Orléans Watermain Link Environmental Assessment

prepared for:

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April 2012

EO2377TOA00

EXECUTIVE SUMMARY

The City of Ottawa has undertaken the Orléans Watermain Link (OWL) Class Environmental Assessment (EA) and Functional Design Study. The OWL is needed to improve the reliability of water supply to the East Urban Community (EUC), and to provide additional transmission capacity needed to accommodate future urban growth. The current EUC water infrastructure is insufficient to ensure that supply can be maintained over the course of a major failure. The OWL project will ensure that the basic water needs of the community can be met over an extended major failure period.

The project is identified in the City's current Infrastructure Master Plan (IMP). The initial concept identified in the IMP was to construct a 762 mm watermain from the existing 610 mm on Ogilvie Road at Blair Road to the existing 914 mm transmission main located on St. Joseph Boulevard near Jeanne D'Arc Boulevard. There is an existing secondary 1067 mm transmission watermain extending from the Hurdman Pump Station to the intersection of Blair Road and Ogilvie Road. This 1067 mm transmission main is in conflict with the City's Light Rail Transit (LRT) project and is located less than 10 m from the primary 1220 mm transmission main for long stretches which creates increased failure risks. Relocation of this 1067 mm watermain is also required for EUC reliability as part of the OWL undertaking.

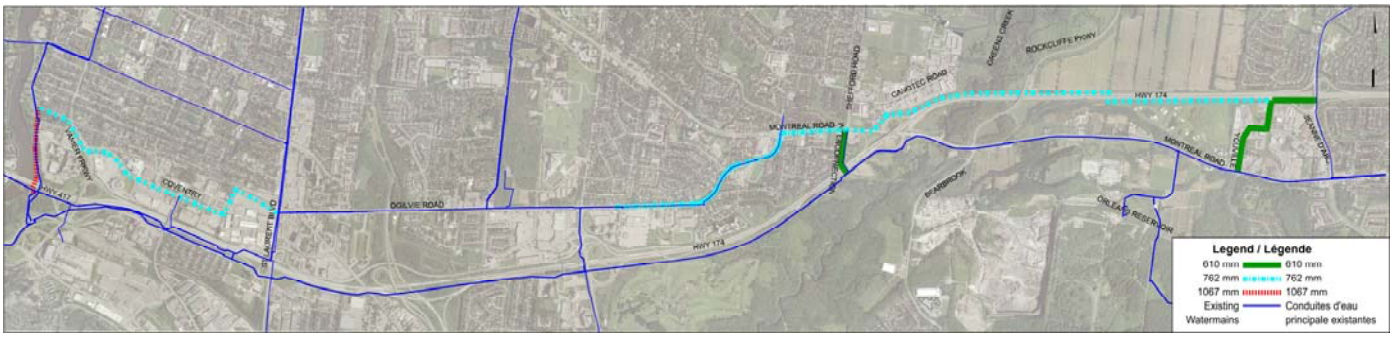
This study was carried out in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (MCEA). The study included identification and evaluation of infrastructure alternatives and the selection of a preferred alternative.

Technical and Environmental reviews were used to identify constraints and opportunities that provided input into the development of seven (7) alternative routes. The key issues that influenced route locations included:

- Proximity of the proposed link to the existing 1220 mm EUC transmission main;
- Extent of Leda clays, and the potential risks that these clays pose in terms of maintaining a secure supply of water to the EUC;
- Location of water pumping and storage facilities;
- Configuration of City road rights-of-way (ROW);
- Hydraulic performance;
- Major utility and water body crossings;
- Green's Creek; and
- Transportation corridors crossing the Greenbelt (Ottawa Road 174, Innes Road).

The top four (4) alternatives based on the screening level assessment were carried forward for further evaluation. Two of the Alternatives had very similar evaluation scores. Technically both had good hydraulic performance and similar compatibility with existing and future utilities and infrastructure. The key differences were the Greenbelt crossing and impacts on the National Capital Commission (NCC) lands. Discussions with the NCC, the principal landowner and approval agency affected by the alignments, confirmed their endorsement of Alternative 6 based on environmental and land use impacts. The preferred alignment is shown following and can be found in larger scale in Appendix A.

Preferred Alignment



Some refinement of the east and west sections of the alignment are the subject of ongoing discussions with approval agencies and will be determined during the subsequent design phases. The refinements were included within the scope of this Class EA Study.

During the construction phase, each individual section will be an active construction site. Traffic disruptions, noise, dust and visual interruptions will be inevitable. Ongoing communications by the City of Ottawa with the affected public will go a long way in alleviating potential concerns and ensuring that timely information about the project is disseminated. Following the construction phase, there will be a positive effects related to water supply integrity.

While the OWL project has the potential to have negative effects on the human and biophysical environments in its vicinity, these effects can be sufficiently mitigated with prescribed design features and sound environmental management practices, where possible and practical. Additional approvals that may be required as part of the subsequent detailed design process, have been identified. By incorporating the mitigation measures identified, no “significant” adverse environmental effects are expected to prevail after mitigation.

Throughout the process, the project benefited from public and agency participation including consultation with the Technical Advisory Committee (TAC) and the general public. In part, from the feedback from these meetings, the Project Team was able to identify and mitigate, where possible, localized impacts for residents/landowners immediately adjacent to the proposed project. This involvement also maximized, to the extent possible, public and agency confidence in the selection of a Preferred Alternative, as well as the process which led to relevant decisions.

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ACRONYMS

ANSI	Areas of Natural and Scientific Interest
APEC	Areas of Potential Concern
BIA	Business Improvement Area
BMPs	Best Management Practices
BRT	Bus Rapid Transit
BSC	Bird Studies Canada
CEAA	Canadian Environmental Assessment Act
CN	Canadian National Railway
DND	Department of National Defense
DOTT	Downtown Ottawa Transit Tunnel
EA	Environmental Assessment
ESD	Environmental Services Department
EUC	East Urban Community
GIS	Geographic Information System
GMP	Greenbelt Master Plan
HWY	Highway
IMP	Infrastructure Master Plan
ISD	Infrastructure Services Department
LOS	Level of Service
LRT	Light Rail Transit
m	Metres
MCEA	Municipal Class Environmental Assessment
ML	Million Litre
mm	Millimetres
MNR	Ministry of Natural Resources
MTCS	Ministry of Tourism, Culture and Sport
MTO	Ministry of Transportation
NCC	National Capital Commission
NEA	Niblett Environmental Assessment
NHIC	Natural Heritage Information Centre
OCC	Orléans Cumberland Collector
OESA	Ontario Endangered Species Act
OHA	Ontario Heritage Act
O&M	Operation and Maintenance
OP	Official Plan
OR	Ottawa Road
OWL	Orleans Watermain Link
PGM	Planning of Growth Management
PPS	Provincial Policy Statement
PTHIA	Public Transportation and Highway Improvement Act,
PTTW	Permit to Take Water

