

*City of Ottawa*

# **Environmental Study Report**

## **Hope Side Road/Old Richmond Road Corridor (Terry Fox Drive to Highway 416)**

### **Class Environmental Assessment**

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## Revision Log

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## Executive Summary

A Class Environmental Assessment (EA) study was undertaken in accordance with the *Municipal Class Environmental Assessment, 2000 as amended in 2007 & 2011*, for transportation in South Kanata, focusing on the road corridor along Hope Side Road (Eagleson Road/Terry Fox Drive to Old Richmond Road), Old Richmond Road (Hope Side Road to West Hunt Club Road) and West Hunt Club Road (Old Richmond Road to Highway 416). The corridor is about 7.6 km long. The purpose of the project was to provide adequate transportation capacity for existing and planned growth, to support the desired shift to sustainable and active transportation modes and to address safety issues along the corridor.

### Description of the Problem

The City of Ottawa Official Plan (OP) includes significant growth areas in Kanata and Stittsville and this growth will increase the number of trips into and out of the area, exacerbating the existing levels of congestion during peak periods. Planned transit improvements will help to achieve the targets for transit use set in the 2013 Transportation Master Plan (TMP) update but will not eliminate the need for road improvements. In addition to addressing travel demand, corridor improvements will provide an opportunity to introduce measures to address existing safety issues.

### Preferred Solution

The alternative solutions generated to address identified needs were:

- Do nothing
- Enhance Transportation Demand Management (TDM) Measures
- Implement Transportation Systems Management (TSM) Measures
- Expand the arterial road network
  - Hope Side, Old Richmond and West Hunt Club Roads
  - Fallowfield Road and connecting roads as needed
- Provide a combination of the above alternatives

A combination of the identified alternative solutions was selected as the preferred solution. It is recognized that TDM and TSM measures will play an important role in the overall solution, as they do in the transportation planning for the City in general. Incorporating TDM, TSM and arterial road widening is consistent with the TMP.

### Alternative Routes

For the arterial road improvement component of the alternative solution, potential east-west corridors from Highway 417 to Fallowfield Road were considered. With respect to existing conditions, only Old Richmond-West Hunt Club and Fallowfield Road corridors were determined to be suitable and were carried forward to the assessment and evaluation.

The widening of Fallowfield Road corridor does not have any physical impact on Stony Swamp; however, examination of the travel demand forecasting model indicated that it would not address required travel demand with respect to the origins and destinations of the majority of travellers. Widening of Fallowfield Road would have impacts on rural communities and rural land uses and may result in pressure on urban boundary to allow urban development further south, closer to Fallowfield Road. This would not be consistent with the policies in the OP and the TMP.

The widening of the Old Richmond-West Hunt Club corridor was identified as the preferred route with the understanding that environmental mitigation measures through the Stony Swamp Core Natural Area of the Greenbelt must meet the requirements of the National Capital Commission (NCC).

### Alternative Designs

Based on the description of the problem and existing conditions, the following alternative designs were identified:

- Road realignment – between Hope Side Road and Old Richmond Road and/or between Old Richmond Road and West Hunt Club Road
- Cross-section – three lanes with centre lane reversible or four lanes and a median (Old Richmond Road and West Hunt Club Road)
- Intersection traffic control – signals or roundabout

The road realignment between Hope Side Road and Old Richmond Road was screened out when the analysis showed that it did not have a significant benefit to traffic overall but had significant impacts to approved development lands. The road realignment between Old Richmond Road and West Hunt Club Road was carried forward with consideration for cross-section and intersection alternatives.

For the evaluation of the three and four-lane alternatives (from Stonehaven Drive to Highway 416), it was noted that the footprint of the three-lane cross-section through Stony Swamp was less than the four-lane cross-section. While this smaller footprint results in lower environmental effects, safety during operations was a significant concern. Without the benefit of an example in North America of a reversible lane of similar length and speed, a standard 4-lane roadway with a narrow raised median was preferred. This decision was made with the knowledge that mitigation acceptable to the NCC would be a requirement for approvals. During detail design, potential methods to minimize the footprint will be considered.

In accordance with City of Ottawa policies, roundabouts were investigated at each intersection location. At all locations, roundabouts provided equal or superior levels of service for traffic. Roundabouts were carried forward for consideration during detail design at study area intersections, with the exception of Moodie Drive and West Hunt Club Road where traffic signals were preferred to minimize the impact on adjacent wetlands. The presence of traffic signals at the Highway 416 southbound ramp terminal intersection means that there are two signals adjacent to each other. These signals will not interfere with the operation of the roundabouts elsewhere along the corridor.

The Technically Preferred Alternative included a four-lane cross-section with raised median and roundabouts at intersections except at West Hunt Club Road and Moodie Drive.

### Public Consultation and Concerns Raised by the Public

Concerns and requirements expressed by agencies such as the NCC, Rideau Valley Conservation Authority, Ministry of Transportation, Ministry of Tourism, Culture and Sport and City of Ottawa departments, members of the public, interest groups and the business community were considered in the development, assessment and evaluation of alternatives.

Based on analysis and investigation of comments received, the following items were included in the Recommended Plan:

- Alignment of Hope Side Road at Old Richmond Road was moved a few metres to the north to better match the existing and future location of the Tomlinson access while avoiding significant impacts on existing buildings
- Curvilinear alignment of Old Richmond Road between Hope Side Road and Stonehaven Drive was revised to avoid encroachment beyond the land already dedicated to the City on the west side
- Noise wall requirements north of Stonehaven Drive intersection were added to the plans
- Pedestrian actuated signal crossing was added on Old Richmond Road at NCC parking lot P6

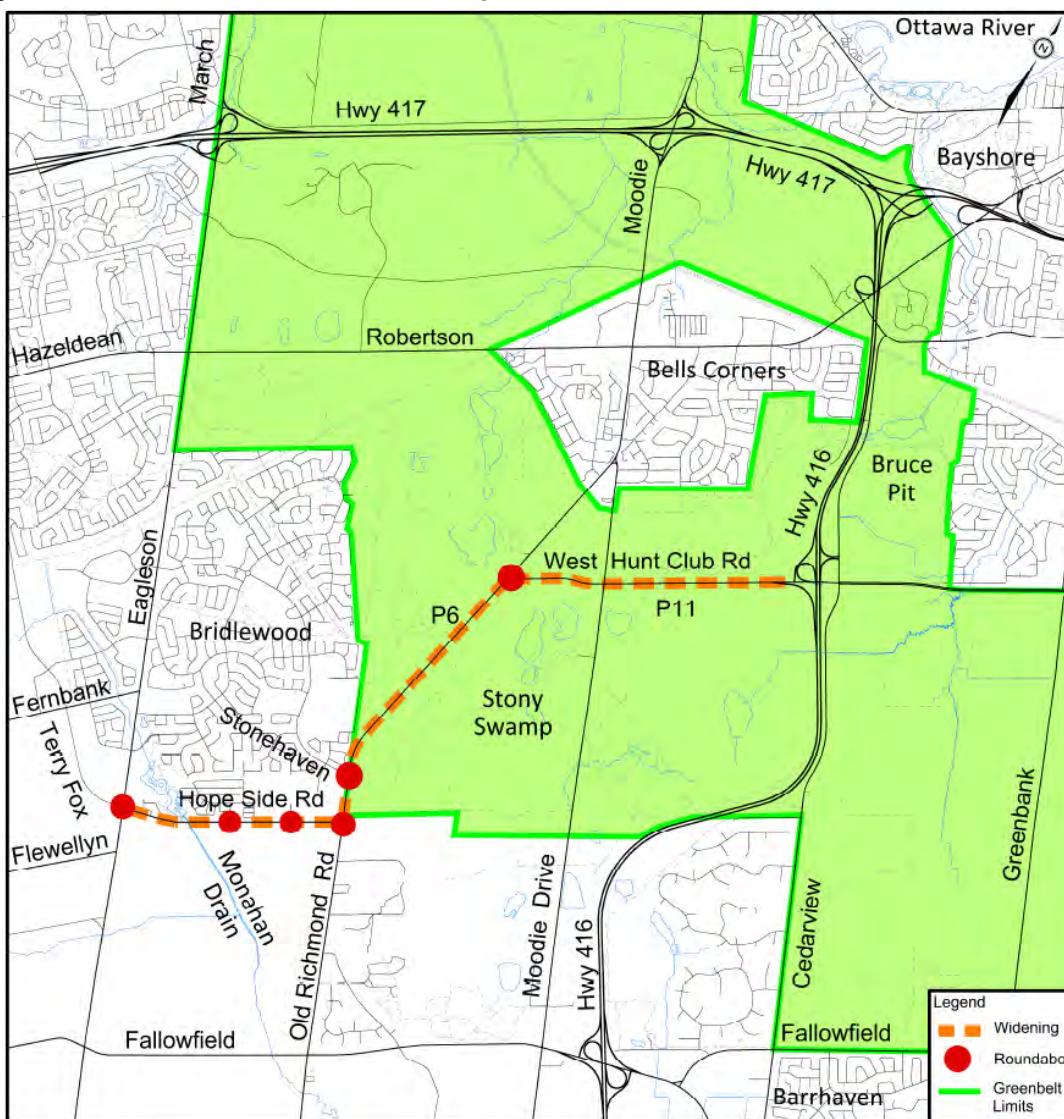
- Property requirements were estimated from the preliminary grading limits. These will be finalized in detail design and the right-of-way limits reduced where feasible

#### Recommended Plan

**Figure E-1** illustrates the Recommended Plan corridor. Sidewalks and cycle tracks will be provided adjacent to the urban area (north side of Hope Side Road and west side of Old Richmond Road south of Stonehaven Drive). Enhanced paved shoulders with rumble strips between the paved shoulder and the traffic lane will be provided in the rural area for use by cyclists and pedestrians. The Monahan Drain structure will be replaced either in advance of or during Hope Side Road widening. A noise wall is proposed for properties with their rear yards facing Old Richmond Road north of Stonehaven Drive. The functional design for illumination considered the lower illumination levels specified for arterial roads through natural areas in the City of Ottawa.

The cost, including capital construction, construction administration, engineering and property acquisition is estimated at over \$48 million.

**Figure E-1. Recommended Plan – Hope Side, Old Richmond, West Hunt Club Corridor**



#### Principal Environmental Impacts and Mitigating Measures

**Table E-1** summarizes the principal potential effects and mitigation measures during construction and during operation, associated with the corridor.

**Table E-1. Principal Potential Effects and Recommended Mitigation Measures**

Construction Phase	
Environmental Component and Potential Environmental Effects	Recommended Mitigation Measures
<b>Archaeology</b> <ul style="list-style-type: none"> <li>Damage to archaeological resources</li> <li>Discovery of buried resources</li> </ul>	<ul style="list-style-type: none"> <li>Conduct a Stage 2 investigation in areas along the corridor identified as having moderate and high archaeological potential that have not received archaeological clearance through the planning process</li> <li>Include requirement in contract for contractor to notify authorities upon discovery of buried resources</li> </ul>
<b>Potential Contamination</b> <ul style="list-style-type: none"> <li>Disturbance of soil/groundwater/surface water contamination</li> </ul>	<ul style="list-style-type: none"> <li>A Limited Phase II ESA is recommended for areas identified as potentially impacted by the historical and current activities on adjacent lands</li> </ul>
<b>Fish and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Impacts to fish passage and spawning, due to replacement/extension of culverts and related activities</li> <li>Locations include Monahan Drain (Hope Side Road) and Stillwater Creek Tributary (West Hunt Club Road)</li> </ul>	<ul style="list-style-type: none"> <li>All work will adhere to applicable MNR timing windows</li> <li>Install, use, and maintain sedimentation and erosion control measures</li> <li>Isolate construction zones, collect and relocate fish and construct in the dry. Conduct construction during period of no or low flow in watercourses</li> <li>Use existing trails, roads, or cut lines wherever possible to avoid disturbance to riparian vegetation. Limit the removal of accumulated material to that necessary to maintain culvert function and fish passage</li> <li>Isolate cast-in-place concrete from the creek for at least 48 hours</li> <li>Operate machinery on land and in a manner that minimizes disturbance to the banks of the watercourse</li> <li>Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. No long term stockpiling within 30 m</li> <li>Remove accumulated material and debris slowly to prevent downstream flooding and to reduce the amount of sediment-laden water going downstream.</li> <li>To minimize the impact of accidental spills on the creek, isolate and clean up spills immediately</li> <li>Have qualified biologists on-site to monitor water quality at appropriate locations</li> <li>Return substrates and flows to pre-development conditions at construction completion. Apply topsoil and seed immediately after final grading</li> </ul>
<b>Noise</b> <ul style="list-style-type: none"> <li>Expected sound levels at closest residential receptor up to 85 dBA, or "loud", during construction/rock shattering.</li> </ul>	<ul style="list-style-type: none"> <li>Limit construction to 7:00 am to 10:00 pm Monday to Saturday, and 9:00 am to 10:00 pm on Sundays and statutory or public holidays. Obtain exemption if construction activities are required outside of these hours</li> <li>Maintain all equipment properly to limit noise emissions</li> <li>In the event of persistent noise complaints, all construction equipment should be verified to comply with MOE NPC-115 guidelines</li> </ul>
<b>Property access and egress</b> <ul style="list-style-type: none"> <li>Access disruptions during construction</li> </ul>	<ul style="list-style-type: none"> <li>Maintain access to homes and businesses during construction</li> <li>Provide advance notice of temporary closures</li> <li>Provide emergency access during construction</li> </ul>
<b>Surface Water Quality &amp; Quantity</b> <ul style="list-style-type: none"> <li>Heavy machinery or construction materials contaminating the water</li> </ul>	<ul style="list-style-type: none"> <li>All machinery must be properly maintained to prevent leakage of contaminants. Undertake maintenance a minimum of 30 m away from any watercourse/wetland. See also aquatic habitat</li> <li>Properly manage concrete products, dust suppression, effluent</li> </ul>
<b>Terrestrial Habitat and Wildlife</b> <ul style="list-style-type: none"> <li>Disturbance to Turtle Habitat and Turtle Movements in Stony Swamp</li> <li>Disturbance to woodland in Stony Swamp that may be impacted by dust generated.</li> </ul>	<ul style="list-style-type: none"> <li>Measures adjacent to and within watercourses describe under Aquatic Habitat apply also to wetland areas</li> <li>See also Vegetation section below</li> </ul>
<b>Birds</b> <ul style="list-style-type: none"> <li>Undertake clearing activities outside the bird nesting season defined by MNR. Stop work and contact MNR immediately if nesting activities are observed during clearing/construction</li> </ul>	
<b>Turtles</b> <ul style="list-style-type: none"> <li>The detail design of roadworks at locations designated as turtle habitat will incorporate mitigation measures to facilitate turtle passage under the road and to minimize the ability of turtles to reach the road</li> <li>Incorporate wildlife passage, if feasible, where culvert replacements are included in the design</li> <li>Provide on-site personnel with training in the handling of turtles prior to the start of work through Stony Swamp Core Natural Area</li> <li>Do not undertake work from October 16 to March 15 to protect at-risk hibernating turtles. If proposed works are to occur during this time, fence off the Site in early fall to prevent turtles from hibernating in the area</li> <li>During the turtle nesting season in June and early July, care will be taken to identify individuals within the</li> </ul>	

Environmental Component and Potential Environmental Effects	Recommended Mitigation Measures
	<p>vicinity of the project. Silt fencing will be installed surrounding the Site</p> <ul style="list-style-type: none"> <li>During the active season (April 1 to October 30) thoroughly sweep the area before works begin to encourage any turtles using the Site to move away</li> </ul> <p><b>Woodland</b></p> <ul style="list-style-type: none"> <li>Reduce dust generation through dust control measures considering Construction Best Management Practices</li> <li>Contact MNR Species at Risk Biologist if construction activities occur within 25 m of any butternut tree</li> </ul>
<b>Traffic Level of Service</b>	<ul style="list-style-type: none"> <li>Potential traffic delays during construction, creating potential idling, increased noise.</li> <li>Traffic staging and detours will be determined to minimize any potential disruptions</li> <li>City staff and contractor staff will communicate with the community and road users through the media and construction signage to provide advance notice of activities</li> <li>An incident management plan will be prepared prior to construction to facilitate the handling of issues</li> </ul>
<b>Traffic safety (all modes)</b>	<ul style="list-style-type: none"> <li>Design construction staging and detours to enhance safety during construction for the travelling public, including non-automobile modes and for workers</li> <li>Where feasible, provide dedicated space for cyclists and pedestrians along the corridor</li> </ul>
<b>Utilities and Municipal Services</b>	<ul style="list-style-type: none"> <li>Relocate power and telephone lines in advance of construction</li> <li>Undertake other advance utility work where feasible</li> </ul>

Operations Phase (following construction)	
Environmental Component and Potential Environmental Effects	Recommended Mitigation Measures
<b>Vegetation and Landscaping</b>	<ul style="list-style-type: none"> <li>Prepare landscape/vegetation consistent with adjacent land use plan. Where feasible replace disturbed vegetation in consultation with property owner</li> <li>Removal of roadside vegetation</li> <li>Disturbance of landscaping</li> </ul>

Environmental Component and Potential Environmental Effects	Recommended Mitigation Measures
<b>Noise</b>	<ul style="list-style-type: none"> <li>Construct 2.5 m high noise barrier for receptors with back/side lots facing Old Richmond Road that do not have adequate noise walls</li> <li>Investigate the existing solid wood fences to confirm characteristics prior to completion of detailed design</li> <li>Where earthen berms are used for noise, used side slopes of 3:1 maximum</li> <li>Design noise walls in accordance with Appendix C, City of Ottawa Environmental Noise Control Guidelines</li> </ul>
<b>Property</b>	<ul style="list-style-type: none"> <li>Provide adjacent developers with preliminary design data to allow them to design adjacent grading to suit</li> <li>Minimize property acquisition across developed parcels and from agricultural lands</li> <li>Where land is required at the time of road widening, the City will negotiate with land owners</li> <li>Application for Greenbelt land will be submitted in detail design when the required level of detail is available to determine the right-of-way width required. Land within Stony Swamp will be required in exchange</li> </ul>
<b>Property access and egress</b>	<ul style="list-style-type: none"> <li>Design of driveways and property accesses will be based on City of Ottawa standards to suit actual conditions at the time of detail design</li> <li>Roundabouts will facilitate U-turns where a raised median has restricted access to right in-right out. U-turns will be permitted at some signalized intersections such as Moodie Drive and West Hunt Club Road</li> </ul>
<b>Recreation</b>	<ul style="list-style-type: none"> <li>Roundabouts will facilitate U-turns where a raised median has restricted access to right in-right out. U-turns will be permitted at some signalized intersections such as Moodie Drive and West Hunt Club Road</li> <li>Pedestrians and cyclists will be accommodated with sidewalks and cycling tracks adjacent to urban lands and enhanced shoulders (concrete rumble strip and paved shoulders) adjacent to rural lands</li> </ul>
<b>Surface Water</b>	<ul style="list-style-type: none"> <li>Direct runoff in urban areas to ditches and then to the Monahan Drain. In rural areas, direct runoff to ditches or to buffer strips adjacent to wetlands. Preferred mitigation methods will be determined in detail design</li> <li>For identified salt-vulnerable areas, explore potential modification to winter maintenance activities in the context of Federal, Provincial and TAC guidelines</li> </ul>
<b>Terrestrial Habitat</b>	<ul style="list-style-type: none"> <li>Minimize property acquisition in areas of terrestrial habitat through Stony Swamp</li> <li>Design lighting to minimize impact on wildlife</li> </ul>
<b>Transportation Service</b>	<ul style="list-style-type: none"> <li>To achieve improvement, provide sidewalks and cycle tracks within urban area and paved shoulders with concrete rumble strips in rural area</li> <li>Design roundabouts and roadways to optimize the level of service for vehicles</li> </ul>
<b>Traffic safety (all modes)</b>	<ul style="list-style-type: none"> <li>Design roadway features to accommodate vulnerable road users and to guide drivers to select an appropriate operating speed for conditions. Provide adequate sight distance and sufficient turning opportunities</li> <li>Update yield requirements for pedestrian and cyclist crossings at roundabouts with the Province</li> </ul>

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## List of Acronyms

AAQC .....	Ambient Air Quality Criteria
ACG .....	Agency Consultation Group
ACPDR .....	Advisory Committee on Planning, Design and Realty
ANSI .....	Areas of Natural and Scientific Interest
AO .....	Algonquins of Ontario
BCG .....	Business Consultation Group
ANSI .....	Area of Natural and Scientific Interest
CEAA .....	Canadian Environmental Assessment Act
CDP .....	Community Design Plan
CO .....	carbon monoxide
COSEWIC ...	Committee on the Status of Endangered Wildlife in Canada
COSSARO ...	Committee on the Status of Species at Risk in Ontario
CSP .....	corrugated steel pipe
dBA .....	decibels
DFO .....	Department of Fisheries and Oceans
EA .....	Environmental Assessment
EAA .....	Environmental Assessment Act (Ontario)
ELC .....	Ecological Land Classification
ESA .....	Environmental Site Assessment
ESR .....	Environmental Study Report
GHG .....	Greenhouse Gases
ha .....	hectare(s)
HADD .....	Harmful Alteration, Disruption or Destruction
HC .....	hydrocarbons
HOV .....	High Occupancy Vehicle
LOS .....	Level of service
MBCA .....	Migratory Birds Convention Act
MNR .....	Ministry of Natural Resources
MOE .....	Ministry of the Environment
MTCS .....	Ministry of Tourism, Culture and Sport
MTO .....	Ministry of Transportation
NAAQO.....	National Ambient Air Quality Objectives

## Glossary

<b>Air Quality Index (AQI)</b>	Rating scale for outdoor air quality in Ontario. The lower the AQI, the better the air quality.
<b>Alternative Solutions</b>	Alternative way of addressing the identified need/ opportunity within the scope of an EA.
<b>Alternative Designs</b>	Alternative ways of implementing the preferred alternative solutions within the scope of an EA.
<b>Class Environmental Assessment</b>	A planning process approved under the <i>Environmental Assessment Act</i> for a class or group of undertakings. Projects may be implemented without further EA approvals if they are undertaken in accordance with the approved Class EA process.
<b>Environmental Assessment (EA)</b>	A decision-making process used to promote good environmental planning by assessing the potential effects of certain activities on the environment.
<b>Environmental Assessment Act (Ontario) (EAA)</b>	Defines and legislates the EA process in Ontario. The purpose of the Act is to provide for the protection, conservation, and wise management of Ontario's environment.
<b>Environmental Site Assessment (ESA)</b>	An investigation undertaken to identify existing and potential contamination of a site based: on an assessment of past, present and adjacent land uses; review of existing physical conditions; review of government and agency records; and a visual inspection of the site.
<b>Environmental Study Report (ESR)</b>	Documentation of the project in accordance with the requirements of the Municipal Engineers Association Class environmental Assessment Process for Schedule "C" projects.
<b>High Occupancy Vehicle (HOV)</b>	Vehicles carrying a number of people which meets or exceeds a minimum number for eligibility to use designated road lanes (usually 2 or 3 is the minimum number).
<b>Mitigation</b>	The elimination, reduction, or control of the adverse environmental effects of the project, including restitution for any damage to the environment caused by such effects through replacement, restoration, compensation, or any other means**.
<b>Modal share</b>	The percentage of total trips by a specific travel mode (such as transit, cycling, automobile).
<b>Park and Ride</b>	Parking areas that allow for convenient transfer from private vehicles to transit.
<b>Part II Order</b>	An order to comply with Part II of the <i>Environmental Assessment Act</i> (previously known as a Bump-up request). This is an appeal process where a request is made to the Minister of the Environment requiring a proponent to comply with Part II of the Environmental Assessment Act.
<b>Screenline</b>	An imaginary line that crosses all major transportation corridors at a location such as along a feature (river or railway) that limits the number of crossing points. A screenline is used to assess the demand for transportation infrastructure in an area.
<b>Transportation Master Plan</b>	Municipal planning document that establishes infrastructure and program needs as well as supporting policies for the regional transportation system. This is a supporting document to the Official Plan.

# 1. Introduction

The City of Ottawa (the "City") is the proponent of a Class Environmental Assessment (EA) Schedule 'C' study for transportation along the corridor that includes Hope Side Road from Eagleson Road/Terry Fox Drive to Old Richmond Road, Old Richmond Road from Hope Side Road to West Hunt Club Road and West Hunt Club Road from Old Richmond Road to west of Highway 416. This Study is also referred to as the "Kanata South EA Study" in this report and related documentation.

AECOM, in association with Stantec Consultants, Ecotec Environmental Consultants, CSW Landscape Architects, FoTenn Consultants and RWDI Air, were retained to undertake this study.

## 1.1 Study Purpose

The purpose of this Class EA study was to study the existing and future transportation needs associated with the growing population in South Kanata, Stittsville, and the rural southwest of Ottawa, to assess impacts and to obtain environmental clearance for the required infrastructure. The purpose of the project (the "undertaking") was:

- To respond to growth pressures by providing adequate transportation capacity in the Study Area; and
- To support the growth of Ottawa by planning the infrastructure and services that are required to encourage sustainable land use practices and active transportation, support desired modal shifts, address congestion and delay, and minimize air pollution.

The Ottawa Official Plan (OP) and Transportation Master Plan (TMP) provide the basis for the Class EA process by defining municipal policies, anticipated growth areas and infrastructure requirements. Under provincial legislation, an Environmental Assessment (EA) study is required prior to road widening. The Hope Side Road/Old Richmond Road Corridor EA study adds site-specific data in the examination of needs and alternatives. This Class EA Study culminated in the Recommended Plan illustrated in [Appendix A](#).

## 1.2 Project Background

The transportation needs in this area have been increasing with development and the EA study was awarded to the consultant team in 2008. At that time, the National Capital Commission (NCC) was at the start of an update of its Greenbelt Master Plan and the NCC requested that the City defer the EA study until the Greenbelt Master Plan was at an appropriate stage. The NCC completed the Greenbelt Master Plan Review in 2013 and in 2012 the NCC and the City completed a joint study on the cumulative effects of transportation infrastructure on the Greenbelt. The City and the NCC therefore agreed that the Hope Side Road/Old Richmond Road Corridor EA Study could proceed in 2013. They also agreed that a new route originally considered in the Core Natural Area of Stony Swamp would not be permitted.

From the City's original Statement of Work for this study, it was noted that growth has resulted in increasing travel demand in the Old Richmond Road-West Hunt Club Road corridor. Congestion and operational concerns were noted at Stonehaven Drive and Old Richmond Road and at Old Richmond Road and West Hunt Club Road. The City undertook a traffic safety and operational study and constructed improvements at these two intersections to address short term needs. This included lengthening the second northbound lane on Old Richmond Road north of Stonehaven Drive and lengthening the second southbound lane on Old Richmond Road south of West Hunt Club Road to increase merging distance. The City also undertook a study of the Hope Side Road and Old Richmond Road intersection to assess the

implementation of new traffic control in keeping with the increasing traffic demands in the area due to the ongoing residential development. Both a signalized intersection and a roundabout were identified as suitable.

Other activities that make the establishment of a recommended plan for transportation in Kanata South important at this time include:

- Enbridge Gas Distribution Inc. (Enbridge) completed an EA study for a 24 inch diameter gas pipeline. Construction began in 2013 with completion in 2014. The gas pipeline is located within the road allowances of the Hope Side Road, Old Richmond Road, and West Hunt Club Road in the Study Area.
- The Tomlinson quarry between Old Richmond Road and Moodie Drive has been granted an access to Hope Side Road at the intersection of Old Richmond Road to reduce truck traffic impacts on the Fallowfield village community.
- There are current development applications in the area north of Hope Side Road (between Eagleson Road and Old Richmond Road) for lands that could be impacted by potential road realignments that should be studied as alternative designs for transportation in Kanata South.

The Hope Side Road/Old Richmond Road Corridor EA Study has facilitated co-ordination between roadworks, development and the Enbridge gas pipeline work, reducing the likelihood of the need to relocate the pipeline in the future allowing efficient, cost-effective delivery of services to the public.

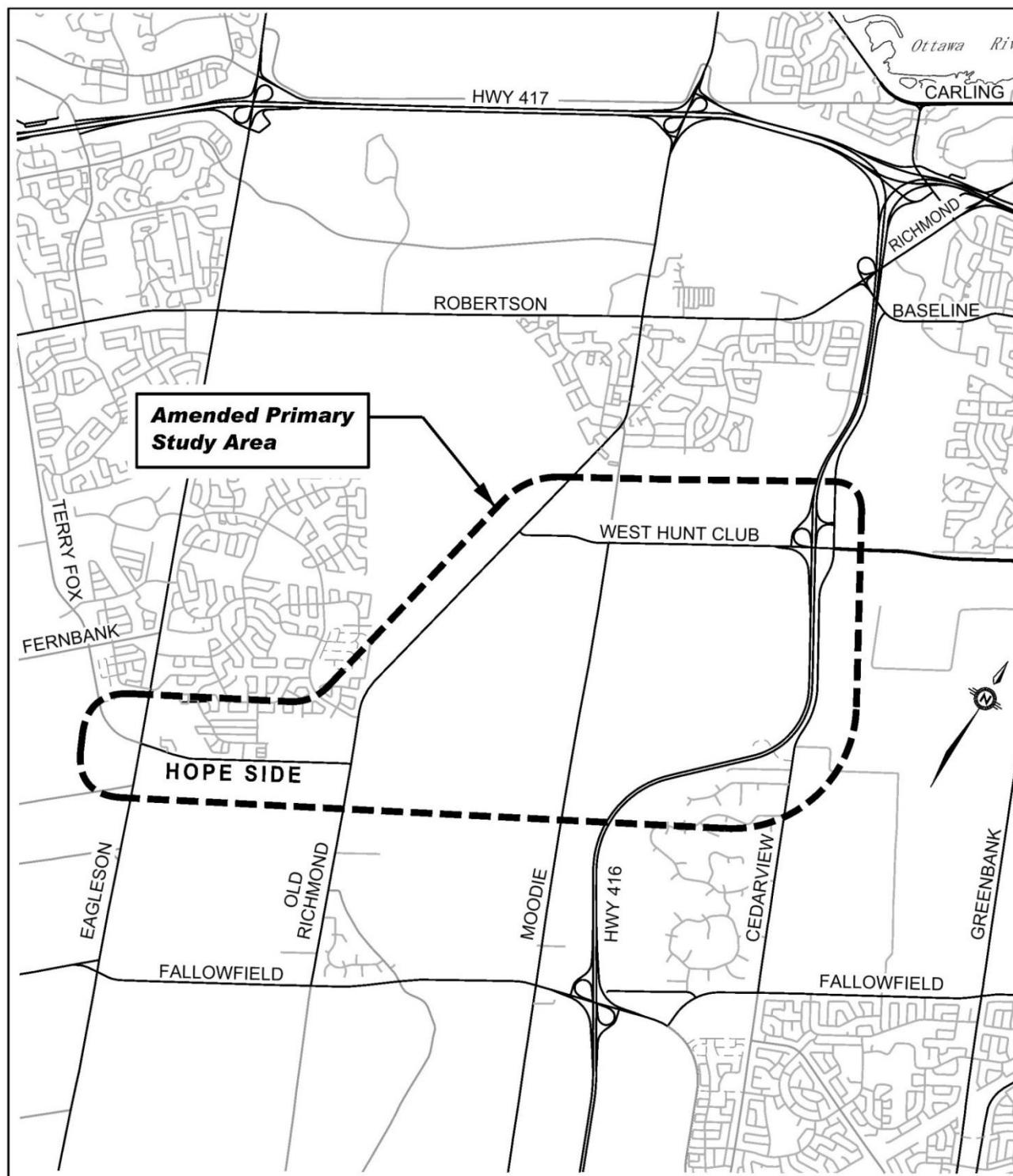
The 2013 TMP update approved by Council in November 2013 includes the widening of Old Richmond-West Hunt Club Road corridor from Hope Side Road to Highway 416 in Phase 1 (2014-2019) and the widening of Hope Side Road in Phase 3 (2026-2031) as part of its affordable road network. Also in the study area, the widening of Eagleson Road to four lanes is proposed for Phase 2 (2020-2025) from Hope Side Road northerly.

## 1.3 Study Area

Hope Side Road is a two-lane east-west arterial at the south edge of the current urban boundary in Kanata South. In recent years the west end of Hope Side Road was realigned to meet the extension of Terry Fox Drive at Eagleson Road. A total corridor length of 7.6 km from Eagleson Road/Terry Fox Drive to Old Richmond Road is included in the Study Area. Old Richmond Road is a two-lane north-south arterial connecting the village of Richmond with Bells Corners and into urban Ottawa. The portion of Old Richmond Road within the Study Area is from south of Hope Side Road to north of West Hunt Club Road and has additional lanes at intersections to improve traffic flow. West Hunt Club Road is a major east-west arterial connecting Kanata to Highway 416 and continues through the south side of Ottawa. The portion within the Study Area is two lanes wide from Old Richmond Road to Highway 416 where it widens to four lanes.

The intersections of Hope Side Road and Eagleson Road, Stonehaven Drive and Old Richmond Road, Old Richmond Road and West Hunt Club Road and West Hunt Club Road and Highway 416 off-ramp are controlled by traffic signals. The intersection of Hope Side Road and Old Richmond Road has a stop sign for the vehicles on Hope Side Road.

The Study Area is shown in [Figure 1](#). During the assessment and evaluation of alternatives, the study area boundaries will vary depending on the environmental feature being described, to reflect the extent of potential environmental effects. For example, traffic impacts will consider other roads crossing the Greenbelt that could be used, while impacts to the natural environment may be localized to where physical works are proposed along Hope Side Road, Old Richmond Road and West Hunt Club Road.

**Figure 1. Study Area**

## 1.4 Environmental Assessment Requirements

### 1.4.1 Provincial Requirements

This study is being carried out in accordance with the requirements of a Schedule 'C' project under the *Municipal Class Environmental Assessment* (October 2000, as amended in 2007 & 2011) document, which falls under the *Environmental Assessment Act* (EAA) provisions. The Municipal Class EA process consists of five phases:

#### Phase 1: Problem or Opportunity

- Review existing and future traffic, road and servicing conditions
- Identify problems and opportunities

#### Phase 2: Alternative Solutions

- Identify alternative solutions
- Develop and refine evaluation criteria
- Assess and evaluate Alternative Solutions
- Present Alternative Solutions at Open House (OH) #1
- Summarize and consider input received at OH#1
- Finalize selection of Alternative Solution

#### Phase 3: Alternative Design

- Identify alternative designs
- Refine evaluation criteria
- Assess and evaluate Alternative Designs
- Identify the Recommended Plan
- Prepare functional design drawings including staging and utilities
- Obtain approvals in principle from regulatory agencies
- Develop project cost estimate
- Develop construction/staging plan
- Present Recommended Plan at OH#2
- Summarize and consider input received at OH#2
- Finalize Recommended Plan

#### Phase 4: Environmental Study Report

- Prepare Environmental Study Report (ESR)
- Prepare Study Completion Notice
- Provide ESR for public and agency review

#### Phase 5: Implementation

- Complete contract drawings and tender documents

#### **1.4.2 Federal Requirements**

The NCC participated in this study as the federal agency responsible for the Greenbelt. Approval through the NCC's Federal Land Use and Design Approvals process under the *National Capital Act* is needed. The Federal Land Use and Design Approval process will examine all aspects of the proposal that affect federal lands. This approval process will be undertaken during detail design as the level of information that must be provided is not available during the provincial class EA process.

As part of the process, the NCC will fulfill their own EA requirements to ensure that there are no significant adverse environmental effects associated with completion of the project.

## 2. Consultation

### 2.1 Consultation Process

The Class EA process encourages effective consultation as a key component of EA planning. A minimum of three mandatory points of contact are identified for Schedule 'C' projects. For this project, points of contact were: two rounds of open houses, formal public review of study documentation and a presentation to the Ottawa Transportation Committee. In accordance with the City's procedures, the consultation program for this study also included meetings with stakeholders through Consultation Groups to provide additional opportunity for agency and public participation.

Summary reports for each round of consultation are provided in **Appendix B**.

### 2.2 Notices

One of the key objectives of the environmental planning process is to provide the public, interested parties and affected agencies with opportunities for meaningful input. To meet this objective, comprehensive public and agency notification of Open Houses (OHs) was undertaken.

The Notice of Study Commencement and OH #1 was placed in the following local newspapers on Friday, April 12<sup>th</sup>, 2013:

- Ottawa Citizen
- Le Droit

In addition to the Newspaper notices, direct contact via email and letter mail was initiated on April 4, 2013 with stakeholder contacts in the study database.

Newspaper notices for OH #2 were placed in the following local newspapers:

- City-wide EMC Papers on September 5<sup>th</sup> and 12<sup>th</sup>, 2013
- Le Droit on September 6<sup>th</sup> and 13<sup>th</sup>, 2013

In addition to the Newspaper notices, direct contact via email and letter mail was provided on August 14, 2013 with contacts in the study database.

Public notification was also provided through distribution of a "buckslip", a postcard-type mailing. Over six thousand buckslops were delivered to local residents in advance of each OH, informing them of the upcoming meeting and inviting them to attend. Buckslops were printed double-sided with French information on one side and English on the other. Councillor Hubley also included information about the first meeting in the April 18th edition of his "Councillor's Message" column appearing on his website.

In addition, notices were placed on the project web site at:  
[www.ottawa.ca/kanatasouthstudy](http://www.ottawa.ca/kanatasouthstudy) and [www.ottawa.ca/etudesudkanata](http://www.ottawa.ca/etudesudkanata).

A Notice of Study Completion indicating where the Environmental Study Report (ESR) is available for formal public review was published at the start of the review period after the City of Ottawa Council approved release of this document.

This notice was placed city-wide in the EMC newspapers on Thursday January 30, 2014 and Thursday February 6, 2014. It was also placed in Le Droit on Friday January 31, 2014 and Friday February 7, 2014.

### 2.3 Project Website

A website was developed and maintained for the Hope Side Road/Old Richmond Road Corridor Class EA Study on the main City of Ottawa website at the following address:  
[www.ottawa.ca/kanatasouthstudy](http://www.ottawa.ca/kanatasouthstudy) and [www.ottawa.ca/etudesudkanata](http://www.ottawa.ca/etudesudkanata).

Public notices advising of OH meetings, display material presented at the meetings and project updates were available online throughout the study. Contact information was also provided to allow the public to comment throughout the study process. Web site material was provided in both English and French.

### 2.4 Consultation Groups

The following two consultation groups were formed to provide additional input:

- Agency Consultation Group (ACG) included members representing City of Ottawa departments, municipal agencies, provincial government and federal government departments as well as utility companies. Their role was to address technical issues, comment on the special studies required to fully assess the various alternatives and to ensure that the City was following procedures, legislation and appropriate policies.
- Public Consultation Group (PCG) included representatives from community associations and resident groups, advocacy groups, businesses and institutions within the study area and developers with interest in the area. Their role was also to advise and comment on local issues and concerns.

Members invited to participate in consultation groups included agencies and interested parties listed in **Table 1**.

**Table 1. List of Consultation Groups**

Agency Consultation Group (ACG)	
<ul style="list-style-type: none"><li>• City of Ottawa – Transportation Planning Branch</li><li>• City of Ottawa – Policy Development &amp; Urban Design Branch</li><li>• City of Ottawa – Transit Service Design Branch</li><li>• City of Ottawa – Traffic Management &amp; Operational Support Branch</li><li>• City of Ottawa – Roads &amp; Traffic Operations &amp; Maintenance Branch</li><li>• City of Ottawa – Design &amp; Construction Services West Branch</li><li>• City of Ottawa – Environmental Services Branch</li><li>• City of Ottawa – Business and Technical Services Branch</li><li>• City of Ottawa – Paramedic Services Branch</li><li>• City of Ottawa – Asset Management Branch</li><li>• City of Ottawa – Planning and Infrastructure Approvals Branch</li><li>• City of Ottawa – Development Review Branch</li><li>• City of Ottawa – Realty Services Branch</li><li>• City of Ottawa – Surface Water Branch</li><li>• Access Now</li><li>• Agriculture and Agri-Food Canada, Environmental and Engineering Services</li><li>• Bell Canada</li></ul>	<ul style="list-style-type: none"><li>• Canadian Environmental Assessment Agency</li><li>• Enbridge</li><li>• Environment Canada, Environmental Protection Act Division</li><li>• Fisheries and Oceans Canada</li><li>• Hydro One Networks Inc.</li><li>• Hydro Ottawa Limited</li><li>• Ministry of Aboriginal Affairs</li><li>• Ministry of Agriculture, Food and Rural Affairs</li><li>• Ministry of Natural Resources</li><li>• Ministry of the Environment</li><li>• Ministry of Tourism, Culture and Sport</li><li>• National Capital Commission</li><li>• Rideau Valley Conservation Authority</li><li>• Rogers</li><li>• Transport Action</li><li>• Transport Canada Canadian Environmental Assessment Agency</li></ul>

Public Consultation Group (PCG)		
<ul style="list-style-type: none"> <li>• Arbeatha Park Property Owner's Association</li> <li>• Ashton Community Association</li> <li>• Bridlewood Community Association</li> <li>• Caivan Development</li> <li>• Cedarhill Community Association</li> <li>• City of Ottawa – Ward 23</li> <li>• Country Club Village Community Association</li> <li>• Ecology Ottawa</li> </ul>	<ul style="list-style-type: none"> <li>• First Line Community Association</li> <li>• Glen Cairn Community Association</li> <li>• Heritage Ottawa</li> <li>• Heron Lake Community Association</li> <li>• Katimavik and Hazeldean Community Association</li> <li>• Lynwood Village Community Association</li> <li>• Lytle Avenue Homeowners Association</li> <li>• Monarch Homes</li> <li>• North West Goulbourn District Community Association</li> </ul>	<ul style="list-style-type: none"> <li>• Orchard Estates Community Association</li> <li>• Pine Meadows Community Association</li> <li>• R.W. Tomlinson Limited</li> <li>• Richmond Village Community Association</li> <li>• Royal LePage Team Reality</li> <li>• Tartan Homes</li> <li>• Tomlinson Group</li> <li>• TrailWest Community Association</li> <li>• Valecraft Homes</li> </ul>

## 2.4.1 Round 1 Consultation Group Meetings

### 2.4.1.1 Agency Consultation Group (ACG) Meeting #1

Prior to the first OH, a separate meeting was held with the ACG to obtain input. This meeting was held on:

- Tuesday, April 16, 2013 from 9:00 a.m. to 11:00 a.m.  
110 Laurier Avenue West, Honeywell Room

The members of the project team in attendance consisted of:

- Angela Taylor: .....Project Manager, City of Ottawa
- Anthony Kwok: .....Transportation Planning Coop Student, City of Ottawa
- Valerie McGirr: .....Consultant Project Manager, AECOM
- Vanessa Skelton: .....Consultant Deputy Project Manager & Transportation Engineer, AECOM

The first ACG meeting dealt with the following topics:

- Role of the Agency Consultation Group
- Introduction and Study Process
- Study Purpose
- Study Area Map
- Consultation
- Schedule
- Project Need
- Screenline Capacity
- Cycling Infrastructure Needs
- Safety
- Traffic Operations
- Existing Environmental Features Map
- Evaluation Criteria
- Evaluation Methodology
- Alternative Solutions
- Screening of Alternatives
- Consideration of a Reversible Lane
- Realignments and Maps
- Next Steps

A total of 21 people signed the registration sheet at the ACG meeting. A summary of the discussion is presented in **Table 2**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 2. Summary of Discussion at Agency Consultation Group Meeting #1**

Consider a broader study area for the EA to include other routes including Fallowfield Road. Need more analysis to confirm that the current proposed route is the best alternative to carry forward. Other alternatives need to be considered.

*The team will update the traffic analysis.*

Further clarification of the collision statistics was requested for comparison to other areas of the City to understand the significance of the data. Is it higher, lower or within City average when compared to other areas of City?

*The study area had a higher percentage of collisions with the particular characteristics identified than the City in general.*

#### What does the “other” classification for type of collisions represent?

*Actual records would need to be reviewed. These are collisions that don't fall into the major categories. [post meeting. The “other collisions” in the dataset include one vehicle reversing into another vehicle that was stopped; one vehicle sliding on icy pavement into a number of other vehicles and two vehicles colliding as they were both going forward resulting in one of the vehicles hitting a fixed object.]*

NCC representatives brought forward environmental issues due to the proposed route passing through the Stony Swamp area of the Greenbelt.

- NCC's Wetland policy is primarily avoidance. At the very least, reduce impacts in Core Natural Area
- Any proposed lighting is a significant concern. Lighting alone has environmental impact
- To preserve the natural environment, “no net loss of ecological function of wetlands”
- Need to justify that no other alternative road corridor solutions are available. Don't assume Old Richmond/West Hunt Club is the solution
- No fragmentation of the Core Natural Area of the Greenbelt
- NCC homes along the corridor are served by wells
- Road drainage from a rural cross-section, as well as additional ROW requirements, are concerns. For drainage, an urban cross-section should be reviewed

*The cumulative effects study recommendations will be reviewed. The team will follow up with the NCC regarding additional data available.*

There was concern about the guidance of motorists coming from secondary roads turning onto the reversible lanes when changing between the AM and PM.

*The design will be done in accordance with best practices for reversible lanes and peer reviewed by the author of the TAC Guide for Reversible Lanes.*

Intersection alternatives will consider both roundabouts and signalized intersections.

The realignment at Hope Side Road and Old Richmond Road has an impact on the recent subdivision development with draft plan approval.

For pedestrian and cycling facilities, extend paved shoulders along Old Richmond Road north of West Hunt Club Road towards Bells Corners to improve community access.

No municipal services (water, sanitary sewer) are planned under Hope Side Road.

City Environmental Services requires the dimension of the right-of-way (ROW) for the widened Hope Side Road to determine the cost of twinning or replacing Monahan Drain culvert. Planned widening to be within existing ROW to the extent possible to avoid land acquisition to the south.

The Road Modification Assessment for temporary access to Old Richmond Road for the Tomlinson quarry is in preparation. The final report will be forwarded to Project Team.

Staff from the City of Ottawa will advise of the best time for AECOM's Natural Environment consultants to undertake their site visits, in particular with respect to turtles and other species active in the spring. Species at Risk will be examined as part of this work.

A list of supporting documents for the EA are:

Received: Geotechnical; Stage 1 Archaeology Assessment; Phase 1 ESA; Land Use Existing Conditions; Natural Environment

In revision: Context Sensitive Design

Noise and Air Quality reports require input from the preferred design before they can be completed.

NCC asked to review public display material from Open House #1.

Enbridge has mobilized the contractors to commence work by end of May at two sites including Richmond Road and Hwy 416 interchange. The planned depth of cover is 1.75 m from Old Richmond to West Hunt Club Road. NCC noted concerns on width of easement required and number of trees cut down if a full 7 m easement is granted.

Include in the EA references of Archeology and Heritage.

