Blair Road Transit Priority (Innes Road to Blair LRT Station) Environmental Assessment Study

Environmental Study Report

Report No.: 2170335.01

April 2021

MORRISON HERSHFIELD 75 YEARS

MORRISON HERSHFIELD

REPORT

Blair Road Transit Priority
(Innes Road to Blair LRT Station)
Environmental Assessment Study

Environmental Study Report

Ottawa, Ontario

Presented to:

City of Ottawa

Report No. 2170335.01 April 2021

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EXECUTIVE SUMMARY

Introduction

The Transportation Master Plan (TMP) identifies Blair Road, from the Blair Light Rail Transit (LRT) Station to Innes Road, as a transit priority corridor in the 2031 Affordable Network. An environmental assessment for this Blair Road transit priority corridor had been included in the ongoing Brian Coburn Boulevard Extension and Cumberland Transitway Environmental Assessment (BCE/CTW EA) study as a result of proximity and transit system continuity. As the BCE/CTW EA study has become increasingly more complex, on April 22, 2020, the City of Ottawa Council approved a motion to separate out the Blair Road portion from the BCE/CTW EA study as a stand-alone project. This approximately two-kilometre section of Blair Road is shown in Figure EX-1 with the proposed recommendations and functional design of the widening described below.

Figure EX-1: Study Area

Study Process

The study was undertaken in accordance with Schedule C of the Municipal Class Environmental Assessment (EA), which is an approved process under the *Ontario Environmental Assessment Act*. The process has involved developing, assessing, and evaluating alternatives, leading to a Recommended Plan.

Consultation

Consultation included two rounds of meetings with the Agency Consultation Group (National Capital Commission; Ontario Ministry of Environment, Conservation and Park; Ontario Ministry of Natural Resources and Forestry; Ontario Ministry of Heritage, Sport, Tourism and Culture Industries; Rideau Valley Conservation Authority; Hydro Ottawa; and various City Departments), and the combined Business and Public Consultation Group (landowners, businesses, community associations, interest groups). Additionally, two public open houses were held along with focused consultation with the National Capital Commission (NCC) because of the impacts to and requirement for NCC Greenbelt lands.

Indigenous Peoples were also consulted in the form of email notices at various times during the study, though no responses were received.

Overall, there is general public support for this project with some issues that were raised during consultation which have been addressed. Concerns about increased traffic noise were raised for the widening of Blair Road and based on a noise study, sound barriers are proposed, where warranted along the west side of Blair Road.

Project Need and Opportunities

Blair Road, between Meadowbrook Road and Innes Road, is currently a congested two-lane rural arterial roadway with direct access to the Ottawa Road 174 (OR174). Approximately 430 buses destined to and from the Blair LRT Station currently travel daily along Blair Road in mixed traffic, resulting in delays to transit service. To address these delays, road widening for transit priority is required to improve transit travel time and service reliability. In accordance with the City's Complete Streets policy, also needed are pedestrian, cycling and accessible infrastructure improvements to provide connectivity to transit, retail (Gloucester Centre), employment (Canadian Security Intelligence Service, Canadian Security Establishment among others), and nearby communities.

Based on a traffic study in the area, the widening of Blair Road is proposed to accommodate combined transit and HOV lanes. The transit and HOV lanes are required to address current and projected travel demand to the 2031 planning horizon and beyond. Various design options to improve pedestrian, cycling and accessibility, such as multi-use pathways (MUPs), sidewalks and cycle tracks or a combination thereof, were assessed and evaluated, which led to the selection of the preferred design.

Development of the Recommended Plan

The Blair Road project is divided into two distinct sections:

1. OR174 Interchange area; and,

2. South of OR174 to Innes Road.

1. Blair Road/OR174 Interchange Area

The existing Blair Road bridge structure over the OR174 includes two general traffic lanes in each direction, a shared northbound OR174 on and off high-speed auxiliary lane, and discontinuous cycling lanes in each direction terminating at each end of the bridge overpass. There are safety concerns regarding the northbound cycling lane as it 'floats' between two traffic lanes and conflicts with vehicles merging on and off the interchange ramps. Pedestrian facilities are also non-existent along this segment. Road cross-section and plan views of these existing conditions are illustrated in Figures EX-2 and EX-3.

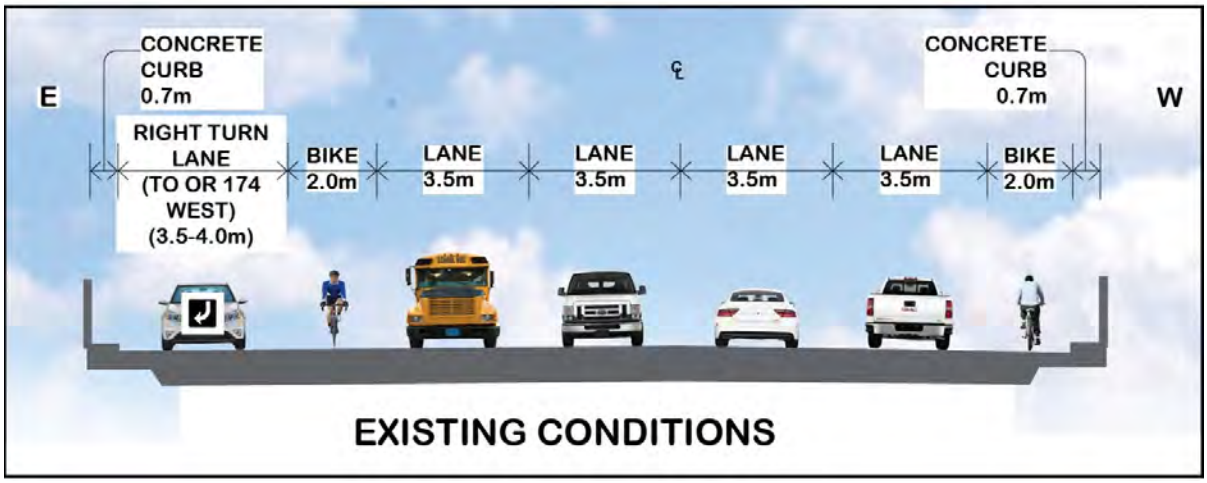

Figure EX-2: Existing Blair Road/OR174 Bridge Cross-Section

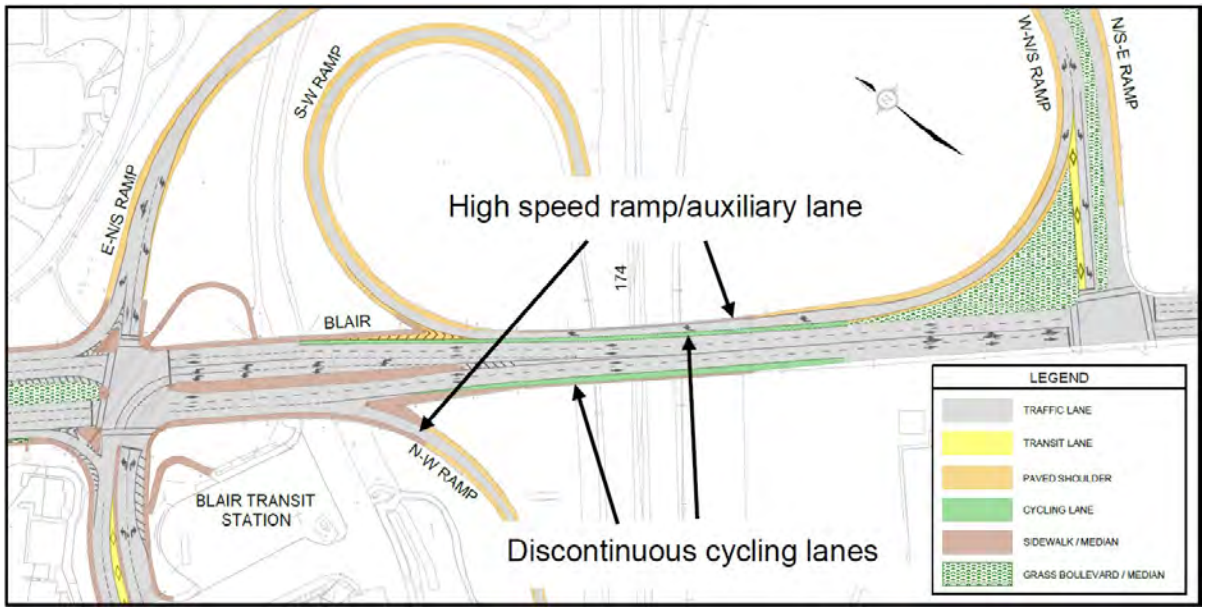

Figure EX-3: Existing Blair Road/OR174 Interchange Plan View

The recommended redesign (Figure EX-4) proposes providing fully accessible facilities for all modes of transportation while maintaining the two general traffic lanes per direction as well as avoiding major modifications to the structure. To reduce vehicle speeds, all three free flow interchange ramps will be realigned with smaller turning radii provided where they intersect with Blair Road. The space allocated to the existing cycling lanes and shared northbound OR174 on and off ramp auxiliary lane is proposed to be repurposed to accommodate a 4.0 m MUP on the west side and a 1.8 m sidewalk and 1.8 m cycle track on the east side. Figure EX-5 illustrates the realigned OR174 ramps and the modifications to the original high-speed ramps.

Additional enhancements for pedestrians, cyclists and accessibility include protected signalized intersections at the two intersections at Blair Station and south of OR174.

Shown on Figure EX-6 is the protected intersection design at Blair Station with improved connections to the proposed MUP on the west side of Blair Road and a separate sidewalk and cycle track on the east side. The existing pathway loop on the east side of Blair Road that passes under the Blair Road structure connecting to the LRT Station will be upgraded to a fully accessible MUP with a connection to the upcoming Stage 2 LRT Confederation Line East Extension MUP. On the west side of Blair Road, a proposed MUP will replace the existing sidewalk and connect further west into the station.

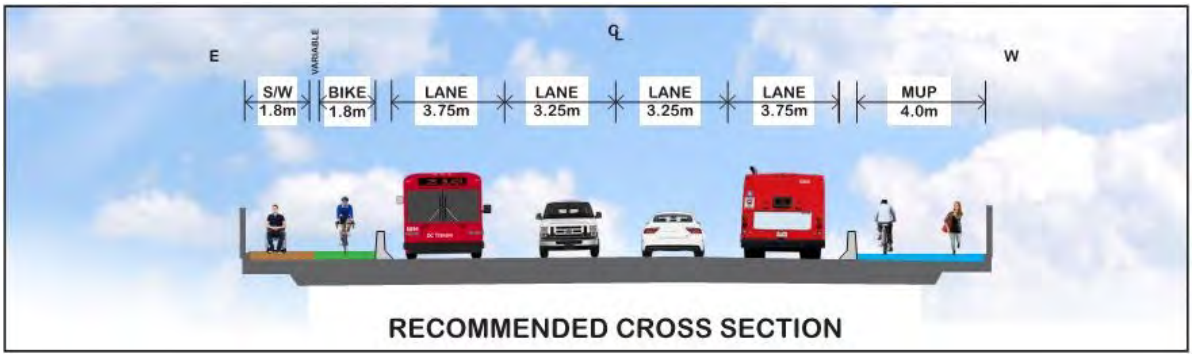

Figure EX-4: Recommended Blair Road/OR174 Bridge Cross-Section

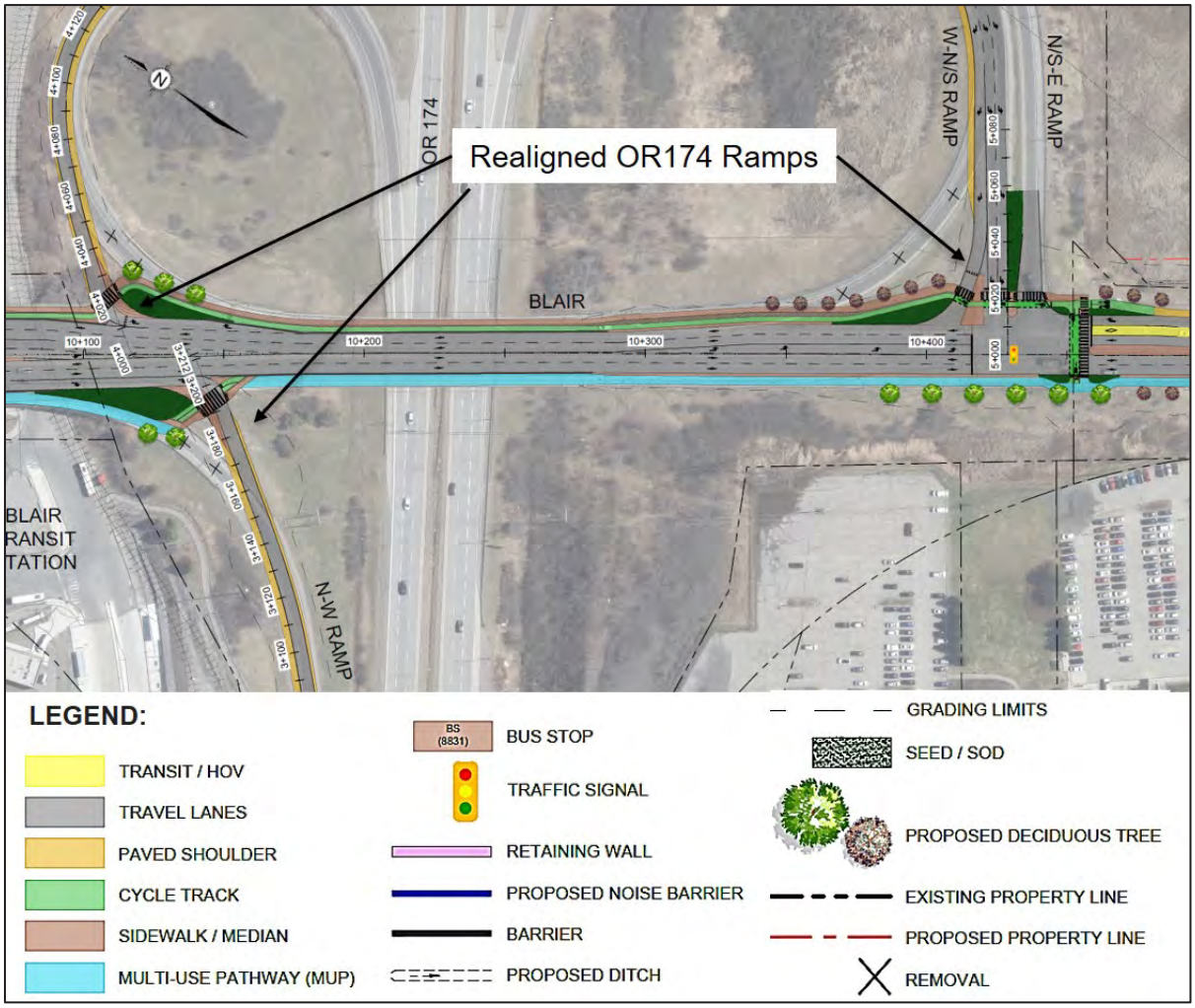

Figure EX-5: Realigned OR174 Interchange Ramps

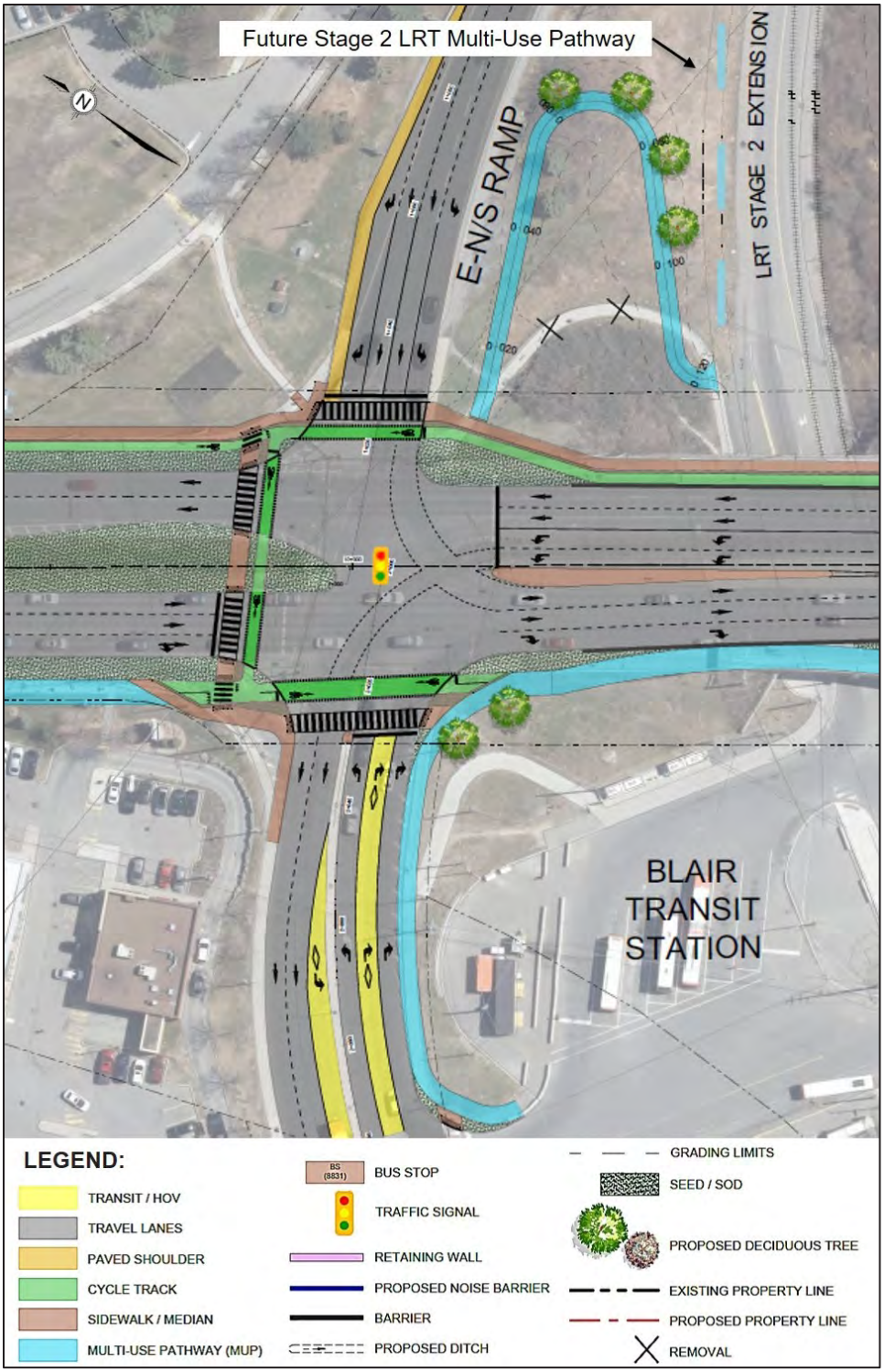

Figure EX-6: Protected Intersection and Highlights at Blair Station

2. Blair Road - South of OR174 to Innes Road

South of OR174, Blair Road currently transitions from four to two lanes just south of Meadowbrook Road. Where there are currently four lanes from south of OR174 to Meadowbrook Road, only minor widening is required and a conversion of the two outer general traffic lanes to transit and HOV lanes is proposed. The northbound transit/HOV lane terminates at the intersection south of OR174 to allow buses destinated to Blair Station to weave across to the left lane. Further south between Meadowbrook Road and Innes Road, Blair Road is currently a two-lane road and widening to four lanes is recommended to accommodate dedicated transit and HOV lanes.

The NCC Greenbelt is on the east side of Blair Road and this project proposes to maintain the rural grading and ditching to preserve the rural character of the Greenbelt. On the west side of Blair Road, the MUP will extend from the OR174 bridge overpass to Innes Road and will provide direct access to the adjacent Pineview Community. A MUP on the west side is preferred as it accommodates bi-directional cycling and reduces the need for northbound cyclists to cross Blair Road. Figure EX-7 illustrates a typical cross-section of the widening.

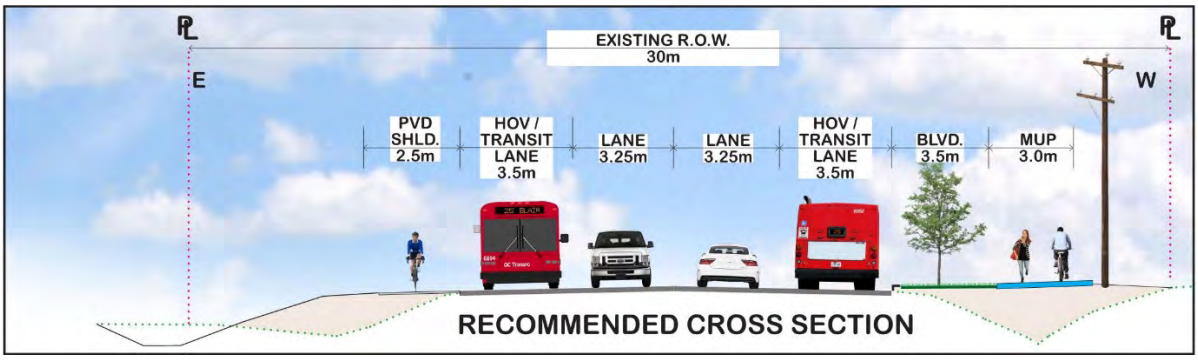

Figure EX-7: Typical Blair Road Cross-Section (South of OR174)

At the east side bus stops, a 4.0 m pedestrian platform is proposed with the cycle track passing behind the shelter to avoid pedestrian and cycling conflicts (Figure EX-8). To strengthen connectivity to bus stops, new pedestrian crossings are proposed at two locations: one just north of Innes Road and the second just south of Laura Private.

The proposed design at the Meadowbrook Road intersection is a partial protected intersection (Figure EX-9). Channelized right turn lanes have been removed to better accommodate pedestrians and cyclists. Protected cycle lanes, shown in green will transition to on-street cycling on Meadowbrook Road. Along the east side of Blair Road, separate northbound cycle track and sidewalk are proposed at the bus stop just north of the intersection. Future consideration may be given to modifying access to the Pine View Golf Course to align with the signalized intersection at Meadowbrook Road.

A pedestrian signal currently exists at Beaverpond Drive and an upgrade to a fully signalized intersection is proposed with an added northbound left turn lane to provide safe crossing for pedestrians and cyclists as illustrated in EX-10.

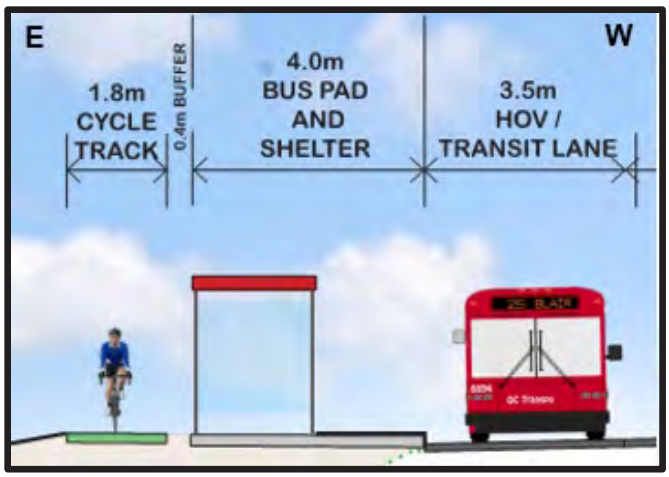

Figure EX-8: Typical Treatment at Bus Stops

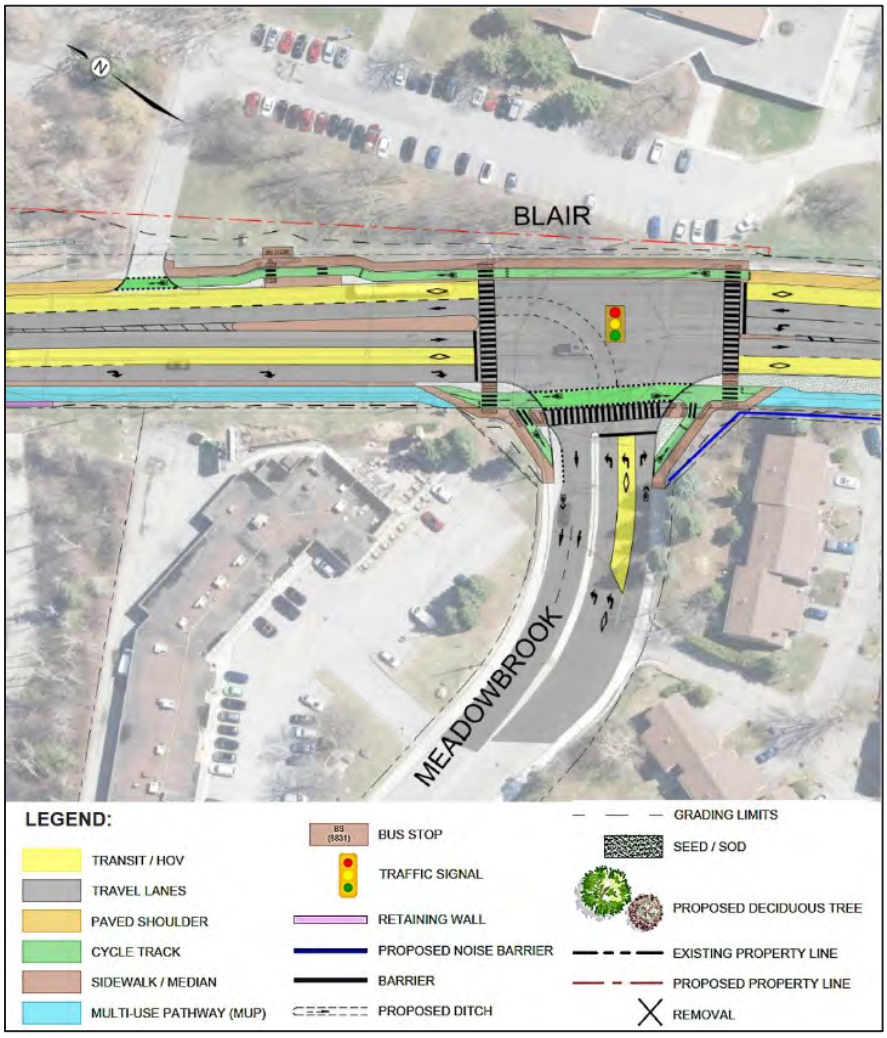

Figure EX-9: Recommended Design at Meadowbrook Road

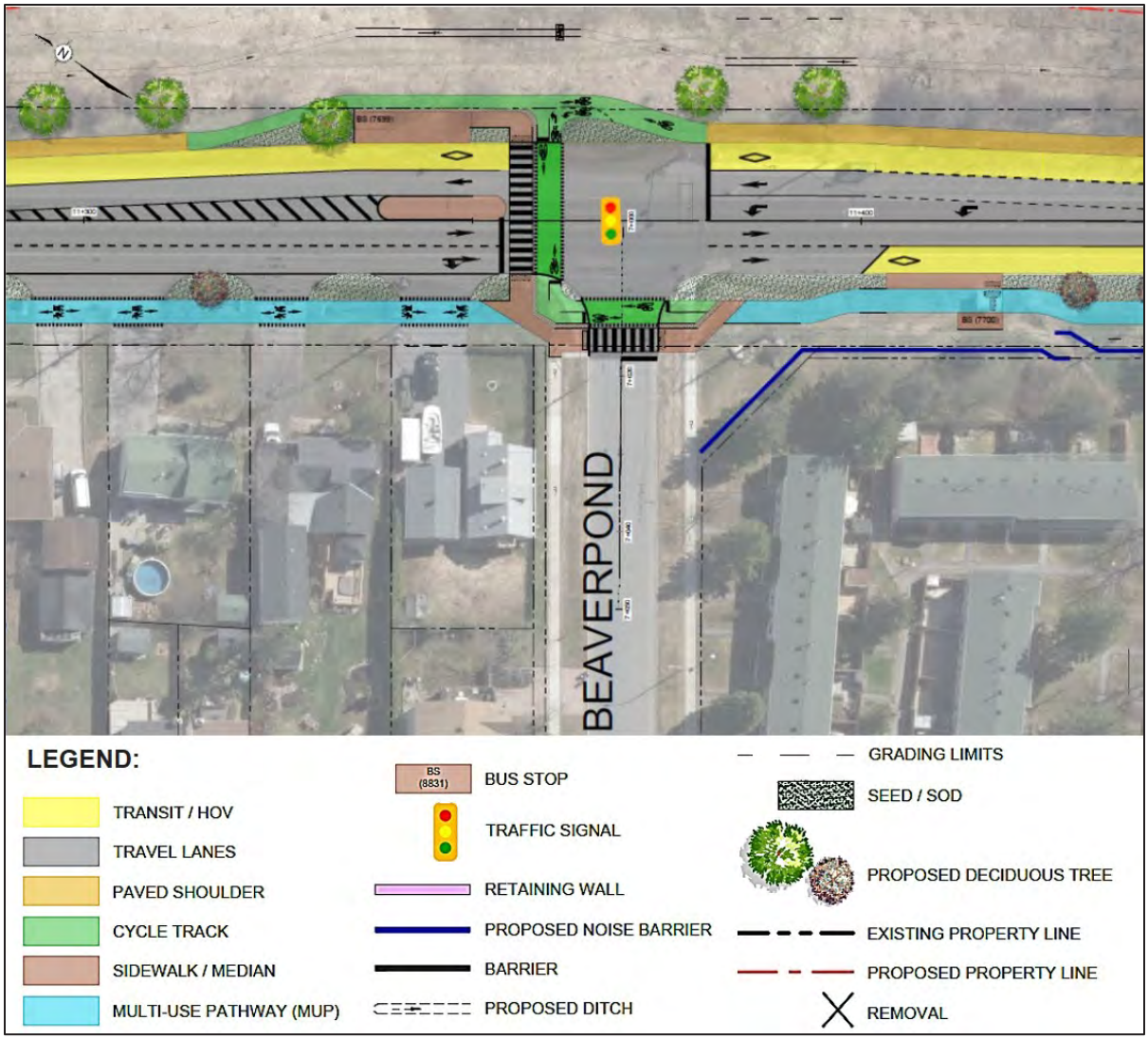

Figure EX-10: Recommended Design at Beaverpond Drive Intersection

At the southern limits of this project is the intersection of Blair Road with Innes Road, and a protected intersection (Figure EX-11) will provide pedestrian and cycling connectivity to the retail plaza and future facilities along Innes Road. Based on a traffic study of future travel demand, the channelized right turn lane from Blair Road south to Innes Road west is not required and is proposed to be removed in favour of a shared through and right turn lane to improve safety for pedestrians and cyclists. The removal of this channelized right turn also provides space to extend the MUP on the west side of Blair Road to the Innes Road intersection, as there is no opportunity to acquire additional property at this location due to the proximity of the fuel storage tanks at the gas station.

Figure EX-11: Protected Intersection at Blair Road and Innes Road

Environmental Implications

Property Impacts

Between Meadowbrook Road and Innes Road, the existing right-of-way for Blair Road is generally 30 m wide and becomes wider north of Meadowbrook Road. The widening is recommended on the east side of Blair Road to avoid impacts on private property and the existing hydro poles. An approximately 10 m strip of property is required from the NCC Greenbelt lands for an estimated one hectare in total and is primarily for grading and

drainage. Additional property of 0.01 hectares in total (100 m^2) from two private properties is required for the proposed protected intersection design at Blair Road and Innes Road.

Noise Impacts

Based on a noise study carried out for this project, noise barriers are proposed along the west side of Blair Road for residential properties with backyards adjacent to Blair Road between Meadowbrook Road and Innes Road and where noise barriers do not already exist.

Landscaping

Some tree pruning will be required at the noise barrier locations and some scrub vegetation will be removed. Boulevard street tree planting, where utilities allow, will create a more pleasant environment for MUP users and create a visually narrower corridor.

Stormwater Management (SWM)

The Recommended Plan will result in a moderate increase in impervious surfaces due to the widening of Blair Road. Runoff quality treatment and quantity control (peak flow attenuation) will be achieved with enhanced grass swales, rock check dams and vegetated filter strips. This approach is preferred due to the number of outlets and the rural ditches versus an urbanized storm sewer approach to stormwater conveyance. The proposed stormwater management controls and any mitigation measures will be included within the proposed Blair Road right-of-way.

Natural Environment

There will be minor loss of vegetation within existing vegetation communities on the west side of Blair Road and temporary and minor disturbance of terrestrial communities on the east side of Blair Road. With mitigation, the potential impacts can be avoided. Retained vegetation will be protected from incidental disturbance during construction and a site restoration and planting plan will be implemented to replace removed vegetation with native plant species. Potential impacts to vegetation and wildlife will be reduced or eliminated.

There is potential for the project to interact with Species at Risk (SAR) and/or SAR habitat. The need for more targeted species studies/inventories has been documented, and following the application of mitigation measures, potential impacts will be reduced or eliminated. This project will adhere to the *City of Ottawa Protocol for Wildlife Protection during Construction*.

With respect to impacts to fish and fish habitat, ditches are proposed along the east side of the Blair Road corridor which will convey stormwater runoff to the unnamed tributary of Greens Creek located approximately 280 m north of Innes Road. Field investigations have determined that the unnamed tributary of Greens Creek at Blair Road supports indirect fish habitat. There were no important or sensitive fish habitats identified and no federally or provincially protected aquatic SAR identified. The proposed works can be completed in accordance with the fish and fish habitat protection provisions of the *Fisheries Act*.

Future commitments will require consultation with the Ministry of Natural Resources and Forestry and the Rideau Valley Conservation Authority to ensure potential impacts to the natural environment are reduced or eliminated.

Climate Change

In December 2017, the Ministry of the Environment, Conservation and Parks released guidelines titled “Considering Climate Change in the Environmental Assessment Process” which lay out the Ministry’s expectations for project proponents to consider including the potential effects of a project on climate change, and the potential effects of climate change on a project.

This EA considered the project’s potential impact on greenhouse gas emissions; assessed the resiliency or vulnerability of the project to changing climate conditions; and, identified potential climate change adaptations and future monitoring requirements based on regional climate and severe weather projections to 2050 and beyond. For example, more frequent severe storm events with increased runoff of roadway drainage may require larger storm sewers and/or roadside ditches. Increased frequency of extreme heat days may require additional landscaping protection at bus stops.

The redesign of Blair Road provides new infrastructure for sustainable modes of active transportation and transit, while encouraging carpooling through HOV lanes, thus reducing greenhouse gas emissions. The wider boulevards along Blair Road will also accommodate tree planting, which will serve as a carbon sink.

Financial Implications

Project costs were developed in accordance with the Council-approved Project Delivery Review and Cost Estimating process for implementing capital projects. Cost for design, construction, property, public art, and contingencies in 2020 dollars is estimated at $32 million. While this project is identified in the City’s 2031 Affordable Rapid Transit Network Plan, funding will be subject to the City’s future capital budget priorities.

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APPENDIX C: Alternatives Solutions Identification and Evaluation Memo (MH, August 9, 2019)

APPENDIX D: Fisheries Existing Conditions and Impact Assessment Memo (MH, February 3, 2021)

APPENDIX E: Terrestrial Existing Conditions and Impact Assessment Memo (MH, March 1, 2021)

APPENDIX F: Air Quality, Noise and Vibration Memo (GWE, March 25, 2021)

APPENDIX G: Environmental Site Assessment – Final Report (Golder Associates, November 2019)

LIST OF ACRONYMS

ACG	Agency Consultation Group
AODA	*Accessibility for Ontarians with Disabilities Act*
AR5	Fifth Assessment Report by the Intergovernmental Panel on Climate Change
BCBE	Brian Coburn Boulevard Extension
BMP	Best Management Practice
BRT	Bus Rapid Transit
CCHIP	Climate Change Hazards Information Portal
CEA	Cumulative Effects Assessment
COSWEIC	Committee on the Status of Endangered Wildlife in Canada
CTP2	Capital Transit Partners Stage 2
CTW	Cumberland Transitway
CVC	Commercial and Institutional classification in the Ecological Land Classification system
CVI	Transportation and Utilities classification in the Ecological Land Classification system
CVR	Residential classification in the Ecological Land Classification system
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EA Act	*Ontario Environmental Assessment Act* Revised Statute of Ontario (R.S.O.) 1990
ECCC	Environment and Climate Change Canada
ERIS	Environmental Risk Information Services / Environmental Risk Limited Partnership
ESA	Environmental Site Assessment
ESR	Environmental Study Report
EUC	East Urban Community
FLUDTA	Federal Land Use, Design and Transaction Approval
FOD7	Fresh Moist Lowland Deciduous Forest classification in the Ecological Land Classification system
GCL-1	Golf Course classification in the Ecological Land Classification system
GCMs	Global Climate Models
GWE	Gradient Wind Engineers and Scientists
GMP	Greenbelt Master Plan
HLUI	Historic Land Use Inventory
HOV	High Occupancy Vehicle

LIST OF ACRONYMS (Continued)

IAA	*Impact Assessment Act*
IDF	Intensity Duration Frequency
IPCC	Intergovernmental Panel on Climate Change
JTBES	JTB Environmental Systems Inc.
LIO	Land Information Ontario
LRT	Light Rail Transit
MASM1-1	Mineral Shallow Marsh classification in the Ecological Land Classification system
MASM1-12	Common Reed Mineral Shallow Marsh classification in the Ecological Land Classification system
MCEA	Municipal Class Environmental Assessment
MECP	Ministry of the Environment, Conservation and Parks
MEM	Mixed Meadow classification in the Ecological Land Classification system
MH	Morrison Hershfield Limited
MHSTCI	Ontario Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF	Ontario Ministry of Natural Resources and Forestry
MECP	Ontario Ministry of Environment, Conservation and Parks (Formerly Ministry of the Environment/ Ministry of the Environment and Climate Change
MOECC	Ontario
MTC	Ontario Ministry of Tourism and Culture (also see MHSTCI)
MUP	Multi-Use Pathway
NCC	National Capital Commission
NCR	National Capital Region
n.d.	No date
NHIC	Natural Heritage Information Centre
NPC	Noise Pollution Control
NSSP	Non-Standard Special Provision
O.Reg.	Ontario Regulation
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OP	Official Plan
OPA	Official Plan Amendment
OPSD	Ontario Provincial Specification Division
OPSS	Ontario Provincial Standard Specification
OR	Ottawa Road
P/BCG	Public and Business Consultation Group

LIST OF ACRONYMS (Continued)

PFCC	Plan for Canada's Capital
PoE	Pathways of Effects
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PVD SHLD	Paved Shoulder
RCP	Representative Concentration Pathway
ROW	Right-of-Way
RSC/R.S.C.	Revised Statutes of Canada
RSI	Risk Sciences International
RSO/R.S.O.	Revised Statutes of Ontario
RVCA	Rideau Valley Conservation Authority
S/W	Sidewalk
SAR	Species at Risk (Canada)
SARA	*Species at Risk Act*
SOP	Standard Operating Practice
SWLK	Sidewalk
TDM	Travel Demand Management
THD	Deciduous Thicket classification in the Ecological Land Classification system
TMP	Transportation Master Plan
TOD	Transit-Oriented Development
TPAP	Transit Project Assessment Process
TSM	Transportation System Management
TSSA	Technical Standards and Safety Authority
UNA	Urban Natural Areas
UNC	Ultimate Network Concept

1. INTRODUCTION

1.1 Purpose of the Project

Blair Road between Meadowbrook Road and Innes Road is currently a congested two-lane arterial roadway in the east end of Ottawa. It accommodates approximately 430 daily buses destined to/from the Blair Light Rail Transit (LRT) Station. The City's Transportation Master Plan (TMP) identifies the corridor as a Transit Priority Corridor and a Spine Cycling Route and includes a widening by 2031 with long term protection for Bus Rapid Transit (BRT) (City of Ottawa, 2013d).

This Blair Road Transit Priority Project had initially been added to the ongoing Brian Coburn Boulevard Extension/Cumberland Transitway (BCBE/CTW) Environmental Assessment (EA) Study as a result of proximity and transit system continuity. The City of Ottawa later separated out the Blair Road project from the BCBE/CTW EA Study. Two studies would position the Blair Road Transit Priority Project to be ready for implementation sooner and would not constitute piece-mealing in accordance with the EA Act of Ontario as the projects are meeting different temporal needs and are undergoing the same Class EA level of assessment.

The overall purpose of this project is to undertake a Schedule "C" Municipal Class EA to consider the Blair Road Transit Priority Corridor between Innes Road and the Blair LRT Station (**Figure 1-1**).

1.2 Project Background

This EA considers the Blair Road corridor from the Blair LRT Station in the north to Innes Road in the south (**Figure 1-1**). The 2013 Transportation Master Plan (TMP) identifies Blair Road between Innes Road and Blair Station as a transit priority corridor as part of the Affordable Transit Network. This Study builds upon the BCBE/CTW Environmental Assessment currently underway and several historical Environmental Assessments and related projects.

The 2011 Hospital Link and Cumberland Transitway Westerly EA recommended that the Blair Road corridor include a fully segregated two lane Transitway between Blair Road and the Pine View Golf Course with provision for a four-lane Blair Road. The EA also recommended an at-grade transit station at the northeast quadrant of Blair Road and Innes Road, with a below grade on-line station proposed at Meadowbrook Road and Blair Road, as the last stop of the Transitway service prior to crossing Ottawa Road 174 and connecting to Blair Station.