PWGSC	Public Works and Government Services Canada
RCMP	Royal Canadian Mounted Police
ROPEC	Robert O. Pickard Environmental Centre
ROW	Rights-of-Way
RVCA	Rideau Valley Conservation Authority
SRANK	Subnational Rank
TAC	Technical Advisory Committee
UNA	Urban Natural Area
WSSOS	Water Supply System Optimization Study

1 INTRODUCTION

The Orléans Watermain Link (OWL) was originally identified in the 1997 Water Master Plan (Regional Municipality of Ottawa-Carleton) and the need for this main has been re-affirmed in the 2003 and 2009 Infrastructure Master Plans (IMP). It has also been identified as a top priority project in the recently completed Critical Infrastructure Identification Study. The purpose of this link is twofold:

- augment water transmission capacity to the East Urban Community (EUC) in order to meet future demands; and
- increase the reliability of the water supply to the EUC.

The project, as originally defined, was expected to involve construction of a 762 mm watermain from the existing 610 mm pipe on Ogilvie Road at Blair Road to the existing 914 mm transmission main located on St. Joseph Boulevard with a connection to the existing 406 mm watermain on Jeanne D'Arc Boulevard.

1.1 Study Scope and Objectives

The scope of this study includes a review of major water infrastructure serving the EUC, starting from the Hurdman Pump Station at the Rideau River, and moving east to the Forest Valley and Orléans Pump Stations, which are both located in Orléans. The general location for the OWL as depicted in the City's IMP is illustrated in Figure 1-1.

The major objectives of the study include:

- Confirm the scope of the OWL project, as originally defined in the City's IMP and identify other infrastructure upgrades needed to meet level of service and system reliability needs.
- Satisfy the Class Environmental Assessment (EA) requirements for the proposed infrastructure improvements.

1.2 Study Process and EA Requirements

The watermain will not likely be entirely located within existing public Rights-of Way (ROW), and thus the project has been identified as a "Schedule B" project under the Municipal Class Environmental Assessment (MCEA) 2007.

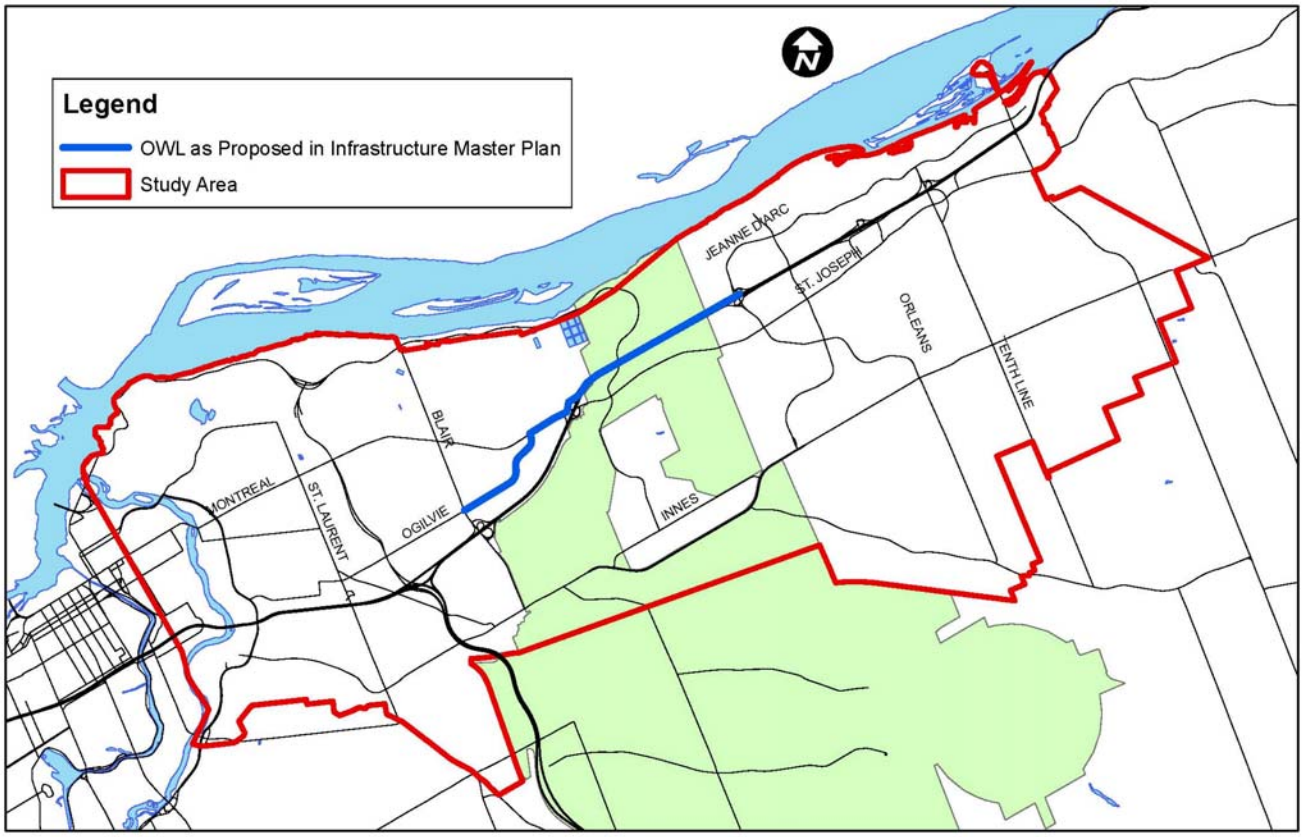
The IMP is considered to have satisfied the requirements of Phases 1 and 2 of the Municipal Class EA process for this project. However, the work completed to date does not fully satisfy the requirements of a "Schedule B" project.

The intent is for the study to undertake more detailed work on the development and assessment of alternative solutions, carry out more focused consultations, and to define the project in further detail (including impact mitigation), than had been completed as part of the IMP.

