demand across each of the three screenlines from year 2011 to 2031. There are no, or only minor, increases in road capacity crossing Greens Creek and Bilberry Creek as part of the Baseline Scenario (i.e., only currently committed road and transit projects) compared to existing. Note that both of these screenlines are projected to be operating at the v/c ratio exceeding

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0.90 at 2031 for this scenario, indicating a clear need for either reduced auto travel demand or additional roadway capacity. The extension of the LRT east of Blair Road combined with the widening of the OR 174, both of which are associated with the Preferred Scenario, result in lower v/c ratios across both the Greens Creek and Bilberry Creek screenlines, with the performance at Greens Creek still slightly over 1.0.

4. Other Considerations

4.1 Societal Benefits

Transportation is recognized as a critical element of the economy of an area. Business and institutions consider the transportation network when they locate and when they expand. The provision of a safe and reliable road system is important for the transportation of goods and for the quality of life for employees.

A congested road system generates lost time for travellers. This project provides an opportunity to improve the flow of traffic and thereby reduce lost time for individuals. Congestion also has a negative effect on pollution as internal combustion engines emit greenhouse gases. By reducing the idling time related to congestion on the roads in the study area, the greenhouse gas emissions can also be reduced.

The project is expected to highlight the importance of enhancing the transit service connections to/from the adjacent communities located along the corridor, as well as the communities located to the east. This could be in terms of expanded park and ride lots and/or provision of supporting HOV facilities.

Active transportation infrastructure enhancements could be included as part of this project. There is an opportunity to construct additional pedestrian and cycling facilities along the ELRT and to provide connections between local communities.

4.2 Economic Benefits

There are a number of major land parcels in Orléans that are ready for development or intensified development that would benefit from a direct connection to the Confederation Line. Extending LRT eastward from Blair would serve to capitalize on current City investments in the Confederation Line. Development opportunities adjacent to or integrated with new LRT stations would benefit/be attractive.

4.3 Downstream Capacity

On Highway 417, the ultimate configuration is to be four lanes in each direction west of the Split with two lanes entering Highway 417 from OR 174. The third lane on OR 174 exits to St. Laurent Boulevard and Highway 417 eastbound. Similarly, the MTO plan calls for two lanes of traffic to exit from Highway 417 eastbound to OR 174. On Innes Road, no further widening beyond three lanes in each direction is planned and congestion is already present in the section east of Highway 417. Widening of the Blackburn Hamlet Bypass and construction of the Cumberland Transitway are planned as part of the ultimate transportation network across the Greenbelt, but they are not part of the affordable plan. Future planning for the transportation network for the east side of Ottawa will need to be cognizant of these downstream constraints.

5. Summary of Findings

This Need and Justification Report has examined traffic volumes and transit projections to identify problems and opportunities to be considered in the ELRT TPAP EA Study. This report found that there is a need for additional transit and roadway infrastructure in the study area based on the results of the screenline performance. The analyses focused on the morning inbound (westbound) direction because trips in the morning peak tend to be more concentrated and predictable than in the afternoon peak.

Based on the analysis provided in the 2013 TMP, there is a demonstrated need for rapid transit in the study area. While existing dedicated bus lanes can accommodate expected demand at the 2031, increasing congestion on the adjacent roadway will impact transit travel time and reliability through increased friction and conflicts at interchanges and more frequent incidents, which may block the shoulder bus lane.