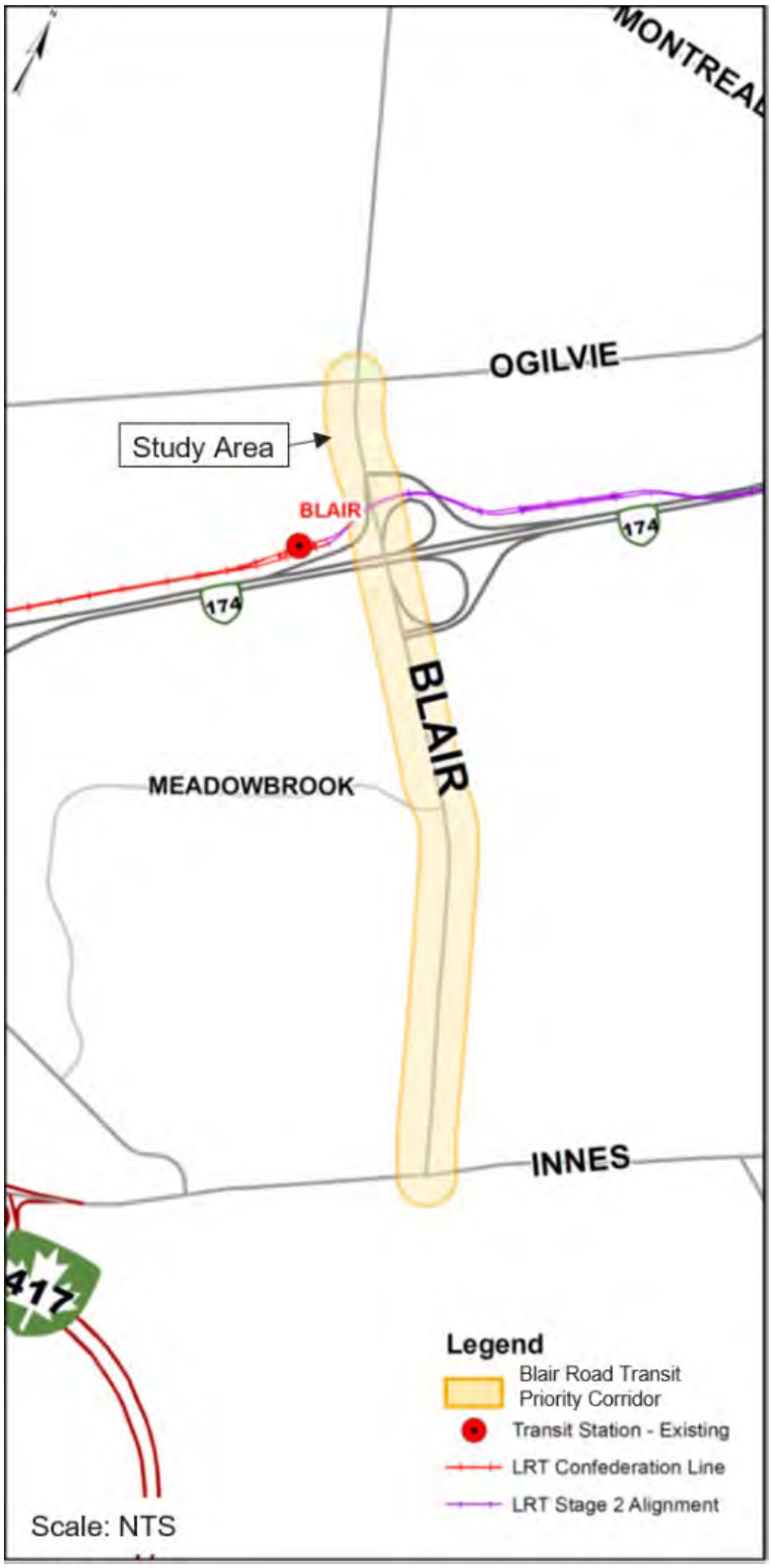

Figure 1-1: Study Area

1.2.1 Related Environmental Assessments

1.2.1.1 Montreal-Blair Road Transit Priority Corridor (Underway)

The Montreal-Blair Road Transit Priority Corridor EA Study has been initiated by the City and will be completed in accordance with the Transit Project Assessment Process (TPAP) Ontario Regulation 231/08. The Corridor is defined as Montreal Road from St. Laurent Boulevard to Shefford Road, and 1.2 km north of Montreal Road to Blair Station (**Figure 1-2**). The City's TMP has identified a number of modifications to road and transit infrastructure within this corridor to accommodate future travel demand and meet modal share objectives. The EA will investigate options to improve transit service efficiency and travel environment for all modes along the corridor, establish the right-of-way requirements for the recommended plan and allow the project to proceed to design and construction.

The Plan will consider the different land-use characteristics within the Study Area in a context-sensitive manner with connectivity to the Blair Station and the O-Train Confederation Line emphasized to provide seamless mobility options for the community.

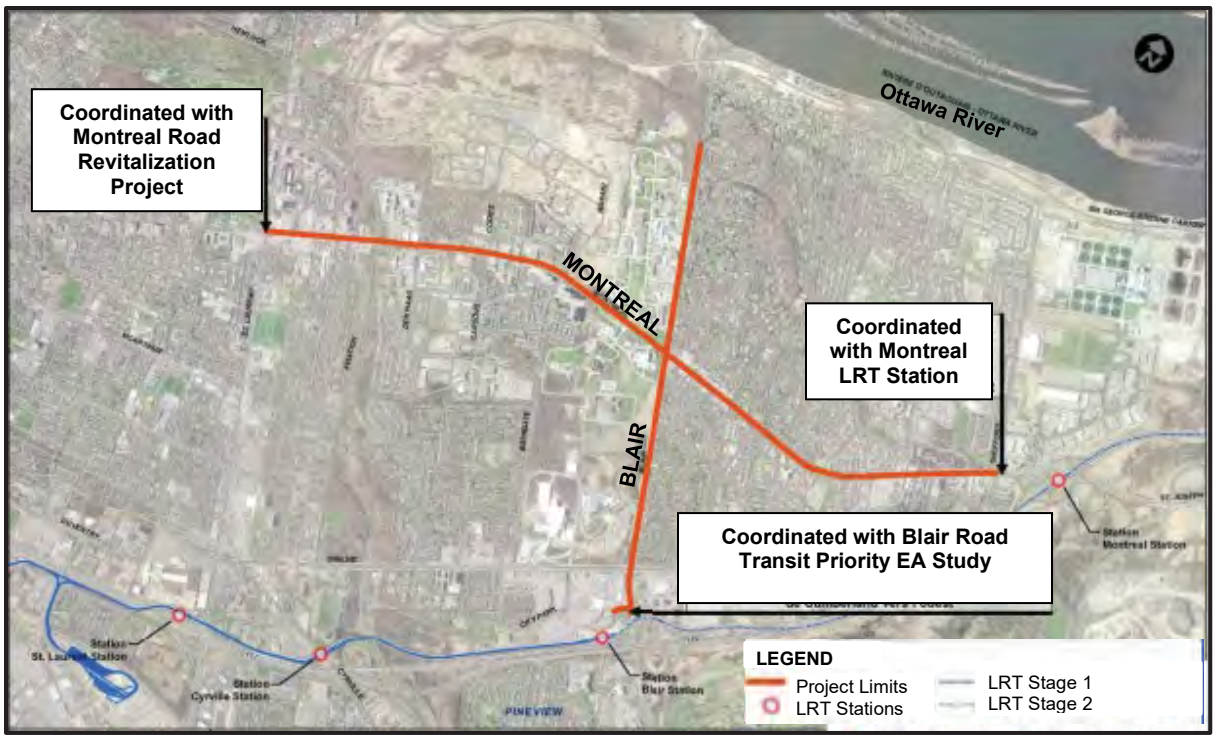

Figure 1-2: Montreal-Blair Road Transit Priority Corridor EA Study

1.2.1.2 Brian Coburn Boulevard Extension/Cumberland Transitway Study (Underway)

The City of Ottawa has initiated an EA study to develop an alternate plan for both the Brian Coburn Boulevard Extension and the Cumberland Transitway west of Navan Road (**Figure 1-3**). A geotechnical analysis confirmed that the soil conditions in the area are very poor and it will be more costly than previously estimated to implement the previously approved 1999 EA Study Recommended Plans. As such, the City is in search of a more cost-effective solution.

The study is being undertaken in accordance with Schedule C of the Municipal Class EA, which is an approved process under the Ontario EA Act. The EA process will involve developing, assessing, and evaluating alternatives, leading to a Recommended Plan. The study will address potential implications of federal and National Capital Commission (NCC) properties and the need for federal approvals to implement the project. As part of the study process, an Environmental Study Report (ESR) will be prepared for public review.

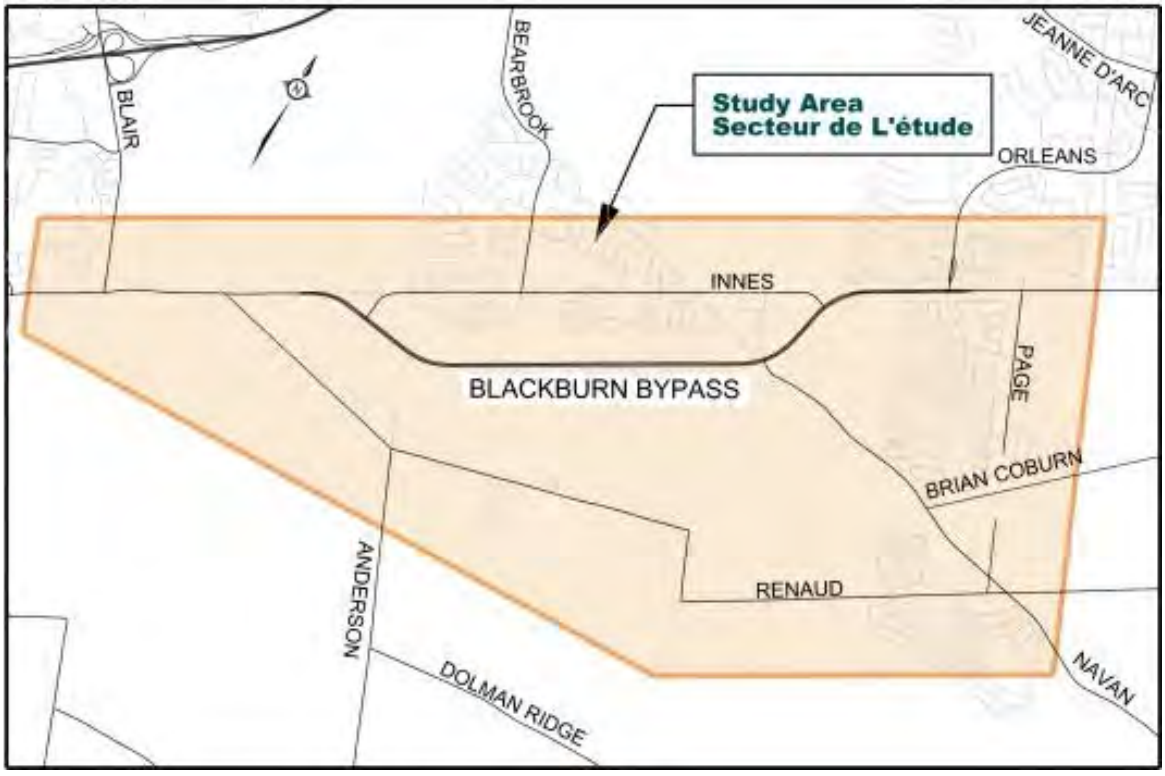

Figure 1-3: Brian Coburn Boulevard Extension/Cumberland Transitway EA

1.2.1.3 Hospital Link and Cumberland Transitway Westerly Environmental Assessment Study (2011)

The City of Ottawa completed the EA Study for the Hospital Link and Cumberland Transitway Westerly in 2009. The Study Area included the western portion of the Cumberland Transitway from Blair Station at Ottawa Road (OR) 174 to west of Navan Road (**Figure 1-4** to **Figure 1-6**).

The Recommended Plan for Section 5 of Blair Road includes a fully segregated two lane Transitway between Blair Road and the Pine View Golf Course with provision for a four-lane Blair Road. An at grade transit station is planned for the northeast quadrant of Blair Road and Innes Road. An on-line station is proposed at Meadowbrook Road and Blair Road, as the last stop of the Transitway service prior to crossing Ottawa Road 174 and connecting to Blair Station.

Figure 1-4: Cumberland Transitway Westerly along Blair Road (2011)

Figure 1-5: Cumberland Transitway Westerly along Innes Road (2011)

Figure 1-6: Cumberland Transitway Westerly along Blackburn Hamlet Bypass (2011)

1.2.1.4 Blackburn Hamlet Bypass Extension Environmental Assessment (1999)

The original Class EA for the four-lane Blackburn Hamlet Bypass Extension from the Blackburn Hamlet Bypass to Trim Road was completed and approved in 1999 (Delcan, 1999a). The rationale for this project was to address the future transportation issues that would arise as a result of development of the East Urban Community Expansion Area and to identify land and corridor opportunities that may not be available in the future due to development. The benefits of protecting land at that time for future transportation uses was to provide for a multi-modal transportation spine through the East Urban Community and to release future development lands that were being held for appropriate transportation infrastructure to serve the developing community.

Key background studies were carried out which determined the need for the Blackburn Hamlet Bypass Extension to meet projected travel demand and transportation system capacity issues created by the East Urban Community.

As part of this EA, the functional design of the Blackburn Hamlet Bypass Extension started from the eastern end of the Blackburn Hamlet and extended east along the base of the Navan Road Escarpment within NCC Greenbelt lands. Orléans Boulevard was also extended west and south going over the transitway before connecting with the Bypass Extension. The Bypass corridor then continued southeasterly across the hydro corridor, following the existing hydro-corridor to the east. This had the effect of splitting Navan Road into 2 segments with new cul-de-sacs both north and south of the (then) proposed Orléans Boulevard/Navan Road intersection. The EA also included the section of the Brian Coburn Boulevard recently built between Navan Road and Trim Road.

1.2.1.5 Cumberland Transitway Environmental Assessment (1999)

In 1999, an EA study was approved for the Cumberland Transitway from the Blackburn Hamlet Bypass to Frank Kenny Road, following an Individual EA process (Delcan, 1999b). The EA for Cumberland Transitway was undertaken at the same time as the Blackburn Hamlet Bypass Extension EA because of its similar alignment, which runs adjacent and parallel to the Bypass (**Figure 1-7**). In following an Individual EA process, the Cumberland Transitway EA study has no expiry date.

The rationale for the 1999 Cumberland Transitway EA Study was to identify existing land availability and corridor opportunities that potentially would not be available in upcoming years due to future development pressures and to solve a projected future transportation issue. The Cumberland Transitway was to address the future transit needs of the East Urban Community Expansion Area, which was projected to have an additional 38,000 - 40,000 residential units by 2011. Two studies carried out in the early 1990s identified the future travel demand and transportation system capacity in the East Urban Community and determined that there was a significant need for improved transportation infrastructure in this location. Hence, the Cumberland Transitway was planned to address and alleviate this future transportation need and encourage increased transit ridership.

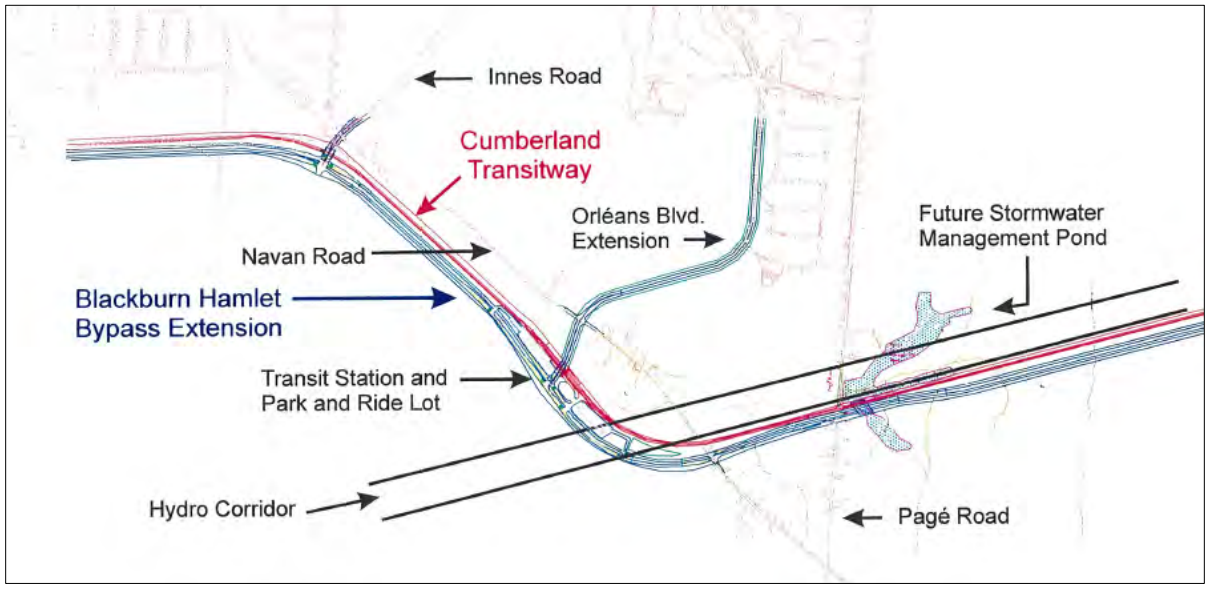

Figure 1-7: Cumberland Transitway Environmental Assessment (1999)

1.3 Report Organization

The remainder of this report is organized as follows:

Section 2: Study Process – describes the legislative and planning processes that provide an outline for the study including the consultation undertaken during the Study to gather comments from the general public and stakeholders.

Section 3: Consultation – documents the consultation undertaken for the Project in accordance with the requirements for a Schedule C Project under the Municipal Class Environmental Assessment (MCEA) Process. This includes consultation for the Blair Road Transit Priority Project before the project became a stand-alone EA, when the project was added as part of the BCBE/CTW EA.

Section 4: Project Need and Opportunities – describes the need and justification for the transit project, based on pre-planning work undertaken by the City of Ottawa. The Council-approved transportation network, as described in the 2013 TMP and its supporting documents.

Section 5: Existing Environmental Conditions – describes the existing environmental setting within the original, broad study area, including an overview of the existing environment conditions: natural, social, cultural, built and economic.

Section 6: Alternative Solutions – highlights the City of Ottawa Vision and Policies, goals of the project, and planning principles and design criteria. Additionally, a description of the alternative corridors and their evaluation process, is detailed and outlines the process for the development of the alternative designs and an assessment of their transportation performance and effects on the components of the environment. The evaluation process for the selection of the preliminary preferred design alternative is described as well as any refinements undertaken.

Section 7: Identification of Alternative Designs – provides an up to date and more in depth description of the environmental setting for the study based on the preferred alternative solution. By refining the study area boundaries and providing more detailed investigations where required, better decisions are made, and mitigation measures can be applied to the recommended plan.

Section 8: Evaluation of Alternative Designs – describes the assessment approach and methodology followed to address potential environmental effects of the project which have been identified as well as mitigation measures which may be put in place to reduce or eliminate negative environmental effects.

Section 9: Recommended Plan – describes the recommended plan for the Blair Road Transit Priority Corridor. The Recommended Plan documents the horizontal and vertical alignment, bus stop locations and layouts, general arrangements for the new and revised structures along the route and documents other relevant elements such as development connections, and pedestrian and cycling routes.

Section 10: Assessment and Evaluation of Impacts – identifies municipal, provincial and federal approvals or permits that may be required for implementation of the Blair Road Transit Priority Corridor Project. Additionally, potential mechanisms for modifying the Recommended Plan for the transit project are provided. Follow-up and monitoring requirements are also detailed in this section.

Section 11: Future Commitments – outlines the next steps committed to, including finalizing needed property acquisitions; construction and implementation timing; developing design details; completing a road safety audit; and securing federal, provincial, and municipal permit approvals.

Section 12: Conclusions – provides a concise overview of the scope of the project.

2. STUDY PROCESS

2.1 Ontario Environmental Assessment Act, R.S.O. 1990

The purpose of the *Ontario Environmental Assessment Act RSO 1990 (*EA Act*)* is to help protect and conserve Ontario's environment by ensuring that projects subject to the Act follow a planning process leading to environmentally sound decision-making. An environmental assessment involves identifying and planning for environmental issues and effects prior to implementing a project. The process allows for opportunities for public involvement in the decision-making process of the project. The planning and assessment is summarized in an ESR prepared by the proponent of the project and is subject to review by the public and government agencies.

This Study is following a Schedule "C" Municipal Class EA process, with thorough stakeholder consultation: Public, Agency, Business, Public Open House, and Indigenous Peoples. Deliverables include environmental and engineering technical studies, consultation materials, EA documents, recommended plans, and capital costs of the project.

The Municipal Class EA is an accepted process for transit projects and would provide an opportunity to develop the transit priority corridor while allowing the proper integration of impacts and alignment considerations within an existing arterial roadway corridor with consideration of modified ramp connections to the 174 (**Figure 2-1**).

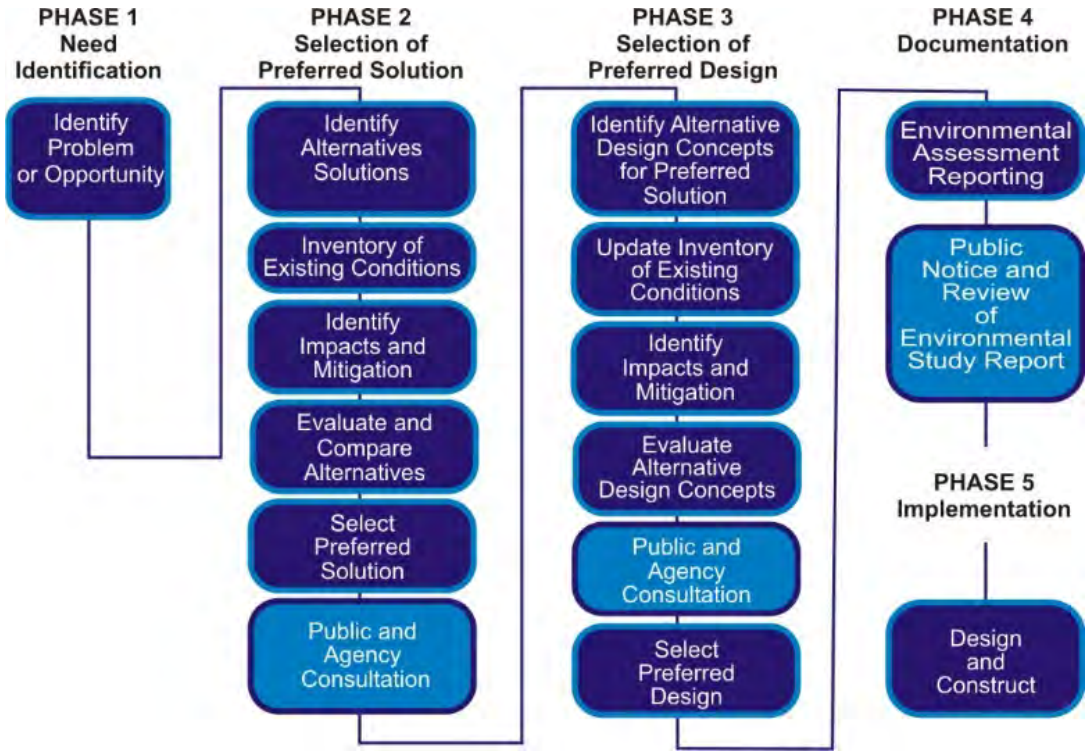

Figure 2-1: Municipal Class EA Process

2.2 Impact Assessment Act, 2019

The purpose of the Federal *Impact Assessment Act, 2019* is to provide a process for assessing the environmental, health, social and economic effects of designated projects with a view to preventing certain adverse effects and fostering sustainability. Additionally, the Act serves to:

- Promote cooperation and coordinated action between federal and provincial governments with respect to environmental assessments,
- Ensure that impact assessments of designated projects consider all effects — both positive and adverse — that may be caused by the carrying out of designated projects, and
- To promote communication and cooperation with Indigenous peoples of Canada with respect to impact assessments, amongst others.

Under Section 82 of the *Impact Assessment Act (IAA),* 2019:

> "An authority must not carry out a project on federal lands, exercise any power or perform any duty or function conferred on it under any Act of Parliament other than this Act that could permit a project to be carried out, in whole or in part, on federal lands or provide financial assistance to any person for the purpose of enabling that project to be carried out, in whole or in part, on federal lands, unless (a) the authority determines that the carrying out of the project is not likely to cause significant adverse environmental effects; or (b) the authority determines that the carrying out of the project is likely to cause significant adverse environmental effects and the Governor in Council decides, under subsection 90(3), that those effects are justified in the circumstances."

As federal lands may be required for various phases of project completion, an Environmental Effects Analysis of all the physical activities proposed on federal lands is required, under Section 82 of the IAA, 2019. No approvals from the National Capital Commission (NCC) under the *National Capital Act* can be issued before these obligations are fulfilled. An Environmental Effects Analysis of a proposed project will determine the need to eliminate or mitigate adverse effects, to modify the project or to recommend further assessment requirements based on detailed design.

Section 84 of the Act notes that an authority's determination regarding whether the carrying out of the project is likely to cause significant adverse environmental effects must consider the following factors:

a) Any adverse impact that the project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the *Constitution Act, 1982,*
b) Indigenous knowledge provided with respect to the project,
c) Community knowledge provided with respect to the project,

d) Comments received from the public under subsection 86(1), and
e) The mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project that the authority is satisfied will be implemented.

The proposed project may also require approval through the Federal Land Use, Design and Transaction Approvals (FLUDTA) process under the *National Capital Act*. In addition to the NCC other federal authorities that may have an interest in the project include Fisheries and Oceans Canada (DFO) and Environment and Climate Change Canada (ECCC). This EA was prepared in consultation with the NCC and is intended to form the basis for Evaluation of Environmental Effects when the Federal EA requirements are met.

3. CONSULTATION

This Section of the Report documents the consultation undertaken for the Project in accordance with the requirements for a Schedule C Project under the MCEA Process. Consultation for the Blair Road Transit Priority Project started before the project became a stand-alone EA, when the project was included as part of the BCBE/CTW EA. To ensure the comments received are not taken out of context, a full account of the combined BCBE/CTW and Blair Road EA Public Open House is provided. A full record of the consultation program for this project is included as **Appendix A.**

The project Study Team involved in consultation has included personnel from the City of Ottawa and technical representatives from Morrison Hershfield, Momentum Planning and Communications, Alta Planning and Design, and COW Landscape Architects.

Consultation involved stakeholders, City Advisory Committees, community groups, property owners, businesses, approval agencies, Indigenous Peoples, and special interest groups. Early in the study process, stakeholders were identified through consultation with Ward Councilors. The consultation strategy consisted of meetings with key stakeholders through an Agency Consultation Group (ACG), a combined Public and Business Consultation Group (P/BCG), and the general public.

3.1 Consultation Groups

3.1.1 Agency Consultation Group

An Agency Consultation Group (ACG) was formed to address a range of technical issues and to comment on all the special studies required to fully assess the various alternatives. The ACG has also ensured that the City followed the agencies' procedures, legislation and has addressed appropriate policies. Members included City staff, representatives from government agencies and approval bodies. The ACG met at key stages throughout the study. Direct one-on-one consultation with other Agency groups occurred as necessary as related to specific issues that arose during the study. In particular, as one of the key landowners affected by both the BCBE/CTW and Blair Road Transit Priority projects, additional meetings were held with the National Capital Commission (NCC). ACG meeting and member details are available in **Appendix A**.

3.1.2 Public/Business Consultation Group

A combined Public and Business Consultation Group (P/BCG) was formed to enable community groups, special interest groups, the City's Advisory Committees, Ward Councilors, and businesses to provide direct input to the study, advising and commenting on local issues and concerns. The P/BCG met at key stages throughout the study. P/BCG meeting and member details are available in **Appendix A**.

3.2 National Capital Commission

Collaboration between the National Capital Commission (NCC) and City of Ottawa was and continues to be needed for the NCC-owned Greenbelt lands potentially required for the Blair Road Transit Priority Project. Additional meetings with the NCC were held in follow-up to materials introduced and presented at the ACG meetings. Meeting notes and documentation related to the NCC specific meetings and correspondence are available in the project Consultation Report (**Appendix A**).

3.3 Indigenous Peoples Consultation

The Study Team ensured appropriate coordination and consultation with Indigenous Peoples in accordance with the requirements of the MCEA and City of Ottawa policies and procedures.

As part of this project, Indigenous groups were contacted to provide information on the project and opportunities for input. Outreach occurred by email at four key points in relation to the Blair Road Transit Priority Project. Details of this outreach are available in **Appendix A**.

3.4 Project Website

A proactive and flexible approach to public consultation was adopted to ensure the interests of stakeholders and the community were taken into consideration. Consultation and the exchange of information was undertaken throughout the EA process using a variety of consultation and engagement methods.

To enhance the community engagement program, the City created a project specific webpage to facilitate communication of key project milestones. Notification of Public Open Houses were posted on the City of Ottawa's website, with materials posted as described in **Appendix A**. Project communications were available online in English (http://www.ottawa.ca/blairroad) and French (http://www.ottawa.ca/cheminblair).

3.5 Public Consultation

In addition to the specific stakeholder groups noted above, the varied interests of the surrounding community have been considered through the study processes and have assisted in verifying the existing conditions; the development of design alternatives; and the refinement of the preferred design.

Two specific public consultation opportunities were organized at key points in the study process as described in the Sections below and detailed in the Consultation Report for the project (**Appendix A**).

3.5.1 Public Consultation Opportunity No. 1

In May 2019 Blair Road widening for transit priority between Innes Road and the Blair LRT Station was included in an expanded study area for the Brian Coburn Boulevard Extension and Cumberland Transitway (BCBE/CTW) EA Study. The second Public Open House for the BCBE/CTW EA study provided preliminary information on the Blair Road study corridor including Design Alternatives. It served as the first public consultation opportunity for the Blair Road Transit Priority Project.

Over 80 people signed into the Public Open House that consisted of a formal presentation and informal display board viewing and discussion. In addition, a large map of the study area offered attendees a visual aid to point to areas of concern and identify where they may like to see changes. Thirteen comments were documented in the mapping exercise and a further ten (10) comment sheets were received at the Public Open House. In addition, over 100 e-mails/letters/telephone correspondence were received after the event. Greater detail on the format and responses provided are available in **Appendix A.**

3.5.2 Public Consultation Opportunity No. 2

Public Consultation Opportunity No. 2 for the Blair Road Transit Priority EA was conducted subsequent to the separation of the Blair Road Transit Priority EA study and presented a Recommended Plan to widen Blair Road for bus only and high occupancy vehicle lanes. Due to public health guidelines for the COVID-19 pandemic, the consultation was held online. The online second/final public consultation involved a recorded presentation made available in English and French on the City of Ottawa website. The recorded presentation was made available online for a period of three weeks, with a comment/questionnaire form available for an additional week following the presentation period.

The Study Team measured public engagement in the online, final consultation opportunity through the Facebook advertisement, views of the recorded presentation on YouTube, and Comment-Questionnaire form submissions. Thirty-six responses were received to the Comment-Questionnaire that asked the public a series of questions related to the Blair Road Transit Priority EA Study. Greater detail on the format and responses provided are available in **Appendix A.**

3.6 Transportation Committee

The City's Transportation Committee met March 3, 2021, with the meeting broadcast live on YouTube for the public (https://www.youtube.com/watch?v=VPCDnNuz4SQ). All contacts maintained on the project's contact list were notified of the meeting by email, mail, or phone call.

4. PROJECT NEED AND OPPORTUNITIES

Phase 1 of the Municipal Class EA Planning and Design Process requires the identification and description of the existing and/or projected problems or opportunities that lead to the conclusion that an improvement or change is needed.

The City of Ottawa's 2013 Transportation Master Plan (TMP) identified transit priority measures along Blair Road from the Blair LRT Station to Innes Road within the *2031 Affordable Road Network* (**Figure 4-1**). Ottawa's Stage 1 LRT project runs east-west from Tunney's Pasture in the west to Blair Road in the east. The LRT system includes 12.5 km of rail, 13 stations and a tunnel through the downtown core.

The City anticipates increased land development pressure in proximity to the LRT stations, and as such has established priority areas for the creation of transit-oriented development (TOD) plans. The City's TMP has identified several modifications to road and transit infrastructure within the Blair Road Corridor to accommodate future travel demand and meet modal share objectives.

A re-examination of the need and a confirmation of the preferred alternative solution were undertaken as part of this study to confirm the TMP conclusions. Supporting documents for the study are provided in **Appendix B.**

4.1 Transportation Master Plan Background

The City's 2013 TMP update identified transit and auto related improvements for the section of Blair Road from the Ottawa Road (OR) 174 North Ramp junction to Innes Road, as follows:

- Affordable Road and Transit Network Configurations (**Figure 4-1** and **Figure 4-2**):
  - Roadway widening (Innes Road to Meadowbrook Road) in the 2026-2031 horizon, and
  - Interim Transit priority measures.
- Network Road and Transit Concept Configurations (**Figure 4-3** and **Figure 4-4**):
  - Roadway widening, and
  - Completion of the Cumberland Transitway including the segment within the Blair Road corridor.

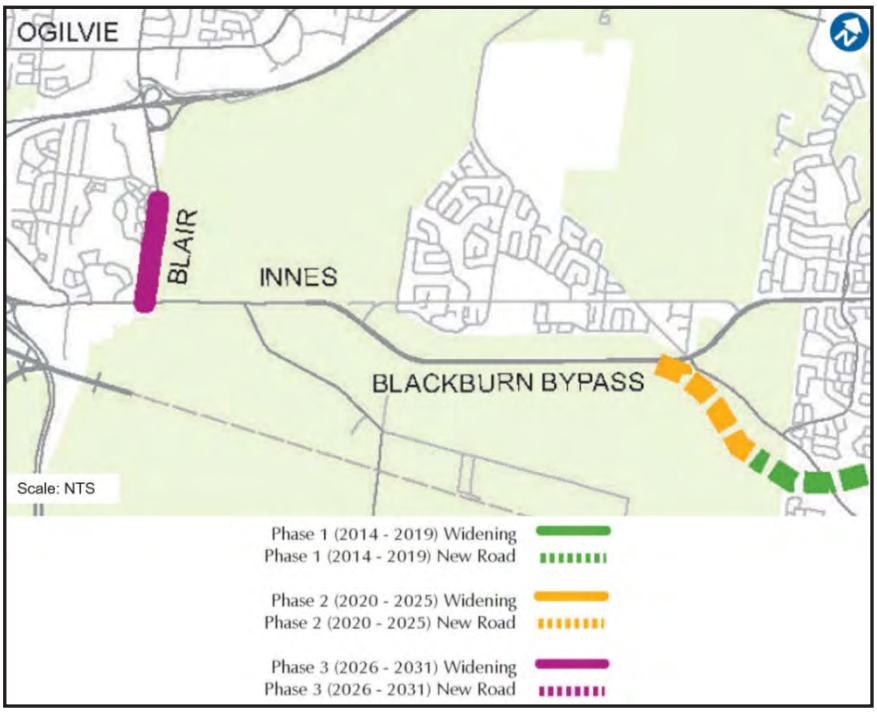

Figure 4-1: 2031 Affordable Road Network (City of Ottawa TMP)

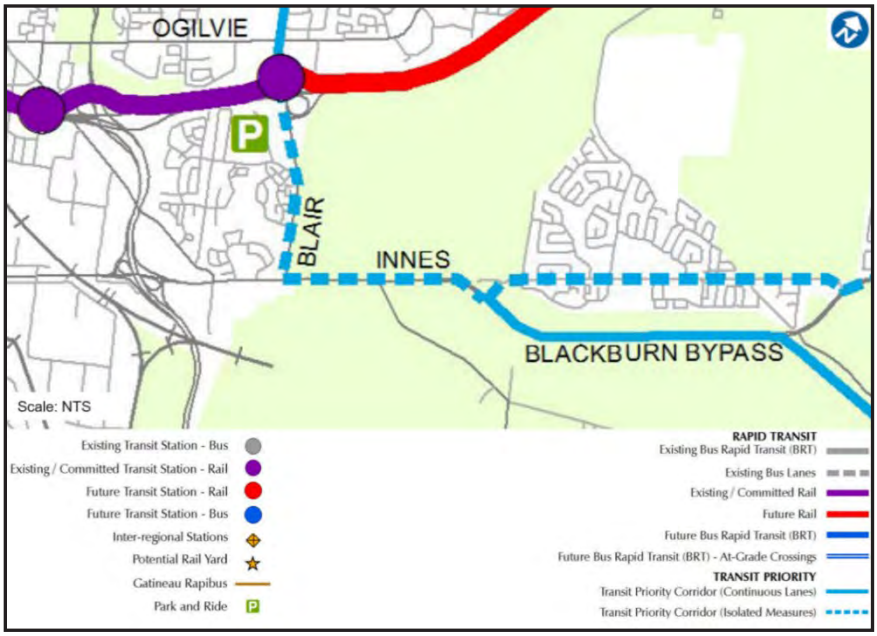

Figure 4-2: 2031 Affordable Transit Network (City of Ottawa TMP)

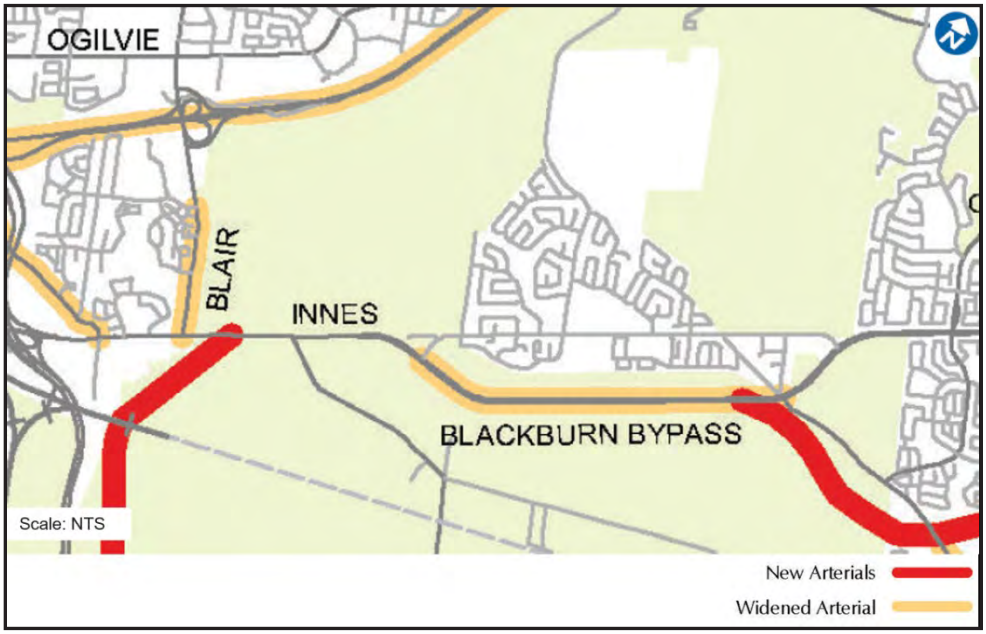

Figure 4-3: Network Road Concept (City of Ottawa TMP)

Other roadway projects are included in the TMP's *2031 Road Network Concept* but not in the *2031 Affordable Road Network*. These include Blackburn Hamlet Bypass widening from 4 to 6 lanes, the new Innes-Walkley-Hunt Club Link (4 lane road with initial 2 lane phase), OR 174 widening to 6 lanes, and Navan Road widening south of Brian Coburn Blvd. to 4 lanes.

The TMP includes the Cumberland Transitway as a fully exclusive Transitway between Blair Station and Frank Kenny Road as part of the *2031 Transit Network Concept* (**Figure 4-4**) but not as part of the *2031 Affordable Transit Network* (**Figure 4-2**) which indicates that it is expected to be constructed after the 2031 horizon.

Other transportation improvements planned to serve the east urban area outside the Greenbelt include the expansion of Ottawa's LRT. Originally, the TMP included an LRT extension from the Blair Station to Place d'Orléans, however, recent planning and funding opportunities have enabled the City to extend the LRT to Trim Road as part of the Stage 2 LRT system, scheduled for operation by 2024. The *2031 Affordable Transit Network* also includes Transit Priority Corridors (either Continuous Lanes or Isolated Measures) on Blair Road, Innes Road, the BHBP, Brian Coburn Blvd. and the BCBE (BHBP to Navan) within the Study Area.

The *Affordable Road and Transit Networks* designation was initially developed based on available funding to construct the infrastructure item by 2031, although funding for implementation continues to be subject to the City's Council approved budget. The *Network Concept* designation indicates that the infrastructure item will be delivered when funding is available.

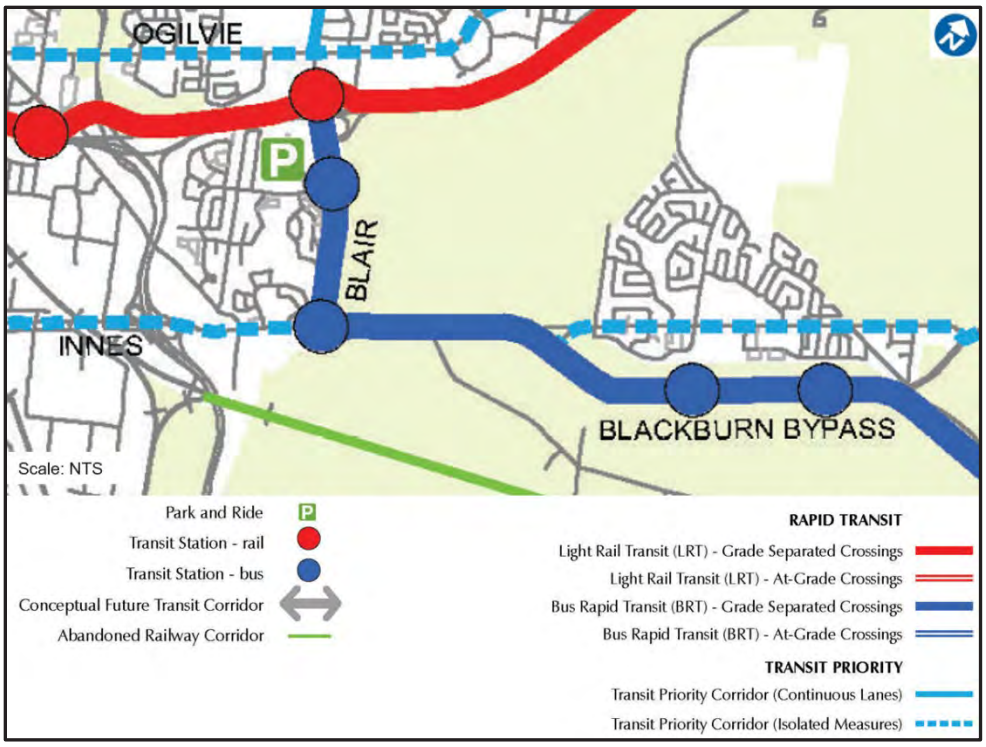

Figure 4-4: 2031 Network Transit Concept (City of Ottawa, TMP)

4.2 Need for the Project

The City's TMP identifies Blair Road as a Transit Priority Corridor and a Spine Cycling Route. As such, a widening of Blair Road by one lane per direction between Innes Road and Meadowbrook Road by 2031 (with long term protection for Bus Rapid Transit) is needed for transit priority.

The City's travel demand forecasting model (i.e., EMME) was used to assess the need for improvements to Blair Road and propose recommendations for any infrastructure improvements within the study area. The EMME model is a city-wide travel demand model that incorporates planned land use developments, transit network upgrades and road network modifications to assess the need for corridor improvements and additional capacity (i.e., widenings and new roadways). This model was updated in 2017 and included the following adjustments (when compared to the previous 2013 version):

- Updated 2031 land use projections,
- Transit routes update related to Stage 2 LRT, and
- Road network modifications
  - Highway 417 weaving section coding changes
  - The easterly extension of LRT to Trim Road by 2023.

Blair Road is identified as a near term transit priority corridor and a future rapid transit corridor.

4.2.1 Projected Travel Demands in Study Area

The communities in the eastern areas of the City are projected to experience continued growth in both population and employment extending up to the 2031 horizon year of the City's TMP and beyond. This growth will require appropriate and targeted transportation infrastructure for transit, auto and Active Transportation (AT) modes to ensure adequate levels of mobility.

The City employs the EMME travel demand model to assist in the determination of the need for transportation infrastructure. The EMME model uses specific inputs related to population and employment, land use, modal share values and other factors to assist in the identification of existing and future traffic/travel demands. This review employs the 2031 traffic demands associated with the TMP's Network Road Concept scenario and includes the following key mobility improvements in the study area:

- Blackburn Hamlet Bypass widening from 4 to 6 lanes,
- The Innes/Walkley/Hunt Club Road link,
- The widening of OR 174 to 6 lanes, and
- The widening of Navan Road to 4 lanes (south of Brian Coburn Boulevard).