The project is expected to require compliance with the Canadian Environmental Assessment Act (CEAA) due to the potential Federal land requirements and necessary approvals. This EA does not complete the Federal EA requirements but the process includes consultations with Federal representatives. Consultations solicited Federal input to the project and reviewed CEAA requirements to be considered. Additional agency approvals will be required during subsequent phases of the project.

A Technical Advisory Committee (TAC) was established, primarily to review and comment on the technical aspects of the study. Further information on the TAC is provided in Section 6 of this report.

Figure 1-1: OWL - 2009 Infrastructure Master Plan



1.3 Report Organization

The report is divided into nine sections. The study description and background, as well as the study process and EA requirements, are provided in Section 1.0. Section 2.0 outlines the Project Justification, focuses on the need for the watermain improvement, and provides the objectives of the study. Section 3.0 describes the existing conditions which are likely to be affected by the proposed alternatives. A description of the watermain improvement alternative solutions is provided in Section 4.0 along with the evaluation process to determine the preferred alignment. Section 5.0 describes the preliminary preferred solution as well as an evaluation of the environmental impacts of the project and associated mitigative measures. Section 6.0 describes Agency and Public consultation which were undertaken as part of the assessment to confirm the Preferred Alternative. Section 7.0 discusses the future commitments for the project. The conclusions and recommendations of the study are provided in Section 8.0 and any references are listed in Section 9.0.

2 PROJECT JUSTIFICATION

2.1 Project Need and Justification

Current planning and design of water supply infrastructure is based on a Level of Service (LOS) that:

- will meet all anticipated water demands over the planning horizon during normal operating conditions; and
- meets *basic water needs* of the community during a critical system failure condition.

Basic water needs are quantified based on the actual demands that occur on a typical winter day in Ottawa, and does not allow for outdoor water use.

The intent is that the new watermain will allow peak hour demand to be met under demands projected at build-out of the City's urban envelope, with allowance for aggressive intensification. It will further allow basic demands to be met for this development condition in the event of a failure of the existing major transmission main which currently supplies the EUC.

The major potable water infrastructure that supplies the City is replicated from the IMP and is shown in Figure 2-1, along with other major municipal infrastructure. The major water infrastructure that supplies the EUC includes a 1220 mm diameter transmission watermain that crosses the Greenbelt, one 80 million litre (ML) ground storage reservoir (i.e. the Orléans Reservoir) and two pumping stations (i.e. the Orléans and Forest Ridge Pumping Stations). Should the transmission main require any emergency repair or maintenance, the available duration of water supply to the EUC would depend on the amount of water in the Orléans Reservoir. Under normal operating conditions, this could be between 2 to 3 days of available water during the emergency repair undertaking. This time would be further reduced if the reservoir is low or if a failure occurs under peak demands. Increased growth and water demands in the EUC would further decrease the volumes available under emergency conditions.

City Operations staff have the capacity to respond to critical system failures and bring the system back up to normal operating conditions in a time frame that typically ranges from a few hours to about one week. Thus, the current EUC water infrastructure is insufficient to ensure that supply to the EUC can be maintained over the course of a major failure. This is the main reason why the OWL project has been identified as a priority project for the City. The OWL project will ensure that the basic water needs of the community can be met over an extended major failure period.

There is existing secondary transmission extending from the Hurdman Pump Station to the intersection of Blair Road and Ogilvie Road. This includes a 1067 mm watermain located within the Highway (HWY) 417 corridor, and a 610 mm watermain on Ogilvie Road. However, the former main is located less than 10 m away from the primary 1220 mm transmission main, over long stretches between Riverside Drive and St. Laurent Boulevard. Should either main fail, there is a significant risk that it would trigger the failure of the other.

The impact of a dual failure at this location would result in a loss of system pressure in some areas of the City, and over-pressurizing of other watermains which may create failures in other areas. In the event of a double failure, the reservoir would need to provide

pressure stabilization in the low-lying areas along the river. Under basic day demands and a dual failure, system operation is stable in that the reservoir is not continually losing ground; under maximum day demands the reservoir loses ground fairly quickly. Water restrictions would need to be imposed and the system stabilized. As such, more separation is required between the two existing watermains between Riverside Drive and St. Laurent Boulevard to reduce this risk.

The existing 1067 mm transmission main previously noted is also in conflict with the City's Light Rail Transit (LRT) project. Thus, relocation of this 1067 mm transmission main is needed to eliminate the LRT conflict, as well as to provide the separation from the other existing 1220 mm transmission main. The timing of relocating the 1067 mm transmission main is being driven by the LRT project schedule.

To meet the City's expected LOS to the EUC, the eastern and western sections of the OWL will be required as soon as possible.

Note:
1) This figure forms part of the Infrastructure Master Plan of the City of Ottawa and should be read in conjunction with the text.
2) This figure is intended as a schematic representation of existing and/or proposed works; consequently alignments and locations of facilities are approximate.
3) The Urban Boundary appears as shown on Schedule A of the Official Plan adopted by Council on

Note:
1) Cette figure fait partie intégrante du Plan directeur de l'infrastructure de la Ville d'Ottawa et devrait être lue conjointement avec le texte.
2) Cette figure se veut être une représentation schématique des travaux actuels et proposés; en conséquence, les tracés et les emplacements des installations sont approximatives.
3) La limite du secteur urbain apparaît comme il est indiqué dans l'annexe A du Plan officiel adopté par le Conseil, le

1

City of / Ville de GATINEAU

Rivière des Outaouais / Ottawa River

Rivière des Outaouais / Ottawa River

Carp

Puit Carp Well

Station de pompage Morgan's Grant Pump Station

Usine de purification de l'eau de l'île Lemieux Water Purification Plant

Station de pompage de Fleet Street Pump Station

Usine de purification de l'eau de Britannia Water Purification Plant

Station de pompage de la Promenade Brittany Drive Pump Station

Station de pompage de la chemin Montreal Road Pump Station

Station de pompage de Forest Ridge Pump Station

Station de pompage Campeau Pump Station

Stittsville North Water Service Area Zone de services d'eau au nord de Stittsville

Station de pompage Glen Cairn Pump Station

Réservoir Glen Cairn Reservoir

Château d'eau de Stittsville Elevated Tank

Réservoir de Carleton Heights Reservoir

Station de pompage de Carleton Heights Pump Station

Station de pompage de Billings Bridge Pump Station

Station de pompage de Hurdman Station Pump Station

Réservoir d' Orléans Reservoir

Station de pompage d' Orléans Pump Station

Réservoir de chemin Innes Road Reservoir

Château d'eau du chemin Conroy Road Elevated Tank

Notre-Dame-des-Champs

Notre-Dame-des-Champs Water Service Area Zone de services d'eau de la piste de Notre-Dame-des-Champs