#### 2.4.1.2 Public Consultation Group (PCG) Meeting #1

The first meeting with the PCG was held on:

- Thursday, April 18, 2013 from 6:30 p.m. to 8:30 p.m.  
Kanata Recreation Complex, Ground Floor Meeting Room, 100 Walter Baker Place

The members of the project team in attendance consisted of:

- Angela Taylor: .....Project Manager, City of Ottawa
- Anthony Kwok .....Transportation Planning Coop Student, City of Ottawa
- Valerie McGirr: .....Consultant Project Manager, AECOM
- Vanessa Skelton: .....Consultant Deputy Project Manager & Transportation Engineer, AECOM

The meeting presentation dealt with the following topics:

- What is an Environmental Assessment Study?
- Role of the Public Consultation Group
- Introduction and Study Process
- Study Purpose
- Study Area Map
- Consultation Process Items
- Schedule
- Project Need
- Travel Demand
- Cycling Route Designations in the Study Area Map
- Pathways and Trails in the Study Area Map
- Safety
- Traffic Operations
- Existing Environmental Features Maps
- Evaluation Criteria (examples)
- Evaluation Methodology
- Alternative Solutions
- Screening of Alternative Solutions
- Alternative Road Improvements
- Initial Design Alternatives
- Consideration of a Reversible Lane
- Realignments and Maps
- Next Steps

A total of 6 people signed the registration sheet at PCG meeting. A summary of the discussion is summarized in **Table 3**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 3. Summary of Discussion at Public Consultation Group Meeting #1**

<b>Does the City provide any guidance for community associations on their operations and procedures?</b>
<i>There are rules for groups that obtain money from the City. Further information can be obtained from Councillor Hubley.</i>
<b>What consultation is being done with First Nations?</b>
<i>First Nations have been contacted by letter asking them how they would like to be consulted on this study. On previous studies, the First Nations groups have been particularly interested in studies of the natural environment and cultural environment. There are no land parcels associated with the draft Algonquin settlement located in the Study Area.</i>
<b>Are the alternatives examining needs associated with the existing community or the planned community?</b>
<i>The project need has examined both existing conditions and future conditions (assuming approved development is in place in accordance with the Official Plan and its supporting document, the Transportation Master Plan). We are considering the widening of Hope Side Road and the section of Old Richmond Road and West Hunt Club Road between Hope Side Road and Highway 416.</i>
<b>Is the capacity available on Eagleson Road captured in the analysis?</b>
<i>Yes. By looking at a variety of locations where east-west traffic approaches the Greenbelt, the screenline captures traffic using Eagleson Road that is headed to the east during the AM peak hour.</i>
<b>Have you considered pay per use as an option?</b>
<i>Tolling is considered as a TSM or TDM measure. These are generally set by the City through the development of goals and policies</i>

*in the Transportation Master Plan.*

**What is the transit modal split?**

*Across the Eagleson screenline the existing transit mode share is 25%. It is assumed to increase to 34% in the future. This higher modal split was used in the analysis for 2031.*

**How do cyclists use the intersection at Old Richmond Road?**

*Cyclists use the paved shoulder, which is 2.5 m in width. At the intersection, cyclists can turn left or right as required.*

**What happens to the remnants of the old roads if the realignment option is selected?**

*The road bed will be reclaimed and naturalized.*

**Can reversible lanes be considered elsewhere in the City?**

*Reversible lanes have been considered in other EA studies where modifications to the road were being considered. A change to City policy regarding this issue is best addressed in the context of the Transportation Master Plan.*

**The proposed new access to the Tomlinson quarry on Old Richmond Road will remove substantial truck traffic through Fallowfield Village and reduce out of way travel for the delivery of aggregates to the developments at Monahan Landing and the Fernbank Community. This new access is a win-win situation for the community and for Tomlinson.**

**Will a roundabout be analyzed? When will the alternatives be formalized?**

*Yes. Roundabouts (including for the intersection of Hope Side Road and Old Richmond Road) are being analyzed and will be compared with signalized intersections and the proposed re-alignment. These will be done in the short term to finalize the preferred alternative. The options will be presented at the next stage of public consultation.*

**Was the new urban expansion in Stittsville captured in the analysis?**

*Yes. An estimate of the traffic from this development reaching Hope Side Road was included.*

**What is the life of the quarry?**

*The quarry has about another 20 years of life. Its license includes a rehabilitation plan that will result in a lake in this area that will become a community feature.*

**I would like to see more of a focus on increased transit services. I would like to see a user pay approach as a policy. These types of questions are best suited for the Transportation Master Plan update, which is currently underway and Official Plan reviews. Specific EA studies are based on the results of the TMP.**

**Would like more plans to restore urbanized area to its natural environment. I would like to see the complete removal of Hope Side Road.**

**Would like more information on sustainability aspects of the project.**

**The City has made efforts to encourage development of mixed use, sustainable communities. Unfortunately, buyers control the market and what developers can reasonably sell.**

*Community Design Plans (CDP) are produced when the City looks at developing an area. The CDP includes consideration of land uses such as employment zones and transit corridors.*

**Have concerns for the number of roads crossing the Greenbelt.**

**Believe a societal change is needed to reduce the need for additional road infrastructure.**

**I have public health concerns such as air pollution.**

**Linkages under or over the road are required for wildlife such as those constructed in Banff National Park. Another option would be to install fencing along the corridor.**

*As part of the mitigation measures for this project, wildlife passages will be considered.*

**Couldn't a bus route be introduced along West Hunt Club?**

*The current plan for transit in the Kanata-Stittsville area is centered around the BRT network. Most new development is planned for the area around the future transit network with intensification in the immediate vicinity of stations.*

**What other departments are involved in the study?**

*We have an Agency Consultation Group that includes representatives from many City departments such as development review, infrastructure approvals, traffic operations, transit services, traffic safety and investigations. These are only a few of the departments involved in the study.*

## 2.4.2 Round 2 Consultation Group Meetings

The second round of consultation meetings (both ACG and PCG) dealt with the following topics:

- Purpose of Final Consultation #2
- Study Area Map
- Recap of Last Meeting
- Updates on Existing Conditions
  - Natural Environment
  - Enbridge Gas Pipeline
  - Development
- Alternative Solutions Update
  - Fallowfield Rd. vs. Old Richmond-West Hunt Club
  - Impacts through Stony Swamp
- Schedule
- Evaluation Criteria
- Alternative Designs – Alignment
  - Hope Side and Old Richmond Road
- Old Richmond and West Hunt Club
- Alternative Designs – Cross-section
  - Hope Side and Old Richmond Road
  - Old Richmond and West Hunt Club
- Evaluation of 3 vs. 4 lanes within the Greenbelt
- Alternative Designs – Illustration of 4 lanes
- Alternative Designs – Signals & Roundabouts
- Evaluation of Signals vs. Roundabouts
- Map of Roundabouts vs. Signals at the West Hunt Club and Moodie Intersection
- Potential Impacts and Mitigation Measures
- Lighting Levels and Renderings
- Preferred Alternative Design
- Standard Roundabout Design
- Next Steps

### 2.4.2.1 Agency Consultation Group (ACG) Meeting #2

Prior to the second Open House, an ACG meeting was held on:

- Monday, September 9th, 2013 from 9:00 a.m. to 11:00 a.m.  
110 Laurier Avenue West, Honeywell Room

The members of the project team in attendance consisted of:

- Angela Taylor: .....Project Manager, City of Ottawa
- Valerie McGirr: .....Consultant Project Manager, AECOM
- Vanessa Skelton: .....Consultant Deputy Project Manager & Transportation Engineer, AECOM

A total of 17 people signed the registration sheet at the ACG meeting. A summary of the discussion is presented in **Table 4**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 4. Summary of Discussion at Agency Consultation Group Meeting #2**

<b>The Tomlinson quarry access from Old Richmond Road has been approved.</b>
<b>Is the centre reversible lane wider?</b>
<i>They can be but not always.</i>
<i>Paved shoulders and rumble strips help to mitigate single vehicle collisions.</i>
<b>What is the design speed for the roundabout design for higher rural speeds?</b>
<i>We will get this information.</i>
<i>In the case of Eagleson Road and Flewellyn Road, longer splitter islands have been used as a speed management tool instead of a curvilinear alignment.</i>
<i>Cyclists can either use the pathway behind the sidewalk at the roundabout or use the roundabout as a car would.</i>
<b>The Highway Traffic Act is being reviewed with respect to priority for pedestrians.</b>

<b>Consider pedestrian linkages for the future and how pedestrians will use the corridor. Need a safe strategy.</b>
<i>Pedestrian signals are proposed at the trail crossing/NCC parking lot on Old Richmond Road under the power transmission corridor.</i>
<b>Lighting was previously mentioned as a concern.</b>
<i>Lighting options for the Greenbelt have considered a “dark skies” policy and will be similar to recently installed lighting in the Greenbelt. Lighting poles will be placed to the outside and not in the median due to the short offset and collision hazard.</i>
<b>Are lighting levels at intersections a concern?</b>
<i>We will check on the difference between intersections and roadways.</i>
<b>The bio-diversity study by the NCC is on hold at this time. Mapping illustrating the changes to the wetland over time is available.</b>
<b>Will there be mitigation measures for species such as turtles and deer?</b>
<i>Yes mitigation measures are proposed with particular emphasis on turtles.</i>
<b>In the documentation, emphasize that Stony Swamp is a Core Natural Area of the Greenbelt and is managed by the NCC. Its bio-diversity is of particular importance.</b>
<b>The City traffic safety staff had been tracking wildlife collisions. Is this ongoing?</b>
<i>This will be confirmed.</i>
<b>The Stony Swamp fire has resulted in the establishment of a number of experimental plots that have been fenced off to prevent deer browsing. These plots will facilitate the study of regeneration.</b>
<b>With the tie-in on West Hunt Club Road at the southbound ramp terminal intersection, the project will require a permit from MTO as it will be within the Controlled Access Highway designation. If there are any changes to the ramp terminal intersection, a revised PHM 125 drawing will be required in detail design.</b>
<b>For the current MTO study of the West Hunt Club interchange with Highway 416, traffic volumes from this EA Study would be helpful.</b>
<i>AECOM will forward these to MTO staff</i>
<b>From the perspective of the wetlands and federal policy, the order of preference is to first avoid, second minimize and then mitigate impacts. Restoration of function within Stony Swamp will be necessary.</b>
<b>Consistency in the implementation of mitigation is needed. The NCC and the City will generate their ideas for opportunities for restoration in Stony Swamp.</b>
<b>Will this be a co-ordinated Provincial-Federal process?</b>
<i>No. The provincial process will be completed and then the City will coordinate with the NCC through the detail design process in order to provide sufficient detail for the federal requirements. The provincial documentation will include caveats with respect to the need to fulfil federal requirements.</i>
<b>Note that the residences within the Greenbelt are generally on well and septic tank and these may be impacted even if the house is not.</b>
<i>These will be considered. If the houses on the west side of Old Richmond Road have either in their front yards, there will be impacts.</i>
<b>Notification of consultation?</b>
<i>Notices have been hand delivered to homes at the north end of Fallowfield Village as well as homes within the Greenbelt.</i>
<b>Ottawa Hydro is doing work in this area and is also planning future work. The planned power line along the north side of Hope Side Road is 3 m from the future property. There are “busy” poles west of Highway 416 that will likely be impacted. Poles from Moodie Drive and West Hunt Club Road westerly are planned for replacement. It would be preferred to place poles in their final locations but the potential for roundabouts will influence the placement of poles. Hydro Ottawa will need approvals from the NCC for the placement of poles and anchors.</b>
<b>Power poles could be joint use for street lighting. There will be an underground section of power line under the power transmission corridor and shorter poles in locations.</b>
<b>City of Ottawa Signals staff have discussed the desire for placement of a fibre optic communications cable in the gas pipeline trench. This will not occur. City staff will request the placement of a fibre optic cable during the West Hunt Club/Old Richmond Road widening.</b>
<b>Is a raised median needed?</b>
<i>A median is recommended in the Roadside Safety Manual for the traffic volumes (over 20,000 daily traffic) and a raised median is preferred to provide positive separation.</i>

<b>Can the NCC review the Open House material?</b> Yes.	<b>At the intersection of Eagleson Road and Hope Side Road/Terry Fox Drive, there is a car wash planned in the northeast corner and a shopping plaza planned in the northwest corner.</b>
<b>Are reverse curves needed at roundabout approaches?</b> <i>This is the preferred method (worst case for property). The Study Team is consulting with experts in this field to assess other methods to minimize impacts.</i>	<b>In the future could the T-intersections on Hope Side Road have 4-legs?</b> <i>The area south of Hope Side Road is outside of the urban boundary so development is unlikely unless the urban boundary is changed. The design does not preclude the construction of a 4<sup>th</sup> leg to the intersection in the future.</i>
<b>The City would like to have the Synchro files and Sidra files from the analysis to complete their own review.</b> <i>Files will be provided. The analysis included existing and future volumes, optimization of signals and roundabouts for the comparison.</i>	<b>Access for the Tomlinson quarry at Hope Side Road will reduce truck traffic through Fallowfield Village.</b>
<b>The design should consider "context-sensitive" features.</b> <i>A report has been prepared on this aspect and will be shared.</i>	<b>The paved shoulder is needed, even without consideration for cycling and pedestrians.</b>
<b>What is the timing of the work?</b> <i>The roll-out of the TMP will be done in a few weeks. At that time there should be more information on the proposed timing of improvements. Traffic will be re-assessed during detail design with the most up to date data available. Current work relies on TRANS forecasting for road links considering existing and future development.</i>	<b>For noise mitigation north of Stonehaven along Old Richmond Road, the grade will be a challenge as the houses are below the road elevation. There may be room to use a berm to minimize the height of a barrier.</b> <i>The required height for noise mitigation will be reviewed with the noise specialist.</i>
<i>An earlier study for the City concluded that a single lane roundabout at the intersection of Hope Side Road and Richmond was preferred. The analysis used volumes projected for 2018.</i>	<i>At Old Richmond Road and Stonehaven the roundabout has been placed to avoid impact on the gas station. There is impact on the Greenbelt and development lands. A posted speed of 60 km/h is assumed along Old Richmond Road from Fallowfield Village to Stonehaven Drive in the design of the roundabout.</i>
<i>Consideration of signals and roundabouts will be reviewed in detail design.</i>	<i>Along Old Richmond Road, widening is generally to the west side. This avoids impacts on the majority of the homes in the Greenbelt. Within Stony Swamp, two houses are slated for removal this year and others will be removed at the end of their useful lives.</i>
<b>Stormwater management should consider methods to address water quality issues. These may involve enhanced swales in rural areas. Road salt is an issue. Refer to the TAC guideline – "Best Management Practices for Road Salt".</b>	<b>What is the protected right-of-way width on Old Richmond Road?</b> <i>In the Greenbelt, the width is not specified. It is developed in consultation with the NCC.</i>
<b>Use of a paved shoulder is good to discourage turtles from nesting.</b>	<i>There is the potential for a signalized pedestrian crossing under the power transmission line to connect NCC pathways and the NCC parking lot. It is not known how many pedestrians cross now in this area.</i>

#### 2.4.2.2 Public Consultation Group (PCG) Meeting #2

Prior to the second OH a meeting was held with the PCG on:

- Thursday, September 12, 2013 from 6:30 p.m. to 8:30 p.m.  
Kanata Recreation Complex, Ground Floor Meeting Room, 100 Walter Baker Place

The members of the project team in attendance consisted of:

- Angela Taylor: .....Project Manager, City of Ottawa
- Anthony Kwok: .....Transportation Planning Coop Student, City of Ottawa
- Valerie McGirr: .....Consultant Project Manager, AECOM
- Vanessa Skelton: .....Consultant Deputy Project Manager & Transportation Engineer, AECOM

A total of 13 people signed the registration sheet at the PCG meeting. A summary of the discussion is summarized in **Table 5**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 5. Summary of Discussion at Public Consultation Group Meeting #2**

<b>Concerned about the use of a 2-lane roundabout.</b> <i>An educational campaign will be required in advance of the opening of the 2-lane roundabouts. The Bridlewood experience with the single lane roundabout should help residents get accustomed to using roundabouts.</i>
<b>Concerned about pedestrian crossing at roundabouts as pedestrians are instructed to yield to cars.</b> <i>This is an issue from the Highway Traffic Act and many municipalities, including Ottawa, are asking the province to make changes to give pedestrians priority.</i>
<b>What speed is expected in the roundabout?</b> <i>About 40 km/h. The curvilinear alignment approaching the roundabout helps to encourage drivers to slow down in advance of entering the roundabout. The City is considering standards for rural roundabouts at this time. The design would be refined during detail design.</i>

<b>At the intersection of Eagleson Road and Hope Side Road/Terry Fox Drive, there is a car wash planned in the northeast corner and a shopping plaza planned in the northwest corner.</b>
<b>In the future could the T-intersections on Hope Side Road have 4-legs?</b> <i>The area south of Hope Side Road is outside of the urban boundary so development is unlikely unless the urban boundary is changed. The design does not preclude the construction of a 4<sup>th</sup> leg to the intersection in the future.</i>
<b>Access for the Tomlinson quarry at Hope Side Road will reduce truck traffic through Fallowfield Village.</b>
<b>The paved shoulder is needed, even without consideration for cycling and pedestrians.</b>
<b>For noise mitigation north of Stonehaven along Old Richmond Road, the grade will be a challenge as the houses are below the road elevation. There may be room to use a berm to minimize the height of a barrier.</b> <i>The required height for noise mitigation will be reviewed with the noise specialist.</i>
<i>At Old Richmond Road and Stonehaven the roundabout has been placed to avoid impact on the gas station. There is impact on the Greenbelt and development lands. A posted speed of 60 km/h is assumed along Old Richmond Road from Fallowfield Village to Stonehaven Drive in the design of the roundabout.</i>
<i>Along Old Richmond Road, widening is generally to the west side. This avoids impacts on the majority of the homes in the Greenbelt. Within Stony Swamp, two houses are slated for removal this year and others will be removed at the end of their useful lives.</i>
<b>What is the protected right-of-way width on Old Richmond Road?</b> <i>In the Greenbelt, the width is not specified. It is developed in consultation with the NCC.</i>
<i>There is the potential for a signalized pedestrian crossing under the power transmission line to connect NCC pathways and the NCC parking lot. It is not known how many pedestrians cross now in this area.</i>
<b>Will there be access for vehicles across the median to the NCC parking lot?</b> <i>This will be considered. The median could be lowered to permit left turn movements; however, it is not intended that a left turn lane be added. Roundabouts also provide safe U-turn locations for vehicles to access driveways on the opposite side of the median.</i>
<b>At Old Richmond Road and West Hunt Club Road, is the presence of the elm tree the reason why a house must be removed?</b> <i>No. Even if the elm tree was not a consideration and the roundabout was shifted to the west, the driveway of the house would still be within the roundabout and would not be acceptable.</i>
<b>Concerned about the viability of the elm tree with construction so close.</b> <i>During detail design the tree will be examined and adjustments made to maximize its chance for continued health. This will be noted in EA documentation.</i>
<i>A right turn bypass lane from westbound West Hunt Club to northbound Old Richmond is needed due to the angles at this intersection to accommodate vehicles appropriately</i>
<b>Will left turns be permitted at the Lone Star driveway?</b> <i>Future work will examine whether the median should be lowered to permit left turns or if U-turns at adjacent intersections will be allowed.</i>
<b>What is being done about the West Hunt Club interchange with Highway 416?</b> <i>The MTO has started a study focusing on the intersection of Cedarview Road and the northbound exit ramp/northbound entrance ramp. We are supplying MTO with our traffic data and discussing issues.</i>
<b>What will happen to the gas pipeline?</b> <i>The gas pipeline will be under the road and shoulder, depending on the location. We have been working with Enbridge throughout this EA Study so that both parties are aware of each other's work.</i>
<b>Will LED lights be used?</b> <i>LED lights for arterial roads have been under development and may be available now. They are expected to be more effective at directing the light down onto the road surface, making it possible to minimize impact to the Greenbelt.</i>
<b>When will this be built? What is the phasing?</b> <i>The TMP is currently being updated and will be rolled out soon. We will find out then where this project is slated.</i>
<b>Councillors are supporting the construction of this project.</b>
<b>What traffic pattern will be influenced by this project? Will there be increased use of Eagleson Road?</b> <i>Increased use of Eagleson to get to North Kanata is not expected to result from this project.</i>
<b>What is the cost of this project?</b> <i>The section through the Greenbelt is estimated at about \$16 million, excluding costs of property and mitigation measures. A preliminary cost estimate will be developed for the full recommended plan.</i>
<b>Support the selection of the 4-lane alternative over the reversible lane.</b>

## 2.5 Open Houses

Two OH's were held during the course of this study. The City of Ottawa and consultant representatives were available at all the meetings to discuss the study and to respond to inquiries.

### 2.5.1 Public Open House #1

The first OH was held Thursday, April 25<sup>th</sup>, 2013 from 6:30 p.m. to 9:00 p.m. with a presentation at 7:00 p.m. at the Kanata Recreation Complex, Hall A, 100 Walter Baker Place.

At the OH there was an opportunity to:

- Learn about the study scope and the need for widening Hope Side Road-Old Richmond Road-West Hunt Club Road between Terry Fox Drive and Highway 416
- Comment on the proposed guiding principles that will be used in decision making throughout the project
- Review and comment on proposed alternative solutions
- Comment on a series of proposed evaluation criteria that will be used to identify a recommended plan
- Ask questions and discuss the project with members of the Study Team

The OH provided an opportunity for members of the public to view the display material and to discuss the project with City of Ottawa and consultant representatives. Attendees were encouraged to provide written comments. The members of the project team in attendance consisted of:

- Angela Taylor: .....Project Manager, City of Ottawa
- Anthony Kwok .....Transportation Planning Coop Student, City of Ottawa
- Valerie McGirr: .....Consultant Project Manager, AECOM
- Vanessa Skelton: .....Consultant Deputy Project Manager & Transportation Engineer, AECOM
- Catherine Ghioureliotis:.....Environmental Planner, AECOM

A presentation was given during the OH that followed the format of the display material. The presentation dealt with the following topics:

- Welcome
- Purpose of Open House #1
- Introduction and Background
- Class EA Process
- Consultation Plan
- Project Need
- Travel Demand
- Pedestrian and Cyclist Facilities Maps
- Project Need - Safety
- Traffic Operations
- Existing Environmental Features Map
- Corridor Context Maps
- Evaluation Criteria
- Evaluation Methodology
- Alternative Solutions
- Evaluation of Alternative Solutions
- Alternative Road Improvements
- Initial Design Alternatives
- Reversible Lane
- Next Steps
- Thank you for Attending

Five comments were received following notification of Study Commencement and Open House, in advance of the event itself. Those comments are detailed in **Table 6** below.

**Table 6 Summary of Comments Received Following Notification of Open House #1**

1	<ul style="list-style-type: none"> <li>• Please add my name to the mailing list and send me more information about the study</li> <li>• Please send me all background information related to the "Project Need and Existing Conditions" as well as planned/approved residential/commercial developments for the surrounding area and justification for this road widening</li> <li>• Information should be provided to the public well in advance of Open Houses so they can do additional research and ask informed questions</li> <li>• Is the new proposed route/road considered an "arterial road" or "collector road"</li> <li>• Arterial roads should have sidewalks on both sides and bike lanes according to City policy; will this road include these items</li> <li>• How will pedestrians, cyclists and public transit users be accommodated?</li> <li>• How does the City justify the need for the new arterial road if there is no need for public transportation infrastructure?</li> <li>• Will the Open House provide more detail about the environmentally significant areas that are likely to be impacted?</li> <li>• How much will Greenhouse Gases and localized Air Pollution likely increase due to increase private auto traffic?</li> <li>• What will a wider road mean for wildlife in the Greenbelt?</li> <li>• Why can't the City make it its goal to greatly increase public transit service and ridership in the neighbourhoods surrounding the study area?</li> </ul>
2	<ul style="list-style-type: none"> <li>• Please add my name to the mailing list</li> </ul>
3	<ul style="list-style-type: none"> <li>• As housing density has increased in our neighbourhood, it has become clear that during certain times of the day it would be very difficult for emergency vehicles to reach our residence in case of a medical emergency.</li> <li>• There are a number of children in this area, and childhood injuries require rapid response times.</li> <li>• Please forward any material regarding the plans, objectives and alternatives related to this project</li> <li>• The rapid growth in this area has displaced a great deal of wildlife in this area, and this doesn't seem to have been taken into account in the development plans</li> </ul>
4	<ul style="list-style-type: none"> <li>• The website doesn't provide any context about the current conditions and what the EA's purpose is</li> <li>• Is this a road widening?</li> <li>• How does it fit into the city's current Transportation Master Plan?</li> <li>• Have Transit Solutions already been ruled out?</li> <li>• Is there currently a budget assigned to this widening project, or only the EA work?</li> </ul>
5	<ul style="list-style-type: none"> <li>• When will the next Open House be?</li> <li>• When will more information be available on the website?</li> <li>• What is the purpose of the assessment when traffic measures have already been taken to relieve congestion in this area?</li> </ul>

A newsletter was prepared for this study and copies were made available to the public at the OH.

During the presentation, a number of comments and questions were received, and the discussion is summarized in **Table 7**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 7. Summary of Discussion at Open House #1**

<b>How did people hear about the Kanata South EA Open House?</b> <i>By show of hands, large majority of the attendees received notification via the buckslip. Attendees mentioned the delivery of the buckslip was short notice. Newspaper advertisement was not a factor in the turnout. Some attendees mentioned they would like to have access to the presentation prior to the Open House.</i>
<b>Why is the extension of Hope Side Road not being considered? It is part of the Transportation Master Plan (TMP) and would be beside a quarry.</b> <i>The City and the NCC completed a joint study on the cumulative effects of transportation infrastructure on the Greenbelt. This study noted key concerns of fragmentation of Core Natural Areas and Natural Area Linkages. Stony Swamp is a Core Natural Area and additional fragmentation through the construction of a new road is unacceptable.</i>
<b>Will this EA Study take into consideration the proposed new quarry access to Old Richmond Road from Tomlinson quarry? Am OK with the new access if the alternative is truck traffic through Fallowfield Village. Concerned about truck traffic.</b> <i>Yes. Tomlinson is interested in having an access to Old Richmond Road to avoid driving through Fallowfield Village while delivering aggregates to the Fernbank development and other areas to the west. This concept is being considered. The configuration of the intersection of Old Richmond Road and Hope Side Road will be investigated (signals, roundabout)</i>

**Does the study consider the adaptation of motorists to congestion, such as peak spreading?**

Yes. We examined traffic volumes before and after the peak hour to assess the length of congestion. It should also be noted that the current review of the Transportation Master Plan is considering changing consideration of the peak hour to consideration of a peak period.

**Is there consideration for another Park and Ride in the Hope Side Road-Eagleson Road area to encourage transit use?**

The Eagleson-417 Park and Ride lot has been expanded. Parking at Scotiabank Place is being used to supplement Park and Ride. Kanata North will be getting a new Park and Ride lot in a couple of years. In addition, there are future plans for Park and Ride and a new transit corridor through the Kanata West and Fernbank communities.

**Concerned about the state of traffic on Stonehaven Drive.**

Improvements have been made in the last 2 years. City staff are monitoring traffic issues.

**Would like to see the City focus more budget on transit and less on roads. Prioritize public transit.**

Connections along Old Richmond Road and across West Hunt Club Road for cyclists and pedestrians between the NCC parking lots and trails are important.

The use of Timm Road as an alternative to relieve traffic problems is not realistic. It is too far north to be on the desire line for traffic.

**Previous studies showed a rail transit corridor along the Trans Canada trail. Will this be considered?**

No. The City's rapid transit network does not involve the Trans Canada trail through Bridlewood and will not be considered as it is a well-used pathway for recreation.

The TMP includes widening of Eagleson Road to 4 lanes and Hope Side Road to 4 lanes. There is nothing in the TMP about the widening of Old Richmond-West Hunt Club as the extension of Hope Side Road was previously the concept. This EA Study will provide documentation for the solution recommended to address transportation problems in this area.

**How much land will be needed for the 3 and 4 lane alternatives?**

This has not been determined yet.

**How has this work been co-ordinated with Enbridge Gas?**

The EA Study for the new pipeline has been completed and it will be under construction this year. Enbridge has provided their studies for use as background information for this transportation EA Study.

**Why not just build 4 lanes?**

The do nothing, 3 and 4 lane alternatives will be fully assessed. There are a number of potential impacts that need to be considered. A 3-lane cross-section will provide as much capacity as a 4 lane cross-section in the peak direction (2 lanes in the peak direction with both alternatives).

I object strongly to widening through Stony Swamp. Widening of Fallowfield Road is the best of the worst options. Prefer no road widening but rather improved transit to address needs.

The Greenbelt could be expanded southerly once the quarry has reached the end of its life.

The quarry has up to 20 years of life remaining. The area is slated to become a lake in the future.

People are a factor too. Would like to see a long-term solution that considers the existing and future community, its residents and realistic travel patterns.

**Is the calculation of capacity precise?**

The TRANS model provides us with a good foundation to determine capacity issues. Actual capacity can vary depending on the location of the road (urban versus rural), the adjacent land use and number of driveways.

**Back in the 1950s, a reversible third lane was considered a suicide lane.**

Now we have access to good equipment to provide guidance to motorists and to monitor the area so that reversible lanes can function well.

**Please consider a roundabout at Crownridge with 4 lanes on Hope Side Road.**

This will be considered. Signals and roundabouts will be investigated.

**Will noise be examined?**

Yes. Noise studies are required both for the development and for the road EA Study.

**There are drawbacks with 3 lanes including the number of signs needed and lighting.**

These potential impacts will be considered.

**I like the realignments shown. Are they for 3 or 4 lanes?**

They are independent considerations and will be examined for both 3 and 4 lanes. The exception is that the realignment of Old

Richmond-West Hunt Club is a prerequisite for the 3-lane alternative.

A third lane on eastbound Stonehaven to allow right turns even when there are left turners in the two lanes designated for left turns would reduce delay for right turners.

Signals at the ramp terminal from Highway 416 northbound to Fallowfield Road is needed to allow drivers to safely complete the left turn to westbound Fallowfield Road.

If Fallowfield is the selected route, this will be considered.

**Where does the NCC stand on this study?**

Staff of the NCC was present at the Open House and noted that the NCC is working with the City. The cumulative effects study was completed and then the Greenbelt Master Plan review incorporated the principles established. The NCC understands the need for travellers to cross the Greenbelt. The NCC has a role as the steward of Stony Swamp and the rest of the Greenbelt. The NCC will continue to work with the Study team.

**Can you clarify how recently the Fallowfield Corridor came forward as an alternative?**

As part of the EA Study, we adjust our work as we go along. In this case, at our recent meeting with the Agency Consultation Group, they expressed a desire to see Fallowfield more explicitly considered.

Happy to see the original idea (extending Hope Side Rd east) off the table. There should be no more roads through the Greenbelt. The 3-lane alternative seems to be a creative way to reduce the width needed. The process requires that a variety of alternatives be examined.

**Can the NCC share information on the ecological function and cumulative effects?**

It is the job of the study to assess the impacts, including wildlife and hydrology. The NCC is participating in the EA Study. During the high level cumulative effects study the NCC and the City reached an agreement on what projects could proceed. The NCC is currently discussing additional work to assess ecological service in Stony Swamp and other Core Natural Areas in the Greenbelt.

**Will mitigation measures be included?**

Yes. Mitigation measures to address any potential environmental effects will be considered.

**There are safety issues associated with a reversible lane and lighting can impact on the natural environment.**

Safety will be a consideration in the assessment of the alternatives. There are currently new lighting options, such as LED and light trespass can be better controlled.

**What are the ecological impacts of alternatives for 2, 3 or 4 lanes?**

These will be assessed in the investigation of alternative designs

Believe that there are deeper social and cultural issues that need to be considered with respect to the impact of single occupant vehicles.

A total of 54 people signed the registration sheet and 7 comment sheets were submitted at the OH held on April 25, 2013. Seven additional comments were received prior to the final submission date for comments to be incorporated into the summary report. A summary of the comments received are summarized in Table 8.

**Table 8. Summary of Comments Received for the First Round of Consultation**

#	Description of Comments
1	<ul style="list-style-type: none"> <li>Priority should be to protect Stony Swamp which provides important hydrological and ecological services</li> <li>Proposed route would further degrade and fragment the Greenbelt and should not proceed</li> <li>Focus should be on improving public transportation services and ridership through transportation demand management and target modal split should be changed to 40-45% by 2031</li> <li>If this road must be widened, it should include designated and priority space for public transit, cyclists and pedestrians</li> <li>City should invest more into improving public transit (i.e., Light Rail in Kanata far more quickly)</li> </ul>
2	<ul style="list-style-type: none"> <li>Build road(s) to direct traffic south to Fallowfield and then to 416 because quarry will eventually be "naturalized" and development south of existing housing will be too much for Old Richmond-West Hunt Club. Fallowfield appears to be a shorter distance to the 416</li> <li>If road widening goes ahead on Old Richmond and West Hunt Club, include deer fences and turtle tunnels</li> </ul>
3	<ul style="list-style-type: none"> <li>Routing traffic from Hope Side Rd. to Fallowfield and then Cedarview will add to the existing traffic and safety problems on Cedarview. Cedarhill Community Association is concerned the growing traffic volumes on Cedarhill Road north of Fallowfield. Growing development in Barrhaven has increased the use of Cedarview Road</li> </ul>

#	Description of Comments
4	<ul style="list-style-type: none"> <li>Necessary transportation infrastructure should be planned and built before the homes</li> <li>The 2013 actual screenline model with 25% public transit use does not seem possible with the low number of buses in the Study Area</li> </ul>
5	<ul style="list-style-type: none"> <li>Study should adhere to the Municipal Class EA, Type C.</li> <li>Documentation should be provided on website well ahead of time</li> <li>Mass transit improvements, cycling, HOV lanes, road widening, other road routes, etc. should be considered as viable alternatives. If a reasonable number of alternatives are not considered, the EA may be appealed to the Minister of the Environment.</li> <li>How much time do we have until traffic volumes become critical? I think TSM and TDM can address needs for some time</li> <li>By 2031 where will growth be and will it all need to use Richmond/Hunt Club? Won't it be southwest of Bridlewood, closer to Eagleson/Fallowfield/Terry Fox? And where do people work? High tech? March Road?</li> <li>Leisure value could also be included in "cultural environment"</li> </ul>
6	<ul style="list-style-type: none"> <li>Another east-west road will be needed when the large new development on Stonehaven is completed.</li> <li>Extend Hunt Club or put in a road right on the edge of the Greenbelt where Scissors Road is and extend it to Robertson Rd.</li> </ul>
7	<ul style="list-style-type: none"> <li>Did not find the Open House to be a good use of time.</li> </ul>
8	<ul style="list-style-type: none"> <li>3 lane upgrade option for Old Richmond Road would require too much lighting and shoulder space and a fourth lane will likely be needed in the future</li> <li>West Hunt Club is to become 4 lanes, so it should continue onto Old Richmond Road. Since roadwork and machinery would already be in place to build the third lane, a fourth lane should be done at the same time.</li> </ul>
9	<ul style="list-style-type: none"> <li>Presentation and Open House were excellent and informative</li> <li>Support the reversible lane option with a 2.5 m shoulder bike lane on each side.</li> <li>Next Open House should include time of day operation for reversible lane and details on how the switch occurs.</li> <li>Support rounded corners at Hope Side Road and at West Hunt Club to allow majority of traffic to travel with fewer turning movements.</li> <li>Corridor needs to be lighted, but shouldn't encroach into the natural areas surrounding the road</li> <li>Left turning traffic in a three-lane option needs to be studied and demonstrated at next Open House (i.e. how one enters from a left turn, how one makes a left turn, safety of an open centre lane instead of a dedicated left turn lane).</li> <li>Traffic circles should be of the one lane or two lane variety.</li> <li>If the Hope Side Road corner is rounded, an exit from Bridlewood at the intersection with the southern connection to Old Richmond Road and Hope Side Road should be evaluated</li> <li>Next Open House should include a table and chairs to sit and write comments</li> <li>Open House shouldn't have been scheduled on the same night as the Western LRT meeting</li> </ul>
10 and 11	<ul style="list-style-type: none"> <li>Copy of the presentation and display boards was requested (2 comments)</li> </ul>
12	<ul style="list-style-type: none"> <li>What caused the collisions shown on the display board?</li> <li>High number of single vehicle collisions and the number of rear-enders at intersections indicates speed</li> <li>Widening a road because low lighting and weather are problems would lead to more speeding</li> <li>What is the destination of the drivers in the peak periods? Can that be modeled using TRANS?</li> <li>Widening roads in Kanata makes commuting by car more attractive</li> <li>What is the actual delay to motorists who may travel along the corridor during the peak period when the v/c exceeds the recommended 0.90 in seconds</li> <li>What is the actual budget allocated to this project?</li> </ul>
13	<ul style="list-style-type: none"> <li>Which side(s) of Old Richmond and Hope Side roads will be widened?</li> <li>What effect will have on my rural mailbox?</li> <li>When will the work begin?</li> <li>Can the speed limit be reduced starting from Stonehaven to Fallowfield Village from 80KPH to 60KPH?</li> <li>Will an all-way stop be placed at the corner of Old Richmond and Hope Side Roads?</li> </ul>
14	<ul style="list-style-type: none"> <li>Glad that the proposal to extend Hope Side Road to Cedarview has been dropped</li> <li>Proposal to widen seems very sensible</li> <li>Any changes to the traffic patterns in the area will significantly impact residents of the Cedarhill community</li> </ul>

## Conclusion

Overall, the Round 1 consultation events seemed to show a consensus that the existing level of service in the study area is poor, and will deteriorate in coming years. The main points of discussion at the OH were concerns about the natural environment within Stony Swamp, including property impacts through the Greenbelt, lighting and mitigation measures as well as transit and route alternatives.

### 2.5.2 Public Open House #2

The second OH was held Monday, September 16<sup>th</sup>, 2013 from 6:30 p.m. to 9:00 p.m. with a presentation at 7:00 p.m. at the Kanata Recreation Complex, Hall A, 100 Walter Baker Place.

At the OH there was an opportunity to:

- Learn about the alternative road widening designs (3 lanes with reversible lane and 4 lanes with a median) and intersection alternatives (signals and roundabouts);
- Learn about evaluation of the alternative designs;
- Comment on the technically preferred design; and
- Ask questions and discuss the project with members of the Study Team.

The OH provided an opportunity for members of the public to view the display material and to discuss the project with City of Ottawa and consultant representatives. Attendees were encouraged to provide written comments. The members of the project team in attendance consisted of:

- Angela Taylor:..... Project Manager, City of Ottawa
- Valerie McGirr:..... Consultant Project Manager, AECOM
- Vanessa Skelton:..... Consultant Deputy Project Manager & Transportation Engineer, AECOM
- Catherine Ghioureliotis: ..... Environmental Planner, AECOM
- Colin MacKenzie ..... Engineer-in-Training, AECOM

A presentation was given during the OH that followed the format of the display material. The presentation and the displays dealt with the following topics:

- Welcome
- Purpose of Open House #2
- Introduction and Background
- Consultation Plan
- Class EA Process
- Update to Existing Conditions
- Natural Environment
- Development
- Evaluation Criteria
- Evaluation Methodology
- Evaluation of Fallowfield and Old Richmond-West Hunt Club Corridors
- Alternative Designs – Alignment
- Alternative Designs
- Roll Plans of the 3 and 4 lane alternatives
- Evaluation of 3 versus 4 lanes
- Evaluation of Signals & Roundabouts
- Potential Impacts and Mitigation Measures
- Technically Preferred Design including drawing of Standard Roundabout Design
- Next Steps
- Thank you for Attending

Three comments were received following notification of the Open House, in advance of the event itself. Those comments are detailed in **Table 9** below.

**Table 9. Summary of Comments Received Following Notification of Open House #2**

1	<ul style="list-style-type: none"> <li>Without having advance copies of the EA reports and supporting documents, I cannot participate or truly be "consulted"</li> <li>Documentation must be available to the public in order for the requirements of the EA legislation to be met.</li> <li>Would like to receive copies of the completed documents ahead of the Open House</li> </ul>
2	<ul style="list-style-type: none"> <li>Bicycle lanes weren't discussed at the first Open House</li> <li>Safety for bicyclists along Richmond Road is a serious concern</li> <li>Should have separate bike lanes</li> <li>Hope Side Road – Richmond Road – West Hunt Club Road corridor needs to be four lanes</li> <li>There will be more head-on collisions if a three-lane solution goes forward</li> <li>The impact on the environment to accomplish a four-lanesolution is minimal</li> </ul>
3	<ul style="list-style-type: none"> <li>I support the four-laneoption</li> <li>I would support a six lane option if it were offered</li> <li>Traffic on Fallowfield is backed up from Terry Fox to the 416 already and this will only get worse with the addition of new homes in the area</li> <li>Thank you for building more roads</li> </ul>

A summary of the discussion that took place at the OH is provided in **Table 10**. Questions and/or comments are shown in bold and responses, where applicable, are shown in italics.

**Table 10. Summary of Discussion at Open House #2**

<b>Are the proposed roundabouts 2-lane roundabouts?</b>
Yes, they are 2 lane roundabouts.
<b>Are cyclists required to dismount at the roundabouts?</b>
Cyclists can use circulating lanes or the multi-use path.
<b>Who has the right-of-way at pedestrian crossings?</b>
Vehicles have the right-of-way.
<b>Aren't cyclists considered vehicles?</b>
Cyclists have to yield to cars.
<b>It's been noted that there is very little injury involved with vehicle sideswipes in roundabouts, but what about cyclists?</b>
Cyclists will need to be educated on how to circulate within the roundabout to act in a safe manner.
<b>Will Hope Side Road be moved further south? Specifically, can my house be avoided?</b>
No, we have kept the design within the existing Right-of-Way.
<b>Where is the single lane section?</b>
The section of Old Richmond Road south of Hope Side Road remains a single lane.
<b>There will be a bottleneck of people entering the roundabout. Old Richmond Road is already congested.</b>
<b>Are you concerned with property impacts further along the design, such as noise?</b>
Noise impacts will be taken into account further along in the design process, and mitigation measures, such as noise walls, will be incorporated as necessary.
<b>What is the design speed?</b>
The speed will be 40 km/h entering the roundabout, and up to 80 km/h in between roundabouts with curvilinear design necessitating a reduction in speed as drivers approach the roundabouts.
<b>Design the road to match the expected speed, don't just post a sign and expect people to follow it.</b>
There are trails on both sides of the road.
<b>What is the impact on the pipeline?</b>
We have been in discussion with Enbridge; they have no problem with pipe under the roadway.
<b>Will there be a median break at the parking lots?</b>
We are considering different medians, but there will be no left turning lanes. Cars can turn at the roundabouts to reach their destinations.

**How will trail users get across the road? Will there be a pedestrian signal?**

There will be a 1.5 m wide median as refuge. It may not be wide enough for cyclists to stop and wait. Median will be curbed so cyclists cannot ride through the median. A pedestrian signal is being considered at NCC parking lot P6.

**Why isn't there a roundabout at the 416?**

*That location is under MTO's jurisdiction.*

**How safe are the rumble strips for cyclists?**

Rumble strips will be used only in rural sections. In the urban areas, there is a bicycle track that has a curb between the automobile lane and a raised cycling section. Hope Side Road north side has a cycling track and a sidewalk. The south side has a shoulder and a rumble strip.

**The rumble strip works well in Riverside South.**

*We appreciate your feedback.*

**Is it possible to introduce legislation to have vehicles reduce their engine noise?**

*This is beyond the scope of this study.*

**What City owned land will be swapped for NCC land?**

We don't know that yet. The new wetlands will be located within Stony Swamp. During Detail Design and Construction, the City will negotiate with NCC the exact limits of the property required. Our mapping provides a good indication, but is not exact. These details will be defined later.

**How many deer hits are there on Richmond Road?**

We did safety assessments in the first part of the study where there was a category for collisions regarding wildlife collisions, but we don't have those numbers here with us now.

**What options are there to appeal the decisions made?**

If your concerns have not been resolved through this process, you can ask for a Part II order and the Minister of the Environment will respond.

**What is the timeline for construction?**

The TMP is currently being updated, and it is updated every 5 years. Projects are listed over a 20 year period. In the 2008 TMP, this was listed as a priority project, but we're not sure where in the schedule this project will now fall.

**It sounds like you don't know the timeline for construction. Is it 30 years?**

We don't have that answer at this time.

**Will it be up to the councillors to vote on?**

The TMP will be brought to council in November to vote on.

**Is this presentation available on the website?**

It will be available on the study website by the end of the week.

A total of 71 people signed the registration sheet and 3 comment sheets were submitted on the night of the OH. In addition to the comment sheets submitted at the OH, seven additional comments were received in the two weeks following the OH. A summary of the comments received related to the OH during the second round of consultation are summarized in **Table 11**.

**Table 11. Summary of Comments for the Second Round of Consultation**

#	Description of Comments
1	<ul style="list-style-type: none"> <li>Is an expansion really needed? Based on what data?</li> <li>Would a combination of enhanced public transit, cycling, improvements to Eagleson/Fallowfield etc. not address the need to keep peak traffic below acceptable limits? If not, based on what data?</li> <li>If the City is to go for the option of expanding Richmond Rd., what are the trade-offs, particularly for the environment?</li> <li>What would be the proposed mitigative actions?</li> <li>How will the proponent deal with threats to endangered species, especially turtle breeding?</li> <li>Data and information has not been provided to answer these questions, and will not be until the formal EA Study is tabled.</li> <li>The public is not in a position to formulate an informed opinion on the project.</li> </ul>
2	<ul style="list-style-type: none"> <li>Well done presentation in all respects.</li> </ul>

#	Description of Comments
3	<ul style="list-style-type: none"> <li>The proposed plan – 4 lanes and roundabouts is the most reasonable and preferred option.</li> <li>Human capital is important as well as financial and ecological.</li> <li>Direct routes save time and reduce fossil fuel use.</li> <li>Safety is paramount.</li> <li>The different perspectives have been considered and balanced in great detail and the study team should be commended for respecting the area and its people.</li> <li>Priorities: safety (4 lanes), movement/flow (roundabouts), pedestrian/cyclist support (paved lanes)</li> <li>This will be a big improvement.</li> <li>Consider installing noise barrier fencing all along Stonehaven Dr – and more roundabouts – to improve flow and reduce noise.</li> </ul>
4	<ul style="list-style-type: none"> <li>Good presentation</li> <li>To route the roundabout at West Hunt Club and Richmond Road around a healthy Elm Tree seems ridiculous as one day, the tree won't be there, and the road won't be in the optimal location.</li> <li>Perhaps due to the bicycle issue the blending of Richmond Rd and West Hunt Club could be revisited. The natural curvature of the road would allow bicyclists to smoothly transition from a northerly direction to an easterly direction when headed to points east and vice versa the other way.</li> </ul>
5	<ul style="list-style-type: none"> <li>Requested a copy of the designs that were presented</li> <li>Curious to know which approach we'll be going with and the timelines.</li> <li>Found the presentation materials very well-done. Congratulations to you and your team.</li> <li>Support the project</li> </ul>
6	<ul style="list-style-type: none"> <li>Would like details of the analysis of the Fallowfield option in comparison with the preferred Old Richmond Road option.</li> <li>Were the Terms of Reference of this study subjected to public consultation? Coming late to this process, it strikes me as odd that Fallowfield was not even in the Study Area.</li> <li>Also, I note that the "Joint Study to Assess Cumulative Effects..." (City-NCC, Nov 2012) investigated 2-lane roads related to Hope Side Road.</li> <li>Have you assessed what a change to 4 lanes would mean in terms of cumulative effects?</li> </ul>
7	<ul style="list-style-type: none"> <li>Requested a copy of any information that was presented</li> </ul>
8	<ul style="list-style-type: none"> <li>Roundabouts of two (or more) lanes in size, as have been already implemented in Ottawa, are an impediment to cyclists' safety and efficiency of travel. Multi-lane roundabouts make left turns especially challenging.</li> <li>Roundabouts are not safer for cyclists--even at low speed or glancing angle, collisions can be fatal for a cyclist.</li> <li>Most cyclists do not have a problem with single-lane roundabouts. Roundabouts of more than one lane in size make it tougher for cyclists.</li> <li>With no traffic signals along a vast length of the corridor, there will be few breaks in the motor vehicle flow in the busy direction. The difficulty for cyclists with these roundabouts is making a left turn, especially when there is no break in the motor vehicle flow.</li> <li>It would be good to show the cost differences between (i) signalized intersections, (ii) the roundabouts as you have shown them, and (iii) as used in the Netherlands, a roundabout with a grade-separated pathway that goes under or over the roundabout. That is not to say that all six roundabouts would have to have grade separation, but perhaps one or two of the busiest ones.</li> <li>Conclusion on roundabouts in this study: Not advisable to be implemented at so many locations, if at all.</li> <li>Currently, Old Richmond Road has no paved shoulder bike lanes between West Hunt Club and Seyton. If not constructed prior to this project, they should be done as part of it. There is a definite desire line to the shopping and employment hub in Bells Corners.</li> <li>Please include Citizens for Safe Cycling on contact lists for major road studies such as this</li> </ul>
9	<ul style="list-style-type: none"> <li>Requested information on the study as they had missed the Open House.</li> </ul>
10	<ul style="list-style-type: none"> <li>Requested information on the study as they had missed the Open House.</li> <li>What is the proposal going forwards? Is it the reversible lane (Stonehaven to Hwy 416)?</li> </ul>

### Conclusion

Overall, there was support at the second round consultation events for the preferred design and acknowledgement that the study took the various criteria into consideration appropriately. The main written comments received at and following OH #2 were concerns about the project need, cyclist safety, requests for a noise wall and the consideration of Fallowfield Road as an alternative.

Following the conclusion of the comment period for the second Open House, four additional comments were received from members of the public. A summary of those comments can be found in **Table 12** below.

**Table 12. Summary of Comments Received Following the Second Round of Consultation**

1	<p><b>Roundabouts:</b></p> <ul style="list-style-type: none"> <li>Median widths must be of sufficient width for bikes waiting in centre median, sufficient to line bike directly in line to cross.</li> <li>Cyclists should be inside pedestrians on crossings at roundabouts.</li> <li>Cyclists should be given the option of entering the all-vehicle lanes of the road well before the roundabout so they may traverse the roundabout as a vehicle. This means stopping any rumble strips, or grade separation, between bicycle and vehicle lanes well before the roundabout.</li> <li>Cyclists crossing at roundabouts must be delineated and separate from pedestrian crossing for better visibility from other users and to allow cyclists to travel mounted.</li> <li>Pedestrian/Cyclist crossing wait times must such that pedestrians and cyclists can cross the traffic points with minimal waiting time.</li> <li>The total time to cross all points must be no longer than crossing a signalized intersection or less. Cameras should be placed at major roundabouts to observe the safety and wait times for all users (for initial observation period).</li> <li>Roundabouts with only three entrance points should be designed such that the bike lane continues around the outside of the roundabout thus allowing for unimpeded travel for one side of the roundabout to the other.</li> <li>Yield to pedestrian/cyclist signs must be placed before pedestrian crossings for vehicles entering the roundabout.</li> </ul> <p><b>Speed of Road:</b></p> <ul style="list-style-type: none"> <li>The posted speed limit of the road where distances between roundabouts should be such that it does not encourage motorists to speed up between roundabouts and then brake at roundabouts.</li> </ul> <p><b>Design of Cycle Tracks and Bike Lanes:</b></p> <ul style="list-style-type: none"> <li>The need for rumble strips between all-vehicle lanes and bike lanes is suspect. Rumble strips are unsafe for cyclists to cross.</li> <li>Bike lanes must be of suitable width to allow passing of slower cyclists as well as to avoid dangerous debris.</li> <li>Cycle tracks must be at the same height as the road on the left and the ground on the right for safety. Otherwise, there must be sufficient rough or grassed surface on both sides of cycle track.</li> <li>If Cycle tracks are used then consideration must be given to width of the outside vehicle lane to accommodate vehicular cyclists not wishing to use unsafe cycle tracks.</li> <li>In rural areas, where the need for sidewalks is not sufficient, bike lanes should be designed with no curbs.</li> </ul>
2	<ul style="list-style-type: none"> <li>Where can I find details of the second Open House?</li> </ul>
3	<ul style="list-style-type: none"> <li>Will the display boards from the Open House be available on the project website?</li> </ul>
4	<ul style="list-style-type: none"> <li>In my opinion, only right angles are effective for slowing traffic approaching a roundabout</li> <li>The evaluation matrix presents a bias against natural systems in favour of widening corridors through NCC lands</li> <li>The matrix relies on speculation to dismiss the Fallowfield Corridor option</li> <li>The evaluation matrix should compare the two options (the current one and Fallowfield) in the degree to which they mitigate the effects estimated in earlier studies done by the City and NCC</li> <li>The Fallowfield option is no less capable of meeting the target level of service and operations that the preferred route</li> <li>The origin-destination data shows many residents of Kanata-Stittsville use Fallowfield for a variety of destinations</li> <li>Suggest that the "x" should be changed to a check mark for the Vehicle Origin-Destination criterion for Fallowfield</li> <li>The criterion for out of way travel should be calculated using peak period volumes rather than free flow conditions, and should include more than a single destination</li> <li>The four minutes of travel time advantage can hardly be called significant</li> <li>Both Fallowfield and the Old Richmond corridor represent a solution that is consistent with the "TMP"</li> <li>The statement that widening Fallowfield may put pressure on the urban boundary and encourage urban sprawl adjacent to Fallowfield should be removed from the evaluation table.</li> <li>What evidence do the consultants have that the farms along Fallowfield have official heritage status? Assigning the Fallowfield option an "x" for heritage suggest that the evaluation didn't consider Stony Swamp as having heritage value</li> <li>The cost to purchase lands from the NCC for the widening isn't included in the economic evaluation</li> <li>The user costs due to 4 minutes of out of way travel has no supporting evidence</li> <li>Mitigation needs to be considered for the barrier for the movement of wildlife</li> <li>To say that the Fallowfield option "may require" other widening is incomplete</li> </ul>

## 2.6 Aboriginal Consultation

The Ontario Aboriginal communities and agencies listed below were asked to identify any potential interests and to confirm their desire for participation in the consultation process. At each key milestone, the study team provided correspondence to inform the Aboriginal communities about the study progress. The correspondence included offers to meet and discuss the project as well as Aboriginal interests.

- Algonquins of Ontario Consultation Office
- Algonquins of Pikwakanagan First Nation
- Ottawa Algonquins
- Aboriginal Affairs and Northern Development Canada - Environmental Unit - Environmental Assessment Coordination
- Métis Nation of Ontario
- Ministry of Aboriginal Affairs

As noted in Section 2.2, a project notification letter was sent on April 12, 2013 to consult on the proposed improvements. No comments were received from any Aboriginal representatives or affiliated agencies during the course of the study.

As part of the background studies done, the study team reviewed the Preliminary Draft Comprehensive Land Claim Agreement-In-Principle among the Algonquins of Ontario, the Province of Ontario, and the Government of Canada to confirm that the project would not be in conflict with the principals of the agreement. No land parcels identified in the Agreement-In-Principle are located in or adjacent to the study area.

## 2.7 Individual Meetings

During the study, a number of individual meetings were held with the NCC and specific City staff members to discuss specific areas of interest and concern. Comments from the meetings were considered in the development of the Recommended Plan. Further discussions between City staff and agencies as well as property owners will be held during detail design of the road widening and improvements.

## 2.8 Council Resolution

This study was presented to the Ottawa Transportation Committee on December 4, 2013 and approved by Council on December 11, 2013.

### 3. Project Need

The identification of problems and opportunities is Phase 1 of the Municipal Class EA process. This phase is addressed during the City's TMP process and reviewed during the studies for individual projects, such as this study for the Hope Side Road/Old Richmond Road corridor. When the project need for the Hope Side Road/Old Richmond corridor was being reviewed, the 2008 TMP was applicable. The 2008 TMP identified the need for additional roadway capacity across the Greenbelt from Kanata, south of Highway 417. The 2013 TMP update was underway over the course of the work on this EA study and was subsequently approved by City Council in November 2013. The 2013 TMP also identified the need for additional roadway capacity across the Greenbelt from Kanata South. The affordable network published in the 2013 TMP included the widening of Old Richmond-West Hunt Club Road from Hope Side Road to Highway 416 in Phase 1 (2014-2019) and the widening of Hope Side Road in Phase 3 (2026-2031).

This section on Project Need was originally completed prior to the release of the 2013 TMP update. After this TMP update was available, the need for the corridor widening was re-examined with consideration for the updated traffic forecasts. The need was confirmed under the 2013 TMP update. Section 3 of this ESR includes references to both the 2008 and 2013 TMP documents with an emphasis on the 2013 TMP results where available.

#### 3.1 Introduction

The Project Need section documents existing and future transportation conditions, identifies transportation problems, and reviews the need for roadway network improvements in the study area.

The traffic level of service (LOS) analysis undertaken to assess the project need considered the following major issues:

- Existing road and screenline capacities within and adjacent to the study area;
- Existing morning and afternoon peak hour traffic volumes and projected AM peak hour traffic volumes and the corresponding capacity deficiencies;
- Future local, regional and provincial transportation infrastructure improvements;
- Future projections for transit usage within and beyond the study area.

The safety issues component examined collision experience for three years from 2009 through 2011 and compared experience along Hope Side Road, Old Richmond Road and West Hunt Club Road in the Study Area with collision experience in the City of Ottawa as a whole during 2009 and 2010.

Geometric issues considered existing horizontal and vertical profiles and cross-section elements.

#### 3.2 Existing Transportation Issues

##### 3.2.1 Previous Studies

As discussed under Background in Section 1, congestion in the corridor along Old Richmond Road-West Hunt Club Road was the subject of a capacity study completed for the City of Ottawa by iTRANS Consulting in 2008. The study included travel time surveys and queuing studies to assess the level of congestion. The study found long queues and wait times during peak periods. The worst conditions were found at the intersection of Stonehaven Drive and Old Richmond Road in the AM and at the intersection of Old Richmond Road and West Hunt Club Road in the PM. As a

result of this work, improvements were constructed at intersections to improve flow between Kanata South and Highway 416. The distance between Stonehaven Drive and the merge from two lanes to one lane northbound on Old Richmond Road was increased and the distance between West Hunt Club Road and the merge from two lanes to one lane southbound on Old Richmond Road was increased. This has improved the existing level of service in the study area.

The City retained AECOM to undertake a traffic study to examine the traffic control at the intersection of Hope Side Road and Old Richmond Road, considering traffic expected in 2021. The study investigated both signalization and construction of a roundabout at this location. Both alternatives were considered feasible for the traffic conditions.

Tomlinson Limited requested an access from their quarry located between Old Richmond Road and Moodie Drive to the intersection of Hope Side Road and Old Richmond Road. Currently their driveway exits onto Moodie Drive and from there the truck route to destinations to the west is Fallowfield Road, Old Richmond Road to Hope Side Road, which takes the trucks through the community of Fallowfield. The purpose of constructing a new driveway to the intersection of Hope Side Road and Old Richmond Road is to remove this truck traffic from Old Richmond Road through Fallowfield village while reducing out-of-way travel for trucks heading from the quarry to the west.

##### 3.2.2 Definition of Level of Service

The evaluation of roadway traffic conditions can be described in terms of the level of service (LOS) provided during peak traffic periods. For specific roadway links, the LOS is determined based on volume to capacity ratios (v/c) (the volume of traffic versus the capability of the roadway to accommodate traffic flow). The v/c ratio measures traffic volume demand and available capacity, with a capacity condition represented by a v/c ratio of 1.0 (i.e. volume equals capacity). The relationships between the LOS and v/c ratio, which are typically defined in relation to the levels of congestion experienced on the roadways, are summarized in **Table 13**. LOS and v/c are used in the assessment of project need in this section of the ESR.

**Table 13. Level of Service Definition**

Level of Service	Volume to Capacity Ratio (v/c)	Description
LOS A	0.0 - 0.59	At this level of service, vehicles rarely wait longer than one red indication to clear the intersection, turning movements are made easily, and the drivers are not obstructed by other vehicles.
LOS B	0.6 - 0.69	At this level of service, drivers will often have to yield to opposing traffic before making turns, and will begin to feel somewhat restricted within groups of vehicles approaching an intersection.
LOS C	0.7 to 0.79	At this level of service, the flow of traffic is stable. Drivers will have to yield to opposing traffic before making left turns, and may occasionally have to wait longer than one traffic signal cycle to clear the intersection. Short queues may develop for a few cycles.
LOS D	0.8 to 0.89	At this level of service, the motorist experiences increasing restriction and instability of traffic flow. There are substantial delays to approaching vehicles during short peaks within the peak period, and it becomes difficult to find gaps in traffic to complete left turns.
LOS E	0.9 to 0.99	At this level of service, capacity is reached and the flow of traffic is not stable. There are frequent queues of vehicles approaching intersections and delays to vehicles may extend to several signal cycles.
LOS F	Greater than 1.0	At this level, capacity is exceeded. There are persistent long queues of vehicles waiting on all approaches to the intersection and vehicles will often have to wait numerous signal cycles to clear the intersection.

### 3.2.3 Study Area Roadways

The roadways of interest to this study include:

- **Hope Side Road** (Ottawa Road (OR) 86) is a two-lane arterial with its western terminus at Eagleson Road and its eastern terminus at Old Richmond Road. The west end of Hope Side Road was realigned to connect to the extension of Terry Fox Drive. Hope Side Road is currently the south boundary of the urban area for Kanata with ongoing urban residential development on its north side and rural agricultural land use on its south side.
- **Old Richmond Road** (OR 59) is a two-lane arterial that connects the village of Richmond and points west along Franktown Road to Bells Corners and into urban Ottawa. Old Richmond Road was constructed during early settlement days in the area. Just south of the study area, Old Richmond Road passes through the Fallowfield community. Within the study area, Old Richmond Road is largely located within the National Capital Greenbelt. Auxiliary lanes have been constructed at the intersections of Stonehaven Drive and West Hunt Club Road. There are two gravel parking areas for recreational use on Old Richmond Road; one north and one south of the West Hunt Club Road intersection.
- **West Hunt Club Road** (OR 32) is a two-lane arterial that connects to Old Richmond Road as its western terminus and continues easterly across the south side of Ottawa. It widens to four lanes at Highway 416. Within the study area, West Hunt Club Road is in the Greenbelt and was constructed generally along township roads with a former jog in the road at Moodie Drive removed through road realignment. There is one gravel parking area for recreational use on West Hunt Club Road east of Moodie Drive.
- **Fallowfield Road** (OR 12) extends from Dwyer Hill Road (OR 3) to Prince of Wales Drive (OR 73). It is a two-lane arterial from Dwyer Hill Road to Moodie Drive, widening to four lanes west of Highway 416. Fallowfield Road borders the south side of the Greenbelt from Cedarview Drive to Woodroffe Avenue. It connects to Lanark County Road 10 and to Highway 7 via Dwyer Hill Road.
- **Eagleson Road** (OR 49) is a two-lane arterial at the west end of the study area at Hope Side Road. It widens to four lanes north of Fernbank Road.
- **Crown Ridge Drive** is a two-lane collector that intersects with Hope Side Road between Eagleson Road and Old Richmond Road and serves the new residential development in south Kanata. A second access from the residential development to Hope Side Road, Charlie Rodgers Way, is planned for the future east of Crown Ridge Drive.
- **Stonehaven Drive** is a two-lane major collector serving the Bridlewood community of Kanata and intersects with Old Richmond Road. At the intersection, there are two lanes allowing double left turns from eastbound Stonehaven to northbound Old Richmond Road.
- **Moodie Drive** (OR 11) is a two-lane arterial south of West Hunt Club Road and a collector north of West Hunt Club Road. It intersects with Old Richmond Road within the community of Bells Corners. There are three gravel parking areas for recreational use on Moodie Drive between West Hunt Club Road and the south Greenbelt boundary.
- **Highway 416** is a four lane, controlled access, divided provincial highway with an interchange that provides full movements at West Hunt Club Road and at Fallowfield Road. Improvements to the West Hunt Club interchange are currently being studied by the Ontario Ministry of Transportation (MTO).