The EMME model only provides am peak hour volumes, however, City policies regarding the analysis of roadway performance, requires the use of an ***average hourly value***, which is developed as follows:

- Base 2031 volumes (am peak hour) were provided by the City's Transportation Modelling staff using the EMME model,
- The base 2031 am peak hour volumes were increased by a value of 2.05 to develop peak period volumes (factor used by the City). The peak period volumes represent a 2.5-hour period (i.e., morning peak period),
- The morning peak period volumes were reduced by a factor of 2.5 to obtain *average hourly values,* and
- The *average hourly values (*for the morning peak period) were then used in the assessment of the future roadway performance at the various screenlines.

The process used to develop *average hourly volumes* results in a lower analysis traffic demand value when compared to the use of a single peak hour. This approach accounts for the unused capacity in the shoulders of the peak period and encourages motorists to travel outside of the single peak hour. As such, the *average hourly volume* will result in better roadway performance (i.e., better V/C values) when compared to the *peak hour volume.* **Table 4-1** illustrates the performance (i.e., Volume to Capacity or V/C ratios) for two roadway segments considering *average* 2031 peak direction auto volumes (am peak northbound).

Table 4-1: 2031 Average AM Volume/Capacity - Existing Configuration

	Average Peak Hour/Peak Direction Volume	# Lanes (per Direction)	Lane Capacity (per Direction)	Total Capacity (per Direction)	Volume/ Capacity (V/C)
Blair Road - Innes Road to Meadowbrook Road	924	1	800	800	**1.16***
Blair Road - Meadowbrook Road to OR 174 North Ramp	787	2	800	1600	0.49

**Segment over capacity (i.e., V/C exceeds 0.90)*

The northerly segment which currently provides 4-lanes of travel, will perform acceptably in 2031, though it is projected that the southerly segment (i.e., the existing 2-lane section from Meadowbrook Road to Innes Road) will be well over-capacity by 2031. **Table 4-2** illustrates the projected V/C ratios considering a widening of 1-lane/direction in the southerly section of the Blair Road corridor, consistent with the City's 2013 TMP.

Table 4-2: 2031 Average AM Volume/Capacity with Blair Road Widening

	Average Peak Hour/Peak Direction Volume	# Lanes (per Direction)	Lane Capacity (per Direction)	Total Capacity (per Direction)	Volume/Capacity (V/C)
Blair Road - Innes Road to Meadowbrook Road	924	2	800	1600	0.58
Blair Road - Meadowbrook Road to OR 174 North Ramp	787	2	800	1600	0.49

The addition of 1-lane/direction in the southern section will greatly improve roadway operations in the 2031 horizon. The capacity analysis in this review confirms the widening recommendations of the City's TMP. The above analysis also indicates there is flexibility in terms of how the lane capacity is used/allocated with the opportunity to consider Transit/HOV lanes.

4.2.2 Transit

Blair Road is an important transit route, in large part because of the presence of Blair Station at the north study limits. The LRT network is also under construction easterly to Trim Road. Blair Station will include an LRT/bus interface linking the future Cumberland Transitway BRT and Blair Station. The TMP and the approved Hospital Link/Cumberland Transitway EA Study envision the BRT alignment extending along Blair Road (i.e., east side of the roadway from Innes Road to Blair Station). The 2013 TMP identifies the Cumberland Transitway as a post 2031 requirement.

The EMME model and the TMP Network Transit Concept indicates that up to approximately 1300 transit-person trips will use the Blair Road corridor in the morning peak (northbound) in 2031 or up to approximately 1100 transit-person trips. Transit performance is a function of the type of service currently provided or the type of service that will be provided in the future. Existing transit services which operate in mixed use conditions (i.e., mixed with automobile traffic) will be subject to the same performance issues encountered by automobiles. Better transit performance is projected where transit priority measures or dedicated lanes are provided. It is anticipated that transit enhancements will form part of any recommended plan until the Cumberland Transitway is fully operational.

4.2.3 Roadway Lane Requirements

Notwithstanding the increased use of transit, additional roadway capacity in the southern section of Blair Road, between Innes Road to Meadowbrook Road, will be warranted by 2031. The added lane requirements needed to satisfy the projected 2031 average peak hour auto demand is one lane per direction. The lane requirements are consistent with the City's TMP related to roadway capacity improvements for this corridor. The current lane arrangement for the northerly section (i.e., from Meadowbrook Road to the OR 174 north ramp junction) will suffice to 2031 and beyond.

There are a number of options related to the operation/function of the widened roadway and the abutting sections to the north such as:

- 1 lane/direction for auto use/1 lane/direction for transit use,
- 1 lane/direction for auto use/1 lane/direction for high-occupancy vehicle (HOV) and transit use, and
- 2 lanes/direction for all vehicles with transit priority at select intersections.

4.2.4 Active Transportation Modes

In terms of active transportation (AT) modes, appropriate pedestrian and cycling facilities will be provided along a widened Blair Road, in accordance with City policies and guidelines. This includes, where appropriate, links with existing pathway networks (City and NCC), links with adjacent communities and major commercial developments along the west side of Blair Road, and enhanced access to transit along the Blair Road corridor and at Blair Station.

The 2013 TMP indicates that the "*implementation of rapid transit corridors can present both opportunities for, and obstacles to, walking and cycling. To take advantage of long, linear rapid transit corridors that are separated from busy roads, the City will provide multi-use pathways in or adjacent to those corridors where physical constraints allow and will aim to construct those pathways as part of rapid transit projects. Furthermore, rapid transit station designs will focus on connectivity to pathways in the immediate vicinity. The City will also provide grade-separated opportunities for pedestrians and cyclists to cross rapid transit corridors, where physical constraints allow, considering the nature of demand and the existence of alternative crossing opportunities.*"

4.2.5 Conclusions

The capacity improvements identified in the preceding analysis (i.e., the widening of Blair Road from Innes Road to Meadowbrook Road) confirm the recommendations of the City's 2013 TMP. The form and function of the widened roadway will be assessed through this EA process. However, given the significant projected transit use, it is anticipated that both transit and roadway enhancements will form part of any recommended plan for the near term and longer-term horizons. Further details are available in **Appendix B.**

4.3 Problem / Opportunity Statement

Problem / opportunity identification and definition are critical to the success of any undertaking. A clear understanding of the problem and its related issues, opportunities, and constraints is needed for the recommended solution to achieve its intended objectives.

The widening of Blair Road from Meadowbrook Road to Innes Road is needed to improve transit travel time and service reliability and to address the capacity deficiency in the road network. As presented above, there are several options available related to the operation/function of the widened roadway.

The purpose of this EA is to determine the preferred configuration of a widened Blair Road. Alternatives will be developed considering a variety of design and operational considerations based on the needs of all modes of travel. However, given the significant projected transit use, both transit and roadway enhancements will form

part of any recommended plan. This approach is consistent with the conclusion reached in Morrison Hershfield's Alternatives Identification and Evaluation Memo, available in **Appendix C**.

4.4 Project Objectives

Several project objectives were identified to guide the work on the Blair Road Transit Priority Corridor EA Study. The objectives were identified by the Study Team and, where appropriate, adapted to suit the concerns and feedback of project stakeholders. Potential modifications to the Blair Road Transit Priority Corridor should:

- Improve the level of service for all roadway users/modes of travel,
- Improve transportation service to the existing and future development in the area,
- Improve safety for all roadway users,
- Minimize negative impacts to natural, social, and economic environments,
- Minimize property acquisition requirements,
- Minimize project costs while achieving other objectives,
- Enhance active transportation facilities, and
- Fulfill requirements of the Municipal Class Environmental Assessment process.

5. EXISTING ENVIRONMENTAL CONDITIONS

This section documents the baseline conditions for the Study Area against which the potential environmental effects of the alternatives can be assessed. In this section the report presents the findings of the studies, investigations and policy review undertaken to document the existing conditions within the Study Area. Environmental conditions include natural, social, cultural, built, and economic environments.

Overall, the baseline data was collected and analyzed for key environmental parameters in order to:

- Provide an understanding of existing conditions,
- Allow for predictions of how the proposed project may cause these environmental conditions to change and how those changes can be mitigated, and
- Provide a basis for designing monitoring programs.

The following sub-sections describe the Study Area boundaries and the existing ecological, social, cultural, built environment and economic conditions within the general Study Area. Once a preferred road cross-section design is selected, a detailed update to existing conditions will occur localized to that corridor.

5.1 Study Area

5.1.1 Physical Boundaries

In general, the Study Area falls within the boundaries identified on **Figure 5-1**. The EA study boundaries extend from Innes Road in the south, north approximately 2 km to Blair Road LRT Station. The Study Area is a buffered width of 75 m along either side of the existing road centerline.

5.1.2 Temporal Boundaries

The temporal boundaries of the Study Area will encompass all phases of the project implementation including planning and design, construction, and operation/maintenance.

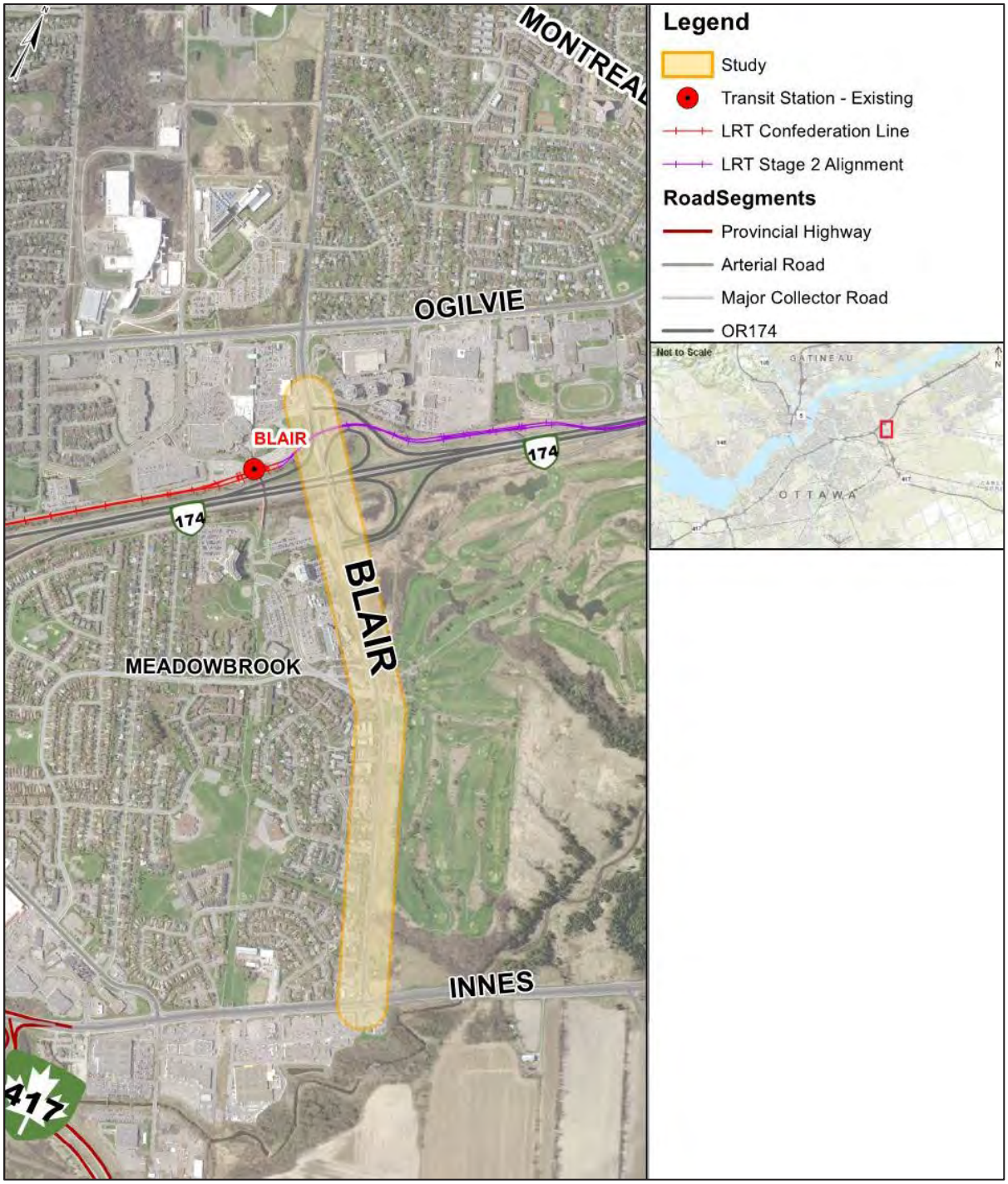

Figure 5-1: Study Area Boundaries

5.2 Natural Environment

5.2.1 Aquatic Environment

The Study Area is located primarily within the western edge of the Green's Creek watershed. Green's Creek flows north for approximately 5 km from the Study Area before draining directly into the Ottawa River **(Figure 5-3**).

The Green's Creek watershed encompasses several subwatersheds: Black Creek Subwatershed and Mud Creek Subwatershed, both of which discharge into Green's Creek. The headwaters of Mud Creek and Black Creek originate from the Mer Bleue Bog, a provincially significant and internationally recognized wetland that exists within the southeast portion of the Study Area.

The Study Area also falls within the eastern extent of the Cyrville Drain watershed. Cyrville Municipal Drain originates at St. Laurent Boulevard south of Highway 417 and flows southeast to its confluence with Green's Creek The land use within the Cyrville Drain watershed is highly urbanized and consists of mainly industrial, residential, and commercial properties. The study area is within the jurisdiction of the Rideau Valley Conservation Authority (RVCA), with regulated areas illustrated on **Figure 5-2**.

Figure 5-2: Rideau Valley Conservation Authority Regulation Limits and Watershed Catchment Areas

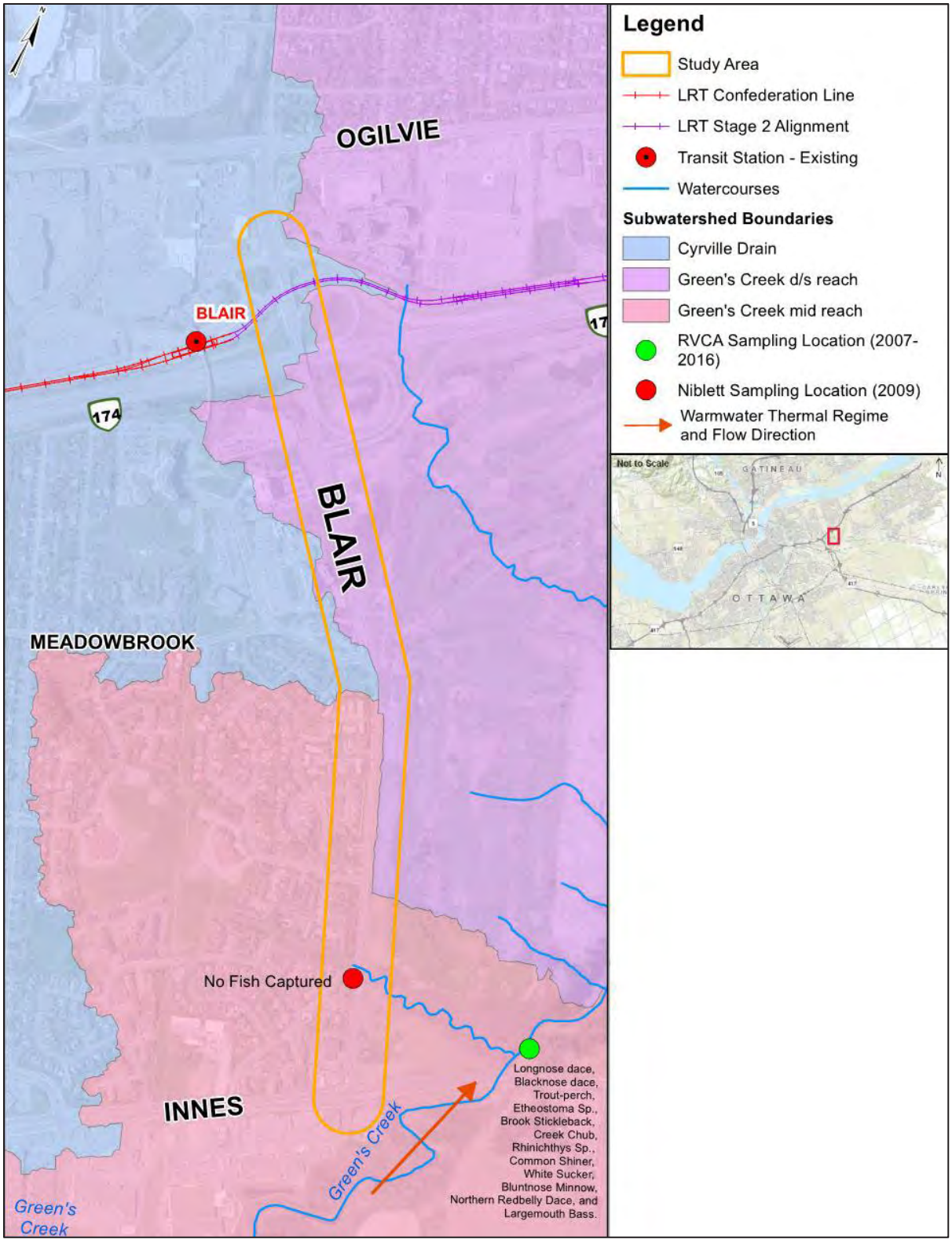

Figure 5-3: Fish and Fish Habitat

5.2.1.1 Surface Water

Green's Creek

The Green's Creek watershed is an important link between the Mer Bleue Bog wetland and the Ottawa River, where it outflows approximately 0.8 km downstream of the Sir George Etienne Parkway. In addition to the Mer Bleue headwaters, drainage from four (4) primary tributaries including Borthwick Creek, Black Creek, Mud Creek and Ramsay Creek contribute to flows within Green's Creek. The Green's Creek main-stem channel meanders through deeply incised channels as a result of the predominant leda clay-based substrates giving rise to highly unstable slopes. Frequent occurrences of slope failure and landslides, primarily between St. Joseph Blvd. and Innes Rd. have occurred within this section of the Green's Creek watershed. Nonetheless, Green's Creek has maintained a relatively high percentage of natural riparian buffer within the watershed compared to other urban streams within the City of Ottawa as more than 70% of the 13.4 km stream length surveyed by City Stream Watch possesses a buffer width of 30 m or greater (RVCA, 2016). The extensive natural features retained within the Green's Creek watershed is further exemplified by the limited percent of anthropogenic alteration along the main stem of the channel. Based on the 2016 City Stream Watch assessment along Green's Creek, approximately 69% of the channel has remained either unaltered or natural (RVCA, 2016).

Mud Creek Subwatershed

Mud Creek originates at the Mer Bleue Bog located at the southern extent of the Study Area, which provides much of the headwater flow with additional flow arising from drainage of adjacent agricultural and residential land uses. One named drainage feature, the James Blais Municipal Drain, contributes to flow for one of the Mud Creek tributaries and is located within the Chapel Hill South residential area along the north side of Renaud Road and Navan Road. The outlet of Mud Creek to Green's Creek is located approximately 0.65 km north of Innes Road. Mud Creek has experienced anthropogenic changes, such as road crossings, shoreline/instream modifications and little to no riparian buffer, however, nearly 50% of the creek has remained unaltered (RVCA, 2012b). Most of the remaining unaltered/natural reaches of the creek exist within 4 km upstream of the confluence with Green's Creek (middle and lower reaches).

Black Creek Subwatershed

The main stem of Black Creek is located approximately 1.2 km south of Mud Creek and flows parallel to Mud Creek in a westerly

direction before draining into Green's Creek. The confluence at Green's Creek is approximately 200 m east of Cyrville Road, which is located near the southwest limit of the Study Area. Black Creek also originates at the Mer Bleue Bog as this wetland is the primary headwater feature for the creek. Part of the Black Creek main-stem channel is a municipal drainage feature, the Lacroix Drain, which is located within the Mer Bleue Bog east of Anderson Road. The City Stream Watch program surveyed Black Creek in 2012 between Anderson Road and the confluence with Green's Creek. Through this stream survey, it was determined that most of Black Creek has been subject to anthropogenic changes that have altered the Creek's natural features resulting in approximately 8% of the Creek remaining unaltered (RVCA, 2012a). This can likely be attributed to the agricultural land uses present throughout much of the Black Creek subwatershed. Overall, there is limited residential development along Black Creek.

Cyrville Drain Subwatershed

Cyrville Municipal Drain consists of two main stems which are referred to by their north and south positions within the watershed. North Cyrville Drain originates near Montreal Road in Gloucester and flows south for approximately 4 km to its confluence with the south branch located northeast of the Innes Road and Highway 417 intersection. South Cyrville Drain originates at St. Laurent Boulevard south of Highway 417 and flows in a general southeast direction for approximately 1.8 km towards its confluence with the north branch as described above. From the confluence of the north and south branches, the main channel joins Green's Creek immediately southeast of the Innes Road and Highway 417 intersection. Although the Study Area overlaps the eastern portion of the Cyrville Drain Watershed, no contributing channels of Cyrville Drain exist within the Study Area (MNRF, 2015a; RVCA, n.d.).

5.2.1.2 Fisheries

Generally, fish species found within the watercourses that flow through the Study Area are reflective of the watercourse's specific thermal regimes (**Figure 5-3**).

Green's Creek

Results of the 2016 City Stream Watch assessment indicate that Green's Creek is primarily a warmwater system with cooler temperatures observed within the upper reaches. The fish community within Green's Creek consists of a wide range of species from bait/forage fish to recreational species, however, the recreational fish species have predominantly been captured near

the outlet to the Ottawa River. With respect to the Study Area, RVCA was able to provide background information from fish community sampling that was carried out in 2010 and 2016 immediately downstream of Innes Road.

The fish community within the Study Area and the downstream reaches primarily consists of diverse bait/forage fish species who prefer warmwater and coolwater conditions, as well as recreational species with similar thermal regime preferences. A small proportion of the fish species identified within the Study Area, including Burbot and Trout-Perch, prefer coldwater conditions.

A fish community and freshwater mussel community sampling was completed by Morrison Hershfield Limited (MH) at the Green's Creek Ottawa Road (OR) 174 culvert crossing as part of the Capital Transit Partners Stage 2 (CTP2) Ottawa LRT Preliminary Design Study in 2017. The survey captured young-of-year Burbot. The freshwater mussel sampling resulted in the capture of (3) species not previously known within the creek including Eastern Elliptio (*Elliptio complanata*), Cylindrical Papershell (*Anodontoides ferussacianus*), and Fragile Papershell (*Leptodea fragilis*). The distribution of the freshwater mussels throughout the upper reaches within the Study Area are not well known.

Through field investigations during the early fall of 2020, it was determined that the unnamed tributary of Green's Creek crossing Blair Road approximately 280 m north of Innes Road supports indirect fish habitat (**Appendix D**). There was no important or sensitive habitat identified at the unnamed tributary of Green's Creek and no federally or provincially protected aquatic SAR (i.e., listed as Endangered or Threatened) are known to exist within Green's Creek.

Mud Creek

The thermal regime of Mud Creek has been classified as warmwater and is known to support a diverse bait/forage fish community. Based on fish community sampling completed by the City Stream Watch program in 2012, many fish species including pumpkinseed (*Lepomis gibbosus*), Creek Chub and Northern Redbelly Dace were captured along Mud Creek within the limits of the Study Area. In addition to fish and fish habitat surveys completed through the City Stream Watch Program, fisheries investigations at various tributaries and drainage features of Mud Creek were also conducted. These surveys were completed in 2009 as part of the Hospital Link and Cumberland Transitway Connection EA. Of the eight (8) reaches that were surveyed, fish were captured at five (5) reaches and no additional species were identified. Overall, the species inventory list shows the diversity

and range of species (i.e., bait/forage fish and recreational species) increases within Mud Creek closer to the outlet to Green's Creek.

Black Creek

Although the main stem of Black Creek falls outside of the Study Area, tributaries of Black Creek extend north to within the study limits. City Stream Watch thermal regime assessments indicate that Black Creek is classified as a coolwater system. Fish community sampling conducted in 2007 and 2012 during the City Stream Watch stream assessments have resulted in the capture of a number of fish species upstream and downstream. The species list indicates the primary fish community present within Black Creek includes coolwater bait/forage fish species along with a few coarse fish species including Brown Bullhead and Burbot.

5.2.1.3 Aquatic/Fisheries Species at Risk

It should be noted that background information indicated the presence of one (1) aquatic SAR within Green's Creek, River Redhorse (Special Concern under the *Species at Risk Act S.C. 2002* (SARA) and the *Ontario Endangered Species Act S.O. 2007*, however, given the fact that the unnamed tributary provides indirect fish habitat, impacts to this species are not expected. Additional details relating to the fisheries field investigations and the determination of indirect habitat are provided in **Appendix D**.

5.2.2 Terrestrial Environment

Existing conditions of the terrestrial environment have been evaluated by Morrison Hershfield and involved undertaking a review of existing background information compiled from a variety of sources, including the Ontario Ministry of Natural Resources and Forestry (MNRF), the City of Ottawa, Committee on the Status of Endangered Wildlife in Canada (COSEWIC), ECCC and Land Information Ontario (LIO). In addition, reviews of aerial photography and direct communication with MNRF have been undertaken. The following have been determined not to occur within or adjacent to the project footprint:

- Urban Natural Areas (UNA)
- Rare vegetation communities
- Documented unevaluated wetlands (LIO)
- Provincially significant wetlands

5.2.2.1 Natural Heritage Features

Within the Blair Road Corridor there are few identified natural heritage features (**Figure 5-5**). A wooded area is identified on the west side of Blair Road, north of Meadowbrook Road and south of OR174. An unevaluated wetland is also identified in the southeast corner of the Study Area, forming a part of the Green's Creek Conservation Area.

Designated Natural Areas are defined by resource agencies, municipalities, the government and/or public, through legislation, policies, or approved management plans, to have special or unique value. Such areas may have a variety of ecological, recreational, and/or aesthetic features and functions that are highly valued and are described in greater detail below.

Areas of Natural and Scientific Interest (ANSIs) – Life Science

Green's Creek Conservation Area

Green's Creek Conservation Area is situated in the southeast of the Study Area and forms part of the NCC's Greenbelt. The Green's Creek catchment supports a variety of provincially and regionally rare species. Its geology is unique due to the presence of two (2) types of leda clay, which create inherent slope instability (RVCA, 2016). The slope instability is exacerbated by increased flows due to adjacent development and agriculture (RVCA, 2016). The forest cover is a complex of deciduous and mixed woodland, with young to mature Sugar Maple, Trembling Aspen, Eastern Hemlock, White Spruce and Eastern White Pine on drier slopes. White Pine and White Cedar are common on the Creek's steep, eroding slopes along with deciduous thicket swamps.

Unevaluated Wetlands

Field investigations completed by Morrison Hershfield to ground-truth existing conditions within the study area confirmed the presence of wetlands on the east side of Blair Road just south of the OR174, within non-federal lands as shown on **Figure 5-4**. The wetland feature was observed by MH during field surveys and determined to be approximately 3.3 ha in size. These Cattail Mineral Shallow Marsh areas (MASM1-1) did not have significant habitat characteristics and were drainage areas, however they may provide breeding habitat for common amphibian species.

Field investigations also verified the presence of a small 0.14 ha Common Reed Mineral Shallow Marsh (MASM1-12) area immediately north of a commercial and Institutional area. It was dominated by non-native Common Reed and contained no significant ecological attributes.

Figure 5-4: Ecological Land Classification Habitat Types within the Study Aera

Designated Natural Areas

The Fresh Moist Lowland Deciduous Forest (FOD7) approximately 225 m north of Innes Road on the west side of Blair Road has been identified by LIO as a Significant Ecological Area. This same area is identified under the City of Ottawa Official Plans as a Natural Heritage System Feature on Schedule L1, and as a Natural Environment Area on Schedule B. This forest is within the NCC's Greenbelt, thus was not part of the City of Ottawa Urban Natural Area Study (2005). During the surveys, the forest was noted as having the following notable features:

- Containing a watercourse with permanent flow
- Containing mature, distinct trees (≥50 cm diameter at breast height)
- Containing moderate proportions of invasive and non-native plant species (Common Buckthorn)
- Creek was subject to serious erosion which was noticeable on the banks in several areas

- Creek contained a moderate amount of garbage (e.g., polystyrene insulation, household garbage)

Significant Wetlands

Wetlands are known to provide key ecological functions and are a key component in hydrologic functions. The *Provincial Policy Statement* (PPS) 2020, prohibits development and site alteration in significant wetlands, also referred to as Provincially Significant Wetlands (PS's). The nearest PSW is the Mer Bleue Bog located approximately 2.2 km southeast of Blair Road.

5.2.3 Wildlife

Based on a review of aerial imagery and background information (**Figure 5-5**), the Study Area has been identified as potentially containing:

- Potential Specialized Habitat for Wildlife: Amphibian Woodland and Wetland Breeding – located in the LIO wetland east of Blair Road, 260 m north of Innes Road; Turtle Nesting –turtles travel from Green's Creek several hundred metres to the east of the Study Area.
- Potential habitat for Special Concern species within the Study Area including Monarch butterfly (within meadow areas and residential neighborhoods) and Eastern Milksnake (within wet and dry meadows and near residential areas).
- Potential Marsh Breeding Bird Habitat: Low Quality potential habitat is present within the shallow marsh communities as open shallow water is ephemeral and small (>400 m^2).

5.2.3.1 Vegetation and Insect Species of Conservation Concern

Species of Conservation Concern includes species that may be locally rare or in decline, but that have not yet reached the level of rarity that is normally associated with **"**Endangered" or "Threatened" designations under the *Ontario Endangered Species Act S.O. 2007*. This information is from the Natural Heritage Information Centre (NHIC) data and presented in **Table 5-1**.

Table 5-1: Vegetation of Conservation Concern

Species of Conservation Concern			Rank/ COSEWIC Status
Species Group	**Common Name**	**Scientific Name**	
Plants and Lichens	Woodland Pinedrops	*Pterospora andromedea*	S2
	Blistered Jellyskin	*Leptogium corticola*	S2
	Cupped Fringe Lichen	*Heterodermia hypoleuca*	S2

	Large Purple Fringed Orchid	*Platanthera grandiflora*	S1
	Southern Twayblade	*Neottia bifolia*	S1

Status Ranks

SH: Only known from historical occurrences
S1: Critically imperiled (territory/province)
S2: Imperiled (territory/province level)

5.2.3.1 Animal Movement Corridors

Animal movement corridors are elongated areas that are used by wildlife to move from one habitat to another habitat (MNRF, 2015b). The following animal movement corridors are potentially located in the Study Area:

Amphibian Movement Corridors (Terrestrial): Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations. These may be located on the east side of Blair Road, near the wetland on federal lands approximately 260 m north of Innes Road (**Figure 5-5**).

5.2.3.2 Terrestrial Species at Risk

The following threatened or endangered species at risk, as specified under the *Ontario Endangered Species Act* or SARA either have been identified as present in the general area (historically or more recently), or they may potentially be found within the Study Area. The list of species is present in the Table below (**Table 5-2**). Based on the information in the table below, the only species that may be present are Barn Swallow and Butternut, with the former only being present during spring, summer, and fall. Blanding's Turtle would be only potentially present as an individual passing through the study area on a very occasional basis.

Field surveys were conducted to ground-truth the terrestrial background information collected as well as to expand upon the knowledge of terrestrial SAR and SAR habitat existing conditions within the project area. The terrestrial field surveys were carried out on September 21 and October 22, 2020, during suitable weather conditions, with low wind, low cloud cover (<25%), and no precipitation. Details of these surveys are available in **Appendix E**.

The results of the SAR habitat screening determined that 9 SAR have suitable habitat present within the study area (**Table 5-2**). These include several SAR that may use the project area for only one of their habitat requirements, such as foraging.

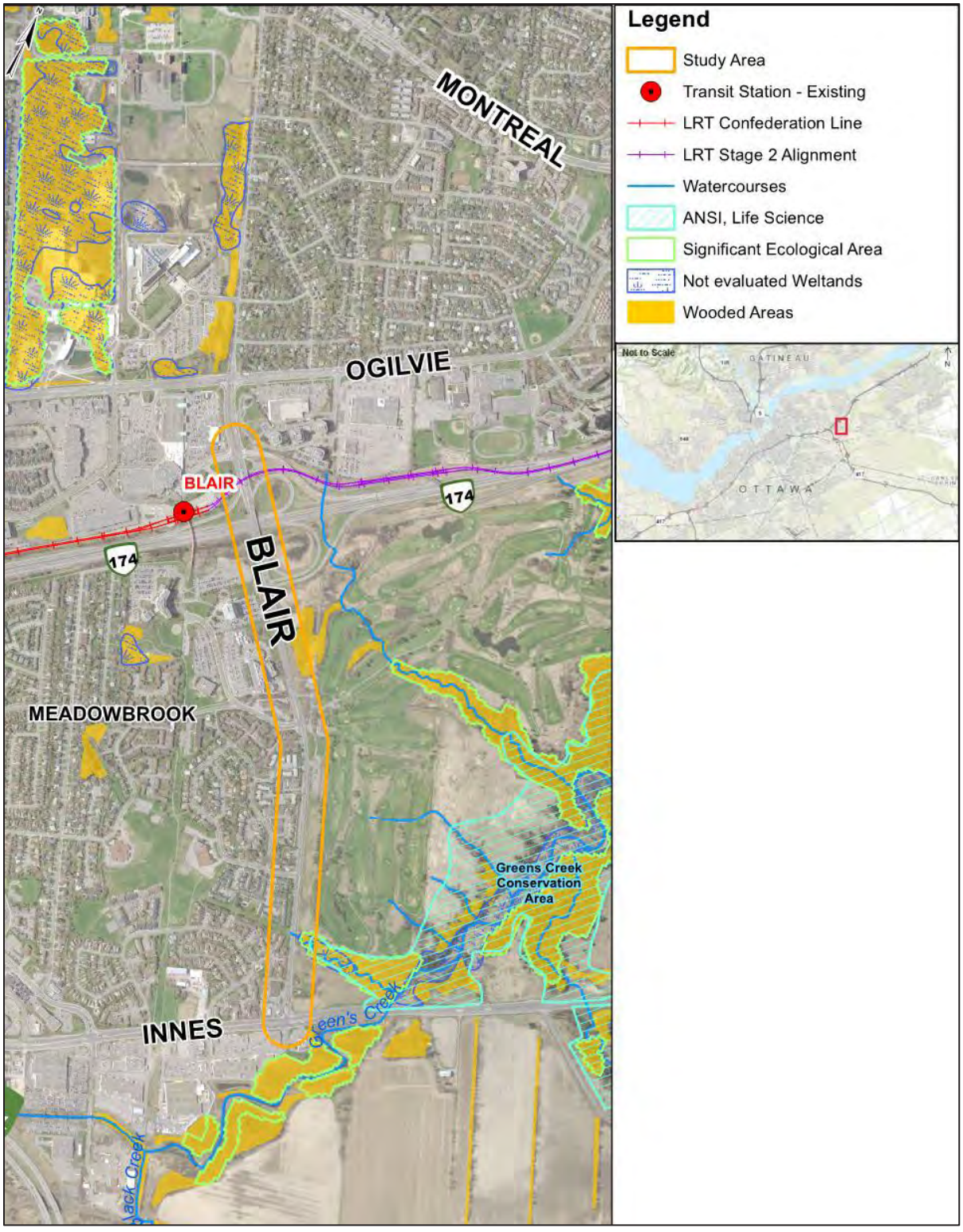

Figure 5-5: Natural Features

Table 5-2: Species at Risk with Habitat Presence in the Study Area

Common Name	Scientific Name	Federal Status	Provincial Status	Potential Habitat Within Study Area[1]	Is Species Present in the Study Area?
Canada Warbler	*Cardellina canadensis*	Threatened	Special concern	Yes, within FOD7.	Unknown; however, there are confirmed observations ~ 1.6 km from the study area.
Eastern Wood-pewee	*Contopus virens*	Special Concern	Special concern	Yes, within WOD, CGL_1, and FOD7.	Unknown; however, there are confirmed observations ~ 0.35 km from the study area.
Eastern Small-footed Myotis	*Myotis leibii*	No Status	Endangered	Yes, foraging and day-roosting may be present.	Unknown; however, there are confirmed observations within Ottawa.
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Yes, foraging and day-roosting present. Maternity roosts may be present within houses, buildings, and sheds adjacent study area.	Unknown; however, there are confirmed observations within Ottawa.
Milksnake	*Lampropeltis triangulum*	Special Concern	No status	Yes, within THD, MEM, WOD, CGL_1, FOD7, MASM1-1, and naturalized areas near water within CV1, CVR, and CVC.	Unknown; however, there are confirmed observations ~ 2 km from the study area.
Northern Myotis	*Myotis septentrionalis*	Endangered	Endangered	Yes, within WOD, CGL_1, CVR, and FOD7.	Unknown; however, there are confirmed observations within Ottawa.

[1] Habitat codes are part of the Ecological Land Classification system. See Acronym List and/or Figure 5-4 for full habitat type names.

Common Name	Scientific Name	Federal Status	Provincial Status	Potential Habitat Within Study Area[1]	Is Species Present in the Study Area?
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Threatened	Special concern	Yes, within WOD, CGL_1, CVR, CVC, and FOD7.	Unknown; however, there are confirmed observations ~ 7.5 km from the study area.
Short-eared Owl	*Asio flammeus*	Special Concern	Special concern	Yes, within MEM and possibly CGL_1.	Unknown; however, there are confirmed observations ~ 2.3 km from the study area.
Tri-colored Bat	*Perimyotis subflavus*	Endangered	Endangered	Yes, foraging and day-roosting may be present.	Unknown; however, there are confirmed observations within Ottawa.

5.2.4 Geological Environment

The geologic subsurface conditions were established based on a review of the Published Geologic Survey of Canada mapping; past geotechnical reports undertaken within the Study Area (Golder Associates Ltd. and McRostie Genest St-Louis and Associates); and reports published in the Ontario Ministry of Transportation GEOCRES Library (Golder Associates Ltd., 2017).

5.2.4.1 Bedrock Geology

Depths to bedrock range from 25 - 50 m over the Study Area. The Study Area bedrock consists primarily of shale (Billings Formation) (**Figure 5-6**). Bedrock outcrops are encountered at the crossing of Green's Creek at Innes Road.

5.2.4.2 Surficial Geology

The Study Area is within the physiographic region known as the Ottawa Valley Clay Plain characterized by an extensive deposit of marine clay deposited within the Champlain Sea basin, interrupted by sand or bedrock ridges. Along the Blair Road corridor subsurface conditions generally consist of glacial till overlaying shale bedrock, with the exception of east of Blair Road and along Innes Road where a silty clay deposit is present (Golder Associates Ltd., 2010; **Figure 5-7**).

5.2.4.3 Groundwater

Within the glacial till and bedrock, groundwater levels were generally lower (from approximately 1 - 8 m in depth). Groundwater levels are expected to fluctuate seasonally with higher groundwater levels in spring.

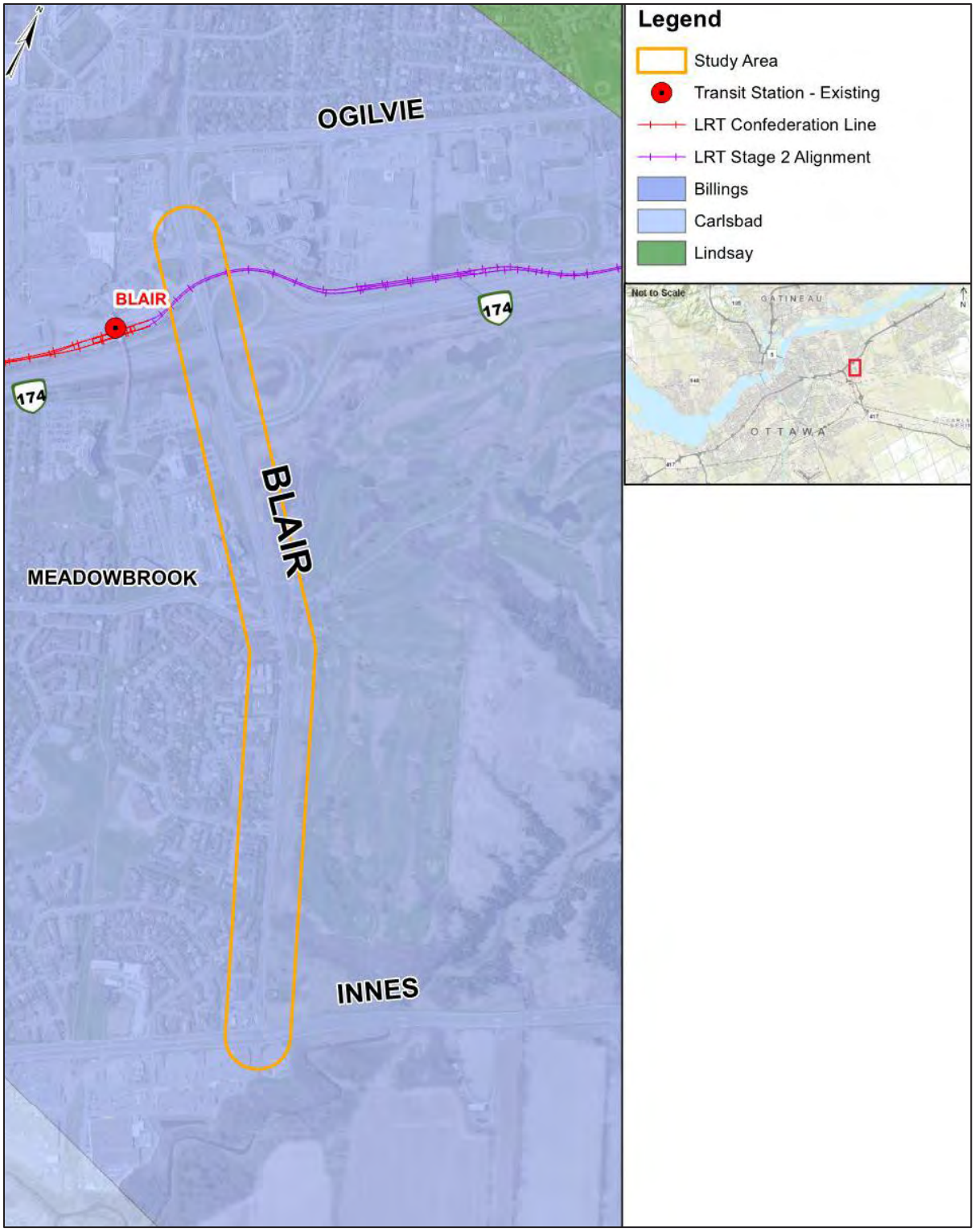

Figure 5-6: Bedrock Geology

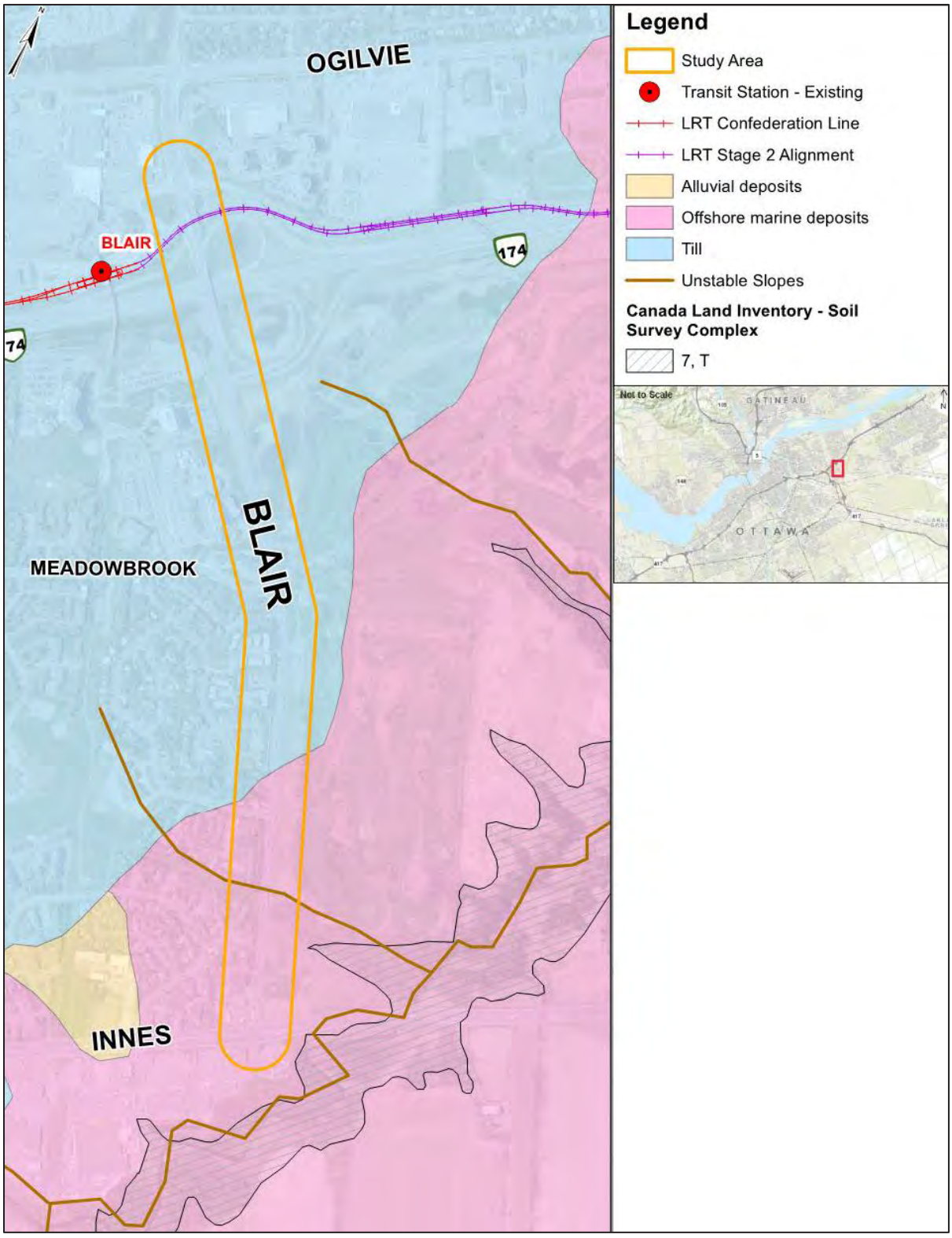

Figure 5-7: Surficial Geology

5.2.4.4 Slopes and Ravines

Schedule K of the City's Official Plan identifies unstable slopes within the Study Area, which are predominantly found along Green's Creek. The Green's Creek main-stem channel meanders through deeply incised channels as a result of the predominantly clay based substrates. This characteristic of highly unstable slopes within the Green's Creek watershed has led to frequent occurrences of slope failure and landslides, primarily between St. Joseph Blvd and Innes Rd (RVCA, 2016). Just upstream of Innes Road, the Green's Creek valley system is approximately 5 m in height. This height increases significantly downstream of Innes Road.