Navan

Château d'eau de Barrhaven Elevated Tank

Fallowfield

Réservoir Barrhaven Reservoir

Station de pompage Barrhaven Pump Station

Macdonald-Cartier International Airport

Aéroport International Macdonald-Cartier

Réservoir Ottawa South Reservoir

Station de pompage de Ottawa South Pump Station

Rivière Jock River

Carlsbad Springs

Munster

Puits Munster Wells

Richmond

Puits Kings Park Wells

Central Canada Exhibition Association Water Service Area Zone de services d'eau de l'association de l'exposition du Canada central

Rideau Carleton Raceway Water Service Area Zone de services d'eau de la piste de course Rideau Carleton

South Gloucester Water Service Area Zone de services d'eau de Gloucester Sud

Carlsbad Springs Water Service Area Zone de services d'eau de Carlsbad Springs

Manotick

Vars

Puit Vars Well

417

416

INFRASTRUCTURE MASTER PLAN - Figure 2.1
Existing Water Distribution System: Schematic

PLAN DIRECTEUR DE L'INFRASTRUCURE Figure 2.1
Réseau de distribution d'eau existant : schéma

- Water Storage Facility / Réservoirs d'eau
- Water Pump Station / Stations de pompage
- Treatment Plant / Usine de traitement
- City Operated Well / Puits exploités par la Ville
- Distribution Main / Conduite principale d'eau existante
- Feedermain / Conduite principale
- Urban Boundary / Limite urbaine
- Greenbelt / Ceinture de verdure
- Public Service Area / Zone de desserte

1 0.5 0 1 2 3 4 5 Km

Prepared by: City of Ottawa, Department of Planning, Transit and the Environment, April 2008

Preparé par: Ville d'Ottawa, Le Service de l'urbanisme, du transport en commun et de l'environment, Avril 2008

3 EXISTING ENVIRONMENTAL CONDITIONS

This section of the report represents the studies reviewed and the investigations undertaken to document the existing conditions of the study area. The existing environmental conditions were characterized to determine sensitivities and provide a baseline against which to assess the effects of each of the alternatives. Overall, the baseline data was collected and analyzed for key environmental parameters in order to:

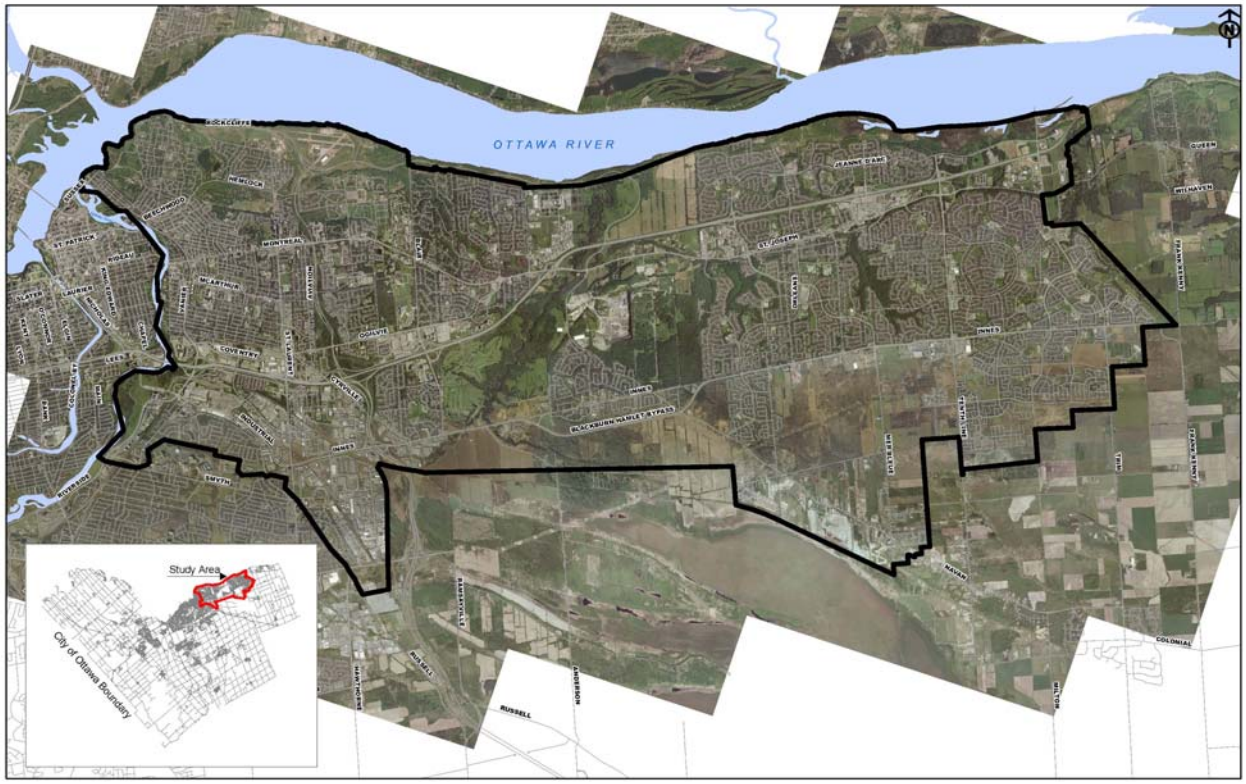
- Provide an understanding of existing conditions;
- Allow for future predictions of how the proposed project may cause these environmental conditions to change; and
- Allow for future predictions of how adverse effects can be mitigated and beneficial effects enhanced.

The following sections describe the existing social, biological, physical and transportation conditions within the study area.

3.1 Study Area

The alignment of the proposed OWL will travel along well developed urban areas, cross water courses and major transportation corridors, and encounter various types of environmental conditions. The study area broadly extends from the Ottawa River to Innes Road and from the Rideau River in the west to Frank Kenny in the east (Figure 3-1). The boundaries were established to encompass the drinking water system serviced pressure zones considered and to allow for the development of alternative solutions.

Figure 3-1: Study Area



3.2 Physical Environment

Existing information on soils, bedrock conditions, potential for contamination and hydrogeology, was reviewed based on in-house databases, published geological maps, well records and other existing information.