### 3.2.4 Safety Concerns

The need for safety improvements was reviewed as part of the Project Need assessment. Motor vehicles collision statistics had been analyzed previously for the section of Old Richmond Road from Stonehaven Drive to West Hunt Club as part of the "Hunt Club Capacity Analysis Result Memorandum, iTRANS Consulting, 2008." To update this existing analysis and extend it to the other roads in the study area, three years of collision data were obtained from the City of Ottawa for 2009, 2010 and 2011. The road segments and intersections included in the data along with the number of reported collisions were:

**Table 14. Collision History**

Road Sections	# of Collisions Reported
• Hope Side Road, Crownridge Drive to Old Richmond Road	1
• Old Richmond Road, Hope Side Road to Khymer Court	3
• Old Richmond Road, Hope Side Road to Stonehaven Drive	5
• Old Richmond Road, Stonehaven Drive to West Hunt Club Road	36
• Old Richmond Road, Seyton Drive to West Hunt Club Road	9
• West Hunt Club Road, Cedarview Road to WB on-ramp to Highway 416 SB	1
• West Hunt Club Rd, WB on-ramp to Hwy 416 SB to off-ramp from Hwy 416 SB	1
• West Hunt Club Rd, off-ramp from Hwy 416 SB to EB on-ramp to Hwy 416 SB	2
• West Hunt Club Rd, Highway 416 ramp 53 to Moodie Drive	18
• West Hunt Club Rd, Moodie Drive to Old Richmond Road	19
<b>Total Number of Collisions:</b>	<b>95</b>

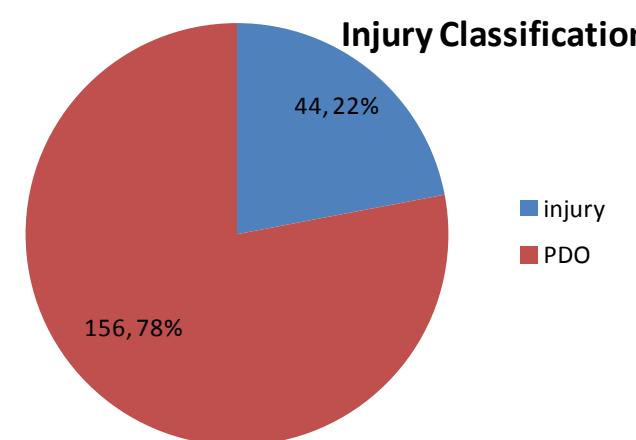
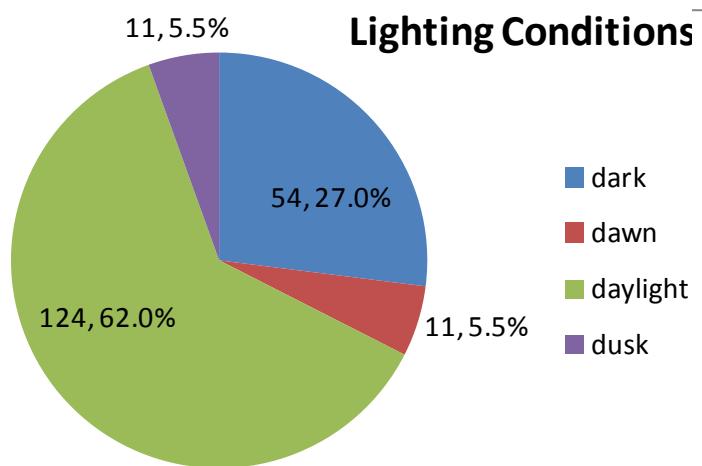
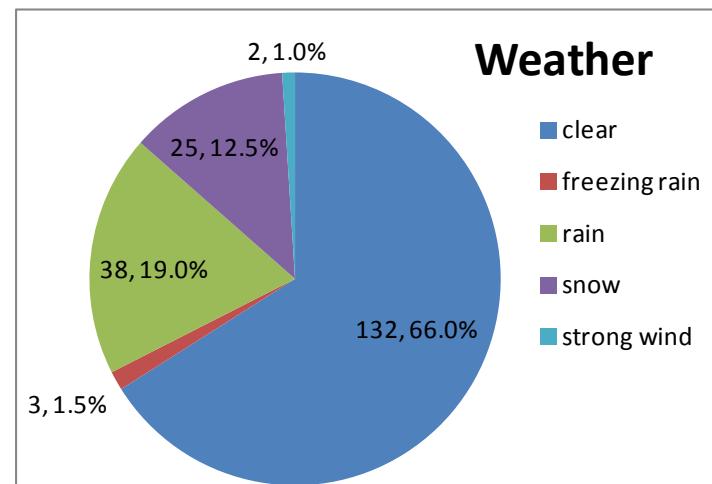
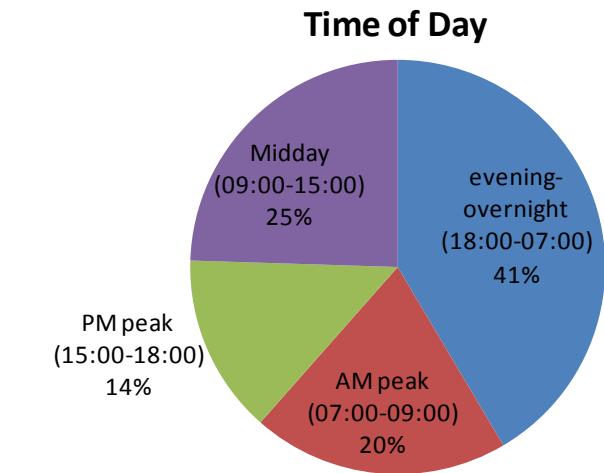
Intersections	# of Collisions Reported
• Crownridge Drive and Hope Side Road	2
• Eagleson Road and Hope Side Road	8
• Hope Side Road and Old Richmond Road	9
• off-ramp from Hwy 416 SB and West Hunt Club Road	8
• Moodie Drive and West Hunt Club Road	35
• Old Richmond Road and Stonehaven Drive	14
• Old Richmond Road and West Hunt Club Road	29
<b>Total Number of Collisions</b>	<b>105</b>

In total there were 200 reported collisions in the three years of data, including 73 in 2009, 76 in 2010 and 51 in 2011. About 22% of the collisions resulted in an injury. No fatalities were reported.

Improvements along Old Richmond Road in the vicinity of Stonehaven Drive were completed in December 2010. Improvements in the vicinity of West Hunt Club Road and Old Richmond Road were completed in Fall 2011. Normally a period of two years is needed to assess the safety effects of improvements. Hence, the collision experience in 2010 and 2011 in the vicinity of the roadworks may be different from previous years due to construction activity and/or completion of improvements.

Graphs illustrating the characteristics of the collisions from 2009 to 2011 are provided below. This includes the number and percentage of collisions by time of day, by weather conditions and by lighting conditions. The number of injury collisions versus property damage only (PDO) collisions is also illustrated. Animal (wild and domestic) collisions accounted for 33 of the 200 recorded collisions and occurred primarily along roads within the Greenbelt. Animal collision statistics are not reported for the overall City.

The collision experience in the study area was compared with overall collision experience in the City of Ottawa to identify characteristics that should be considered in the development of alternatives and plans for infrastructure improvements.

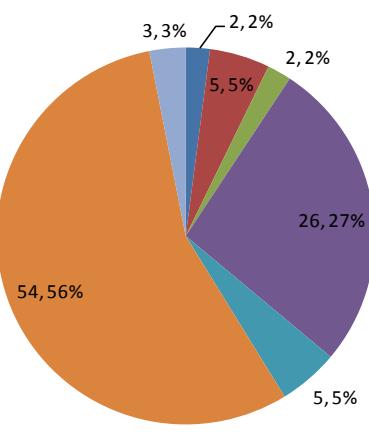


Another characteristic of collisions that helps to assess safety is the impact type. Impact types generally vary according to the location in the road network (intersections versus road segments). For that reason separate graphs are presented for these two groups of locations. **Table 15** provides the number of collisions by impact type:

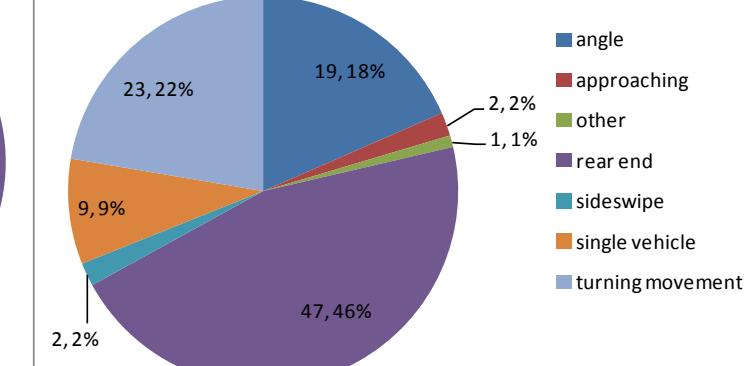
**Table 15. Collisions by Impact Type**

Impact Type	All locations	Road Sections	Intersections
Angle	21	2	19
Approaching	7	5	2
Other	3	2	1
Rear End	73	26	47
Sideswipe	7	5	2
Single Vehicle	63	54	9
Turning Movement	26	3	23
<b>Totals</b>	<b>200</b>	<b>97</b>	<b>103</b>

#### Impact Type No Control (Road Sections)



#### Impact Type Intersections



In combining the characteristics, a total of 83 collisions (41.5%) occurred in daylight, in clear weather. The following additional observations were noted from the collision statistics for the study area with reference to the collision experience in the City of Ottawa reported in the 2009 and 2010 Collision Statistics Reports published by the City:

#### Collision Classification

- Property damage only (PDO) collisions typically make up about 80% of collisions in Ottawa. The 78% of PDO collisions in the Study Area is therefore consistent with experience in Ottawa as a whole.

#### Control

- In the order of 47-48% of collisions in Ottawa occur at intersections, therefore the 47.5% of collisions in the study area occurring at intersections is consistent.

#### Light

- Daylight collisions in Ottawa account for 67 to 68% of the collision total while in the study area 62% of collisions occurred in daylight, therefore collisions in reduced lighting conditions are somewhat over-represented.

- There were 51 collisions on Old Richmond Road under dark, dawn, dusk conditions.

- There were 37 collisions (non-intersection) on Old Richmond Road under dark, dusk, dawn conditions (including 27 single motor vehicle collisions).

- In Ottawa, 76 to 79% of collisions occur in clear weather while in the study area 66% were during clear weather. Therefore collisions in poor weather are over-represented in the study area.

- Collisions during rain and snow account for 18.3% of collisions in Ottawa and 31.5% of collisions in the study area.

- Collisions during the AM peak in Ottawa total between 11 and 12% of all collisions and during the PM peak, 26-27% of collisions occur. Therefore in the study area collisions in the AM peak are over-represented (at 20%) and during the PM peak collisions are under-represented (at 14%).

- Midday collisions in Ottawa account for 32-33% of all collisions while in the study area the midday accounts for 25% of collisions.

- Evening/over-night collisions account for 30-31% in Ottawa versus 41% in study area. Therefore evening and overnight collisions are over-represented in the study area.

In summary, while the effect of the intersection improvements to collision experience on Old Richmond Road and West Hunt Club Road cannot be determined at this time, the following should be considered to improve safety experience in the study area.

- Improve “positive” guidance for drivers, especially under reduced lighting (improve pavement markings and signage to guide motorists and review lighting warrants);
- Make the roadside more forgiving when vehicles veer out of their lane (examine items such as wider lanes and paved shoulders);
- Improve skid resistance of pavement (resurface the roadway).

The above should be incorporated into the Recommended Plan where feasible.

### 3.2.5 Geometric Issues

The horizontal alignment on the roads in the study area is generally straight with curvature on Old Richmond Road north of Stonehaven Drive and on West Hunt Club Road west of Moodie Drive. None of the horizontal curves are substandard. The vertical alignment is generally gentle. There is a crest curve on Hope Side Road west of Old Richmond Road that appears to restrict sight distance; however, it is adequate for a design speed of more than 100 km/h.

There are hazards within the clear zone along the corridor, such as at the Monahan Drain culvert and at rock cuts along the roadways. There is also a potential for hazards along wetlands adjacent to the roadways. Generally the water depth is shallow; however roadside barriers may be warranted. In some areas the side slopes are steeper than 3:1, requiring consideration for slope flattening or roadside protection.

At the intersection of Old Richmond Road and West Hunt Club Road, sight distance is a concern due to the skewed alignment and the presence of trees in close proximity to the road.

## 3.3 Future Travel Demand

In support of the OP, the City's TMP documents the results of the long range travel demand forecasting work conducted to identify future transportation needs and services. The analysis of future travel demand for the City of Ottawa is carried out using the travel demand forecasting model developed by TRANS, a joint technical committee on transportation systems planning in the National Capital Region (NCR). The TRANS model contains coded road and transit network infrastructure for both existing facilities and planned long-range improvements. The mathematical relationships and sub-models calculate travel demands based on shortest trip times for each origin and destination pair (traffic zones) and results in the assignment of trips (private vehicle and transit trips) to the network respecting key travel elements such as delay within specific corridors.

The location of where people live and work are key elements in identifying the travel demands and consequently trip origins and destinations are primary inputs to the TRANS model. It includes assumptions for future land use based on detailed projections of employment, population and number of planned dwelling units. The level and distribution of growth for the City of Ottawa's 2031 planning horizon as outlined in the 2013 TMP is provided in **Table 16**.

The study area is in the Kanata-Stittsville area. It includes land within both the urban boundary and the rural area of the City, which accounts for the variety of land uses and trip generators. Major land uses are residential development, a

large quarry, the Stony Swamp Conservation Area in the Greenbelt and agricultural lands. Trip generators are generally outside of the Greenbelt. South of the study area is the Fallowfield community.

**Table 16. Population and Employment: 2011 Actual and 2031 Projections**

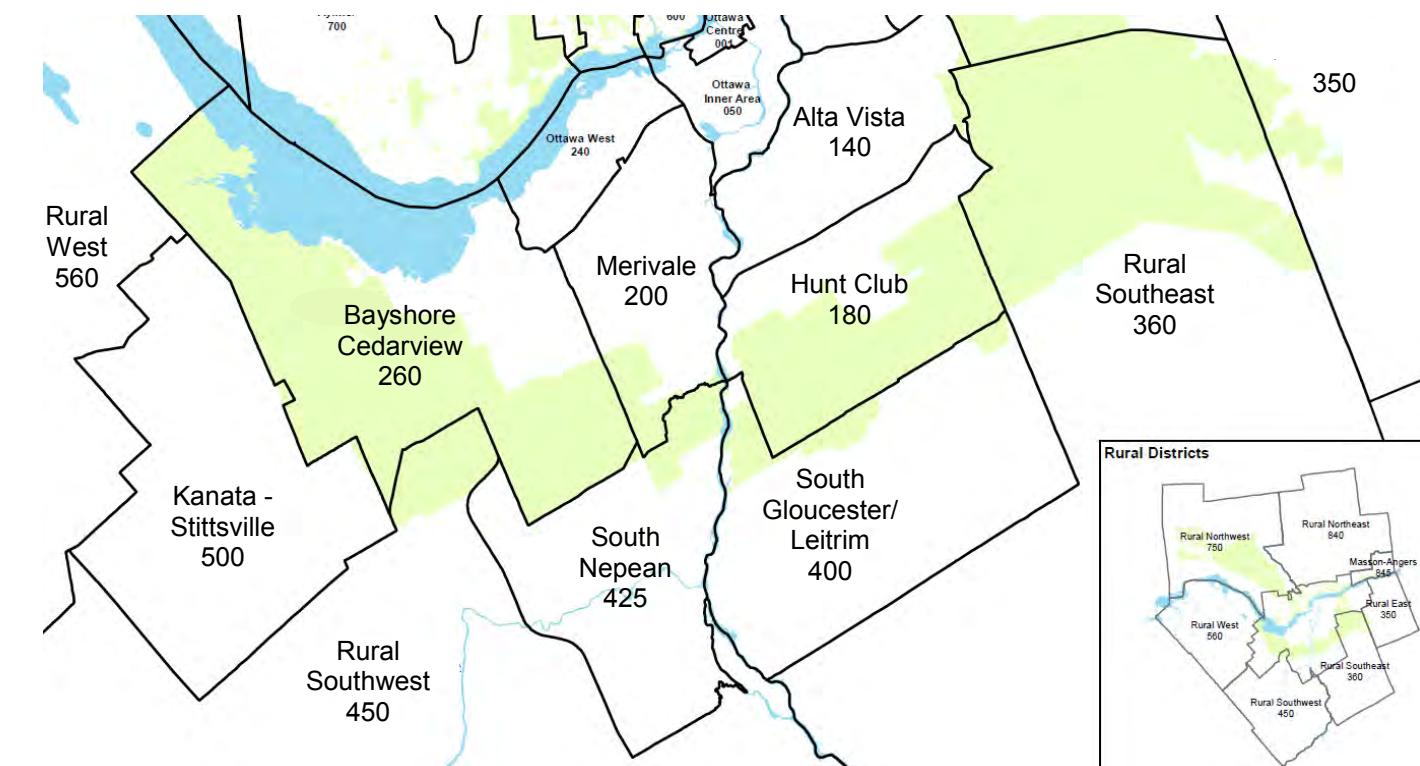
Area	Population			Employment		
	2011	2031	Growth	2011	2031	Growth
Inner Area	97,200	116,400	19,200 (9%)	170,600	201,800	31,200 (23%)
Inner Suburbs	432,500	459,300	26,800 (6%)	287,400	355,300	67,900 (49%)
Kanata/Stittsville	105,200	162,000	56,800 (27%)	51,300	62,500	11,200 (8%)
Barrhaven	71,200	107,400	36,200 (17%)	11,100	21,800	10,700 (8%)
Riverside South/Leitrim	15,900	35,800	19,900 (9%)	4,000	7,800	3,800 (3%)
Orléans	108,200	143,400	35,200 (16%)	20,600	33,000	12,400 (9%)
Rural Ottawa	91,400	111,700	20,300 (9%)	20,000	20,900	900 (1%)
Total	922,000	1,135,900	213,900	564,900	703,200	138,100

Source: City of Ottawa Transportation Master Plan 2013, Exhibit 2.10

The Kanata-Stittsville area is expected to have 27% of the population growth that occurs in the City of Ottawa over the next 20 years and 8% of the employment growth. Closer to the study area, the population on the south side of Bridlewood, including the Monahan Landing area north of Hope Side Road is expected to increase by almost 4300. The population in the Fernbank community and other residential expansion in areas between Stittsville and Kanata (south of the old rail corridor and east of Stittsville Main Street) is expected to increase by over 16,000.

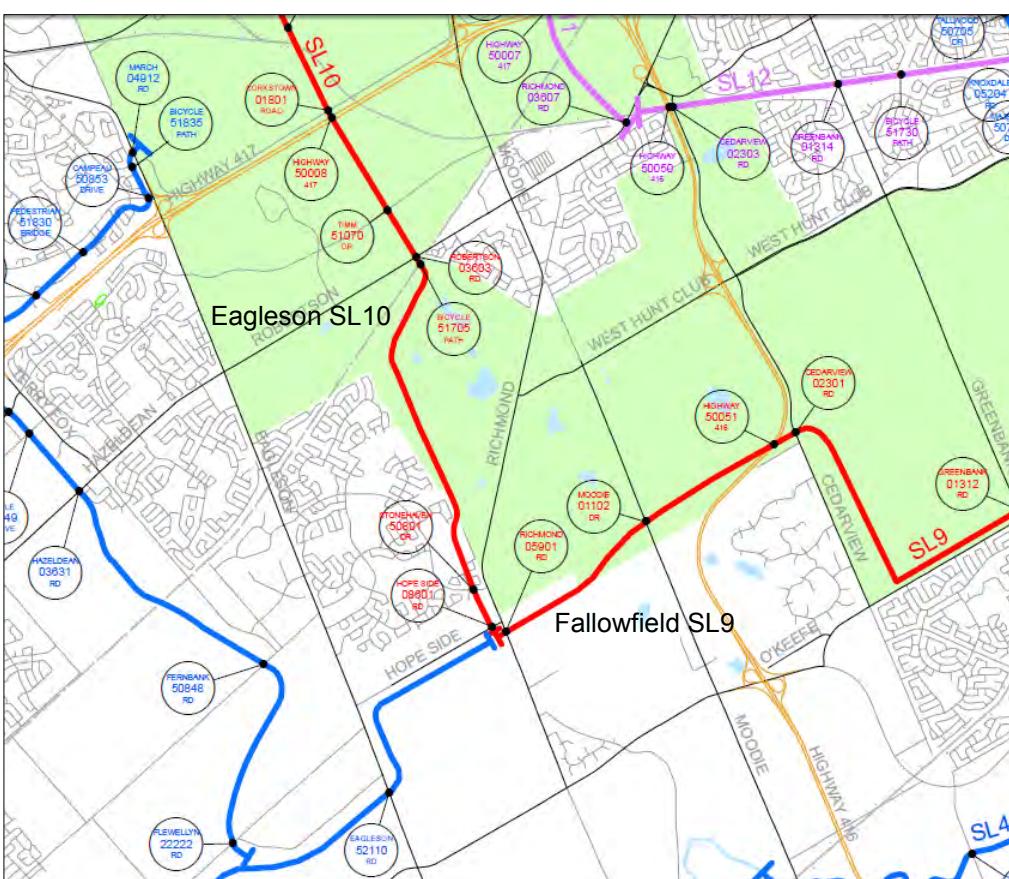
The TRANS model has a traffic zone system to help monitor growth trends. These zones are aggregated into districts to facilitate analysis of larger areas. **Figure 2** illustrates the traffic districts in a portion of Ottawa.

**Figure 2. Study Area Traffic Districts**



As part of the TRANS model, "screenlines" were established throughout the city to measure traffic volumes and other traffic patterns. A screenline is an imaginary boundary across which travel demand and supply issues may be evaluated. Often, physical barriers (rail lines/rivers/greenbelt) are used as screenlines as they tend to limit the number of crossings and also reduce any tendency of drivers to make multiple crossings during peak traffic periods. This minimizes the potential for over or under-estimation during the needs assessment. **Figure 3** illustrates the TRANS screenlines in the study area. SL 10 is the "Eagleson" screenline located in the Greenbelt between Kanata and Bells Corners. SL 9 is the "Fallowfield" screenline located in the Greenbelt north of Barrhaven.

**Figure 3. TRANS Screenline Map in Study Area**



The transportation conditions in the study area were evaluated using a project-specific screenline, comprised of four stations on TRANS Screenline 10 Eagleson Road (Timm Road, Robertson Road, Stonehaven Drive and Hope Side Road) plus the Old Richmond Road station immediately south of Hope Side Road on the Fallowfield Road screenline (Screenline 9). In addition, a station on Fallowfield Road itself between Eagleson Road and Old Richmond Road was added. This provides a reasonable group of roads serving traffic from Kanata-Stittsville and relevant areas in the rural southwest of Ottawa.

The objective for the transit mode share in the City of Ottawa's 2013 TMP is 26% (i.e. 26% of trips from all areas of the city made using transit in the AM peak period). Based on 2011 data, the current transit mode split is 22% for the city as a whole. More specific to the study area, the transit mode share in the 2013 TMP update (Exhibit 2.13) for Kanata-Stittsville is given as 15% actual for 2011 and 21% target for the 2031 AM peak period.

The objective for walking and cycling mode share in the 2013 TMP for internal trips in Kanata-Stittsville is 27% for 2031.

### 3.4 Traffic Operations Analysis (Existing, Future)

The planning horizon for the TRANS model is 2031. To assess need across the screenline, the study examines traffic volumes and capacities for existing and future (2031) conditions. The existing conditions and conditions in 2031 without any widening were taken from the 2008 TMP.

**Figure 4** indicates an overall project screenline volume/capacity ratio of 0.67 in 2013 and 1.08 in 2031 (total all six routes). In 2013 there is reserve capacity at all screenline stations except Stonehaven Drive and Fallowfield Road. **Table 17** provides the data illustrated in Figure 4. In 2031, roads crossing the Greenbelt between Highway 417 and Highway 416 are congested with a v/c ratio that exceeds capacity. The numbers generated for 2031 were based on the "do nothing" case with no widening of Hope Side/ Old Richmond/ West Hunt Club Road.

**Table 17. Project Screenline 2013 AM Peak Volumes and Capacities**

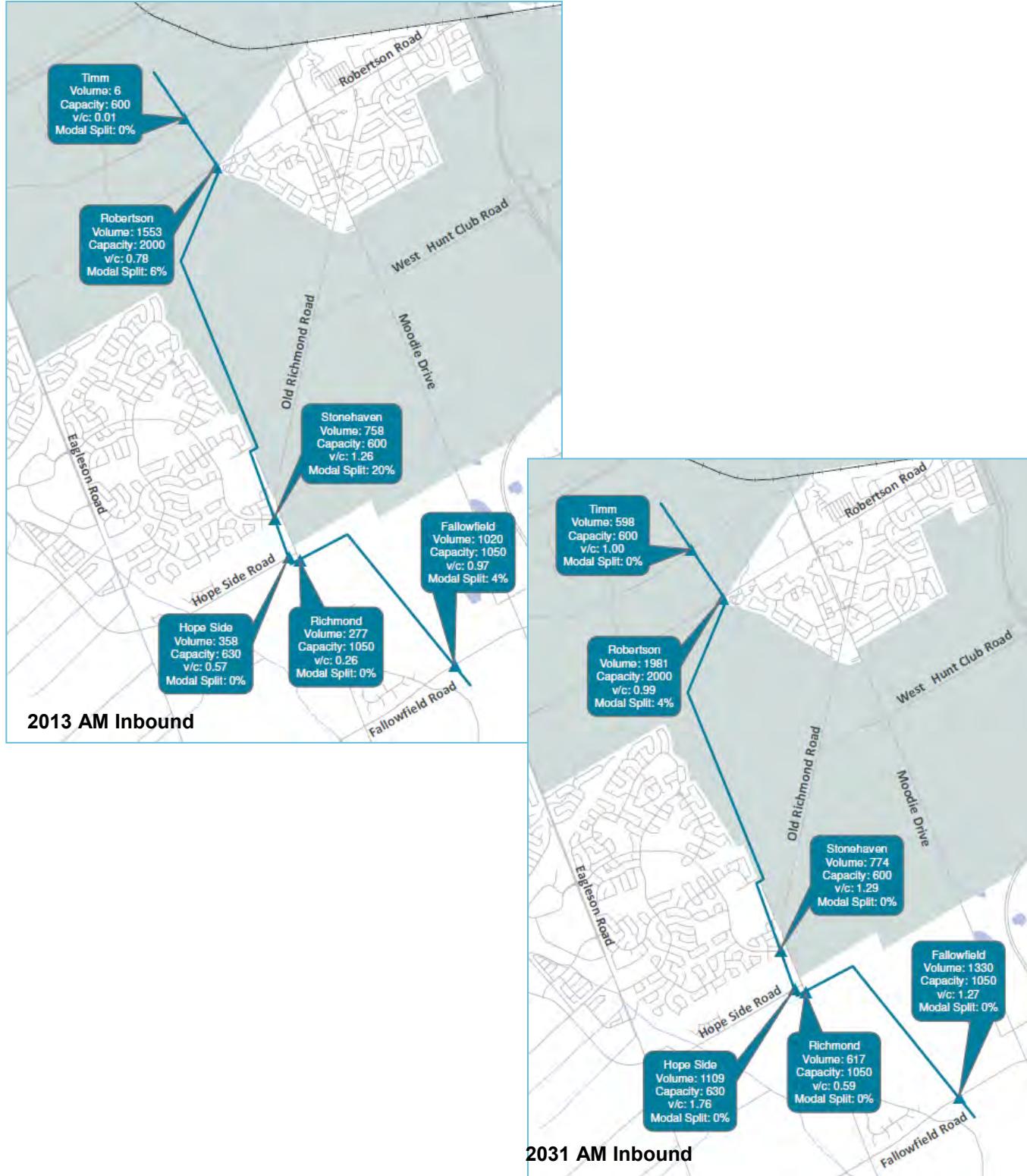
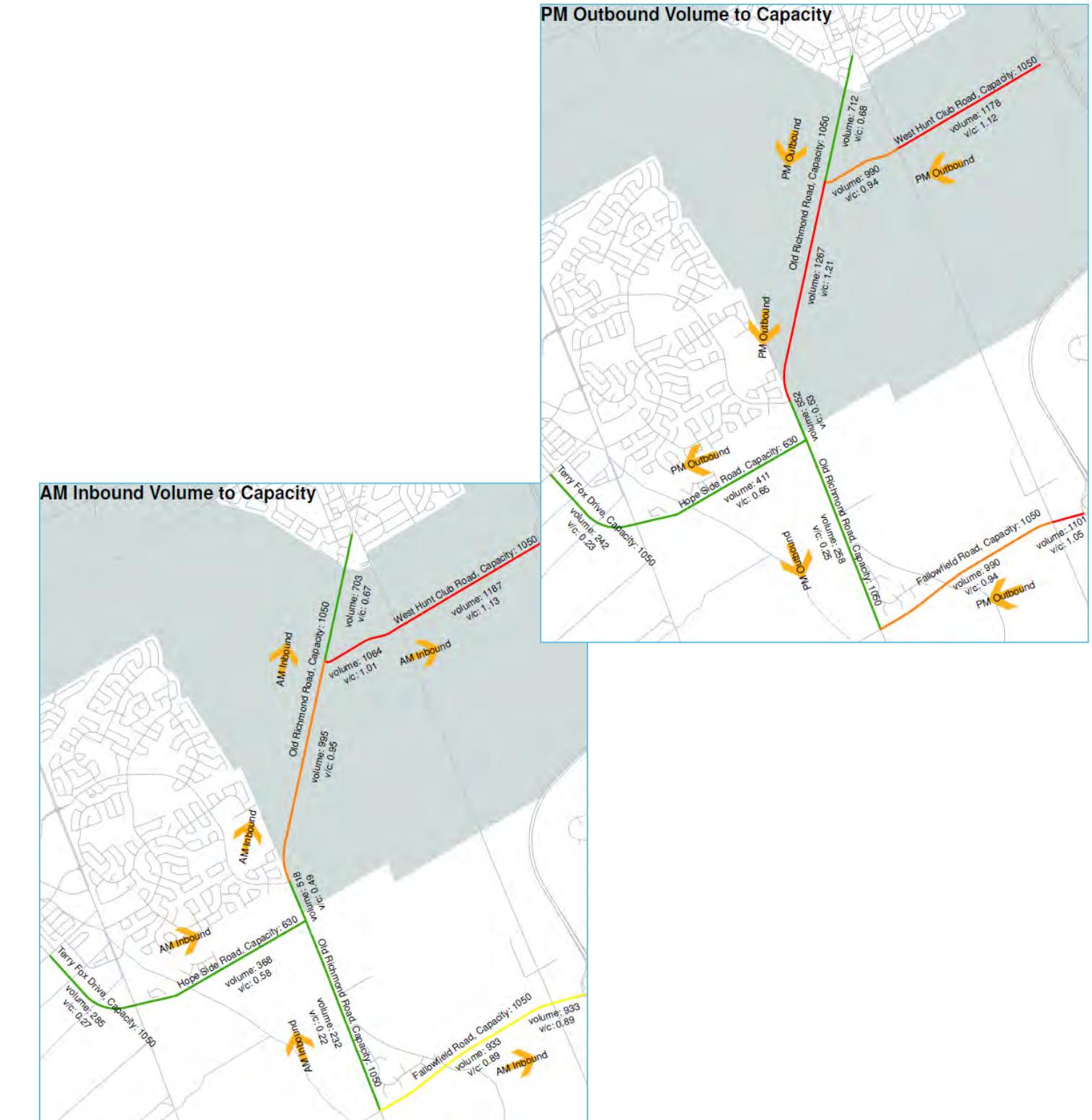
SL Station	2013 – Existing Conditions			2031 – Do Nothing		
	Capacity (vph)	Volume (vph)	V/C	Capacity	Volume	V/C
Robertson	2000	1553	0.78	2000	1981	0.99
Hope Side	630	358	0.57	630	1109	<b>1.76</b>
Stonehaven	600	758	<b>1.26</b>	600	774	<b>1.29</b>
Timm	600	6	0.01	600	598	<b>1.00</b>
Richmond	1050	277	0.26	1050	617	0.59
Fallowfield	1050	1020	0.97	1050	1330	<b>1.27</b>
<b>Summary</b>	<b>5930</b>	<b>3972</b>	<b>0.67</b>	<b>5930</b>	<b>6409</b>	<b>1.08</b>

Project need was also assessed by examining the level of service for road segments in 2013 based on observed traffic volumes. The results are provided in **Figure 5** and **Table 18**. In 2013, West Hunt Club Road is operating over capacity in both the AM and PM peak hours. Old Richmond Road and Fallowfield Road are operating over capacity in the PM peak. This emphasizes existing traffic operational issues along the corridor.

**Table 18. 2013 Link Traffic Volumes and Capacities**

Link	From	To	Volumes		Capacity	Volume to Capacity	
			AM	PM		AM	PM
West Hunt Club	Hwy 416	Moodie	1187	1178	1050	<b>1.13</b>	<b>1.12</b>
	Moodie	Old Richmond	1064	990	1050	<b>1.01</b>	0.94
Old Richmond	West Hunt Club	Stone Haven	995	1267	1050	0.95	<b>1.21</b>
	Stone Haven	Hope Side	518	552	1050	0.49	0.53
	Hope Side	Fallowfield	232	258	1050	0.22	0.25
Hope Side	Old Richmond	Eagleson	368	411	630	0.58	0.65
Terry Fox	Eagleson	Fernbank	285	242	1050	0.27	0.23
	Old Richmond	Moodie	933	990	1050	0.89	0.94
Fallowfield	Moodie	Hwy 416	933	1101	1050	0.89	<b>1.05</b>

Notes: AM link volumes are for the Inbound direction towards downtown Ottawa. PM link volumes are for the Outbound direction.

**Figure 4. Project Screenline Results for 2013 and 2031**

**Figure 5. Level of Service on Various Road Segments in 2013**


Within the study area, the TRANS model for the 2013 TMP is assumed to have incorporated the following road improvements, for the affordable network:

- Eagleson Road widening from two to four lanes between Cadence Gate and Hope Side Road;
- Kanata West new four-lanenorth-south arterial between Hazeldean Road and Fernbank Road;
- Old Richmond Road widening from two to four lanes between Hope Side Road and West Hunt Club Road;
- West Hunt Club Road widening from two to four lanes between Old Richmond Road and Highway 416, and
- Hope Side Road widening from two to four lanes between Eagleson Road and Old Richmond Road

These roadworks were included in both the 2013 TMP affordable road network and in the 2008 TMP. Road network improvements that were included in the 2008 TMP but not included in the affordable network of the 2013 TMP are the widening of Terry Fox Drive northwest of Hope Side Road and the widening of West Hunt Club Road to 6 lanes east of Highway 416. These similarities and differences influence how the TRANS model distributes traffic volumes to the road network.

**Table 19** compares the inbound (eastbound) traffic volume results for the project screenline from the 2008 TMP and from the 2013 TMP update. As noted, the road network is different in these model results.

**Table 19. Comparison of Project Screenline Traffic Volumes 2008 TMP to 2013 TMP**

	2008 TMP Forecasts with 2031 Network AM peak hour	2013 TMP Forecasts 2031 Affordable Network AM peak hour	Capacities with Widening
<b>Robertson Road (4 lanes)</b>	1734	1803	2000
<b>Hope Side Road (4 lanes)</b>	1380	1304	2000
<b>Stonehaven Drive (2 lanes)</b>	771	841	600
<b>Timm Drive (2 lanes)</b>	514	523	600
<b>Old Richmond Road (2 lanes)</b>	809	373	1050
<b>Fallowfield Road (2 lanes)</b>	1330	1127	1050
<b>Total Screenline</b>	<b>6538</b>	<b>5876</b>	<b>7300</b>

The primary change between the 2008 and 2013 results is the reduction in the volume of vehicles northbound on Old Richmond Road at Hope Side Road. The volume of vehicles in the AM peak hour decreased from 809 vehicles per hour to 373 vehicles per hour. The reduction in available capacity downstream of this corridor along West Hunt Club Road (due to the deferral of the widening of West Hunt Club east of Highway 416) is a contributing factor.

Both the 2008 TMP and the 2013 TMP results indicate that widening of the corridor will improve the operations across the screenline to an acceptable LOS D (v/c between 0.80 and 0.89). Without widening the LOS across the screenline will be approaching or over the 5930 vehicles per hour capacity.

### 3.5 Project Need Conclusions

The LOS calculated using existing (2013) traffic volumes is poor in the study corridor. Traffic conditions in 2031 also necessitate the provision of additional road capacity to meet LOS objectives set by the City of Ottawa during peak periods even with the achievement of the transit, walking and cycling targets established in the 2013 TMP.

There is an opportunity to improve safety during this project by designing measures to help the driver better navigate the roadway, improving the design of the roadside and the condition of the pavement.

## 4. Existing Conditions

As part of the foundation or baseline for this Municipal Class EA study, existing conditions in the study area were investigated. This included review of the transportation, socio-economic, natural, cultural and physical environments. The existing conditions data was collected and analyzed to:

- Understand existing conditions;
- Identify constraints to the development of alternatives;
- Develop better predictions of how the alternatives may affect environmental conditions;
- Consider appropriate mitigation measures to address adverse effects;
- Design monitoring programs for environmental commitments.

The following sub-sections describe the existing transportation, social, natural, economic, cultural and physical environments within the study corridors. The findings and highlights of the key features of the environment and the constraints affecting the assessment and evaluation of alternatives are summarized.

Once contact was made with regulatory agencies, the City, Enbridge and others, and data was collected, the team discussed requirements with relevant agencies, meeting with them where appropriate. Field verification where required was completed in the spring of 2013. The extensive material collected for the Enbridge Ottawa Reinforcement Pipeline project was helpful in the assessment of alternatives before field work was feasible.

Specialists in the Study Team and others provided advice on the use of the existing conditions information for the determination of criteria for the evaluation. Specific information on the investigations undertaken are provided in the respective sections.

### 4.1 Transportation

#### 4.1.1 Transportation Policies

The OP of the City of Ottawa identifies Old Richmond Road, West Hunt Club Road, Cedarview Road, Moodie Drive (between Old Richmond Road and West Hunt Club Road) and Hope Side Road as 'Existing Arterials'. City policy requires sidewalks on both sides of arterial roads in urban areas and a sidewalk or multi-use pathway on at least one side of arterial roads through the Greenbelt.

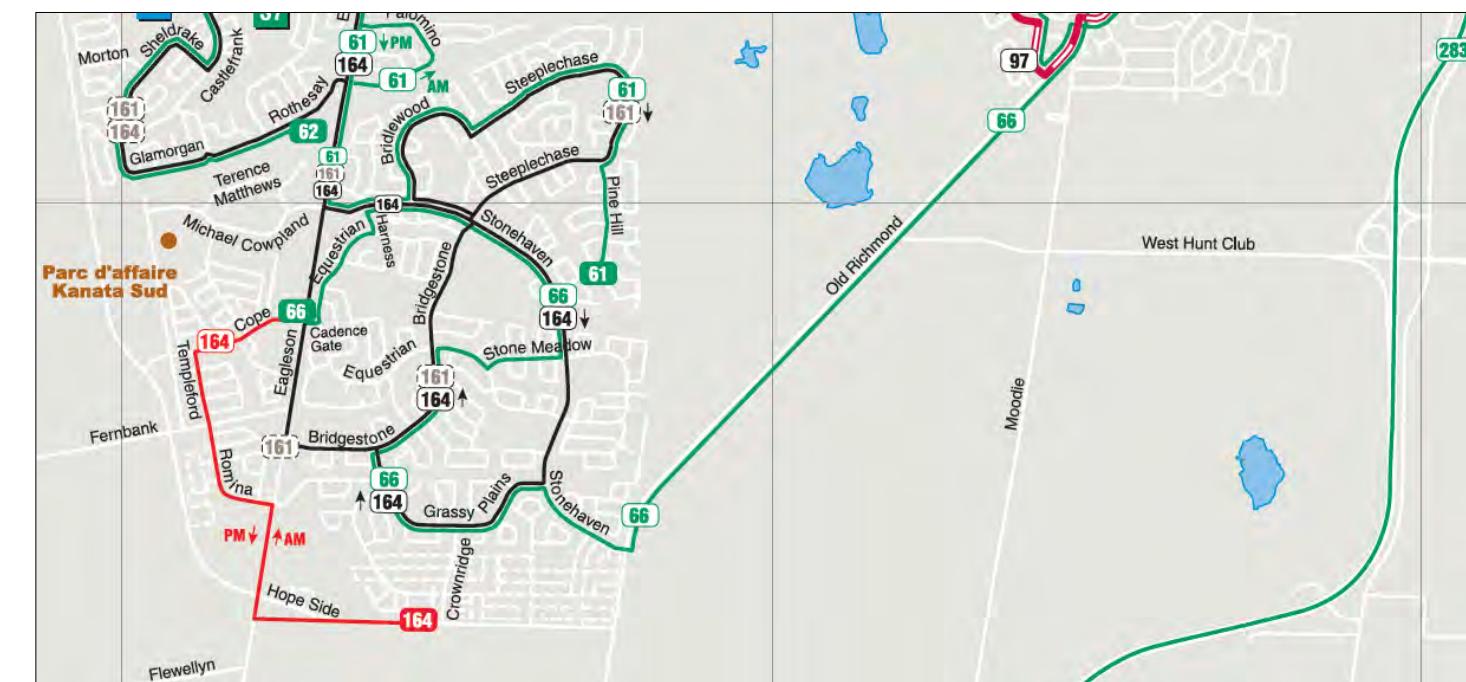
With respect to protecting land for road widening, 44.5 m of right-of-way (ROW) must be protected along Hope Side Road, between Eagleson Road and Old Richmond Road, with a further 5 m potentially required from the south side [OP Annex 1 – Table 1]. A width for ROW protection is not established through the Greenbelt.

West Hunt Club, Highway 416 and a portion of Old Richmond Road are identified as 'Scenic-Entry Routes', while 'Major Recreational Pathways' pass through the study area [OP Schedules I & J – Major Recreational Pathways and Scenic-Entry Routes]. Policies establish that signage and development along Scenic-Entry Routes should create a favourable first impression of Ottawa [OP Section 4.6.4], while the continuity of Major Recreational Pathways should be maintained and new connections provided where there are opportunities [OP Section 4.6.5].

#### 4.1.2 Transit Service

##### 4.1.2.1 Current Transit Service

The excerpt below from the Transit System map (OC Transpo, February 2013) illustrates a peak route (in red) along Hope Side Road west of Crownridge Drive and an express route (in green) along Old Richmond Road north of Stonehaven Drive. The express service does not include bus stops along Old Richmond Road.



##### 4.1.2.2 Current Plans for Transit

OC Transpo monitors development and updates transit routes and service to serve communities and encourage ridership where feasible. The TMP defines longer term plans for transit.

The affordable transit map for 2031 presented in the 2013 TMP update indicates transit priority measures along Hazeldean Road and Robertson Road from Stittsville to Bells Corners. Improvements are also included to the West Transitway from Bayshore to west of Moodie Drive and a new bus rapid transit corridor is shown on March Road from Highway 417 to Carling Avenue. While these measures are not physically within the study area, they help achieve the transit share targets that have been assumed for Kanata-Stittsville.

The future transit map presented in the 2013 TMP update expands on the affordable network, extending the West Transitway from Eagleson Road at Highway 417 to Fernbank Road through the Fernbank Community. In addition, transit priority measures are shown along Fernbank Road and Stittsville Main Street.

## 4.1.3 Road, Pedestrian and Cycling Network

### 4.1.3.1 Roadways

Roadways are classified into four categories in the City of Ottawa: City Freeways, Arterials, Collectors and Local Roads. Each type of road serves a different purpose with respect to mobility and accessibility. City of Ottawa definitions for each road type is provided below:

#### City Freeway

A City freeway "...describes a limited access highway with high-speed traffic that serves the need for intra-city travel similar to the provincial limited access highways." (City of Ottawa Official Plan, 2007)

#### Arterial Roads

Arterial Roads "... are the major roads of the City that carry large volumes of traffic over the longest distances. The majority of these roadways were formerly identified as regional roads. To best provide access to arterials, block lengths and intersections should be spaced and designed to accommodate all transportation modes; vehicular access to adjacent properties should be controlled to minimize turning movements and to reduce conflicts between travel modes; and arterials road corridors should provide a high degree of connectivity between land uses and places along and across the route." (City of Ottawa Official Plan, 2007)

#### Major Collector and Collector Roads

The City of Ottawa defines collectors as roads that "... connect communities and distribute traffic between the arterial system and the local road system. These roads tend to be shorter and carry lower volumes of traffic than do the arterials. Direct access to collector roads from adjacent properties will be permitted where such access will not introduce traffic safety or capacity concerns. The design and construction of collector roads will accommodate the safe and efficient operation of transit services. In general, a major collector is a roadway that acts as a connection between an arterial road and collector roads." (City of Ottawa Official Plan, 2007)

#### Local Roads

Local roads generally serve residential areas "... and distribute traffic from arterial and collector streets to individual properties, typically over short distances. Local roads, to varying degrees, also serve a collector road function by distributing traffic between collector streets and other local streets." (City of Ottawa Official Plan, 2007)

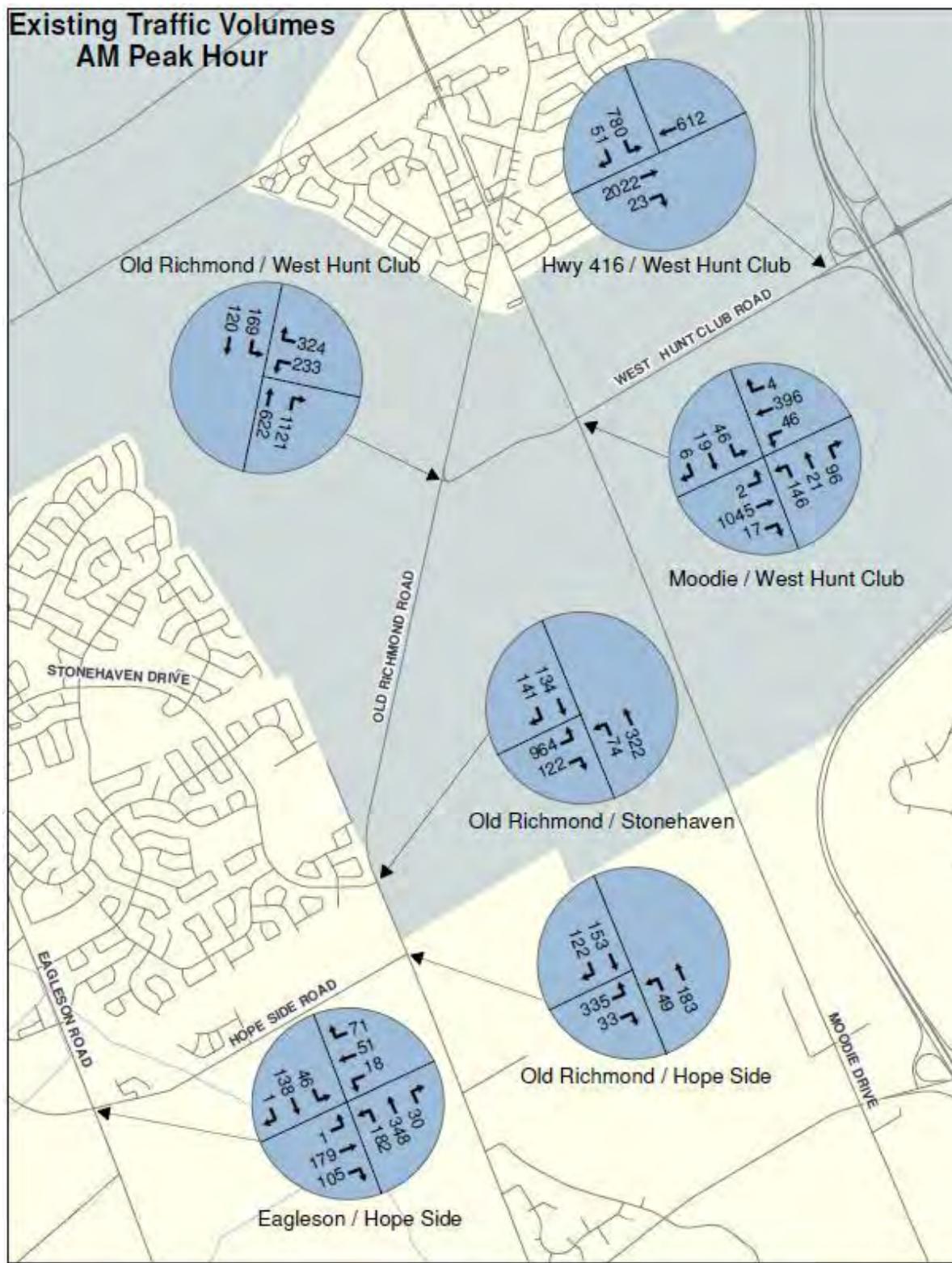
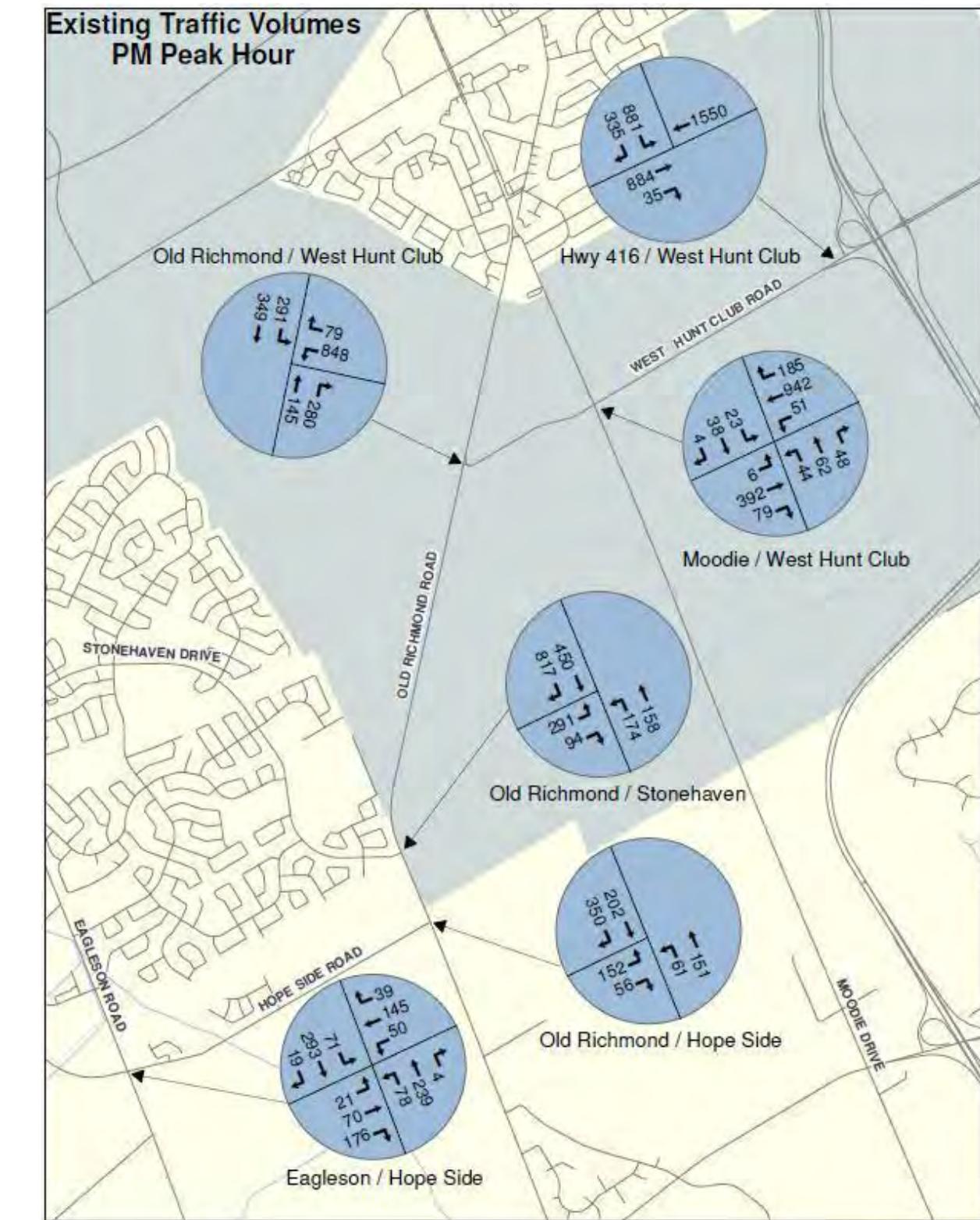
The main road system serving the study area is comprised of Highway 416, West Hunt Club Road, Moodie Drive, Richmond Road, Stonehaven Drive and Hope Side Road.

- **Highway 416** is a four-lane limited access highway with a posted speed limit of 100 km/h that runs north-south connecting Highway 417 in Ottawa to Highway 401 near Prescott. There is an interchange access to the highway at West Hunt Club Road.
- **West Hunt Club Road** is a 2-lane, east-west arterial road through the study area and has a posted speed limit of 80 km/h. West of Highway 416, West Hunt Club Road widens to four lanes.
- **Moodie Drive** is a two-lane arterial road that runs north-south through the middle of the Stony Swamp Conservation Area with a posted speed limit of 80 km/h. North of West Hunt Club Road Moodie Drive is a collector road and the speed limit reduces.