The Canada Land Inventory is an interpretative system for assessing the effects of climate and soil characteristics as they relate to agriculture. The system classifies mineral soils into seven groups according to their potentials and limitations, with the first three classes (Classes 1-3) capable of sustained production of cultivated field crops and are considered prime agricultural land resources (OMAFRA, 2020). The seventh class (Class 7) has no agricultural capability and includes marsh, rockland and soil on very steep slopes (OMAFRA, 2020). Various soil subclasses further identify limitations of the soils on agriculture. As it relates to steep slopes, Subclass T - Topography denotes limitations due to slope steepness and length (OMAFRA, 2020). As depicted in **Figure 5-7**, soils classified as 7,T are located to the east and adjacent to the Study Area, indicating steep and/or long slopes.

5.3 Social Environment

5.3.1 Federal Planning Policies

National Capital Act

The Parliament of Canada passed the *National Capital Act* in 1985. This Act established the NCC, a Crown corporation whose responsibility is "to prepare plans for and assist in the development, conservation and improvement of the National Capital Region in order that the nature and character of the seat of the Government of Canada may be in accordance with its national significance." (R.S.C. 1985, c. N-4, s. 10.1).

The 2013 Greenbelt Master Plan, which sets out the planning policies for the use and development of all Greenbelt lands, is one of the plans that has been prepared to fulfill this requirement. Additionally, the NCC is mandated to "coordinate the development of public lands in the National Capital Region (NCR)", which includes reviewing all changes of land, use, construction, demolition, or other works on federal lands in the region. The

NCC carries out this function through its Federal Land Use and Transaction Design processes, which takes the entire study area into consideration.

Plan for Canada's Capital

The renewed mandate of the NCC has brought into focus the importance of successful long-term planning and decisive stewardship actions to ensure that the Capital is worthy of its important national role. The Plan for Canada's Capital (PFCC, 2017) is the preeminent planning document of the NCC and its Capital Planning Framework.

The PFCC outlines a framework for the continued evolution of the Capital to ensure it remains a welcoming and beautiful place, and that it makes Canadians proud.

The PFCC notes that in 2067, the Greenbelt will remain a fundamental part of the region's vast network of natural spaces, in the midst of an urbanized region. The projected population increase will have an impact on the Greenbelt, as those green open lands will become more of a rarity. Much of the growth within the City of Ottawa could take place in communities adjacent to the Greenbelt. Key policy direction for the Greenbelt are identified in the PFCC for the next 50 years, and include:

- Where new infrastructure must cross the Greenbelt since it is demonstrated that there is no other viable alternative, the NCC will encourage clustering of the infrastructure in corridors to avoid further fragmentation of the land base. Any proposed new transportation infrastructure must be evaluated through the cumulative effects assessment process the NCC has jointly established with the City of Ottawa.

With regards to policy directions related to the Capital and the regional economy over the next 50 years the PFCC states that:

- Changes to federal accommodations will include locating facilities near readily available transit, and retrofitting or replacing buildings with more energy efficient design will contribute to regional sustainability and reduce environmental impacts; and
- In all aspects of its mandate, the NCC will support the use and development of smart technologies, and the sharing and exchange of information through partnerships with other federal agencies and the municipalities, when appropriate.

NCC 2013 Greenbelt Master Plan

The PFCC is the high-level strategic plan for all federal lands in the Capital, while the master plans such as the Greenbelt Master Plan (GMP) provide more specific policy direction to guide area planning, development, and management decisions. The 1996 GMP established land use strategies to provide recreation and attractive landscapes, to improve damaged and abandoned lands, to secure natural spaces and to support agriculture and forestry (NCC, 2013). The NCC's 2013 GMP takes into account the extent to which the Greenbelt is presently meeting these objectives and looks ahead to where the Greenbelt could be in 2067.

The GMP takes an integrated land use planning approach that incorporates ecological, economic and social factors in Plan proposals and policies. The GMP sets policies for:

- Protected ecologically significant habitats,
- A connected system of natural lands,
- Sustainable farming,
- Capital experiences, achieved through completion of a recreational pathway system and offering visitor features such as trails, protected views, and interpretation areas,
- Greenbelt profile and environmental leadership, and
- Federal and non-federal facilities which respect the Greenbelt roles of Natural Environment, Sustainable Agriculture and Capital Experiences and Recreation and which demonstrate sustainable design and operations.

Transportation infrastructure within the GMP framework is identified in Section 6.7 of the GMP. The Plan notes that this infrastructure has considerable impacts on the Greenbelt environment, including noise, visual nuisance, habitat loss and fragmentation, and pollution of air, water, and land. Devaluation of the landscape and of natural areas in terms of their recreation and tourism value can also be a significant economic factor. The NCC is committed to achieving sustainable transportation that complies with environmental conservation best practices in the Greenbelt, through collaboration with partners and stakeholders. The NCC will promote and give preference to sustainable, safe, and active transportation infrastructure that is consistent with the vision, roles and goals of the Greenbelt and is in accordance with the following policies:

(a) Future transportation infrastructure projects that are proposed to be located within or adjacent to the Greenbelt will be considered according to the categories determined through the Cumulative Effects Assessment Study.
(b) Work with the City of Ottawa, and other authorities to ensure that projects listed, are planned from the earliest stage to ensure early

consultation and collaboration with, and consideration of the input of the NCC.

(c) Apply the “No net loss” ecological principle to transportation infrastructure projects, through identification and implementation of appropriate mitigation measures. Off-site restoration may be sought where on-site restoration cannot be achieved.

(d) Required, of proponents of any future new transportation infrastructure or improvement to existing transportation infrastructure, a thorough assessment of the loss in environmental value resulting from any such proposal(s), such assessment to include a cumulative effects component.

(e) Work with the City of Ottawa and other jurisdictions with the aim of closing unopened road allowances and existing low volume roads in the Greenbelt.

(f) Give priority to transport demand management measures when assessing new infrastructure proposals that respond to increasing demand for access to and within the Greenbelt.

(g) Apply context sensitive design best practices to transportation infrastructure projects that aim to conserve Greenbelt natural and visual resources. Take landscape ecology principles into account in order to achieve ecological connectivity and wildlife safety. Include measures that seek to “blend” the infrastructure project into the Greenbelt landscape and protect views. Require the incorporation of wildlife-friendly designs and crossing facilities, where appropriate, in transportation infrastructure projects that affect natural areas on the Greenbelt.

(h) Work with proponents of transportation infrastructure projects to ensure the provision of a symbolic and distinctive sense of place and arrival, to and through the Greenbelt.

(i) Discourage Park-and-Ride facilities from locating within the Greenbelt.

(j) Identify and implement measures to mitigate the deficiencies of existing transportation corridors and other structures and their impacts upon terrestrial and aquatic habitat.

(k) Encourage the reduction or elimination of unnecessary lighting along transportation routes and at facilities in the Greenbelt to help achieve a night sky quality, without compromising safety.

(l) Work with stakeholders to monitor and evaluate the extent of fragmentation caused by transportation projects and determine the effectiveness of mitigation measures.

(m) Maintain and enhance the continuity of recreational pathways and natural links in the planning, design, and function of transportation infrastructure.

Assessment of Cumulative Effects of Transportation Infrastructure on the National Capital Greenbelt

The *Assessment of Cumulative Effects of Transportation Infrastructure on the National Capital Greenbelt* (2012) *[Cumulative Effects Assessment]* was undertaken in partnership by the NCC and the City of Ottawa to identify projects within the TMP and other transportation projects that could have an impact on the environmental integrity of the federal Greenbelt lands.

The Study 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. Blair Road BRT was included in the Hospital Link and Cumberland Transitway Westerly EA Report (2011), which was included in the Cumulative Effects Assessment (CEA). The Cumberland Transitway was recognized in the CEA for it' s contribution in the reduction of automobile travel however it also has a higher contribution to cumulative effects than the other projects included in the study. It was identified as one of eight Category 1 projects requiring mitigation.

Pathway Network for Canada's Capital Region, 2006 Strategic Plan

The 2006 Pathway Network Strategic Plan is a comprehensive strategy and vision for the planning, management, and expansion of the Capital pathway network. The 2006 Strategic Plan, prepared by the NCC in partnership with the City of Ottawa and the Ville de Gatineau, complements the NCC's Plan for Canada's Capital, and sets out a clear and common vision for the integrated network of pathways within Canada's Capital Region. While the Strategic Plan does not identify projects for implementation, it does include objectives, strategies, and policies to promote the safety and enjoyment of the pathways and ensures that the potential of the network is optimized.

5.3.2 Provincial Planning Policy

Political Policy Statement

The Provincial Policy Statement (PPS), 2020, is authorized under Section 3 of the *Planning Act, R.S.O. 1990*. It contains policies relating to a wide range of areas of Provincial interest and it recognizes and addresses the complex inter-relationships among environmental, economic, and social factors in land use planning. Of relevance in regard to the study are policies that relate to recreation, transportation systems and infrastructure, long-term economic prosperity, and the protection of natural, cultural, and built heritage. In particular, the PPS promotes:

- Healthy and active communities by facilitating active transportation and community connectivity,

- The planning for and protection of corridors and rights-of-way for transportation infrastructure and transit to meet current and projected needs,
- Providing a safe, efficient, cost-effective, and reliable multimodal transportation systems that facilitate the movement of people, are integrated with adjacent systems and are appropriate to address projected needs,
- Maintaining or restoring the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems and recognizing linkages between and among natural heritage features and areas, surface water features and ground water features,
- Restricting development and site alteration in or adjacent to significant natural areas unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions,
- Restricting development and site alteration in habitat of endangered or threatened species except in accordance with provincial and federal requirements,
- Restricting development and site alteration in or near sensitive surface or groundwater features such that their features and related hydrological functions will be protected, improved, or restored, and
- Conserving heritage and significant cultural heritage landscapes.

5.3.3 Municipal Planning

City of Ottawa Official Plan

The City of Ottawa Official Plan (OP) provides a vision for the future growth of the city and a policy framework to guide the city's physical development to the year 2031. It is a legal document that addresses matters of provincial interest defined by the *Planning Act* and the PPS. The City of Ottawa's OP was adopted by City Council in May 2003 and approved by the Minister of Municipal Affairs and Housing in November 2003. Two major updates to the OP were adopted as part of a comprehensive review of the City's Official Plan completed in 2013. On November 26, 2013 Ottawa City Council unanimously approved the Official Plan Amendment #150 (OPA150); the plan was approved by the Minister of Municipal Affairs on April 24, 2014 although appeals are still pending. Policies contained within the approved plan update are still considered council policy pending appeals.

The purpose of OPA#180 is to make changes to the various parts of the Official Plan to implement changes recommended by the Employment Land Review, the Land Evaluation and Area Review (LEAR) for Agricultural Land and the extension of the planning horizon for the Official Plan to 2036. This amendment constitutes part of the comprehensive 5-year review undertaken by the City in 2013 and as required by Section 26 of the *Planning Act*. Official Plan Amendment 180 was adopted by By-law 2017-19 on January 25th 2017 and is forwarded to the Ministry of Municipal Affairs

and Housing for provincial approval. Once Ministerial approval is given those persons who have already registered with the City will be notified by the Ministry.

Section 2 of the OP details the geography of growth and highlights growth projections, households, and employment. Section 2 of the OP further details how the City will manage that growth, provide infrastructure, maintain the environmental integrity within the city limits, and policy for the development of livable communities. Section 3 of the OP provides more detailed direction for the use of land within specific areas of the city. These areas are identified by land-use designations which describe an area of land within which a specific set of policies applies. The first policy typically identifies the objective of the designation. Subsequent policies, taken together, provide a framework for making land-use decisions within the designation. Area specific land use designations within the Study Area are detailed below. **Figure 5-8** displays the OP land use designations within the Study Area.

5.3.3.1 Secondary Plans and Transit-Oriented Development Guidelines

The East Urban Community (EUC) of the southeast Orléans area is a 570-hectare parcel of relatively urban land that has been designated as a Developing Community within the City of Ottawa OP. The proposed plan for the entire EUC area includes an addition of 6,700 residential units, accommodating 18,110 new residents (CH2M, 2018).

There is one *Secondary Plan* within the land use planning Study Area, and one TOD Plan, both of which are located at the northern extent of the Study Area, around Blair Station.

Blair Secondary Plan (2015)

The Blair Secondary Plan provides direction on maximum building heights and minimum densities within the planning area identified within the Blair Transit-Oriented Development Plan to prioritize development intensification that is transit oriented and accessible to pedestrians, cyclists, and vehicles (**Figure 5-9**; City of Ottawa, 2015a). The TOD area is defined as an area within an approximate 800 m walk from a transit station.

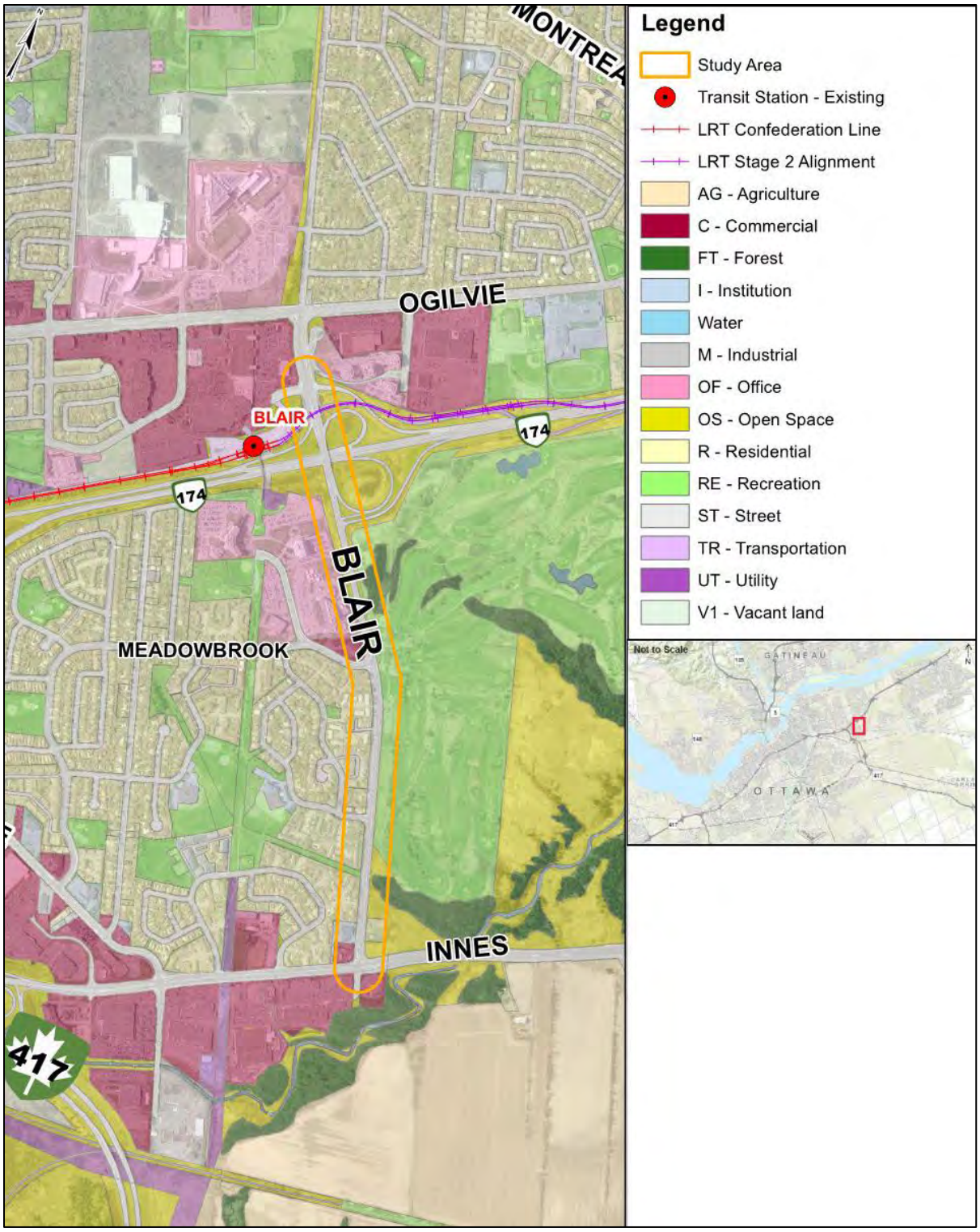

Figure 5-8: Existing Official Plan Land Use Designations

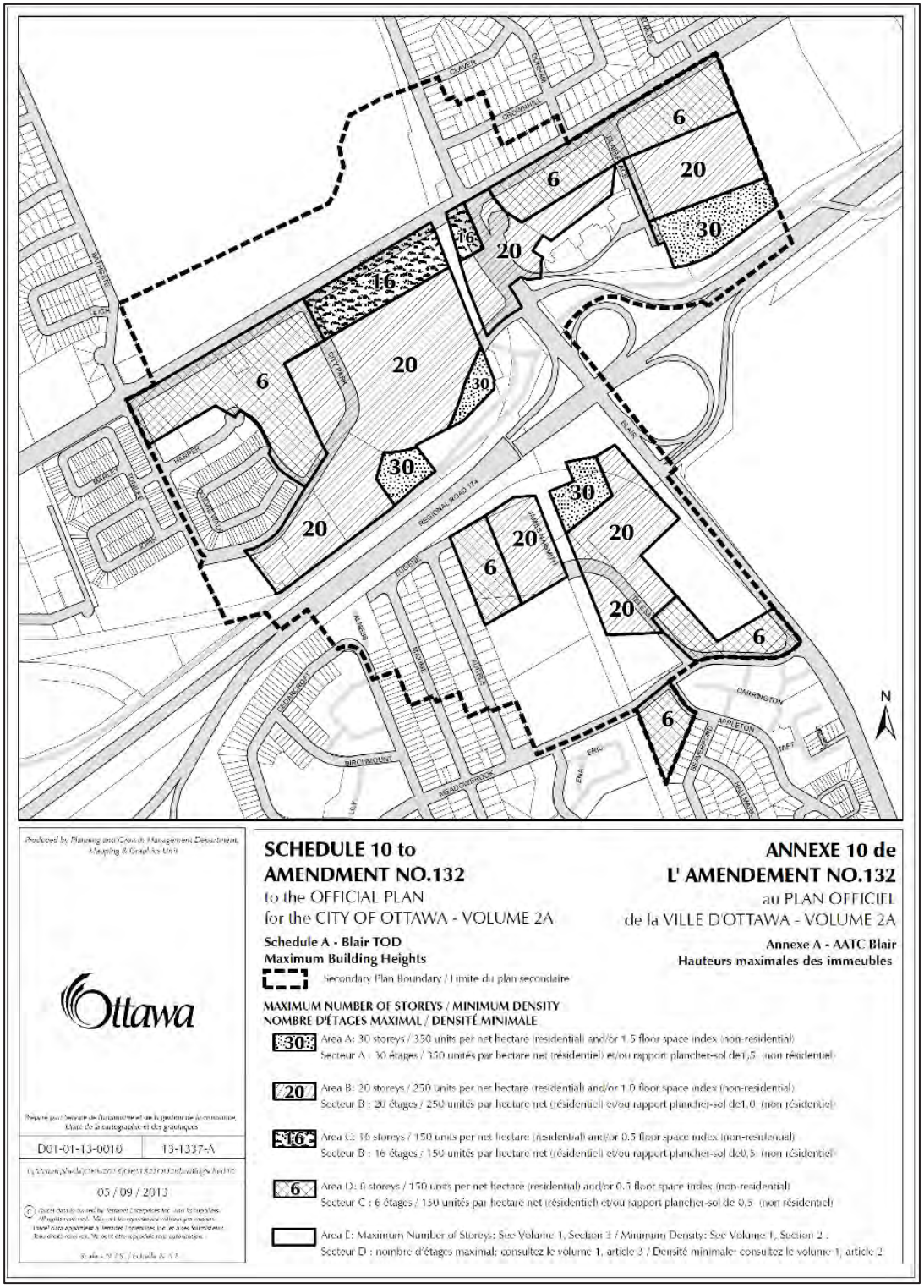

Figure 5-9: Blair Secondary Plan

Blair Transit-Oriented Development (TOD) Plan (2014)

The interim eastern terminus for the City of Ottawa's LRT Confederation Line is located at the meeting point of Ottawa Road 174 and Blair Road. As a primary exchange point for the transfer between light rail and buses, this area has been identified by the OP as a TOD priority site. The TOD area is 119 hectares in size and includes properties within an 800 m walk from the station platform. It is divided into three sectors: the northwest sector is located north of OR174 and west of Blair Road; the northeast sector is east of Blair Road and north of OR174 and the south sector is located south of OR174.

The Plan calls for creating new and improved street, cycling and pedestrian connections to increase accessibility to Blair Station. There are close to 8,700 jobs and residents combined in the Blair TOD Study Area (2014b). Over the next 20 years, current projections foresee the addition of approximately 2,300 jobs and residents combined over this time period. Over the longer-term, well beyond the next 20 years, there is capacity for close to 28,900 jobs and residents combined if fully built to transit-supportive densities. This long-term scenario is expected to include over 2,200 residential units – most of which would be condominium or rental apartments.

5.3.3.2 City of Ottawa Zoning By-Law No. 2008-250

The City of Ottawa's Comprehensive Zoning By-law 2008-250 implements the overall policies and objectives for growth and development that are identified in the City of Ottawa Official Plan through specific regulatory provisions.

"Section 87, Rapid Transit Network" stipulates that the provisions of the Zoning by-law do not apply to the rapid transit network and to land used for the construction, staging and repair works to support the rapid transit network. Further, any related construction, staging or repair works to support this network are permitted in all zones.

5.3.3.3 City of Ottawa 2036 Population Projections (2017)

The City expects a 31% increase in total population from 921,000 residents in 2011 to 1,214,000 million residents in 2036 (OPA 180). The East Urban Community, Mer Bleue Community Design Plan and expansion area, and the Orléans Industrial Park contribute to an 812% population increase and 157% employment increase from 2012 to 2031. The Blair TOD area, specifically, contributes significantly to the growth for the eastern area of the

City, with a population increase of 179% and an employment increase of 22% from 2012 to 2031.

In general, the eastern urban area is expected to experience significant growth over the remainder of the planning horizon due primarily to Community Design Plans that have set ambitious targets for increasing population and employment opportunities in this region of Ottawa.

5.3.3.4 City of Ottawa Transportation Master Plan (TMP)

To implement the transportation policies expressed in the OP, City Council has adopted a Transportation Master Plan (TMP) that identifies facilities and services that the City intends to put in place over the next two decades in order to meet the travel needs of residents and businesses in Ottawa and to support the development pattern identified in the OP.

The City's TMP and OP place considerable emphasis on transit. The TMP states that enhanced transit service elements will be provided as early as possible. These may take the form of surface transit routes with accelerated frequencies, accompanied by transit priority measures. While the City is protecting for grade-separation of most of the rapid transit network (i.e., intersections where rapid transit corridors intersect with streets, or pedestrian crossings at rapid transit stations), where practical it will defer the costs of grade-separation by using transit priority measures that reduce delay and improve service reliability by isolating transit from mixed traffic.

The TMP indicates that the majority of Ottawa's transit service is delivered on roads, where traffic congestion increases delay and reduces the reliability and efficiency of transit services. Transit priority can improve the competitiveness of transit by reducing travel times and improving service reliability, while allowing more transit service to be delivered with the same resources. Transit priority measures (e.g., dedicated bus lanes, transit signal priority treatments, bus queue jumps, special bus stop arrangements, and traffic management techniques such as queue relocation) are intended to eliminate delay to transit services caused by congestion, and to minimize delay caused by traffic signals. Providing road corridors with a set of coordinated transit priority measures can substantially improve the quality of service enjoyed by transit customers without incurring the costs of a fully grade-separated rapid transit corridor. As stated, the transportation analysis and the development of solutions will be undertaken in a manner that prioritizes the implementation of transit in the Study Area.

The 2013 TMP/OP also supports the use of non-auto modes including walking and cycling:

Walking: The City's Pedestrian Charter establishes the vision, goals and objectives for walking. The Charter articulates a commitment to creating a city where people walk because they want to and defines a series of guiding principles to create a supportive urban environment. The Ottawa Pedestrian Plan contains a number of policies and actions for the City to implement. They address land use, walking network development, street and pedestrian facility design, maintenance, safety programs, information, promotion, stakeholder engagement, interjurisdictional cooperation, and performance measurement (City of Ottawa, 2013c). The City requires that the planning processes such as Community Design Plans, Transit Oriented Design plans, and Environmental Assessments for transportation projects include the prescribed pedestrian facilities found within the 2013 Pedestrian Plan.

The City of Ottawa 2013 Pedestrian Plan contains mapping of the proposed network (Exhibit 3.2 within the Plan) as well as an outline of the prioritization process that was undertaken to determine the links that are deemed affordable that would be built during the planning horizon of the OPP 2013. The plan does not identify any proposed connections within the Blair Road corridor.

Cycling: The Ottawa Cycling Plan contains a number of policies and actions to increase the safety, convenience, and comfort of cycling in Ottawa (City of Ottawa, 2013b). These include land use, cycling network development, street and cycling facility design, bicycle parking, cycling-transit integration, funding, maintenance, safety programs, wayfinding assistance, information, promotion, stakeholder engagement, inter-jurisdictional cooperation, and performance measurement. The existing Study Area includes on road cycling facilities (generally on-road bicycle lanes/paved shoulders).

The 2013 City of Ottawa Cycling Plan (OCP) notes that cyclists are permitted on all City roadways with the exception of major divided highways. That being said the OCP 2013 identifies a complete network of cycling routes covering the entire City. While this Ultimate Network Concept (UNC) has no targeted completion date, it serves as a framework for prioritizing projects within the planning horizon (**Figure 5-10**). The OCP 2013 notes that the second important role of the UNC map is to allow for coordination when roadworks or developments are being reviewed.

Blair Road and Innes Road have been identified as Spine Routes within the UNC. Spine routes are defined within the OCP as those that follow major roadways (typically arterials) and may provide a

reserved space for cyclists (cycle track or a buffered bike lane). Spine routes are intended to provide access along major corridors and provide connections for Cross-Town Bikeways and major off-road bike paths to neighbourhoods.

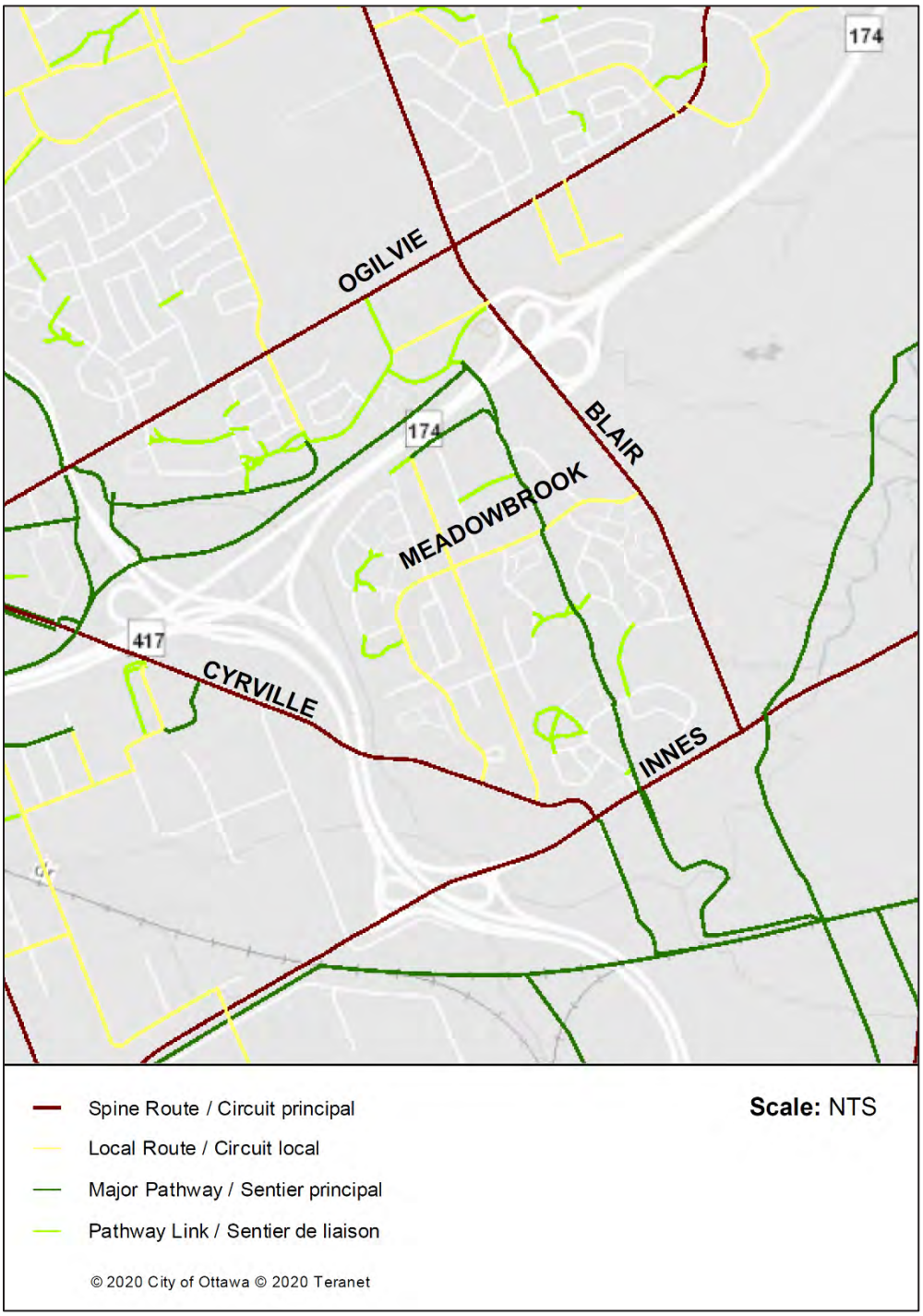

Figure 5-10: Ultimate Cycling Network

5.3.4 Land Use

Existing land uses within the Study Area include natural (forest), residential, recreational, office space, retail commercial, and open space. Residential land use is concentrated on the west side of Blair Road in the Pineview neighbourhood, north of Innes Road and south of Meadowbrook Road. The Pine View Golf Course is the primary land use along the east side of the Blair Road Study Area (**Figure 5-8**).

The Study Area falls within the Green's Creek Sector of the National Capital Greenbelt. The Greenbelt consists of 20,000 hectares of greenspace and includes a comprehensive trail network that is easily accessible to residents in the area. Other recreational uses within the Greenbelt include the Pine View Golf Course.

The Gloucester Centre retail commercial space is located at the intersection of Blair Road and Ogilvie Road on the west side of Blair Road at the northern extent of the Study Area. Retail/office uses are also concentrated in proximity to the Blair Road/OR174 interchange.

5.3.5 Land Ownership

The NCC is the primary landowner of the eastern side of the Study Area, outside of the existing right-of-way (ROW). The lands owned by the NCC form part of the NCC's Greenbelt, as illustrated in Figure 5-11. The City of Ottawa owns the existing Blair Road ROW and the OR 174 interchange area. The remainder of the land parcels are in private ownership.

5.3.6 Landscape Character

Analyses of the natural and built environment provides input on land use, connectivity, important views, and landscape character. The Study Area has been broken into descriptive roadway spans as described below.

Blair Station – Innes Road

Views along the eastern side of Blair Road, overlooking Pine View Golf Course, extend from Innes Road to OR 174. The views of the golf course contribute to a rural aesthetic. Most residential homes back onto Blair Road, with set-backs that have trees and mown turf. With homes oriented away from the roadway this span of Blair Road feels separate from the community. One of the important views identified by the Study Team was from the southern corner of Pine View Gold Course at the Blair Road and Innes Road Intersection, looking east over Innes Road and Green's Creek.

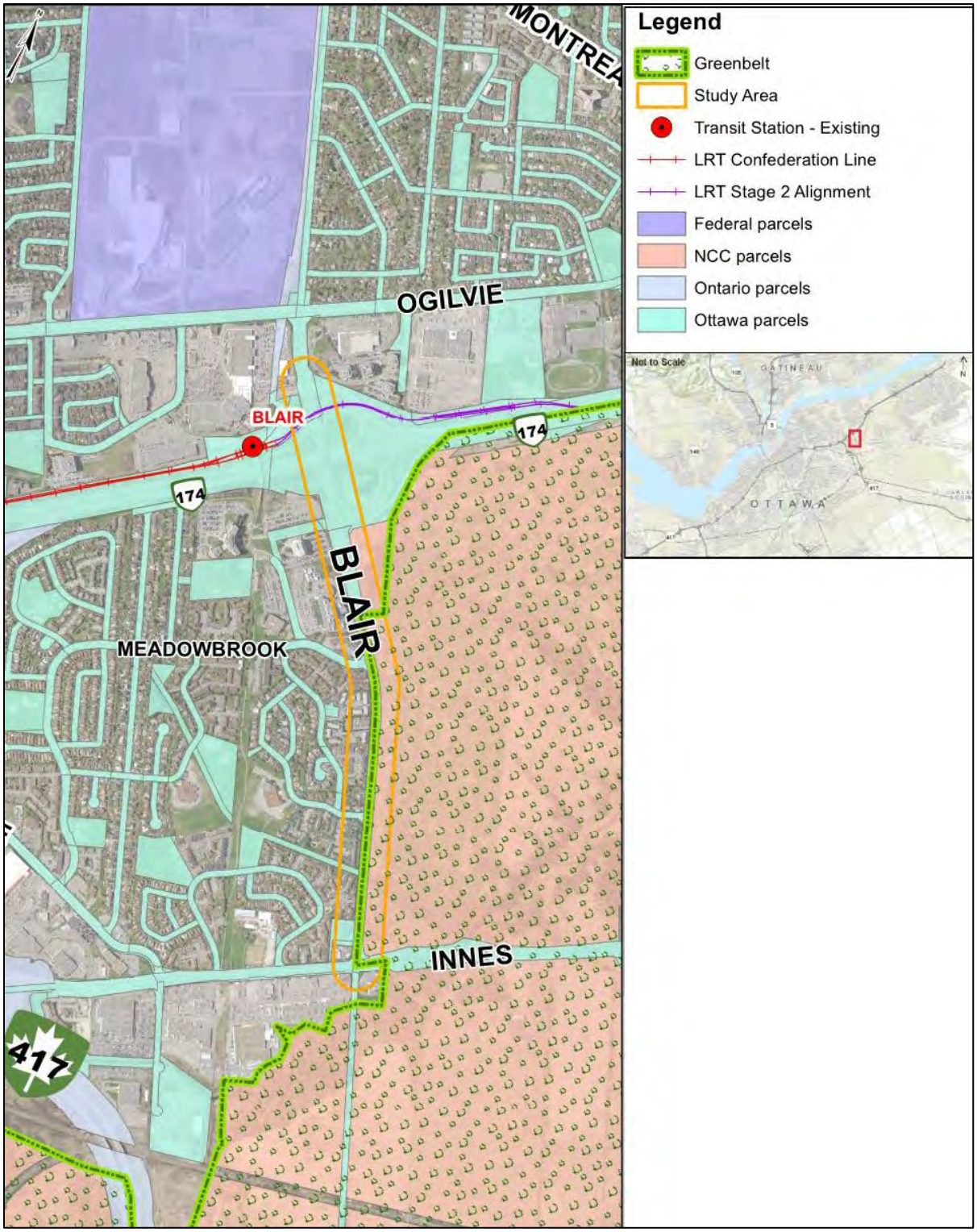

Figure 5-11: Public Land Ownership

Innes Road – Blackburn Hamlet Bypass

The span of Innes Road, beginning from Blair Road and continuing until Blackburn Hamlet Bypass, is within the NCC Greenbelt. Rural zones comprise the majority of land-uses, which contributes to a rural feel. There are views of agricultural and open fields, as well as forested areas which surround both Mud creek and Green's creek.

Fast moving, heavy vehicular traffic may deter cyclists from using the existing on-road bicycle lane. Bicycle lane widths are reduced during winter months as a result of incomplete snow-removal.

5.3.7 Air Quality, Noise and Vibration

Noise sensitive residential areas are located along the west edge of Blair Road (**Figure 5-12**). Current major sources of air quality and noise emissions in the area are the existing road networks, including Ottawa Road 174, Blair Road, and Innes Road. Ottawa Road 174 is also a source of minor ground vibrations and ground-borne noise, mainly due to heavy vehicles passing over uneven surfaces. An Air Quality, Noise and Vibration memo was completed by Gradient Wind Engineers and Scientists (GWE) for this study, and is available in **Appendix F**.

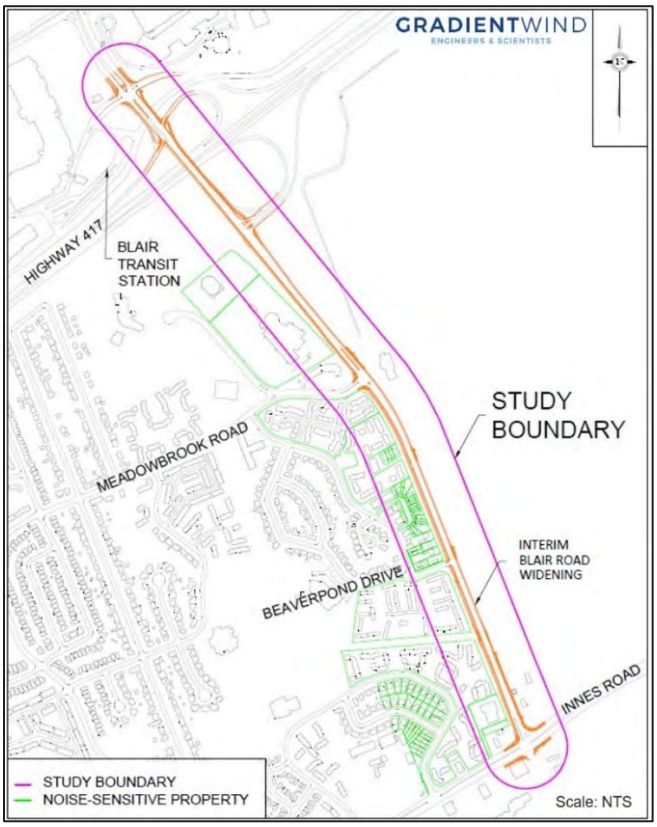

Figure 5-12: Noise Sensitive Receptors

5.4 Cultural Environment

5.4.1 Aboriginal Land Claims

The City of Ottawa is within the land claim area of the Algonquins of Ontario. The land claim is in the process of negotiation and currently, an Agreement-in-Principle has been prepared as a first step toward an eventual signed Treaty between the Algonquins of Ontario, the Province of Ontario, and the Government of Canada (2016). The Agreement-in-Principle contains Maps of Proposed Settlement Lands, including a "Proposed Settlement Lands in the City of Ottawa" (Algonquins of Ontario, Government of Ontario, Government of Canada, 2016). None of the lands within the Study Area encompass any Proposed Settlement Lands within the proposed Agreement-in-Principle City of Ottawa map.

5.4.2 Archaeological Potential

Previous archaeological assessments have been undertaken in the Study Area to ensure preservation and management of any property that may hold an archaeological interest, in keeping with the requirements of Section VI of the *Ontario Heritage Act, RSO 1990, c.0.18*. Previous studies are documented in the 2011 Hospital Link and Cumberland Transitway Westerly EA report. It is noted that an archaeological review was completed as part of this study. The archaeological update, completed by Golder Associates in 2019 included data collection, review of historic maps as well as relevant archaeological, historical, and environmental documentation including the City of Ottawa GIS data for areas of archaeological potential within the Study Area (**Figure 5-13**).

5.4.2.1 Archaeological Resources

Registered Archaeological Sites

Golder has consulted the Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) archaeological sites database and reviewed the registered archaeological sites entered in the database as of 11 April 2019. There are no registered archaeological sites identified within 1 km of the Blair Road Study Area.