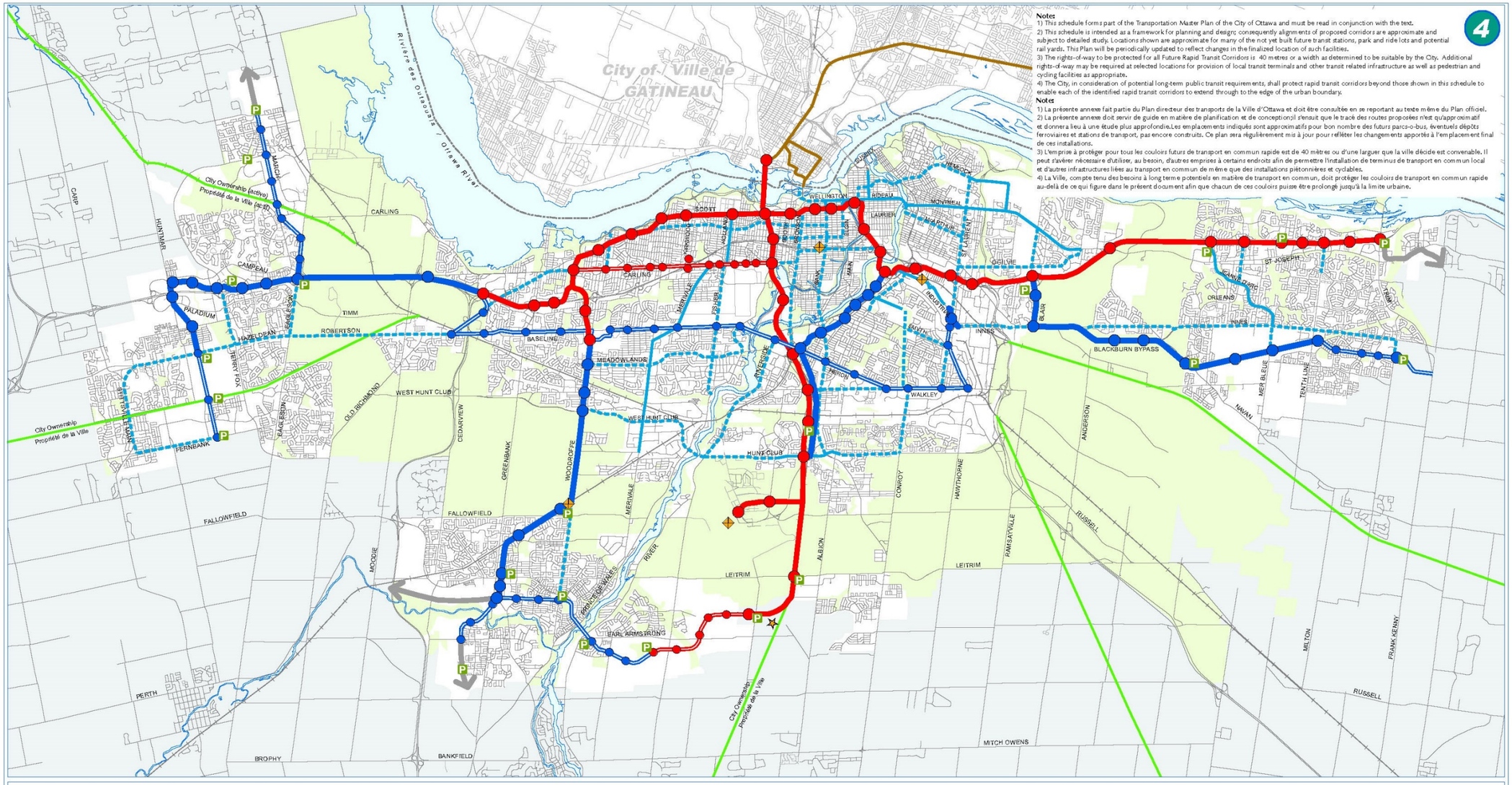
It is recognized that additional travel demand analyses, using the TRANS model, will likely be required as part of subsequent work to better understand the implications of various design refinements of both the subject *ELRT EA* and *OR 174/CR 17 EA,* including, for example, the ridership/modal share impact of the proposed road widening, extending LRT 3km easterly from Place d'Orléans to Trim Road, providing expanded park and ride lots, and introducing HOV facilities within (and approaching) the OR 174 corridor.

Annex A-1

SECONDARY PLAN MAPS

MAP 1 – City of Ottawa Transportation Master Plan (2013) – 2031 Network Concept

MAP 2 – City of Ottawa Transportation Master Plan (2013) – 2031 Affordable Network Concept



Note:
1) This schedule forms part of the Transportation Master Plan of the City of Ottawa and must be read in conjunction with the text.
2) This schedule is intended as a framework for planning and design; consequently alignments of proposed corridors are approximate and subject to detailed study. Locations shown are approximate for many of the not yet built future transit stations, park and ride lots and potential rail yards. This Plan will be periodically updated to reflect changes in the finalized location of such facilities.
3) The rights-of-way to be protected for all Future Rapid Transit Corridors is 40 metres or a width as determined to be suitable by the City. Additional rights-of-way may be required at selected locations for provision of local transit terminals and other transit related infrastructure as well as pedestrian and cycling facilities as appropriate.
4) The City, in consideration of potential long-term public transit requirements, shall protect rapid transit corridors beyond those shown in this schedule to enable each of the identified rapid transit corridors to extend through to the edge of the urban boundary.