- **Old Richmond Road** is a two-lane arterial road that runs north-east, north of Stonehaven Drive, and then north-south south of Hope Side Road. It serves as a major connection between Kanata South and other areas to the south and Bells Corners. The speed limit is 80 km/h.
- **Stonehaven Drive** is a two-lane collector road that connects Eagleson Road to Old Richmond Road winding through the residential areas of Bridlewood / Emerald Meadows.
- **Hope Side Road** is an east-west arterial road that connects Terry Fox Drive and Eagleson Road to Old Richmond Road.

### 4.1.3.2 Traffic Volumes

Available turning movement counts and link counts from the City of Ottawa were used to develop balanced traffic counts along the study corridor, as illustrated in **Figure 6** and **Figure 7** for the AM and PM peak hours, respectively.

**Figure 6. Existing Traffic Volumes - AM Peak Hour****Figure 7. Existing Traffic Volumes - PM Peak Hour**

#### 4.1.3.3 Cycling and Pedestrian Networks

The Hope Side Road-Old Richmond corridor is generally rural with limited existing facilities for pedestrians and cyclists adjacent to the road. The existing conditions are:

- Terry Fox Drive:** A sidewalk on the south/west side of the road is separate from vehicular traffic by a grass boulevard. Eastbound cyclists share the travel lane with the vehicles. In the westbound direction there is a paved shoulder that is available for cyclists.
- Hope Side Road:** There is a section of curb, designated cycle lane and pedestrian pathway located on the south side of the road in the vicinity of the bus stop at Freeport Drive. Otherwise there are no sidewalks. Both eastbound and westbound cyclists have the use of narrow paved shoulders.
- Old Richmond Road:** Pedestrians throughout the corridor share the shoulder with cyclists. Within the Greenbelt, there are several recreational trails that can be accessed from Old Richmond Road.
- West Hunt Club Road:** Pedestrians throughout the corridor share the shoulder with cyclists. Within the Greenbelt, there are several recreational trails that can be accessed from West Hunt Club road. Pathways continue north to Bells Corners and the broader Greenbelt complex.

The Ottawa Pedestrian Plan and Ottawa Cycling Plan have been written to help guide and prioritize infrastructure projects to encourage walking and cycling.

The City of Ottawa Pedestrian Plan (2013) emphasizes the need to accommodate and encourage walking as a viable mode of transportation, although it does not identify any particular network changes in the study corridor. The 2013 TMP update recommends implementation of the Ottawa Pedestrian Plan and expansion of the pedestrian network, in particular to support transit and to link neighbourhoods.

Hope Side Road, Old Richmond Road and West Hunt Club Road are identified in the 2013 Cycling Plan as City-wide cycling routes along with Terry Fox Drive and Eagleson Road. Paved shoulders were recommended to support cycling on these routes. Portions of West Hunt Club and Old Richmond Roads are also included in the planned cycling route through the Greenbelt on NCC pathways. An off-road cycling pathway along Monahan Drain is also planned.

Pedestrians and cyclists are also recognized in the 2013 TMP through its discussions on complete streets, context sensitive design and safety.

#### 4.1.4 Structures

**Table 20** lists the structures/culverts within the study area in the City inventory database. There are seven culverts and one bridge (Monahan Drain under Hope Side Road) in the inventory. The conditions noted in the database were assessed during the City's periodic inspection process.

**Table 20. Structures in the Hope Side Road, Old Richmond-West Hunt Club Corridor**

Name [Structure Number]	Location	Condition	Year Built	Type	Span (m)	Length (m)
Hope Side Rd over Monahan Drain [113090]	0.60 km E of Eagleson Rd, RF Con 6 Lot 25/26	Good	1975	Conc.Reinf.Frame Bridge	5.6	26.1
Hope Side Rd Culvert [A112350]	0.01 km W of Old Richmond Rd	Poor	2002	CSP [Riveted]	0.750	21.4
Old Richmond Rd Culvert [A111520]	0.22 km N of Hope Side Road	Good	1985	CSP [Riveted]	0.915	19.5

Name [Structure Number]	Location	Condition	Year Built	Type	Span (m)	Length (m)
Old Richmond Rd Culvert [A111530]	1.26 km N of Hope Side Road	Poor	1970	CSP [Riveted]	0.750	19
Old Richmond Rd Culvert [A111550]	1.48 km N of Hope Side Road	Fair	1970	CSP [Riveted]	0.750	21
Old Richmond Rd Culvert [A111570]	0.18 km N of West Hunt Club Road	Poor	1985	CSP [Riveted]	0.600	17.7
West Hunt Club Rd Culvert [118940]	1.10 km E of Richmond Road RF Con 4 Lot 31	Good	2006	Polymer Coated CSP	1.0	22
West Hunt Club Rd Culvert [A112360]	0.01 km W of Moodie Drive	Very Good	1985	Conc. Pipe (round)	0.760	25.5

#### 4.1.5 Summary of Key Transportation Conclusions/Values

The Kanata-Stittsville area is presently served by transit including peak only, express service and regular routes. Routes are examined regularly to keep pace with development. The road network serving the communities in and beyond the study area includes provincial freeways as well as city arterial, collector and local roads. There is limited accommodation for cyclists and pedestrians along the largely rural road corridor under study.

Accommodation of all modes and users will be considered in the Municipal Class EA study. This includes the safety and operations of pedestrians, cyclists, transit, automobiles, trucks and emergency vehicles.

## 4.2 Socio-Economic Environment

As part of this study, FoTenn Consultants Inc. prepared a report titled *Kanata South Transportation Environmental Assessment Existing Conditions Report Land Use Planning*, which is provided in **Appendix C** of this report. The following section highlights key points from their report.

### 4.2.1 Planning Documents

#### 4.2.1.1 Plan for Canada's Capital (1999)

The Plan for Canada's Capital was prepared by the NCC (NCC, 1999). It represents the federal government's lead policy statement on the physical planning and development of the National Capital Region over a 50-year period. The Plan is of particular relevance since the majority of the study area is located within the NCC Greenbelt.

The Greenbelt is intended to provide a fitting and symbolic setting for the capital with rural-related visitor attractions, farm vacations, interpretation areas and an extensive network of recreational pathways.

The Plan identifies the majority of the study area as a 'Natural Heritage Area'. These areas are generally unbroken areas of vegetation, significant natural features, or key ecological locations. Small portions of the Greenbelt in the study area are identified as 'Rural Land', which support farms, forests, and recreational activity. The Plan identifies a 'Proposed Capital Pathway' running along the eastern boundary of the study area, which could form part of an integrated network of recreational pathways in the future. Highway 416 is identified as a 'Capital Arrival', which suggests high-quality signage and landscaping treatments for its role as a scenic entry.

#### 4.2.1.2 Horizon 2067: The 50-Year Plan for Canada's Capital

Horizon 2067 is an update to the Plan for Canada's Capital described above and is currently being prepared by the NCC. In 2011, the NCC launched a public consultation across Canada, to ask Canadians to share their ideas on the future of Canada's capital. The draft plan is scheduled to be released to the public in late 2013.

#### 4.2.1.3 2013 Greenbelt Master Plan

The NCC began a comprehensive review of its 1996 Master Plan in the Fall of 2008. Phase I of the Master Plan review focused on developing a comprehensive assessment, a vision statement and a land-use concept for the Greenbelt. Phase II included the development of policy statements and the update of the land use designations. The updated Greenbelt Master Plan will provide a vision for the Greenbelt to 2067 and will include a ten year implementation plan. It was being completed at the time of writing and has since been approved by the NCC Board.

The updated Greenbelt Master Plan is intended to contain five land use designations:

- Core Natural Area
- Natural Link
- Agriculture
- Federal Facility and Operations
- Non-Federal Facility and Operations

The Hope Side Road/Old Richmond Road Corridor EA study area includes lands shown as 'Core Natural Area', 'Agriculture', 'Addition 1996', 'Addition 2013' and 'Special Study Area'. The Core Natural Area lands are intended to include areas of ecologically sensitive habitats, such as provincially significant wetlands, habitat of threatened and endangered species, wildlife habitat and woodlands. Allowable uses within Core Natural Area lands include passive recreational uses and existing residences and facilities. Lands shown as 'Agriculture' represent areas of significant agricultural potential. Lands within this designation are generally characterized by class 2 to 4 soils.

Lands shown as Addition 1996 were added to the Greenbelt in 1996, however, have not been designated. The 'Addition 1996' and the 'Addition 2013' lands are owned by the Ministry of Transportation (MTO). It is anticipated that the City of Ottawa will update its OP to recognize the 2013 addition once these are approved by the NCC board.

The 'Special Study Area' within the study area currently accommodates active quarries. Once the quarries are decommissioned and the sites are restored, NCC intends to explore the potential of converting the lands into a Core Natural Area designation to provide for additional recreational opportunities or environmental lands within the Stony Swamp Conservation Area. This initiative will extend beyond the Greenbelt ten year implementation plan.

#### 4.2.1.4 Official Plan

At the time of writing this report, the City completed its review of the OP, which was approved by Council on November 20, 2013. All reference to the OP relates to the former 2009 OP as this work was carried out in early 2013 while the OP review was underway. The Official Plan provides the basis for planning activities in the City of Ottawa. A number of policies contained in the City's OP focus on roads and right of way protection. The policies that support the building and maintaining of roads and have a direct impact on this EA study are:

- The City will develop the road network to provide for the safe and convenient movement of people and goods.  
Section 2.3.1 - Policy 30.

- The City will ensure that road corridors function as public spaces in Ottawa by implementing the *Arterial Road Corridor Design Guidelines* for the City's urban arterial roads and Village main-streets. Application of the guidelines will result in street tree plantings, which helps to improve the natural environment. The City will prepare and implement similar guidelines for all other arterial and collector roads.
- Provincial highways are core elements of the City transportation system. In considering prospective changes to the provincial highway network, the City would likely favour actions to improve road safety and reduce emissions, but it is not likely to favour actions that have substantial neighbourhood impacts or increase congestion on parallel or intersecting streets [OMB decision #1582, June 17, 2005].
- Priority use of lanes on a road or planned new lanes may be given exclusively to certain classes of roadway users if it contributes to the implementation of transportation and land-use objectives of this plan.

In January 2013, the City released a report which provides the basis for the update to the City's OP. Entitled 'Building a Liveable Ottawa 2031 - Preliminary Policy Proposals', the document is centered around fourteen proposals, including affordability, infrastructure and urban design and compatibility.

The greater part of the study area is located within the City of Ottawa Greenbelt. The OP policies for the Greenbelt implement the provisions of the 1996 Greenbelt Master Plan. In particular, roads and other infrastructure must maintain the rural character of the Greenbelt and minimize fragmentation of farmland and natural areas. This may be achieved by using existing rights-of-way wherever possible.

The Rural Policy Plan, and the Urban Policy Plan are presented in **Figure 8 and 9**.

**Figure 8. Rural Policy Plan**

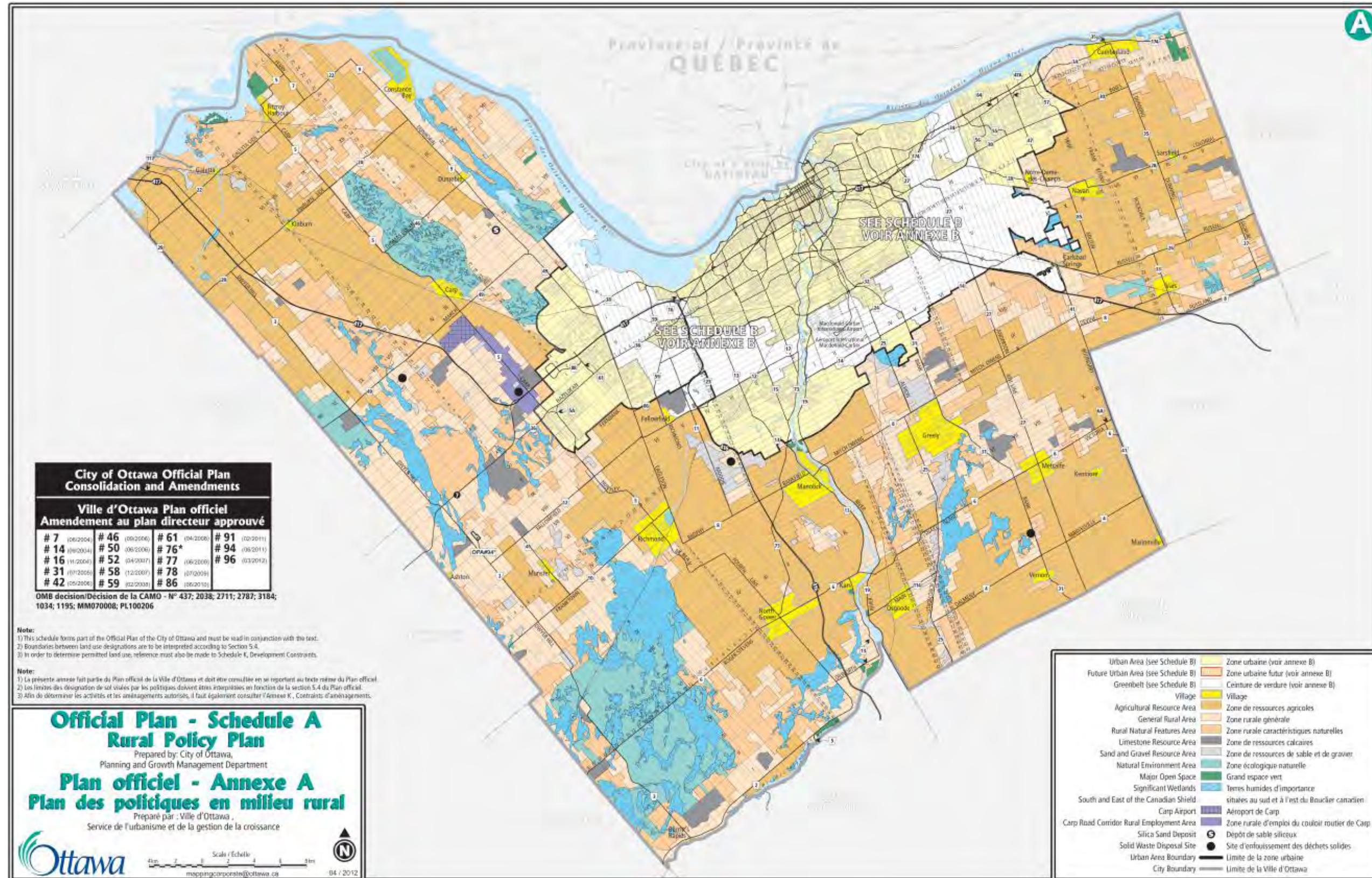
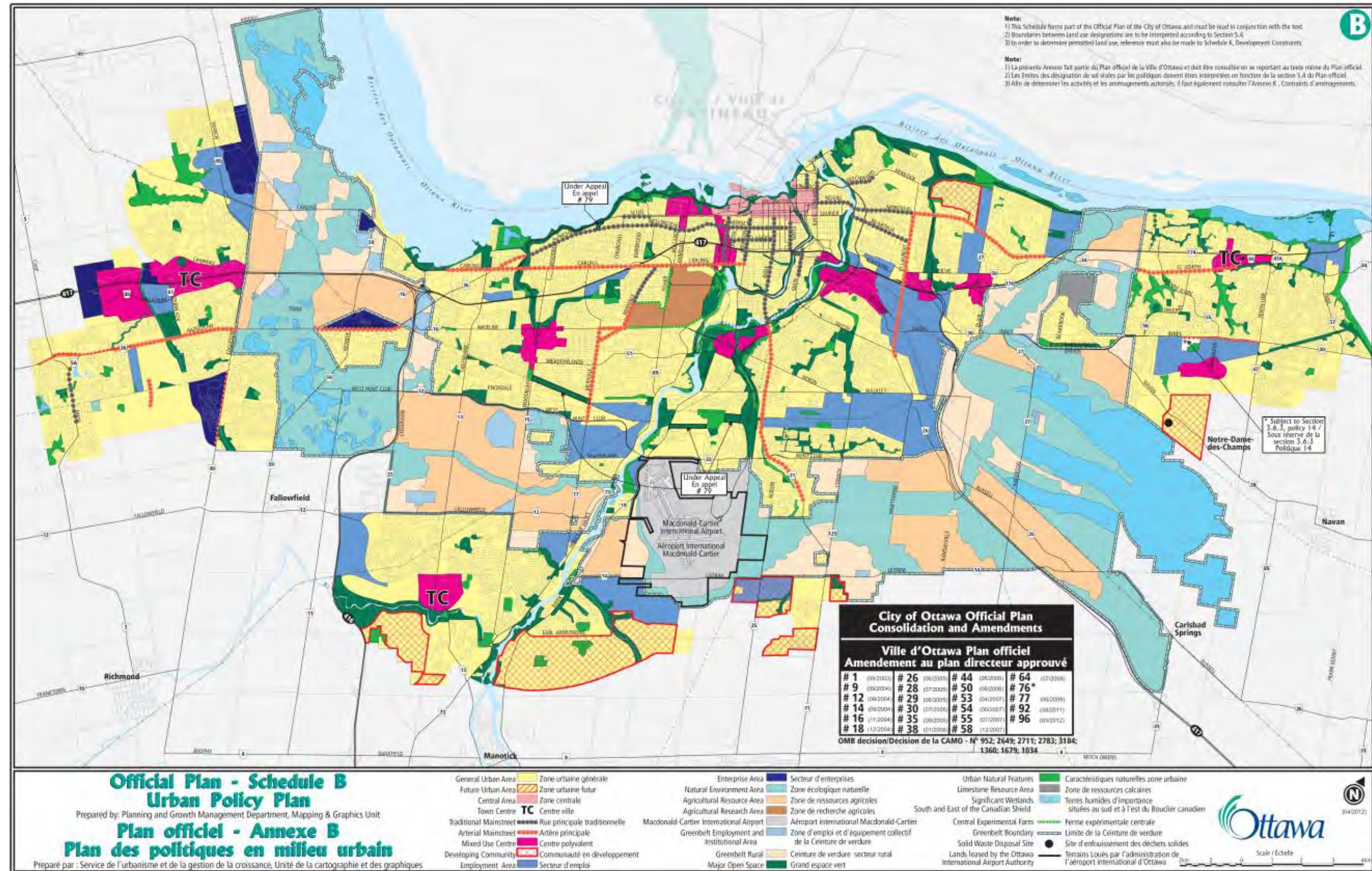


Figure 9. Urban Policy Plan



#### 4.2.1.5 Transportation Master Plan

The City of Ottawa's 2008 TMP was updated in 2013. A draft version was released in October and approved by Council in November 2013. The TMP recognizes the growth management goals outlined in the OP and strives to minimize pollution and levels of congestion that would result in unacceptable implications for Ottawa's quality of life and economy.

The 2013 TMP provides recommendations for future transit and road network modifications based on 2031 population and employment projections. These projections suggest that population and employment in Ottawa will grow by 23% and 24% respectively between 2011 and 2031. Most of the population growth is expected to occur in neighbourhoods outside the Greenbelt while most of the employment growth is expected to occur inside the Greenbelt.

The 2013 TMP key themes are:

- Affordability
- Safe and efficient transportation infrastructure
- Sustainable transportation
- Complete streets
- Active transportation
- Public transit
- Transit-oriented development

The 2013 transportation vision aims to reduce automobile dependence while meeting mobility needs and protecting public health, safety and the environment. It recognizes the need to encourage commuters to shift their travel times to less busy periods to minimize the need for new infrastructure. The TMP set targets for active and sustainable travel modes for the AM peak hour across the city, as illustrated in **Table 21**.

**Table 21. Sustainable Mode Share Targets - 2013 TMP Update**

Travel Mode	2011	2031
Cycling	2.7%	5%
Walking	9.5%	10%
Transit	22%	26%
Automobile passenger	10.7%	9%

Despite the shift towards increased use of transit and other modes, the overall number of trips taken by automobiles during peak hours will still grow, requiring additional road capacity to accommodate the increase in future travel demand. The 2013 TMP includes the widening of Old Richmond-West Hunt Club from Hope Side Road to Highway 416 to four lanes in Phase 1 (2014-2019) and the widening of Hope Side Road in Phase 3 (2026-2031) as part of its affordable road network.

Within the vicinity of the study area, there are a number of additional projects that are slated for implementation within the 2031 horizon that are likely to influence traffic volumes in the corridor. A summary of the relevant projects recommended in the affordable road network of the 2013 Transportation Master Plan is provided in **Table 22**:

**Table 22. Summary of Relevant Road Projects Identified in the 2013 TMP Update**

Phase 1 (2014-2019)	Old Richmond Road and West Hunt Club Road Kanata West North-South Arterial Palladium Drive Realignment	Widen from two to four lanes from Hope Side Road to Highway 416 New two-lane road from Fernbank Road to Livery Street Realign in vicinity of Huntmar Road to new north-south arterial
Phase 2(2020-2025)	Eagleson Road	Widen from two to four lanes from south of Cadence Gate and Hope Side Road
Phase 3 (2025-2031)	Hope Side Road	Widen from two to four lanes between Eagleson Road and Old Richmond Road

In addition to the road infrastructure noted above, transit infrastructure will play a key role in the movement of people in the Kanata-Stittsville area and beyond. According to the affordable network of improvements in the 2013 TMP update, extension of the Transitway from Bayshore Station to west of Moodie Drive is to be constructed along with the Kanata North Transitway from Highway 417 to Carling Avenue. In addition, transit priority measures are to be introduced on Eagleson Road, Hazeldean Road, March Road and Robertson Road as well as many other locations. With these improvements, the transit mode share for Kanata-Stittsville during the morning peak hour is expected to increase from 15% in 2011 to 21% in 2031.

#### 4.2.1.6 Regional Road Corridor Design Guidelines (2000)

The Regional Road Corridor Design Guidelines focus on the function and design of 'regional roads' of the former Regional Municipality of Ottawa-Carleton. Hope Side Road, Old Richmond Road, Moodie Drive and West Hunt Club Road, are identified as 'regional roads'. The document provides guidelines for five distinct components of each regional road:

- Adjacent lands
- Road edge
- Roadway
- Intersections, driveways and pedestrian crossings
- Linear services and road operation

Overall, the intent of the guidelines is to respect traditional design objectives for safety, efficiency, capacity, and maintenance, while integrating objectives relating to compatibility, livability, community building, urban design, cost and environmental impacts.

## 4.2.2 Land Use and Zoning

### 4.2.2.1 Zoning By-law

The City of Ottawa Zoning By-law 2008-250 was adopted by Council on June 25, 2008. The majority of the study area, corresponding to most of the lands within the Greenbelt, is zoned 'EP – Environmental Protection Zone'. The purpose of this zone is to recognize lands that contain important environmental resources which must be protected. Permitted uses are limited to environmental preserve and education area and forestry operation. Small portions of the study area located within the Greenbelt are zoned 'EP2 – Environmental Protection Zone, Subzone 2,' which permits additional uses such as agriculture or one detached dwelling.

A broad range of zones are associated with the remaining lands. Portions near the southern boundary are zoned 'RU – Rural Countryside Zone', permitting a range of rural-based land uses.

The lands used for the quarry operation are zoned for aggregate extraction ('ME – Mineral Extraction Zone' with a range of exceptions and holding provisions), while lands within or in proximity to the Cedarhill Golf and Country Club are zoned for residential and open space uses (RR – Rural Residential with a range of subzones and exceptions and 'O1A – Parks and Open Space Zone, Subzone A').

Lands in the Bridlewood community, within the study area, are zoned for future development, including residential and commercial uses.

#### 4.2.2.2 Developments

A portion of the lands in the study area have organic soils as shown on Schedule K of the OP and are identified with a 'Natural Heritage System Features Overlay' on OP Schedule L1. Development applications on lands shown with a Natural Heritage System Features Overlay are required to provide an Environmental Impact Statement which demonstrates that the proposal will have no negative impact on the environment as per Section 2.4.2 and Section 4.7.8 of the OP.

According to Volume 2C of the OP, expansion of Fallowfield Village beyond the existing boundaries is not anticipated, mainly due to surrounding land use constraints such as high quality agricultural land (to the west and south) and neighbouring quarry and groundwater recharge areas (to the east). The Village is expected to accommodate approximately 150 dwelling units. Any commercial development will be small in scale to serve local residents.

The area north of Hope Side Road between Eagleson Road and Old Richmond Road, known as Monahan Landing, has a draft approved plan of subdivision for 1400 units. This development will be completed in five phases with phases 1-3 registered at this time.

The Fernbank Community Design Plan (CDP), approved June 24, 2009, encompasses approximately 675 hectares located west of Terry Fox Drive between Fernbank Road and Hazeldean Road. The CDP provides a blueprint to help shape the Fernbank Community and includes a land use plan, a demonstration plan, a parks and recreation plan, an environmental management plan, a master servicing plan, a transportation and transit master plan and design guidelines. The Fernbank CDP area is expected to have a population of 27,800 to 30,800 residents (8,660 to 10,780 dwelling units) and 2,500 to 2,625 jobs. The residential uses will be complemented by commercial, institutional and recreational uses to create a 'live-work-play' community. Work is ongoing by the developers.

As part of the City of Ottawa 5-year Official Plan Review completed in 2009 and approved by the Ontario Municipal Board in 2012, a 67.1 hectare area was added south of the existing Stittsville urban boundary. A concept plan will be developed for the Stittsville Expansion Area. The Official Plan targets a minimum density of 34 units per net hectare in developing communities outside of the Greenbelt. With 57 net hectares of developable land in the expansion area, it is anticipated that the area could accommodate 1,900 to 2,000 dwelling units.

Other ongoing developments include Bridlewood Trails in the vicinity of Eagleson Road and Fernbank Road with 200-300 units registered in Fall 2013 and 310 Stonehaven Drive in Bridlewood where 225 units are registered and under construction.

#### 4.2.2.3 Existing Land Use

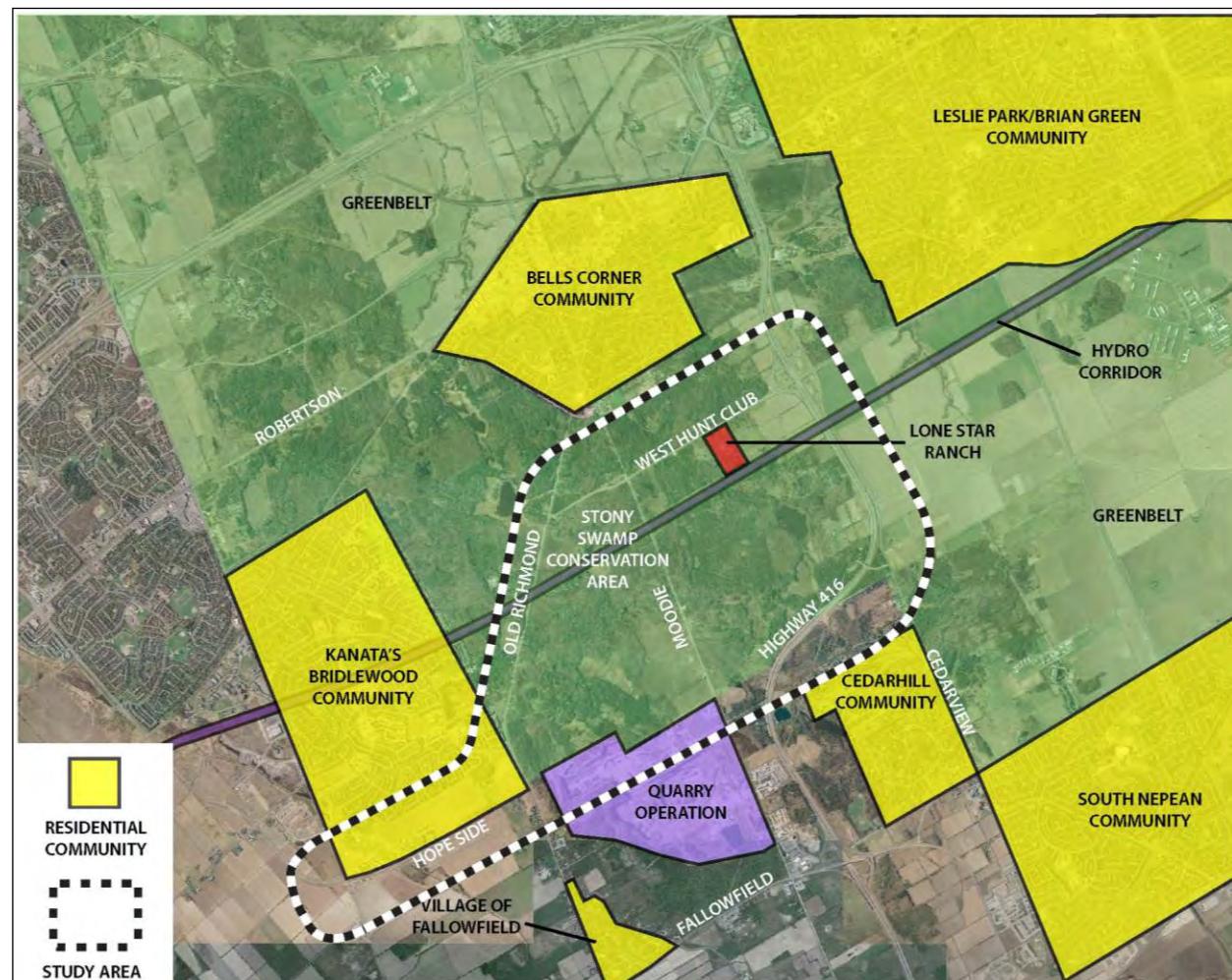
Land uses adjacent to the road corridor under study are a combination of Greenbelt lands, agricultural lands, open space and urban development. The majority of the study area is located within the National Capital Greenbelt, which is a well-recognized regional landmark consisting of approximately 20,000 hectares of green space. The Greenbelt, the majority of which is owned and managed by the NCC, is a mosaic of land uses and facilities.

For the most part the Greenbelt lands in the study area are within the Stony Swamp Conservation Area, which comprises almost 2,000 hectares of woodland, wetland and regenerating old field. These lands are the largest forested area of the Greenbelt and are accessible via several trails traversing through the study area. Limited agricultural uses are located in proximity to Highway 416 and Cedarview Road and extend east of the study area. Other significant uses within the Greenbelt portion of the study area include the Lone Star Ranch, a large scale banquet facility south of West Hunt Club Road, and a hydro corridor running parallel to West Hunt Club Road.

The Greenbelt extends north of the study area, leading to the Bells Corners community. Anchored by Robertson Road, Bell's Corners is located just beyond the study area's northern boundary. The second residential community adjacent to and within the study area is Bridlewood. Bridlewood is the only residential community that is partly within the study area boundary. Located west of the study area, it consists of primarily low to medium density residential uses complemented by schools and small-scale commercial uses. The western edge of the South Nepean community is located southeast of the study area.

A large quarry operation is located within and south of the study area, extending along Moodie Drive, while the Cedarhill Golf and Country Club and subdivision are located east of Highway 416 just south of the study area. Uses south of Hope Side Road, beyond the study area, consist mainly of agricultural uses. Moreover, several residential dwellings are located along Old Richmond Road, leading south to Fallowfield Village. **Figure 10** illustrates land use.



**Figure 10. Existing Land Use**

### 4.2.3 Noise

As part of this study, RWDI Air Inc. prepared a report titled *Kanata South from Terry Fox to West Hunt Club Road, Environmental Noise Assessment*, which is provided in **Appendix D** of this report. The following section highlights key points from their report.

The City of Ottawa's noise guidelines are more stringent than the MTO/Ministry of the Environment (MOE) protocol and encompass both City and provincial requirements. Points of reception for consideration of sound levels in environmental assessment are those locations identified to be noise sensitive, i.e. outdoor living areas associated with residential developments, seasonal residential developments, and hospitals, nursing/retirement homes, schools and daycare centres.

A summary of the surface transportation corridor sound level criteria used in the assessment, including mitigation requirements, are summarized in **Table 23**.

**Table 23. Surface Transportation Corridor Criteria**

Future "Build" Sound Level ( $L_{EQ,16hr}$ )	Change Above Background ( $L_{EQ,16hr}$ )	Impact Rating	Mitigation Requirements
Greater than 55 dBA and less than or equal to 60 dBA	0 to 3 dB	Insignificant	None
	3 to 5 dB	Noticeable	
	5 to 10 dB	Significant	
	10+ dB	Very Significant	
Greater than 60 dBA	0 to 3 dB	Insignificant	Investigate noise control measures (to achieve minimum 6 dB attenuation)
	3 to 5 dB	Noticeable	
	5 to 10 dB	Significant	
	10+ dB	Very Significant	

Reference: Table 2.1 of City of Ottawa Environmental Noise Control Guidelines

A total of twelve representative sensitive receptors were identified through the study area as illustrated in **Figure 11**.

Predicted Future "Build" sound levels at all of the sensitive receptors were predicted to be over 60 dBA, with a change between Future "No-Build" and Future "Build" of between 1 and 5 dB. Therefore, these receptors required investigation of the feasibility of mitigation measures. City of Ottawa guidelines require that the mitigation achieve at least a 6 dB reduction averaged over the first row of affected receivers. The preferred height of new sound barriers is 2.5 m.

The recommended sound barriers are included in the description of the project in Section 9 and impacts and proposed mitigation measures in Section 10 of this report.

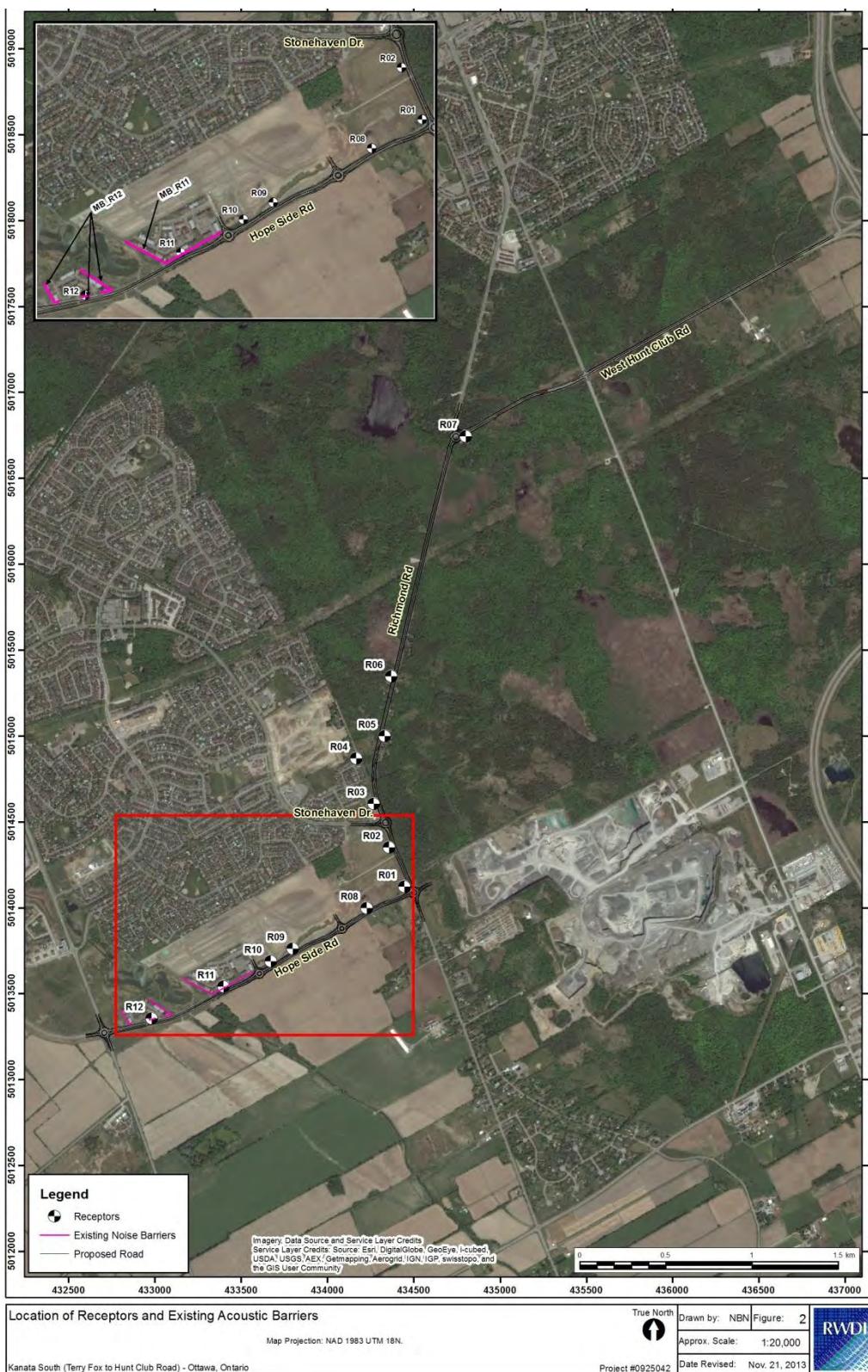
### 4.2.4 Air Quality

As part of this study, RWDI Air Inc. prepared a report titled *Kanata South Class EA from Terry Fox to West Hunt Club Road, Air Quality Assessment*, which is provided in **Appendix E** of this report. The following section highlights key points from their report.

The main objective of the assessment was to quantify how changes to the road network within the study area will affect local air quality in the future. The assessment used dispersion modelling techniques to predict local air quality conditions at sensitive receptor locations in the model area. The assessment was undertaken for the year 2031, to evaluate post-construction air quality conditions against acceptable criteria.

Future air quality in the study area will be affected by both increased traffic capacity along with regulated improvements in vehicle exhaust emissions and gradual change over of the fleet, as older vehicles are replaced by newer, lower-emission vehicles.

**Figure 11. Noise Sensitive Receptors for Modeling**



#### 4.2.5 Landscape, Views and Vistas

As part of this study, CSW prepared the report titled *Landscape Assessment and Evaluation* for the Kanata South Environmental Assessment, which included a description of existing conditions and is provided in **Appendix F** of this report. The following section highlights key points from their report.

The landscape adjacent to the road corridor reflects the combination of agricultural land use, open space Greenbelt lands and urban development. In general, the overall character of the existing road corridor is rural: one lane of traffic in either direction, with open ditches on either side. The study area has scenic views of Stony Swamp and the Richmond Plain.

Along **Hope Side Road** the terrain is generally flat with a gentle rise towards Old Richmond Road. Urban development is ongoing north of the Hope Side Road corridor, with two existing residential developments framing the Monahan Drain stormwater management facility. The stormwater facility has a blend of deciduous and coniferous plant material planted on low berms and landforms. A recreational path is provided around the ponds. South of Hope Side Road, the Monahan Drain is defined by a mature growth of primarily deciduous trees. The lands to the south are primarily in agricultural use. Throughout this section of the study area, mature trees intermittently define the edge of the corridor.

The distinguishing feature for this portion of the corridor is the contrast between the built environment to the north, with the open agricultural and woodlots to the south. At the west end of the roadway, there are shorter views of fencing/noise walls for the developments and longer views towards Monahan Drain. The size and orientation of Monahan Drain stormwater facility allows for long views to the north with a young, established natural aesthetic that contrasts and physically separates the residential development to the east and west. Future residential development in Monahan Landing will strengthen the urban edge of the viewshed, and increase the contrast between the urban and rural landscapes.

At the east end of Hope Side Road the rise in topography offers a significant vantage point with long views over the Richmond Plain west along the corridor. The views note the contrast between the urban development to the north and the pastoral agricultural lands to the south.

Along **Old Richmond Road** between Hope Side Road and Stonehaven Drive, the terrain is relatively flat, with development (now agricultural) land to the west, and the forested edge of Stony Swamp to the east. The commercial development in the northwest corner of the Stonehaven and Old Richmond Road intersection, delineates the entrance into Bridlewood. Continuing northerly, Old Richmond Road follows the undulating topography of the adjacent Greenbelt lands. The landscape character changes, with a blend of shrub/successionary growth interspersed with open meadows, and transitioning to forest surrounding wetland areas. Older rural homes occur within the Greenbelt. A major overhead power transmission line crosses Old Richmond Road approximately 500 metres south of West Hunt Club Road.

At the south end of Old Richmond Road, the views are of urban development to the west and the open meadows and woodlots of the Greenbelt to the east. Stonehaven Drive creates a strong visual node and focal point, with the increased lighting and activity associated with the commercial development. Through the Greenbelt, the viewshed is varied and diversified, including significant views into Stony Swamp. The single family homes contrast with the natural environment of the Greenbelt.

Along **West Hunt Club Road** in the study area, the terrain is relatively flat, with a slight rise east of Moodie Drive and at the structure carrying West Hunt Club Road over Highway 416. The gentle gradients integrate the road landform into the overall landscape. The landscape character varies between the north and the south sides of West Hunt Club Road, with more open meadows, shrubs and successionary growth occurring to the south, and more established forest to the north.

In the eastern portion of the study area, historic agricultural lands emerge on the south side of West Hunt Club Road, with hedgerows delineating the fields.

The views along the West Hunt Club Road corridor are defined by the Greenbelt. The woodlots commence at the ROW and define the character of the landscape. Closer to Old Richmond Road, the focus of the views is along the roadway corridor. There are a series of low lying lands with wetlands and a range of woodlots. The wetlands are smaller than those along Old Richmond Road, and contain more woody vegetation, creating an undulating edge to the viewshed. East of Moodie Drive, the large wetland in the vicinity of the Stillwater Creek tributary provides a panoramic view of the Greenbelt lands. The density of the woodlots on the south side of the corridor reduces towards the east, creating a more porous edge to the viewshed, with views of open meadows interspersed with trees. The views towards the agricultural fields to the south are filtered by the hedgerow framing the fields.

#### 4.2.6 Summary of Socio-Economic Conditions and Values

The study area is located within the NCC Greenbelt as well as along the boundary between the urban area in Kanata South and the rural area, resulting in a broad range of land uses. There are municipal and federal policy documents that guide and control development and infrastructure.

In this study, potential impacts on existing and planned (development) land uses will be considered. This will involve environmental protection areas, residential, industrial, agricultural and other business uses and will consider consistency with municipal and federal policies, property acquisition, noise and air quality issues, capital and property costs.

### 4.3 Natural Environment

EcoTec Environmental Consultants Inc. undertook an environmental assessment and prepared the report titled *Natural Resource Inventory and Assessment Report for the Kanata South Environmental Assessment*, which is provided in Appendix G of this report. The following section highlights key points from their report.

The Greenbelt in the study area is part of a Candidate Life Science Area of Natural and Scientific Interest (ANSI) (OMNR 2010).

#### 4.3.1 Aquatics and Aquatic Habitat

Fish surveys were conducted in November 2012 and April 2013 with additional field investigations in July 2013, where Monahan Drain crosses Hope Side Road and where the tributary to Stillwater Creek crosses West Hunt Club Road.

##### 4.3.1.1 Monahan Drain

Monahan Drain crosses Hope Side Road through a concrete box culvert at the west of the study area. Upstream of Hope Side Road, Monahan Drain flows through a stormwater management pond. Downstream (south), the watercourse joins the Jock River.

Flow was observed within Monahan Drain during the November 2012 and April and July 2013 field investigations. In the April 2013 field survey, the upstream reach was represented by approximately 70% riffle and 30% pool flowing over a mix of detritus, silt, sand, clay, and gravel. The upstream channel had a mean wetted width and depth of 8 m and 1 m, respectively and a bankful width and depth of 9 m and 5 m, respectively. The channel morphology downstream was

represented by approximately 95% riffle and 5% pool flowing over a mix of muck, detritus, sand, clay, gravel, cobble and boulders. The downstream channel had a mean wetted width and depth of 8 m and 1.2 m, respectively. During the April 2013 field survey, water quality parameters measured for Monahan Drain included a water temperature of 8.9°, pH of 7.76, and conductivity of 1460 µS/cm.

Reaches upstream and downstream of Hope Side Road were well-vegetated in-stream and within the riparian area. Reed canary grass and narrow-leaved cattail were dominant. In-stream fish habitat was provided by emergent and floating vegetation and shoreline vegetation, as well as undercut banks, boulders, cobble, woody and organic debris.

Fish captured within the study limits included white sucker, bluntnose minnow, carp, common shiner, creek chub, northern redbelly dace, brook stickleback, pumpkinseed, and Johnny darter.

##### 4.3.1.2 Stillwater Creek

A tributary of Stillwater Creek crosses West Hunt Club Road east of Moodie Drive. The tributary's headwaters flow northerly from Stony Swamp. Upstream of West Hunt Club Road there is no defined channel within the wetland area, which is dominated by willows and cattails. The downstream reach was defined and travelled through a similar wetland area, with reed canary grass, shrubs and trees. Fisheries surveys were not conducted within the tributary to Stillwater Creek in November due to freezing conditions. A fish survey was conducted during EcoTec's April 2013 investigations and no fish were captured.

#### 4.3.2 Wetlands

Several wetland communities were identified within the study area, including: cattail marsh, willow thicket, glossy buckhorn thicket, white cedar swamp and black ash swamp. The wetland location and boundaries were consistent with the Stony Swamp Provincially Significant Wetland Complex Mapping. Stony Swamp is composed of open ponds, flooded wetlands and creek valleys, as well as forest and thicket swamps.

##### 4.3.2.1 Cattail Shallow Marsh

Cattail shallow marsh communities were identified throughout the study area. Small pockets dominated by broad-leaved cattail were common bordering wooded areas along the roadside. Several cattail shallow marsh communities with organic soil were found to extend beyond the roadside, representing large wetland areas.

The cattail shallow marsh community west of Old Richmond Road and south of the hydro corridor was dominated by broad-leaved cattail, with scattered purple loosestrife and reed canary grass. A narrow band of thicket swamp dominated by glossy buckthorn bordered this wetland area. The cattail shallow marsh community located both east and west of Old Richmond Road, north of the hydro corridor, was also dominated by broad-leaved cattail with scattered purple loosestrife, maple, eastern white cedar, and dead standing trees.

The area north and south of West Hunt Club Road, immediately east of Moodie Drive was represented by a cattail shallow marsh adjacent to the roadside. Farther from the roadside, this wetland area south of West Hunt Club was represented by a thicket swamp with pockets of cattail shallow marsh.

#### 4.3.2.2 Thicket Swamp

Thicket swamp communities were identified within the study area along Old Richmond Road and West Hunt Club Road. Most thicket swamp communities within the study area were dominated by glossy buckthorn, while others were primarily willows. Thicket swamp communities dominated by glossy buckthorn included scattered black ash and willows in the canopy and sub-canopy, as well as cinnamon fern, and sensitive fern in the understory and ground layer.

Mapping provided by the NCC indicated an area of provincially significant wetland (PSW) located north and south of West Hunt Club Road, east of Moodie Drive. The wetland area south of the roadway was represented by a large thicket swamp dominated by slender willow and meadowsweet with pockets of cattail shallow marsh. North of the roadway, a small wetland area was represented by cattail shallow marsh and swamp thicket dominated by glossy buckthorn.

#### 4.3.2.3 White Cedar and Black Ash Swamp

White cedar swamp and a black ash swamp with organic soil were found to exist along Old Richmond Road. It should be noted that mapping provided by the NCC indicates the occurrence of a silver maple swamp at one location west of Old Richmond Road. Mapping provided by NCC illustrating the Stony Swamp Wetland Complex indicated that this area is not represented by PSW. Based on field investigations by EcoTec, this area is best described as a mixed forest. Dominant tree species noted within this community included some wetland species, such as red maple, white pine, and green ash. Glossy buckthorn was present in the sub-canopy, and dominant in the understory, and ground layer.

A white cedar swamp community with mineral soil was found to exist northeast of the intersection of Hope Side Road and Old Richmond Road. This area is illustrated as “plantation” on vegetation mapping provided by NCC; however, mapping provided by NCC illustrating the Stony Swamp Wetland Complex indicated that this area is represented by PSW. During EcoTec’s field investigations, this community was found to be represented almost entirely by white cedar in the canopy. Scattered balsam fir and black ash were also noted. The sub-canopy and understory were dominated by glossy buckthorn. Mosses, sedges, and poison ivy were evident in the ground layer. The edge of this community, located adjacent to the existing roadway, was composed of a mix of white cedar as well as ash, poplars, and glossy buckthorn.

A black ash swamp community with organic soil was identified west of Old Richmond Road, north of the hydro corridor. Mapping by the NCC identifies this area as flooded land and PSW. This community was separated from the roadway by a cattail shallow marsh. The canopy was dominated by black ash and Freeman’s maple. The sub-canopy was represented by glossy buckthorn, alder, as well as scattered white cedar and black ash. The understory and ground layer was represented by sensitive fern, cinnamon fern, with scattered jewelweed. Standing water was noted throughout this community during the July 2013 field investigations.

#### 4.3.3 Wildlife and Wildlife Habitat

Mammals identified during the field surveys included grey squirrel, red squirrel, coyote, and white-tailed deer. A snapping turtle and painted turtles were also observed. In addition, dead snapping turtles were observed on the road during the June 2013 field investigation.

The Ontario Breeding Bird Atlas (OBBA) provides data in areas defined by 10 kilometre squares. Square 18VR31 of the database includes the study area and indicates 62 confirmed bird species and 48 other species of migratory birds with a possible or probable likelihood of breeding within the area. The list of birds observed during the field surveys for this study is provided in **Table 24**. According to OBBA data, three bird species at risk have been historically documented within the area including barn swallow, bobolink, and eastern meadowlark. There is some potential for these and other bird species at risk to use habitat provided within the study area. One bird species at risk, the barn swallow, was

observed during field investigations. Area sensitive species listed in the Ministry of Natural Resources (MNR) Significant Wildlife Habitat Technical Guide are those requiring large areas of suitable habitat for long term population survival. Area sensitive bird species identified within the study area included northern harrier and black-and-white warbler.

**Table 24. Bird Species Observed within the Study Area during the 2013 Field Surveys**

Common Name	Scientific Name	Status
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	
Canada Goose	<i>Branta canadensis</i>	
Mallard	<i>Anas platyrhynchos</i>	
Northern Harrier	<i>Circus cyaneus</i>	AS
Wild Turkey	<i>Meleagris gallopavo</i>	
Killdeer	<i>Charadrius vociferus</i>	
Ring-billed Gull	<i>Larus delawarensis</i>	
Herring Gull	<i>Larus argentatus</i>	
Mourning Dove	<i>Zenaida macroura</i>	
Eastern Phoebe	<i>Sayornis phoebe</i>	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	
American Crow	<i>Corvus brachyrhynchos</i>	
Barn Swallow	<i>Hirundo rustica</i>	THREATENED
Black-capped chickadee	<i>Poecile atricapillus</i>	
American Robin	<i>Turdus migratorius</i>	
European Starling	<i>Sturnus vulgaris</i>	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	
Yellow Warbler	<i>Dendroica petechia</i>	
Black-and-white warbler	<i>Mniotilla varia</i>	AS
Common Yellowthroat	<i>Geothlypis trichas</i>	
Chipping Sparrow	<i>Spizella passerina</i>	
Field Sparrow	<i>Spizella pusilla</i>	
Song Sparrow	<i>Melospiza melodia</i>	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	
Common Grackle	<i>Quiscalus quiscula</i>	
Baltimore Oriole	<i>Icterus galbula</i>	
House Finch	<i>Haemorhous mexicanus</i>	
American Goldfinch	<i>Carduelis tristis</i>	

Notes: AS – Area sensitive species described in Significant Wildlife Habitat Technical Guide (OMNR 2000).

#### 4.3.4 Vegetation

Vegetation in the study area consists of Plantation, Deciduous Forest, Mixed Forest, and other (identified as areas near the utility corridor). The Stony Swamp Conservation Area has been recorded as having diverse vegetation with young early successional deciduous and mixed forests, and young to sub-mature deciduous forest of sugar maple and beech.

##### 4.3.4.1 Plantation

The NCC maps indicate that multiple areas within the study area are represented as plantation. Areas identified as plantation include: the northeast intersection of Hope Side Road and Old Richmond Road, an area northeast of the intersection of Old Richmond Road and West Hunt Club Road, and areas north and south of West Hunt Club Road between Moodie Drive and Highway 416.

Plantations in the study area were predominately white cedar, white spruce, and white pine. In addition, staghorn sumac, black cherry, poplars, and bur oak were noted along the edge of some plantation communities.

#### 4.3.4.2 Deciduous Forest

NCC maps indicate areas of deciduous forest east of Old Richmond Road and north and south of West Hunt Club Road. EcoTec noted that the deciduous forest east of Old Richmond Road was primarily poplar, ash, beech, and oak and that communities north and south of West Hunt Club Road were predominately composed of oak, white birch, poplar, as well as some coniferous species.

#### 4.3.4.3 Mixed Forest

Mixed forest communities exist east and west of Old Richmond Road, and species were reported to include poplar, beech, ash, white birch, oak, white spruce, white pine, and white cedar. Edges of the community were reported to also have staghorn sumac, buckthorn, poplars and white birch.

#### 4.3.4.4 Other

Approximately 700 m south of the intersection of Old Richmond Road and Hunt Club Road there is a utility corridor that has vegetation identified on NCC maps as "other". Along the corridor there are areas of cultural meadow that exist beyond the ROW. Areas adjacent to the roadway are predominately represented by cultural meadow communities; dominant species include birds-foot trefoil, wild carrot, purple loosestrife, and cow vetch. In addition, there were scattered tree and shrub species along fence lines adjacent to the roadside. Species included white elm, common buckthorn, and staghorn sumac. The white elm tree was located approximately 750 m north of Stonehaven Drive, west of Old Richmond Road.

#### 4.3.5 Species at Risk

The MNR's National Heritage Information Centre (NHIC) database includes records for least bittern, milksnake, and flooded jellyskin within the study area. Communication with MNR indicated a number of additional documented species at risk within the site, or in close proximity to it, including butternut, bobolink, whip-poor-will, black tern, eastern ribbonsnake, Blanding's turtle and snapping turtle. Communication with MNR also indicated that potential suitable habitat for eastern meadowlark, barn swallow, Henslow's sparrow, chimney swift, and short-eared owl exists within the study area.

During field surveys it was recorded that the farmland south of Hope Side Road was planted with corn and soybean, and the field along West Hunt Club Road was planted with corn. This large open agricultural area could potentially provide habitat for both bobolink and eastern meadowlark planted with hay; however, the crops present during the 2013 field surveys did not provide suitable habitat.

The main threat to the least bittern is the conversion of wetlands to farmland and urban development. Species-specific surveys for the least bittern were completed using Environment Canada's National Least Bittern Survey Protocol on June 13, 24, and July 10, 2013 at five different locations within the study area. Suitable habitat for this species was found to exist within the study area; however, least bitterns were not observed during field investigations.

No fish species at risk were identified in the EcoTec field investigations.

#### 4.3.6 Summary of Natural Conditions and Values

The Stony Swamp Wetland Complex is a Provincially Significant Wetland as well as a Core Natural Area within the Greenbelt and is of special interest. There is excellent biodiversity in the Stony Swamp area with numerous wildlife species residing within the study area, as well as a variety of vegetative species. Records indicate that the study area may also be home to a number of Species at Risk.