Potential for Archaeological Resources

Areas identified within the Study Area as having "potential for archaeological resources" are based on the following indicators:

Historic Euro-Canadian Settlement Patterns: All areas that fall within 100 m of early transportation routes and 300 m of early Euro-Canadian settlement.

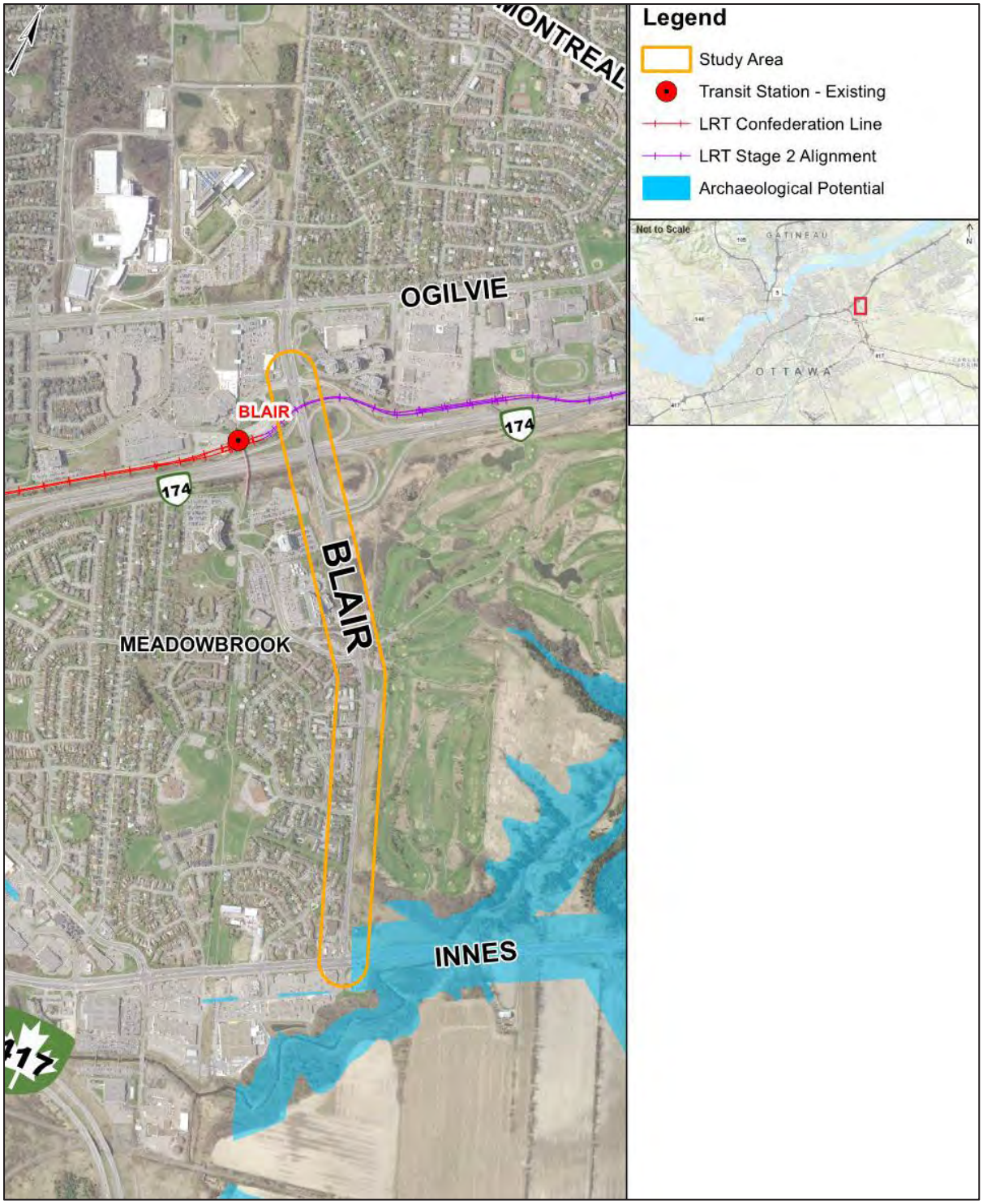

Figure 5-13: Archaeological Potential

Pathways of Historic Roadways/Transportation Routes: Innes Road follows the path of a historic roadway. In addition, some 19th century historic roads that have been altered or are no longer in use represent areas of archaeological potential.

Areas within 300 m of all Watercourses and Secondary Water Sources: Includes areas found within 300 m of the following primary water sources: Green's Creek, Mud Creek, other small watercourses.

5.4.3 Cultural Heritage Resources

Federal, provincial, and municipal heritage registers, inventories, and databases were reviewed to identify known cultural heritage resources in the Study Area. This included a review of the Canadian Register of Historic Places (Parks Canada, n.d.b); the Government of Canada's Directory of Federal Heritage Designations (Parks Canada, n.d.a); Ontario's Heritage Trust Online Plaque Database; Ontario's Heritage Trust Places of Worship Inventory; Ontario Ministry of Government and Consumer Services (OMGCS) Database of Registered Cemeteries; the City of Ottawa's Heritage Register and Heritage Resources Inventory; and aerial photographs from 1976 and contemporary aerial photos and satellite imagery.

In addition, stakeholder consultation included contact with the City of Ottawa Heritage Planner regarding cultural heritage resources in the Study Area. They advised that no properties designated under Part IV of the *Ontario Heritage Act* and no properties listed on the Heritage Register are located in the Study Area. However, two properties in vicinity of the Study Area are included on the City's Heritage Reference List. No protections or restrictions are placed on properties included on the Heritage Reference List. Lastly, the MHSTCIs checklist for *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (2015) was completed for the Study Area.

Protected Cultural Heritage Resources

None of the properties identified in the Study Area are protected cultural heritage resources.

Cultural Heritage Landscapes

The NCC has identified a combination of distinct landscape features and man-made structures as components of the cultural heritage landscape. These features may include landscape features that visually express land stewardship, ecological diversity, and the history of the Capital; buildings structures and features of cultural and heritage value that celebrate the Capital's rural history; and rural cultural heritage. Property on the east side of Blair Road between Innes Road and Ottawa Road 174 is part of the

Greenbelt eastern farmlands cultural landscape, which is identified as demonstrating a rural, agricultural character.

Heritage Reference List Properties

The following properties were identified on the City of Ottawa's Heritage Reference List: 1691 Blair Road and 1873 Innes Road (Mrs. Emerson Woodburn House), and are identified on **Figure 5-14**. As noted in the Hospital Link and Cumberland Transitway Westerly EA archaeological report, the brick farmhouse at 1691 Blair Road dates to the twentieth century, though the timber frame barn has been demolished (Past Recovery Archaeological Services, 2010). It is noted that the extant heritage structure at 1873 Innes Road is set back from Innes Road and is surrounded by Stonehenge Crescent (Past Recovery Archaeological Services, 2010).

The Pineview Golf and Country Club, located at 1471 Blair Road was previously noted as being on the City's Heritage Reference List, though it was determined that any of the built heritage structures associated with the property have since been demolished (Past Recovery Archaeological Services, 2010).

Buildings Over 40 Years of Age

The *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* includes consideration of buildings or structures that are over 40 years old to be considered as having potential cultural heritage value or interest. Within the Study Area, such buildings are located along the west side of Blair Road from Innes Road, north to Beaverpond Drive, including (**Figure 5-14**):

- 1700 Blair Road
- 1574 Blair Road
- 1570 Blair Road
- 1566 Blair Road, and
- 1562 Blair Road

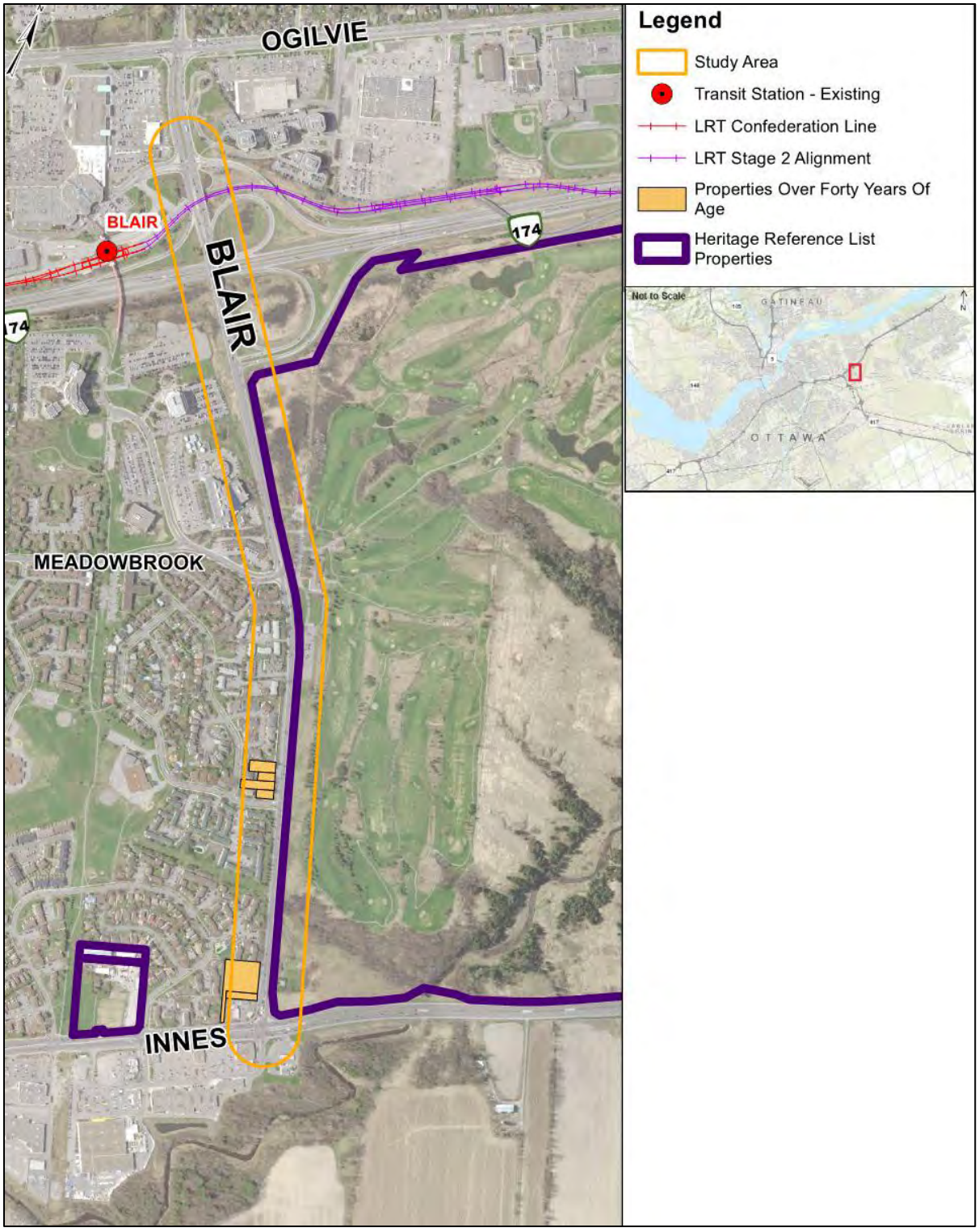

Figure 5-14: Potential Cultural Heritage Constraints

5.5 Built Environment

5.5.1 Transportation

Section 2.3.1 of the City's Official Plan describes the City's transportation system as one which emphasizes the use of public transit, and wherever possible reduces the reliance on private automobiles. The single biggest transportation issue the City currently faces is accommodating the movement of people during the morning and evening peak periods. Therefore, a key strategy in the OP is to expand the rapid transit network to serve more of the urban area. However, despite encouraging increased transit use through infrastructure improvements, on-going improvements to the road infrastructure network are also needed to accommodate projected traffic volumes. This includes road widenings and extensions. These improvements are designed and maintained in coordination with the City of Ottawa's Transportation Master Plan's *"Complete Streets Policy*", which plans for transportation infrastructure that prioritizes the needs of pedestrians and cyclists and ensures safety, comfort, and convenience to users of all ages and abilities.

Along with protecting corridors for the development of the transit network and acquiring lands for transit ROW, Section 2.3.1of the City's OP also stipulates that it will protect rights-of-way for the future development of the road transportation network. A right-of-way establishes allowances for a new road, major widening of an existing road, or minor widening of an existing road.

Section 3.5 of the OP provides a transportation infrastructure policy for lands designated as Greenbelt. This policy stipulates that "roads and other infrastructure will be designed to maintain the rural character of the Greenbelt in order to minimize the fragmentation of farmland and natural areas. Combining infrastructure in a limited number of corridors and utilizing existing rights-of-way wherever possible can help achieve this end. Transportation infrastructure, including lighting, will be designed to a rural standard.

5.5.2 Transit Network

Currently bus routes 25, 26, 42, 222, 225 and 228 service the Blair Road corridor. The proposed future BRT corridor travels along Innes Road from Blair Road and continues east along the Blackburn Hamlet Bypass. As part of the future Cumberland Transitway, it will continue through the Greenbelt southwest of Navan Road to the newly constructed Brian Coburn Boulevard then continue further east to Frank Kenny Road.

Current transit network modifications within the Study Area include the extension of the LRT line beyond the Stage 1 Confederation Line that will

end at Blair Road, which recently opened in September 2019. Stage 2 LRT will include an extension east to Trim Road along Ottawa Road 174 with construction currently underway and completion expected in 2024. Innes Road and Jeanne D'Arc Boulevard are planned to be established as Transit Priority Corridors.

In terms of transit use, the 2011 transit (or non-auto) modal share is estimated at 37% at the Green's Creek Screenline (SL16). The projected 2031 TMP transit modal share is 43%.

5.5.3 Road Network

The road-based transportation system within the City of Ottawa consists of a network of provincial highways, municipal freeways, arterial roads, collector roads, and local roads. The existing roadways which service east/west travel demands range from multi-lane, high speed roadways (such as OR 174) to single lane, lower speed operations (such as Sir George-Étienne Cartier Parkway). With the exception of Blair Road, the nearest north/south connection, crossing the OR174 and serving the east side of the city include Highway 417, located approximately 1.5 km to the west, and Bearbrook Road/Rockcliffe Parkway, located over 3 km to the east.

The major network includes:

Highway 417: This provincially owned Highway 417 is a six lane, divided highway that runs east west along the northwestern border of the Study Area. At the Aviation Parkway/Highway 417/Ottawa Road 174 major interchange, Highway 417 becomes a north south, four lane highway with an interchange located at Innes Road.

Ottawa Road 174: This municipally owned freeway is a four lane, divided freeway that runs east west along the north border of the Study Area east of the Highway 417 interchange.

Both Blair Road and Innes Road are considered arterial roads, while Meadowbrook Road is a major collector road. The City's OP defines arterial roads as those that have limited direct access with direct access only provided to major parcels of adjacent lands. Similarly, major collector roads, such as Meadowbrook Road, are defined as those that serve neighbourhood travel between collector and arterial roads.

Structures

Structures within the Study Area include bridges with spans greater than 3 m, which are termed "bridge-culverts." There are three (3) such structures within the Study Area (**Table 5-3**).

Table 5-3: Structures

Structure	Photograph
Blair Road East Transitway Overpass (City Structure No. 226780) is a concrete rigid frame structure with a 23 m span. It carries two through-lanes in each direction as well as 3 auxiliary lanes and two sidewalks. Built in 1989, the structure is currently in fair to good condition.	
Hwy. 174 Blair Road Underpass (City Structure No. 224840) is a four-span voided slab post-tensioned concrete structure with an overall length of approximately 85 m. It carries two through-lanes in each direction as well as two bike lanes and a sidewalk on the east side. The original metal railings have been replaced with combination vehicle/bicycle concrete parapet walls with railings. Constructed circa 1967, the structure is in overall fair to good condition. A minor rehabilitation was conducted in 2012.	
The Blair Road Box Culvert (City Structure No. 227340) is concrete, has a 3 m span and is approximately 26 m long. It crosses under Blair Road just north of Innes Road. The box culvert was replaced in 2020.	

5.5.4 Pedestrian and Cycling Networks

Paved shoulders are provided along Blair Road for cycling between Innes Road and Meadowbrook Road. There is a sidewalk located on the west side of Blair Road from Laura Private in the south to Meadowbrook Road in the north. **Figure 5-15** below highlights the existing pedestrian and cycling networks.

Innes Road has a dedicated bike lane which is referred to as a Cross-Town Bikeway within the City's Official Plan (OPA 150). Various trails within the Study Area provide connections to the City and NCC trail network. Informal trails and accessways also exist and form important connections within the multi-modal network.

5.5.5 Sewage, Water and Stormwater

Water Distribution System

There are service pipes located within the residential areas to the west of Blair Road, within the Study Area (**Figure 5-16**). There is a large 400 mm water pipe on Innes Road. A 406 mm diameter pipe runs along Blair Road from just south of Ottawa Road 174 to Innes Road.

Sanitary Sewers

Local sanitary sewers service the residential neighbourhoods. These local sewers feed into the trunk sewers located in the Study Area. There is the 525 mm Innes Road Trunk located on Innes Road west of Blackburn Hamlet and crossing the southern extent of the Study Area. The 1650 mm North Green's Creek Collector crosses the Study Area near the Innes and Blair intersection. Additionally, there is a 1200 mm Trunk located on Blair Road just south of the east-bound Ottawa Road 174 on-ramp that connects to the North Green's Creek Collector north of Meadowbrook Road. **Figure 5-17** illustrates sewer infrastructure within the Study Area.

Storm Drainage

The largest diameter storm sewers are typically located along arterial roads, including Innes Road (1350 mm), and Blair Road (1350 mm).

Blair Road drainage is characterized via roadside ditches to a 1500 mm corrugated steel pipe culvert between Meadowbrook Road and Innes Road; and via 1200 mm culvert that outlets easterly through adjacent golf course lands between Meadowbrook Road and OR 174. North of OR 174, drainage is via roadside ditches that outlet west to Cummings Creek (IBI, 2011).

Municipal Drains

There are no municipal drains located within the Blair Road study corridor.

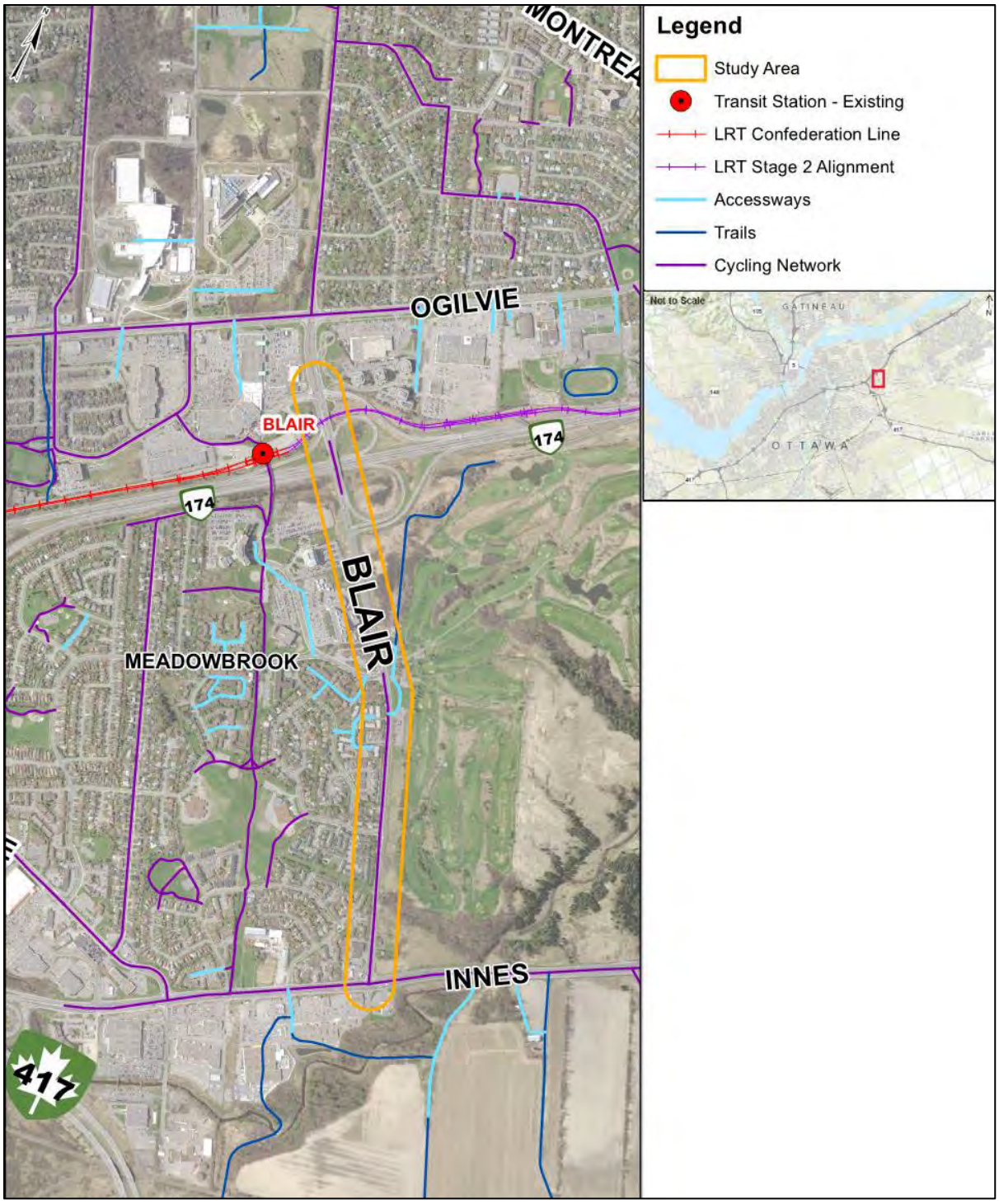

Figure 5-15: Cycling and Pedestrian Networks

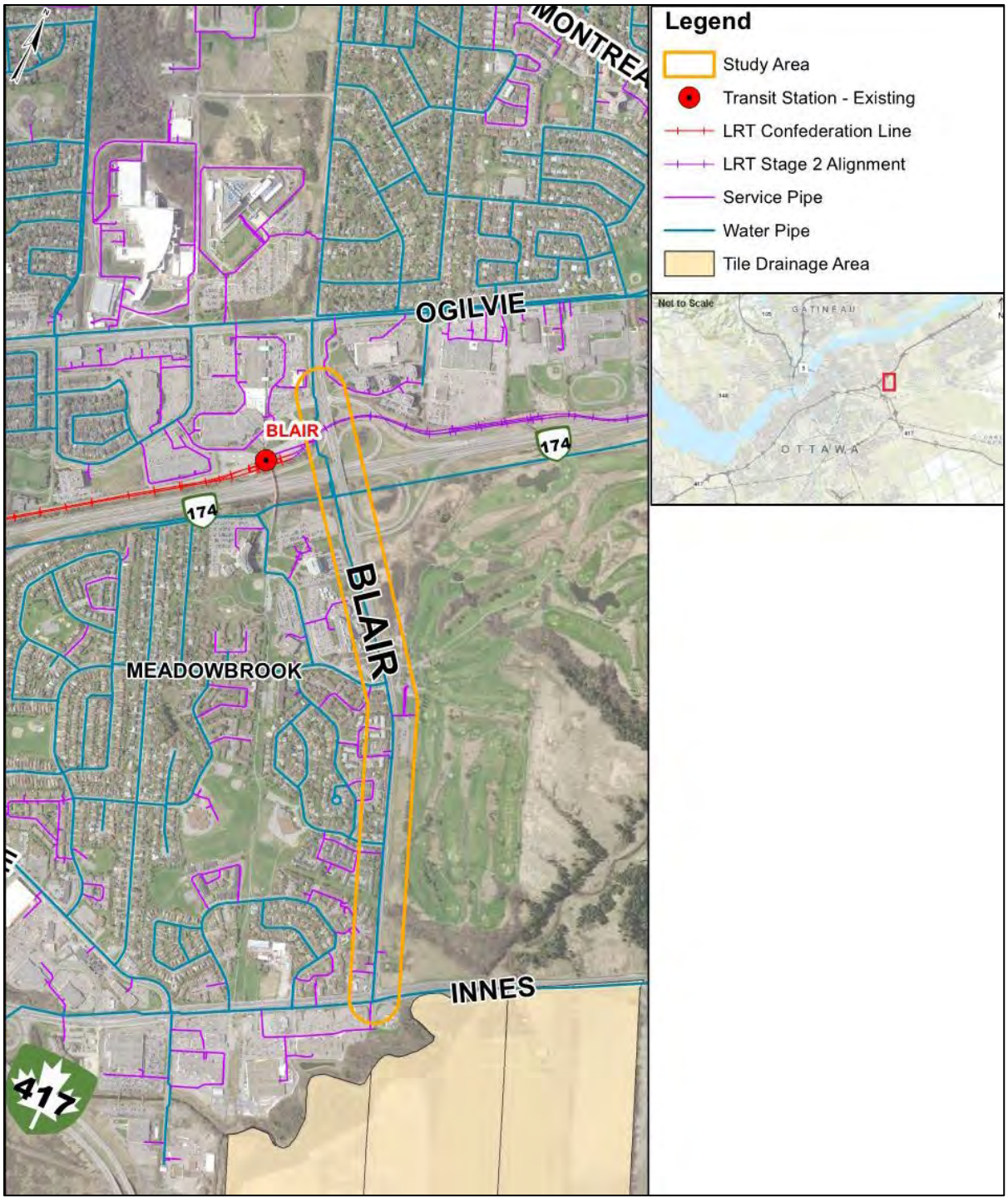

Figure 5-16: Water Infrastructure

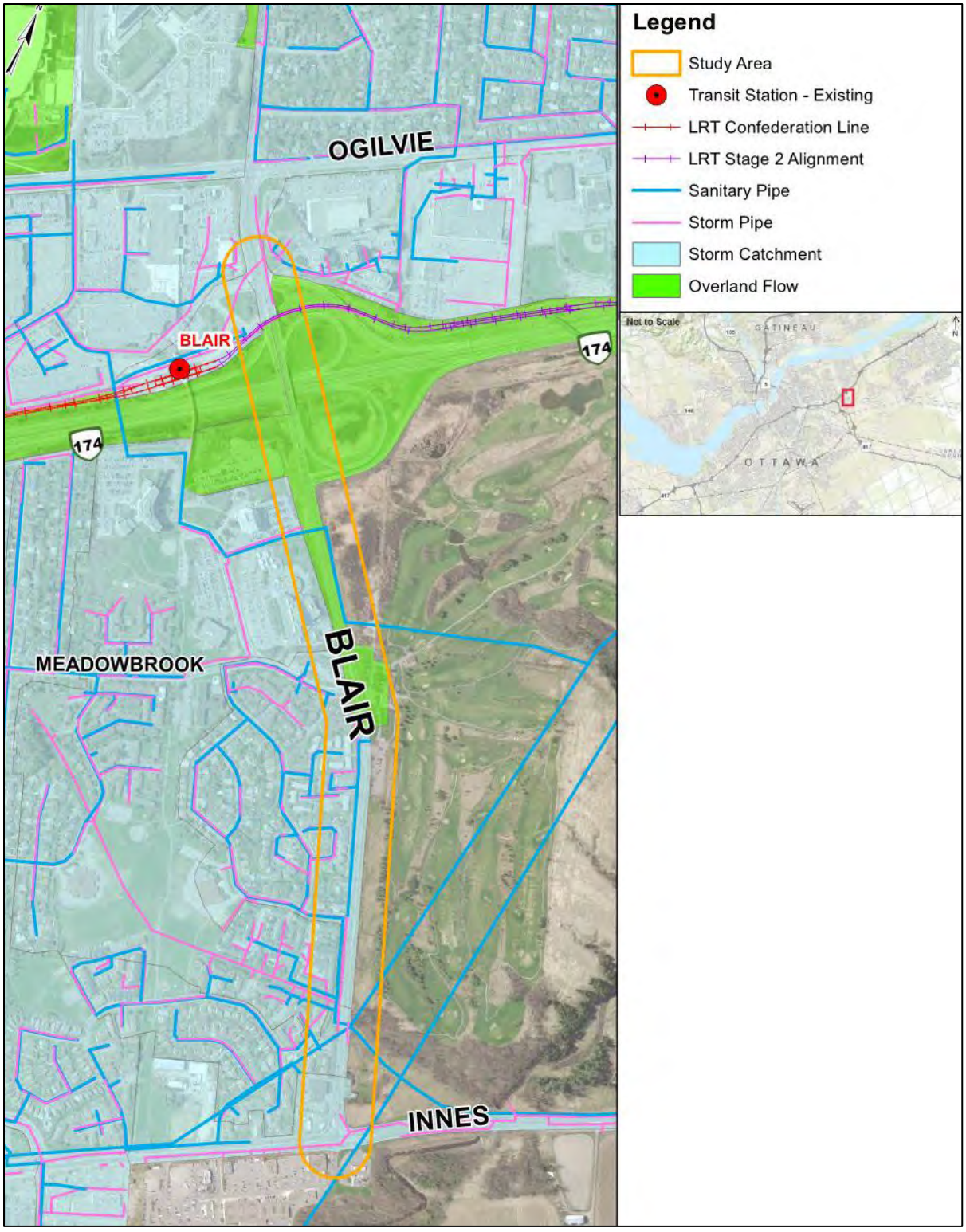

Figure 5-17: Sewer Infrastructure

5.5.6 Utilities

Hydro One and Hydro Ottawa

There is an aerial Hydro line along Blair Road located along the west side of Blair Road south of Meadowbrook Road; the east side of Blair Road from south of Meadowbrook Road to south of OR 174; and the west side of Blair Road at the OR 174 interchange.

Hydro One Transmission has a high voltage transmission line consisting of two parallel tower lines that crosses the southern end of the Study Area. There is also a Hydro One Transmission line that crosses Blair Road immediately south of OR 174.

Telecommunications

The majority of the telecom infrastructure in the Study Area is located on Hydro poles. There are Bell conduits on Innes Road and Blair Road crossing the Study Area.

Natural Gas

There is a 200 mm gas main located on the east side of Blair Road at the intersection of Innes Road extending east. An additional 100 mm gas main is located on the west side of Blair Road from Innes Road to Meadowbrook. The rest of the developed area is served by local gas mains.

Other Utilities

There is street lighting along Blair Road (the Study Area). There are also traffic conduits at the Innes, Meadowbrook, OR 174 Interchange and Ogilvie intersections.

5.5.7 Contamination and Hazardous Materials

Former and current activities within the Study Area have the potential to impact the soil and/or groundwater along the proposed alignment section. A Phase I Environmental Site Assessment (ESA) was undertaken to identify actual or potential issues of environmental concern within the Study Area (Golder Associates Ltd., 2019). The identification of issues was based on readily available information and did not include an intrusive investigation. Site visits occurred in November 2017 and March 2019.

The Phase 1 ESA, undertaken by Golder Associates (2019), included an investigation into potentially impacted areas within a 100 m buffer of the Blair Road corridor, and is available in **Appendix G**. Sources included:

- The City of Ottawa's Historic Land Use Inventory (HLUI),

- Federal, provincial, and private sector databases which included Certificates of Approval, List of Expired Technical Standards and Safety Authority (TSSA) Facilities, Fuel Storage Tank, Ontario Regulation 347 Waste Generators Summary, TSSA Incidents, Private and Retail Fuel Storage Tanks, Scott's Manufacturing Directory and Ontario Spills, and
- Past and currently available aerial photographs, for various specific years within the time period spanning the years 1945 to 2014.

5.5.7.1 Areas of Potential Environmental Concern

Several areas of potential environmental concern were identified within the Phase 1 ESA for the Blair Road Study Area. The areas were described based on their tendency to potentially impact the soil and/or groundwater. Golder Associates (2019) identified properties that are currently being used as retail fuel outlets with associated underground storage tanks; properties formerly having dry cleaning facilities; and properties noted to have fuel and/or hydraulic oil spills on record. A total of six properties were identified within the Study Area limits.

Historic Land Use Inventory (HLUI)

The HLUI data provided by the City, included noteworthy records for the Study Area including retail fuels outlets along Innes Road, near Blair Road (Golder Associates Ltd., 2019).

ERIS Reports

Various environmental concerns were noted through the Environmental Risk Information Services (ERIS) by Environmental Risk Limited Partnership review, including Certificates of Approval (various uses), fuel storage tanks, expired TSSA facilities, various waste generation sites, TSSA incidents, private and retail fuel storage tanks, Scott's Manufacturing Directory listings and various spills as reported to Ontario (Golder Associates Ltd., 2019).

Developed Areas and Transportation Facilities

The southern portion of Blair Road (south of Meadowbrook Road) has been present since before 1945, while the northern portion was constructed between 1965 and 1976. For parcels of land within the Study Area that were developed prior to the 1940's, Golder Associates (2019) reports that such land may show the potential for the presence of former and/or existing heating oil tanks.

It is also noted that residual salt may be present along the roadways within the Study Area. The presence of residual salt is

due to de-icing agents having been, and presently being, applied for the purpose of road maintenance.

5.5.8 Economic

Lands designated as Employment Areas are typically large parcels of land situated off major roadways that have been identified as important sites for business and economic activity.

A number of land-use benefits can be derived from improved transit. It supports land use intensification and more compact urban form, making infrastructure and service provision more cost effective.

5.6 Climate Change

Climate Change Projection Data

Climate change projection models used for this study were primarily sourced from an international body referred to as the Intergovernmental Panel on Climate Change (IPCC). The IPCC was established by the United Nations and World Meteorological Organization in 1988 to review information on climate change. The IPCC has since been preparing Assessment Reports that, among other things, aggregate global climate models and projection data. The latest such report, the Fifth Assessment Report (AR5), included projection information from forty Global Climate Models (GCMs).

For this climate change risk assessment, projected changes for various climate elements were computed through the GCMs from AR5 using historical climate data from ECCC. This was accomplished using the Climate Change Hazards Information Portal (CCHIP), a climate analysis tool developed by Risk Sciences International (RSI).

AR5 also uses the concept of Representative Concentration Pathways (RCPs) to denote scenarios of various climate change intensities. Each scenario is named after ‘radiative forcing values’, a measure of the rate of energy change per unit area of the globe, measured in watts per square metre.

The scenario with the lowest projected change, or 2.6 W/m^2, is represented by RCP 2.6, while the highest projected change, or 8.5 W/m2, is represented by RCP 8.5. The two RCPs used in this risk assessment were RCP 4.5 (moderate future emissions), and RCP 8.5 (highest future emissions).

The historical climate data used in the computation of climate projections comes from the Ottawa CDA meteorological station, located at the Central Experimental Farm, which has over 100 years of data.

In addition to CCHIP, historical trends and climate projections were identified through the review of past climate change risk assessments from the Ottawa area and academic papers from the field of climate science.

Daily Average Temperature

Temperatures in the Ottawa area are projected to increase in future. Overall, annual daily average, maximum, and minimum temperatures are projected to increase at similar rates. All three variables are projected to increase on average between 2.4 and 3.1 degrees by 2050, and between 3.3 and 5.8 degrees by 2080.

Extreme Heat Days

Along with an increase in average daily temperatures, an increase in extreme temperatures is projected for the Study Area under the RCP 4.5 and 8.5 climate scenarios. Projections for the number of days with daily maximum temperatures above 30ºC, show a possible increase from an annual average of 12 days, historically, to between 33 and 37 days in 2050 and to between 42 and 69 days in 2080.

Precipitation

According to current projections under the RCP 4.5 and 8.5 climate scenarios:

- Total annual precipitation would increase; and
- Extreme precipitation would increase at a faster rate than total annual precipitation.

The total annual precipitation is projected to increase by up to 11% in 2080, the average maximum 24hr precipitation is expected to increase by 17% in that same time frame. The 11% increase in total annual precipitation would predominantly occur in the form of extreme rain events.

Average Snowfall Trend

A downward trend can be identified in the historical data for the Ottawa CDA station, and this generally aligns with projections for annual increases in temperature.

Freeze-thaw Cycles

The ensemble of projections for both the moderate and high concentration pathways (RCPs) show a noticeable decrease in the number of days with freeze-thaw cycles in 2050 and 2080. The months of April and October may see 62% to 95% fewer freeze-thaw cycles on average under the RCP 4.5 and 8.5 climate scenarios. December, January, and February are projected to see an increase in freeze-thaw cycles. The month of March would continue to see the most days with freeze-thaw cycles in 2080.

Freezing Rain

An Environment and Climate Change Canada study by Cheng et. al. (2007) concluded that freezing rain events are very likely to increase in northern, eastern, and southern Ontario in the coming century. The study concluded that eastern Ontario is likely to see a 60% and 95% increase in freezing rain event frequency by

2050 and 2080, respectively, during the months of December, January, and February. The study projected that the frequency of freezing rain events would remain unchanged for the months of November, March, and April.

Wind

One Environment and Climate Change Canada study by Cheng et. al. (2012) looked at projected increases in daily and hourly wind gusts for various regions of Ontario, including eastern Ontario. The results suggest modest increases in wind gusts are likely in the coming decades. Wind gusts over 70 km/h may see the highest increase in frequency, occurring 23% to 46% more often than current conditions.

Water Balance

Water deficits exist when potential evapotranspiration is greater than actual evapotranspiration. Results from CCHIP for the RCP 4.5 and 8.5 climate scenarios show that water surplus in the region would increase during the winter months (December to March), while water deficits will increase from May to October, with pronounced deficits in July and August.

Rainfall Intensity Duration Frequency

Intensity Duration Frequency (IDF) relates rainfall intensity with its duration and frequency and is used for flood forecasting and drainage design. For this parameter, the IDF_CC tool, developed by Western University and the Institute for Catastrophic Loss Reduction, was used to project the change in total 24-hour precipitation for various design return periods. The results project a 19-22% increase in the 5-year, 24-hour rainfall amount, and a 17-30% increase in the 100-year, 24-hour rainfall amount.

6. ALTERNATIVE SOLUTIONS

Phase 2 of the Municipal Class EA process requires the identification and assessment of a reasonable range of functionally different Alternatives to the Undertaking, or Alternative Solutions, to address the identified transportation Problems and/or Opportunities.

As noted previously, the communities in the eastern areas of the City of Ottawa are projected to experience continued growth in both population and employment up to 2031 and beyond. This growth will likely require appropriate and targeted transportation infrastructure (for transit, automobiles, and AT modes) to accommodate this projected growth. This Section of the Report assesses the possible Alternative Solutions to address the north-south capacity deficiency and mobility needs as defined in **Section 4**

As described in **Section 1.2** of this Report, the 2011 Hospital Link and Cumberland Transitway EA recommended a fully segregated two lane Transitway between Innes Road and the Pine View Golf Course with provision for a four-lane Blair Road. The EA further recommended an at-grade transit station at the northeast quadrant of Blair Road and Innes Road, with an on-line station proposed at Meadowbrook Road and Blair Road as the last stop of the Transitway service prior to crossing Ottawa Road 174 and connecting to Blair Station. The City's current TMP includes the proposed future Transitway as a project that is anticipated for implementation some time beyond 2031. Therefore, a fully segregated Transitway has not been considered as an Alternative Solution for the near term 2031 horizon. However, protection for the proposed future Transitway has been considered.

6.1 Near-term Blair Road Transit Priority Corridor Solutions

Near term (by 2031) Alternative Solutions were determined for the Blair Road (Innes to Blair Station) study corridor as described in **Appendix C.** The Alternative Solutions include:

- Do Nothing
- Expand/Enhance Transit Service (Localized Transit Priority, Bus Only Lanes, High Occupancy Vehicle (HOV) Lanes)
- Expand/Enhance Accessibility/Pedestrian/Cycling Facilities
- Transportation System Management
- Travel Demand Management
- Expand Roadway Capacity (General Purpose or HOV Lanes)

6.1.1 Do Nothing

Under the 'Do Nothing' alternative, no significant changes would be made to the transportation network. Although capital costs and certain environmental impacts would be low for this alternative, the 'Do Nothing' approach does not accommodate future travel demand (general purpose traffic, transit) within the Study Area. Further it does not address the needs of pedestrians and cyclists within the Blair Road corridor.

6.1.2 Expand/Enhance Transit Service

The expansion or enhancement of transit service is a key measure for managing the increased travel demand across the roadway network. Transit programs that offer services competitive to automobile use can absorb a significant portion of person-trip demand, consequently reducing a community's vehicle-trip demand and leading to considerable reductions in need for additional supportive roadway infrastructure.

The City of Ottawa's growth management strategy recognizes the contribution of transit modal split in decreasing vehicle-trip demand. As such, a significant increase in transit ridership has been targeted to manage the ever-growing travel demand pressure across the roadway network and, in particular, in the East Urban Area.

The Official Plan and the TMP have set out an extensive plan for implementation of rapid transit lines, service strategies, and transit priority measures which will be instrumental to reaching the City's increased transit mode split objective. Additional north-south capacity will be required to meet the projected 2031 travel demand.

The expansion or enhancement of transit service holds very good potential to help accommodate projected increased north-south travel demand and is considered important to helping to build transit ridership in advance of a proposed future implementation (post-2031) of fully segregated rapid transit service along the Blair Road corridor.

6.1.3 Expand/Enhance Accessibility and Active Transportation Facilities

Measures to accommodate and increase walking, cycling and accessibility are an integral part of the TMP. The City of Ottawa is committed to promoting these modes and opportunities as a way of meeting future mobility needs. Design solutions may include MUPs, sidewalks, pedestrian crossings, and/or cycle tracks. Though these measures would help address existing deficiencies, improve service for active modes of transportation and provide enhanced accessibility, they will not serve as stand-alone solutions to address travel demand in the Study Area. These measures should be considered as part of a package of solutions.

6.1.4 Transportation System Management

Transportation System Management (TSM) is a category of alternatives that includes various approaches to optimizing the existing transportation network. Typical measures include intersection improvements, traffic signalization changes, signage, etc. The extent to which the City of Ottawa can address the needs for maximizing its people-moving capacity is limited and, although important, is not usually seen as a stand-alone solution.

The implementation of TSM is, therefore not considered a stand-alone solution that would satisfy future travel demands within the broader study area.

6.1.5 Travel Demand Management

The City's future travel projections give consideration to the portion of the population that regularly works from home. Travel Demand Management (TDM) measures to increase the portion of the population that regularly works from home, while beneficial, are not considered a stand-alone solution that would satisfy future travel demands within the broader study area.

6.1.6 Expand Roadway Capacity

There is an identified need for expanding roadway capacity to meet future travel demand. Given the high demand for transit service and good potential for High Occupancy Vehicle (HOV) travel within the project limits consideration should be given to allocation of additional roadway capacity to transit and/or HOV travel.

Such consideration can either involve new lanes for the existing two-lane section of Blair Road, or conversion of lanes on the existing four-lane section of Blair Road.

Increased ridesharing is an effective strategy that can decrease total vehicle-trip demand through the promotion of the sharing of private vehicles by individuals. A common ridesharing supportive measure is the implementation of designated HOV lanes, which provide vehicles meeting a specified minimum occupancy with travel time and trip reliability benefits over non-HOV lanes. HOV lanes are often implemented initially for vehicles with a minimum of two passengers and typically carry transit vehicles, such as buses, as well.

A preliminary review was undertaken of the potential for HOV lanes on Blair Road. The review examined the impacts and potential benefits associated with the introduction of HOV facilities, possibly shared with surface transit facilities, as part of planned interim (up to 2031) transportation improvements in the Study Area. Transit and multiple occupant vehicle (HOV; i.e., vehicles transporting 2 or more persons) use was determined to be significant on Blair Road north of Innes Road. The City's EMME travel demand model projected a 2031 base case scenario in which 60% of the total person trips on Blair Road between Innes Road and Blair Station would be made either by persons on transit or persons in multiple occupant vehicles during morning peak traffic hours.