3.2.1 Surficial Geology

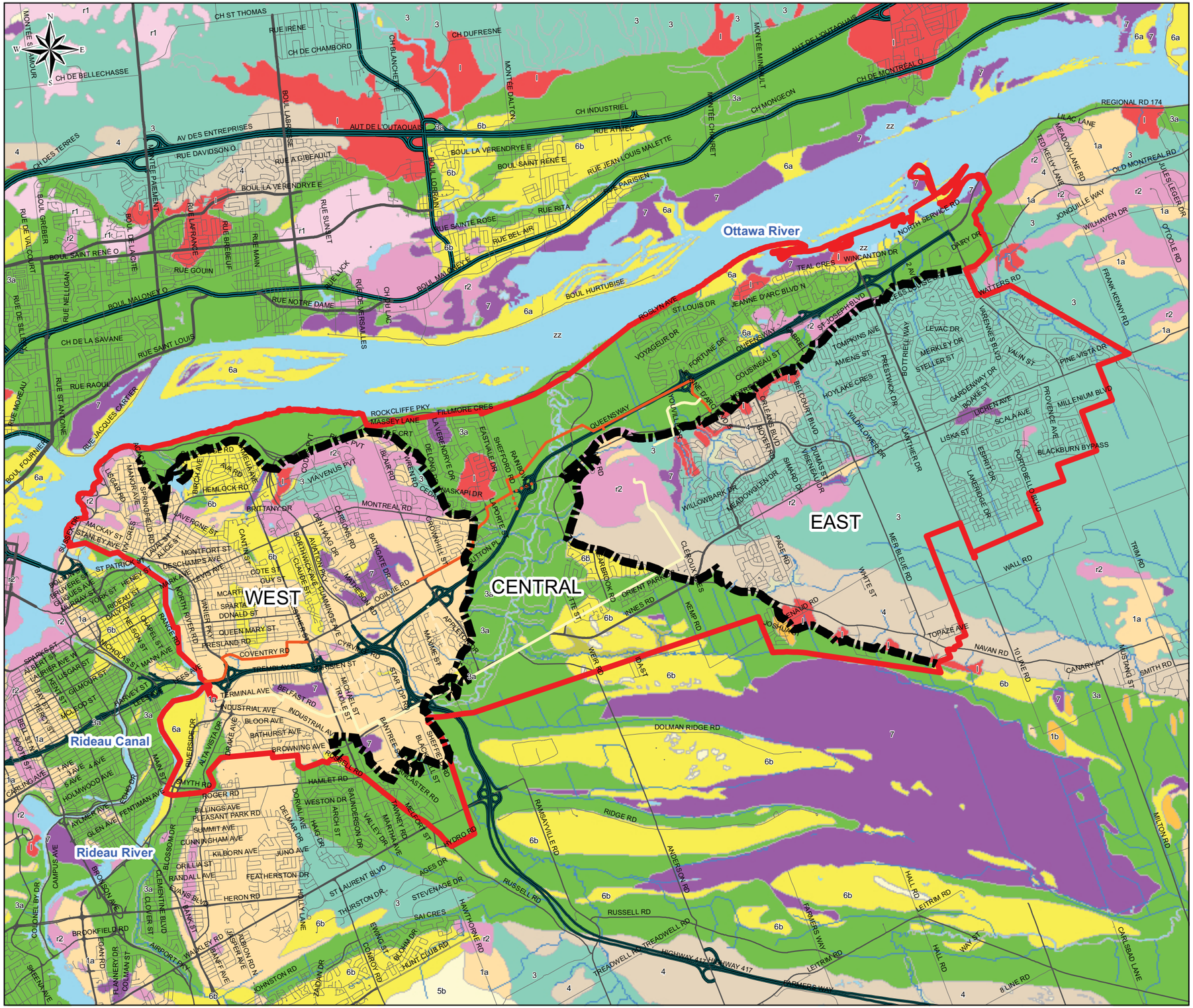
The surficial geology within the study area is comprised of three general surficial geological areas; west, central and east, as shown on Figure 3-2. The West area is generally comprised of glacial till overlying shallow bedrock. Closer to the banks of the Rideau River, loose sandy alluvial deposits and localized areas of silty clay are present. Fill materials associated with past development are expected over much of the western area, reflecting more than 100 years of development. The fill materials are typically 1 to 3 metres in thickness and of variable composition.

The Central and East areas are generally comprised of a thick deposit of sensitive silty clay. The Central area is generally lower lying and the silty clay has been subjected to significant historical erosion, such that this deposit is typically stiffer than in the Eastern Area. In the eastern portions of the Central area and in the East area, the silty clay is locally covered with a sand cap, in areas near the Blackburn Hamlet Bypass, Bearbrook Road/Navan Road and Jeanne D'Arc Boulevard.

3.2.2 Bedrock Geology

Published geological mapping indicates that the bedrock within the study limits consists of two main bedrock types, shale and limestone as shown on Figure 3-3. There are three shale formations: the Billings, the Carlsbad, and the Rockcliffe formations. There are three limestone formations: the Lindsay, the Gull River and the Bobcaygeon formations. The shale bedrock is mapped over much of the southern and western portions of the study area, while the limestone bedrock is mapped within the northern portion of the study area with a shale band.

The overburden in the western portion of the study is generally less than 10 metres thick, with most areas having bedrock within 2 to 3 metres of the ground surface. The bedrock dips down just east of Highway 417 to more than 50 metres depth, as shown on Figure 3-4. There are, however, localized areas where bedrock is at the ground surface or within 1 metre of the ground surface. These localized areas are generally located near Montreal Road, just south of St. Joseph Boulevard in the north east section of the study area, and along Innes Road near the eastern limits of the study area. Groundwater is typically expected within 2 to 4 metres below the existing ground surface.