Aquatic and terrestrial habitat and the flora and fauna that are found or could be found in these areas will be considered in this class EA study. Areas of special interest such as provincially significant wetlands and other environmentally sensitive areas and significant species will be emphasized.

### 4.4 Cultural Environment

#### 4.4.1 Archaeological Resources

As part of this study, Stantec Consulting Ltd. undertook an archaeological assessment and prepared the report titled *Stage 1 Archaeological Assessment, Kanata South Environmental Assessment, City of Ottawa, ON, Lots 25 and 26, Concession 6; Lots 25-31, Concession 5; Lots 25-31, Concession 4; and Lots 25-31, Concession 3, Township of Nepean*, which is provided in **Appendix H** of this report. The following section highlights key points from their report.

There are two registered archaeological sites within the limits of the study. The registered sites are: Nepean Lime Kiln Site (BhFw-1) and the Log Tavern Site (BhFw-3). The Nepean Lime Kiln site is located along a recreational trail in the Stony Swamp Conservation Area. The Log Tavern Site is also located in the Stony Swamp Conservation Area. Parts of the study area have been reviewed in two formal archaeological potential modelling exercises. These include a study conducted by the City of Ottawa in 1999 to identify areas of archaeological potential within Carleton County and one completed by the NCC for federally owned lands in the capital region, which includes most of the study area.

Stantec Consulting Ltd. prepared the archeological assessment based on existing archaeological potential models, recent archaeological assessment reports, topographic mapping, archival research and knowledge of the study area and determined the archaeological potential, as detailed in **Table 25**.

**Table 25. Archaeological Potential Determination Criteria**

Criterion	Presence?	Comment
Known archaeological sites within 300 m?	Y	Two registered sites located within boundaries of PSA
Is there a body water within 300 m of the property?		
Primary water source (lake, river, large creek, etc.)	N	---
Secondary water source (stream, spring, marsh, swamp, etc.)	Y	Stony Swamp wetland complex
Past water source (beach ridge, river bed, relic creek, ancient shoreline etc.)	Y	Marine beach deposits noted in surficial geology
Topographical features (knolls, drumlins, eskers, plateaus)	N	---
Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area	Y	Loam and sand soils located within confines of surrounding clay soils
Distinctive land formations (mounds, caverns, waterfalls, peninsula, etc.)	N	---
Known burial site or cemetery on or adjacent to the property (cemetery is registered with the Cemeteries Regulation Unit)	N	---
Food or scarce resource harvest areas on property	Y	Maple dominated forest may have provided sap for syrup
Indications of early Euro-Canadian settlement within 300 m of property	Y	James Bradley and Henry Brennan homesteads, c. 1830
Early historic transportation routes within 100 m (historic road, trail, portage, rail corridor, etc.)	Y	Old Richmond Road

Criterion	Presence?	Comment
Contains property designated under the Ontario Heritage Act	N	---
Local knowledge of archaeological potential	Y	City of Ottawa and NCC archaeological potential modeling; completion of other previous Stage 2 AA studies
Recent (post-1960) deep ground disturbance (confirmed extensive and intensive)	Y	Partial: existing road corridors, housing subdivisions, quarrying operation

It was concluded, using the criteria presented in Table 25 and the generally undisturbed characteristics of the study area, that it should be considered that all areas of the study area, with the exception of land that has been previously disturbed or are within the limits of existing wetlands, or cleared of archaeological concerns through previous Stage 2 Archaeological Assessment investigations, should be considered to contain potential for the presence of undiscovered archaeological resources.

Archaeological potential zones are illustrated in **Figure 12**.

#### 4.4.2 Heritage Resources

The study area is within the former Township of Nepean, which was first established as a settlement in either 1793 or early 1794. Between 1800 and 1812 over half the land in the Township had been granted to children of United Empire Loyalist veterans and settlers, as they came of age. Many lots were obtained by land speculators, including John Crysler of Williamsburgh, who owned the land on which the major battle of the War of 1812 was fought. Crysler owned 1,800 acres of land in Nepean, including lots within the study area.

The first major influx of settlement occurred in Richmond, in Goulbourn Township. Settlers arrived via the Ottawa River to the area that became known as LeBreton Flats. This area was the northern terminus of the original Richmond Road, which went from the Ottawa River to Richmond, passing through the study area. Within the study area, this road is now known as Old Richmond Road. In the 1830s, several families of mixed religious background settled parts of the study area: James Bradley (Lot 26, Concession 4) and John Wright (Lot 27, Concession 4). On a map produced in 1833, it is reported that there were still very few roads in the study area, and that the Bradley and Wright lots would have been accessed through the woods or small trails that led from Old Richmond Road.

An 1863 map of Carleton County shows details of settlements in the study area; the map indicates that all lots on Concessions 5 and 6 in the study area were occupied and the location of residences along or near Old Richmond Road, with the exception of Lot 29. The residences of Lot 29 were located in the north of the Lot, near present day Moodie Drive. Lot 25, Concession 4 was also depicted as fronting Moodie Drive. All other lots on Concession 4, within the study area, were shown to be unoccupied. The 1863 map also shows a deviation in Moodie Drive, presumably due to poorly drained soils, which could be indicative of the wetland. Fifteen years later, remapping shows all lots within the study area as occupied with homes built, and the extensive wetlands in Concession 5, and a different route of the road deviation of Moodie Drive. Both maps indicate that historically there were homesteads in the study area and the possibility for historic period remains should be anticipated.

#### 4.4.3 Cultural Landscapes

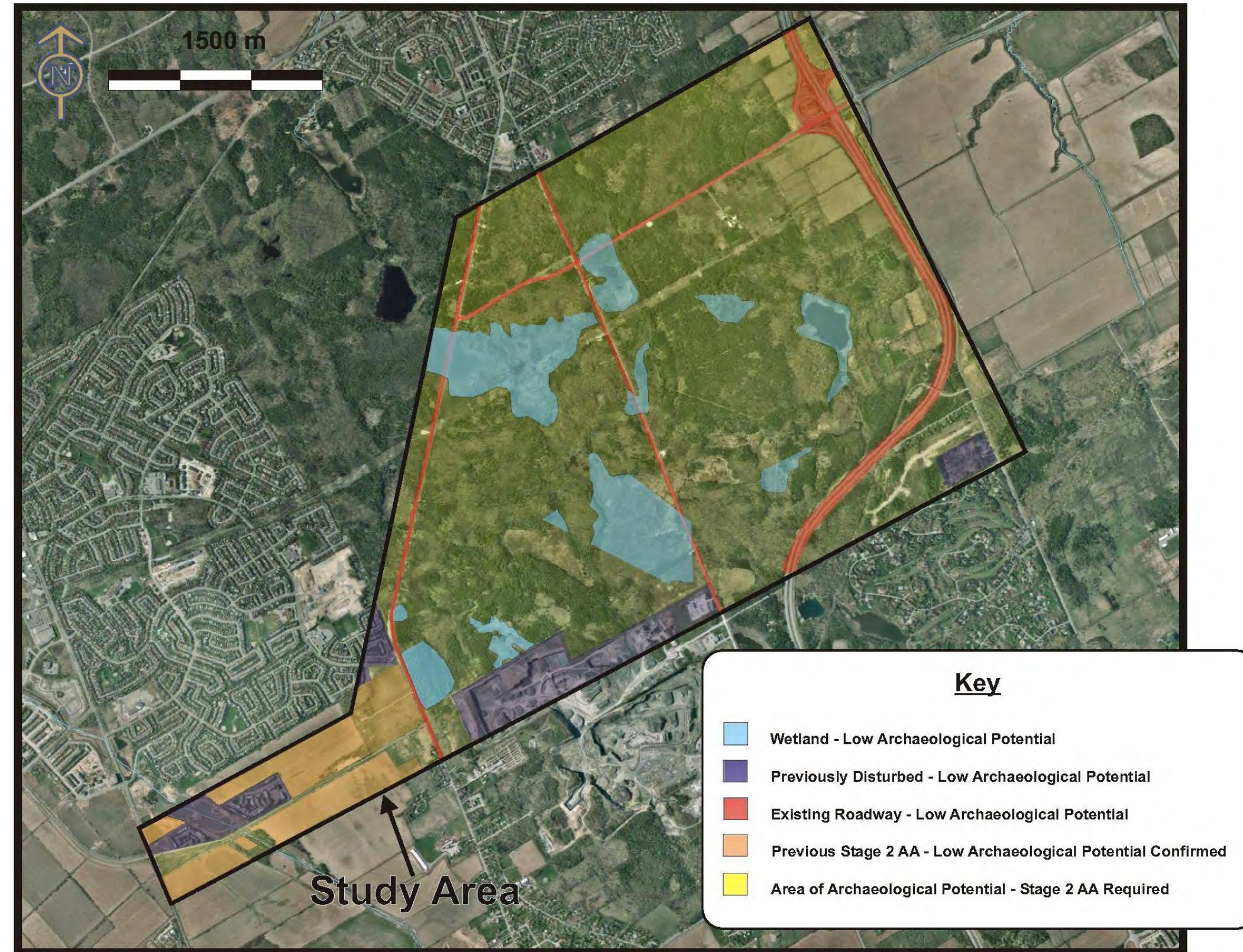
The Greenbelt portion of the study area is, in general, undeveloped with limited older residential development. Urban development is ongoing north of Hope Side Road and west of the Greenbelt. Old Richmond Road and Moodie Drive and the other old Township roads in the study area are historic roads with some alignment changes through the years. The forest in the Greenbelt may have provided useful resources for both pre-contact and historic period populations. Views along the roads and of the historic farms and farmland provide reminders of the historic past.

#### 4.4.4 Summary of Cultural Condition and Values

Stony Swamp contains two registered archaeological sites, which are removed from the road corridor. Stage 2 Archaeological Assessment is required within the grading limits except for land that has already received archaeological clearance through previous investigations, is previously disturbed, or is within the limits of existing wetlands. Cultural landscapes in the study area include farmscapes, wetlands and the Richmond Plain.

The area of undisturbed land that may have buried archaeological and historic artifacts will be considered in the evaluation of alternatives and the development of mitigation measures.

Figure 12. Zones of Archaeological Potential



## 4.5 Physical Environment

### 4.5.1 Subsurface Materials

As part of this study, Stantec Consulting Ltd. conducted a *Geotechnical Existing Conditions and Assessment, Kanata South EA Study*, which is provided in **Appendix I**. The following section highlights key points from the Stantec report.

The study area is within the Ottawa Valley Clay Plains physiographic region. This region consists of clay plains, interrupted by ridges of rock or sand. Soils in the Ottawa area, including the study area, were deposited in the following stratigraphic sequence: bedrock overlain by glacial deposits; which area overlain by soils deposited during the time period that the area was flooded by the Champlain Sea; the uppermost soils were deposited since the recession of the Champlain Sea.

The following materials are present at a shallow depth in the study area: imported fill (typical roadway embankments), marine silts and clays, river sands, glacial till, organic deposits (such as peat) and bedrock. Borehole locations and records are included in the Stantec report. Surficial soil types within the study area are illustrated in **Figure 13**.

#### 4.5.1.1 Imported Fill

Existing roadway embankments were constructed from imported fill, increasing the grade to slightly higher than the surrounding site grades. The fill ranged from well graded gravel with varying quantities of silt, sand and gravel and local zones containing frequent cobbles and organics. A Standard Penetration Test conducted by Stantec indicates that wide variation in the compaction of the fills from very loose to very dense. Moisture contents in the fill ranged from 1% to 36%, with an average of 8%.

#### 4.5.1.2 Marine Silts and Clays

Marine silts and clays were deposited in the area of the post-glacial Champlain Sea and are present in the west half of Hope Side Road, West Hunt Club Road at the Highway 416 interchange, and in isolated pockets along Old Richmond Road. Silts and clays are found in several areas at the center of the study area, typically overlying glacial till and occasional sand partings. Marine silt and clay deposits encountered during the investigation for the Enbridge pipeline in the study area are further described as follows:

Silt was common along West Hunt Club Road with a thickness ranging from 0.3 m to 4.8 m. In some instances, silt contained organic materials; silts with high organic content typically have higher moisture content. The silt was in a very loose to compact state. The moisture content ranged from 3% to 71%, with an average of 28%. The grain size analysis indicated that the soil can be classified as silt to sandy silt.

Clay was found under surficial fills and layers of silt and/or sand. The consistency of the clay ranged from soft to very stiff. The moisture content ranged from 3% to 79%, with an average of 35%. The grain size analysis indicated that the soil can be classified as silty clay, lean clay and fat clay.

#### 4.5.1.3 Silty Sand

Sands of glaciofluvial origin are present along West Hunt Club Road, near the Highway 416 interchange. Pockets were also encountered overlying and interbedded within silt and clay materials throughout the study area. Sands throughout

the Ottawa area tend to be poorly graded, although many deposits can have significant silt content; these sands are typically very loose to compact, well drained materials.

Sand was encountered in some boreholes in the study area, both below the fill and at ground surface. The thickness of the sand ranged from 0.1 to 3.8 m and it was classified as very loose to very dense. The moisture content of the sand ranged from 3% to 29%, with an average of 10%. The grain size analysis indicated that the soil can be classified as a silty sand to a silty sand with gravel, with one sample classified as poorly graded sand with silt.

#### 4.5.1.4 Glacial Till

Glacial till is found at relatively shallow depths near the intersection of Hope Side Road and Old Richmond Road, along portions of Old Richmond Road and along West Hunt Club Road, over shallow bedrock.

Granular till in the Ottawa area is typically non-cohesive and generally dense to very dense. The thickness of the till layer from previous borehole information varied from 0.3 to 3.6 m. The compaction was rated as very loose to very dense. The till contained cobbles and boulders. The moisture content was 5% to 34%, with an average of 13%. The grain size analysis indicated that the soil can be classified as silt with sand, silty sand, poorly-graded sand with silt and gravel and silty sand with gravel.

#### 4.5.1.5 Organic Deposits

Published surficial geology maps indicate large deposits of organic material and peat present within the study area, particularly in the area of Stony Swamp. These deposits may be directly beneath the proposed road widening in two areas: the north portion of Old Richmond Road, and midway along West Hunt Club Road. Organic material is typically of a high water content and extremely compressible. The compressibility and potential for biodegradation can result in large amounts of settlement when load is applied. The thickness of buried organic material encountered was between 100 mm and 400 mm. Several silt deposits encountered were also reported to contain organic materials.

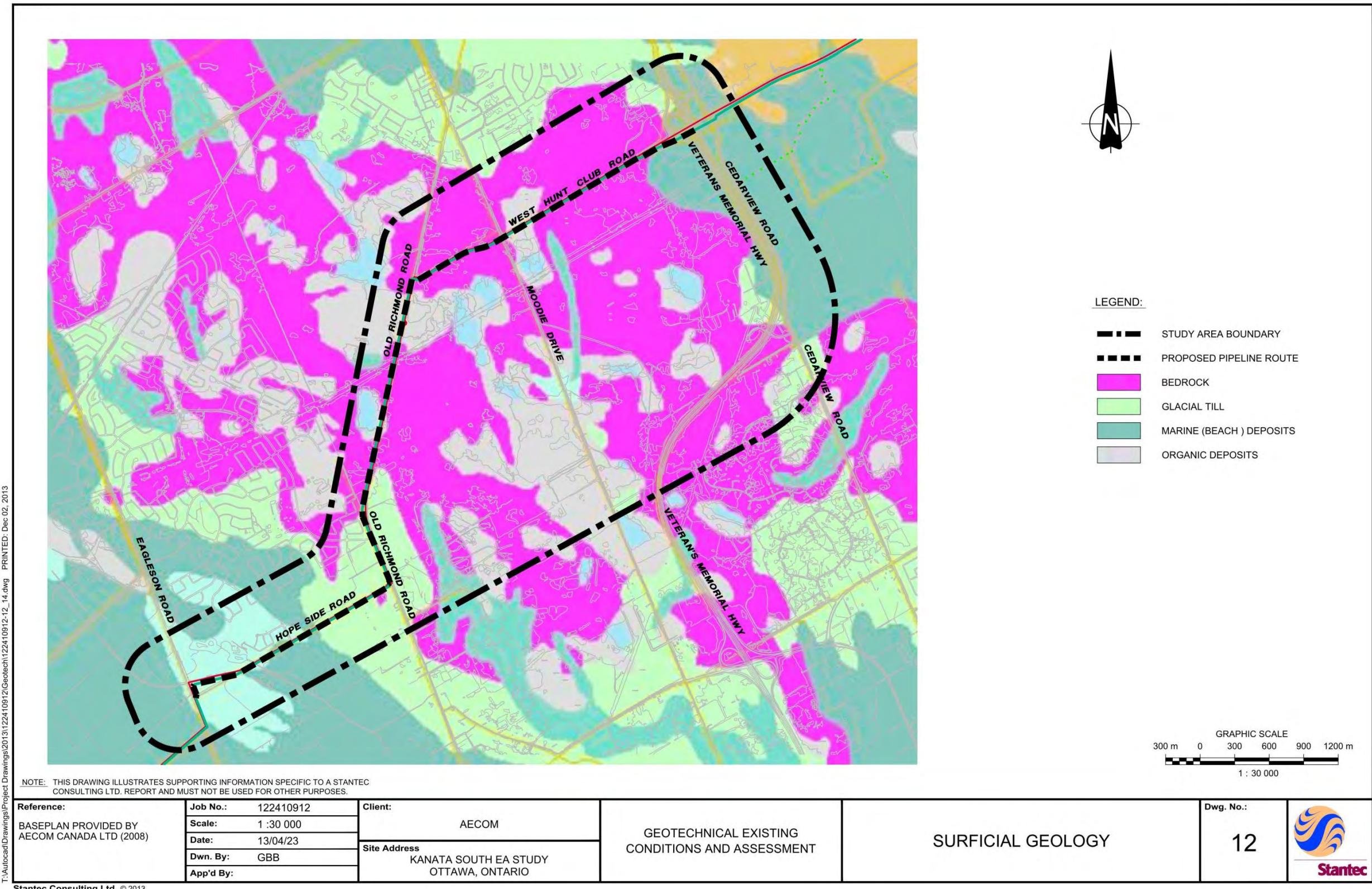
#### 4.5.1.6 Bedrock Geology

The northern part of the study area is underlain by the March Formation, consisting of interbedded quartz sandstone, sandy dolostone and dolostone. The southern portion of the study area is underlain by the Gull River Formation, which consists of interbedded silty dolostone, lithographic to fine crystalline limestone, oolitic limestone, shale, and fine-grained calcareous quartz sandstone. At the south of the study area, a small outcrop of the Bobcaygeon Formation is present, and consists of bioclastic and nodular limestone.

The boundary between the Gull River and March Formations is marked by a steeply dipping fault, which is estimated to cross Old Richmond Road in the vicinity of Stonehaven Drive. Bedrock in fault areas is typically fractured. The depth to bedrock ranges from greater than 25 m at the intersection of Hope Side Road and Eagleson Road to less than 1 m in portions of Stony Swamp, along Old Richmond Road and along West Hunt Club Road.

Results of the unconfined compressive tests indicate that the strength of limestone was determined to be strong or very strong, while the rock strength of sandstone was determined to be strong to extremely strong. The rock strength of the dolomite and sandy dolomite was determined to be very strong.

**Figure 13. Surficial Soil Types**



#### 4.5.2 Potential Site Contamination

As part of this study, Stantec Consulting Ltd. conducted a *Modified Phase 1 Environmental Site Assessment, Kanata South EA Study*, which is provided in **Appendix J**. The following section highlights key points from the Stantec report.

The purpose of the Modified Phase 1 ESA was to evaluate the possible environmental concerns associated with the current and historical activities on properties within, adjacent to and near the road corridor that may adversely impact on the proposed roadworks.

The potential for site contamination was based on a review of available historical aerial photographs, city directories, federal, municipal, provincial and private databases and other pertinent historical information as well as a reconnaissance of the corridor. Eight sites of potential environmental concern were identified along the road corridor. Two sites were categorized as moderate concern and six were categorized as minor concerns. The level of concern considers the proposed location of the roadworks as well as the regional groundwater flow in the area. **Table 26** summarizes the sites of environmental concern.

**Table 26. Assessment of Sites of Environmental Concern**

	Site No.	Civic Address/ Location	Current Land Use	Historical Land Use/ Concern(s)
<b>Moderate Environmental Concerns</b>	1	5271 Old Richmond Rd; 30 m west of road	Agriculture and residential/	Agriculture and residential/ Reported 1,800-litre diesel fuel spill in 1992 from an above ground storage tank
	2	Moodie Dr & West Hunt Club intersection	Right-of-way	Undeveloped/ Reported 120-litre hydraulic oil spill in 2003 due to a vehicular collision (soil contamination noted as possible)
<b>Minor Environmental Concerns</b>	3	North of Hope Side Rd, Monahan Landing vicinity	Undeveloped	Agriculture/ Visible soils berm, likely related to recent land development
	4	Hope Side Rd & Old Richmond Rd intersection	Right-of-way	Agriculture and right-of-way/ Reported 20-litre diesel spill in 1990 due to vehicular collision (soil contamination not anticipated)
	5	800 Stonehaven Dr at Old Richmond Rd	Commercial	Commercial, agriculture/ Underground storage capacity of 100,000 litres associated with the gas station. Tanks installed in 2001
	6	4062 Old Richmond Rd; 50 m north of road	Residential	Residential, undeveloped/ Reported 45-litre furnace oil spill in 2011 due to over-filling of tank (soil contamination not anticipated)
	7	4040 Old Richmond Rd; 40 m north of road	Residential	Residential, undeveloped/ Reported 800-litre furnace oil spill due to equipment failure (distance and gradient makes this concern minor)
	8	Hwy 416 south of West Hunt Club Rd; 50 m east of study area	Right-of-way	Agriculture, Service Station, Right-of-way/ Former gas station at the intersection of West Hunt Club Road and Cedarview Road, which is now Highway 416 (anticipated to be addressed during road planning and construction) Diesel spills of unknown volume on Hwy 416 recorded in 1999 and 1997

A Limited Phase II ESA will be required to further assess the sites of moderate environmental concern during the detail design phase.

#### 4.5.3 Hydrogeology (Groundwater)

Stantec Consulting Ltd. reported on hydrogeology in their *Geotechnical Existing Conditions and Assessment, Kanata South EA Study*, which is provided in **Appendix I**. Monitoring wells were installed at seven borehole locations within the

study area during the subsurface investigation for the Enbridge Ottawa Reinforcement Pipeline project. Depth to groundwater was recorded generally during June-July. Results were:

- Eagleson Road at the west end of Hope Side Road ..... 1.9 m
- Hope Side Road east of Crown Ridge Drive ..... 1.2 m
- Old Richmond Road north of Hope Side Road ..... 2.2 m
- Old Richmond Road near homes in Stony Swamp ..... 1.2 m
- Old Richmond Road south of West Hunt Club road ..... 1.4 m
- West Hunt Club Road west of Moodie Drive ..... 1.1 m
- West Hunt Club Road at Stillwater Creek Tributary ..... 0 m (October)
- West Hunt Club Road at Highway 416 ramp terminal ..... 3.3 m (September)

Fluctuations in groundwater level are anticipated due to seasonal variations or precipitation events. The water level in undeveloped areas of Stony Swamp is anticipated to be near the ground surface.

#### 4.5.4 Hydrology and Hydraulics (Surface Water)

Stony Swamp is the headwaters of several watercourses including a tributary of the Monahan Drain, a tributary of Graham Creek and Stillwater Creek and its tributaries. Watercourses within the study area flow to the Jock River and to the Ottawa River, and are under the jurisdiction of the Rideau Valley Conservation Authority. The relevant catchments and their relationship to the study corridor are identified in **Figure 14**.

Three watercourse crossings in the study corridor were identified; their locations are detailed in **Figure 15**:

1. **Hope Side Road:** .....Conveys the Monahan Drain through a 4,900 mm x 23,000 mm rigid frame concrete bridge. The upstream drainage area is  $\pm$ 975 hectares (ha) and the watercourse flows through urban developments to a stormwater management pond. Downstream (south), the watercourse flows through agricultural lands to the Jock River.
2. **Old Richmond Road** .....Conveys a tributary of the Monahan Drain through a 900 mm CSP. The upstream drainage area is ill-defined wetland, estimated at 51.8 ha. Downstream, the lands are a mix of agricultural and urban development.
3. **West Hunt Club Road:** ..Conveys a tributary of Stillwater Creek through a 1,000 mm polymer-coated CSP with upstream orifice control (510 mm) to mitigate downstream flooding of Lynwood Village. The upstream drainage area is 319.1 ha of wetland, while downstream the lands are a mixture woodlands and urban development.

Water quality impacts from the existing roadway are somewhat mitigated by the rural cross section with roadside ditches that provide flow attenuation and some water quality treatment through sedimentation.

Relevant studies providing a review of existing conditions are:

- Lynwood Village SWM Study – Vol. 1 (A.J. Robinson Associates, September 1990)
- Lynwood Village – Functional Design Study – Area 3 (A.J. Robinson Associates, December 1990)
- Monahan Drain Constructed Wetlands – Required Storage Capacity (J.F. Sabourin Associates, March 2012)
- Monahan Constructed Wetlands – Stormwater Facility - Condition Assessment Report (AECOM April 2012)

Figure 14. Study Area Watersheds and Catchment Areas

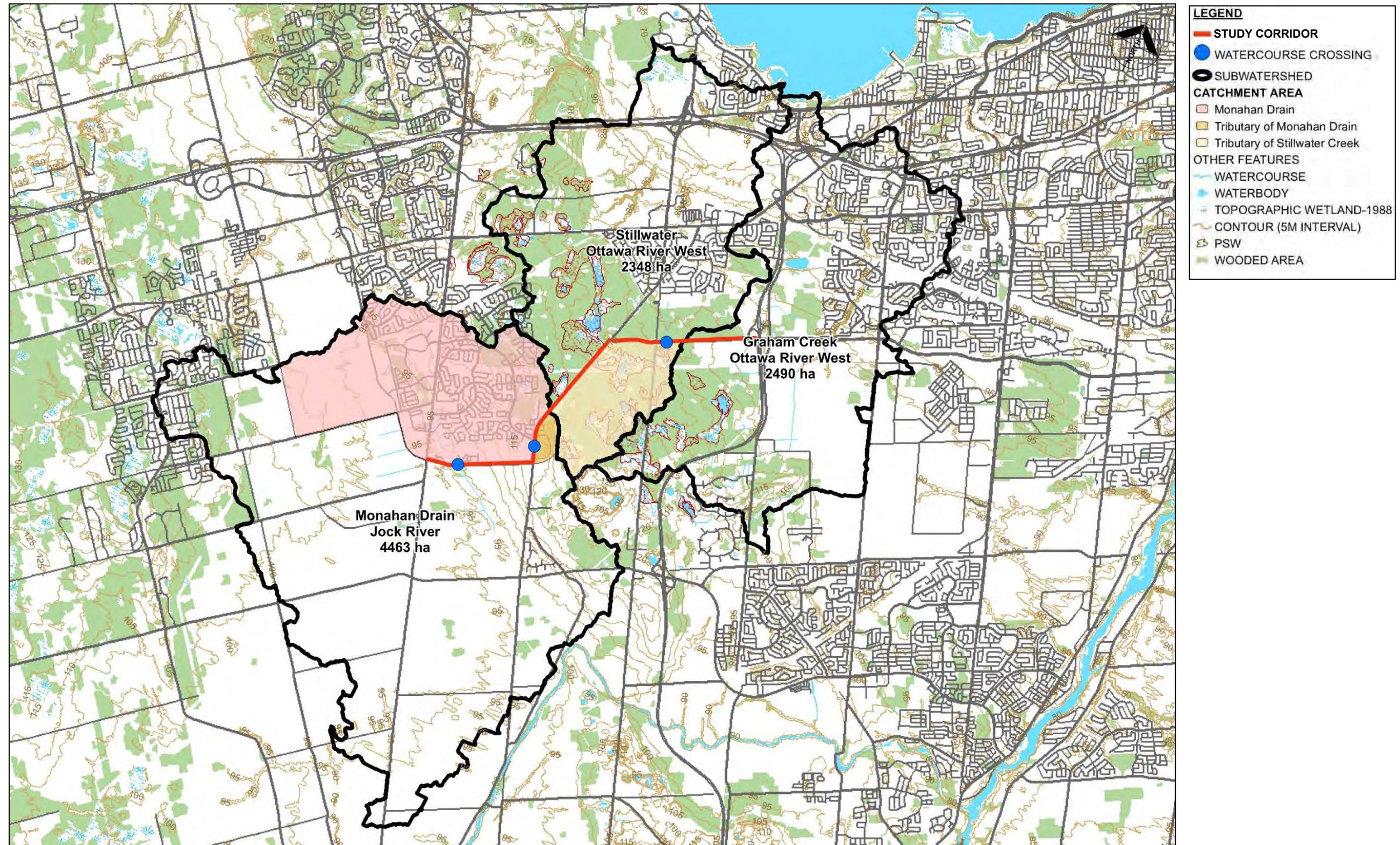
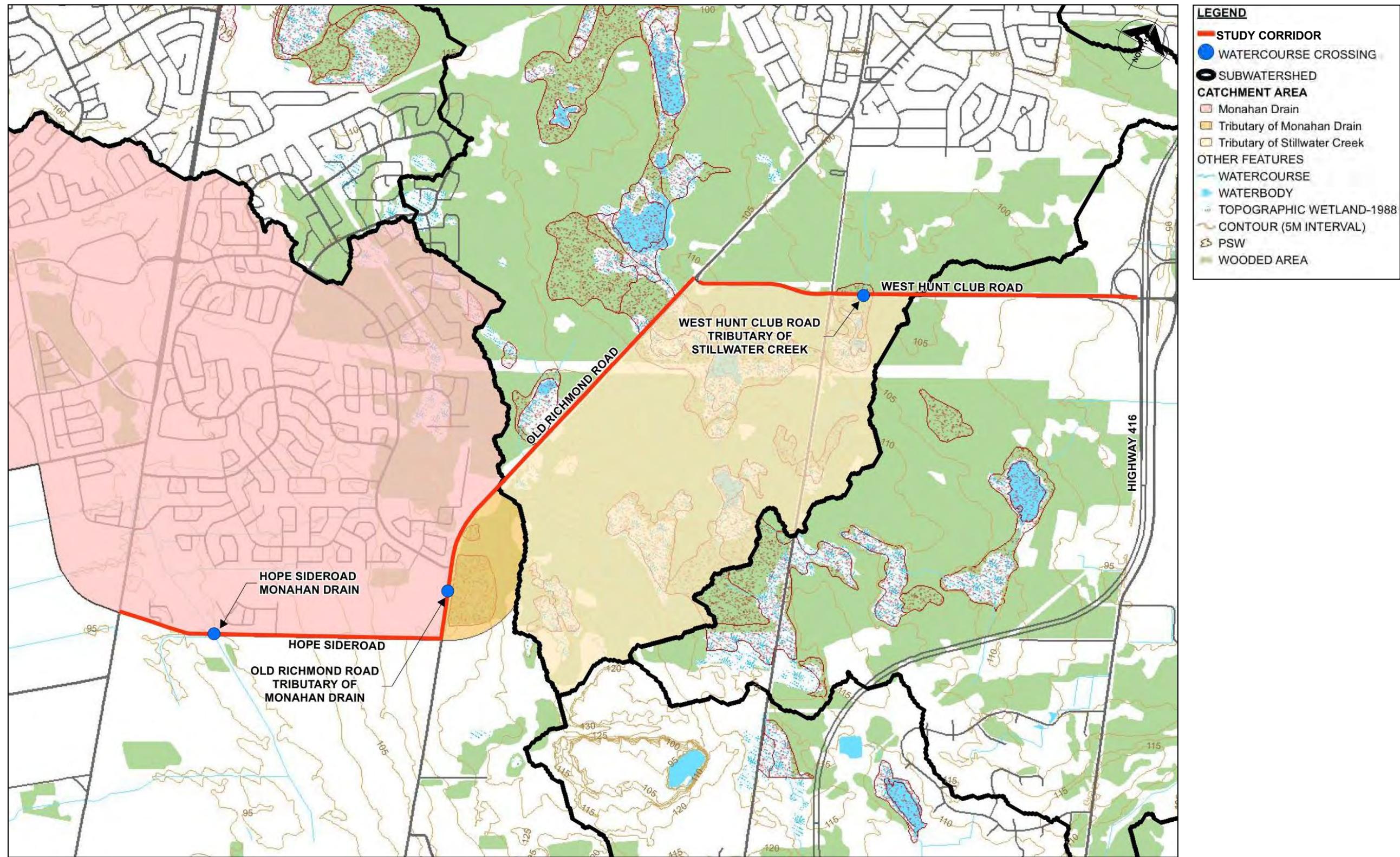


Figure 15. Watercourse Crossings



#### **4.5.5 Summary of Physical Conditions and Values**

The constraints due to the subsurface materials present in the study area include:

- Compressible clays that have low bearing capacity, may be wet and frost susceptible
- Organic materials that are compressible and may be in environmentally sensitive areas
- Shallow, strong bedrock that will likely require hoe-ramming or blasting and drilling
- High water table requiring special dewatering measures in environmentally sensitive areas

Three watercourses are crossed by the road corridor. Eight locations where spills have been reported are present in the study area (two of moderate concern and six of minor concern).

The potential for contamination and the physical characteristics of the study area will be considered in the development of designs and, where appropriate, in the evaluation of alternatives. The potential impact on surface water and the availability of suitable stormwater management measures will be examined.

## 5. Evaluation of Alternatives

The Municipal Class EA process, described in Section 1, requires consideration of a reasonable range of alternatives and their effects on the environment. The evaluation of alternatives during the EA process must be systematic, leading progressively to the identification of the preferred. To achieve this, evaluation criteria are developed to compare the alternatives. These criteria need to reflect an understanding of the existing conditions, the nature of the proposed project and the issues related to the project.

The first alternatives considered in the process are the “alternatives to the undertaking” (also called alternative solutions). These are functionally different ways of addressing the project need. In the evaluation of the alternative solutions, the first consideration is whether or not they address the identified problems and opportunities. The second consideration is the impacts that have been identified. The identified impacts are described with reference to the criteria groups and relevant criteria.

The second alternatives considered are “alternative routes”. The evaluation of alternative routes also considered whether or not they address the identified problems and opportunities and considered the identified impacts.

The third and final alternatives considered are “design alternatives”. The evaluation of design alternatives focuses on the impacts associated with relevant criteria from the long list of evaluation criteria described below.

### 5.1 Evaluation Criteria

Evaluation criteria were selected with input from agencies and the public as well as study team specialists. **Table 27** lists criteria in the order discussed under Existing Conditions and provides the rationale for their selection. **Table 28** provides the measures proposed under each of the criteria. The list of criteria and measures were refined for each independent set of alternatives to reflect the ability of each criterion to help distinguish between the alternatives.

**Table 27. Evaluation Criteria**

Criteria Group	Criteria	Rationale
Transportation and Traffic	Transit	The road corridor is not presently a significant transit corridor. Its ability to facilitate transit movements and encourage transit ridership may be a consideration. Transit is not expected to vary for alternative designs within the study area.
	Pedestrian and Cyclist Accommodation	Providing for the safety and comfort of pedestrians and cyclists is important to the encouragement of active transportation, healthy lifestyles and an active community. All alternatives will include similar provisions for the use of the corridor by pedestrians and cyclists and their safety.
	Safety	Designs that meet driver expectations, provide users with positive guidance and create a forgiving roadside will result in reduced risk of collisions. Designs that create fewer conflict points are preferred.
	Emergency Response	The addition of lanes, paved shoulders and other improvements to the road corridor will improve access and travel for emergency responders.
	Level of Service/ Capacity	The ability of design alternatives to provide an acceptable level of service during peak periods is required.
	Road Geometry	Improvements to the road corridor provide an opportunity to address any deficiencies in vertical and horizontal curvature and cross-section elements. All improvements will be designed using the established standards for the selected design speed.

Criteria Group	Criteria	Rationale
Socio-Economic Environment	Land Use	Land use outside the Greenbelt is changing as development occurs within the urban boundary along Hope Side Road. The effect of traffic from this development on the alternatives for the road corridor are of interest. Natural, agricultural and recreational land uses are also of interest.
	Recreation	There are several parking areas within the Greenbelt for recreational users of the pathways and trails within Stony Swamp. Their popularity is illustrated by the cars parked along the road during peak times. Recreational users and facilities need to be considered in the alternative designs.
	Noise	Outdoor living spaces are located adjacent to and nearby the road corridor at the south end of Bridlewood and in the new Monahan Landing community. The effect of increased traffic on noise needs to be determined.
	Air Quality	The impact on air quality of increased traffic volumes is important to the community and corridor users. All alternatives will have similar impacts on a regional level (number of vehicles and congestion).
	Community and Greenbelt Linkages	Multi-use pathways, sidewalks and/or bike lanes may help link the Kanata South community with the Greenbelt. These need to be considered in the development of alternatives. Connections across and along the road corridor would facilitate movement from one section of Stony Swamp to another.
	Property requirements	Greenbelt land required is a significant consideration as NCC Greenbelt policies require “no net loss” of area. The need to acquire private property along Hope Side Road or within adjacent urban or rural lands must also be considered.
	Capital Costs	The construction cost will vary depending on the width of the road, the amount of rock excavation and the need for signals and other equipment as well as the property required.
	Operations and Maintenance Costs	Operations and maintenance costs will vary. For example, reversible lanes will require continuous power supply and ongoing equipment maintenance. Wider roads require more winter maintenance.
Natural Environment	Aquatic Habitat and Fisheries	There are two watercourses (including one municipal drain) that cross the road corridor and a number of areas of wetland adjacent to the road corridor. They provide aquatic habitat that may be impacted by a change to the alignment and/or width of the road.
	Terrestrial Habitat, Wildlife and Vegetation	The Stony Swamp Core Natural Area of the Greenbelt and the agricultural fields south of Hope Side Road offer diverse habitat for wildlife and vegetation species that may be impacted by a change to the alignment and/or width of the road.
	Wetlands	Stony Swamp includes provincial significant wetlands adjacent to the road corridor that may be impacted by a change to the alignment and/or width of the road. NCC Greenbelt policies require “no net loss of wetland function”.
	Species at Risk (SAR)	Due to the diverse nature of the lands adjacent to the road corridor, there is the potential for Species at Risk to use these areas that may be impacted.
Cultural Environment	Archaeology	Undisturbed areas with archaeological potential must be identified for investigation prior to construction.
	Heritage	Built heritage must be reviewed to identify impacts on adjacent property or the heritage structure itself.
	Cultural Landscapes	The road corridor provides viewscapes of farmland and natural areas that are of interest to the historical context.
Physical Environment	Subsurface Material	The presence of rock at shallow depths will impact on construction methods and costs. Conversely, materials with poor bearing capacity will also impact on road construction and require identification. Subsurface conditions are not expected to vary for alternative designs within the study area.
	Potential Contamination	Locations identified with potential for contamination must be investigated during detail design so that appropriate steps can be taken to confirm the presence of contamination and any need for clean-up prior to road construction. Potential contamination is not expected to vary for alternative designs within the study area.
	Groundwater	The depth of groundwater may be a factor in roadway constructability depending on its relationship to the elevation of the subgrade. Groundwater conditions are not expected to vary for alternative designs within the study area.
	Infrastructure	The presence of above ground and below ground infrastructure may be a factor.
	Surface Water and Drainage	Changes to watercourse crossings are required where pavement widening is needed. Wetlands along the corridor may also benefit from improved hydraulic connections. Rural drainage is anticipated except along the north side of Hope Side Road where curb and sidewalk is planned to reflect the adjacent urban development.

With consideration for the criteria that are expected to help differentiate between the alternatives, the following measures were selected.

**Table 28. List of Criteria and Measures**

Criteria Group	Criteria	Measure
Transportation and Traffic	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Emergency Response</li> <li>• Level of Service/Capacity</li> <li>• Road Geometry</li> </ul>	<ul style="list-style-type: none"> <li>• Road characteristics and their influences on safety/ collision experience (better/worse)</li> <li>• Space available for emergency responders to proceed through traffic (shoulder widths, number of lanes)</li> <li>• Calculated LOS</li> <li>• Presence of substandard elements (yes/no)</li> <li>• Ability to provide above minimum standards for design speed including cross-section elements such as clear zone</li> </ul>
Socio-Economic Environment	<ul style="list-style-type: none"> <li>• Land Use</li> <li>• Recreation</li> <li>• Noise</li> <li>• Community and Greenbelt Linkages</li> <li>• Property requirements</li> <li>• Capital Costs</li> <li>• Operations and Maintenance Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on existing land uses (area)</li> <li>• Support for planned development (yes, partially, no)</li> <li>• Impact on existing NCC parking areas (loss of space)</li> <li>• Widenings across Greenbelt pathways (provisions for trail users)</li> <li>• Increase in sound levels of 5 dBA or more. Sound levels 55 dBA or greater</li> <li>• Provides improved pedestrian and/or cyclist facility through the Greenbelt</li> <li>• Area of Greenbelt land required (<math>m^2</math>)</li> <li>• Area of development land required (<math>m^2</math>)</li> <li>• Relative cost based on area of pavement, structures and other major items required</li> <li>• Relative cost based on length and area of road and equipment requirements</li> </ul>
Natural Environment	<ul style="list-style-type: none"> <li>• Aquatic Habitat and Fisheries</li> <li>• Terrestrial Habitat and Wildlife Vegetation/Woodlots</li> <li>• Wetlands</li> <li>• SAR</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts to Monahan Drain culvert(s) and Stillwater Tributary culvert (length of extension required)</li> <li>• Impacts to fish habitat areas within wetlands (<math>m^2</math>)</li> <li>• Area of wooded area impacted (<math>m^2</math>)</li> <li>• Length of edge affected (m)</li> <li>• Area of PSW impacted (<math>m^2</math>)</li> <li>• Impact on ecological function (defined)</li> <li>• Impact on potential SAR habitat (defined)</li> </ul>
Cultural Environment	<ul style="list-style-type: none"> <li>• Archaeology</li> <li>• Heritage</li> <li>• Cultural Landscapes</li> </ul>	<ul style="list-style-type: none"> <li>• Grading required in area of archaeological potential (<math>m^2</math>)</li> <li>• Potential impact on built heritage (yes/no)</li> <li>• Potential impact on heritage views and vistas (better or worse in comparison)</li> </ul>
Physical Environment	<ul style="list-style-type: none"> <li>• Infrastructure</li> <li>• Surface Water and Drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on power lines, gas pipeline, other utilities and services; Need for additional roadworks</li> <li>• Anticipated runoff (based on <math>m^2</math> pavement) and its impact on drainage</li> </ul>

## 6. Alternative Solutions

### 6.1 Generation of Alternative Solutions

Based on the Statement of Work prepared by the City of Ottawa for this Class EA Study and the results of the needs assessment, functionally different ways of addressing the transportation needs for the study area were identified. Construction of a new route within Stony Swamp was screened out during the preparation of the scope of this study as a result of discussions between the NCC and the City at the conclusion of their joint study on the assessment of cumulative effects of transportation infrastructure on the Greenbelt. The Stony Swamp Core Natural Area is an important feature of the Greenbelt and further fragmentation will not be permitted.

The alternative solutions generated to address identified needs were as follows:

- Do nothing
- Enhance Transportation Demand Management (TDM) Measures
- Implement Transportation Systems Management (TSM) Measures
- Expand the arterial road network
  - Hope Side, Old Richmond and West Hunt Club Roads
  - Fallowfield Road and connecting roads as needed to address capacity
- Provide a combination of the above alternatives

**Table 29** provides a summary description of the alternative solutions.

**Table 29. Description of Alternative Solutions**

Alternative Solution	Description
<b>Do Nothing</b>	This alternative assumes no changes are made to the arterial road or transit system to address the needs identified. Development will continue and local roads will be built to serve the property development.
<b>Enhance TDM Measures</b>	Transportation demand management (TDM) initiatives encourage individuals to reduce the number of trips they make, to travel more often by non-driving alternatives, to travel outside peak periods, and to reduce the length of their trips. TDM measures make alternatives to driving more attractive, build a positive public attitude towards those alternatives, and provide information and incentives that encourage responsible travel behaviours. Examples include: <ul style="list-style-type: none"> <li>• priority to and enhancement of public transit</li> <li>• make walking and cycling more attractive through the addition of facilities on City roads</li> <li>• telework/telecommuting</li> <li>• public education including cycling skills training, active lifestyle promotion, and public education on commuting options, active transportation, air quality, climate change and energy conservation.</li> </ul>
<b>Implement TSM Measures</b>	Transportation System Management (TSM) is an approach aimed at optimizing the safety, efficiency and capacity of the existing transportation system through the use of effective, low cost improvements. Examples include: <ul style="list-style-type: none"> <li>• traffic signs, signals, pavement markings and regulations</li> <li>• computerized traffic signal coordination</li> <li>• incident management tools to deal with weather conditions, collisions or vehicle breakdowns</li> <li>• traveller information systems using variable message signs or wireless communications</li> <li>• transit vehicle tracking using on-board computers and global positioning systems (GPS)</li> </ul>
<b>Expand Arterial Roads</b>	This alternative assumes that most of the growth in travel demand will be accommodated by additional arterial road lanes. This alternative is limited to road widening as new routes are not permitted within the Stony Swamp Core Natural Area of the Greenbelt. This alternative does not rely on TDM and TSM measures to address increased demand for trips.

Alternative Solution	Description
<b>Provide a Combination of the Above Alternatives</b>	<p>This alternative represents a combined solution. It assumes that the travel-reducing strategies and transit ridership objectives in the Transportation Master Plan will be achieved. This alternative therefore confirms the travel demand forecasts in the TMP as they include targets for TDM and TSM. Furthermore, this alternative assumes that roadway improvements will help address the transportation problems in the study area.</p> <p>This alternative will involve the examination of the widening of:</p> <ul style="list-style-type: none"> <li>• Hope Side Road from Eagleson Road to Old Richmond Road; Old Richmond Road from Hope Side Road to West Hunt Club Road and West Hunt Club Road from Old Richmond Road to west of Highway 416.</li> <li>• Fallowfield Road from Eagleson Road to west of Highway 416</li> </ul>

### 6.2 Assessment and Evaluation of Alternative Solutions

The analysis and evaluation of the Alternative Solutions was based on readily available information and field reviews and used a qualitative trade-off comparison approach. This level of detail was deemed sufficient for the evaluation of alternative solutions and was traceable and objective.

The alternative solutions were assessed in terms of their ability to address existing and future problems and needs as well as their potential environmental effects. Alternative solutions must solve the problems identified during the project need in order to be considered further. Solutions that do not address problems are screened out. Alternatives with unacceptable negative impacts as defined by the City, the NCC and other regulatory agencies, are screened out. Alternative solutions were evaluated based on five categories of criteria:

- Transportation and Traffic
- Social-Economic Environment
- Natural Environment
- Cultural Environment
- Physical Environment and Infrastructure

Within each category, criteria were chosen that address the problem and opportunity statement and provide meaningful comparisons of the alternative solutions. Based on the criteria selected, the alternatives were analysed and then ranked according to whether their impacts or benefits (when compared to other alternatives) were better, worse or the same. A relative comparison and "reasoned argument" approach was used. **Table 30** provides an assessment and evaluation of the alternative solutions described above in Table 29.

**Table 30. Assessment and Evaluation of Alternative Solutions**

Evaluation Criteria	Do Nothing	Enhance TDM	Implement TSM	Expand Arterial Roads	Provide a Combination of Solutions
<b>Does it address the identified needs?</b>					
Transportation and Traffic – Level of Service, safety and operations	<ul style="list-style-type: none"> <li>• Does not address the identified needs</li> <li>• Congestion and safety concerns will remain and be exacerbated in time</li> </ul>	<ul style="list-style-type: none"> <li>• TDM is part of TMP traffic projections. Does not fully address the identified needs</li> <li>• Congestion and safety concerns will be exacerbated in time</li> </ul>	<ul style="list-style-type: none"> <li>• TSM is part of TMP traffic projections. Does not address the identified needs</li> <li>• Congestion and safety concerns will be exacerbated in time</li> </ul>	<ul style="list-style-type: none"> <li>• New arterial road capacity will help address the identified needs</li> <li>• Additional road widening will be required to address identified needs even if TDM and TSM targets are met</li> </ul>	<ul style="list-style-type: none"> <li>• TDM, TSM and new arterial road capacity will address the identified needs</li> </ul>
<b>What are the preliminary identified impacts?</b>					
Social – Existing Land Use and Support for Development	<ul style="list-style-type: none"> <li>• Does not impact on existing homes in the Greenbelt</li> <li>• Does not support planned development</li> </ul>	<ul style="list-style-type: none"> <li>• Does not support all planned development</li> <li>• Does not impact on existing homes in the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Does not support all planned development</li> <li>• Does not impact on existing homes in the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Will support planned development</li> <li>• May impact on existing home(s) within and outside of the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Will support planned development</li> <li>• May impact on existing home(s) within and outside of the Greenbelt</li> </ul>
Economic – Costs	<ul style="list-style-type: none"> <li>• No capital costs</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of TDM measures can be significant, such as enhancement to transit service, cycling and walking facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of TSM measures can be significant, such as traffic signal controls, incident management and traveller information</li> </ul>	<ul style="list-style-type: none"> <li>• Road widening costs are significant and will affect capital, maintenance and operations budgets</li> </ul>	<ul style="list-style-type: none"> <li>• Road widening costs are significant and will affect capital, maintenance and operations budgets</li> <li>• Cost of TDM and TSM measures can be significant</li> </ul>
Natural (Biological) – Aquatic and Terrestrial Habitats; Flora and Fauna	<ul style="list-style-type: none"> <li>• No impacts to Monahan Drain, agricultural areas or the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal (localized) impacts to Monahan Drain, agricultural areas and/or the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal (localized) impacts to Monahan Drain, agricultural areas and/or the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>• Road widening will impact lands adjacent to existing roads with the Stony Swamp Core Natural Area and near Monahan Drain. Widening will impact agricultural lands</li> <li>• Road widening will be subject to approval by the NCC</li> </ul>	<ul style="list-style-type: none"> <li>• Depending on location, road widening will impact lands adjacent to existing roads with the Stony Swamp Core Natural Area, along the edge of the Monahan forest and near Monahan Drain.</li> <li>• Widening will impact agricultural lands</li> <li>• Road widening will be subject to approval by the NCC</li> </ul>
Cultural – Archaeology and Heritage	<ul style="list-style-type: none"> <li>• No impact on archaeology and heritage</li> </ul>	<ul style="list-style-type: none"> <li>• No expected impact on archaeology and heritage (TDM measures could have localized impacts requiring study)</li> </ul>	<ul style="list-style-type: none"> <li>• No impact on archaeology and heritage (TSM measures could have localized impacts requiring study)</li> </ul>	<ul style="list-style-type: none"> <li>• A study of archaeology and heritage would be required along the impacted corridors. Mitigation measures are likely feasible</li> </ul>	<ul style="list-style-type: none"> <li>• A study of archaeology and heritage would be required along the impacted corridors. Mitigation measures are likely feasible</li> </ul>
Physical and Infrastructure	<ul style="list-style-type: none"> <li>• No additional pavement area; no impacts to gas pipeline and power lines</li> </ul>	<ul style="list-style-type: none"> <li>• No additional pavement area; no impacts to gas pipeline and power lines</li> </ul>	<ul style="list-style-type: none"> <li>• Minor additional pavement area and potential minor impacts to gas pipeline and power lines. These impacts will be considered when TSM measures are identified and assessed</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts to existing infrastructure will be considered during alternative design process and reflected in the cost</li> <li>• Relocation of power poles and new power lines must be discussed with the utility agency to minimize additional costs</li> <li>• Road widening will necessitate extension or replacement of culverts at Monahan Drain and Stillwater Creek tributary</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts to existing infrastructure will be considered during alternative design process and reflected in the cost</li> <li>• Relocation of power poles and new power lines must be discussed with the utility agency to minimize additional costs</li> <li>• Road widening will necessitate extension or replacement of culverts at Monahan Drain and Stillwater Creek tributary</li> </ul>
Summary – Recommendation	<p>Does not address the problem. Is not consistent with TMP policies.</p> <p>Has no physical impacts as no new infrastructure would be constructed</p> <p>The extent of impacts depends of the TDM solution implemented (telecommuting has no physical impacts while new transit systems can have significant impacts).</p>	<p>Does not address the problem on its own. Is consistent with the policies of the Transportation Master Plan (TMP).</p> <p>Likely limited impacts due to the usually limited nature of the measures (such as intersection improvements, and incident management)</p>	<p>Does not address the problem on its own. Is consistent with TMP policies.</p> <p>Likely extensive physical impacts due to the extent of road widenings.</p>	<p>Addresses the problem. Requires construction of more roadwork than an alternative that includes TDM and TSM. Is not consistent with TMP policies.</p>	<p>Addresses the problem. Is consistent with TMP policies.</p> <p>Impacts associated with physical improvements must be studied.</p>
	<b>Carry forward for comparison purposes only.</b>	Do not carry forward as a stand-alone solution.	Do not carry forward as a stand-alone solution.	Do not carry forward as stand-alone solution.	<b>Carry forward as the most comprehensive and efficient solution.</b>

Notes:

1. Planned development in Kanata South, Fernbank Community and rural villages/areas in south west Ottawa contribute to the traffic projections. Development north of Hope Side Road may impact on design alternatives for widening or realignment.

2. Detailed capital costs will be considered in the evaluation of design alternatives in a later phase.

3. Impacts to the Greenbelt/Stony Swamp other natural features such as Monahan Drain should be avoided where feasible.

In summary, the Do Nothing alternative does not address the problems and opportunities, but will be carried forward to the alternative design phase for comparison purposes.

TDM measures, on their own, do not address the deficiencies/ needs. They are however, an important component of the solution and will be carried forward as part of the solution.

Improving the existing corridor using TSM measures will not address the problems and opportunities throughout the study area in the long term; however, they may be applicable for portions of the study area and during staging of improvements. TSM measures (auxiliary lane improvements) have been incorporated into the corridor in recent years and will be carried forward as part of the solution.

Providing additional arterial road capacity can address the deficiencies/needs but will not be carried forward as a stand-alone alternative solution since solving transportation needs through the addition of arterial road capacity alone is not consistent with the policies of the City of Ottawa as articulated in the TMP.

A combination of the identified alternative solutions is the preferred solution. It is recognized that TDM and TSM measures will play an important role in the overall solution, as they do in the transportation planning for the City in general. Incorporating TDM, TSM and arterial road widening is consistent with the TMP.