6.2 Confirmation of the Preferred Alternative Solution

Of the above alternatives, a combination of additional roadway and transit capacity in conjunction with measures to accommodate and increase walking, cycling and accessibility, is the recommended Alternative Solution to address the identified problems, needs and opportunities for Blair Road from Innes Road in the south to Blair Station in the north within the 2031-time horizon. The widening of Blair Road from two lanes to four lanes between Innes Road and Meadowbrook Road is recommended.

While a combination of roadway widening (for general purpose traffic) and a new dedicated north-south segregated rapid transit parallel to Blair Road meets long term needs in accordance with the TMP, the provision of dedicated Transit/HOV lanes on Blair Road is considered the best near-term solution and is recommended to be carried forward for further study.

7. IDENTIFICATION OF ALTERNATIVE DESIGNS

This section of the report describes the Alternative Design Concepts that were identified and evaluated for the Blair Road corridor. The project is divided into two distinct sections:

- Section 1: Blair Road/OR174 Interchange area
- Section 2: Blair Road from south of OR174 to Innes Road

The following activities were undertaken as part of Phase 3 of the Municipal Class EA process:

- Identification of Alternative Design Concepts for the preferred Alternative Solution,
- Inventories of the natural, socio-economic, and cultural environments,
- Identification of the impacts of each alternative on the environment and potential mitigating measures,
- Evaluation of Alternative Designs and selection of the recommended design, and
- Consultation with review agencies and previously interested and directly affected members of the public for input on the recommended design prior to selection of the preferred alternative.

7.1 Alternative Design Concepts

7.1.1 Cross-Section Alternatives

The identification of roadway cross-section alternatives involved consideration of various potential combinations of several roadway elements including:

- Number of Through Lanes (e.g., 2 or 4-lanes) and Special Purpose Lanes
- Median Treatments/Extent of Access Control – Raised Median, No Median
- Provision for Cyclists – Paved Shoulders, Cycle Tracks, Multi-Use Pathways
- Sidewalks, Boulevards, Planting Zones

Identification of roadway cross-section alternatives required consideration of roadway classification, as well as design guidelines and standards. Noise attenuation, illumination and utilities were also considered.

7.1.2 Intersection Alternatives

The following Blair Road intersections were considered.

Section 1: Blair Road/OR174 Interchange area:

- Ottawa Road 174 westbound off-ramp/Blair Transit Station entrance (existing condition includes traffic control signals)
- Ottawa Road 174 westbound on-ramp from Blair Road southbound (existing condition includes a signalized free-flow ramp)
- Ottawa Road 174 westbound on-ramp from Blair Road northbound (existing condition includes a signalized free-flow ramp)
- Ottawa Road 174 eastbound off-ramp to Blair Road northbound (existing condition includes a signalized free-flow ramp)
- Ottawa Road 174 eastbound off-ramp to Blair Road southbound and eastbound on-ramp (existing condition includes traffic control signals)

Section 2: Blair Road from south of OR174 to Innes Road:

- Meadowbrook Road (existing condition includes traffic control signals)
- Pine View Golf Course entrances (both are unsignalized)
- Emergency chained community access lane (chained) south of Meadowbrook (existing condition is unsignalized)
- Laura Private (unsignalized)
- Beaverpond Drive (existing conditions include stop sign control on Beaverpond Drive and pedestrian traffic control signals on Blair Road)
- Innes Road (existing condition includes traffic control signals)

The following traffic control alternatives were considered:

- Intersection/access configuration modifications
- Free-flow ramp modifications
- Traffic control signals – new or modified
- No modifications

7.1.3 Other Design/Mitigation Alternatives

Other types of design alternatives that were considered include:

- Drainage/Stormwater Management Alternatives
- Noise Attenuation
- Landscaping
- Illumination Alternatives

The above elements and consideration of traffic signal modifications are documented in the description of the Recommended Design.

7.2 Blair Road (at OR 174) Bridge Cross-Section Alternatives

Existing Conditions at the Blair Road/Ottawa Road 174 bridge structure are shown in **Figure 7-1** which include two general purpose traffic lanes per direction, a northbound turning/weaving lane between on- and off-ramps, and northbound and southbound cycling lanes. There are no sidewalks on the existing bridge over Ottawa Road 174. A short distance to the north the existing Blair Road structure over the Transitway (and future Stage 2 Light Rail Transit extension) is somewhat wider and less constrained. Both bridge structures are considered to have significant time remaining in their life cycle.

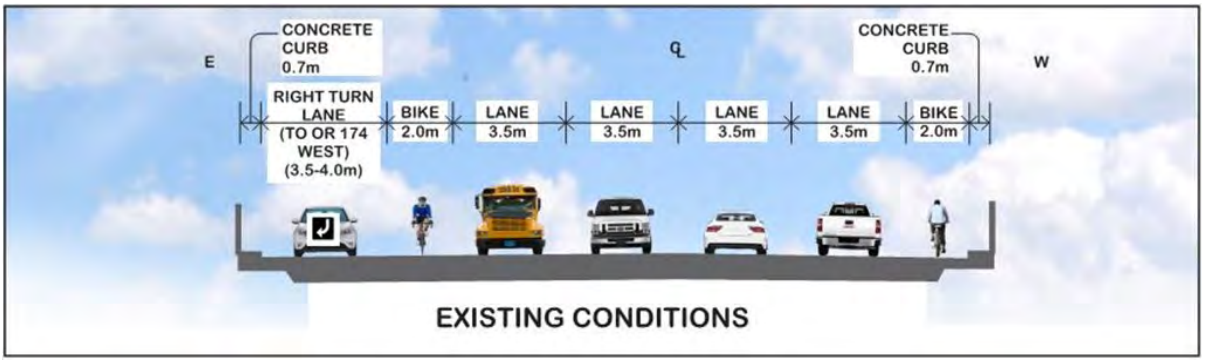

Figure 7-1: Existing Blair Road/OR174 Bridge Cross-Section

Neither bridge replacement nor widening options were considered feasible and affordable at this time. As a result, design alternatives gave consideration to possible changes to how the existing bridge widths are being used such as reallocation of space being used for the existing cycling lanes and/or auxiliary lanes.

Options 1 and 2 below considered reallocation of the bridge width currently be used for cycling lanes. Options 3 and 4 also considered reallocation of bridge width currently being used for auxiliary lanes – which could only be undertaken in conjunction with the interchange ramp modifications described in **Section 7.4** under 'Major Interchange Modifications'.

The four cross-section options developed are summarized below and illustrated in **Figure 7-2** through **Figure 7-5**.

- Option 1 has a 4.0 m MUP on the west side with mixed pedestrian and cyclist use
- Option 2 has a 1.8 m east side sidewalk and a west side 3.0 m MUP
- Option 3 has 1.8 m sidewalks and 1.8 m cycle tracks on both sides
- Option 4 has an east 1.8 m sidewalk and 1.8 m cycle track and a west side 4.0 m MUP

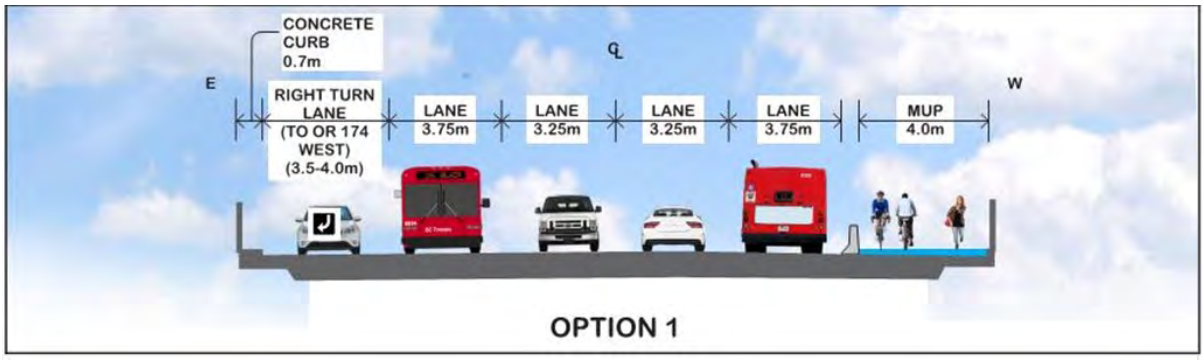

Figure 7-2: Option 1 – West MUP

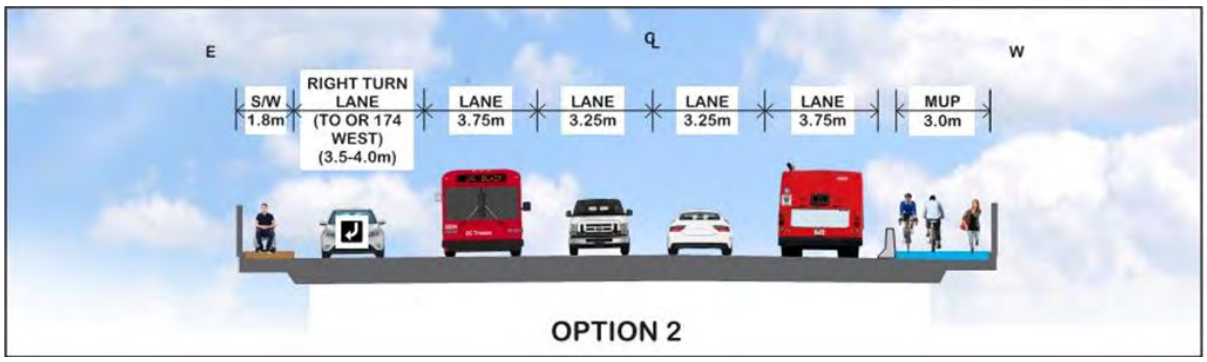

Figure 7-3: Option 2 – West MUP/East Sidewalk

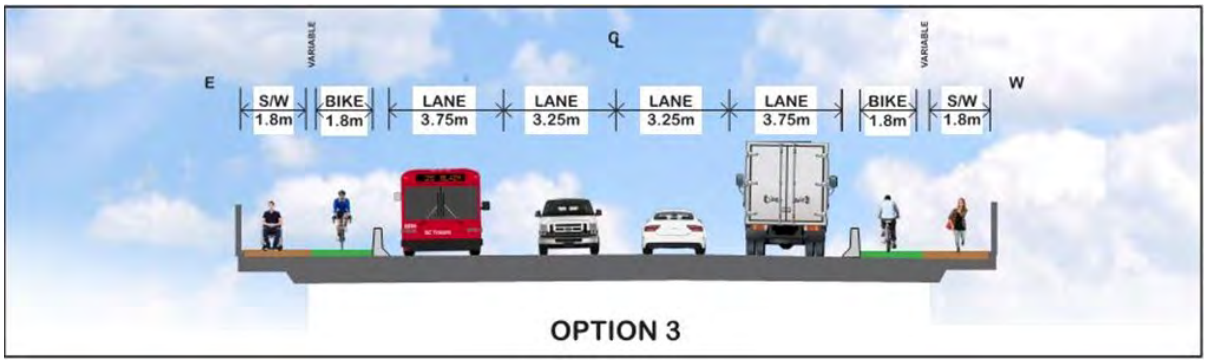

Figure 7-4: Option 3 - West and East Cycle Tracks and Sidewalks

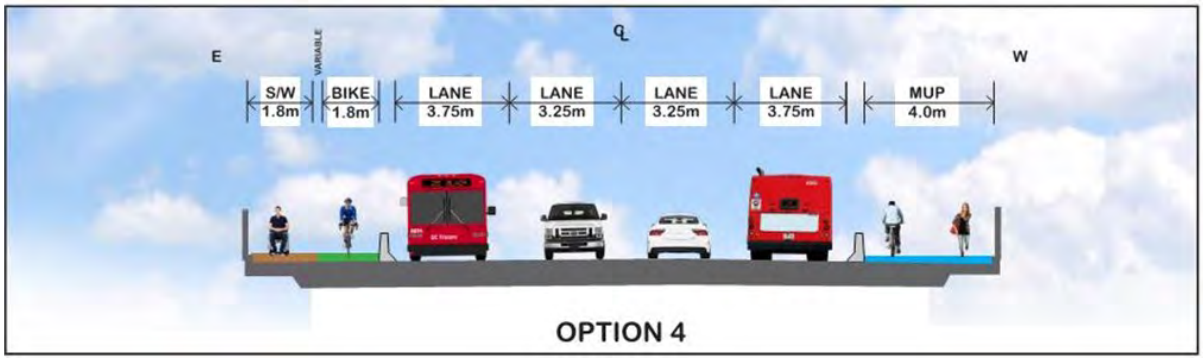

Figure 7-5: Option 4 - West MUP/East Cycle Track and Sidewalk

7.3 Blair Road (South of OR 174) Cross-Section Alternatives

7.3.1 Existing Design Conditions

The existing Blair Road cross-section, between Meadowbrook Road and Innes Road, has a northbound and southbound 3.5 m vehicular lane, with a 3.2 m paved shoulder in each direction, as illustrated in **Figure 7-6**.

The roadway cross-sections below apply to both the existing two-lane of Blair Road from north of Innes Road to south of Meadowbrook Road and the existing four-lane section of Blair Road between Meadowbrook Road and the interchange ramp terminals immediately south of Ottawa Road 174.

All four Options include a northbound and southbound general traffic lane, each with a 3.25 m width, and two outer HOV/Transit lanes, which measure 3.5 m in width, on either side of the general traffic lanes. A median is typically not provided.

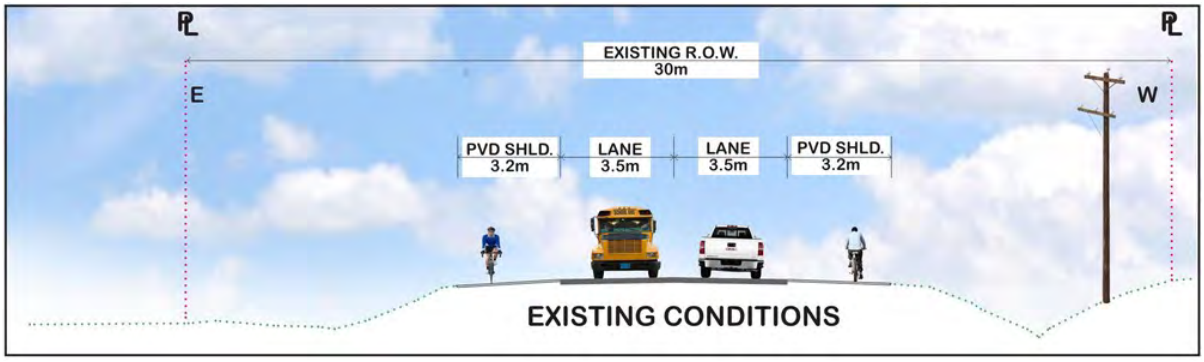

Figure 7-6: Existing Blair Road Conditions Cross-Section

7.3.2 Option 1 – West MUP/East Paved Shoulder

As illustrated on **Figure 7-7**, Option 1 includes a west MUP (3.0 m) which mixes pedestrians and cyclists and a 3.0 m boulevard adjacent to a curbed roadway edge. The east side of the roadway has a paved shoulder with a 3.0 m width for cyclist use.

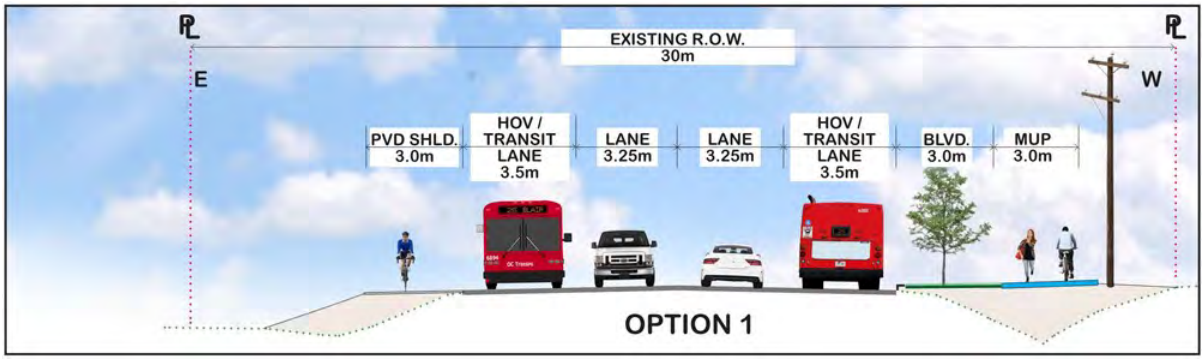

Figure 7-7: Option 1 – West Side MUP and Boulevard/East Paved Shoulder

7.3.3 Option 2 – West Cycle Track and Sidewalk/East Paved Shoulder

As shown in **Figure 7-8**, Option 2 has a 1.0 m boulevard to separate the curbed HOV/Transit lane from a 1.8 m off-road cycle track on the west side of the roadway. A 1.8 m sidewalk is separated from the cycle track by a 1.5 m boulevard. The east side of the roadway has a paved shoulder with a 3.0 m width for cyclist use.

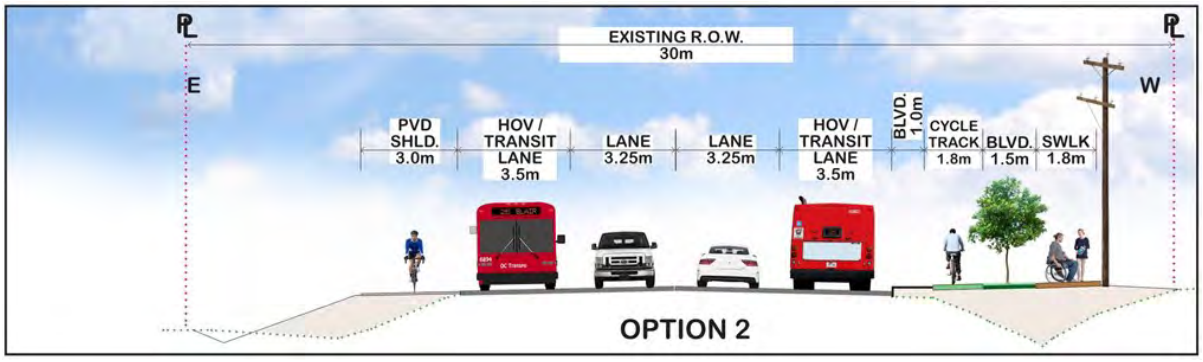

Figure 7-8: Option 2 - West Cycle Track and Sidewalk/East Paved Shoulder

7.3.4 Option 3 – West MUP/East Cycle Track

As shown in **Figure 7-9**, Option 3 includes a MUP (3.0 m) on the west side, separated by a 3.0 m boulevard from the curbed roadway edge. The east side includes a 1.8 m cycle track, separated from the outer HOV/Transit Lane by a 3.0 m boulevard and curbed roadway edge.

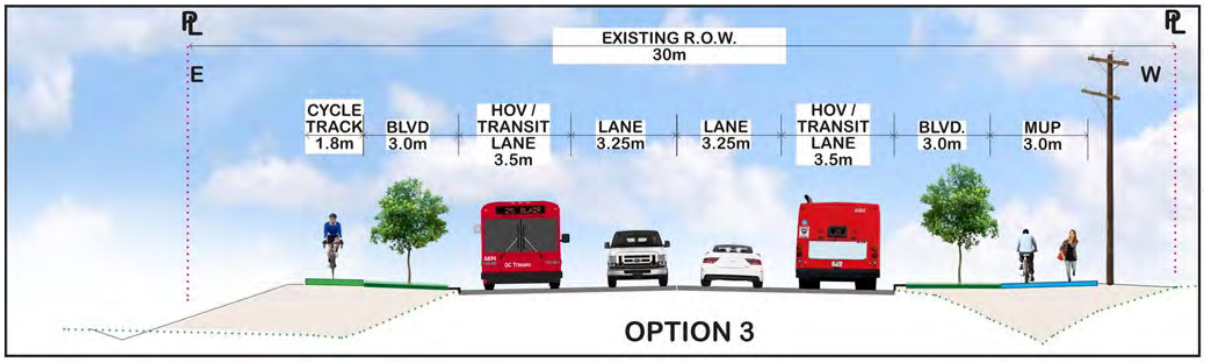

Figure 7-9: Option 3 - West Multi-Use Pathway/East Cycle Track

7.3.5 Option 4 – West and East Cycle Tracks and Sidewalks

Option 4 (**Figure 7-10**) includes sidewalks (1.8 m) and cycle tracks (1.8 m) on both sides of the roadway separated from each other by a 1.5 m boulevard. The cycle track is separated from the roadway by a 1.0 m boulevard and curb on each side of the roadway.

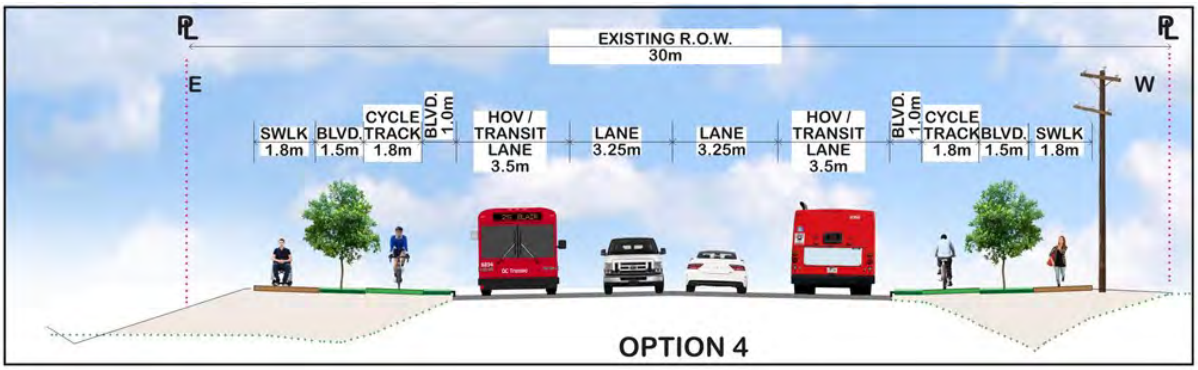

Figure 7-10: Option 4 – West and East Cycle Tracks and Sidewalks

7.4 Blair Road/Ottawa Road 174 Interchange Alternatives

Special consideration was given to the Blair/Ottawa Road 174 interchange and potential modifications to the existing free flow ramps which result in conflicts between fast moving vehicles and both cyclists and pedestrians. Existing conditions at the interchange are shown in **Figure 7-11** and **Figure 7-12**.

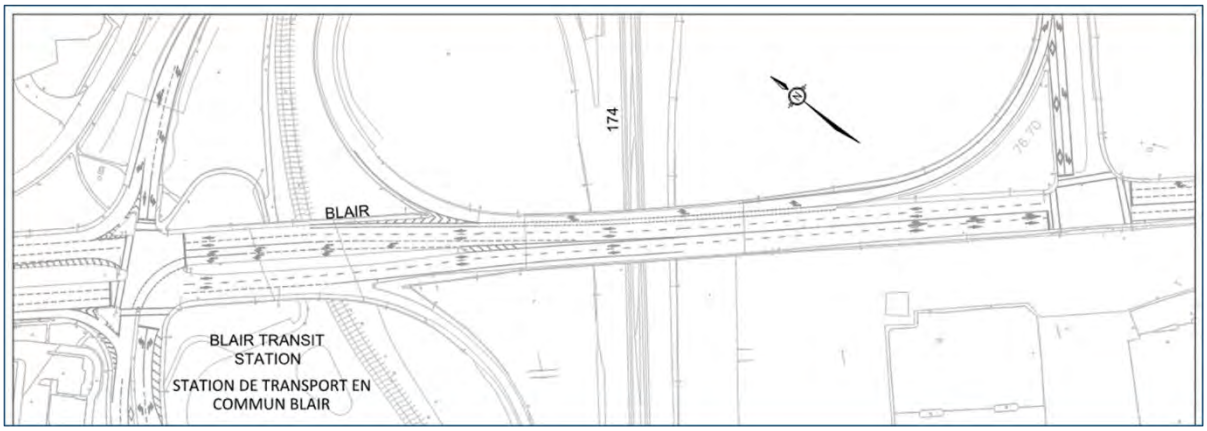

Figure 7-11: Existing Conditions at Blair/Ottawa Road 174 Interchange

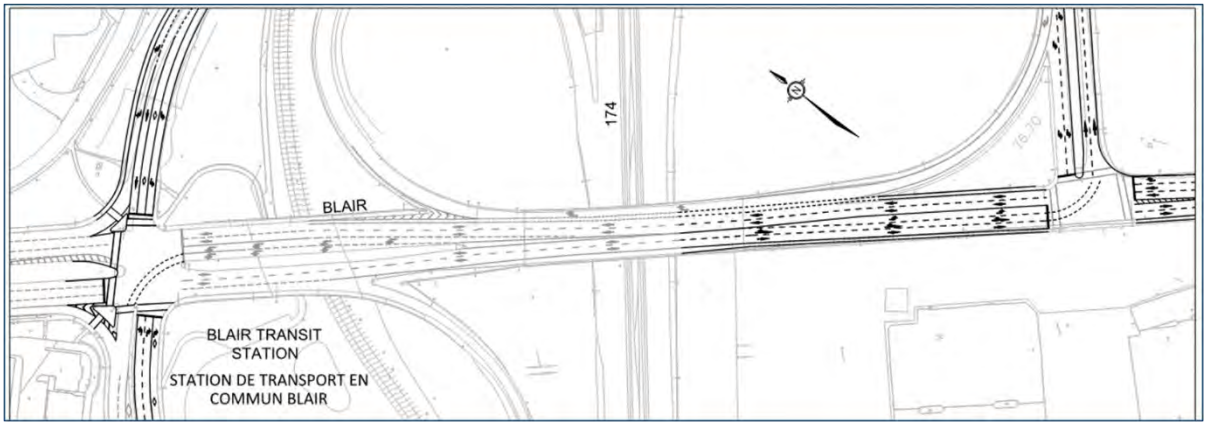

Figure 7-12: Modified Existing Conditions during Stage 2 LRT Construction at Blair/Ottawa Road 174 Interchange

Two options were developed, Minor Modifications and Major Modifications, which can be combined with the Blair Road at Ottawa Road 174 Cross-Section Options presented in **Figure 7-13** and **Figure 7-14**.

- Option 1 – Minor Ramp Modifications – includes modified geometry of only the Ottawa Road 174 westbound on-ramp from Blair Road southbound. This interchange modification option could be combined with either Cross-Section Option 1 or Option 2 for Blair Road at OR 174 as described in **Section 7.2**.
- Option 2 – Major Ramp Modifications Option includes modified geometry of all three free-flow ramps. This interchange modification option could be combined with either Cross-Section Option 3 or Option 4 for Blair Road at OR 174 as described in **Section 7.2**.

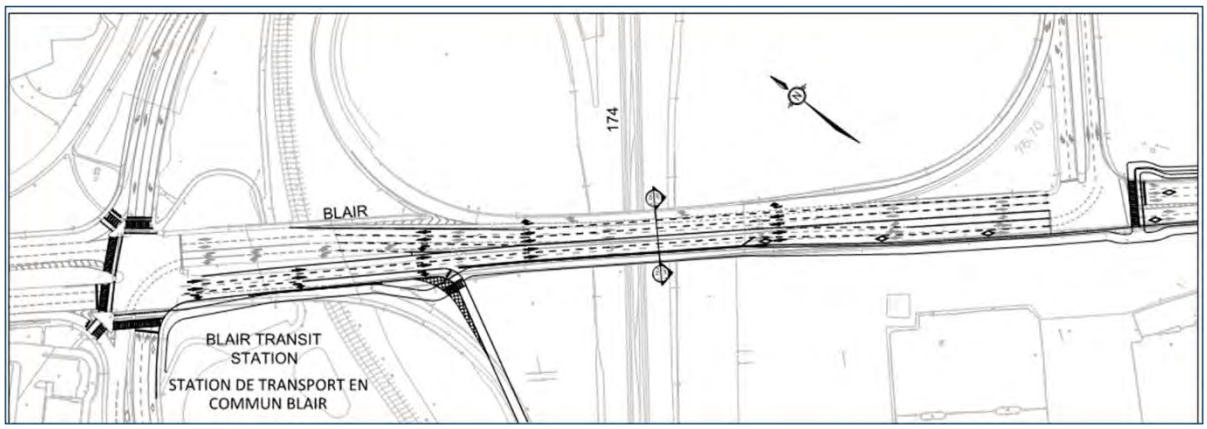

Figure 7-13: Option 1 – Minor Interchange Modifications

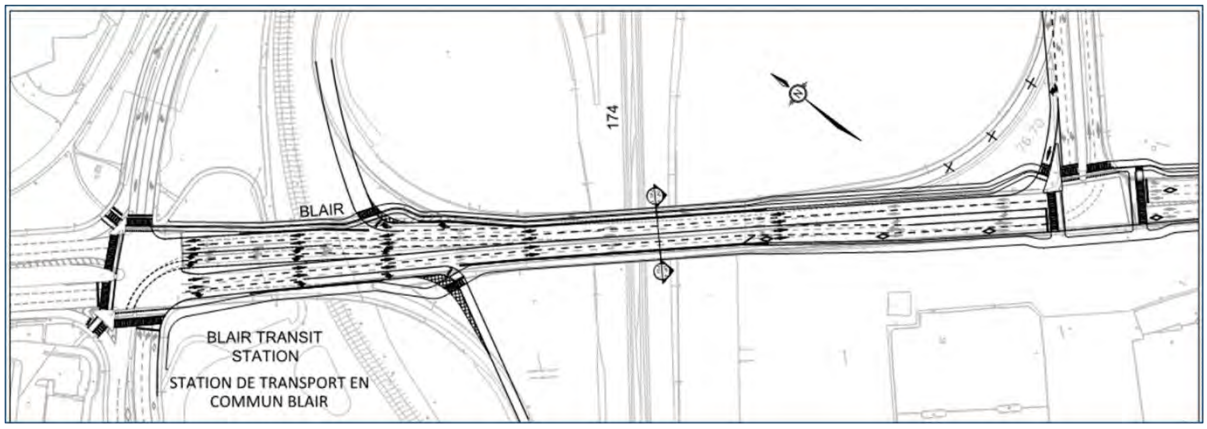

Figure 7-14: Option 2 – Major Interchange Modifications

8. EVALUATION OF ALTERNATIVE DESIGNS

8.1 Evaluation Methodology

The evaluation of alternatives is a fundamental requirement of the Municipal Class EA Process. An evaluation method, as defined by the MECP, is a formal procedure to establish an order of preference among alternatives which provides a traceable, defensible rationale for selecting preferences.

Alternative design concepts are typically evaluated based on environmental, engineering and cost factors considering natural, social, economic, and cultural environments. Engineering factors typically include transportation considerations and engineering aspects. Cost comparisons consider financial factors. A primarily qualitative methodology was utilized as part of the evaluation of alternatives.

8.1.1 Qualitative Assessment

Qualitative Assessment (identifying pros and cons and relative preferences for key differentiators) was utilized to assess both the cross-section and intersection/interchange alternatives. The key advantage of this approach is that it is informative, easily understood, and serves to highlight the trade-offs between alternatives.

The method involves screening a long list of potential evaluation criteria (or sub-factors) from within several broad factor groups (i.e., Traffic & Transportation, Natural Environment, Socio-Economic Environment, Cultural Environment, and Cost) to select suitable criteria that might be relevant in differentiating between alternatives.

A recommended alternative was selected based on which option had the highest proportion of favourable ratings (good in comparison) and the lowest proportion of least favourable ratings (poor in comparison).

8.1.2 Selection of Evaluation Criteria

The Alternative Designs were screened based on distinguishing transportation, natural and social environmental criteria to determine which alternative, or combination of alternatives, would be carried forward as the preferred. A long list of screening evaluation factors were considered for the evaluation of Alternative Designs:

Natural Environment

- Fisheries and Aquatic Habitat
- Vegetation
- Wildlife Habitat and Mobility
- Surface Water
- Groundwater
- Surface Geology and Soils
- Air Quality

Socio-Economic Environment

- Noise and Vibration
- Land Use
- Property Ownership
- Economy
- Agricultural
- Community/Recreation
- Aesthetics

Traffic and Transportation

- Road Network Continuity
- Traffic and Operations
- Cyclist/Pedestrian Accommodation
- Safety
- Access/Egress
- Construction Staging
- Emergency Vehicle Access

Cultural Environment

- Heritage
- Archaeological
- Cultural Landscape

Cost

- Life Cycle
- Property
- Utilities

The small, anticipated project footprint, relatively similar characteristics between alternatives and anticipated environmental effects, resulted in the list of screening criteria being shortened to reflect factors that were based on distinguishable differences between the alternatives. These criteria included:

Traffic and Transportation Factors:

- Ability to meet future (2031) transportation demand
- Multi-modal transportation connectivity

Natural Environment Factors:

- Maintenance of Greenbelt rural edge/vegetation (east side of corridor)

Economic/Cost Factors:

- Number of interchange ramp modifications.

8.2 Evaluation of Alternatives

Table 8-1 through **Table 8-3** present the screening/evaluation of Design Alternatives for the study.

Table 8-1: Blair Road (at OR 174) Bridge Cross-Section Alternatives

Criteria	Option 1 – West MUP	Option 2 – West MUP/East Sidewalk	Option 3 - West and East Cycle Tracks and Sidewalks	Option 4 - West MUP/East Cycle Track and Sidewalk
Ability to Meet Future (2031) Transportation Demand	Yes	Yes	Yes	Yes
Enhanced Multi-Modal Transportation Connectivity	Doesn't accommodate northbound cyclists on longer trips as well	Doesn't accommodate northbound cyclists on longer trips as well	Less suited for local northbound cycling travel on west side	Good for expected higher bi-directional travel (MUP) East sidewalk and cycle tracks maximize mobility and future compatibility
Number of Unmodified Free-Flow Ramp Crossings	Two on east side	Two on east side	None	None
CARRIED FORWARD	✗	✗	✗	✓

Table 8-2: Blair Road/Ottawa Road 174 Interchange Alternatives

Criteria	Option 1 – Minor Ramp Modifications	Option 2 – Major Ramp Modifications
Ability to Meet Future (2031) Transportation Demand	Yes	Yes
Enhanced Multi-Modal Transportation Connectivity	Less suited for pedestrians and cyclists along east side of bridge	Maximizes mobility and compatibility with future cross-section to the south
Cost of Ramp Modifications	1 Ramp Modification Lower Cost	3 Ramp Modifications Higher Cost
CARRIED FORWARD	✗	✓

Table 8-3: Blair Road (South of OR 174) Cross-Section Alternatives

Criteria	Option 1 – West MUP/East Paved Shoulder	Option 2 – West Cycle Track and Sidewalk/East Paved Shoulder	Option 3 – West MUP/East Cycle Track	Option 4 – West and East Cycle Tracks and Sidewalks
Ability to Meet Future (2031) Transportation Demand	Yes	Yes	Yes	Yes
Enhanced Multi-Modal Transportation Connectivity	West Side MUP maximizes connectivity – allows bi-directional cycling mobility	Less suited for local northbound cyclists	West Side MUP maximizes connectivity – allows bi-directional cycling mobility	Less suited for local northbound cycling travel on west side
Maintenance of Greenbelt Rural Edge (East Side of Corridor)	Yes	Yes	No	No
CARRIED FORWARD	✓	✗	✗	✗

9. RECOMMENDED PLAN

9.1 Recommended Design Overview

The Recommended Plan includes the following design elements as improvements within the Study Area:

- New multi-use pathway along the west side of Blair Road for the full length of the study corridor
- New raised cycling track and sidewalk along the east side of the study area across OR174 and at bus stops along the northbound lane south of OR174
- Modified OR174 ramps with Blair Road terminals close to a 70° angle for enhanced pedestrian crossings
- Existing cycling lanes and northbound vehicle weaving lane between the westbound on-ramp and the eastbound off-ramp to be removed at OR174 interchange
- OR174 and Stage 2 LRT bridge modifications include the addition of traffic barrier walls at the outer edge of the traffic lanes and replacement of the parapet walls with lighter weight pedestrian railings
- All existing intersections upgraded to accommodate protected pedestrian and cyclist crossing
- Widening of Blair Road from two to four lanes from south of Meadowbrook Road to Innes Road
- Inclusion of one traffic lane and one HOV/Transit lane per direction (south of OR174 to Innes Road)
- Design and posted speeds on Blair Road are proposed to remain as per existing conditions:
    - 60 km/hr design speed and 50 km/hr posted speed from Innes Road to south of OR 174
    - 80 km/hr design speed and 60 km/hr posted speed in the area of OR174.
- A semi-urban cross-section with a raised concrete curb on the west side and a rural shoulder along the east side (south of OR174)
- Two new pedestrian crossing signals at two bus-stops south of Laura Private and north of Innes Road
- Upgrade of Beaverpond Drive intersection to a full traffic signal
- A drainage ditch along the east side of the corridor and catchbasins along the west side with catchbasin leads outletting to the east ditch will capture surface drainage, and
- New noise barriers are proposed along the west side of the corridor, south of Meadowbrook Road, where warranted.

The recommended design has been coordinated with the work of the Montreal-Blair Road Transit Priority Project which connects to the Study Area at the north as well as plans for the Stage 2 LRT Confederation Line East Extension project from Blair Station easterly. In addition, the Blair Road Transit Priority Corridor project makes provision for

the future Cumberland Transitway project immediately east of Blair Road from Blair Station south to Innes Road.

The functional design plans and profiles for the recommended alternative are shown on the attached Plates 001 through 012. These plates are appended to this report in an Annex entitled 'Functional Design Plans'.

9.2 Recommended Design Features

At the Blair Road/OR 174 bridge structure, the recommended cross-section is Option 4 (**Figure 9-1**). The recommended plan proposes providing fully accessible facilities for all modes of transportation while maintaining two general traffic lanes per direction as well as avoiding major modifications to the structure. To reduce vehicle speeds, all three free flow interchange ramps will be realigned with smaller turning radii provided where they intersect with Blair Road. The shared northbound OR174 on and off ramp auxiliary lane and on-road cycling lanes have been repurposed to accommodate a 4.0 m MUP on the west side and a 1.8 m sidewalk and 1.8 m cycle track on the east side. **Figure 9-2** illustrates the realigned OR174 ramps.

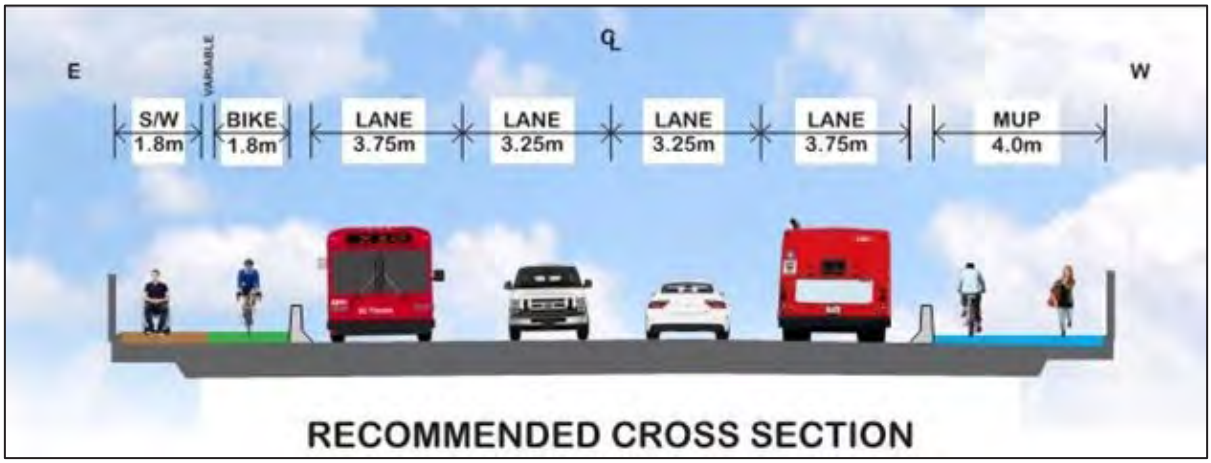

Figure 9-1: Recommended Blair Road/OR174 Bridge Cross-Section

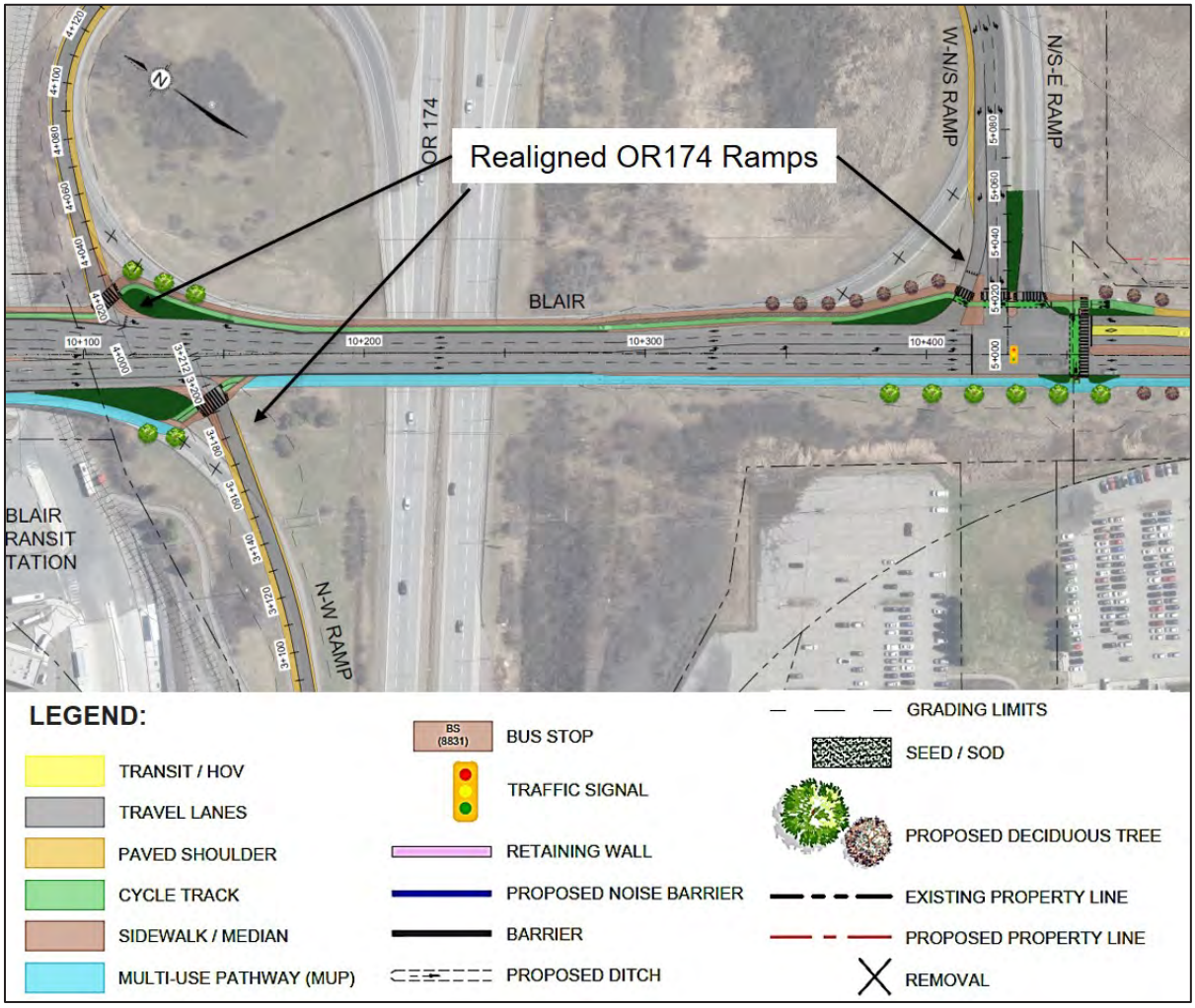

Figure 9-2: Realigned OR174 Interchange Ramps

South of OR174, Blair Road currently transitions from four to two lanes just south of Meadowbrook Road. For the existing four lane section between OR174 and Meadowbrook Road, only minor widening is required and a conversion of the two outer general traffic lanes to transit and HOV lanes is proposed. The northbound transit/HOV lane terminates at the intersection south of OR174 to allow buses destinated to Blair Station to weave across to the left lane. Further south between Meadowbrook Road and Innes Road, Blair Road is currently a two-lane road and widening to four lanes is recommended to accommodate dedicated transit and HOV lanes.