Note:
1) La présente annexe fait partie du Plan directeur des transports de la Ville d'Ottawa et doit être consultée en se reportant au texte même du Plan officiel.
2) La présente annexe doit servir de guide en matière de planification et de conception;il s'ensuit que le tracé des routes proposées n'est qu'approximatif et donnera lieu à une étude plus approfondie.Les emplacements indiqués sont approximatifs pour bon nombre des futurs parcs-o-bus, éventuels dépôts ferroviaires et stations de transport, pas encore construits. Ce plan sera régulièrement mis à jour pour refléter les changements apportés à l'emplacement final de ces installations.
3) L'emprise à protéger pour tous les couloirs futurs de transport en commun rapide est de 40 mètres ou d'une largeur que la ville décide est convenable. Il peut s'avérer nécessaire d'utiliser, au besoin, d'autres emprises à certains endroits afin de permettre l'installation de terminus de transport en commun local et d'autres infrastructures liées au transport en commun de même que des installations piétonnières et cyclables.
4) La Ville, compte tenu des besoins à long terme potentiels en matière de transport en commun, doit protéger les couloirs de transport en commun rapide au-delà de ce qui figure dans le présent document afin que chacun de ces couloirs puisse être prolongé jusqu'à la limite urbaine.

RAPID TRANSIT
Light Rail Transit (LRT) - Grade Separated Crossings
Light Rail Transit (LRT) - At-Grade Crossings
Bus Rapid Transit (BRT) - Grade Separated Crossings
Bus Rapid Transit (BRT) - At-Grade Crossings

TRANSIT PRIORITY
Transit Priority Corridor (Continuous Lanes)
Transit Priority Corridor (Isolated Measures)

TRANSPORT EN COMMUN RAPIDE
Transport en commun par train léger (TCTL) - passages étagés
Transport en commun par train léger (TCTL) - passages à niveau
Transport en commun rapide par autobus (TCRA) - passages étagés
Transport en commun rapide par autobus (TCRA) - passages à niveau

PRIORITÉ AU TRANSPORT EN COMMUN
Corridor donnant priorité au transport en commun (voies continues)
Corridor donnant priorité au transport en commun (mesures isolées)

Park and Ride — Parc-O-Bus
Transit Station - rail — Station du transport - train
Transit Station - bus — Station du transport - autobus
Conceptual Future Transit Corridor — Avenir conceptuel - Couloir de transport en commun
Abandoned Railway Corridor — Emprises ferrouiaires abandonnées
Inter-regional Stations — Stations interrégionales
Potential Rail Yard — Cour de tirage possible pour trains
Gatineau Rapibus — Rapibus de Gatineau

1 0.5 0 1 2 3 km

Prepared by: Planning and Growth Management Department, Mapping & Graphics Unit, 2013
Préparé par: Service de l'urbanisme et de la gestion de la croissance, Unité de la cartographie et des graphiques, 2013

TRANSPORTATION MASTER PLAN - Map 4
RAPID TRANSIT AND TRANSIT PRIORITY NETWORK - 2031 NETWORK CONCEPT

PLAN DIRECTEUR DES TRANSPORTS - Carte 4
RÉSEAU DE TRANSPORT EN COMMUN RAPIDE ET DE TRANSPORT EN COMMUN PRIORITAIRE – CONCEPT DU RÉSEAU 2031