## **6.3 Selection of the Preferred Solution**

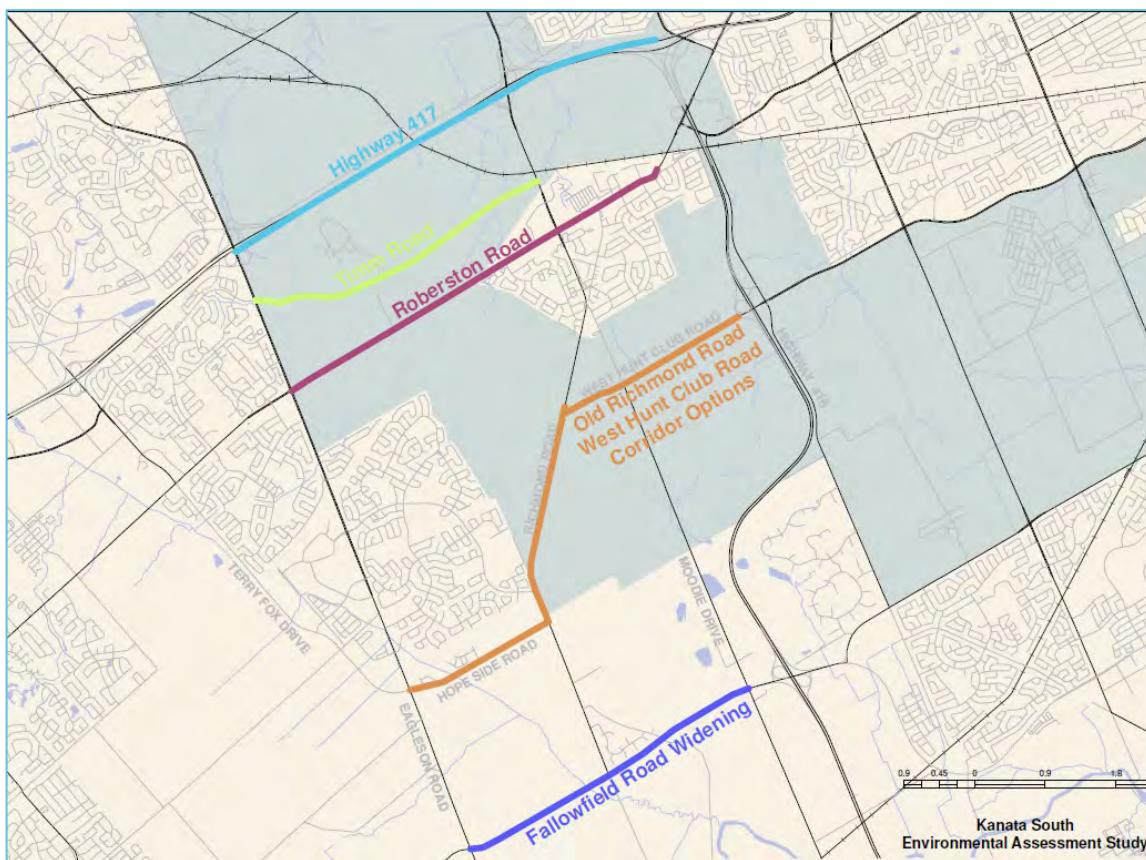
The alternative solution that combines TDM, TSM as well as arterial roadway improvements was selected as the preferred solution to address the transportation problems in the study area.

## 7. Alternative Routes

### 7.1 Generation of Alternative Routes

For the arterial road improvement component of the alternative solution, there are a number of east-west corridors in the area that could be considered as illustrated in **Figure 16**.

**Figure 16. Alternative Routes**



Highway 417 was not considered suitable for widening as it is a provincial highway, recently widened to four lanes (including High Occupancy Vehicle lanes) with no plans for future widening. Timm Road was not considered suitable as it is discontinuous at Moodie Drive. Robertson Road was not considered suitable for widening as it is already four lanes wide. Based on this review, it was concluded that arterial capacity could be improved on:

- Old Richmond - West Hunt Club Road corridor
- Fallowfield Road corridor (to existing four-lane section of Fallowfield Road west of Highway 416).

Widening of Hope Side Road is needed to address future traffic for either the widening of the Old Richmond-West Hunt Club corridor or the widening of the Fallowfield corridor and therefore the impacts of Hope Side Road widening will not be considered in the evaluation of alternative routes. Four-laning of Cedarview Road or Greenbank Road may be required in association with Fallowfield widening to accommodate travel through the Greenbelt and this has not been considered.

### 7.2 Assessment and Evaluation of Alternative Routes

In a similar manner to the evaluation of alternative solutions, criteria were chosen that have the potential to address the problem and opportunity statement and provide meaningful comparisons of the routes carried forward. Based on the criteria selected, the alternatives were analysed and then compared according to whether their impacts or benefits (when compared to other alternatives) were better, worse or the same. A relative comparison and "reasoned argument" approach was used. In **Table 31**, criteria not previously screened out are considered for their application to the assessment and evaluation of alternative routes. Those shown in gray were considered for this evaluation.

**Table 31. Criteria for the Evaluation of Alternative Routes**

Criteria Group	Criteria	Rationale
<b>Transportation and Traffic</b>	Pedestrian and Cyclist Accommodation	The requirements from the 2013 Pedestrian Plan and the 2013 Cycling Plan to better serve these modes will be considered.
	Safety	The alternative routes will have similar design standards and traffic volumes. Safety will not explicitly be considered.
	Emergency Response	The alternatives will result in improvements to access and travel for emergency responders along the respective corridor. Emergency response will not be explicitly considered.
	Level of Service/ Capacity	The ability of routes to provide an acceptable level of service during peak periods will be considered.
	In addition, because the alternative routes vary with respect to the origin and destination of trips that they serve, the suitability of each route for the desire lines of traffic and the out of way travel potentially incurred will be considered	
<b>Socio-Economic Environment</b>	Existing and Future Land Use	Impact on existing homes and buildings and impact on planned development will be considered.
	Recreation	Recreational features of the Greenbelt and Monahan Forest on Fallowfield Road are not expected to be directly impacted. Recreation will not be considered.
	Noise	Outdoor living spaces are located adjacent to and nearby the road corridors and will not be used to distinguish between the two corridors.
	Community and Greenbelt Linkages	Multi-use pathways, sidewalks, bike lanes and/or connections to existing pathways will not help to distinguish between the routes but will be considered once the route has been selected.
	Property requirements	Potential property acquisition requirements will be considered.
	Capital, Operations and Maintenance Costs	The length and extent of roadworks and potential property acquisition will be used as a surrogate for capital, operations and maintenance costs
<b>Natural Environment</b>	Aquatic Habitat and Fisheries	Potential impacts to Monahan Drain, which crosses Fallowfield Road and Stillwater Creek Tributary, which crosses West Hunt Club Road, will be considered.
	Terrestrial Habitat, Wildlife and Vegetation	The assessment will consider potential impacts to the Stony Swamp Core Natural Area of the Greenbelt, agricultural fields, Monaghan Forest will be considered.
	Wetlands	Stony Swamp includes provincial significant wetlands adjacent to the road corridor that may be impacted by a change to the alignment and/or width of the road. These will be considered.
	Species at Risk (SAR)	The potential for impact to Species at Risk will be considered.
<b>Cultural Environment</b>	Archaeology	Undisturbed areas with archaeological potential will be considered.
	Heritage	Built heritage will be considered.
	Cultural Landscapes	The historic viewscapes will be considered.
<b>Physical Environment</b>	Infrastructure	The need for additional road infrastructure to complement the route will be considered.
	Utilities	The presence of above ground and below ground infrastructure such as power distribution lines, gas pipeline, fibre optic cables may be a factor.
	Surface Water and Drainage	The area of new pavement (impervious surface) may influence the need for quantity and quality stormwater management measures along the alternative routes.

The criteria being carried forward for the alternative routes are discussed in the next section in more detail.

## 7.2.1 Transportation and Traffic

### 7.2.1.1 Pedestrian and Cyclist Accommodation

The 2013 Cycling Plan indicates both routes as spine (city-wide) cycling routes with paved shoulders as the facility type. The Old Richmond-West Hunt Club corridor connects to cycling facilities in South Kanata and the Greenbelt. The Fallowfield corridor connects easterly to facilities in the Barrhaven community.

The 2013 Pedestrian Plan recommends for Kanata-Stittsville that there continue to be improvements to connections to main pathways heading east towards downtown and to commercial areas. Future planned pathways are along watercourses and open space lands. In the rural area, connections between villages and hamlets using multi-use pathway corridors are preferred, potentially along abandoned railway lines, river and stream corridors, unopened road allowances, hydro corridors.

Paved shoulders are recommended for both routes under consideration to accommodate both pedestrians and cyclists.

### 7.2.1.2 Level of Service/ Capacity

The TRANS model from the 2008 TMP was used to assess the project screenline level of service for the widening of the two alternative routes. The purpose of this review was to determine whether both routes could address the screenline deficiency identified.

A summary of the 2031 projected volumes, capacities, v/c ratios, and capacity deficiency at the project screenline for each alternative is provided in **Table 32**.

**Table 32. Project Screenline Level of Service in 2031 for Alternative Corridors**

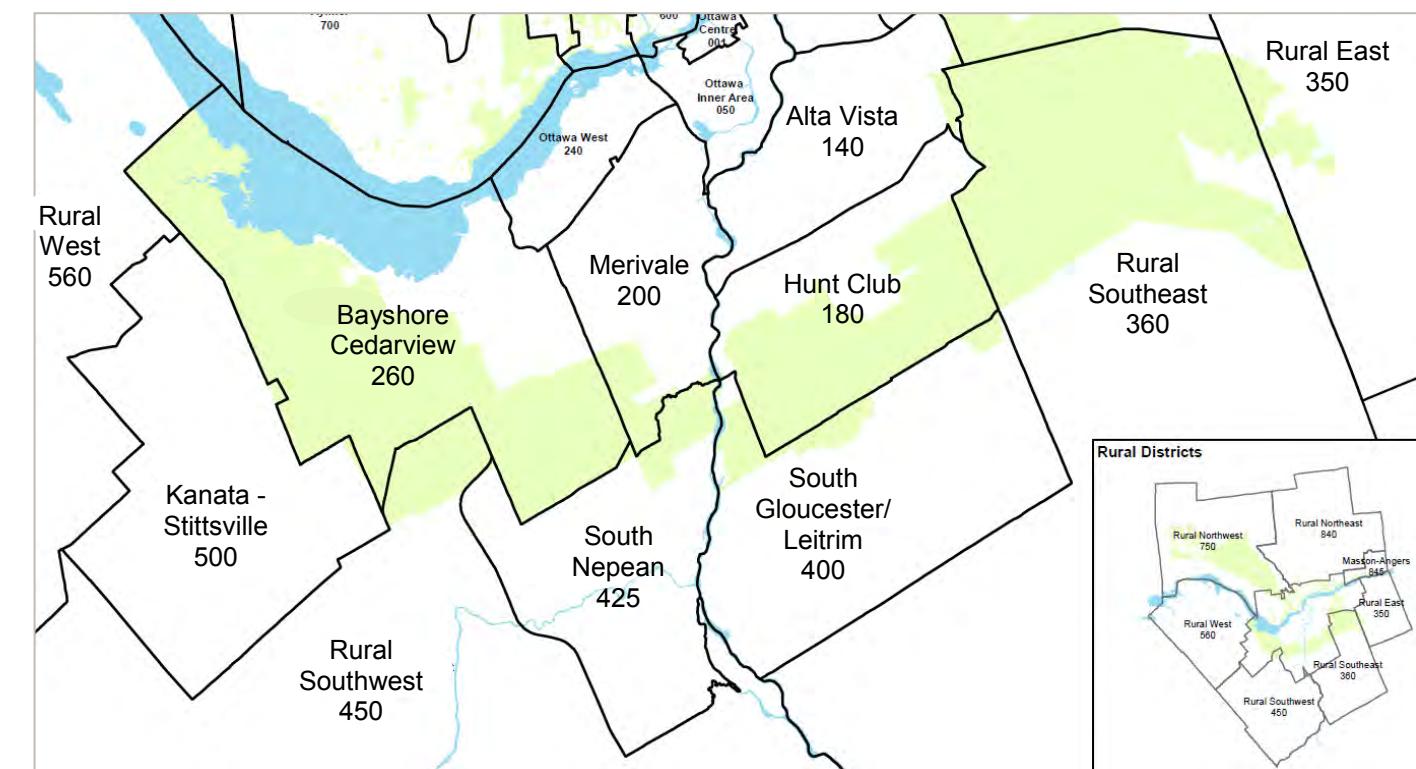
	Do Nothing	Fallowfield Corridor Widening	Old Richmond-West Hunt Club Corridor Widening
Screenline Volume	6109	6554	6538
Screenline Capacity	5930	6980	6930
v/c	1.08	0.94	0.94
Deficiency	-479	No Deficiency	No Deficiency

Regardless of the route selected, the TRANS model indicates that all roads will be operating near or over capacity in 2031. This is because the model assigns traffic to routes using a delay function. Regardless of the origin and destination of the traffic TRANS assigns traffic to the route with the overall shortest travel time (once the shortest distance route has any more delay than a longer route, the TRANS model assigns traffic to the longer route, and so on). A screenline level of service analysis therefore does not help to distinguish between the two alternative routes. Both would address the screenline deficiency.

### 7.2.1.3 Vehicle Origins and Destinations

The output from the TRANS model was used to assess the origins and destinations of travellers using Old Richmond Road and Fallowfield Road both now and in the 2031 planning horizon. The purpose of this review was to determine the reasonableness of both routes to serve the traffic desire lines. **Table 33** provides the origin and destination data for traffic on Old Richmond Road and on Fallowfield Road from the 2010 TRANS model, representing existing conditions. The review of existing traffic helps us to assess the reasonableness of the model results in the future.

The External District is likely traffic from Lanark County into the City of Ottawa. Traffic districts were generally illustrated in Section 3, Figure 2, which is reproduced below.



**Table 33. Do Nothing 2010 AM Scenario**

**Old Richmond Rd. between Stonehaven Dr. & West Hunt Club Rd. (Inbound)**

Origin	Destination												Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	Rural Southeast	South Nepean	Rural Southwest	
Rural Southwest	1	3	0	0	3	3	13	1	98	0	0	0	122
Kanata/Stittsville	24	67	15	10	105	91	226	41	256	1	0	0	907
External District	0	0	0	0	0	16	20	0	13	0	0	0	50
Trip Totals	25	70	15	11	108	110	259	42	367	2	0	0	1079

**Fallowfield Rd. between Eagleson Rd. & Old Richmond Rd. (Inbound)**

Origin	Destination														Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	Rural Southeast	South Nepean	Rural Southwest	Other		
Rural Southwest	28	44	13	11	31	10	77	25	89	0	11	9	30	377	
Kanata/Stittsville	0	0	0	0	0	0	3	0	0	20	156	57	16	252	
Rural West	0	0	0	0	0	0	0	0	0	12	51	0	0	64	
External District	0	0	0	0	1	50	85	0	14	1	33	14	0	198	
Trip Totals	28	44	13	11	32	61	164	25	103	20	212	131	46	890	

On Old Richmond Road north of Stonehaven, there are 1079 trips in the AM peak hour. The majority of trips (84%, 907) originate in the Kanata/Stittsville area. The Rural Southwest contributes 11% and the External District contributes 5% of the trips. The destinations for the trips from Kanata-Stittsville are Bayshore/ Cedarview (28%), Merivale (25%), Hunt Club (10%), Alta Vista (12%) and Ottawa Centre/Inner Area (10%). The destinations for the trips from the Rural Southwest are Bayshore/ Cedarview (81%) and Merivale (10%).

On Fallowfield Road west of Old Richmond Road there are 890 trips in the AM peak hour. Of these 42% of trips are from the Rural Southwest, 28% are from Kanata-Stittsville, 22% are external and 7% are from the Rural West. The trips originating in Kanata Stittsville are destined for South Nepean (60%), Rural Southwest (20%) and Rural Southeast (8%). The trips originating in the Rural Southwest are destined for Merivale (20%), Bayshore/Cedarview (24%), Alta Vista (8%), Ottawa West (7%) and Ottawa Centre/Inner Area (19%).

These results illustrate that the model is predicting existing travel movements in a reasonable manner. In general, trips from Kanata-Stittsville use Fallowfield Road when the destinations are in the south part of Ottawa and use Old Richmond Road when the destinations are inside the Greenbelt. Trips from the Rural Southwest use Fallowfield Road for a broad range of destinations inside and outside the Greenbelt and use Old Richmond Road when the destinations are specifically in the Bayshore/ Cedarview area.

Following examination of the 2010 Do Nothing scenario, the TRANS model was used to assess 2031 conditions for the Do Nothing scenario as well as for the widening of Old Richmond Road and for the widening of Fallowfield Road.

**Table 35** provides the origin and destination data for trips on Old Richmond Road and Fallowfield Road for the year 2031 without widening of either of these roadways. **Table 36** provides this trip data for the same locations for the year 2031 assuming that Fallowfield Road is widened. **Table 37** provides trip origin and destination data for the same locations for the year 2031 assuming that Old Richmond Road is widened.

As expected, the results show that trips are attracted to routes with greater capacity. **Table 34** illustrates that the do nothing scenario has fewer trips on the two links under study than the scenarios where a road is widened.

**Table 34. Comparison of Trips on Old Richmond Road and Fallowfield Road**

Scenario	Old Richmond Rd	Fallowfield Rd	Total Trips
Do Nothing	1264	1075	2339
Widen Fallowfield	1227	1628	2855
Widen Old Richmond-West Hunt Club	1966	1031	2997

The origins and destinations of trips remain similar for the three scenarios and the roadway that is not widened has approximately the same volume of traffic as in the Do Nothing scenario. Trips from Kanata-Stittsville constitute the majority of the trips, accounting for 66-73% of the total trips at these two locations.

**Table 35. Do Nothing 2031 AM Scenario**
**Old Richmond Rd. between Stonehaven Dr. & West Hunt Club Rd. (Inbound)**

Origin	Destination														Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester/ Leitrim	South Nepean	Rural Southwest	Other		
Rural Southwest	6	8	2	2	2	0	45	15	157	0	0	0	43	280	
Kanata/Stittsville	21	62	11	13	114	141	233	33	270	1	4	0	77	979	
External District	0	0	0	0	0	0	0	0	5	0	0	0	0	5	
Trip Totals	27	69	13	14	116	141	278	49	432	1	4	0	120	1264	

**Fallowfield Rd. between Eagleson Rd. & Old Richmond Rd. (Inbound)**

Origin	Destination														Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester/ Leitrim	South Nepean	Rural Southwest	Other		
Rural Southwest	34	36	12	12	15	1	67	24	81	0	6	2	39	329	
Kanata/Stittsville	0	0	0	0	0	1	3	0	0	61	535	34	7	640	
Rural West	0	0	0	0	0	0	0	0	0	0	2	49	0	52	
External District	0	0	0	0	0	0	0	0	0	3	27	11	13	54	
Trip Totals	34	36	12	12	15	3	70	24	81	65	570	96	58	1075	

In the 2031 Do Nothing scenario, trips from Kanata Stittsville use Old Richmond Road for destinations inside the Greenbelt and use Fallowfield Road for trips to the south side of Ottawa. This is similar to the existing traffic pattern. Trips from the Rural Southwest traffic zone use Old Richmond Road for destinations such as Bayshore-Cedarview, Merivale and Ottawa West and Fallowfield Road for these and other destinations.

**Table 36. Widen Fallowfield Road 2031 AM Scenario**
**Old Richmond Rd. between Stonehaven Dr. & West Hunt Club Rd. (Inbound)**

Origin	Destination												Totals	
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	Other	
Rural Southwest	1	1	0	0	1	0	3	1	115	0	0	0	2	125
Kanata/Stittsville	26	80	14	17	131	137	244	43	302	0	0	0	102	1095
External District	0	0	0	0	0	0	0	0	7	0	0	0	0	7
Trip Totals	27	81	14	17	132	137	247	44	424	0	0	0	104	1227

**Fallowfield Rd. between Eagleson Rd. & Old Richmond Rd. (Inbound)**

Origin	Destination												Totals	
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	Other	
Rural Southwest	35	39	12	12	38	11	73	25	86	0	12	10	42	396
Kanata/Stittsville	0	0	0	0	1	3	5	0	0	111	759	81	33	992
Rural West	0	0	0	0	0	0	0	0	0	7	20	88	36	151
External District	0	0	0	0	0	2	1	0	0	19	33	13	22	90
Trip Totals	35	39	12	12	39	15	79	25	86	137	823	191	133	1628

In the 2031 Widen Fallowfield Road scenario, trips from Kanata Stittsville still use Old Richmond Road for destinations inside the Greenbelt and use Fallowfield Road for trips to the south side of Ottawa. Trips from the Rural Southwest use Old Richmond Road for Bayshore-Cedarview destinations and Fallowfield Road for this and all other destinations.

**Table 37. Widen Old Richmond 2031 AM Scenario**
**Old Richmond Rd. between Stonehaven Dr. & West Hunt Club Rd. (Inbound)**

Origin	Destination												Totals	
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	Other	
Rural Southwest	20	25	7	7	33	12	129	27	221	0	0	0	55	536
Kanata/Stittsville	37	111	20	24	173	166	321	57	369	2	6	0	133	1420
External District	0	0	0	0	1	0	1	0	8	0	0	0	0	10
Trip Totals	57	136	27	31	207	178	451	84	597	2	6	0	189	1966

**Fallowfield Rd. between Eagleson Rd. & Old Richmond Rd. (Inbound)**

Origin	Destination												Totals	
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Merivale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	other	
Rural Southwest	31	35	11	11	34	10	67	23	81	0	8	3	37	351
Kanata/Stittsville	0	0	0	0	0	0	0	0	0	57	475	29	7	571
Rural West	0	0	0	0	0	0	0	0	0	1	2	49	0	53
External District	0	0	0	0	1	1	1	0	0	4	27	10	13	57
Trip Totals	31	35	11	11	35	11	70	23	81	62	513	91	57	1031

In the 2031 Widen Old Richmond-West Hunt Club Road scenario, trips from Kanata Stittsville again generally use Old Richmond Road for destinations inside the Greenbelt and use Fallowfield Road for trips to the south side of Ottawa. Trips from the Rural Southwest to most destinations are more divided between Old Richmond Road and Fallowfield Road with more trips using Old Richmond Road for destinations on the west side of Ottawa. There is a closer division between Old Richmond Road and Fallowfield Road for trips to downtown Ottawa and the east end of Ottawa.

**Summary of Origins and Destinations:**

In all scenarios, most of the trips using Old Richmond Road are from the Kanata-Stittsville area. Trips from Kanata-Stittsville use Fallowfield Road for destinations to the south of the City. Widening of Fallowfield Road did not affect the use of Old Richmond Road by Kanata-Stittsville traffic but did attract additional trips destined for the southern portion of the City. These may have been trips that previously made use of the provincial highway system or other roads.

Given the identified need to provide additional capacity across the Greenbelt for Kanata-Stittsville trips and the major role that the Kanata-Stittsville trips play in the travel patterns in the area under study, the analysis indicates that the widening of Fallowfield Road would not address the identified problem.

The results of this work were incorporated into an evaluation of the two routes.

**Review of 2013 TMP Update:**

Following the release of the 2013 TMP update, a new origin-destination review was undertaken to reflect the 2031 Affordable Road Network, which includes less road and transit infrastructure than the 2031 network from the 2008 TMP. In this scenario, 2207 trips were generated on Old Richmond Road and 1262 trips were generated on Fallowfield Road.

**Table 38** provides the origin and destination data for the 2031 affordable road network of the 2013 TMP update.

Trips from Kanata Stittsville account for 78% of the total trips across the two links identified; 86% of the trips on Old Richmond Road and 63% of the trips on Fallowfield Road. Again, only those trips from Kanata-Stittsville destined for South Gloucester/Leitrim, South Nepean and the Rural Southwest used Fallowfield Road.

**Table 38. 2013 TMP Update – 2031 Affordable Road Network AM Scenario**
**Old Richmond Rd. North of Stonehaven Dr. (Inbound)**

Origin	Destination													Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Mervale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	Other	
Rural Southwest	0	12	0	0	25	10	93	4	149	0	0	0	3	296
Kanata/Stittsville	113	155	44	59	200	124	440	106	423	0	1	0	236	1900
External District	0	0	0	0	0	1	0	8	0	0	0	0	1	11
Total Trips	113	168	44	59	224	134	534	109	580	0	1	0	240	2207

**Fallowfield Rd. East of Old Richmond Rd. (Inbound)**

Origin	Destination													Totals
	Ottawa Centre	Ottawa Inner Area	Ottawa East	Beacon Hill	Alta Vista	Hunt Club	Mervale	Ottawa West	Bayshore/ Cedarview	S. Gloucester / Leitrim	South Nepean	Rural Southwest	Other	
Rural Southwest	37	75	22	7	14	0	21	69	53	0	16	6	32	352
Kanata/Stittsville	0	0	0	0	0	0	1	0	0	77	612	70	31	791
Rural West	0	0	0	0	0	0	0	0	0	1	0	64	0	66
External District	0	0	0	0	0	0	0	0	0	0	39	14	0	54
Total Trips	37	75	22	7	14	0	22	69	53	78	668	154	63	1262

This result is similar to the results found with the 2008 TMP network. The conclusion reached in the original analysis remains valid.

**7.2.1.4 Out of Way Travel**

Recognizing that the majority of traffic is from Kanata-Stittsville, providing additional capacity on Fallowfield Road will result in out-of-way travel for those drivers that select Fallowfield Road due to congestion on Old Richmond-West Hunt Club but who are destined inside the Greenbelt. The difference in travel distance from Hope Side Road to Highway 416 at West Hunt Club Road is about 6 km further via Fallowfield Road.

Diversion from one route to another is familiar to Ottawa drivers, during both regular and unanticipated congestion including construction and incidents. An example in the study area would be the experience prior to and during the widening of Highway 417 between Eagleson Road and Highway 416 as drivers sought to find the best route (Robertson Road, Hunt Club – Old Richmond and/or Fallowfield Road) across the Greenbelt.

The results of the TRANS model indicate that Old Richmond Road remains the best route for many Kanata-Stittsville drivers and only those who would use Fallowfield under normal conditions (i.e. destination in the south side of Ottawa) are better off using Fallowfield Road. Drivers from the Rural Southwest are more likely to change their route.

**7.2.2 Social Environment**
**7.2.2.1 Existing and Future Land Use**

Widening of Old Richmond and West Hunt Club Roads will affect homes within the Greenbelt and require additional Greenbelt property. With respect to the loss of the rental homes, it is noted that the NCC plans to remove rental homes in Stony Swamp at the end of their useful lives to provide an opportunity to rehabilitate the area. The existing ROW along the Old Richmond Road-West Hunt Club corridor is not adequate for a four-lane road. Widening of Fallowfield Road will affect rural residential and farmland as the existing ROW is not adequate for a four-lane road. Diversion of traffic from Kanata-Stittsville to Fallowfield Road has the potential to impact on Fallowfield Village along Old Richmond Road. Homes are located along this route where the ROW is about 26 m wide.

The widening of Fallowfield Road west of Highway 416 is not consistent with the OP and the TMP. Traffic from planned and ongoing developments such as the Fernbank Community, Monahan Landing, Soho and the urban expansion lands in Stittsville will experience congestion and/or out-of-way travel. The widening of the Old Richmond Road-West Hunt Club corridor is consistent with the City's OP, TMP, and the NCC's 2013 Greenbelt Master Plan Review.

Provision of additional road capacity to the south of Kanata-Stittsville may place unintended pressure on the urban boundary between Hope Side Road and Fallowfield Road. Developers continue to assemble agricultural land on the Richmond Plain for future development.

**7.2.2.2 Property Acquisition**

As noted above, there will be property acquisition required along both corridors. Through the Greenbelt, the NCC will require a land exchange. Along Fallowfield Road, property will be required from agricultural and rural residential properties. The need for any further infrastructure improvement to accommodate diverted traffic may also impact on property requirements.

**7.2.2.3 Costs**

The capital and property costs are expected to be similar along the two corridors. Fallowfield Road corridor requires widening of 6.2 km of road from two to four lanes while the Old Richmond Road-West Hunt Club corridor requires widening of 5.3 km of road. The Old Richmond Road-West Hunt Club corridor will have higher costs associated with environmental mitigation and protection.

**7.2.3 Natural Environment**

The potential effects on aquatic habitat involved the Monahan Drain for Fallowfield Road and the Stillwater Creek Tributary for the Old Richmond Road-West Hunt Club corridor. In both cases, appropriate mitigation measures are available to result in no net adverse effects.

For terrestrial habitat, vegetation and wetlands, the widening of Fallowfield Road may have edge impacts along Monaghan Forest west of Moodie Drive. The widening of Old Richmond Road-West Hunt Club corridor will have impacts through Stony Swamp Core Natural Area including within provincially significant wetlands. Biodiversity within Stony Swamp is particularly documented. Habitat for Species at Risk may be present along both corridors.

#### **7.2.4 Cultural Environment**

Both routes involved largely undisturbed areas with archaeological potential that will require investigation prior to construction. Both routes have built heritage resources, generally back from the roadway. Impacts on built heritage including churches, homes and barns will be avoided where possible. Both routes have cultural landscapes such as the view of the Richmond Plain from the Hazeldean Ridge. Old Richmond Road is a historic road built during settlement of the area while other roads are also original township roads, modified to eliminate offset connections at some locations (such as Fallowfield Road and Old Richmond Road, West Hunt Club and Moodie Drive, Eagleson and Hope Side Road).

#### **7.2.5 Physical Environment**

In addition to the widening of Fallowfield Road, focus on that corridor may require additional road infrastructure to provide adequate access from Kanata Stittsville such as the widening of Eagleson Road and Old Richmond Road both from Hope Side Road to Fallowfield Road.

Along the Fallowfield corridor, the power lines are generally along one side of the road; however, they switch sides on occasion. There are also guy poles on the opposite side of the road in some locations. Relocation of some power poles and guy poles will be unavoidable. Along the Old Richmond Road-West Hunt Club corridor, the power lines are also generally along one side of the road, minimizing the pole relocations required with widening. The new large gas pipeline installed by Enbridge in 2013 will not impact on the Old Richmond Road-West Hunt Club corridor.

Additional paved area (impervious surface) results in a larger quantity of runoff, which would be similar for both routes. In rural areas, roadside ditches are generally adequate for quantity and quality treatment. Stormwater management requirements would need to be investigated for either route.

### **7.3 Evaluation and Selection of the Preferred Route**

Table 39 provides a summary of the evaluation of the alternative routes and the selection of the preferred.

**Table 39. Evaluation of Alternative Routes**

Evaluation Criteria	Do Nothing	Fallowfield Corridor Widening	Old Richmond-West Hunt Club Corridor Widening
<b>Does it address the identified needs?</b>			
<b>Transportation and Traffic:</b>			
Pedestrian and Cyclist Accommodation	<ul style="list-style-type: none"> <li>No improved accommodation for pedestrians and cyclists</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to improve pedestrian and cyclist access along Fallowfield</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to improve pedestrian and cyclist connections within and through the Greenbelt for South Kanata and Fallowfield Village residents</li> </ul>
Level of Service/ Capacity	<ul style="list-style-type: none"> <li>Does not address the needed road capacity. Congestion and safety concerns will remain and be exacerbated in time. Project Screenline V/C= 1.08</li> <li>Total of Screenlines 9 and 10 V/C= 0.97 (represents the capacity crossing the Greenbelt west of the Rideau River)</li> </ul>	<ul style="list-style-type: none"> <li>Increased capacity across project screenline but not across the Greenbelt. Project Screenline V/C = 0.94</li> </ul>	<ul style="list-style-type: none"> <li>Increased capacity across the project screenline and the Greenbelt. Project Screenline V/C = 0.94</li> </ul>
Vehicle origin and destination	<ul style="list-style-type: none"> <li>About 60% of traffic using Fallowfield Road in the future is from Kanata-Stittsville and is destined for South Nepean. One third of traffic is from the Rural SW and destined for locations in the west, south and inner area of the city</li> <li>About 77% of traffic using Old Richmond Road is from Kanata Stittsville and destined for Bayshore/Cedarview, Merivale, Hunt Club and Alta Vista</li> </ul>	<ul style="list-style-type: none"> <li>About two-thirds of traffic using Fallowfield Road in the future is from Kanata-Stittsville destined for South Nepean, South Gloucester/ Leitrim and Rural Southwest areas of Ottawa. About one third of traffic using Fallowfield Road in the future is from the Rural SW and Rural West. This traffic uses Fallowfield Road for a variety of destinations in central, south, and west Ottawa</li> <li>About 90% of trips using Old Richmond Road are from Kanata-Stittsville and are destined for a range of destinations, except the south side of Ottawa</li> </ul>	<ul style="list-style-type: none"> <li>The majority of drivers using Old Richmond now and in the future are from Kanata-Stittsville. The majority of this traffic has destinations in Bayshore/Cedarview, Merivale Alta Vista, Hunt Club and the central area of Ottawa. Rural SW drivers use Old Richmond primarily where their destination is the Bayshore/Cedarview area of Ottawa with some headed for Merivale.</li> </ul>
Out of way travel	<ul style="list-style-type: none"> <li>Drivers may select other routes involving out of way travel to avoid congestion delays</li> </ul>	<ul style="list-style-type: none"> <li>From Hope Side Road to Hwy 416 at West Hunt Club Road via Fallowfield Road; 11.7 km</li> <li>Capacity is provided away from major desire line for traffic flow</li> </ul>	<ul style="list-style-type: none"> <li>From Hope Side Road to Hwy 416 at West Hunt Club via Old Richmond; 5.7 km</li> <li>Capacity is provided along existing major desire line for traffic flow</li> </ul>
<b>What are the preliminary identified impacts?</b>			
<b>Socio-Economic:</b>			
Existing and Future Land Use	<ul style="list-style-type: none"> <li>Not consistent with OP/TMP</li> <li>Does not impact on existing homes in the Greenbelt</li> <li>Does not support planned development</li> </ul>	<ul style="list-style-type: none"> <li>Not consistent with OP/TMP</li> <li>Affects Fallowfield Village, rural residential along Fallowfield Road west of Moodie Drive and farms with additional traffic and property acquisition for widening</li> <li>Potential impacts to field tile drainage</li> <li>Some support for planned development (requires out of way travel)</li> <li>May put pressure on urban boundary and development, encouraging urban sprawl adjacent to Fallowfield Road</li> </ul>	<ul style="list-style-type: none"> <li>Consistent with OP/TMP and NCC Greenbelt Master Plan (GMP)</li> <li>Affects rural residences within the Greenbelt, which are slated for eventual removal</li> <li>Supports planned development (provides most direct route for many)</li> <li>Forms boundary around Kanata South urban area</li> </ul>
Property Acquisition	<ul style="list-style-type: none"> <li>No property required</li> </ul>	<ul style="list-style-type: none"> <li>Property required from rural residential and agricultural lands</li> </ul>	<ul style="list-style-type: none"> <li>Land exchange within Stony Swamp required with the NCC</li> </ul>
Costs	<ul style="list-style-type: none"> <li>No capital costs</li> <li>Increased user costs due to congestion</li> </ul>	<ul style="list-style-type: none"> <li>Capital cost associated with 6.2 km of road widening</li> <li>Increased user costs due to out of way travel</li> </ul>	<ul style="list-style-type: none"> <li>Capital costs incl. mitigation associated with 5.3 km of road widening</li> </ul>
<b>Natural Environment:</b>			
Aquatic and Terrestrial Habitats; Flora and Fauna	<ul style="list-style-type: none"> <li>No direct impacts to Monahan Drain or Stillwater Creek Tributary, agricultural areas or the Greenbelt</li> </ul>	<ul style="list-style-type: none"> <li>Potential edge impacts along Monaghan Forest west of Moodie Drive</li> <li>Requires mitigation of impacts to culvert extension for Monahan Drain crossing west of Old Richmond Road</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts within Stony Swamp along existing road corridor including physical and other impacts (noise, lighting, runoff). Affects Greenbelt core natural area with excellent biodiversity.</li> <li>Requires mitigation to result in no net loss of wetland area, no net loss of wetland ecological function and no residual adverse effects at Stillwater Creek tributary</li> </ul>
<b>Cultural Environment:</b>			
Archaeology and Heritage	<ul style="list-style-type: none"> <li>No impact on archaeology and heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>Historic farming area, potential change to westbound views of Richmond Plain</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts on viewscapes/roadscapes along historic road through Stony Swamp and the Richmond Plain farming area</li> </ul>
<b>Physical Environment</b>			
Infrastructure, Utilities and Services	<ul style="list-style-type: none"> <li>No impact on utilities and services</li> <li>No additional road infrastructure required</li> </ul>	<ul style="list-style-type: none"> <li>No direct impacts to gas pipeline. Likely feasible to widen away from most power lines</li> <li>In addition to widening of Fallowfield Road from Highway 416 to Eagleson Road, may require future widening of Eagleson &amp; Old Richmond Roads south of Hope Side Road</li> </ul>	<ul style="list-style-type: none"> <li>No direct impacts to gas pipeline. Likely feasible to widen away from most power lines</li> <li>Need to widen Old Richmond Road and West Hunt Club Road from Hope Side Road to Hwy 416</li> </ul>
Stormwater Management	<ul style="list-style-type: none"> <li>No additional pavement area creating greater storm runoff</li> </ul>	<ul style="list-style-type: none"> <li>Additional pavement width (1 lane in each direction)</li> </ul>	<ul style="list-style-type: none"> <li>Additional pavement width (1 lane in each direction)</li> </ul>
Summary – Recommendation	Does not address the problem. Carry forward for comparison purposes only.	<p><b>The widening of Fallowfield Road corridor is not preferred. Do not carry forward.</b></p> <ul style="list-style-type: none"> <li>No physical impact on Stony Swamp; however,</li> <li>Does not address required travel; results in out of way travel for many</li> <li>More impacts on rural communities and rural land uses</li> <li>Not consistent with the OP and TMP</li> <li>Potential pressure on urban boundary</li> </ul>	<p><b>The widening of Old Richmond-West Hunt Club Road is preferred. Carry forward.</b></p> <ul style="list-style-type: none"> <li>Potential impacts through Stony Swamp along existing corridor require mitigation and land exchange that meets NCC requirements</li> <li>Less out of way travel and delays; addresses travel for users</li> <li>Less impacts to communities</li> <li>Consistent with the OP and TMP policies and NCC GMP</li> </ul>

## 8. Design Alternatives

### 8.1 Design Issues

The study area includes a Core Natural Area of the Greenbelt with its natural heritage values as well as areas of existing and proposed development and rural land uses. The corridor functions as an important transportation link from Kanata South across the Greenbelt to Highway 416 and West Hunt Club Road.

The considerations that helped the team to generate, develop and evaluate design alternatives and mitigation measures to address potential adverse impacts included:

- Environmental sensitivity of Stony Swamp, which is a Core Natural Area within the NCC Greenbelt
- Presence of habitat potentially suitable for Species at Risk
- 2013 construction of a large gas pipeline by Enbridge within the municipal road ROW along the corridor
- Presence of popular year-round recreational paths and parking areas within Stony Swamp accessed from Old Richmond Road and West Hunt Club Road as well as from Moodie Drive
- Desire to accommodate pedestrian and cyclist movements in the corridor and provide connections to Greenbelt pathways where feasible
- Presence of ongoing development north of Hope Side Road in the Study Area and west of Eagleson-Terry Fox in the Stittsville-Kanata areas
- Predominant east-west movement through the Greenbelt served by the corridor
- Active industrial area on Moodie Drive south of West Hunt Club Road
- Request for access to Hope Side Road/Old Richmond Road intersection from the Tomlinson quarry

### 8.2 Identification, Assessment and Evaluation of Design Alternatives

Based on the Project need and existing conditions, the following alternative designs were identified:

- Road realignment – between Hope Side Road and Old Richmond Road, between Old Richmond Road and West Hunt Club Road)
- Cross-section – three lanes with centre lane reversible or four lanes and a median (Old Richmond Road and West Hunt Club Road)
- Intersection traffic control – signals or roundabout

#### 8.2.1 Road Realignment

Realignments at the intersections of Hope Side Road and Old Richmond Road and at Old Richmond Road and West Hunt Club Road were of interest to reduce the need for the dominant flow of traffic to turn at the intersection. Concept plans were developed for these two locations and their feasibility was assessed. To minimize property requirements 280 m radii (requiring 4% super elevation) were selected. Because of the complexities of the reversible lane concept, the realignment of Old Richmond Road and West Hunt Club Road was a prerequisite of the reversible lane alternative.

The original realignment concepts are provided in **Figure 17**.

Figure 17. Intersection Realignment Concepts



The feasibility of the realignment of Hope Side Road and Old Richmond Road was examined. Due to the amount of traffic along Old Richmond Road now and the forecasted volumes of traffic in the future, it would be necessary to construct a southbound double left turn lane on the realignment as well as a channelized northbound right turn. The level of service for traffic would not be as good with the realignment and it would require a significant purchase of land approved for development. Since this design alternative would not provide the anticipated level of service benefit for traffic and would have significant property impacts, it was screened out from further consideration.

As noted, the realignment of Old Richmond – West Hunt Club is a pre-requisite of the reversible lane option and it was also considered for the four-lane option. Signals and a roundabout were considered for this location. A separate evaluation was not undertaken. Instead this realignment was considered in conjunction with the cross-section and intersection traffic control alternative designs.

### 8.2.2 Three versus Four-laneCross-section

The feasibility of a centre reversible lane from Stonehaven Drive easterly to Highway 416 was investigated to reduce direct impacts through the Core Natural Area of Stony Swamp. The development of the concept plan followed the Transportation Association of Canada Reversible Lane Guideline document. This document provides a checklist to assess the appropriateness of a location for reversible lanes. Using this Guideline, **this location is appropriate for the development of a reversible lane** based on considerations described in **Table 40**.

**Table 40. Checklist of Criteria for Reversible Lane**

Consideration	Criteria	This Location
<b>Mobility</b>	Traffic flow at least 65/35 split during peak Significant queues exist Demand is over capacity Demand is predictable Congestion last more than 1 hour	Yes Yes Yes Yes Yes
<b>Traffic/ Parking/ Pedestrians</b>	Left/right turns are limited Incident management must be provided Parking is restricted	Yes Available No parking
<b>Network</b>	Limited alternative routes available Adequate space for appropriate entrance/ exit design Provisions for emergency vehicles Transit changes needed?	Yes During design During design No
<b>Risk/ Safety</b>	Minimal side streets Adequate transitions to reversible lane Minimize head-on collision risk Minimize driver workload Accommodate pedestrians	Yes During design During design During design During design
<b>Environment</b>	Reduced emissions Reduced land required Less materials for construction	Yes Yes Yes

Capital cost of equipment for a reversible lane is estimated at \$1.4 million. An estimate of 5% is suggested for annual maintenance for an equipment installation of this type (about \$70,000).

As a result of this preliminary analysis, designs for both a three-laneand four-lanealternative were prepared and evaluated. **Table 41** provides a screening of the criteria to identify those that help distinguish between the alternatives. The criteria in gray will be considered.

**Table 41. Screening of Evaluation Criteria**

Criteria Group	Criteria	Screening
<b>Transportation and Traffic</b>	Safety	<ul style="list-style-type: none"> <li>Physical separation of traffic is preferable. Safety will be considered</li> </ul>
	Emergency Response	<ul style="list-style-type: none"> <li>Presence of a median may impact the ability of emergency responders to get passed traffic. Emergency response will be considered.</li> </ul>
	Level of Service/Capacity	<ul style="list-style-type: none"> <li>Level of Service will be considered.</li> </ul>
	Road Geometry	<ul style="list-style-type: none"> <li>Road geometry will be considered.</li> </ul>
<b>Socio-Economic Environment</b>	Land Use	<ul style="list-style-type: none"> <li>There are existing rental houses within the Greenbelt that will be impacted (front yard and driveway). They are planned for eventual removal. Impact on existing and future land use will be considered.</li> </ul>
	Recreation	<ul style="list-style-type: none"> <li>Road widening will have no impact on existing parking areas or trails within the Greenbelt for recreational users. Both alternatives will provide an opportunity to improve access for pedestrians and cyclists to the trails through the enhancement of paved shoulders.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>There are residences backing towards Old Richmond Road north of Stonehaven Drive. Noise impacts will be considered.</li> </ul>
	Community and Greenbelt Linkages	<ul style="list-style-type: none"> <li>A future crossing by the Greenbelt trail is proposed in the vicinity of Old Richmond Road and West Hunt Club Road. There will be no difference in the opportunity to provide community and Greenbelt linkages.</li> </ul>
	Property requirements	<ul style="list-style-type: none"> <li>Greenbelt land required is a significant consideration as NCC Greenbelt policies require "no net loss" of area.</li> </ul>
	Capital Costs	<ul style="list-style-type: none"> <li>The construction cost will vary depending of the width of the road, the amount of rock excavation, mitigation requirements and the need for signals, overhead signs and other equipment.</li> </ul>
<b>Natural Environment</b>	Operations and Maintenance Costs	<ul style="list-style-type: none"> <li>Operations and maintenance costs will be considered as they will vary depending on the area of asphalt and equipment needs.</li> </ul>
	Aquatic Habitat and Fisheries	<ul style="list-style-type: none"> <li>A tributary of Stillwater Creek crosses West Hunt Club Road east of Moodie Drive and the wetlands along Old Richmond Road and West Hunt Club Road form the headwaters of Stillwater Creek and others. Impact on aquatic habitat and fisheries will be considered.</li> <li>It is anticipated that impacts to fish habitat within wetlands will be negligible due to the lack of defined channels in the area of impact.</li> </ul>
	Terrestrial Habitat, Wildlife and Vegetation	<ul style="list-style-type: none"> <li>The area impacted is through the Greenbelt from Stonehaven Drive to Highway 416. The impact on terrestrial habitat, wildlife and vegetation will be considered.</li> </ul>
	Wetlands	<ul style="list-style-type: none"> <li>There is provincially significant wetland in this area along Old Richmond Road and West Hunt Club Road. Wetland impacts will be considered.</li> </ul>
<b>Cultural Environment</b>	SAR	<ul style="list-style-type: none"> <li>Any loss of terrestrial and wetland habitat must be examined for SAR potential. Impact on potential habitat will be considered.</li> </ul>
	Archaeology	<ul style="list-style-type: none"> <li>Undisturbed areas with archaeological potential must be identified for investigation prior to construction. Both alternatives will involve widening; and Stage 2 work will be required in undisturbed areas beyond work completed by Enbridge Gas.</li> </ul>
	Heritage	<ul style="list-style-type: none"> <li>There are no changes to built heritage.</li> </ul>
<b>Physical Environment</b>	Cultural Landscapes	<ul style="list-style-type: none"> <li>The impact of road geometry, equipment and overhead signs on viewscapes of natural areas, water and rural scenes will be considered.</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>Infrastructure will be considered.</li> </ul>
	Surface Water and Drainage	<ul style="list-style-type: none"> <li>Both alternatives will need to consider new culverts under the roadway based on work by others. Wider asphalt will result in additional runoff. Drainage will be considered.</li> </ul>

**Table 42** provides a description of the evaluation of the three-lane (reversible lane) cross-section and the four-lanecross-section (with median).

**Table 42. Evaluation of Three and Four-lane Cross-sections**

Criteria	Measure	Widen to 3 Lanes with Reversible Lane	Widen to 4 Lanes with Median
<b>Transportation and Traffic</b>			
Safety	<ul style="list-style-type: none"> <li>Road characteristics and their influences on safety/ collision experience (better/worse)</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Unusual configuration, especially for unfamiliar drivers (reversible lane)</li> <li>No separation of directions results in potential conflict/risk between turning and through movements and between through movements (turning, sideswipe, approach crashes)</li> <li>Presence of gantries and equipment requires installation of barriers or protection of the clear zone for roadside safety</li> <li>Requires mitigation for equipment failure to avoid lack of guidance for drivers regarding lane use</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>Conforms to driver expectation (four-lane divided road)</li> <li>Potential for raised median allows positive separation of travel directions, reducing potential conflicts. Will require U-turns at intersections to provide access to homes and parking lots</li> <li>Divided road warranted with existing and future traffic volumes (greater than 20,000 AADT). Narrow raised median without a barrier is not standard for separation of opposing traffic at anticipated rural speeds</li> </ul>
Emergency Response	<ul style="list-style-type: none"> <li>Space available for emergency responders to proceed through traffic (better/worse – shoulder widths, # of lanes)</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Paved shoulders and 1-2 lanes in each direction allow emergency responders to maneuver around traffic</li> <li>Incident in non-peak direction has greater potential to block a direction of travel (one lane plus shoulder) for emergency vehicles and incidents can more easily spill over into the other travel direction</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>Paved shoulders and 2 lanes per direction to allow emergency responders to maneuver around traffic</li> <li>Raised median to minimize risk of incident spilling over into opposing direction</li> </ul>
Level of Service/Capacity	<ul style="list-style-type: none"> <li>Calculated LOS</li> </ul>	<ul style="list-style-type: none"> <li>Similar LOS as two lanes are provided in the peak direction in both alternatives. Reversible lane is generally not carried through intersections.</li> </ul>	
Road Geometry	<ul style="list-style-type: none"> <li>Presence of substandard elements (yes/no)</li> <li>Ability to provide <b>above minimum</b> standards for design speed including cross-section elements such as clear zone</li> </ul>	<b>YES</b> <ul style="list-style-type: none"> <li>No median protection (warranted by traffic volumes)</li> <li>Lane and shoulder widths, horizontal and vertical alignments are in accordance with standards</li> </ul>	<b>YES</b> <ul style="list-style-type: none"> <li>Raised median of 1.5 m width does not provide standard protection for design speed of 90 km/h</li> <li>Lane and shoulder widths, horizontal and vertical alignments are in accordance with standards</li> </ul>
Transportation and Traffic Summary	Safety is a concern with respect to the 3-lane cross-section due to the complexity of the driving environment. None of the examples of reversible lanes in other locations in North America are as long as the proposed corridor from Stonehaven Drive to Highway 416. Experience in the national capital region is limited to bridges and urban low speed environments. Speeds are another safety concern with the reversible lane operation. Single motor vehicle crashes are a concern in this area and the availability of a narrow median with the 4-lane cross-section provides positive separation for the two directions of travel. The raised median also helps to contain a collision to one direction of travel and minimizes the potential for full road closure. The gantries for the reversible lane signalling equipment must be protected by steel beam guiderail due to the posted and operating speeds along this corridor.		
<b>Socio-Economic Environment</b>			
Land Use	<ul style="list-style-type: none"> <li>Impact on existing and future land uses</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>Will require land through the Greenbelt and may impact existing homes slated for eventual removal on the west side of Old Richmond Road.</li> <li>An additional home on West Hunt Club Road will be impacted by intersection construction (same for 3 and 4-lane alternatives)</li> <li>Both alternatives will provide the same road capacity to support development</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Will require more land through the Greenbelt and will impact two existing homes slated for eventual removal on the west side of Old Richmond Road</li> <li>An additional home on West Hunt Club Road will be impacted by intersection construction (same for 3 and 4-lane alternatives)</li> <li>Both alternatives will provide the same road capacity to support development</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Increase in south levels of 5 dBA or more. Sound levels 55 dBA or greater</li> </ul>	<ul style="list-style-type: none"> <li>Similar noise levels above 60 dBA in the Greenbelt. Mitigation not technically feasible. Homes to be removed eventually.</li> </ul>	
Property requirements	<ul style="list-style-type: none"> <li>Area of Greenbelt land required</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>3.3 ha (using 3 m buffer to grading limit)</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>6.0 ha (using 3 m buffer to grading limit)</li> </ul>
Capital Costs	<ul style="list-style-type: none"> <li>Relative cost</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>\$16.2 million (plus property and mitigation)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>\$15.8 million (plus property and mitigation)</li> </ul>
Operations and Maintenance Costs	<ul style="list-style-type: none"> <li>Relative cost</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Potentially less salt; less pavement area to maintain.</li> <li>Reversible lane equipment maintenance estimated at \$70,000 per year (include gantries, signals, equipment)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>More pavement area to maintain, including salt application.</li> </ul>
Socio-Economic Summary	<p>The 3-lane cross-section has a narrower footprint than the 4-lane cross-section and therefore would require less right-of-way acquisition. The 4-lane alternative provides a refuge for pedestrians crossing the road and the "traditional" operation means that there is no confusion about which way vehicles may be approaching in the centre lane.</p> <p>The 3-lane cross-section has a greater capital and operating cost than the 4-lane cross-section due to the equipment and infrastructure required to support the reversible lane construction and operation. The mitigation costs in Stony Swamp to achieve no net loss of ecological function and no net loss of area are expected to be similar (wildlife culverts may be shorter for the 3-lane alternative while fencing and walls would be the same for both).</p>		
<b>Natural Environment</b>			
Aquatic Habitat and Fisheries	<ul style="list-style-type: none"> <li>Impacts to Stillwater Tributary culvert (length of extension required)</li> <li>Impacts to fish habitat areas within wetlands (m<sup>2</sup>)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>There will be a permanent footprint impact as a result of the culvert extension of 6 m.</li> <li>No other long-term impacts to the ecological function of fish habitat are anticipated.</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>There will be a permanent footprint impact as a result of the culvert extension of 10 m</li> <li>No other long-term impacts to the ecological function of fish habitat are anticipated.</li> </ul>
Terrestrial Habitat, Wildlife and Vegetation	<ul style="list-style-type: none"> <li>Area of wooded area impacted (m<sup>2</sup>)</li> <li>Length of edge affected (m)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>1.5 ha woodland</li> <li>3.5 km edge</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>3.3 ha woodland</li> <li>4.5 km edge</li> </ul>

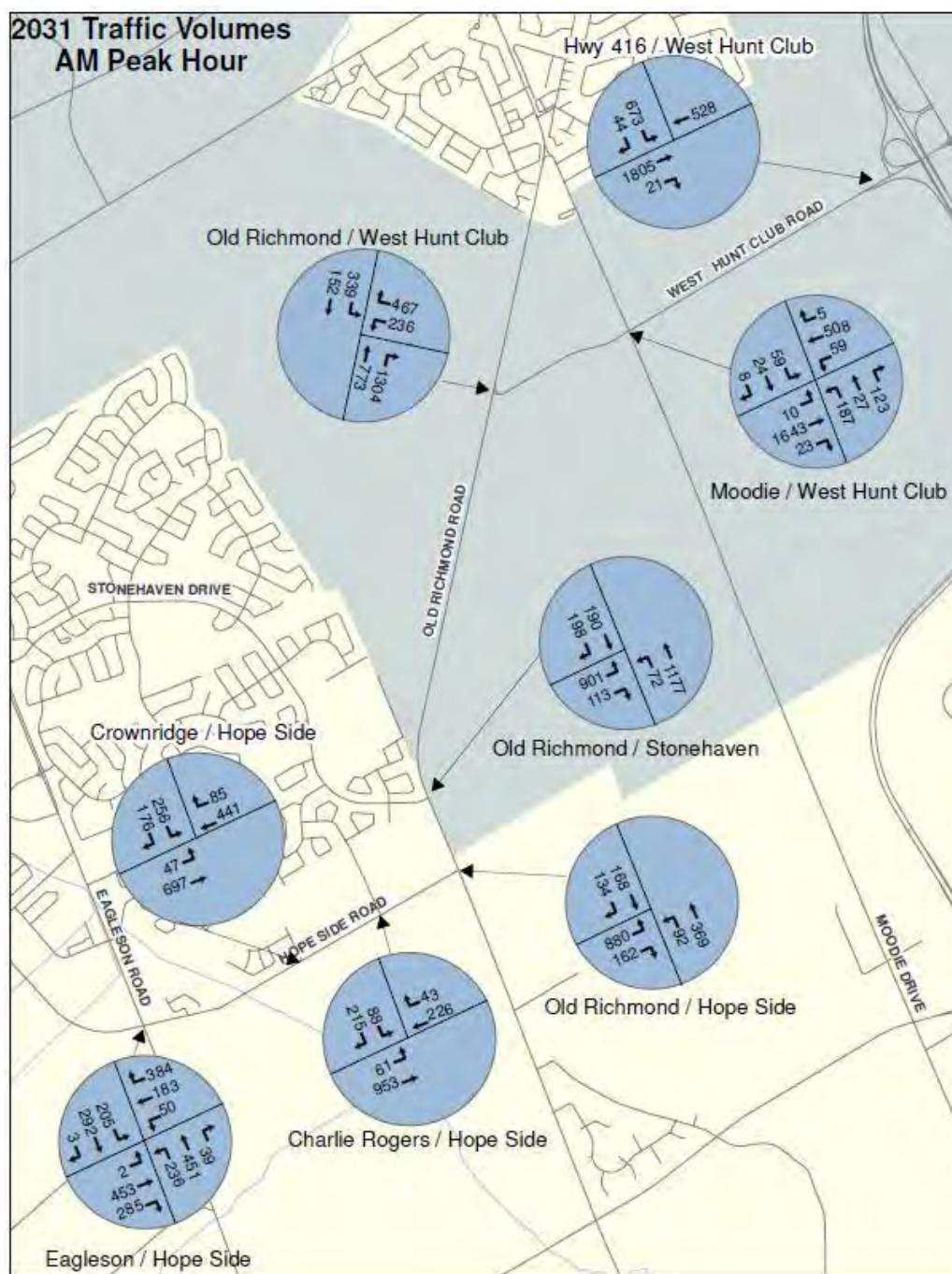
**Table 42. Evaluation of Three and Four-lane Cross-sections**

Criteria	Measure	Widen to 3 Lanes with Reversible Lane	Widen to 4 Lanes with Median
Wetlands	<ul style="list-style-type: none"> <li>Area of PSW impacted</li> <li>Impact on ecological function (defined)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>1.7 ha PSW</li> <li>Note that the majority of the area of PSW impacted will be cattail marsh, a common community in Ontario and within the PSW complex. Ecological function will be defined for the preferred alternative and measures recommended to result in no net loss</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>2.2 ha PSW</li> <li>Note that the majority of the area of PSW impacted will be cattail marsh, a common community in Ontario and within the PSW complex. Ecological function will be defined for the preferred alternative and measures recommended to result in no net loss</li> </ul>
SAR	<ul style="list-style-type: none"> <li>Impact of potential SAR habitat</li> </ul>	<ul style="list-style-type: none"> <li>It is anticipated that the proposed project will have no negative impact to SAR habitat.</li> </ul>	
Natural Summary	<p>The <b>3-lane cross-section</b> has a narrower footprint than the 4-lane cross-section and therefore would require less mitigation to address loss of wetland area and function. The update of existing conditions and the assessment of the natural environment indicate the need for mitigation measures to facilitate existing wildlife movement and to avoid mortality on the road by preventing turtles, in particular, from accessing the road. Fencing and walls to prevent access to the road will be similar for both alternatives. Creation of new wetland areas and re-establishment of the forest edge will be required.</p>		
<b>Cultural Environment</b>			
Archaeology	<ul style="list-style-type: none"> <li>Grading required in area of archaeological potential (<math>m^2</math>)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>Medium potential: 0.47 ha</li> <li>High potential: 0.52 ha</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Medium potential: 0.66 ha</li> <li>High potential: 0.75 ha</li> </ul>
Cultural Landscapes	<ul style="list-style-type: none"> <li>Potential impact on heritage views and vistas (better or worse in comparison)</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Both alternatives provide views of Greenbelt natural areas. Views with 3-lane alternative are somewhat disrupted by roadside barrier and gantries required for reversible lane operation</li> <li>Lighting, gantries and equipment not in keeping with rural Greenbelt (Lighting required for arterials in urban area. Reversible lane requires gantries and equipment)</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>Both alternatives provide views of Greenbelt natural areas. Views with 4-lane alternative somewhat better without the equipment and gantries required for reversible lane operation</li> <li>Lighting not in keeping with rural Greenbelt (Lighting required for arterials in urban area)</li> </ul>
Cultural Summary	<p>Both alternatives require Stage 2 Archaeological Assessment for areas outside of wetlands and outside of work completed by Enbridge for the new pipeline to obtain clearance for construction. 4-lane alternative will have a greater area of study. The 3-lane cross-section will have greater disruption to views due to the required equipment and gantries to indicate permitted lane usage. Lighting design to minimize impacts beyond the right-of-way will be important.</p>		
<b>Physical Environment</b>			
Infrastructure	<ul style="list-style-type: none"> <li>Impact on power lines, gas pipeline, other utilities and services; Need for additional roadworks</li> </ul>	<ul style="list-style-type: none"> <li>No significant difference between the alternatives</li> <li>No anticipated impact on the gas pipeline.</li> <li>Some relocation of lighting and power poles likely.</li> </ul>	
Surface Water and Drainage	<ul style="list-style-type: none"> <li>Anticipated runoff (based on <math>m^2</math> pavement) and its impact on drainage</li> </ul>	<b>BETTER</b> <ul style="list-style-type: none"> <li>20,000 <math>m^2</math> less pavement area (61,000 <math>m^2</math> plus intersections, which are the same for both)</li> </ul>	<b>WORSE</b> <ul style="list-style-type: none"> <li>Pavement area 81,000 <math>m^2</math> plus intersections (which are the same for both alternatives)</li> </ul>
Physical Summary	<p>The 3-lane cross-section has a narrower pavement than the 4-lane cross-section and therefore would generate less runoff. Both alternatives may require relocation of lighting and power poles where these are located on both sides of the existing 2-lane road.</p>		
Overall Summary	<p><b>The footprint of the 3-lane cross-section through Stony Swamp is reduced in comparison to the 4-lane cross-section. While this smaller footprint results in lower environmental effects, safety during operations is a significant concern. Reversible lane examples within Canada and the United States include bridges and urban streets. There are also examples of reversible rural roads (i.e. 2-lane roads that carry traffic on one direction or another depending on the time of day). Without the benefit of an installation of similar length and speed to reference, a standard 4-lane roadway with a narrow raised median is preferred, recognizing the requirement to minimize the footprint as the design progresses and to provide mitigation acceptable to the NCC for the larger footprint.</b></p>		
Recommendation		Do not carry forward	Carry forward

### 8.2.3 Intersection Traffic Control

Signals and roundabouts must be assessed at each location to take advantage of the reduced delay and lower collision severity associated with roundabouts where feasible. Traffic operations were assessed for both signals and roundabouts with consideration for the traffic forecasts from the 2008 TMP and the 2013 TMP update. **Figure 18** and **Figure 19** provide the 2031 intersection traffic volumes used for the calculations.