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LEGEND

- SURFICIAL GEOLOGICAL AREAS
- NORTH ROUTE
- POTENTIAL NORTH ROUTE
- POTENTIAL SOUTH ROUTE
- SOUTH ROUTE
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATER
- STUDY AREA

SURFICIAL GEOLOGY

- 1a TILL, PLAIN WITH LOCAL RELIEF <5m
- 1b TILL, DRUMLINIZED
- 1c TILL, HUMMOCKY TO ROLLING WITH LOCAL RELIEF 5 TO 10 m
- 2 ICE CONTACT STRATIFIED DRIFT: GRAVEL & SAND
- 3 OFFSHORE MARINE DEPOSITS: CLAY, SILTY CLAY & SILT
- 3_g OFFSHORE MARINE DEPOSITS: CLAY, SILTY CLAY & SILT (GULLIES & RAVINES)
- 3a OFFSHORE MARINE DEPOSITS: CLAY & SILT UNDERLYING EROSIONAL TERRACES
- 3a_g OFFSHORE MARINE DEPOSITS: CLAY & SILT UNDERLYING EROSIONAL TERRACES (GULLIES & RAVINES)
- 4 DELTAIC AND ESTUARY DEPOSITS: MEDIUM TO FINE GRAINED SAND
- 4_g DELTAIC AND ESTUARY DEPOSITS: MEDIUM TO FINE GRAINED SAND (GULLIES & RAVINES)
- 5a NEARSHORE SEDIMENTS: GRAVEL, SAND & BOULDERS
- 5b NEARSHORE SEDIMENTS: FINE TO MEDIUM GRAINED SAND
- 6a ALLUVIAL DEPOSITS: SILTY SAND, SILT, SAND & CLAY
- 6a_g ALLUVIAL DEPOSITS: SILTY SAND, SILT, SAND & CLAY (GULLIES & RAVINES)
- 6b ALLUVIAL DEPOSITS: MEDIUM GRAINED STRATIFIED SAND WITH SOME SILT
- 6b_g ALLUVIAL DEPOSITS: MEDIUM GRAINED STRATIFIED SAND WITH SOME SILT (GULLIES & RAVINES)
- 7 ORGANIC DEPOSITS: MUCK & PEAT
- d DUNE
- d_g DUNE (GULLIES & RAVINES)
- l LANDSLIDE AREA
- l_g LANDSLIDE AREA (GULLIES & RAVINES)
- r1 BEDROCK: INTRUSIVE & METAMORPHIC
- r2 BEDROCK: LIMESTONE, DOLOMITE, SANDSTONE & LOCAL SHALE
- r2_g BEDROCK: LIMESTONE, DOLOMITE, SANDSTONE & LOCAL SHALE (GULLIES & RAVINES)
- zz WATER

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD.REPORT NO. 11-1121-0144

REFERENCE

BÉLANGER, J. R., URBAN GEOLOGY OF THE NATIONAL CAPITAL AREA, GEOLOGICAL SURVEY OF CANADA, OPEN FILE D3256, 2001

Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 18

2,000 0 2,000

1:75,000 METRES

PROJECT

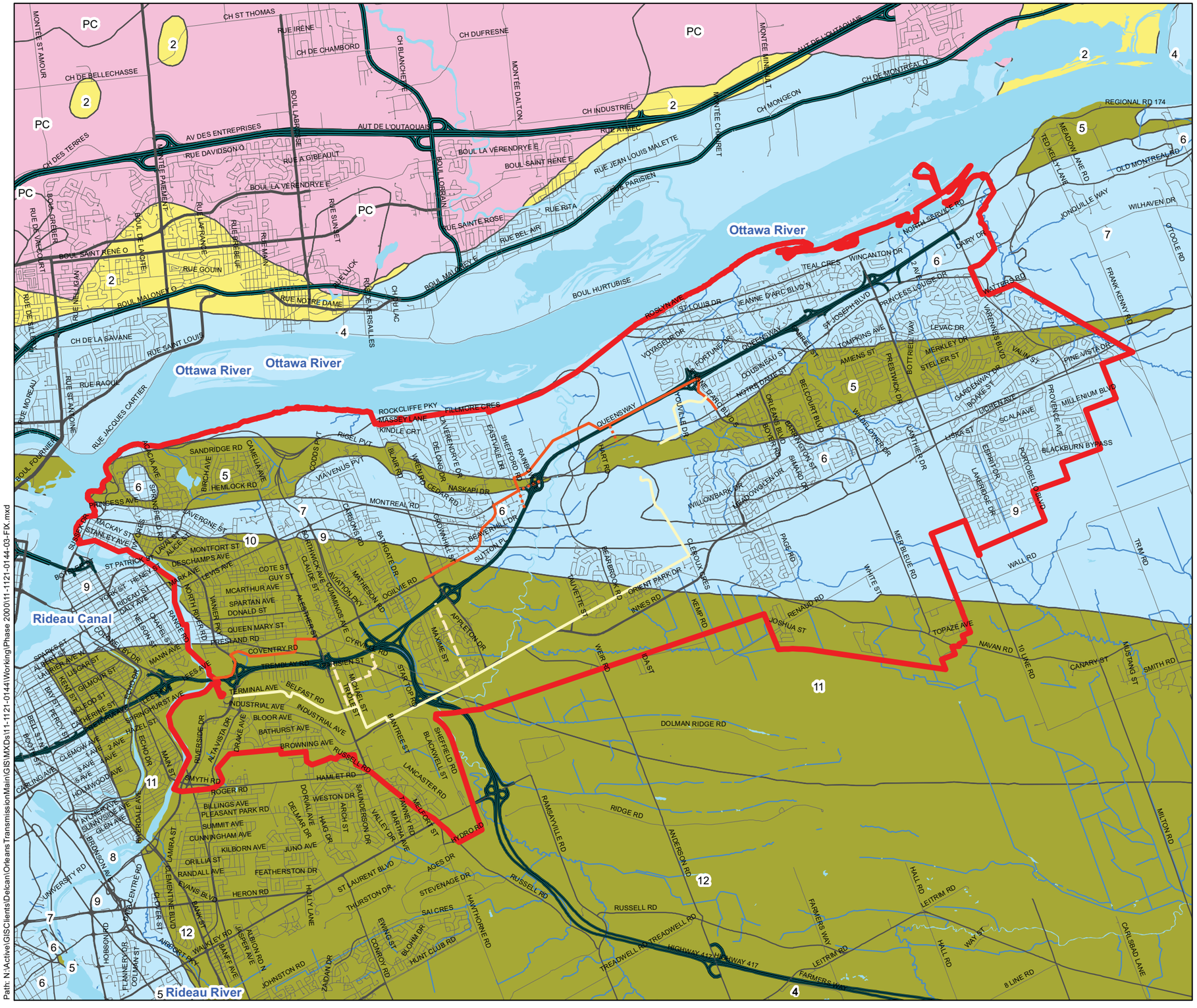
ORLEANS TRANSMISSION MAIN LINK
OTTAWA,ONTARIO