Of the cross-section alternatives considered for Blair Road from south of OR174 to Innes Road, Option 1 is recommended. The NCC Greenbelt is on the east side of Blair Road and this project proposes to maintain the existing east rural grading and ditching to preserve the rural character of the Greenbelt. On the west side of Blair Road, a 3.0 m MUP will extend from the OR174 bridge overpass to Innes Road and will provide direct access to the adjacent Pineview Community. A MUP on the west side is preferred as it accommodates bi-directional cycling and reduces the need for northbound cyclists to cross Blair Road. Design refinements to the Recommended Design that arose through

the consultation process include a slightly widened boulevard (3.5 m) between the MUP and the roadway, and a wider paved shoulder (2.5 m) on the east side of Blair Road. **Figure 9-3** illustrates a typical cross-section of the widening of Blair Road from south of the OR174 to Innes Road.

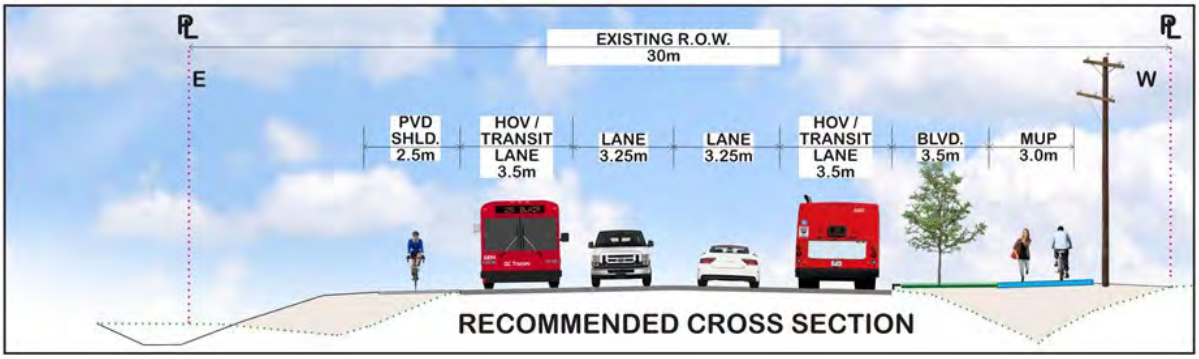

Figure 9-3: Typical Blair Road Cross-Section (South of OR174)

At the east side bus stops, a 4.0 m pedestrian platform is proposed with a cycle track passing behind the shelter to avoid pedestrian and cycling conflicts (**Figure 9-4**). To strengthen connectivity to bus stops, new pedestrian crossings are proposed at two locations: one just north of Innes Road and the second just south of Laura Private.

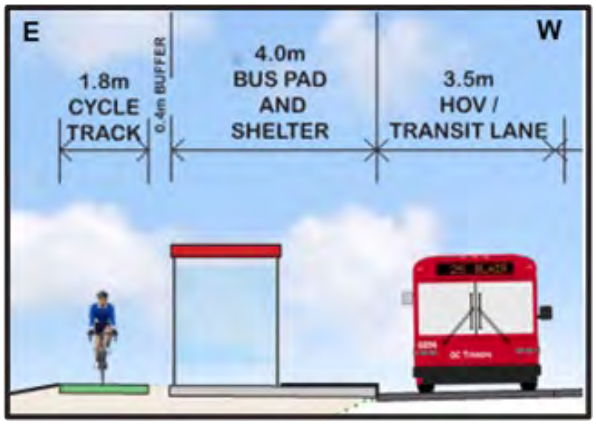

Figure 9-4: Typical Treatment at Bus Stops

Additional enhancements for pedestrians, cyclists and accessibility include protected intersections at all signalized intersections. **Figure 9-5** illustrates the protected intersection design at Blair Station with improved connections to the proposed MUP on the west side of Blair Road and a separate sidewalk and cycle track on the east side. The existing pathway loop on the east side of Blair Road that passes under the Blair Road structure connecting to the LRT Station will be upgraded to a fully accessible MUP with a connection to the proposed Stage 2 LRT Confederation Line East Extension MUP. On the west side of Blair Road, a proposed MUP will replace the existing sidewalk and connect further west into the station.

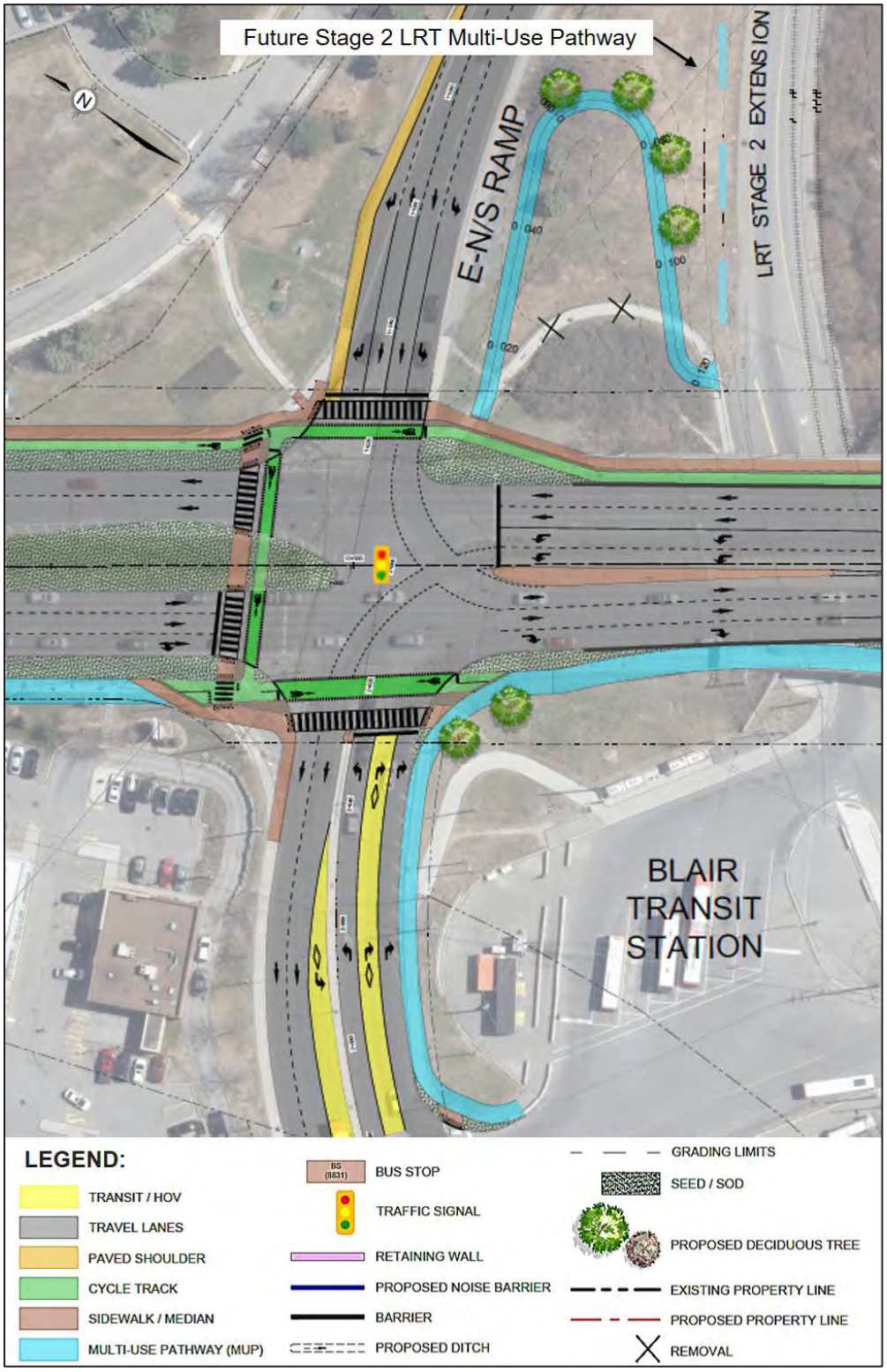

Figure 9-5: Protected Intersection and Highlights at Blair Station

Meadowbrook Road intersection will become a partial protected intersection. Channelized right turn lanes have been removed to better accommodate pedestrians and cyclists as shown in **Figure 9-6**. Protected cycle lanes will transition to on-street cycling on Meadowbrook Road. Along the east side of Blair Road, separate northbound cycle track and sidewalk are proposed at the bus stop just north of the intersection. Future consideration may be given to modifying access to the Pine View Golf Course to align with the signalized intersection at Meadowbrook Road (**Figure 9-7**). While the two accesses into the golf course will continue to operate well with the widening, potential access modification was raised during consultation and may be considered in the future.

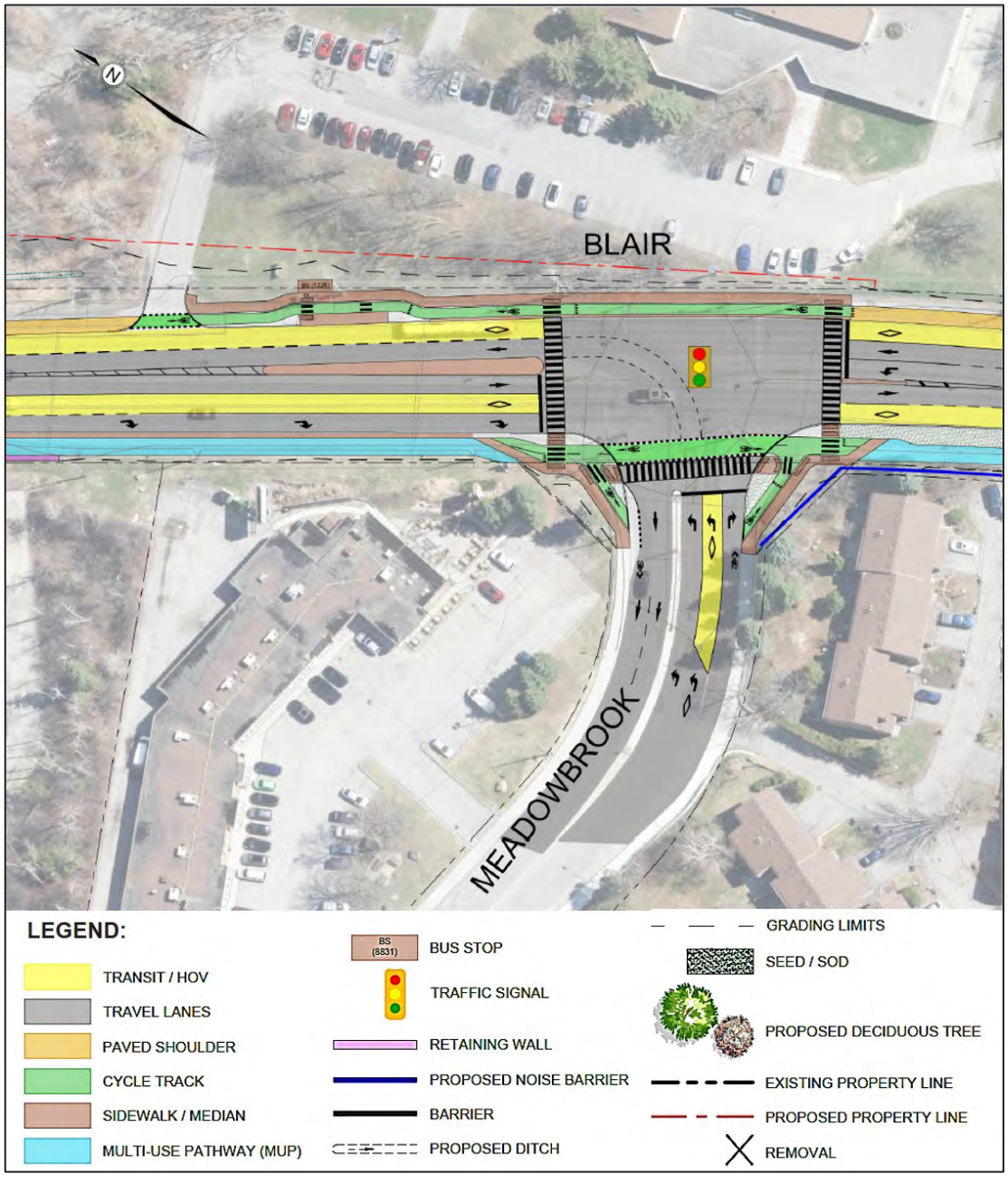

Figure 9-6: Recommended Design at Meadowbrook Road

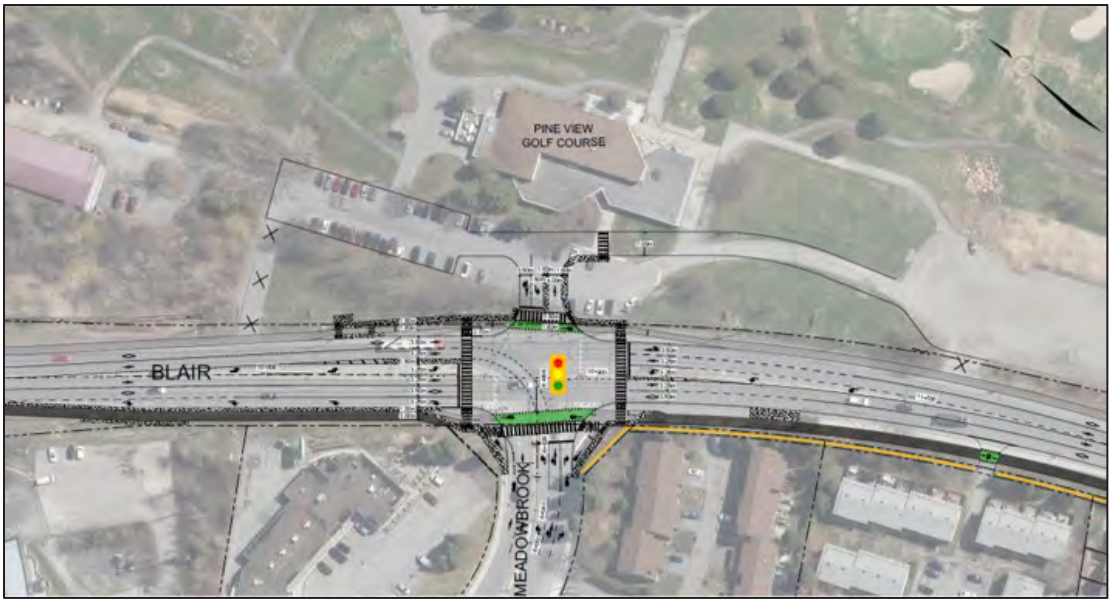

Figure 9-7: Potential Modified Access to Pine View Golf Course

The Meadowbrook Road intersection is expected to be modified post-2031 as per the City's TMP's future plans for a separate BRT facility. The open-cut view in **Figure 9-8** shows the planned Cumberland bus rapid transitway below the roadway with an overpass to access Pine View Golf Course. These future intersection enhancements will require the golf course's parking to be relocated and allow the combined HOV and Transit lanes to be converted to general purpose lanes once the future Transitway is implemented.

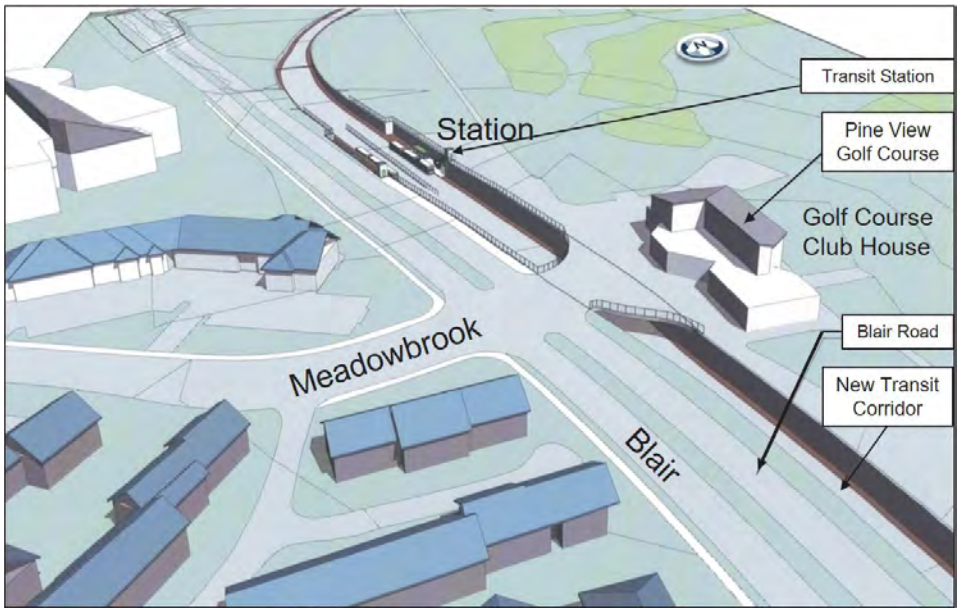

Figure 9-8: Concept Design of Meadowbrook Road and Pine View Golf Course Entrance (post-2031)

Moving south of Meadowbrook Road, the Beaverpond Drive intersection is proposed to be upgraded from a pedestrian signalized intersection to a fully signalized intersection. The pedestrian signaled crossing will be relocated to north of the intersection as shown in **Figure 9-9** to increase transit level-of service. A northbound left turn lane will also be added to provide safe crossing for pedestrians and cyclists.

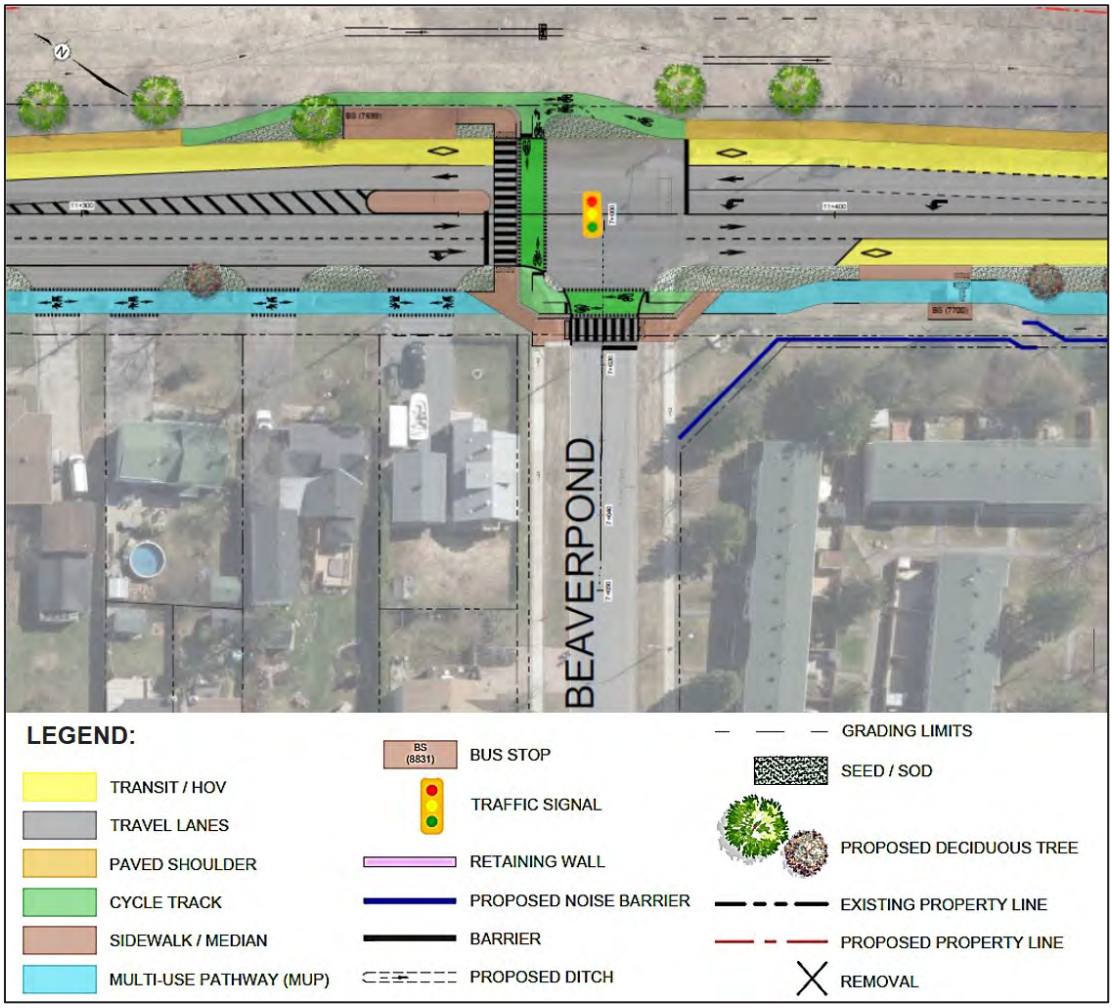

Figure 9-9: Recommended Design at Beaverpond Drive Intersection

Modifications to the intersection of Blair Road with Innes Road include a protected intersection (**Figure 9-10**) that will provide pedestrian and cycling connectivity to the retail plaza on the south side of Innes Road. Based on a traffic study of future travel demand, the channelized right turn lane from Blair Road south to Innes Road west is not essential and is proposed to be removed in favour of a shared through and right turn lane to improve safety for pedestrians and cyclists. The removal of this channelized right turn also provides space to extend the MUP on the west side of Blair Road to the Innes Road intersection, as there is no opportunity to acquire additional property at this location due to the proximity of the fuel storage tanks at the gas station.

Figure 9-10: Protected Intersection at Blair Road and Innes Road

9.3 Stormwater Management

The proposed road cross section includes a semi urban cross section with paved shoulders and ditches along the east side, and barrier curbs with a MUP behind the curb on the west side. Stormwater on the east side of the road will be captured with drainage ditches while the west side of the road will include curb face inlet catch basins, which will outlet as follows:

- North of Meadowbrook Road to the existing ditch along the west side
- Between Meadowbrook Road and Laura Private to the existing storm sewer system, and

- South of Laura Private the catch basins leads will outlet to the proposed east ditch

The Recommended Plan will result in a moderate increase in impervious surfaces due to the widening of Blair Road. Runoff quality treatment and quantity control (peak flow attenuation) will be achieved through enhanced grass swales with rock check dams and vegetated filter strips along the east side of Blair Road. This approach is preferred due to a number of factors including presence of multiple outlets and the rural ditches versus an urbanized storm sewer approach to stormwater conveyance, the size of catchments, and the low cost of installation/maintenance. The proposed stormwater management controls and any mitigation measures will be included within the proposed Blair Road right-of-way.

9.4 Property Impacts

Between Meadowbrook Road and Innes Road, the existing right-of-way for Blair Road is generally 30 m wide and becomes wider north of Meadowbrook Road. Widening is recommended on the east side of Blair Road to avoid impact on private property and the existing hydro poles on the west side. An approximately 10 m strip of property is required from the NCC Greenbelt lands for an estimated one hectare in total and is primarily for grading and drainage. Additional property of 0.01 hectares in total (100 m^2) from two private properties is required for the proposed protected intersection design at Blair Road and Innes Road.

9.5 Cost Estimate

Project costs were developed in accordance with the Council-approved Project Delivery Review and Cost Estimating process for implementing capital projects. Cost for design, construction, property, public art, and contingencies in 2020 dollars is estimated at $32 million. While this project is identified in the City's 2031 Affordable Rapid Transit Network Plan, funding will be subject to the City's future capital budget priorities.

9.6 Construction Phasing and Staging

Roadway construction south of OR174 is a typical road widening and resurfacing project that can be completed while maintaining traffic generally as per existing and with possible lane reductions to one lane per direction north of Meadowbrook Road. Temporary lanes shifts may be required during construction south of Meadowbrook Road to maintain one lane of traffic per direction.

The OR174 interchange modifications that include ramp terminal modifications, bridges parapet wall modifications, addition of sidewalk, raised cycling track and a MUP will have to be completed in one contract and preferably within one construction season. Short term lane closures and some detouring to accommodate the staging will be required.

10. ASSESSMENT AND EVALUATION OF IMPACTS

10.1 Assessment and Evaluation Approach

The preliminary impact analysis of alternatives outlined in the previous section went only so far as to be able to determine which alternative solution and designs were the preferred for the Study Area. If the resulting effects for a particular criterion were the same for each alternative, or if no residual effects were predicted, the results were not used to compare alternatives. These potentially impacted features, however, are still considered during the impact assessment for the preferred alternative and are presented in this section. An analysis/assessment of all reasonably anticipated impacts associated with implementing the preferred alternative is presented below.

The existing conditions, as defined in **Section 5** of this Report were used as the basis for assessing the effects of the preferred alternative on the transportation, social, and natural environments. The impact analysis involved applying the steps as presented in **Table 10-1**.

Table 10-1: Impact Assessment Approach

	Assessment Approach
Step 1	Identify and analyze instances where the project may interact with existing environmental conditions (**Section 10.2**).
Step 2	Acknowledge predetermined project activities that act as *built-in mitigation measures* (**Sections 10.3 and 10.4**).
Step 3	Identify the residual environmental effects, if any (**Section 10.5**).
Step 4	Identify opportunities for further mitigation of residual effects, if possible/practical (**Section 10.5**).
Step 5	Determine the significance of the residual environmental effects, after further mitigation (**Section 10.5**).

10.2 Interactions

In order to understand the project interactions with the environment it is necessary to consider all phases of the project: pre-construction/design; construction; and operation. **Table 10-2** highlights the key activities associated with each phase and identifies areas of potential environmental interaction.

Table 10-2: Potential Project-Environment Interactions

Phase	Activity	Potential Environmental Interactions
Pre-Construction	Field Investigations	Subsurface Conditions Environmental Contamination Potential Fish and Aquatic Habitat Bird and Nesting Habitat SAR and Critical Habitat Archaeological Potential Cultural Heritage Resources
	Completion of detailed design and contract drawings	None anticipated
	Acquisition of land required for new ROW requirements/transit priority infrastructure	Land Use Land Ownership City Budgeting
Construction	Relocating hydro, telephone, and other utilities	Subsurface Conditions Environmental Contamination Potential Surface Water Fish and Aquatic Habitat Municipal Infrastructure Utilities
	Clearing and grubbing trees and vegetation within the grading limits	Vegetation Bird and Nesting Habitat SAR and Critical Habitat
	Installing remaining landscape features and soil stabilization (such as sodding or hydra-seeding)	Vegetation Land Use
	Construction related traffic impacts, including delays, traffic reductions, detours etc.	Traffic and Transit inconveniences
	Construction related social inconveniences including noise and air quality	Noise Air Quality Recreation and Multi-Use Pathways
Operation	Operation of the HOV/Transit Lanes on Blair Road	Transportation and Transit Existing Land Use Recreation and Multi-Use Pathways Noise

10.3 Built-In Mitigation Measures

Built-in mitigation measures are defined as actions and design features incorporated in the pre-construction, construction, and operational phases and has the specific objective of lessening the significance of severity of environmental effects which may be caused by the project. They typically include standard construction practices and Best Management Practices (BMPs).

The Blair Road Transit Priority Corridor will be designed and implemented with the benefit of contemporary planning, engineering, and environmental management practices. Regard shall be had for the legislation, policies, regulations, guidelines, and best management practices, current at the time of writing. Where possible, mitigation measures will be prescribed in construction contracts and specifications, including reference to applicable Ontario Provincial Standard Specifications (OPSS) at later project stages. BMPs considered to be included with the implementation of the preferred design are noted below.

10.3.1 Emergency Response Plan

The preparation of an Emergency Response Plan will be prepared to allow full access to/from emergency services during the construction phase, so as to ensure a method of site access and maintained access for all adjacent land uses. The plan should include provisions for providing temporary services to end users in the event of a construction related service outage or other service disruption.

10.3.2 Traffic Management, Access and Pedestrian Control Plan

A Traffic Management, Access and Pedestrian Control Plan will be prepared to manage transportation functions for all travel modes including equipment and material deliverables at various times during the construction period. It is further intended to ensure continued use of the Blair Road corridor through construction. This plan should be developed during the detailed design/pre-construction phase and implemented in the construction phase. Any pedestrian/cycling detours, traffic detours, turn/movement restrictions, and/or lane reductions associated with the project should be included in the plan.

10.3.3 Environmental Protection Plan

The intent of the Environmental Protection Plan is to ensure that no contamination, waste, or other substances, which may be detrimental to aquatic life or water quality, will enter a watercourse as either a direct or indirect result of construction. Consideration will be made for any floating debris resulting from construction which accumulates on watercourse beds and watercourse banks should be immediately cleaned up and disposed of. At all times, construction activities are to be controlled in a manner that will prevent entry of deleterious materials to watercourses. Construction material, excess material, construction

debris and empty containers are to be stored away from watercourses and the banks of watercourses, in accordance with any and all permits and approvals.

10.3.4 Contaminant and Emergency Spill Response Plan

A Contaminant and Emergency Spill Response Plan will highlight spills response and reporting procedures for the construction period with procedures initiated immediately in the event of a sediment release or spill of a deleterious substance. Spills or discharges of pollutants or contaminants will be reported immediately to the landowner and relevant regulatory authorities. An adequate supply of clean-up materials is to be kept on-site with a work crew that is fully trained to prevent and respond to accidental spills. Clean up of any spills shall be initiated quickly to ensure the protection of the environment to the extent possible.

10.3.5 Erosion and Sediment Control Plan

The purpose of the Erosion and Sediment Control Plan is to determine the degree of erosion and sedimentation that may occur under normally anticipated weather conditions during the life of the project, and to develop and implement mitigation strategies to control any unforeseen areas determined to have a pre-disposition to the problem. During construction, effective erosion and sediment control measures are to be maintained until the site of the project is re-stabilized following construction. This plan should include the identification of planting and slope rounding specifications within the contract tender; identifying and specifying seeding and sodding locations; identifying areas requiring slope benching or retaining structures in the detailed design process; and construction and post-construction monitoring and mitigation practices.

10.3.6 Air Quality, Noise and Vibration

Varied construction activities within the Study Area are expected to create isolated and short-term noise, air quality and vibration impacts on the environment. A strategy for mitigating the effects according to good practices intended to satisfy, as feasible, the fugitive dust limits specified in *O.Reg. 419/05*, the noise limits specified in Ministry of the Environment (MOE) NPC-115 *Sound Level Limits for Construction Equipment* and NPC-118 *Motorized Conveyances* and the City of Ottawa By-laws for Noise should be developed (1978a; 1978b). If applicable the plan should include good practices intended to satisfy, as feasible MOE (1978c) NPC-119 *Blasting* and MOE (1983) NPC-207 *Impulse Vibration in Residential Buildings* (draft technical publication) for ground vibrations. A list of common mitigation strategies adapted to the current project includes, but is not limited to the following:

Air Emissions BMPs:

- Monitor wind conditions and plan operations to take advantage of calm wind periods,
- Minimize site storage of granular material in height and extent,
- Locate storage piles in sheltered areas that can be covered,
- Provide movable wind breaks,
- Use water spray and suppression techniques to control fugitive dust, and
- Cover haul trucks and keep access route to the construction site clean of debris.

Noise and Vibration BMPs:

- Limit speeds of heavy vehicles within and approaching the site,
- Provide compacted smooth surfaces, avoiding abrupt steps and ditches,
- Install movable noise barriers or temporary enclosures if required, and
- Keep equipment properly maintained and functioning as intended by the manufacturer.

10.3.7 Communications Plan

The Communications Plan is intended to keep the public and adjacent landowners informed about the work in progress and the end results of the construction activities. Residents and stakeholders should be kept aware of any scheduled service or pathway interruptions ahead of time so that their activities can be planned with minimum disruption. The plans should detail how to communicate the information to the public/stakeholder, what information should be disseminated, and in which project stages the communications should take place.

10.3.8 Unexpected Discovery of Archaeological Resources

In the event that previously undocumented archaeological resources and/or human remains are uncovered, the proponent or the person discovering the archaeological resources must cease alteration to the site immediately and engage a licensed consultant archaeologist to carry out field work, in compliance with Section 48 (1) of the *Ontario Heritage Ac*t. Should deeply buried deposits be found on this property during any construction activities, the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries shall be notified immediately (416-212-8886). In the event that human remains are encountered during construction activities, local law enforcement authorities and/or the coroner will be notified immediately, followed by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries, and the Registrar of Cemeteries at the Ministry of Consumer Services.

The NCC, as federal landowner, shall additionally be notified immediately upon any discoveries under their jurisdiction.

10.3.9 Management of Contaminated Materials

The MECP and the City's Project Manager should be notified immediately upon discovery of any contaminated material encountered within the construction area. If contaminated materials or contaminated groundwater are encountered within the construction limits, these are to be removed and disposed of in accordance with all applicable Acts and Regulations. Any contaminated materials found on NCC lands will require immediate notification of the NCC.

10.3.10 Waste Management Plan

During construction there will be some excess materials that must be disposed of away from the project site. These may include concrete rubble, asphalt, waste steel/metal structural components, earth, and pathway appurtenances such as signs. The intent of the Waste Management Plan is to ensure that surplus material is recycled wherever practical and to describe the methods to be used by the contractor for disposal of all other surplus material in accordance with federal, provincial, or local municipal practices and guidelines.

10.3.11 Migratory Bird Protection

The *Migratory Birds Convention Act* provides legal protection of migratory birds and their nests in Canada. The following avoidance and mitigation measures are recommended to avoid incidental impacts to migratory birds because of the proposed project activities:

- All vegetation and tree removal operations and/or clearing shall be completed between September 01 and April 08 of any year, outside of the breeding bird active season (ECCC 2018) and nests or eggs of protected migratory birds shall not be disturbed or destroyed as per NSSP 001A870: Migratory Bird Protection – General
- Vegetation clearing shall not extend past the limits of the new Blair Road expansion area.
- All vegetation removals shall be clearly staked in the field.
- If breeding birds and/or nests are encountered within the construction area, the Contractor will consult an Avian Specialist, and works will not continue in the location of the nest until after September 01 (or until the nest is no longer active). Species specific buffers (or setback distances) may be established by the Avian Specialist using guidance provided by ECCC (2019; refer to the following website for more information: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html#toc5).

10.3.12 Species-at-Risk Protection

The SARA and *Endangered Species Act* are updated regularly. SARA and the *Endangered Species Act* should be reviewed, and an update of the potential species present within the study area and their associated habitat should be completed prior to construction.

Protection afforded to any species shall be in accordance with appropriate federal/provincial jurisdiction. If a SAR is observed during construction, in the construction zone, the MNRF, NCC and Environment Canada are to be contacted immediately, as applicable, and operations modified to avoid any negative impacts to the species or their habitat until further direction is provided by the governing authority. If necessary, permits will be obtained under SARA and/or the *Endangered Species Act*.

To ensure compliance under Section 9 and/or Section 10 of the *Endangered Species Act*, and to protect SAR and SAR habitat during development and operations of the proposed project activities, the general mitigation measures provided in the City of Ottawa's Special Provision, D-032B – Appendix B are recommended. Refer to Attachment 5 for the full details of the City of Ottawa's Recommended Mitigations Measures (#1 - #22) from D-032B – Appendix B. The City of Ottawa's SAR Mitigations #1, #2, and #4 provide recommendations that can be applied to construction activities to reduce risks to SAR. These include:

- A worker awareness program shall be provided to all on-site personnel that includes species at risk identification and habitat characteristics and provides general species-specific guidance with respect to appropriate actions to be taken whenever these species are encountered.
- A daily pre-construction search of the machinery and the work area shall be implemented to identify presence of species at risk, as animals may be found hiding or basking around equipment, rocks, debris piles etc.
- If endangered or threatened species are observed in or near the study area, work shall stop immediately, a photograph shall be taken of the species (if possible) and the SAR shall be allowed to move out of the work area on its own. The MECP shall be notified (as required).

In addition, the D-032A/B Appendix A – Wildlife Protocol for Road Construction/Rehabilitation Projects is recommended.

10.3.13 Wetland Protection

Recommended mitigation measures to reduce impacts to wetlands (as defined in the Terrestrial Memo – **Appendix E)**:

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, and noxious weeds for

the duration of construction according to OPSS.MUNI 182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.

- Wash, refuel and service machinery and store fuel and other materials for the machinery a minimum of 30 m from any surface water features to prevent any deleterious substances from entering the water according to NSSP 001A850: Equipment Refueling, Maintenance and Washing.
- Restore disturbed areas (i.e., channel, bank and riparian) immediately following completion of work to pre-existing or better condition and seed to establish vegetative cover as per OPSS.MUNI 182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks and any proposed Landscape Design
- Implementation of a naturalization strategy that includes the planting of mixed native shrubs, shrub seedlings, wetland plugs and seeding.

Mitigations relating to operation of machinery, clean equipment, and measures to avoid impacts to bank vegetation and stability have been captured in the *Near and In-Water Works* section (10.4.1).

10.3.14 Significant Wildlife Habitat Protection

Features in the study area may provide candidate significant wildlife habitat for Amphibian Breeding Habitat (Wetlands) and Marsh Breeding Bird Habitat. General mitigation measures can be applied to mitigate effects to these species' habitat from site operations and alterations. The following mitigation measures are recommended:

- Harassment and/or harm to wildlife during construction is prohibited, as prescribed by NSSP 001A860: Prevention of Wildlife Harassment and The City of Ottawa's Protocol for Wildlife Protection during Construction (2015b) and D-032A/B Appendix A – Wildlife Protocol for Road Construction/Rehabilitation Projects.
- Exposed soils shall be revegetated as soon as possible using a seed mix composed of native species which are appropriate for the site conditions, in accordance with OPSS.MUNI 804: Construction Specification for Seed and Cover and Ottawa Specification F-8041 Section 32 92 19 13 – Mechanical Seeding.
- All vegetation and tree removal operations and/or clearing shall be completed as per the details provided in the above section "Vegetation and Terrestrial Habitat Protection".

10.4 Site Specific Mitigation Measures

10.4.1 Near and In-Water Works

DFO has developed a number of Standards and Codes of Practice which outline a variety of routine works which are able to be carried out if effects to fish and fish habitat can be avoided through implementation of the measures to protect fish and fish habitat. Based on a review of the Blair Road Transit Priority Project design, the proposed works do not meet the required criteria outlined within each of the Standards and Codes of Practice to be considered routine works. Therefore, effects to fish and fish habitat were assessed using the Pathways of Effects (PoE) diagrams. Through the PoE assessment, land-based and in-water activities (i.e., pathways) were reviewed to identify potential effects (i.e., stressors) and develop appropriate measures to mitigate the likelihood of the project resulting in death of fish, or harmful alteration, disruption, or destruction of fish habitat.

The following mitigation measures were deemed to be applicable for proposed road work activities along Blair Road which has the potential to impact indirect fish habitat within the unnamed tributary of Green's Creek located approximately 280 m north of Innes Road.

Project Planning and Fish Habitat Protection:

- All work in-water and on waterbody banks shall be completed during the in-water timing window of July 1 to March 14.
- The extent of disturbance to waterbody banks shall be kept to the minimum necessary for the construction specified in the Contract Documents per OPSS.MUNI 182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.
- The limit of the area to be disturbed shall be clearly marked prior to commencement of the work. The markings shall be maintained for the duration of the Contract. Trees, shrubs, and other vegetation shall be preserved when possible as per OPSS.MUNI 182.

Sediment and Erosion:

- Use of effective erosion and sediment controls measures, as well as site stabilization and restoration (i.e., topsoil and seeding) techniques as per OPSS.MUNI 182; OPSS.MUNI 802: Construction Specification for Topsoil; OPSS.MUNI 804: Construction Specification for Seed and Cover; and OPSS.MUNI 805: Construction Specification for Temporary Erosion and Sediment Control Measures.
- Excess materials shall not be permitted in waterbodies as per OPSS.MUNI 180: General Specification for the Management of Excess Materials.

- The installation, maintenance, and monitoring of erosion and sediment control measures shall be completed as per OPSS.MUNI 182 and OPSS.MUNI 805.

Site Restoration/Rehabilitation:

- The waterbody and waterbody banks disturbed from equipment use and general construction activities shall be restored to the finished condition specified in the Contract Documents as per OPSS.MUNI 182.

Operation of Machinery:

- All equipment used for work in waterbodies and on waterbody banks, shall be free of earth material, and excess, leaking fuel, lubricants, coolant and other contaminates that could enter the waterbody as per OPSS.MUNI 182.
- Vehicular maintenance, washing and refueling shall be conducted away from waterbodies and waterbody banks, and shall be controlled to prevent any discharge of equipment fuels and fluids onto the ground or into waterbodies as per OPSS.MUNI 182.
- Have emergency spill kits on site and within equipment.
- Operation of equipment in waterbodies or on waterbody banks shall be carried out according to OPSS.MUNI 182.
- Excavation shall only be carried out within the areas identified for such activity as per the Contract Documents and in accordance with OPSS.MUNI 902: Construction Specification for Excavating and Backfilling – Structures.
- Grading shall only be carried out within the areas identified for such activity as per the Contract Documents and as per OPSS.MUNI 206: Construction Specification for Grading.
- Any in-water works would require consultation/approval with all regulatory agencies (i.e., RVCA, NCC, DFO) during the detailed design phase.

10.4.2 Vegetation and Terrestrial Habitat Protection

Clearing of vegetation will be kept to a minimum whenever possible, and existing trails, roads or cut lines should be used to avoid disturbance to vegetation and prevent soil compaction. Recommended mitigation measures to further protect terrestrial habitat and vegetation include:

- Surplus material resulting from vegetation removal operations shall be managed in accordance with OPSS.MUNI 180: General Specification for the Management of Excess Materials and Ottawa Specification 201 – Clearing and Grubbing.
- Trees not planned for removal must be protected according to Ottawa Specification Section 32 01 90.33 - Tree Preservation.