**Figure 18. 2031 Traffic Volumes - AM Peak Hour**



**Figure 19. 2031 Traffic Volumes - PM Peak Hour**

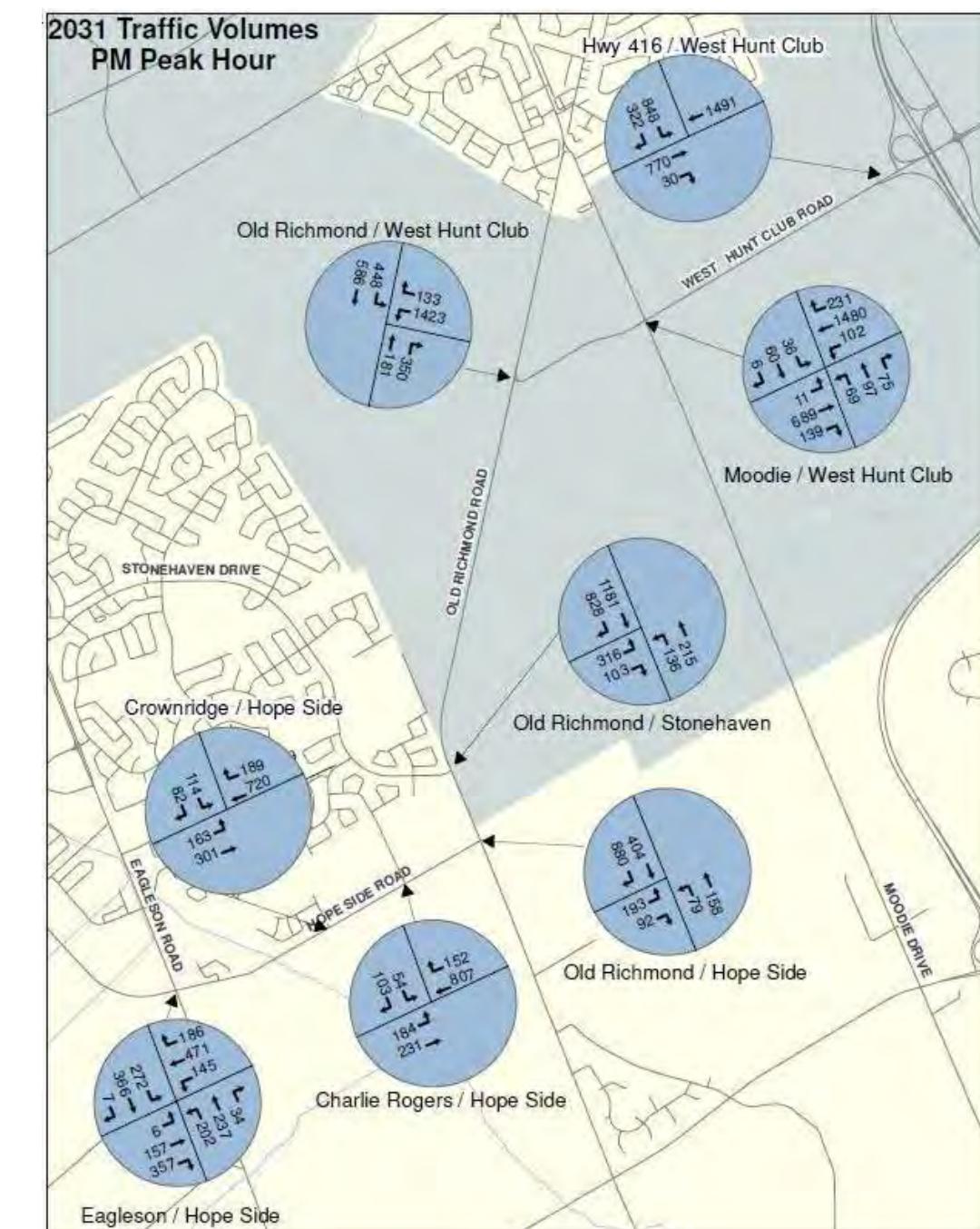


Table 43 details the results of the level of service analysis for each intersection.

**Table 43. Level of Service for Roundabouts and Signals at Study Area Intersections**

Location of Intersection		Signalized Intersection			Roundabout		
		2008 TMP	2013 TMP	Notes	2008 TMP	2013 TMP	Notes
<b>Hope Side Rd. @ Eagleson Rd.</b>	AM	LOS C	LOS C	All v/c < 0.85, EB Through 0.86 v/c	LOS B	<b>LOS B</b>	All v/c < 0.85
	PM	LOS C	LOS D	All v/c < 0.85	LOS B	<b>LOS C</b>	All v/c < 0.85
<b>Hope Side Rd. @ Crownridge Dr.</b>	AM	LOS C	LOS B	All v/c < 0.85	LOS B	LOS B	All v/c < 0.85
	PM	LOS C	LOS C	All v/c < 0.85	LOS B	<b>LOS B</b>	All v/c < 0.85
<b>Hope Side Rd. @ Charlie Rogers Way</b>	AM	LOS B	LOS B	All v/c < 0.85	LOS B	LOS B	All v/c < 0.85
	PM	LOS B	LOS B	All v/c < 0.85	LOS B	LOS B	All v/c < 0.85
<b>Hope Side Rd. @ Old Richmond Rd.</b>	AM	LOS C	LOS D	All v/c < 0.85, WB 1.24	LOS A	<b>LOS B</b>	All v/c < 0.85
	PM	LOS C	LOS C	SB Through, SB Right v/c > 0.85	LOS B	<b>LOS B</b>	All v/c < 0.85
<b>Old Richmond Rd. @ Stonehaven Dr.</b>	AM	LOS C	LOS B	All v/c < 0.85	LOS B	LOS B	All v/c < 0.85
	PM	LOS B	LOS C	All v/c < 0.85	LOS A	<b>LOS B</b>	All v/c < 0.85
<b>Old Richmond Rd. @ West Hunt Club Rd.</b>	AM	LOS D	LOS C	NB Left, SB Left, WB Right v/c > 0.85	LOS A	<b>LOS A</b>	All v/c < 0.85
	PM	LOS E	LOS E	SB Left & Through, WB Through v/c > 0.85	LOS B	<b>LOS B</b>	All v/c < 0.85
<b>West Hunt Club Rd. @ Moodie Dr.</b>	AM	LOS C	LOS B	All v/c < 0.85. EB Through 0.90 v/c	LOS B	LOS B	All v/c < 0.85
	PM	LOS B	LOS B	All v/c < 0.85	LOS B	LOS B	All v/c < 0.85

In all cases, a roundabout provided equal or better levels of service. With signals, some movements experienced a reduced level of service. Given City policy to obtain enough property for the construction of roundabouts where they function well, all these locations were carried forward for assessment of potential impacts. For traffic operations, roundabouts and signals should be grouped.

Roundabouts on Hope Side Road were placed to avoid impacts, where reasonable, on the Monahan Landing subdivision beyond the property already dedicated to the City of Ottawa for road widening. Curvilinear alignments were developed approaching the roundabouts to help encourage drivers to select a lower speed. The roundabout at Hope Side Road and Old Richmond Road was placed to minimize impacts on the existing residential property in the northwest quadrant while considering the location of the access to the Tomlinson quarry on the east side.

The roundabout at Stonehaven Drive and Old Richmond Road was placed to avoid impacts on the existing service centre/ McDonalds restaurant. This resulted in impacts to Greenbelt lands east of Old Richmond Road and development land west of Old Richmond Road. The roundabout at Old Richmond Road and West Hunt Club Road was placed to take advantage of previously disturbed area of the current intersection and the adjacent home. Consultation with Enbridge Gas indicated the need to avoid a specimen tree in the northwest quadrant.

The roundabout at West Hunt Club Road and Moodie Drive was centred on the existing intersection. Table 44 describes the potential impacts and the selection of the preferred configuration at each intersection.

**Table 44. Summary of Intersection Alternatives**

Intersection Location	Assessment of the impact of Roundabouts and Result
<b>Hope Side Rd. @ Eagleson Rd.</b>	Property required in northwest quadrant (future commercial) can be minimized by grading the property to match roadway elevations. Culvert on south side carrying municipal drain under Eagleson Road may require extension. Carry forward Roundabout
<b>Hope Side Rd. @ Crownridge Dr.</b>	The roundabout design touches the property boundary in the northwest and northeast quadrants. Impacts can be minimized in detail design. The park area can be graded to match the roadway. Land impacts on agricultural lands to the south of Hope Side Road. Carry forward Roundabout
<b>Hope Side Rd. @ Charlie Rogers Way</b>	The first two properties on the east and west sides of Charlie Rogers Way may require adjustments to locate driveways beyond the pedestrian and bike crossings. Land impacts on agricultural lands to the south of Hope Side Road. Carry forward Roundabout
<b>Hope Side Rd. @ Old Richmond Rd.</b>	The driveway of the home in the northwest quadrant must be relocated to access Old Richmond Road outside of the pedestrian and bike crossings. The approach on the east side will be offset from the interim Tomlinson quarry driveway. Carry forward Roundabout
<b>Old Richmond Rd. @ Stonehaven Dr.</b>	Greenbelt land impacts east of Stonehaven Drive in area designated as Provincially Significant Wetland (headwaters of a tributary to Monahan Drain). Development land impacts in southwest quadrant (draft approved). Construction will be immediately adjacent to the existing commercial sign. Carry forward Roundabout
<b>Old Richmond Rd. @ West Hunt Club Rd.</b>	Greenbelt land impacts on the south approach in area designated as Provincially Significant Wetland (headwaters of Stillwater Creek). Requires removal of one rental property in southeast quadrant and relocation of the driveway of the second rental property. Carry forward Roundabout
<b>West Hunt Club Rd. @ Moodie Dr.</b>	Greenbelt land impacts on the east approach in area designated as Provincially Significant Wetland (headwaters of Stillwater Creek tributary). Can minimize impacts by widening of road to the north (downstream side) and avoiding roundabout configuration. Given the presence of traffic signals at Highway 416, signals at this location would not interfere with the operation of the roundabouts at other locations. Carry forward Signals

The intersection of Freeport Drive and Hope Side Road is expected to remain stop sign control with left turns allowed. Development to the north on Freeport Drive is expected to have an alternative access to Eagleson Road.

Actual intersection configuration will be confirmed in detail design with consideration for updated traffic, land use and environmental data.

### 8.3 Selection of the Technically Preferred Alternative

The Technically Preferred Alternative included a four-lane cross-section with raised median, roundabouts at intersections with the exception of West Hunt Club Road and Moodie Drive where signals are preferred.

## 8.4 Modifications Resulting from Consultation

Concerns and requirements expressed by agencies such as the NCC, Rideau Valley Conservation Authority, MTO, Ministry of Tourism, Culture and Sport and City of Ottawa departments, members of the public, interest groups and the business community were considered in the development, assessment and evaluation of alternatives. Following the second round of consultation, changes were made to the Technically Preferred Alternative to reflect input received.

Based on analysis and investigation of comments received, the following items were included in the Recommended Plan:

- Alignment of Hope Side Road at Old Richmond Road was moved to the north to better match the existing and future location of the Tomlinson access
- Curvilinear alignment of Old Richmond Road between Hope Side Road and Stonehaven Drive was revised to avoid encroachment beyond the land already dedicated to the City on the west side
- Noise wall requirements were added to the plans once available
- Pedestrian actuated signal crossing was shown on Old Richmond Road at NCC parking lot P6
- Property requirements were estimated from the preliminary grading limits. These will be finalized in detail design and the ROW limits reduced where feasible

# 9. Project Description

## 9.1 Description of Recommended Design

The Recommended Plan is illustrated on the drawings in **Appendix A**. Hope Side Road, Old Richmond Road and West Hunt Club Road will be widened from two to four lanes over a distance of almost 8 km. An index sheet and typical section drawing are included in Appendix A for reference. Sidewalks and cycle tracks will be provided adjacent to the urban area (north side of Hope Side road and west side of Old Richmond Road south of Stonehaven Drive). Enhanced paved shoulders with rumble strips between the paved shoulder and the traffic lane will be provided in the rural area for use by cyclists and pedestrians.

Road design will generally be in accordance with the MTO's *Geometric Design Standards for Ontario Highways* and/or the Transportation Association of Canada's *Geometric Design Guidelines for Canadian Roads*. The design criteria for the corridor are provided in the tables below. **Table 45** applies to Hope Side Road and Old Richmond Road (from Hope Side Road to Stonehaven Drive) and **Table 46** applies to Old Richmond Road (from Stonehaven Drive to West Hunt Club) and West Hunt Club Road. The existing posted speed limits have been used for guidance; however, these are subject to change in the future. Design speeds are typically selected to be 10 to 20 km/h above the posted speed limit.

**Table 45. Proposed Design Criteria for Semi-Urban Roads**

	Proposed Criteria
<b>Roadway Classification</b>	UAD 90
<b>Design Speed</b>	90 km/h
<b>Posted Speed</b>	70 km/h
<b>AADT (Horizon Year 2031)</b>	13,000
<b>% Trucks (Horizon Year 2031)<sup>1</sup></b>	4%
<b>No. of Through Lanes</b>	4
<b>Lane Widths</b>	3.5 m - 3.75 m
<b>Median<sup>2</sup></b>	1.5 m minimum (raised)
<b>Cycle Tracks</b>	2.0 m
<b>Boulevard<sup>3</sup></b>	2.0 m minimum
<b>Sidewalk</b>	2.0 m
<b>Minimum Stopping Sight Distance</b>	170 m
<b>Minimum Horizontal Radius<sup>4</sup></b>	380 m
<b>Minimum Gradient</b>	0.5 %
<b>Cross fall</b>	2 %
<b>Maximum Gradient</b>	2.5 % (actual maximum))
<b>Minimum Vertical Curve – Crest</b>	K=70
<b>Minimum Vertical Curve – Sag</b>	K=40

Notes: 1. After the closure of the quarry and the completion of the planned development in Stittsville-Kanata, the percentage of trucks will likely change on Hope Side Road.

2. The median width varies. Where a left turn lane is provided, the median width is 5 m. Elsewhere, the median has a minimum width of 1.5 m increasing to the splitter island at the roundabouts.

- 3. The sidewalk alignment may be placed along the property line, providing a variable boulevard where the road has a curvilinear alignment in the vicinity of the roundabouts. The Recommended Plan drawings show the sidewalk 2 m from the curb.
- 4. Design speed is reduced on the approaches to roundabouts to provide a transition from the operating speed on the road section to the operating speed in the roundabout.

**Table 46. Proposed Design Criteria for Rural Roads**

	Proposed Criteria
<b>Roadway Classification</b>	RAD 100
<b>Design Speed</b>	100 km/h
<b>Posted Speed</b>	80 km/h
<b>AADT (Horizon Year 2031)</b>	21,000
<b>% Trucks (Horizon Year 2031)</b>	4%
<b>No. of Through Lanes</b>	4
<b>Lane Widths</b>	3.5 m - 3.75 m
<b>Median<sup>1</sup></b>	1.5 m (raised)
<b>Shoulder Width<sup>2</sup></b>	2.5 m (paved)
<b>Rumble Strip</b>	0.3 m (between paved shoulder and traffic lane)
<b>Minimum Stopping Sight Distance</b>	185 m
<b>Minimum Horizontal Radius<sup>3</sup></b>	420 m
<b>Minimum Gradient</b>	0 %
<b>Cross fall</b>	2 %
<b>Maximum Gradient</b>	2.2 % (actual maximum)
<b>Minimum Vertical Curve – Crest</b>	K=70
<b>Minimum Vertical Curve – Sag</b>	K=50

Notes: 1. The median width varies from a minimum width of 1.5 m increasing to the splitter island at the roundabouts.

2. The paved shoulder accommodates cyclists and pedestrian movements along the road.

3. Design speed is reduced on the approaches to roundabouts to provide a transition from the operating speed on the road section to the operating speed in the roundabout.

### Hope Side Road:

Hope Side Road is on the urban boundary and therefore the north side adjacent to the residential development will have an urban section while the south side will have a rural section. The horizontal alignment is curvilinear approaching the roundabouts at Eagleson, Crownridge, Charlie Rogers Way and Old Richmond Road to provide speed management on the approaches to the roundabouts. As a result of this curvilinear alignment, the boulevard width may vary if the sidewalk follows the property line of the road. A left turn lane is provided at Freeport Drive to facilitate access to the development area west of the Monahan Stormwater Management Facility. Where the alignment of Hope Side Road is parallel to the north property line, there needs to be sufficient space for the sidewalk, power line and boulevard. Hydro Ottawa is installing a new power line to serve the community in 2013.

### Old Richmond Road from Hope Side Road to Stonehaven Drive:

Old Richmond Road will have an urban section on the west side adjacent to the residential development and a rural section on the east side in the Greenbelt. The four lanes on Old Richmond Road are developed at the roundabout at Hope Side Road. The alignment of Old Richmond Road has been established to maximize the use of the land dedicated by the developer for road widening and to minimize the land required from the Greenbelt.

#### **Old Richmond Road from Stonehaven Drive to West Hunt Club Road:**

Old Richmond Road will have a rural cross-section throughout this section. The alignment transitions from the road widening being centred (in the vicinity of Stonehaven Drive) to being on the west side of the existing road platform. Driveways will be restricted to right in-right out with U-turns provided at roundabouts. The homes on the west side of Old Richmond Road are expected to be impacted by the road grading which will require much of their front yards. A pedestrian actuated signal will be installed at the Rideau Trail crossing of Old Richmond Road in the vicinity of NCC parking lot P6. The profile, in wetland areas in particular, is subject to change to accommodate dry culverts for wildlife as part of the mitigation of impacts. The profile is also subject to change when survey data for the existing road is available.

#### **West Hunt Club Road from Old Richmond Road to Highway 416:**

West Hunt Club Road will have a rural cross-section through the Greenbelt. The road widening is generally located on the north side of the existing road platform. The driveway for the house to remain in the vicinity of Old Richmond Road must be relocated beyond the roundabout bike crossing. Driveways will be restricted to right in-right out with U-turns provided at roundabouts. The profile is subject to change as noted above for Old Richmond Road. The roadworks will match existing at the southbound ramp terminal intersection.

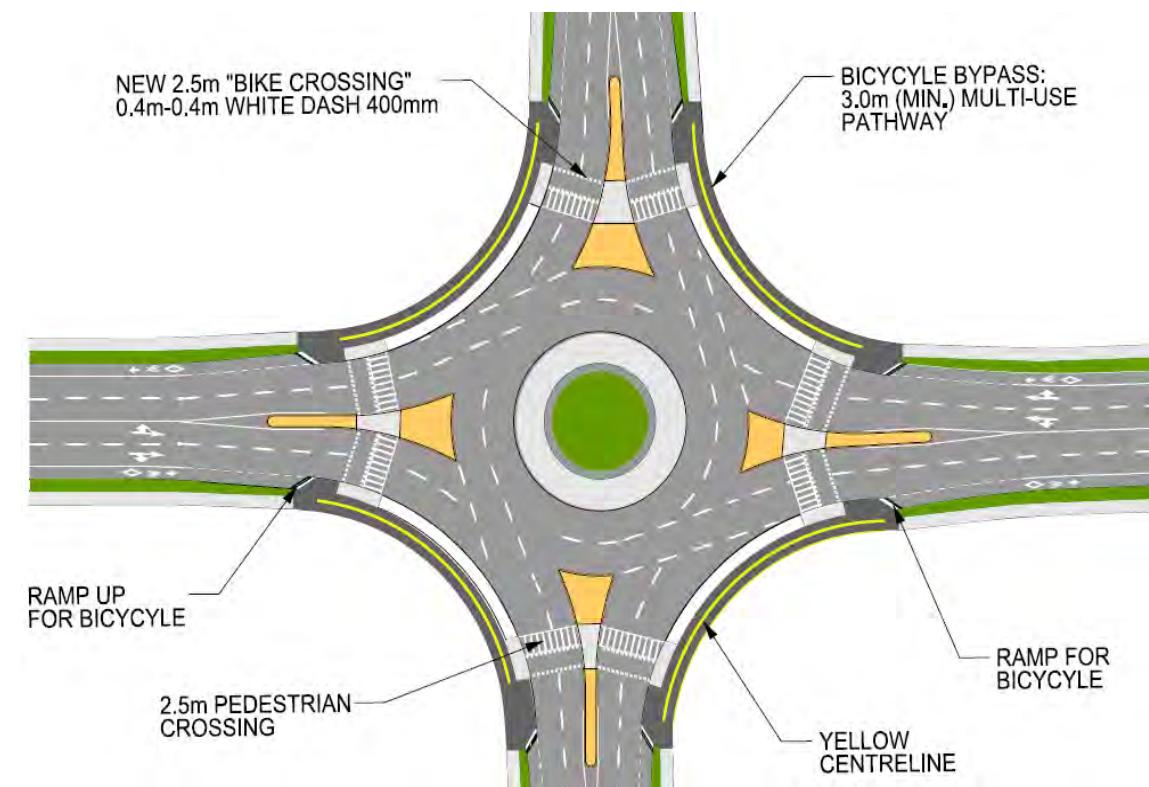
## **9.2 Intersections**

Future intersection locations have been estimated based on plans of subdivision. A new access to the Tomlinson quarry is being constructed at Hope Side Road. The Recommended Plan for Hope Side Road will need to be reviewed during detail design to reflect any changes to the location of subdivision accesses and the actual location of the quarry access.

The final selection of intersection configuration (roundabout or signalized intersection) will be made during detail design to suit actual conditions and updated traffic forecasts. At this time, roundabouts are preferred except at the intersection of West Hunt Club Road and Moodie Drive. **Figure 20** illustrates the standard 2-lane roundabout design for the City of Ottawa. At roundabout locations with single lane approaches, the standard 2-lane design will be modified during detail design to reflect actual requirements for circulating roadways.

Driveways/property accesses will be designed to City of Ottawa standards to suit actual conditions at the time of detailed design and implementation.

**Figure 20. City of Ottawa Standard 2-Lane Roundabout (Urban Condition)**



## **9.3 Pedestrian and Cyclist Facilities**

Bike lanes and sidewalks are required within the urban boundary along the north side of Hope Side Road and the west side of Old Richmond Road (south of Stonehaven Drive) to accommodate pedestrians and cyclists.

The City has updated its options for cyclist accommodation, providing raised tracks to separate cyclists from vehicular traffic, as shown opposite. Treatments at intersections and channelizations for cycle tracks have not been detailed at this time. The Recommended Plan provides 2 m within the cross-section for cyclist accommodation adjacent to the right vehicular lane. The final configuration within the available footprint will be determined in detail design.

The sidewalk will be located along the north property line/power line of Hope Side Road and along the west property line of Old Richmond Road. The sidewalk will be a minimum of 2 m wide. The boulevard will vary in width, depending on the final alignment chosen for the sidewalk.

Bike paths and sidewalks will be provided at roundabouts (urban and rural locations) and traffic signals in accordance with the standard City of Ottawa designs.



One-Way Cycle Track Cross-Section

To accommodate pedestrians and cyclists through the Greenbelt, the City will provide an enhanced paved shoulder with a rumble strip between the travel lane and the 2.5 m paved shoulder. At NCC parking lot P6 on Old Richmond Road, an actuated pedestrian signal will be installed to facilitate road crossing at the Rideau Trail. The crossing will be limited to non-motorized modes.

## 9.4 Profile

The existing profiles of Hope Side Road, Old Richmond Road and West Hunt Club Road have generally been maintained where the proposed roadway matches the existing location.

Areas with longitudinal grades of less than 0.5% in curbed areas are not expected. This is to be confirmed using field survey data during detailed design as the mapping available during this EA Study was not accurate enough for this task. Where necessary, the centreline profile should be adjusted to achieve at least 0.5% grade. In rural sections, no minimum grade is required as the crossfall on the road is adequate for drainage.

The road profile may also be raised to minimize property impacts.

## 9.5 Structures

As noted under existing conditions, three of the seven culverts in the study corridor are in poor condition and should be replaced as part of the widening project. The Monahan Drain bridge should also be replaced. More details regarding the three main watercourse crossings in the study area are provided below.

### 9.5.1 Monahan Drain Bridge

The bridge carrying Monahan Drain under Hope Side Road needs to be replaced to accommodate flows from the Monahan Stormwater Management Facility when the facility's re-development is complete. The new bridge will be designed with a tangent alignment to suit the upstream and downstream location of Monahan Drain. This will eliminate the kinks found in the existing bridge, which are undesirable from both a structural and hydraulic perspective. The bridge will be designed to convey a 1:100 year design flow (City flow criteria for an urban arterial culvert with span greater than 6 m) assuming flow attenuation from the dependable wetland storage and outlet control structure upstream of Hope Side Road. The required freeboard and clearance of 1.0 m and 0.3 m, respectively, will be confirmed at detailed design. A preliminary general arrangement of the new bridge with a 9 m wide by 2.5 m rise opening is found in **Figure 21** and assumes an erodible invert. The size and configuration assumptions need to be confirmed at detailed design. The length of the bridge will depend on the presence of walls at the ends to retain slopes.

### 9.5.2 Stillwater Creek Tributary

The existing culvert carrying the Stillwater Creek Tributary under West Hunt Club Road is to be extended to accommodate the road widening while still maintaining its flow attenuation capability.

### 9.5.3 Monahan Drain Tributary

The existing 900 mm diameter corrugated steel pipe (CSP) culvert carrying the Monahan Drain Tributary under Old Richmond Road must be extended to accommodate the road widening or replaced. The developer of Monahan Landing

is connecting the west end of the culvert to a maintenance hole and 900 mm concrete diversion pipe to convey flow around the subdivision and along Hope Side Road to a confluence with the Monahan Drain.

### 9.5.4 Noise

The analysis of the proposed barriers for Monahan Landing – Phase 1 confirmed that the sound barriers are required and will be technically feasible. The developer will be required to undertake a similar design for noise barriers for subsequent phases of the development.

For the existing residences in the Freeport Drive and Crown ridge Drive area, the existing board fences appear to have the correct construction (i.e. no gaps and wood construction). Modelling of a barrier that is at least 1.75 m high for these locations confirmed that the existing fence can achieve the minimum 6dB reduction required. However, it is recommended that a detailed review of the barrier height be completed to ensure that the fence is interrupting line of sight from roadway to receptor.

The proposed barrier on the west side of Old Richmond Road north of Stonehaven Drive was found to be technically feasible. The location would be along an existing fence line rather than the usual location along the roadway ROW. The fence line location for the sound barrier was requested for economic and aesthetic reasons and because the land is owned by the City of Ottawa.

## 9.6 Right-of-Way Requirements

Along Hope Side Road, land in the vicinity of the city-owned Monahan Stormwater management facility will be required. Property along the north side of Hope Side Road was acquired by the City of Ottawa during the development process. The design makes use of the dedicated lands to the extent practical; however, the choice of roundabouts for intersection controls requires a shift in the alignment to the south for the roundabouts at Crownridge Drive, Charlie Rogers Way and Old Richmond Road to minimize any additional property impact on the approved development lands and existing buildings. This results in the need to acquire agricultural lands to the south of Hope Side Road for the preferred roundabout design.

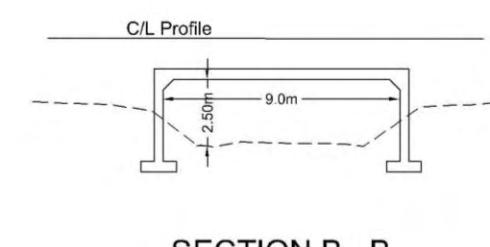
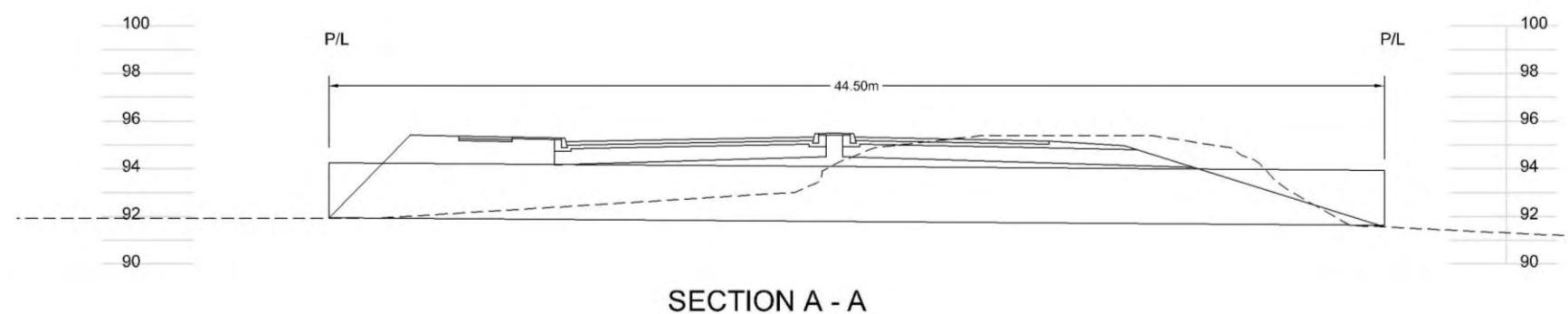
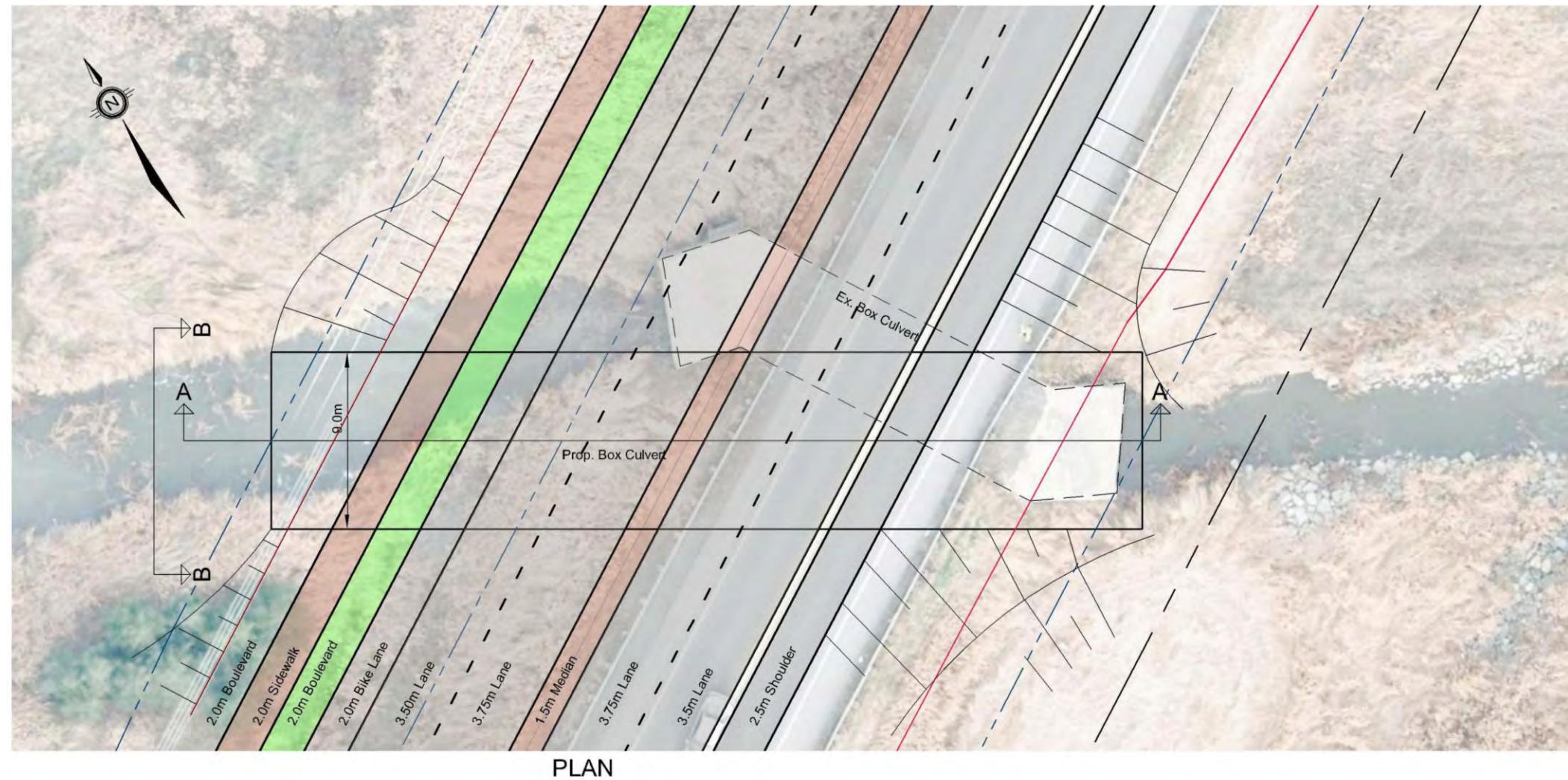
On Old Richmond Road at Stonehaven Drive, development land is required in the southwest corner of the roundabout.

In urban cross-section areas, drainage will be provided in storm sewers. In rural areas, roadside ditches for drainage will be required within the right-of-way. To minimize impacts on existing land uses, drainage may be enclosed across specific rural properties. The recommended plan illustrates the property required to accommodate grading across undeveloped parcels. Right of way requirements may also be refined in detail design with consideration for actual subsurface conditions and the pavement depth needed.

The property required through the Greenbelt will be reviewed with the NCC in detail design as part of the federal land use approval process. A land exchange will be required. It is expected that there will be a need to remove the two rental properties on the west side of Old Richmond Road and one rental property on the south side of West Hunt Club Road. In addition, land along the corridor within the Greenbelt will be required.

The design of West Hunt Club Road, including signage, will be subject to the review of the Ministry of Transportation as construction will occur within their controlled access highway influence distance.

Figure 21. Preliminary General Arrangement Monahan Drain Bridge under Hope Side Road



## 9.7 Greenbelt Interests

As noted in the discussion of ROW requirements above, the Recommended Plan was developed in consultation with the NCC. The NCC requested a cross-section design for the corridor through the Greenbelt in keeping with the rural nature of the Greenbelt and noted that a federal EA and land use approvals will be addressed in detail design.

The NCC federal EA process will focus on the environmental effects on federal lands. *Application of the National Capital Act* will determine the scope of work required during detail design. Items to be considered as part of environmental effects include mitigation measures to enhance wetland function, protection of habitat for Species at Risk, measures to facilitate turtle crossing under the road, stormwater management, noise, traffic volumes and lighting. The NCC noted that no net loss of wetland function must be demonstrated. A Project Description will be required in order to assess the risks associated with the project. Higher risk projects require detailed documentation including cumulative effects.

## 9.8 Preliminary Cost Estimate

The cost of the project was estimated in two phases, reflecting the proposed implementation strategy. The first phase involves the widening of Old Richmond Road and West Hunt Club Road to four lanes, a distance of approximately 5.6 km. The second phase involves the widening of Hope Side Road to four lanes, a distance of about 2.2 km. **Table 47** provides the project cost estimate.

**Table 47. Project Cost Estimate**

Phase	Cost	Description
1	\$30,200,000	Old Richmond Road and West Hunt Club Road
2	\$18,100,000	Hope Side Road
<b>Total</b>	<b>\$48,300,000</b>	including construction, property acquisition and engineering

This budget estimate includes construction, engineering, contingency and property. It will be reviewed and revised once preliminary design plans of the road widening are completed and requirements are more accurately defined.

## 9.9 Geotechnical Requirements

### 9.9.1 Excavations and Embankments

Excavations will be required in a variety of subsurface materials. Minimum cut slopes for earth excavations should be 3H:1V in silty clay and sandy silt. In silty sand, glacial till and structural fill materials, excavations can be made at 1:1. In bedrock vertical excavations are suitable for open cut excavations. Rock excavation may be done by hoe ram or drilling and blasting.

Dewatering in wetland areas should be prevented during excavating activities. Where excavations extend below the water table, the excavation should be backfilled with clear stone wrapped with a non-woven geotextile up to the water level.

Embankments should be constructed of materials meeting the requirements of "Structural Fill". Silty clay and sandy silt material should only be re-used in landscaping applications while the silty sand, glacial till may be used in embankments. Peat and other organic materials should be removed or pre-loaded to reduce settlements after construction.

### 9.9.2 Pavement Structure

The subgrade material present in the study area varies from bedrock to glacial till to silty clay. The preliminary pavement structure appropriate for this project is:

- 140 mm asphalt
- 150 mm Granular A
- 275 mm to 700 mm Granular B, depending on subgrade material

Where bedrock is encountered less than 565 mm below ground surface, the Granular B level may be decreased (minimum thickness for drainage 150 mm)

### 9.9.3 Foundation Design

Culverts will require replacement or extension at Monahan Drain, Stillwater Creek tributary as well as drainage culverts along the corridor. At Monahan Drain, the culvert is expected to be founded on soft to stiff lean clay while at Stillwater Creek tributary, the culvert is expected to be founded on loose to compact silty sand till or sandstone bedrock. Soil parameters are provided in **Table 48**.

**Table 48. Soil Design Parameters**

Soil Type:	Bulk Unit Weight (kN/m <sup>3</sup> )	Angle of Internal Friction (°)
Silty Clay	17.5 – 19	28
Sandy Silt	20	30
Silty Sand	22	32
Glacial till	19 – 20	30
Structural Fill	20	33

Frost treatment depth, k, of 1.2 m and a frost penetration depth, f, of 1.8 m are suitable for this study area.

## 9.10 Enbridge Pipeline

A 600 mm diameter gas pipeline was installed along the corridor in 2013 as part of the "Ottawa Reinforcement Pipeline Project" designed to provide an adequate supply of natural gas for the Ottawa area for the future. The new pipeline is illustrated on the utility drawings provided in **Appendix K**. Local information obtained during the construction of the pipeline will provide valuable data for the proposed road widening. This included actual depth to rock, rock characteristics, groundwater conditions and data on flora and fauna (in particular species at risk).

## 9.11 Utilities and Municipal Services

The Hope Side-Old Richmond-West Hunt Club corridor is used primarily for above ground utilities with some underground utilities and municipal services, both existing and planned. Plans illustrating the existing utilities and services are provided in **Appendix K**. During preliminary and detail design, the utility companies will be contacted to confirm the presence of their infrastructure and to discuss replacement/relocation where required. Developers have been working with the EA Study team and are considering the road corridor widening plans in the preparation of their land development utility plans. Coordination with the City will be required to continue as development proceeds.

**Watermains:**

There is a 200 mm watermain along the north side of existing Hope Side Road from Crownridge Drive westerly to Eagleson Road. Other watermains are within urban development areas. Homes along Old Richmond Road and West Hunt Club Road are served by individual wells.

**Sanitary Sewers:**

There is a 500 mm force main running north-south on Eagleson Road. Sanitary sewers from the Freeport Drive subdivision run for a short distance in Hope Side Road and then north of the road right of-way to a sanitary pumping station located on the north side of Hope Side Road just east of the Monahan Drain. Sanitary sewers from Monahan Landing also flow to this pumping station from within the development. Rural homes along Old Richmond Road and West Hunt Club Road are served by individual septic systems.

**Storm sewers, Diversion Pipe and major flow routes:**

The development of Monahan Landing north of Hope Side Road requires installation of a 900 mm diameter diversion pipe to carry runoff from a small portion of Stony Swamp from the southwest corner of the Greenbelt at Old Richmond Road north of Hope Side Road. The pipe will replace the existing watercourse through the Monahan Landing subdivision and will outlet at the location where the watercourse currently enters the north ditch of Hope Side Road east of Crown Ridge Drive. The diversion pipe will be extended to Monahan Drain to outlet to the watercourse as part of this project. The location of the diversion pipe needs to be selected to avoid conflicts with the planned storm sewer system and other utilities.

Storm sewers will be required to serve the sections of road with an urban cross-section. Along the urban west side of Old Richmond Road from Hope Side Road to Stonehaven Drive, storm runoff collected along the road should be directed into the storm sewer system constructed as part of the Monahan Landing development. Along the urban north side of Hope Side Road, runoff will flow into catchbasins and then be conveyed through storm sewers to the ditch on the south side (see Drainage section below).

**Gas Mains:**

In addition to the large gas pipeline described earlier, there is a gas main north-south on Eagleson Road and a gas main along the north side of Hope Side Road serving the urban development.

**Electrical and Telephone Distribution:**

There are overhead wires through the corridor. The City of Ottawa is working closely with Ottawa Hydro on the ongoing placement and replacement of wooden power distribution poles servicing existing and planned communities. Where feasible, Ottawa Hydro will install new and replacement poles such that they are consistent with the Recommended Plan. Ottawa Streetlighting staff will work with Ottawa Hydro on the potential for joint use poles in the Greenbelt.

There is a Bell facility on the south side of Hope Side Road between Charlie Rogers Way and Old Richmond Road. There are also existing buried cables, both conventional and fibre optic along the road corridor. The type of buried ducts must be confirmed in detail design to assess the impact of these ducts on the design.

## 9.12 Stormwater Management and Drainage

The proposed cross section for Hope Side Road is a rural/urban mix. Drainage from the north side where there are curbs and catchbasins will be conveyed through storm sewers to the ditch on the south side. The ditch will convey the runoff flow to an outlet at Monahan Drain on the south side of Hope Side Road. Stormwater management will be achieved by a

detailed design that includes roadside ditches developed as enhanced swales for water quality impact mitigation and, if necessary, flow attenuation using either rock check dams or swales with a controlled outlet.

The proposed cross section for Old Richmond Road is rural, using roadside ditches to capture the runoff from the road. Stormwater management will be achieved by a detailed design that includes roadside ditches developed as enhanced swales for water quality impact mitigation and, if necessary, flow attenuation using either rock check dams or swales with a controlled outlet. Flow attenuation will be required for any roadway drainage to the existing 900 mm CSP crossing between Hope Side Road and Stonehaven Drive.

The proposed cross section for West Hunt Club Road is similar to Old Richmond Road and is rural on both sides. Again drainage will incorporate roadside ditches and stormwater management will be achieved by a detailed design that includes roadside ditches developed as enhanced swales for mitigation of water quality impacts and, if necessary, flow attenuation using either rock check dams or swales with a controlled outlet.

Where the Old Richmond Road and West Hunt Club Road lie adjacent to wetlands, direct discharge from the roadway to the wetland is recommended, using intervening buffer strips to mitigate any water quality impacts. Water quantity attenuation would not be required since the increased flow and volume is insignificant when compared to the wetland volume and a distributed discharge will minimise localised velocity impacts.

The potential impact of increased winter maintenance salt loading to Stony Swamp, due to increased pavement width, cannot be directly mitigated: salt is typically “in solution” when runoff occurs and cannot be cost-effectively removed. The federal government, in partnership with Canadian municipalities and the Transportation Association of Canada, have developed a *Code of Practice for the Environmental Management of Road Salts* for identifying salt-vulnerable areas and the *Salt Management Guide (TAC 1999)* for appropriate winter maintenance operations that can minimise the impact of salt application on these areas. These additional salt management measures could include:

- Using technologies that further optimize the use of road salts, e.g., electronic spreader controls, Road Weather Information System (RWIS) sites, pre-wetting, direct liquid application, Automatic Vehicle Location/ Global Positioning System (AVL/GPS)
- Using alternatives to road salts, e.g., calcium magnesium acetate (CMA)
- Increasing the monitoring and measuring of chlorides and their impacts on sensitive wetlands

It is recommended that the City of Ottawa, in conjunction with the NCC, identify these salt-vulnerable areas in relation to the study corridor and that the City review its winter maintenance activities in these areas by considering reduced salting applications or alternative materials.

## 9.13 Traffic Control Signal Requirements

Existing traffic control signals are present at the intersections of:

- Eagleson Road and Terry Fox/Hope Side Road
- Stonehaven Drive and Old Richmond Road
- Old Richmond Road and West Hunt Club Road
- West Hunt Club Road and Moodie Drive

It is recommended that the signals be replaced with two-lane roundabouts except at the intersection of West Hunt Club and Moodie Drive where traffic signals are recommended. A new pedestrian-actuated traffic signal is required at NCC parking lot P6.

Road geometry changes in the vicinity of the signal at the southbound exit ramp and West Hunt Club Road may require update of the PHM125 drawing of the MTO.

## 9.14 Illumination

The lighting levels and uniformities as outlined in the City of Ottawa's illumination design criteria are taken from the Right-Of-Way Policy (2008) with reference to the OP Schedule B which classifies Old Richmond Road as an arterial road in a Natural Environmental Area. The following target illumination levels are for a rural-arterial roadway classification:

Average Maintained Horizontal Illuminance: .....	9.0 Lux
Uniformity - Average/Minimum: .....	4:1

The luminaire used would be a "full cut-off" (in compliance with the "Dark sky" policy). The use of side shields to reduce backlighting in the Greenbelt or the use of luminaires with low backlighting characteristics will be considered. Detail design will be undertaken by the City of Ottawa street lighting group.

## 9.15 Streetscaping and Landscaping

Context sensitive design is an approach to understanding and designing public projects that addresses the needs of users, impacted communities and the environment. The goal of context sensitive design is to integrate a project into its setting in a thoughtful manner. This is achieved by understanding existing conditions and constraints and developing a design that addresses the unique characteristics of the project. Issues considered include pedestrian and vehicular connectivity and safety; significant features of interest; edge conditions between land uses, and overall aesthetics that contribute to people's general experience in the corridor.

Improvements to the road corridor will offer opportunities to improve existing elements within the area. In addition, there are opportunities to enhance and strengthen connections such as: bicycle routes, pedestrian movements, recreational trails, and access to adjacent lands. Specifically, there are conditions that are repeated throughout the corridor that offer opportunities that will help unify the project and general experience of the road corridor. The proposed roundabouts can function as gateways entering communities and the Greenbelt, emphasizing the transition from Greenbelt to urban area.

Enhancing the conditions between the road corridor and residential developments will provide privacy to the residents and unify the purpose and aesthetic that frames this land use. With the increase in residential development, there is a need to increase the pedestrian and cycling connectivity throughout the corridor and the connections to the many recreation trails that interact with the corridor. Preserving the scenic views from the corridor to the natural areas throughout the NCC Greenbelt improves user-experience and recognizes the NCC Greenbelt as a large natural feature unique to Ottawa.

### 9.15.1 Hope Side Road

The existing subdivisions that flank the Monahan Drain will benefit from additional buffering vegetation to create a greater sense of separation from the road. The north side of the road is an 'urban edge', suggesting a more structured design

approach with a focus on hard landscape elements like concrete sidewalks, structures and street furnishings. The south side of the road will have a 'non-urban edge' reflecting the adjacent rural/agricultural land uses. This will consist of a paved shoulder, allowing undisrupted views of the rural/agricultural landscape beyond.

There are scenic views to and from the Monahan Drain as well, that can be preserved. Some additional landscape planting would strengthen the visual connection, provided the view is not obstructed.

The north side of Hope Side Road will have a sidewalk and cycle track to connect the residential communities and also connect to current and future bus stop locations. Sidewalks along the road will tie into the existing sidewalks at side streets and connect people with the residential communities. The boulevard separates pedestrian and vehicular traffic. At the east end of Hope Side Road, it is a short distance to connect the sidewalks/bike path at the roundabout to the existing Lime Kiln Trail and Rideau Trail at the southwest corner of Stony Swamp (ultimately connecting to the larger complex of trails in the Greenbelt).

### 9.15.2 Old Richmond Road

The western edge of Old Richmond Road, south of Stonehaven Drive, is an 'urban edge' similar to the north side of Hope Side Road, suggesting a focus on hard landscape elements like concrete sidewalks, structures and street furnishings. The east side in this section is NCC Greenbelt and will have paved shoulders.

There is an opportunity to formalize the trail connection along the noise wall immediately north of Stonehaven Drive and add safety to the existing connection being used by the community.