TITLE

SURFICIAL GEOLOGY

Golder Associates
Ottawa, Ontario

PROJECT No.	11-1121-0144	SCALE AS SHOWN	REV. 0	
DESIGN	BDG	14 JULY 2011	Figure 3-2	
GIS	ABD	14 JULY 2011		
CHECK	BDG	20 JULY 2011		
REVIEW	MIC	20 JULY 2011		



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LEGEND

- NORTH ROUTE
- POTENTIAL NORTH ROUTE
- POTENTIAL SOUTH ROUTE
- SOUTH ROUTE
- STUDY AREA
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATER

BEDROCK FORMATION

- 13 QUEENSTON FORMATION: RED TO LIGHT GREENISH GRAY SILTSTONE AND SHALE, WITH INTERBEDS OF SILTY BIOCLASTIC LIMESTONE IN LOWER PART
- 12 CARLSBAD FORMATION: INTERBEDDED DARK GRAY SHALE, FOSSILIFEROUS CALCAREOUS SILTSTONE, AND SILTY BIOCLASTIC LIMESTONE
- 11 BILLINGS FORMATION: DARK BROWN TO BLACK SHALE, WITH LAMINATIONS OF CALCAREOUS SILTSTONE
- 10 EASTVIEW FORMATION: INTERBEDDED SUBLITHOGRAPHIC TO FINE CRYSTALLINE LIMESTONE AND DARK BROWN TO DARK GREY SHALE

MIDDLE TO UPPER ORDOVICIAN

- 9 LINDSAY FORMATION: SUBLITHOGRAPHIC TO FINE CRYSTALLINE LIMESTONE, NODUALAR IN PART, WITH INTERBEDS OF CALCARENITE AND SHALE
- 8 VERULAM FORMATION: INTERBEDDED BIOCLASTIC LIMESTONE, SUBLITHOGRAPHIC TO FINE CRYSTALLINE LIMESTONE
- 7 BOBCAYGEON FORMATION: INTERBEDDED SILTY DOLOMITE, LITHOGRAPHIC TO FINE CRYSTALLINE LIMESTONE, OOLITIC LIMESTONE, SHALE, AND FINE-GRAINED CALCAREOUS QUARTZ SANDSTONE
- 6 GULL RIVER FORMATION: INTERBEDDED SILTY DOLOMITE, LITHOGRAPHIC TO FINE CRYSTALLINE LIMESTONE, OOLITIC LIMESTONE , SHALE, AND FINE-GRAINED CALCAREOUS QUARTZ SANDSTONE
- 5 ROCKCLIFFE FORMATION: INTERBEDDED FINE-GRAINED LIGHT GREENISH GREY QUARTZ SANDSTONE, SHALEY LIMESTONE AND SHALE, LOCALLY CONGLOMERATE AT BASE, INTERBEDS OF CALCARENITE (ST. MARTIN MEMBER, 5A) AND SILTY DOLOSTONE IN UPPER PART

LOWER ORDOVICIAN

- 4 OXFORD FORMATION: SUBLITHOGRAPHIC TO FINE CRYSTALLINE DOLOSTONE
- 4* ALTERED FROM PUBLISHED MAPPING
- 3 MARCH FORMATION: INTERBEDDED QUARTZ SANDSTONE, SANDY DOLOSTONE, AND DOLOSTONE

CAMBRIO ORDOVICIAN

- 2 NEPEAN FORMATION: FINE TO COARSE GRAINED QUARTZ SANDSTONE, PARTIALLY CALCAREOUS IN UPPER PART
- 1 COVEY HILL FORMATION: NONCALCAREOUS FELDSPATHIC, FINE TO COARSE GRAINED QUARTZ SANDSTONE AND QUARTZ PEBBLE CONGLOMERATE

UNCONFORMITY

PRECAMBRIAN

- PC UNDIFFERENTIATED METAMORPHIC AND IGNEOUS ROCKS

NOTE:

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD.REPORT NO. 11-1121-0144

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DESIGN	BDG	14 JULY 2011		
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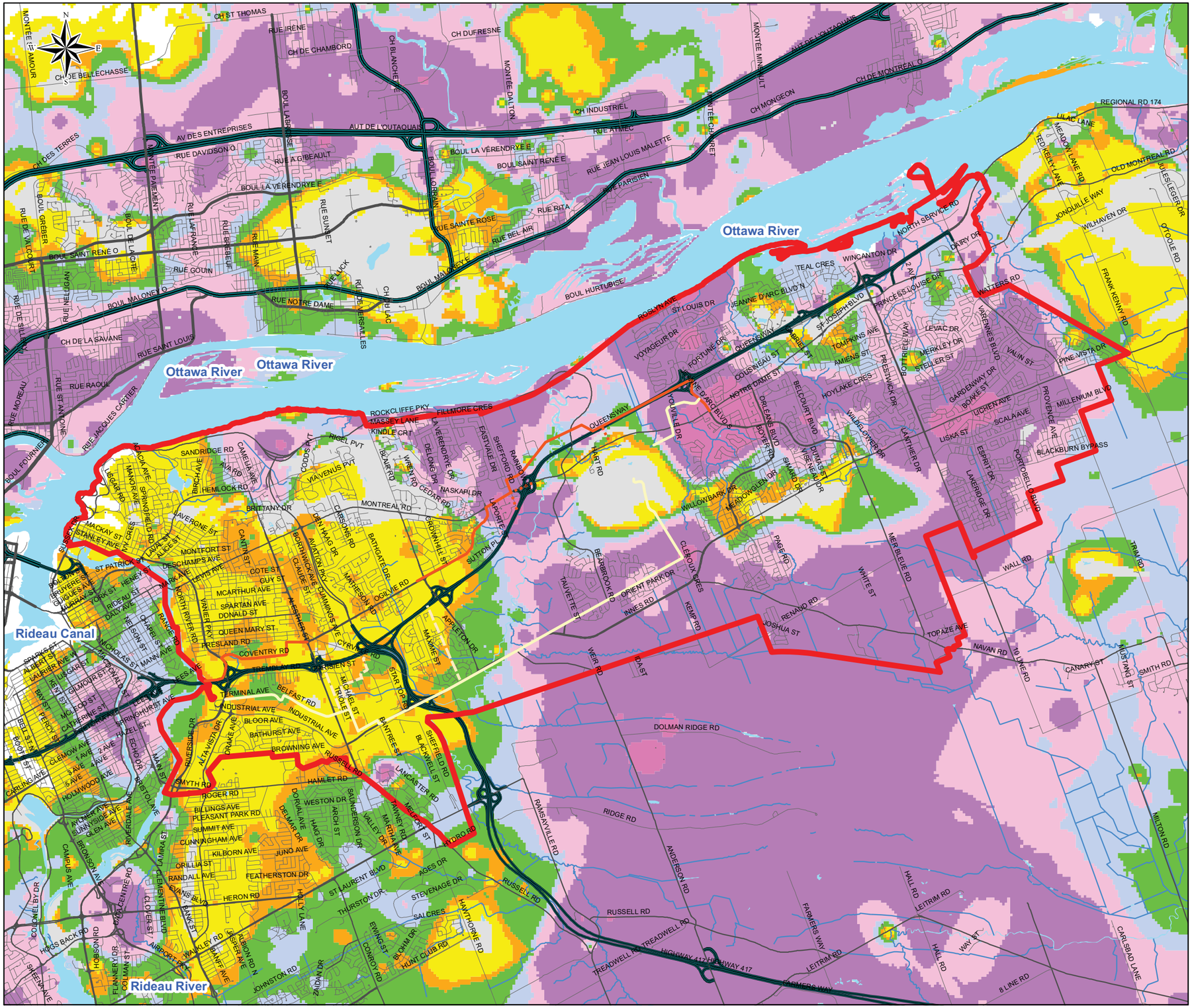
CHECK	BDG	20 JULY 2011		
REVIEW	BDG	20 JULY 2011		