- In the event of accidental damage to trees, or unexpected vegetation removal, vegetation shall be replaced/restored with native species according to Non-Standard Special Provision (NSSP) 1396: Construction Specification for Planting, Ottawa Specification Section 32 93 10 – Trees, Shrubs and Ground Cover Planting and/or Section 32 90 11 – Bare Root & Naturalization Planting and F-8047 Hedgerows, Nursery Stock and Reforestation.
- Disturbed vegetation/soils within the impacted areas shall be re-established as soon as weather/conditions permit to provide stabilization to exposed soils and minimize sedimentation into the watercourses within the study area according to OPSS.MUNI 206: Construction Specification for Grading; and OPSS.MUNI 802 and Ottawa Specification F-8041 Section 32 91 19 13 – Topsoil Placement and Grading.
- Following completion of grading and topsoil application, disturbed areas will be re-seeded with a standard roadside seed mixture as specified in OPSS.MUNI 804 and Ottawa Specification F-8041 Seeding and Mulching.
- During ditching or culvert replacement works, any tree roots greater than 25 mm in diameter shall be cut off cleanly according to the following F-05 – Tree Removal and Pruning, Standard Special Provision (SSP) 032S09: Special Provision for Tree Trimming and Ottawa Specification F-8047 Section 32 93 43.01 – Tree Pruning.
- Develop a Tree Protection Plan which identifies locations to be preserved as specified in F-8011- Tree Protection, City of Ottawa's Tree Protection Fencing detail, OPSS.MUNI 801: Construction Specification for the Protection of Trees and Ontario Provincial Specification Division (OPSD) 220.01: Barrier for Tree Protection.
    - Ensure that trees larger than 10 cm DBH that are to be protected are included in this Plan.
- To allow for rapid regeneration within disturbed areas, the following steps will be taken for on the east side of Blair Road contract area:
    - Close cut mature trees in very poor or dead condition within 10 m of the road to avoid possible windfalls toward the road or construction area.
    - Retain all suitable fully branched deciduous trees within 3 m of the newly constructed ditchline, where possible.
    - Close cut young, spindly deciduous trees to allow regeneration.
    - Retain original ground on remaining areas to allow for the existing tree and shrub seedling stock to establish in response to post-construction conditions.

10.4.3 General Wildlife Protection

To avoid adverse effects to wildlife present within the study area, the following mitigation measures are recommended:

- Harassment and/or harm to wildlife during construction is prohibited, as prescribed by NSSP 001A860: Prevention of Wildlife Harassment and as described in the City of Ottawa *Protocol for Wildlife Protection during Construction* (2015b) and D-032A/B Appendix A – Wildlife Protocol for Road Construction/Rehabilitation Projects. The City of Ottawa protocol is a compilation of best practices that serves as a guide and a common frame of reference for the City and the development industry in addressing wildlife protection during construction (City of Ottawa, 2015b). This protocol is intended to help reduce the direct impacts of development on wildlife that occur during construction (ibid). The protocol promotes best management practices relating to sensitive timing windows for clearing, pre-stressing, site clearing, construction site management, wildlife encounters, wildlife-proofing, and owner awareness (ibid).

10.5 Assessment and Evaluation Results

An environmental effect requires consideration of the interaction of the project (i.e., project activities) with the environment at any project phase (pre-construction, construction, and operation, demolition), as presented in the methodology below. Decommissioning/demolition was not included in this assessment given the anticipated life of the project. Professional judgement and experience formed the basis for identifying environmental effects and mitigation measures. The analysis was based primarily on comparing the existing environment with the anticipated future environment, during and after construction. Consideration was given to:

- The magnitude, spatial extent, and duration of effects,
- The proportion of a species population of the number of people affected,
- Direct or indirect effects,
- The degree to which the effect responds to mitigation, and
- The level of uncertainty about the possible effect.

In this assessment, “residual” environmental effects are defined as changes to the environment caused by the project, and vice versa, when compared to existing conditions and considering all mitigation measures. Potential residual environmental effects are assessed as to their significance, including spatial and temporal considerations, and are categorized according to the following definitions:

“**Negligible**” means an effect may exhibit one or more of the following characteristics:

- Nearly-zero or hardly discernible effect; or
- Affecting a population or a specific group of individuals at a localized area and/or over a short period of time.

"**Insignificant**" means an effect that may exhibit one or more of the following characteristics:

- Not widespread,
- Temporary or short-term duration (i.e., only during the construction phase),
- Recurring effect lasting for short periods of time during or after project implementation,
- Affecting a specific group of individuals in a population or community at a localized area or over a short period, or
- Not permanent, so that after the stimulus (i.e., project activity) is removed, the integrity of the environmental component would be resumed.

"**Significant**" means an effect that may exhibit one or more of the following characteristics:

- Widespread,
- Permanent transcendence or contravention of legislation, standards, or environmental guidelines or objectives,
- Permanent reduction in species diversity or population of a species,
- Permanent alteration to groundwater flow direction or available groundwater quantity and quality,
- Permanent loss of critical/productive habitat,
- Permanent loss of important community archaeological/heritage resources, or
- Permanent alteration to community characteristics or services, established land use patterns, which is severe and undesirable to the community as a whole.

The above definitions of significance were adopted for use in this assessment because many of the impacts cannot be quantified in absolute terms, although changes and trends can be predicted. The definitions provide guidance and are intended to minimize personal bias.

Study boundaries serve to focus the scope of the assessment such that a meaningful analysis of potential impacts arising from the proposed project can be made. Project boundaries are defined by the spatial and temporal limits of the proposed project activities, and their zones of influence.

Spatial: The physical area which may be disturbed (directly or indirectly) by construction activities on the property and directly adjacent lands. Consideration was given to the areas downstream of the works that may be impacted before, during and/or after construction.

Temporal: The duration of the active construction phase of the project, scheduled to occur over several months and is not anticipated to take longer than two years. The completed project is permanent infrastructure, which will operate as constructed for the life span of the facility as determined by transportation needs in the City.

Table 10-3 describes the potential effects, mitigation, residual effects, and their significance, and monitoring recommendations for the preferred alternative.

Project phases are identified as follows:

P – Pre-construction/design; **C** – Construction; **O** - Operation

Once potential effects were predicted, project specific mitigation measures were identified. Often these mitigation measures, when used with industry best management practices, were sufficient to reduce potential negative effects to an insignificant or negligible status. Mitigation includes environmental rehabilitation and replacement. Proposed mitigation measures are summarized in **Table 10-3**.

Table 10-3: Assessment of Environmental Effects

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
Surface Water		X		Potential for short-term, localized increase in sediment release into the unnamed Green's Creek tributary approximately 280 m north of Innes Road and/or Green's Creek drainage feature approximately 300 m south of OR174 during construction resulting from run-off related to various construction activities that result in ground/soil disturbance.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Near/In-Water Works Site Specific Mitigation Measures as outlined in **Section 10.4.1** (above), including referenced Ontario Provincial Specifications.	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan.
		X		While construction is active near the unnamed Green's Creek tributary approximately 280 m north of Innes Road and/or Green's Creek drainage feature approximately 300 m south of OR174, there is a risk of accidental spills or leaks from construction machinery, which may directly or indirectly enter the water body.	Insignificant	Environmental Protection Plan Contaminant and Emergency Spill Response Plan Near/In-Water Works Site Specific Mitigation Measures as outlined in **Section 10.4.1** (above), including referenced Ontario Provincial Specifications.	Insignificant	Monitoring to ensure adequate spill prevention and spill response preparedness throughout construction are to be determined in the Contaminant and Emergency Spill Response Plan.
			X	Increase in impervious surfaces (due to widening) will lead to recurring, increases in stormwater runoff peak and volume following rain events with enough rainfall to generate runoff into the unnamed tributary of Green's Creek approximately 280 m north of Innes Road and/or Green's Creek drainage feature approximately 300 m south of OR174. Potential increase in sedimentation from winter maintenance of road (e.g., salt, sand).	Insignificant	To be addressed in detailed design. The flat-bottom grass swales and check-dams in the recommended plan will slow the velocity of water, allow it to infiltrate the ground and will additionally reduce the likelihood of sediment transport. Given the erosive nature of Green's Creek, erosion threshold protocol should be followed to determine stormwater criteria as general water quantity control (post to pre) may not be sufficient (JTBES, 2011). As per enhanced water quality target of MOECC, 80 % Total Suspended Solids (TSS) removal will be required for water quality treatment.	Negligible	To be determined during detail design.
Fish and Aquatic Habitat		X		Potential stressors to fish and fish habitat may result from proposed construction activities including vegetation removals and ground disturbance activities. Short-term localized sediment release resulting from runoff related to various construction activities may decrease water quality and aquatic habitat.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Near/In-Water Works Site Specific Mitigation Measures as outlined in **Section 10.4.1** (above), including referenced Ontario Provincial Specifications.	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan.
		X		While construction is active near the unnamed Green's Creek tributary, there is a risk of accidental spills or leaks from construction machinery, which may directly or indirectly enter the water body and indirect aquatic habitat.	Insignificant	Environmental Protection Plan Contaminant and Emergency Spill Response Plan Near/In-Water Works Site Specific Mitigation Measures as outlined in **Section 10.4.1** (above), including referenced Ontario Provincial Specifications.	Insignificant	Monitoring to ensure adequate spill prevention and spill response preparedness throughout construction are to be determined in the Contaminant and Emergency Spill Response Plan.
			X	Ditchlines are proposed along the east side of the Blair Road corridor which will convey stormwater runoff to the	Insignificant	Design elements including check dams and flat-bottom grass swales have been incorporated to slow the velocity and reduce the	Negligible	None anticipated

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
				unnamed tributary of Green's Creek located approximately 280 m north of Innes Road. Stormwater runoff is a potential recurring effect, lasting for short periods of time during or after project implementation when there are rain events with enough rainfall to generate runoff into the unnamed tributary of Green's Creek.		likelihood of sediment transport to the unnamed tributary and subsequently Green's Creek. Design elements to be confirmed in detail design.		
Natural Heritage - Wetlands		X		There will be temporary and minor disturbance of vegetation along the westernmost edge of the Cattail Mineral Shallow Marsh (MASM1-1) during construction.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Contaminant and Emergency Spills Response Plan Effective erosion and sediment control measures shall be installed between the wetland features and the construction area before starting work, as per NSSP 001A820: Erosion and Sedimentation Control and OPSS.MUNI 805: Construction Specification for Temporary Erosion and Sediment Control Measures and Ottawa Specification SP 805 F-1004, Section 01 57 13 – Erosion and Sediment Control. Wetland Protection Site Specific Mitigation Measures as outlined in **Section 10.3.13** (above), including referenced Ontario Provincial Specifications. Near/In-Water Works Site Specific Mitigation Measures as outlined in **Section 10.4.1** (above), including referenced Ontario Provincial Specifications.	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan.
Natural Heritage – Designated Natural Areas		X		Temporary and minor impacts are anticipated to the Fresh Moist Lowland Deciduous Forest (FOD7), including removal of vegetation near the road, for an approximate distance of 10 m and a width of approximately 50 m. A few mature trees and undergrowth will be removed during construction	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Contaminant and Emergency Spills Response Plan Exposed soils shall be revegetated as soon as possible using a seed mix composed of native species which are appropriate for the site conditions, in accordance with OPSS.MUNI 804: Construction Specification for Seed and Cover and Ottawa Specification F-8041 Section 32 92 19 13 – Mechanical Seeding. All vegetation and tree removal operations and/or clearing shall be completed as per the details provided per the Vegetation and Terrestrial Habitat Protection Site Specific Mitigation Measures as outlined in **Section 10.4.2** (above).	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan. Monitoring to ensure adequate spill prevention and spill response preparedness throughout construction are to be determined in the Contaminant and Emergency Spill Response Plan.
Wildlife - General		X		Construction activities are likely to cause localized and temporary disruptions/disturbances to the wildlife within the semi-rural corridor. The area to be impacted is of low intrinsic ecological value, and its value as a buffer to	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
				higher quality habitat will be lost temporarily during construction.		Contaminant and Emergency Spills Response Plan General Wildlife Protection Site Specific Mitigation Measures as outlined in **Section 10.4.3** (above), including referenced Ontario Provincial Specifications. It is proposed to vegetate swales with a diverse assortment of robust native or non-invasive vegetation that will not only serve to slow water movement and quickly stabilize soil but will provide wildlife habitat and foraging opportunities. Flowering plants are proposed to be added for interest and for pollinator habitat. In addition to the grass on the swales and filter strips, it is proposed that short and salt/drought tolerant vegetation be planted.		determined in the Erosion and Sediment Control Plan. Monitoring to ensure adequate spill prevention and spill response preparedness throughout construction are to be determined in the Contaminant and Emergency Spill Response Plan.
Significant Wildlife Habitat	X	X		Localized and temporary disruption and disturbance of wildlife and marsh breeding bird habitat within and adjacent to the the project area may occur as a result of construction. Specifically, the MASM1-1 community may provide candidate Amphibian Breeding Habitat (Wetlands), and candidate Marsh Breeding Bird Habitat. The area to be impacted is of low intrinsic ecological value, and its value as a buffer to higher quality habitat will be lost temporarily during construction.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Contaminant and Emergency Spills Response Plan Further study/field surveys are required prior to construction to determine the presence of amphibians and confirmation if habitat provides candidate significant habitat. Where possible vegetative buffer features should be maintained through construction between the transit corridor and the MASM1-1 vegetation. All vegetation and tree removal operations and/or clearing shall be completed as per the details provided per the Vegetation and Terrestrial Habitat Protection Site Specific Mitigation Measures as outlined in **Section 10.4.2** (above). Significant Wildlife Protection Site Specific Mitigation Measures as outlined in **Section 10.3.14** (above), including referenced Ontario Provincial Specifications. Migratory Bird Protection Site Specific Mitigation Measures as outlined in **Section 10.3.11** (above).	Negligible	Monitoring as determined/required through future study/survey.
Vegetation – East of Blair Road		X		Vegetation losses are expected to be temporary and minor on the east side of Blair Road within natural habitat.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan Contaminant and Emergency Spills Response Plan All vegetation and tree removal operations and/or clearing shall be completed as per the details provided per the Vegetation and Terrestrial Habitat Protection Site Specific Mitigation Measures as outlined in **Section 10.4.2** (above). Exposed soils shall be revegetated as soon as possible using a seed mix composed of native species which are appropriate for the	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan.

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
						site conditions, in accordance with OPSS.MUNI 804: Construction Specification for Seed and Cover and Ottawa Specification F-8041 Section 32 92 19 13 – Mechanical Seeding.		
Vegetation – West of Blair Road		X	X	There will be a permanent removal of localized CV1 vegetation on the west side of Blair Road. This habitat has low ecological value, however, allows water infiltration and filtering, and supports atmospheric cooling through evapotranspiration.	Insignificant	Erosion and Sediment Control Plan Environmental Protection Plan All vegetation and tree removal operations and/or clearing shall be completed as per the details provided per the Vegetation and Terrestrial Habitat Protection Site Specific Mitigation Measures as outlined in **Section 10.4.2** (above). Exposed soils shall be revegetated as soon as possible using a seed mix composed of native species which are appropriate for the site conditions, in accordance with OPSS.MUNI 804: Construction Specification for Seed and Cover and Ottawa Specification F-8041 Section 32 92 19 13 – Mechanical Seeding. Opportunities to enhance landscape features exist along the Transit Priority Corridor. Planting of boulevard trees, and the vegetated flat-bottom swale as identified in the Recommended Plan will mitigate the effects of permanent vegetation removals.	Negligible	Monitoring during construction to ensure erosion and sedimentation measures are sufficient to be determined in the Erosion and Sediment Control Plan.
Migratory Birds		X		Temporary, short-term impacts to potential nesting habitat are anticipated during construction, throughout all areas with vegetation, bare soil, and gravel surface.	Insignificant	All vegetation and tree removal operations and/or clearing shall be completed as per the details provided per the Vegetation and Terrestrial Habitat Protection Site Specific Mitigation Measures as outlined in **Section 10.4.2** (above). Migratory Bird Protection Site Specific Mitigation Measures as outlined in **Section 10.3.11** (above).	Negligible	None anticipated
Species at Risk - Milksnake		X		Most impacts to SAR habitat (milksnake) are expected to be minor and are related to the excavation for a new ditchline.	Insignificant	Species-at-Risk Production Site Specific Mitigation Measures as outlined in **Section 10.3.12** (above). Due to the cryptic nature of Milksnake and the difficulty in verifying their presence, they should be assumed to be present. To avoid potential impacts to SAR reptiles (Milksnake) because of the proposed project activities, D-032A/B Appendix A – Wildlife Protocol for Road Construction/Rehabilitation Projects is recommended. As well, the following avoidance and mitigation measures shall be implemented, and documented in NSSP ENVR007: Protection of Species at Risk by the Design-Builder: • It is recommended that work, including tree and vegetation clearing, occur outside the peak activity period for reptiles (i.e., May 01 to October 31).	Negligible	Monitoring as determined/required through future study/survey.

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
Species at Risk - Birds		X		Most impacts to SAR habitat are expected to be minor and are related to the excavation for a new ditchline. There is potential for SAR birds to be present within the study area during construction.	Significant	Surveys should be completed during breeding bird season to determine whether SAR species are present. **If absent, the potential significance of the effect is Negligible.** Species-at-Risk Production Site Specific Mitigation Measures as outlined in **Section 10.3.12** (above). The mitigation measures outlined in section above **"Migratory Bird Protection"**, shall be followed to mitigate negative impacts to bird species at risk.	Insignificant	Monitoring as determined/required through future study/survey.
Species at Risk - Bats		X		Most impacts to SAR habitat (mammals) are expected to be minor and are related to the excavation for a new ditchline. There is a potential for roosting bats to be present within the study area.	Significant	Surveys should be completed during breeding bird season or maternity roosting period for bats to determine whether SAR species are present. **If absent, the potential significance of the effect is Negligible.** Species-at-Risk Production Site Specific Mitigation Measures as outlined in **Section 10.3.12** (above). To avoid potential impacts to SAR bats because of the proposed project activities, D-032A/B Appendix A – Wildlife Protocol for Road Construction/Rehabilitation Projects is recommended. As well the following avoidance and mitigation recommendations shall be documented in NSSP ENVR007: Protection of Species at Risk by the Design-Builder and implemented during construction: • All tree clearing activities shall be completed between September 01 and April 08 of any year, during the species' inactive season, to avoid impacts to individuals. • Vegetation clearing shall not extend past the limits of the new road expansion area. • All vegetation removals shall be clearly staked in the field.	Insignificant	Monitoring as determined/required through future study/survey.
Surficial and Bedrock Geology	X			Surficial geology generally alluvial deposits with a pocket of offshore marine deposits (clay, silty/clay, silt) north of the Blair Rd Innes Rd. intersection may impact design and preferred construction techniques. Heading north along Blair, bedrock becomes gradually shallower and ranges from 2 to 10 m below surface.	Insignificant	Consideration of geology and soils during preliminary and detail design.	Negligible	None anticipated
Unstable Slopes/Geomorphology	X	X		The proposed road widening will likely require some encroachment (grading) into ravine set-back areas associated with a tributary to Green's Creek, posing a potential hazard to Green's Creek the upper limits of the Green's Creek tributary. No culvert extension is anticipated in the Recommended Plan.	Significant	A fluvial geomorphologist evaluation is proposed to be undertaken as part of detail design to assess risk and develop mitigation measures. If warranted, this will need to take into account the geotechnical constraints as it relates to sensitive marine clays and the potential for landslide activity.	Insignificant	To be determined during detailed design.

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
						The impact on Green's Creek will need to be adequately addressed at detailed design. Ensuring flows remain, and that erosion is not exacerbated will be a key consideration. Recommendations from the NCC's fluvial geomorphology study should be reviewed during detail design and incorporated where feasible based on a thorough review of their study and associated risk mapping.		
Groundwater		X		Construction will generally be widening on existing grades. No impact anticipated to groundwater.	Negligible	None required	Negligible	None anticipated
Property Ownership		X		Additional property of 0.01 hectares in total (100 m^2) from two private properties is required for the proposed protected intersection design at Blair Road and Innes Road.	Insignificant	Acquisition of public property will be negotiated by the City by means of land purchase, land exchange or land lease. Acquisition of private land may be via land purchase or expropriation.	Negligible	None anticipated
		X		An approximately 10 m strip of property is required from the NCC Greenbelt lands for an estimated one hectare in total and is primarily for grading and drainage.	Insignificant	Early and ongoing collaboration with the NCC through detail design is recommended. Acquisition of property will be negotiated by the City by means of land purchase, land exchange or land lease, as agreed to by the NCC. Federal Land Use, Design and Transaction Approval (FLUDTA) required.	Negligible	None anticipated
Land Use – Rural Landscape Character	X			Rural landscape character along the east side of Blair Road, south of Hwy 174 to Innes Road may be affected by the project.	Insignificant	Continue to work with NCC through detail design and FLUDTA process to minimize disruption to rural landscape.	Negligible	None anticipated
Land Use – Pine View Golf Course			X	Proximity to Pine View Golf Course has the potential for the occasional golf ball/transit/cyclist interaction.	Insignificant	Adequate separation and/or netting may be required to prevent golf balls from interfering with Blair Road Corridor. Work closely with the NCC through the FLUDTA process to ensure that the nature and character of the proposed facility are in keeping with the appropriate current and future land use planning policies of both the City and the NCC.	Negligible	None anticipated
Land Use – NCC Property Access	X	X	X	Access to the NCC maintained residences (2) on the east side of Blair Road, north of Innes Road and the Pine View Golf Course may be impacted by construction and operation of the Blair Road Transit Priority Corridor	Insignificant	Continue to work with the NCC through detail design and FLUDTA process to minimize impacts. Road access to the two residences on the east side of Blair north of Innes will be maintained during and after construction. Road access to the Pine View Golf Course will be maintained during and after construction. It is proposed through this EA to maintain the two existing accesses to the Pine View Golf Course at their existing locations with full movement access as exists today.	Negligible	None anticipated

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
						The City agrees to future consideration of an alternative access configuration that relocates the primary golf course access to the signalized intersection at Blair Road/Meadowbrook Road. Communications Plan Emergency Response Plan Traffic Management, Access and Pedestrian Control Plan		
Air Quality		X		Varied construction activities, including soil exposure, are expected to create isolated and short-term air quality impacts for adjacent landowners and those using the Blair Road Transit Priority Corridor.	Insignificant	Communications Plans Air Quality Best Management Practices	Insignificant	None anticipated
			X	Increased bus and vehicle traffic volumes may be offset by improved emission technology over time, including hybrid and alternate fuel vehicles.	Insignificant	It is anticipated that overall air quality throughout the corridor will improve in the future.	Negligible/Positive	None anticipated
Noise		X		During construction, isolated and short-term noise impacts may occur and be a disturbance to adjacent landowners and corridor users.	Insignificant	Communications Plan Noise and Vibration Best Management Practices	Insignificant	None anticipated
			X	Some sensitive residential areas (Receptors 30 and 45) may periodically have noise levels exceed 60 dBA (Leq 16 hour) during Transit Priority Corridor Operation.	Insignificant	Noise abatement where implementation is practical where noise sensitive receptors are expected to have noise levels exceeding 60 dBA, such as along the west side of the corridor, south of Meadowbrook is to be incorporated into the final design. The noise barriers included in the recommended plan will provide a 6 dBA reduction in noise levels, achieving the ENCG criteria for minimum attenuation. Noise from buses accelerating and decelerating are anticipated to be masked by background traffic noise.	Negligible	None anticipated
Ground Vibration		X		Ground borne vibrations from construction equipment may be noticeable in proximity to the project area from time to time during construction but is not anticipated to be disruptive to normal activities.	Negligible	Noise and Vibration Best Management Practices Operational controls: Limit speeds of heavy vehicles around sites, provide smooth access without abrupt changes in road surface.	Negligible	None anticipated
			X	The largest ground vibration levels at sensitive receivers are not expected to increase substantially resulting in annoyance to people or damage to structures and buildings.	Negligible	None anticipated	Negligible	None anticipated
Archaeological Potential		X		Potential to disturbance of archaeological resources in undisturbed areas adjacent to Blair Road, particularly at	Insignificant	Unexpected Discovery of Archaeological Resources Plan per **Section 10.3.8** (above).	Negligible	Further studies and monitoring to be determined through

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
				the southeast corner of the study area just north of Innes Road around the unnamed Green's Creek tributary.		Stage 2 Archaeological Survey, including test pit surveys may be required in the vicinity around Green's Creek in areas of undisturbed grounds. Confirmation of project footprint and archaeological recommendations to be determined during detail design.		archaeological assessment/survey as determined in detail design.
Cultural Heritage Resources		X		1691 Blair Road is a property with identified heritage potential (City of Ottawa Heritage Reference List). Access to this property may be directly affected during the construction phase of the project.	Insignificant	Emergency Response Plan Traffic Management, Access and Pedestrian Control Plan Communications Plan Further consultation will be required with the NCC to determine appropriate mitigation measures to maintain access to/from the property through construction.	Negligible	None anticipated
Traffic Operations During Construction		X		Construction activities have the potential to cause disruptions in traffic operations especially during the peak hours.	Insignificant	Emergency Response Plan Traffic Management, Access and Pedestrian Control Plan Communications Plan During the detailed design phase, a plan to manage traffic during construction will need to be developed in consultation with City Operations, the local communities, and other affected stakeholders.	Negligible	None anticipated
Road Network			X	Following construction, the reliability of the road network will improve and the resulting shift to HOV use, which should somewhat improve traffic congestion during peak hours.	Positive	None required	Positive	None anticipated
Transit Operations		X		Construction activities have the potential to cause disruptions in localized transit operations especially, during the peak hours.	Insignificant	During the detailed design phase, a plan to provide local transit during construction will need to be developed in consultation with OC Transpo, and other stakeholders. Emergency Response Plan Traffic Management, Access and Pedestrian Control Plan Communications Plan	Negligible	None anticipated
Transit Operations			X	Following construction, the reliability of transit services will improve and the resulting shift of riders from cars to buses should somewhat improve traffic congestion during peak hours.	Positive	None anticipated	Positive	None anticipated
Pedestrian and Cycling Network		X		Temporary disruptions to the local active transit network (pedestrian and cycling) within the Blair Road corridor, including detours may be experienced throughout construction.	Insignificant	Emergency Response Plan Traffic Management, Access and Pedestrian Control Plan Communications Plan	Negligible	None anticipated

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
			X	There will be improvements to pedestrian and cycling facilities with the addition of sidewalks and multi-use pathways in the Study Area.	Positive	None anticipated	Positive	None anticipated
Municipal Infrastructure – Stormwater Management			X	Stormwater runoff may increase slightly due to the widened impervious surface within the study corridor.	Insignificant	It is proposed for the Blair Road Transit Priority EA project that runoff quality treatment and quantity control (peak flow attenuation) will be best achieved with enhanced grass swales, rock check dams and vegetated filter strips. This approach is preferred due to the number of outlets and the rural (ditched) vs. urbanized (storm sewer) approach to stormwater conveyance. This approach will address the SWM criteria with lower capital cost and operations and maintenance requirements. The proposed SWM controls and any mitigation measures will be included within the proposed Blair Road right-of-way.	Negligible	None anticipated
Municipal Infrastructure – Sanitary	X	X		The Green Creek Collector (1650 mm Concrete Sanitary Sewer) and Innes Road Trunk (525 mm Concrete Sanitary Sewer) cross the study corridor and may be impacted from construction related vibrations.	Insignificant	The existing Green Creek Collector and Innes Road Trunk Sanitary Sewers should be protected during construction to prevent damage to the infrastructure. Further study is required by a geotechnical engineer to determine vibration monitoring requirements for the Green's Creek Collector. A **Vibration Monitoring Plan** for the Green Creek Collector should be implemented prior to construction, following the recommendations of the geotechnical study. Existing grading and access around the existing collector sewer shaft on the east side of Blair Rd should be maintained as part of the design.	Negligible	Vibration Monitoring during Construction as determined via future study.
Utilities – Hydro One		X	X	There are existing high voltage Hydro One Transmission Facilities within the study.	Insignificant	Any changes to lot grading or drainage within, or in proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor. Developments should not reduce line clearances or limit access to Hydro One infrastructure at any time. Any construction activities must maintain the electrical clearance from the transmission line conductors as specified in the *Ontario Health and Safety Act* for the respective line voltage. As detail design progresses, formally confirm that Hydro One infrastructure and associated rights-of-way will be completely avoided, or if not possible, allocate appropriate lead-time in the project schedule to collaboratively work through potential conflicts with Hydro One.	Negligible	None anticipated

Factors/Subfactors	Phase of Potential Interaction*			Environmental Effects	Potential Significance of Effect	Mitigation Measures	Significance after Mitigation	Monitoring Requirements
	P	C	O					
Utilities – Enbridge	X	X		There is an existing 300mm Vital Gas main which crosses the study corridor at the intersection of Blair Rd and Innes that may be impacted by general construction activities.	Insignificant	Vital gas main should be protected during construction. Any changes required to the vital gas main shall be coordinated and confirmed with Enbridge during detailed design.	Negligible	None anticipated
Utilities	X	X		There are likely to be impacts to utilities (such as street lighting, traffic signals, rogers/bell, and small water main adjustments) during construction, particularly at Meadowbrook Road where the intersection will be modified.	Insignificant	Minor utility relocations may be required and should be further detailed during detailed design.	Negligible	None anticipated
Areas of Potential Environmental Concern	X	X		Disturbance of areas of potential environmental concern during construction is possible. Known areas of potential environmental concern include the following locations, as identified in the Phase 1 ESA (**Appendix G**): • 1960 Innes Road (Site ID 1) • 1941 Innes Road (Site ID 5) • 1700 Blair Road (Site ID 21) • NE corner of Blair and Meadowbrook Road (Site ID 33) • Blair Road, just south of the Queensway (Site ID 35) • 1150 Blair Road (Site ID 36)	Significant	Where works are undertaken on or in close proximity to any of the areas of potential environmental concern, further ESA work is required, including a Phase II ESA. Phase II ESA requirements should be confirmed at detailed design in order to further assess the soil and groundwater.	Insignificant	Monitoring as determined/required through future study/survey.
Climate Change Mitigation			X	It is anticipated that greenhouse gas emissions within the Blair Road Transit Priority Corridor will generally be reduced in the future.	Positive	None anticipated	Positive	None anticipated
Climate Change Adaptation	X		X	Various climate change hazards exist for the study area.	Insignificant	To reduce risks associated with various climate change hazards, it is recommended that adaptation measures be considered in future stages of development for the Blair Road corridor. Preliminary recommendations are included in **Table 10-4** of this report.	Negligible	None anticipated

* **P** – Pre-construction/design; **C** – Construction; **O** - Operation

10.6 Monitoring

Monitoring is important to verify the accuracy of effects predictions. Monitoring measures have been recommended to determine what effects actually occurred with project implementation and may result in the modification of mitigation measures to improve their effectiveness.

The identified environmental impacts are to be monitored during and after construction. Monitoring through construction will ensure BMPs and mitigation measures are sufficiently implemented to fulfill their intended use in reducing environmental impact. Future studies have been recommended which may identify additional construction monitoring requirements as the project progresses. The City of Ottawa is to ensure that experienced and appropriately trained staff manage and supervise the construction of the project, including the implementation of recommended monitoring programs. The contractor will be required to maintain and replace, as required, certain construction items pertaining to environmental impact mitigation (e.g., erosion and sediment control devices) during construction, as well as a specified post-construction period.

10.7 Climate Change Adaptation

Climate change presents both challenges and opportunities, particularly as it relates to infrastructure design, implementation, and operations/maintenance of new infrastructure. There are two categories of response to climate change risk: 1) Mitigation refers to human interventions to reduce greenhouse gas emissions, and, 2) Adaptation refers to any activity designed to reduce the negative impacts of climate change and/or takes advantage of new opportunities. To reduce risks and take advantage of various opportunities, it is recommended that adaptation measures be considered in future stages of development for the Blair Road corridor.

Natural Resources Canada has published a report presenting the current state of knowledge related to climate risks within the context of the Canadian transportation sector (Woudsma & Towns, 2017). This report identifies existing or potential adaptation practices reflecting the different climate change impacts, vulnerabilities, and opportunities.

Climate change and severe weather impacts related to roads may include infrastructure damage and deterioration, disruptions to transport operations and generally unsafe conditions. To mitigate these impacts, a summary of potential climate induced impacts and adaptation/mitigation strategies is presented in **Table 10-4**.

Table 10-4: Preliminary Recommendations for Climate Change Adaptation

ID #	Infrastructure Component	Potential Functional Design/ Environmental Assessment Considerations:	Potential Preliminary Design/Detail Design Considerations:	Potential Maintenance/Operations Considerations
1	Roadway Pavement	• Increased risk of freeze-thaw damage to pavements. • Document issues for consideration at Preliminary/Detail Design.	• Assess risk and consider modifications during pavement design.	• Assess/monitor climate change implications for maintenance/operations planning and standards (e.g., increased ditch erosion and debris accumulation due to increased severe weather events; increased freeze-thaw; increased freezing rain). • Develop Standard Operating Procedures (SOPs) for: a. Monitoring b. Response Plans c. Contingency/Back-up Plans d. Restoration/Lessons Learned
2	Roadway Drainage	• Increased peak runoff could result in larger roadside storm sewers and/or ditches. • Potential for increased erosion risk – particularly at outlet to unnamed tributary to Green's Creek (approximately 280 m north of Innes Road).	• Consider climate change implications during design (e.g., peak design storms, stress testing of designs, IDF curves for future conditions). • Consider additional erosion protection of ditches and Green's Creek tributary.	
3	Bus Stops	• Projected increases in extreme heat days may require adjustment of bus-stop shelter design and provision of shading. • Document issues for consideration at Preliminary/Detail Design.	• Extreme heat should be considered when choosing materials and designing bus shelters and landscaping.	
4	Landscaping	• Projected changes to average temperatures, extreme heat days and water balance cycle (drought) may influence landscaping design and life cycle. • Document issues for consideration at Preliminary/Detail Design.	• Design should consider future climate change conditions (landscaping composition, tolerance to changing climate, growth rates, invasive species). • Tree planting plan should consider implications of broken off limbs or downed trees.	

10.8 Cumulative Effects

The *Joint Study to Assess Cumulative Effects of Transportation Infrastructure on the National Capital Greenbelt* (AECOM 2012) was undertaken in partnership by the NCC and the City of Ottawa to identify projects within the TMP and other transportation projects that could have an impact on the environmental integrity of the federal Greenbelt lands. The fundamental notion behind Cumulative Effects Assessment (CEA) is that if proposed projects are evaluated individually, the broader perspective may be overlooked. Blair Road BRT was included in the CEA as part of the Hospital Link and Cumberland Transitway Westerly EA (IBI Group & Morrison Hershfield, 2011). The Blair Road Transit Priority Corridor was developed with consideration for co-locating infrastructure and has been identified and protected in the TMP and several planning studies for more than a decade. The City TMP and Official Plan, have served to identify the project and provide a context for consideration of the cumulative impacts and integration with other projects.

The proposed Blair Road Widening for Transit Priority Project, as a portion of the Cumberland Transitway, will not negatively contribute to the cumulative effects as previously determined.

10.9 Sustainability Statement

Sustainability refers to meeting the needs of the present without compromising the ability of future generations to meet their needs. The concept of sustainability is composed of economic, environmental, and social components. Specifically, this study has considered the following sustainability components:

- Provision of multi-use pathways and accessible transit stations
- Collaboration with agency, businesses, and the public throughout the study process
- Evaluation of alternative solutions and designs with bio-physical and socio-economic considerations, and
- Climate mitigation and adaptation/resilience.

By incorporating sustainability principles and throughout the planning and design stages, the project will provide a greater sustainability return at lower cost, compared to inclusion of sustainability opportunities late in the project development process. Given the preliminary stage of the Project, it will be important to consider sustainability moving forward, including incorporation/action on the recommended for climate adaptation strategies, as identified in **Table 10-4**.

11. FUTURE COMMITMENTS

11.1 Property Acquisition

An approximately 10 m strip of property is required from the NCC Greenbelt lands for an estimated one hectare in total and is primarily for grading and drainage. Additional property of 0.01 hectares in total (100 m^2) from two private properties is required for the proposed protected intersection design at Blair Road and Innes Road.

11.2 Construction Timing/Implementation

Construction timing will be subject to funding availability.

11.3 Road Safety Audit

Due to the land-use within the study area (i.e., transit stations and pedestrian and cyclist friendly infrastructure), this area is expected to be well utilized by vulnerable road users. Additionally, this project includes major change in cycling facilities and as such, it is recommended that a Road Safety Audit (RSA) be conducted during detail design.

An RSA is a formal review focusing on the safety of all road users (pedestrian, cyclist, accessibility, vehicles) to identify defects likely to result in collisions. The purpose of the RSA is to have an independent team of road safety experts review this design to ensure that the roadway environment is built using the most up to date knowledge/best practices for road safety design. Design and construction jobs involve thousands of decisions, and sometimes decisions are made that inadvertently compromise safety. The RSA will identify any safety issues that may have inadvertently been overlooked and make suggestions to help mitigate the safety issues. Some of the things that the Road Safety Auditors consider, include:

- Conflict areas (areas where different types of roadway users may interact), and whether there is sufficient warning/accommodations in these areas,
- Hazards on and off the road that might result in damage or injury if they are hit,
- Sight lines between road users and traffic control devices,
- *Accessibility for Ontarians with Disabilities Act* (AODA) requirements for tactile and audible warning, and

Locations that might be difficult for users from a human factors' perspective (i.e., driver's expectation, driver's load, positive guidance, predictable driver error, control device visibility and conspicuity, background visual attraction or clutter etc.).

11.4 Approvals Required

The following Federal, provincial, and municipal approvals may be required prior to implementation of this project based on the current level of design. Review of the legislation (current at the time of detailed design/construction) will confirm approval requirements.

11.4.1 Federal

11.4.1.1 Fisheries Act Authorization

Given appropriate mitigation and avoidance measures can be implemented to minimize potential effects to fish and fish habitat, *death of fish and harmful alteration, disruption of destruction of fish habitat* is not anticipated to result from the proposed works at Blair Road. Therefore, further review of the project by DFO under the fish and fish habitat protection provisions of the *Fisheries Act* is deemed to be not required.

11.4.1.2 Federal Land Use, Design and Transaction Approval

A request for Federal Land Use Approval to the NCC will be required at a future date when funds are committed for more detailed design, and a construction timeframe is proposed. The NCC would then be able to further guide the federal level environmental effects analysis per the *Impact Assessment Act* (IAA).

The Federal Land Use, Design and Transaction Approval (FLUDTA) will require the City to engage a qualified environmental consultant to conduct a federal level environmental effects analysis that incorporates the environmental effects indicated within the IAA for the NCC to assess potential impacts and proposed mitigation measures, construction monitoring and follow-up studies.

11.4.2 Municipal

Municipal permits, licenses, and authorizations may be required for the construction period, including for utility relocates., noise bylaw exemptions, road cut permits and encroachment permits.

11.4.2.1 Development, Interference with Wetlands and Alternations to Shorelines and Watercourses Approval

As the proposed works fall within natural areas regulated by the RVCA, permission for the proposed works will be required from

RVCA under Ontario Regulation 174/06 – *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* (O.Reg. 174/06).

11.5 Monitoring

The identified environmental impacts are to be monitored during and after construction, as indicated in **Table 10-3** above. The City of Ottawa is to ensure that experienced and appropriately trained staff manage and supervise the construction of the project. The contractor will be required to maintain and replace, as required, certain construction items pertaining to environmental impact mitigation (e.g., erosion and sediment control devices) during construction, as well as a specified post-construction period.

The City of Ottawa will monitor traffic volumes and roadway operations and make adjustments (e.g., traffic signal timing) to ensure the corridor effectively handles traffic conditions. The City of Ottawa will be responsible for regular long-term monitoring and maintenance of the roadworks, bridges and culverts, stormwater management facilities, and landscaping within the right-of-way.

11.6 Modifying the Recommended Plan

This Report is based on a functional design level of detail for the Blair Road Transit Priority (Innes Road to Blair LRT Station) Corridor. The functional design level provides the basis of the design and additional detail will be developed during later stages of preliminary and detailed design. The functional design does provide a sufficient level of detail to assess the environmental effects of the Recommended Plan. The effects identified in the EA are considered reliable for the MECP to base a decision on regarding approval of the proposed project. Once approval is received from the MECP in accordance with the MCEA Schedule 'C', the project may proceed.

Unforeseen changes to the project as described may arise after the ESR is filed due to any number of circumstances, such as the development of new technology or mitigation measures, cost control, or the identification of previously unknown information. Changes to the project as described in the ESR may be considered not significant if they:

- Do not fundamentally affect the identified impact or mitigation measures;
- Do not change the landowner notification requirements; and,
- Do not include additional approval agencies.

Significant modifications to Schedule C projects, as presented to the public during the screening process and as set out in the Notice of Completion shall be reviewed by the proponent. Similarly, if the period of time from filing the Notice of Completion to the proposed commencement of construction for the project exceeds ten (10) years, the proponent shall review the planning and design process to ensure that the project and the mitigating measures are still valid in the current planning context.

11.6.1 Addendum Process

Where an addendum is required, it shall describe the circumstances necessitating the change, the environmental implications of the change, and what, if anything can and will be done to mitigate any negative environmental impacts. The addendum would clearly identify project components that have changed and only the items in the addendum (i.e., the changes) are open for review. Review and response by affected parties, shall be allowed for a period of 30 calendar days following the issue of Notice of Addendum.

12. CONCLUSIONS

A project such as the Blair Road Transit Priority Corridor has the potential to change the surrounding environments. The purpose of this environmental assessment is to anticipate these potential changes and recommend measures to minimize the negative effects and enhance or broaden the positive environmental effects.

In this study, the existing conditions were documented, alternative solutions and designs were identified and evaluated, and a Recommended Plan of the preferred design was developed. Throughout the process, the study benefited from public and agency engagement including meetings with the Agency, Business, and Public Consultation Groups, and two public open houses. The study also was subject to a civic dialogue, which culminated in the City of Ottawa Transportation Committee recommendations and Council approval. Through these meetings, the Study Team was able to identify and mitigate localized impacts for both users and residents/landowners immediately adjacent to the proposed project.

During the construction phase, the overall corridor will be an active construction site. Traffic disruptions, noise, dust, and visual interruptions will be inevitable. Ongoing communications by the City of Ottawa with the affected public will go a long way in alleviating potential concerns and ensuring that timely information about the project is shared. Once complete, there will be many positive effects such as the enhanced transit, pedestrian and cycling facilities. While the project has the potential to have effects on the human and biophysical environments during construction in the vicinity of the project, these effects can be largely mitigated with prescribed design features and best management practices. Through incorporating the mitigation measures recommended by this study, no significant adverse environmental effects are expected to result.

In accordance with the provisions of the Municipal Class Environmental Assessment Schedule C Process, the study results are documented in this Environmental Study Report, which will be made available for public review once finalized. During this period, there will be an opportunity for an individual or group to provide a written submission to the Minister of the Environment, Conservation and Parks. A request for a Part II order requiring a higher level of study (i.e. requiring an individual / comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights may be made to the Ministry of the Environment, Conservation and Parks. Requests on other grounds will not be considered.

Informed by this ESR, this project will culminate in the completion of detailed designs, specifications, and tender documents, as well as other associated approvals for the initial stage of construction. The detailed project mitigation features and plans will be created during the detailed design phase. The project will then be tendered and constructed in accordance with the plans and details.

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For further information please contact:

Angela Taylor, P.Eng.
Senior Project Engineer
City of Ottawa
Transportation Services Department
Transportation Planning
Tel.: (613) 580-2424, Ext. 15210
Email: angela.taylor@ottawa.ca