5

Note:
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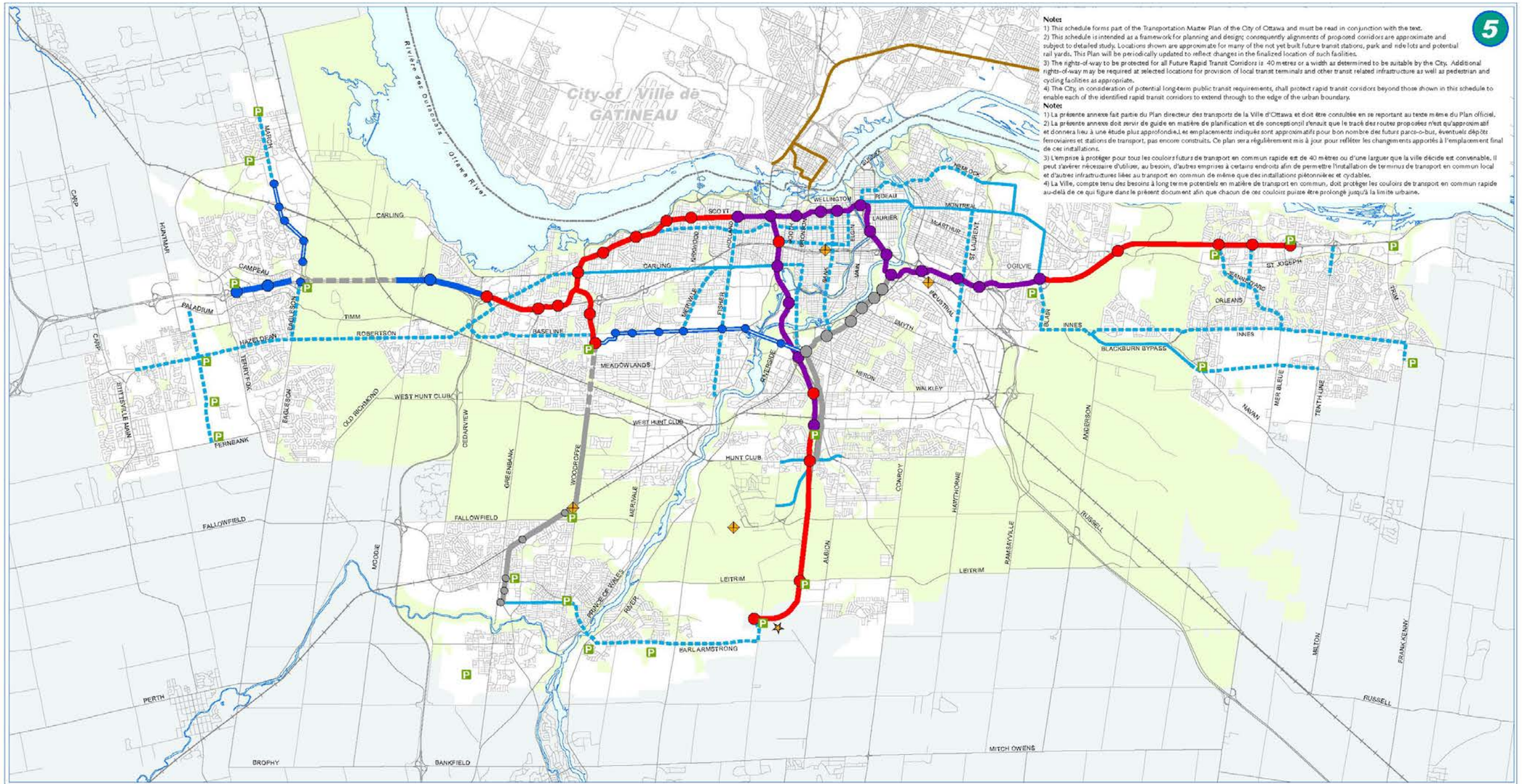

RAPID TRANSIT
Existing Bus Rapid Transit (BRT)
Existing Bus Lanes
Existing / Committed Rail
Future Rail
Future Bus Rapid Transit (BRT)
Future Bus Rapid Transit (BRT) - At-Grade Crossings

TRANSIT PRIORITY
Transit Priority Corridor (Continuous Lanes)
Transit Priority Corridor (Isolated Measures)

TRANSPORT EN COMMUN RAPIDE
Transport en commun rapide par autobus actuel
Voies actuelles réservées aux autobus
Réseau de transport ferroviaire actuel/prévu
Réseau ferroviaire futur
Transport en commun rapide par autobus (TCRA) futur
Transport en commun rapide par autobus (TCRA) - passages à niveau futur

PRIORITÉ AU TRANSPORT EN COMMUN
Corridor donnant priorité au transport en commun (voies continues)
Corridor donnant priorité au transport en commun (mesures isolées)

Existing Transit Station - Bus
Existing / Committed Transit Station - Rail
Future Transit Station - Rail
Future Transit Station - Bus
Inter-regional Stations
Potential Rail Yard
Gatineau Rapibus
Park and Ride

Station de transport en commun actuelle – autobus
Station de transport en commun actuelle/prévue – train
Station de transport en commun future – train
Station de transport en commun future – autobus
Stations interrégionales
Cour de tirage possible pour trains
Rapibus de Gatineau
Parc-O-Bus

1 0.5 0 1 2 3 km

Prepared by: Planning and Growth Management Department, Mapping & Graphics Unit, 2013
Préparé par: Service de l'urbanisme et de la gestion de la croissance, Unité de la cartographie et des graphiques, 2013

TRANSPORTATION MASTER PLAN - Map 5
RAPID TRANSIT AND TRANSIT PRIORITY NETWORK - 2031 AFFORDABLE NETWORK

PLAN DIRECTEUR DES TRANSPORTS - Carte 5
RÉSEAU DE TRANSPORT EN COMMUN RAPIDE ET DE TRANSPORT EN COMMUN PRIORITAIRE – RÉSEAU ABORDABLE 2031