North of Stonehaven Drive both sides of Old Richmond Road and then both sides of West Hunt Club Road, are within the Stony Swamp Core Natural Area of the NCC Greenbelt. Paved shoulders will be provided throughout. Effort must be made to preserve the existing woodlots and wetlands. As the existing residential homes in the Greenbelt reach the end of their life span and are removed, there will be an opportunity to re-establish the land as part of Stony Swamp.

The parking lot (P6) under the power transmission towers has good visibility up and down Old Richmond Road.

Any removals within the existing woodlots and forest edges will have a visual impact on the corridor and should be minimized and mitigated with new planting. Removing the smaller successive plant material at the edge of woodlots exposes the lack of understory creating a negative visual impact. Additional planting will be required to soften these edges and maintain the existing natural aesthetic. There are a couple of areas where long views are offered over wetland areas that span the road corridor and these views will be maintained with road widening.

### 9.15.3 West Hunt Club Road

This section of the corridor falls within the NCC Greenbelt with existing woodlots and wetland areas preserved where possible. Views over wetland areas will be maintained with road widening.

Parking lot (P11) for Greenbelt trails is located at the top of a hill. Views toward the parking lot and trailheads should be enhanced to improve visibility and safety for trail users and drivers. Paved shoulders for cyclists and pedestrians will be provided.

# 10. Impacts and Proposed Mitigation Measures

The widening of Hope Side, Old Richmond and West Hunt Club Roads in the study area will benefit community development and traffic operations with mitigative impacts to the natural, social and cultural environments. The widening is in keeping with the network identified in the Ottawa Transportation Master Plan, 2013. The identified potential impacts and proposed mitigation measures are described in the following sections organized by evaluation criteria used in this study. Later in this section a summary table is provided, organized by environmental components.

## 10.1 Transportation

Paved shoulders for pedestrian and cyclist accommodation will be enhanced with the addition of a rumble strip between the vehicular lane and the shoulder. Residents in south Kanata will have improved connections to NCC pathways as well as through the Greenbelt for those who prefer on-road accommodation. Public concerns with respect to cyclist movements at roundabouts will be re-assessed in detail design as the City of Ottawa and other municipalities have requested changes to the *Ontario Highway Traffic Act* from the provincial government. Requirements at roundabouts will be considered with respect to the legislative progress made on this issue.

Safety for all road users will be enhanced through the inclusion of a raised median, lighting and a signalized pedestrian crossing at NCC parking lot P6. Lighting will be designed with consideration for impacts on wildlife.

Emergency response will be enhanced with additional lanes and paved shoulders.

The additional capacity will reduce congestion and delays experienced now and in the future. The selection of a roundabout or a signalized intersection will be re-visited in detail design with updated land use and traffic data to confirm the preferred intersection control. The configuration of roundabouts will be examined in detail design to eliminate any lanes that are not required (for example, a location such as Crown Ridge Road and Charlie Rogers Way with a single lane entering a two-lane roundabout). At Charlie Rogers Way, the location and configuration of the roundabout will be reviewed with consideration for the location of residential driveways that are under construction to ensure that the pedestrian and bike crossings associated with the roundabout are south of the driveways.

During construction, a Traffic Management Plan will be prepared along with a Construction Staging Plan, an Incident Management Plan and a Communications Plan. Road users and local residents will receive advance notice of construction activities to allow them to plan their trips accordingly. The work zone will be designed to enhance safety during construction for all road users and construction workers. Where feasible, dedicated space for pedestrians and cyclists will be made available during construction.

## 10.2 Socio-Economic Environment

### 10.2.1 Land Use, Recreation and Property

The recommended plan has been developed with consideration for existing and planned land use and the area of property required. Property impacts exist throughout. Adjacent to development lands, the right-of-way requirements assume that adjacent lands will be graded to match the edge of the road right-of-way. Elsewhere, ROW

requirements will be based on the grading limits. Where possible property acquisition in agricultural areas will be minimized.

There are impacts on the draft approved plan of subdivision in the southwest quadrant of the Stonehaven and Old Richmond Road intersection. The subdivision plan needs to be updated to reflect the roundabout design. At the intersection of Hope Side Road and Charlie Rogers Way, the configuration of the roundabout needs to be reviewed to ensure that the driveways that exist at the time of detail design do not conflict with the pedestrian and bike crossings of the north approach of the roundabout.

There are impacts on NCC Greenbelt lands, including rental homes. Application for land will be submitted in detail design when the required level of detail is available to more accurately identify the right-of-way width required. City-owned land within Stony Swamp will be required in exchange.

Access to recreational lands in Stony Swamp will improve with the addition of paved shoulders along the corridor. The new pedestrian actuated signal at NCC parking lot P6 will also facilitate the movements of trail users.

During construction, access to homes and businesses along the corridor must be maintained, including access during emergencies. Where access must be temporarily closed, advance notice of construction activities must be provided to property owners

### 10.2.2 Noise and Vibration

A new noise wall is proposed across rear-facing yards north of Stonehaven Drive as illustrated on the Recommended Plan. Along Hope Side Road, the existing fencing appears to be suitable as a sound wall. The characteristics of the existing fences should be confirmed in detail design to determine if they are functioning as designed. Appendix C of the City of Ottawa Environmental Noise Control Guidelines provides detailed barrier specifications that are to be met by any barrier design.

During construction mitigation of noise impacts will consider the requirements of the City of Ottawa Noise By-law. An exemption will be required should construction activities need to be undertaken outside the specified hours. The City of Ottawa will enforce noise control issues.

Expected sound levels at the closest residential receptor may be up to 85 dBA, or "loud", during construction/ rock excavation. Excavation of rock may be accomplished through drilling and blasting or shattering. The appropriate method will be determined in detail design. Drilling and blasting was used for pipeline excavation work.

To minimize noise levels during construction all equipment must be properly maintained and operated with effective muffling devices that are in good working order. The Contract documents will contain a provision that any initial noise complaint will trigger verification that the agreed-upon noise control measures are in effect and in the event of persistent noise complaints, all construction equipment should be verified to comply with MOE NPC-115 guidelines. In the presence of persistent complaints during construction and subject to the results of a field investigation, alternative noise control measures may be required. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative, and economic feasibility of the various alternatives.

Vibration levels are expected to be within an acceptable range.

### 10.2.3 Air Quality

The assessment of air quality related to the project indicated that for all contaminants, the predicted maximum concentrations at sensitive receptors are within applicable air quality thresholds. One exception is benzene, which is a hydrocarbon resulting from incomplete fuel combustion, as well as evaporation from fuel tanks and fuel lines. Predicted annual average benzene levels exceed the applicable provincial criterion. This is the result of the background concentration, which exceeds the threshold for annual average benzene on its own. The predicted contribution of the project-related traffic (not including background) is an order of magnitude lower than the threshold, and only 4% of background or less.

Therefore, contribution of the proposed project to benzene levels is considered acceptable and, since predicted levels for all other contaminants are within applicable ambient air quality criteria, no mitigation measures are recommended for air emissions associated with the operational phase of the project. Noise fences may provide some mitigation for downwind receptors.

To reduce the potential for air quality impacts during construction such as machinery emissions and dust, it is recommended that an Emissions Management Plan based on established best practices be implemented.

### 10.2.4 Landscape, Linkages and Views

#### Hope Side Road

The overall landscape character is evolving, with the urban development creating a strong edge to the north side of Hope Side Road. Opportunities exist to integrate the proposed roadway with this community at key viewpoints such as at the trail system at Monahan Drain, intersections along Hope Side Road (unsignalized or signalized/roundabouts), single loaded streets with homes facing Hope Side Road, at parks and open spaces. Intersections such as roundabouts provide an opportunity for community/gateway features. Potential connections should be developed as the residential community grows. The view of the Richmond Plain from the east end of Hope Side Road will be retained.

#### Old Richmond Road

This roadway has two distinct sections: south and north of Stonehaven Drive. South of Stonehaven Drive, access points to the developing residential community should be provided. To the north, Old Richmond Road bisects the Greenbelt, providing a range of landscape treatments, from open meadows to mature woodlots. The single family homes in Stony Swamp are expected to be removed at the end of their useful lives. The two homes on the west side of Old Richmond Road are expected to be removed as part of this widening project. Removal of homes in Stony Swamp will provide an opportunity to rehabilitate the landscape. Rehabilitation of the landscape will also be required as part of this project to mitigate impacts on the existing roadside vegetation and forest. Views into the wetlands and along the power corridor and road corridor will be retained. Connections with Greenbelt pathways and recreational areas will be enhanced by the signalization of a pedestrian crossing at NCC parking lot P6.

#### West Hunt Club Road

At least one of the two single family homes on the south side east of the Old Richmond Road intersection is expected to be removed as part of this road widening project, providing another opportunity to rehabilitate the landscape. Views into the adjacent wetlands and agricultural lands and along the road corridor will be retained. The median will provide a refuge for trail users to cross the road at NCC parking lot P11.

### 10.2.5 Costs

Costs will be consistent with the affordable network defined in the 2013 TMP. Where necessary, the design will be reviewed and updated to achieve these objectives for capital, operating and maintenance costs.

## 10.3 Natural Environment

During detail design a compensation plan will be negotiated with the NCC to result in no net loss of wetland area and no net loss of ecological function. Mitigation measures will be developed to enhance wetland function, protect habitat for Species at Risk, facilitate turtle crossing under the road, provide stormwater management and address any concerns with noise, traffic volumes and lighting. Standard environmental protection will also be required during and after construction. An environmental inspector will be required to monitor construction in environmentally sensitive areas.

Road widening and realignment, as well as embankment reconstruction may result in the suspension of sediment into the study area drainage channels, watercourses, and wetlands. Similarly, exposed soils and/or stock piles of excess material (such as earth, rock, concrete or wood) located adjacent to watercourses can result in the release of sediment into watercourses during rain events.

In order to prevent the entry of sediment into drainage channels, watercourses, and wetlands various sediment and erosion control measures, as well as operational constraints, should be incorporated into the final contract package. It is recommended that the following be included:

- In order to mitigate the transport of sediment, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, and erosion control blankets) should be incorporated into the final design and installed during construction. *Ontario Provincial Standard Provision (OPSS) 805 Construction Specifications for Temporary Erosion and Sediment Control Measure* should be included in the final contract package in order to provide construction specifications for these measures;
- Any construction works should be isolated from watercourses and conducted 'in the dry';
- Where dewatering is required, effluent should be discharged so as to prevent entry of sediment to watercourses;
- In order to minimize sources of fine sediment that may potentially enter study area watercourses, clean granular materials, free of fines, should be used for road or slope stabilization construction adjacent to study area watercourses;
- Exposed slopes should also be protected by requiring the Contractor to limit the time that such areas are exposed prior to final application of topsoil and seed;
- Following the completion of final site grading and topsoil application, a suitable seed mixture should be applied to all exposed soils;
- Installation of silt fence barriers 2 m from the final toe-of-slope for any roadway embankment areas adjacent to watercourses.

Construction activities, such as refuelling, may increase the potential for accidental fuel or lubricant spillage, debris accumulation, and subsequent contamination to surface water. Construction activities may also result in litter and debris accumulation within the study limits.

In order to prevent surface water contamination during construction, measures should be taken to avoid accidental spillage or discharge of chemical contaminants (e.g., gasoline, oils and lubricants). It is recommended that the following measures be taken:

- All mobile equipment refuelling will take place no closer than 30 m from wetted roadside drainage channels, watercourses, and wetlands in order to prevent water contamination due to accidental fuel spillage. For non-mobile equipment, refuelling will be carried out in a controlled manner so as to prevent fuel spillage. In addition, a drip pan should be installed under any non-mobile equipment working within the construction zone.
- All equipment operating near wetted roadside channels, watercourses, and wetlands shall be properly maintained in order to avoid contaminant leakage and will be free of excess oil/grease.
- The contract package should provide contact information for the Spills Action Centre (1-800-268-6060). An emergency spill response kit should be on site at all times and in the event that a spill occurs, proper containment, clean up and reporting, in accordance with provincial requirements, is required.
- The Contractor will take all necessary precautions to prevent the accumulation of litter and construction debris within any natural areas outside of the construction grading limits.

Construction activities at locations of groundwater discharge may result in negative impacts to water levels and flow, as well as potential contamination.

If seepage or areas where the groundwater table is high are identified during project construction, work within that area should be scheduled from mid to late summer when water table levels are depressed. This will minimize potential disruption or contamination of groundwater.

### 10.3.1 Aquatics and Aquatic Habitat

In general, works in and around watercourses may result in the suspension of sediment into study area watercourses or wetted roadside channels from disturbances and loss of the existing vegetative cover. Similarly, exposed soils and/or stock piles of excess material (such as earth, rock, concrete or wood) located adjacent to watercourses can result in the transport of sediments into the watercourse during rain events.

Suspension of sediments can have direct negative effects on resident fish such as respiratory stress, reduced feeding efficiency, and impairment of physiologic processes such as growth and reproduction. Indirect effects may include changes in the diversity of benthic invertebrates (food source), and the loss of spawning and nursery habitat. Elevated levels of suspended sediments may result in a shift in fish population diversity and density, as various species will leave the area for more suitable environments. Therefore, impacts due to construction activities may affect immediate fish populations, as well as those within downstream reaches.

In order to prevent and minimize unnecessary degradation of fish habitat within study area watercourses, appropriate environmental protection measures, operational constraints, and in-water work timing restrictions should be applied during activities at all watercourse crossings. It is recommended the following be included:

- Due to the presence of both warm and cold water fish species in the study area watercourses, it is anticipated that any required in-water works or work on channel banks will be restricted to a period from July 1 to September 30; however, this will need to be confirmed with the MNR during detail design. Work in warm water systems may be less restrictive;

- In order to mitigate the transport of sediment along ditch lines, as well as exposed soils adjacent to sensitive areas, environmental protection measures (such as straw bale flow checks, rock flow check dams, silt fence barriers, and erosion control blankets) should be incorporated into the final design, as necessary, and should be installed during construction;
- Any construction works should be isolated from the watercourses and conducted 'in the dry';
- Removal or disturbance of woody riparian vegetation should be minimized during construction activities in order to prevent unnecessary loss of watercourse shading, over hanging cover, or bank stability. Use existing roads and trails to avoid disturbing riparian vegetation;
- Prior to commencement of any in-water work, the work area shall be isolated and all fish and aquatic wildlife shall be removed and released upstream of the work area. The fish rescue and relocation shall be completed under a Licence to Collect Fish for Scientific Purposes obtained from the MNR. All captured fish will be identified to species, enumerated and live released downstream of the work area;
- All dewatering operations for embankment construction should be outlet onto a grassed area away from the nearest watercourse or into an appropriate filtering mechanism/settling pond;
- Silt barriers should be installed approximately 2 m from the final toe-of-slope for any disturbed embankment areas adjacent to watercourses and wetlands;
- Include a qualified biologist on the construction administration team to monitor water quality at the construction site and at points downstream;
- Return substrates and flows to pre-construction levels at completion of the project to encourage fish to return to the area; and
- Following the completion of final site grading and top soil application, a seed mixture should be applied to all exposed soils. Exposed slopes should be protected to limit the time that such areas are exposed prior to final application of topsoil and seed. In areas adjacent to watercourses and wetlands, the Contractor should apply topsoil and seed immediately following completion of construction activities.

### 10.3.2 Wildlife and Wildlife Habitat

While a variety of wildlife habitat exists within and adjacent to the project limits, no critical habitat was identified during field investigations. Based on findings during the 2012 and 2013 field investigations and the nature of the proposed activities, no permanent negative impacts on wildlife or wildlife habitat are anticipated in the area as a result of the project. Vegetation removal associated with the proposed project may, however, result in the temporary displacement of wildlife species using the area.

In order to minimize the temporary displacement of wildlife species potentially using the study area, it is recommended that efforts be made to minimize vegetation removal within the project limits.

It is recommended that clearing activities take place outside the bird nesting season of May 1 to August 1. If clearing work must be conducted during the breeding bird season a detailed breeding/nesting bird survey should be conducted by an avian specialist prior to the beginning of clearing activities in order to verify potential nesting activity. If nesting activities are observed during clearing/construction, works in that area should cease and the MNR should be contacted immediately.

Additional mitigation measures for wildlife and wildlife species at risk are provided in the following section.

### 10.3.3 Vegetation

The proposed project will result in the loss of some vegetation due to widening. Loss of terrestrial vegetation is expected to occur within areas of cultural meadow existing within the roadway ROW, as well as the edge of forest communities existing adjacent to the ROW. Proposed activities are unlikely to have significant negative impacts on vegetation units within the study area. Impacts to the NCC's Stony Swamp Conservation Area are expected to be minimal as the widening zone is limited to the edge of these vegetation communities.

No vulnerable, threatened, or endangered vegetation species were identified within the proposed grading limits. As noted in Section 4.9, three live butternut specimens were found within the study area; however, the trees are located beyond the proposed grading limits and no impact to these trees is anticipated.

Construction activities may result in the temporary disturbance of vegetation outside of the proposed grading limits.

In order to reduce impacts on vegetation units within and adjacent to the grading limits, the following measures are recommended:

- Vegetation removal should be minimized where possible;
- Following completion of grading and topsoil application, disturbed areas should be re-seeded with a seed mixture that will promote suitable native vegetation regeneration;
- Tree barrier protection, in accordance with *OPSS 801 Construction Specification for the Protection of Trees*, in order to demarcate and protect existing trees along cut lines from equipment damage;
- Delineation of vegetation clearing zones and vegetation retention zones should be made clear on construction specifications and in the field;
- Specifications for appropriate tree felling and grubbing procedures should be implemented in order to minimize impacts on surrounding vegetation;
- Appropriate edge planting strategies should be utilized along any newly created edges of wooded areas; and
- A restoration and seeding plan should be developed and a Vegetation Specialist shall monitor that all seeding and plantings are installed and maintained in accordance with the Contractor requirements.

### 10.3.4 Wetlands

A large part of the study area falls within the NCC's Stony Swamp Conservation Area. This area is designated as a PSW complex and is a Candidate Life Science ANSI (OMNR 2010). The Stony Swamp Conservation Area is composed of open ponds, flooded woodlands, creek valleys, as well as forest and thicket swamps. It is anticipated that the proposed activities will result in the loss of some wetland area adjacent to the existing ROW.

Construction activities may result in the temporary disturbance of wetland areas outside of the proposed grading limits. The excavation and grading of earth material due to construction may result in the release of sediment into the adjacent wetlands. In addition, exposed soils and/or stockpiles of excess material (such as earth, rock, concrete, or wood) can result in sediment transport into the adjacent wetlands.

It is recommended that disturbance to the wetland areas be minimized, where possible, and appropriate restrictions and mitigation measures be implemented in order to reduce the potential for negative impacts. These measures should include the following:

- Drainage within the project limits should be designed so as to maintain the existing hydrological regime of the area;
- Vegetation clearing within wetland areas should be minimized, where possible;
- Appropriate erosion and sediment control measures should be implemented at locations where there is potential for sediment release to study area wetlands;
- No equipment should enter wetlands outside of the grading limits;
- Construction activities adjacent to wetlands should occur from within the grading limits;
- No long-term stockpiling of excavated material should occur within 30 m of a watercourse or wetland;
- In order to minimize the spread of invasive species, all equipment should be thoroughly cleaned with water before it is moved from one area to another.

A Technical Memo entitled "Assessment of the Potential Impacts of Installing Culverts in Stony Swamp During the Richmond Road Widening" (City of Ottawa 2009), examined the potential impacts and advisability of installing culverts under Old Richmond Road as part of its widening in order to establish a surface water connection between the two portions of the Stony Swamp PSW Complex. The Memo concluded that there is no ecological reason to install culverts under Old Richmond Road and that the installation of such culverts would create potential adverse impacts on the hydrology and ecology of both Stony Swamp and Stillwater Creek.

### 10.3.5 Species at Risk

Field investigations were conducted within the Kanata South study area in order to document a number of potential species at risk and their habitat. Three species at risk, the snapping turtle, butternut, and barn swallow, were observed during field investigations.

Potential habitat within the study area was assessed for suitability to snapping turtles. A snapping turtle was observed on two occasions within suitable habitat within the study area. In addition, dead snapping turtles were observed on the road during the June 6, 2013 field investigations.

Species-specific surveys were conducted for the barn swallow, a nationally and provincially threatened species, by searching for this species within study area bridges and culverts. One barn swallow was observed in the vicinity of the study area; however, no nests were found within 120 m of the roadway.

Three live butternut specimens were found within the study area; however, the trees are located beyond the proposed project limits and no impact to these trees is anticipated.

Potential habitat for Blanding's turtles was not observed within the scoped study area (120 m from either side of the existing roadway); however, potential habitat was noted beyond 120 m southeast of West Hunt Club Road and Moodie Drive intersection and southwest of Old Richmond Road and West Hunt Club Road. Although no Blanding's turtles were found, female Blanding's turtles have been known to travel up to 6 km in order to nest (MNR, 2013).

Habitat for bobolink and eastern meadowlark did not exist at the time of the 2013 field surveys. Based on habitat present during the 2013 field investigations, no impacts to bobolink or eastern meadowlark are expected as a result of road construction.

Other species at risk that may occur within in the vicinity of the study area include Henslow's sparrow, whip-poor-will, chimney swift, short-eared owl, black tern, flooded jellieskin, milksnake, eastern ribbonsnake, least bittern, and Blanding's

turtle. Based on findings during the 2012 and 2013 surveys and the nature of the proposed activities, no permanent negative impacts on these species are anticipated in the area as a result of the project.

No negative impacts to the Blanding's turtle are anticipated as a result of the proposed project; however, due to their potential to utilize the study area and its vicinity, a number of mitigation measures are recommended. These mitigation measures will also function to minimize potential impacts to snapping turtles and painted turtles. The MNR has indicated that timing restrictions for construction apply from October 16 – March 15 to protect at risk hibernating turtles. If the proposed project activities are to occur during this time, the MNR recommends fencing off the site in early fall to prevent turtle hibernation with the work area. The MNR has also indicated that caution should be taken during the turtle nesting season in June and early July as turtles use embankments and other terrestrial sites for nesting. During the active season (April 1 – October 30), the MNR recommended a thorough sweep of the area before works begin to encourage any turtles using the site to move away.

Should work be required during the active season (April 1 – October 30), it is recommended that exclusion fencing (e.g. silt fencing) or another appropriate barrier must be installed in March at a number of locations in order to deter any nesting turtles (as well as other reptiles or amphibians) from entering the construction area. These locations include the cattail swales along Richmond Road approximately 1 km north of Stonehaven Drive, approximately 160 m south of Old Richmond Road, and West Hunt Club Road as well as at Monahan Drain and the Tributary to Stillwater Creek. Exclusion fencing should be maintained and checked each day prior to activities commencing to ensure species are not trapped inside the work area.

If construction activities are required to occur within 25 m of any butternut tree, the Kemptville District MNR Species at Risk Biologist should be contacted.

It should be noted that bobolink and eastern meadowlark may begin to inhabit agricultural fields within the study area if they are left fallow in following seasons. If clearing is required during the breeding bird season (May 1 – August 1), it is recommended that the areas previously surveyed for bobolink and eastern meadowlark be surveyed prior to construction to determine whether these areas provide suitable habitat.

On site personnel should receive training on all potential species at risk. Thorough sweeps of the work area should be conducted on days when construction is to occur to identify the occurrence of any species at risk within the work area. Although no negative impacts to species at risk are anticipated as a result of the proposed widening, if during construction, any species at risk are observed or it is determined that their habitat may be impacted, the Kemptville District MNR Species at Risk Biologist should be contacted immediately.

## 10.4 Cultural Environment

### 10.4.1 Archaeological Resources

In the areas of elevated archaeological potential any project-related ground disturbances, including new road development, temporary laydowns, storage or work areas, and any other activities which might cause below grade disturbances, will need to be preceded by Stage 2 Archaeological Assessment. In areas where the land is cleared and is currently, or has been recently, cultivated Stage 2 Archaeological Assessment will need to be conducted using a pedestrian survey strategy. For a pedestrian survey ploughing of cultivated fields and weathering to allow for artifacts to be readily identified on the ground surface is required. Other specific requirements for preparation of fields for pedestrian survey will follow standards detailed in Section 2.1.1 of the 2011 *Standards and Guidelines for Consultant Archaeologists*.

In areas where ploughing of the ground surface is not feasible Stage 2 Archaeological Assessment will be completed using a test pit excavation strategy. In this situation test pits measuring a minimum of 30 cm x 30 cm are excavated through topsoil and 5 cm into the subsoil and the soil contents screened through 6 mm mesh. Specific requirements for test pit excavation survey will follow standards detailed in Section 2.1.2 of the 2011 *Standards and Guidelines for Consultant Archaeologists*.

The construction specification will include standard requirements for the reporting and protection of unanticipated discoveries of artifacts.

### 10.4.2 Heritage Resources

No impact on built heritage features is anticipated.

### 10.4.3 Cultural Landscapes

Cultural landscapes such as views of the historic road corridors, farmscapes and natural landscapes are described in Section 10.2.4.

## 10.5 Physical Environment

### 10.5.1 Geotechnical and Soils

During design data analysis will confirm the characteristics of the subsurface materials and determine potential impacts due to blasting or settlement and the potential for re-use of excavated material. These issues will be addressed in detail design.

### 10.5.2 Potential Site Contamination

Additional assessment of areas of the subject right-of-way adjacent to the site of moderate environmental concern is recommended because of the possibility of adverse impacts to the groundwater associated with the contaminants of concern.

It is recommended that a Limited Phase II ESA be completed to further assess the corridor for potential adverse impacts related to the sites of moderate concern identified during the Modified Phase I ESA. The additional data acquired during the recommended intrusive Limited Phase II ESA would be used to support the completion of the following project elements:

- The modification of proposed construction activities, if required;
- The development of appropriate protocols for the protection of health and safety for workers during the Construction Stage;
- The determination of the presence and nature of contaminant impacts in soil and groundwater to better select methods, protocols, and associated costs for the management and/or disposal of contaminant-impacted materials;
- The selection of appropriate construction materials to ensure compatibility with the contaminants of concern; and

- The development of a more effective tendering process by identifying possible quantities of contaminated materials to be disposed, as well as special provisions for the management of materials should it be required (e.g., Management of possible contaminated groundwater).

The Limited Phase II ESA should include subsurface testing of soil and groundwater from selected locations for petroleum hydrocarbon fractions F1 to F4 (PHC F1 to F4), and benzene, toluene, ethylbenzene, and xylenes (BTEX). The principal contaminants of concern recommended for further assessment are typical of those associated with the current and historical land uses identified on the sites of moderate concern within the assessment area.

As the scope of the proposed Limited Phase II ESA is minor based on the two moderate environmental concerns identified in the assessment area, the work should be completed in conjunction with geotechnical investigations to optimize efficiency and cost savings.

Should additional soil or groundwater impacts be observed along the corridor at the time of construction, in areas outside of this moderate environmental concern, these should be addressed by collecting a representative soil/groundwater sample and submitting for laboratory analysis.

In addition, it is recommended that representative sample(s) of any excess soils generated during the proposed construction be collected and analyzed for waste characterization purposes to determine appropriate disposal options.

### 10.5.3 Groundwater

Temporary impacts on groundwater during construction may occur as a result of trenching during this widening project. Standard environmental protection measures will apply. Where necessary a Permit to Take Water will be obtained in advance of construction.

### 10.5.4 Infrastructure – Pipeline and Utilities

The City of Ottawa has worked closely with Enbridge Gas during the planning, design and construction of their new 600 mm gas pipeline. The designed location is shown on the utility plans in **Appendix K**. The as-built location of the pipeline should be confirmed with Enbridge and shown on detail design drawings for the road widening. No impacts on the buried pipeline are anticipated due to road construction.

The location of buried cables, including fibre optic cables must be considered in the design and construction of buried municipal services to identify the need for relocation or changes to the road design. Where possible, utilities and municipal services should be relocated in advance of road construction. Ottawa Hydro is working closely with the developers and the City of Ottawa staff to locate power lines to serve existing and future requirements.

For properties with private services, the location of wells and septic systems will be identified in detail design. Impacts and mitigation measures will be identified and included in the contract documents. Provisions for protecting existing private services to remain will also be included in the contract documents.

### 10.5.5 Surface Water and Drainage

Replacement of the Monahan Drain bridge under Hope Side Road is included in this project. The preliminary sizing was established based on separate studies undertaken by the City of Ottawa and the developer reflecting future conditions. The flexibility of the timing of this replacement is being considered by the City of Ottawa and the developer. As the new

culvert will be longer than the existing structure, mitigation of impacts on the watercourse must be considered as described under the natural environment section.

The diversion pipe along Hope Side Road must be located to minimize conflicts with the planned storm drainage system and other underground services and utilities.

Extension of the Stillwater Creek tributary culvert under West Hunt Club Road will be required. Generally the widening is to the north or downstream end of the culvert, which will not impact its flow attenuation capabilities. Mitigation of impacts on the watercourse must be considered.

Drainage culverts throughout the corridor should be examined to assess the feasibility of extending or replacing them during the construction of the widening.

In general, the impact of increased pavement width on the quantity and quality of runoff, will be addressed by the use of enhanced swales for quality impact mitigation and rock check dams or end-of-swale outlet controls for quantity impact mitigation.

In areas adjacent to wetlands, point discharge is not advisable as contaminants may be concentrated in the flow. Drainage from the roadway should be directed to the wetland over grassed or vegetated buffer strips for water quality impact mitigation. Water quantity attenuation is not required since any increase in flow and volume due to pavement widening is insignificant when compared to the wetland volume. A distributed discharge will also minimise localised velocity impacts.

Water quality impacts from winter salting operations can be mitigated by identification of salt vulnerable areas and modifications to the quantity of salt applied or replacing salt with some alternative form of anti-icing material that has less impact.

## 10.6 Monitoring Requirements

Monitoring of the environmental protection measures during construction and the performance of environmental mitigation measures after construction will be required and will be subject to agreement with the NCC.

The City of Ottawa typically maintains full time inspection and construction administration of a project of this size and complexity.

## 10.7 Summary of Potential Effects, Mitigation Measures and Future Works

**Table 49** identifies the potential effects, mitigation measures and requirements for follow-up work listed by valued ecosystem components (VEC). A VEC is defined as an element of the environment that has scientific, economic, social or cultural significance. VECs often include human beings (individuals and groups), flora and fauna, water and soil quality, views and landscape, and archaeological and heritage resources. In the case of the Hope Side Road/Old Richmond Road Corridor Class EA, VECs may be affected both temporarily during construction and permanently after construction. Environmental components considered in conjunction with VECs include (in alphabetical order):

- Air quality

- Agriculture and agricultural land loss in the Greenbelt and along the corridor
- Archaeology and the potential effect on unknown buried resources
- Potential contamination (soil, groundwater and/or surface water) disruption
- Fish and aquatic habitat effects on fish passage and spawning
- Geotechnical – soils and the effect on construction excavations
- Groundwater effects
- Noise and the potential effect on living things
- Property acquisition along the corridor including federal and private lands
- Property access and egress effects
- Recreation pathway needs
- Surface water quality and quantity effects
- Terrestrial habitat and wildlife disturbance and loss
- Traffic level of service reductions and improvements
- Traffic safety (all modes) reductions and improvements
- Utilities and municipal services disruptions and improvements
- Vegetation and landscaping damage and reinstatements
- Vibration by traffic, heavy equipment, buses and trucks
- Wells and septic services effects

The significance of potential environmental effects, before and after the application of mitigation measures, was identified as follows:

- *Significant* (S) means that a potential effect may be:
  - Widespread;
  - Permanent loss of features or habitat;
  - Permanent alteration to the community;
  - Permanent reduction in species diversity or population; or
  - Transcendence or contravention of legislation, standards, or environmental guidelines
- *Insignificant* (I) means that a potential effect may be:
  - Not widespread
  - Temporary or short term duration if recurring (not permanent)
- *Negligible* (N) means that a potential effect may be:
  - Nearly zero or hardly discernible effect
  - Affecting a small proportion of the population/group in a localized area or over a short period of time such that it would not affect the population/group as a whole.
- *Positive* (P) means that the effect may result in a benefit.

**Table 49. Identification of Potential Effects, Mitigation Measures and Future Works**

Construction Phase						
Environmental Component	Potential Environmental Effect	Potential Significance (sig.)	Recommended Mitigation Measures	Level of sig. following Mitigation	Follow-up	
Air Quality	<ul style="list-style-type: none"> <li>Emissions from construction machinery and generation of dust (particulate matter) with resulting effects on living things</li> </ul>	I	<ul style="list-style-type: none"> <li>Construction contract will include requirements for implementation of an emissions management plan</li> <li>Some best practices include:                             <ul style="list-style-type: none"> <li>Use of reformulated fuels, emulsified fuels, exhaust catalyst and filtration technologies, cleaner engine repowers, and alternative-fuelled trucks</li> <li>Regular cleaning of construction sites and access roads to remove construction-caused debris and dust</li> <li>Dust suppression on unpaved haul roads and other traffic areas susceptible to dust, subject to the area being free of sensitive plant, water or other ecosystems that may be affected by dust suppression chemicals</li> <li>Covered loads when hauling fine-grained materials</li> <li>Prompt cleaning of paved streets/roads where tracking of soil, mud or dust has occurred</li> <li>Tire washes and other methods to prevent trucks and other vehicles from tracking soil, mud or dust onto paved streets or roads</li> <li>Covered stockpiles of soil, sand and aggregate as necessary</li> <li>Compliance with posted speed limits and, as appropriate, further reductions in speeds when travelling sites on unpaved surfaces</li> </ul> </li> </ul>	I	<ul style="list-style-type: none"> <li>Prepare Emissions Management Plan</li> </ul>	
Archaeology	<ul style="list-style-type: none"> <li>Excavations resulting in damage to unknown archaeological resources</li> <li>Discovery of unknown buried resources</li> </ul>	S	<ul style="list-style-type: none"> <li>A Stage 2 Archaeological Assessment will be conducted by a licensed archaeologist using the shovel test survey method at 5 m intervals in all areas along the corridor identified as having moderate and high archaeological potential that cannot be ploughed and that have not received archaeological clearance through the planning process</li> <li>Include requirement in contract for contractor to notify authorities upon discovery of unanticipated buried resources</li> </ul>	I	<ul style="list-style-type: none"> <li>Stage 2 Archaeological Assessments</li> </ul>	
Potential Contamination	<ul style="list-style-type: none"> <li>Construction activities may disturb soil/groundwater/surface water contamination</li> </ul>	S	<ul style="list-style-type: none"> <li>A Limited Phase II ESA is recommended to be completed in the areas identified as potentially impacted by the historical and current activities on the adjacent lands. The Phase II ESA can be completed in conjunction with the planned geotechnical investigation</li> <li>Send samples of any excess soils generated for analysis to determine appropriate disposal options</li> </ul>	I	<ul style="list-style-type: none"> <li>Complete Limited Phase II ESA along with follow-up work if needed</li> </ul>	
Fish and Aquatic Habitat	<ul style="list-style-type: none"> <li>Impacts to fish passage and spawning, due to replacement/extension of culverts and related activities during construction</li> <li>Locations include the Monahan Drain culvert under Hope Side Road and Stillwater Creek Tributary under West Hunt Club Road</li> </ul>	S	<ul style="list-style-type: none"> <li>All work will adhere to applicable MNR timing windows to be confirmed in detail design. For cold water systems, work is expected to be permitted between July 1 and September 30. For warmwater systems, the window is expected to be longer</li> <li>Installation, use, and proper maintenance of sedimentation and erosion control measures including turbidity curtains, coffer dams with fish outs of each isolated section, etc. will be employed as necessary</li> <li>Isolate construction zones and conduct construction "in the dry". Collect fish within the work zone and relocate. Dewater to grassed areas of location equipped to filter water before it re-enters the watercourse. Remove accumulated material and debris slowly to allow clean water to pass, to prevent downstream flooding and reduce the amount of sediment-laden water going downstream. Gradual dewatering will also reduce the potential for stranding fish in upstream areas</li> <li>Limit the removal of accumulated material (i.e., branches, stumps, other woody materials, garbage, etc.) to the area within the culvert, immediately upstream of the culvert and to that which is necessary to maintain culvert function and fish passage. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation</li> <li>No equipment should enter watercourses/wetlands outside of the grading limits. In order to minimize the spread of invasive species, all equipment should be thoroughly cleaned with water before it is moved from one area to another.</li> <li>Construct during periods of no or low flow in watercourses. Stop construction activities if conditions are not suitable, such as during and after heavy rain</li> <li>Any cast-in-place concrete will be isolated from the creek for at least 48 hours to allow the pH to neutralize</li> <li>Operate machinery on land (front outside of the water) and in a manner that minimizes disturbance to the banks of the watercourse. No long-term stockpiling of excavated material should occur within 30 m of a watercourse or wetland</li> <li>Stabilize any waste materials removed from the work site to prevent them from entering the watercourse</li> <li>During construction, including qualified biologists on the construction administration team to monitor turbidity and sedimentation measures to prevent excessive turbidity on the Site and to monitor water quality downstream of the Site at appropriate locations</li> <li>To minimize the impact of accidental spills (should they occur) on the creek, spills will be isolated and cleaned up immediately. An Emergency Response Plan (ERP) will be developed to include a spill response plan. Spill response equipment will be readily available</li> <li>Apply topsoil and seed immediately after final site grading, with particular attention to areas adjacent to wetlands and watercourses</li> <li>Following the completion of the project, return substrates and flows to pre-construction conditions to the extent possible in order to encourage fish to return to the immediate area of the work</li> </ul>	I	<ul style="list-style-type: none"> <li>Include operational constraints in construction contract</li> <li>Develop Emergency Response Plan, including Spills Action Plan</li> </ul>	
Geotechnical - Soils	<ul style="list-style-type: none"> <li>Potential impacts during temporary excavations. Need to prepare subgrade soils along the route during construction.</li> </ul>	I	<ul style="list-style-type: none"> <li>Site-specific geotechnical investigations will be required to confirm the subsurface conditions along the selected route. Shallow bedrock is present in portions of the study area</li> <li>Additional investigation with deeper boreholes may be required for the construction of deep services and any new structures such as structural culverts</li> </ul>	I	<ul style="list-style-type: none"> <li>Undertake site-specific geotechnical investigations</li> </ul>	
Groundwater	<ul style="list-style-type: none"> <li>Groundwater has the potential to be impacted during temporary excavations needed to prepare subgrade soils along the route for construction.</li> </ul>	I	<ul style="list-style-type: none"> <li>If trench dewatering in excess of 50,000 litres per day is required during installation of underground utilities, a Permit to Take Water (PTTW) will need to be obtained to comply with the Ontario Water Resources Act, and to limit the potential for delays in construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Review at Detail Design and obtain PTTW if necessary</li> </ul>	
Noise	<ul style="list-style-type: none"> <li>Expected sound levels at closest residential receptor up to 85 dBA, or "loud", during construction/ rock shattering.</li> </ul>	I	<ul style="list-style-type: none"> <li>Construction will be limited to 7:00 am to 10:00 pm Monday to Saturday, and 9:0 am to 10:00 pm on Sundays and statutory or public holidays</li> <li>If construction activities are required outside of these hours, permits or exemptions must be sought from all governing bodies in advance</li> <li>There will be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the City of Ottawa for work done by Contractors</li> </ul>	I	<ul style="list-style-type: none"> <li>Include operational constraints in construction contract</li> </ul>	

Construction Phase						
Environmental Component	Potential Environmental Effect	Potential Significance (sig.)	Recommended Mitigation Measures	Level of sig. following Mitigation	Follow-up	
			<ul style="list-style-type: none"> <li>All equipment will be properly maintained to limit noise emissions. As such, all construction equipment will be operated with effective muffling devices that are in good working order.</li> <li>Include provision in contract documents that an initial noise complaint will trigger verification that the agreed-upon noise control measures are in effect</li> <li>In the event of persistent noise complaints, all construction equipment should be verified to comply with MOE NPC-115 guidelines</li> <li>In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative, and economic feasibility of the various alternatives</li> </ul>			
Property access and egress	<ul style="list-style-type: none"> <li>Access disruptions during construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Maintain access to homes and businesses during construction</li> <li>Provide advance notice of temporary closures</li> <li>Provide emergency access during construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Prepare Traffic Management Plan (TMgmtP)</li> <li>Prepare Communications Plan</li> </ul>	
Surface Water Quality and Quantity	<ul style="list-style-type: none"> <li>Heavy machinery or construction materials contaminating the water</li> <li>Planned diversion pipe may affect design of storm drainage system along Hope Side Road</li> </ul>	I	<ul style="list-style-type: none"> <li>Diversion pipe to be designed to avoid conflicts with proposed storm system</li> <li>See requirements under aquatic habitat for replacement/lengthening of culverts/structures. These include: <ul style="list-style-type: none"> <li>All machinery must be properly maintained to prevent leakage of any possible contaminants. Maintenance will be undertaken a minimum of 30 m away from any watercourse/wetland</li> <li>Proper management of concrete products, dust suppression, effluent. No introduction of deleterious substances into the watercourse</li> </ul> </li> </ul>	I	<ul style="list-style-type: none"> <li>Design diversion pipe</li> <li>Include operational constraints in construction contract</li> <li>Develop Emergency Response Plan</li> </ul>	
Terrestrial Habitat including wetlands and Wildlife	<ul style="list-style-type: none"> <li>Disturbance to Turtle Habitat and Turtle Movements in Stony Swamp</li> <li>Disturbance to woodland in Stony Swamp that may be impacted through dust generated from general construction activities.</li> </ul>	S	<p><b>Birds</b></p> <ul style="list-style-type: none"> <li>Measures adjacent to and within watercourses describe under Aquatic Habitat above apply also to wetland areas</li> <li>See also Vegetation section below</li> </ul> <p><b>Turtles</b></p> <ul style="list-style-type: none"> <li>Undertake clearing activities outside the bird nesting season of May 1 to August 1. If nesting activities are observed during clearing/construction, works in that area should cease and the MNR should be contacted immediately</li> <li>The detail design of roadworks at locations designated as turtle habitat will incorporate mitigation measures to facilitate turtle passage under the road and minimize the ability of turtles to reach the road. New dry culverts will be added in consultation with biologists</li> <li>Where culvert replacements are included in the design, designers will consult with biologist to incorporate wildlife passage, if feasible</li> <li>On-site personnel to receive training in the handling of turtles prior to the start of work through Stony Swamp Core Natural Area</li> <li>A timing restriction from October 16 to March 15 to protect at-risk hibernating turtles has been applied by the MNR. If the proposed works are to occur during this time, the MNR recommends fencing off the Site in early fall to prevent turtles from hibernating in the area</li> <li>During the turtle nesting season in June and early July, as turtles use embankments and other terrestrial sites for nesting, care will be taken to identify individuals within the vicinity of the project. Install silt fencing surrounding the Site to limit the possibility of individuals entering the project footprint</li> <li>During the active season (April 1 to October 30) the MNR recommends a thorough sweep of the area before works begin to encourage any turtles using the Site to move away</li> </ul> <p><b>Woodland</b></p> <ul style="list-style-type: none"> <li>Reduce dust generation through dust control measures such as periodic wetting of soils, and development of Construction based Best Management Practices that include specific measures to limit dust generation during high wind events</li> <li>If construction activities occur within 25 m of any butternut tree, the Kemptville District MNR Species at Risk Biologist should be contacted</li> </ul>	I	<ul style="list-style-type: none"> <li>Include operational constraints in construction contract</li> </ul>	
Traffic Level of Service	<ul style="list-style-type: none"> <li>Potential traffic delays during construction, creating potential idling, increased noise.</li> </ul>	I	<ul style="list-style-type: none"> <li>Traffic staging and detours will be determined before construction to minimize any potential disruptions to traffic flow</li> <li>City staff and contractor staff will communicate with the community and road users through the media and construction signage to provide advance notice of activities</li> <li>An incident management plan will be prepared prior to construction to facilitate the handling of issues</li> </ul>	I	<ul style="list-style-type: none"> <li>Prepare construction staging plan</li> <li>Prepare TMgmtP including Incident management</li> <li>Prepare Communications Plan</li> </ul>	
Traffic safety (all modes)	<ul style="list-style-type: none"> <li>Reduced safety during construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Design construction staging and detours to enhance safety during construction for the travelling public, including non-automobile modes and for workers</li> <li>Where feasible, provide dedicated space for cyclists and pedestrians along the corridor</li> </ul>	I	<ul style="list-style-type: none"> <li>Prepare TMgmtP including Incident management</li> <li>Prepare Communications Plan</li> </ul>	
Utilities and Municipal Services	<ul style="list-style-type: none"> <li>Service disruptions during construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Relocate power and telephone lines in advance of construction</li> <li>Undertake other advance utility work where feasible</li> </ul>	I	<ul style="list-style-type: none"> <li>Include operational constraints in construction contract</li> </ul>	
Vegetation and Landscaping	<ul style="list-style-type: none"> <li>Damage to roadside vegetation during construction</li> </ul>	I	<ul style="list-style-type: none"> <li>Protect vegetation not slated for removal; provide tree barrier protection in accordance with OPSS 801 for the Protection of Trees</li> <li>Delineate vegetation clearing zones and vegetation retention zones clearly in construction specifications and in the field</li> <li>Include specifications for tree felling and grubbing procedures to minimize impacts on vegetation</li> <li>Develop a restoration and seeding plan. Use appropriate edge planting strategies along any newly created edges of wooded areas. Re-seed disturbed areas with a seed mixture that will promote suitable native vegetation regeneration</li> <li>Have a Vegetation Specialist monitor seeding and plantings</li> </ul>	I	<ul style="list-style-type: none"> <li>Include provisions for the removal, protection and re-establishment of vegetation in the contract documents</li> </ul>	
Vibration	<ul style="list-style-type: none"> <li>Vibration caused by heavy equipment and trucks</li> </ul>	I	<ul style="list-style-type: none"> <li>Vibration levels expected to be within acceptable range</li> </ul>	I		
Wells and Septic Services	<ul style="list-style-type: none"> <li>Construction may impact on well and septic systems located in the vicinity of the road</li> </ul>	S	<ul style="list-style-type: none"> <li>Where wells and septic systems are to remain, include in contract documents provisions for protecting these locations and conducting before and after testing</li> </ul>	N	<ul style="list-style-type: none"> <li>Include protection and testing requirements in contract</li> </ul>	

Notes: Significance: S=Significant; I=Insignificant; N=Negligible; P=Positive

Operations Phase (following construction)						
Valued Ecosystem Component	Potential Environmental Effect	Potential Significance	Recommended Mitigation Measures	Level of significance Following Mitigation	Follow-up	
Agriculture	• Widening of Hope Side Road will affect agricultural operations. Property acquisition will be required in agricultural areas	I	• Minimize acquisition of agricultural lands	I		
Air Quality	• Pre-build Benzene concentrations already exceed the threshold	I	• None required as pre-build concentrations already exceed the threshold • Noise barriers have the potential to provide some mitigation to residences located downwind of the barriers	I		
Noise	• Predicted Future "Build" sound levels greater than 60 dBA at twelve of the eighteen receptors	S	• Barriers for front-facing houses (nine of the eighteen receptors) were considered infeasible and therefore mitigation investigation was not required • Construct 2.5 m high noise barrier for receptors with back/side lots facing Hope Side Road and Old Richmond Road that do not have adequate noise walls • Investigate the existing solid wood fences in the vicinity of the proposed noise wall prior to completion of detailed barrier design • Noise barriers can be formed of earthen berms, engineered noise walls, or some combination of the two • Where earthen berms are used, side slopes of 3:1 are to be used for drainage and erosion control and right-of-way maintenance. • Where noise walls are to be used, they are to be free of gaps and cracks, and have a minimum surface density (mass per unit of face area) of 20 kg/m <sup>2</sup> • Appendix C of the City of Ottawa Environmental Noise Control Guidelines provides detailed barrier specifications that are to be met by any barrier design.	I		
Property	• Property acquisition is required from private landowners and the NCC	S	• Provide adjacent developers with preliminary road design data to allow them to design adjacent grading to suit the future roadway • Where feasible, minimize property acquisition across developed parcels using enclosed drainage, retaining walls and/or re-grading (using construction easements) • Where land is required at the time of road widening, the City will negotiate with land owners. Site plans for affected properties will be developed in detail design • National Capital Commission was consulted regarding the need for Greenbelt land. Application for Greenbelt land will be submitted in detail design when the required level of detail is available to determine the right-of-way width required. Land within stony Swamp will be required in exchange	I		
Property access and egress	• Change to driveways to homes and businesses	I	• Design of driveways and property accesses will be based on City of Ottawa standards to suit actual conditions at the time of detail design • Roundabouts will facilitate U-turns where a raised median has restricted access to right in-right out. U-turns will be permitted at some signalized intersections such as Moodie Drive and West Hunt Club Road	N		
Recreation	• Reduced movements at NCC parking lots on Old Richmond Road and West Hunt Club Road providing access to Stony Swamp recreational trails • Greater pedestrian and cyclist demand along the corridor	S	• U-turns will be available at roundabouts and signalized intersections to allow vehicles to access the NCC parking lots and homes within areas with a raised median • A signalized pedestrian crossing will be provided along Old Richmond Road to connect the trail crossing at NCC Parking Lot 6 • Pedestrians and cyclists will be accommodated with sidewalks and cycling tracks adjacent to urban lands and with enhanced shoulders (concrete rumble strip and paved shoulders) adjacent to rural lands	P		
Surface Water	• Increased flooding and/or reduced runoff quality due to additional paved surface • Water quality and quantity during winter maintenance	S	• Runoff to catchbasins along urban curbs, will be directed to roadside ditches and then to the Monahan Drain. In areas of rural drainage, runoff will be directed to ditches or allowed to flow to buffer strips adjacent to wetlands. Preferred mitigation methods, such as enhanced swales and rock check dams will be determined in detail design to suit requirements including subsurface material characteristics • For identified salt-vulnerable areas, potential modification to winter maintenance activities should be explored in the context of Federal, Provincial and TAC guidelines	N		
Terrestrial Habitat	• Loss of habitat • Disruption to wildlife due to spillage of roadway lighting beyond right-of-way	S	• Minimize property acquisition and disruption in areas of terrestrial habitat through Stony Swamp. Where residences must be acquired, consider the potential to rehabilitate the landscape/terrestrial habitat • Design lighting to minimize impacts on wildlife	I		
Transportation Service	• Improved accommodation of pedestrians and cyclists • Reduced congestion and delays • Better emergency response with additional lanes	P	• To achieve improvement, provide sidewalks and cycle tracks within urban area and paved shoulders with concrete rumble strips in rural area • Design roundabouts and roadways to optimize the level of service for vehicles	P		
Traffic safety (all modes)	• Improved safety	P	• Design roadway features to accommodate vulnerable road users and to provide positive guidance, adequate sight distance and sufficient turning lanes to minimize conflicts. Provide raised median, lighting and signalized pedestrian crossing at NCC Parking Lot 7 • Update yield requirements for pedestrian and cyclist crossings at roundabouts with the Province	P	Discussions with the Province on right-of-way at roundabouts	
Vegetation and Landscaping	• Removal of roadside vegetation • Landscaping will be disturbed in various areas	I	• Prepare landscape/vegetation consistent with adjacent land use plan. Where feasible replace disturbed vegetation in consultation with property owner	N	Prepare Landscaping plan and Vegetation replanting plan	
Vibration	• Vibration caused by traffic (in particular trucks and buses)	I	• Vibration levels are expected to be within acceptable range	I		
Wells and Septic Services	• Road widening may impact on well and septic systems located in the vicinity of the road	S	• Locate wells and septic systems during detail design and identify impacts • Where impacts are unavoidable, determine the feasibility of a replacement system	N	Design replacement system where needed	

Notes: Significance: S=Significant; I=Insignificant; N=Negligible; P=Positive

## 11. References

- AECOM, 2012: Monahan Constructed Wetlands – Stormwater Facility, Condition Assessment Report.
- AECOM for the City of Ottawa and the National Capital Commission, 2012: Assessment of Cumulative Effects of Transportation Infrastructures on the National Capital Greenbelt.
- A.J. Robinson & Associates Inc. Consulting Engineers, 1990: Lynwood Village Stormwater Management Study, Area 3, Functional Design – Draft Report.
- A.J. Robinson & Associates Inc. Consulting Engineers, 1990: Lynwood Village Stormwater Management Study, Vol. 1.
- City of Ottawa, 2013: Building a Liveable Ottawa – Official Plan and Master Plan Review.
- City of Ottawa, 2009 and 2010: Collision Statistic Reports.
- City of Ottawa, 2008 and 2013: Cycling Plan.
- City of Ottawa, 2006: Environmental Noise Control Guidelines.
- City of Ottawa, 2009: Fernbank Community Design Plan (CDP).
- City of Ottawa, 2009: Official Plan.
- City of Ottawa, 2009 and 2013: Pedestrian Plan.
- City of Ottawa, 2008 and 2013: Transportation Master Plan.
- City of Ottawa, 2008: Zoning By-law 2008-250.
- CSW, for AECOM Canada Ltd., 2013: Hope Side Road Expansion, Landscape Assessment and Evaluation.
- Delcan, 2008: Transportation Master Plan, City of Ottawa, Road Infrastructure Needs Study.
- Dillon Consulting for Enbridge, 2012: Ottawa Reinforcement Pipeline Project EA Study.
- EcoTec Environmental Consultants Inc. for AECOM Canada Ltd., 2013: Natural Resource Inventory and Assessment Report for the Kanata South Environmental Assessment.
- FoTenn Planning & Urban Design for AECOM Canada Ltd., 2013: Kanata South Transportation Environmental Assessment, Existing Conditions Report, Land Use Planning.
- iTRANS, 2008: West Hunt Club Capacity Analysis Results Memorandum.
- J.F. Sabourin Associates, 2012: Monahan Drain Constructed Wetlands – Required Storage Capacity.
- Municipal Engineers Association, 2011: Municipal Class Environmental Assessment.
- NCC, 1999: Plan for Canada's Capital.
- NCC, 2011: Horizon 2067: The 50-Year Plan for Canada's Capital.
- NCC, 2013: Greenbelt Master Plan Review.
- OC Transpo, 2013: System Map.
- Province of Ontario, 1990: Environmental Assessment Act (R.S.O. 1990, Last Amendment: 2010).
- RWDI Air Inc. for AECOM Canada Ltd., 2013: Kanata South Class EA From Terry Fox to West Hunt Club Road – Air Quality Assessment.
- RWDI Air Inc. for AECOM Canada Ltd., 2013: Kanata South Class EA From Terry Fox to West Hunt Club Road – Environmental Noise Assessment.
- Stantec. for AECOM Canada Ltd., 2013: Stage 1 Archaeological Assessment, Kanata South Environmental Assessment, City of Ottawa, ON.
- Stantec. for AECOM Canada Ltd., 2013: Geotechnical Existing Conditions and Assessment, Kanata South EA Study, Ottawa, ON.
- Stantec. for AECOM Canada Ltd., 2013: Modified Phase 1 Environmental Site Assessment, Kanata South EA Project.