Figure 3-3



Path: N:\Active\GIS\Clients\Delcan\OrleansTransmissionMain\GIS\MXDs\11-1121-0144\Working\Phase 2000\11-1121-0144-02.mxd

LEGEND

- NORTH ROUTE
- POTENTIAL NORTH ROUTE
- POTENTIAL SOUTH ROUTE
- SOUTH ROUTE
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATER
- STUDY AREA

TREND IN DEPTH TO BEDROCK
METRES

- 0 to 2
- 2 to 3
- 3 to 5
- 5 to 10
- 10 to 15
- 15 to 25
- 25 to 50
- 50 to 150

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD.REPORT NO. 11-1121-0144

REFERENCE

BEDROCK TOPOGRAPHY AND OVERBURDEN THICKNESS MAPPING, SOUTHERN ONTARIO, ONTARIO GEOLOGICAL SURVEY, MISCELLANEOUS RELEASE - DATA 207
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

2,000 0 2,000
1:75,000 METRES

PROJECT
ORLEANS TRANSMISSION MAIN LINK
OTTAWA,ONTARIO

TITLE
TREND IN DEPTH TO BEDROCK

Golder Associates
Ottawa, Ontario

PROJECT No.11-1121-0144			SCALE AS SHOWN	REV. 0
DESIGN	BDG	14 JULY 2011	Figure 3-4	
GIS	ABD	14 JULY 2011		
CHECK	BDG	20 JULY 2011		
REVIEW	MIC	20 JULY 2011		

3.2.3 Areas of Potential Environmental Concern (APEC)

A review of available databases (Golder 2011), and existing facilities and streets supporting commercial/industrial operations within the study area, found several areas of potential environmental concern, as identified on Figure 3-5. The potential areas of environmental concern are briefly described below.

- Several closed waste disposal sites are located within the study area (Notre Dame Cemetery (L-14), Beechwood Avenue (Ur-46) Rideau View Estates (Ur-47); St Charles Street (Ur-48); Dominion Bridge Company (Ur-49); Ivey Street Dump and Marier Avenue Dump (Ur-50); Lenore Place and Coupal Street (Ur-52); Gloucester near ROPEC (Gl-5); St. Joseph (Cu-22) and Petrie Island Dump (Cu-13).
- Nine (9) former industrial sites (N3 to N10 and N166) located mainly along Industrial Avenue, Triole Street, Michael Street, Shore Road, Old Russell Road, K Street and Sussex Drive. One (1) active privately owned waste site is located along the south portion of the study area on the south side of Navan Road between Pagé Road and Mer Blue Road.
- Arterial streets have been identified within the study area as having several APECs from commercial and industrial business, either historically or presently.
    - Montreal Road (once a main artery into the city with retail fuels outlets, automotive garages, dry cleaning, etc.);
    - Tremblay Road (Via Train Station and Ontario Ministry of Transportation property);
    - Belfast Road (OC Transpo main garage and former dry-cleaning businesses);
    - Coventry Road (commercial businesses along both sides of the road);
    - Michael Street (commercial and manufacturing businesses);
    - Triole Street (commercial businesses and former oil dealer);
    - McArthur Avenue (commercial businesses);
    - Donald Street (commercial businesses);
    - Ogilvie Road (car dealership and commercial businesses);
    - Canotek Road (Queensway Industrial Campus);
    - Industrial Avenue (commercial businesses, retail fuel outlet, city maintenance garage and warehouses);
    - Innes Road (commercial business, retail fuel outlets);
    - Old Innes Road (Blackburn Hamlet);
    - St. Laurent Boulevard (commercial businesses, retail fuel outlets and automotive garages);
    - St. Joseph Boulevard (commercial businesses, retail fuel outlets and automotive garages);
    - Bearbrook Road (quarry and commercial businesses);
    - Tenth Line Road (commercial businesses and retail fuel outlets; and
    - Taylor Creek Drive (Taylor Creek Business Park).

3.3 Biological Environment

The documentation of the biological environmental conditions of the study area consisted of a review of available, previously completed reports, constraint mapping, existing data records and plant and wildlife lists, air photographs and readily available Geographic

Information System (GIS) data. This information was supplemented with field investigations as required.

3.3.1 Natural Heritage Features

A detailed background literature review of the existing study area identified several natural heritage features that may be on or adjacent to the proposed watermain alignments (Figure 3-6).

There are no provincially significant wetlands within the study area, however, the Mer Bleu Wetland (known as the Mer Bleu Bog) is located adjacent to the study area. The Mer Bleu Bog is a large wetland that includes a number of provincially and federally protected species.

Areas of Natural and Scientific Interest (ANSI)

Two areas of Natural and Scientific Interest: Green's Creek; and Blackburn Hamlet Department of National Defense (DND), have been identified within the study area.

Greens Creek Conservation Area

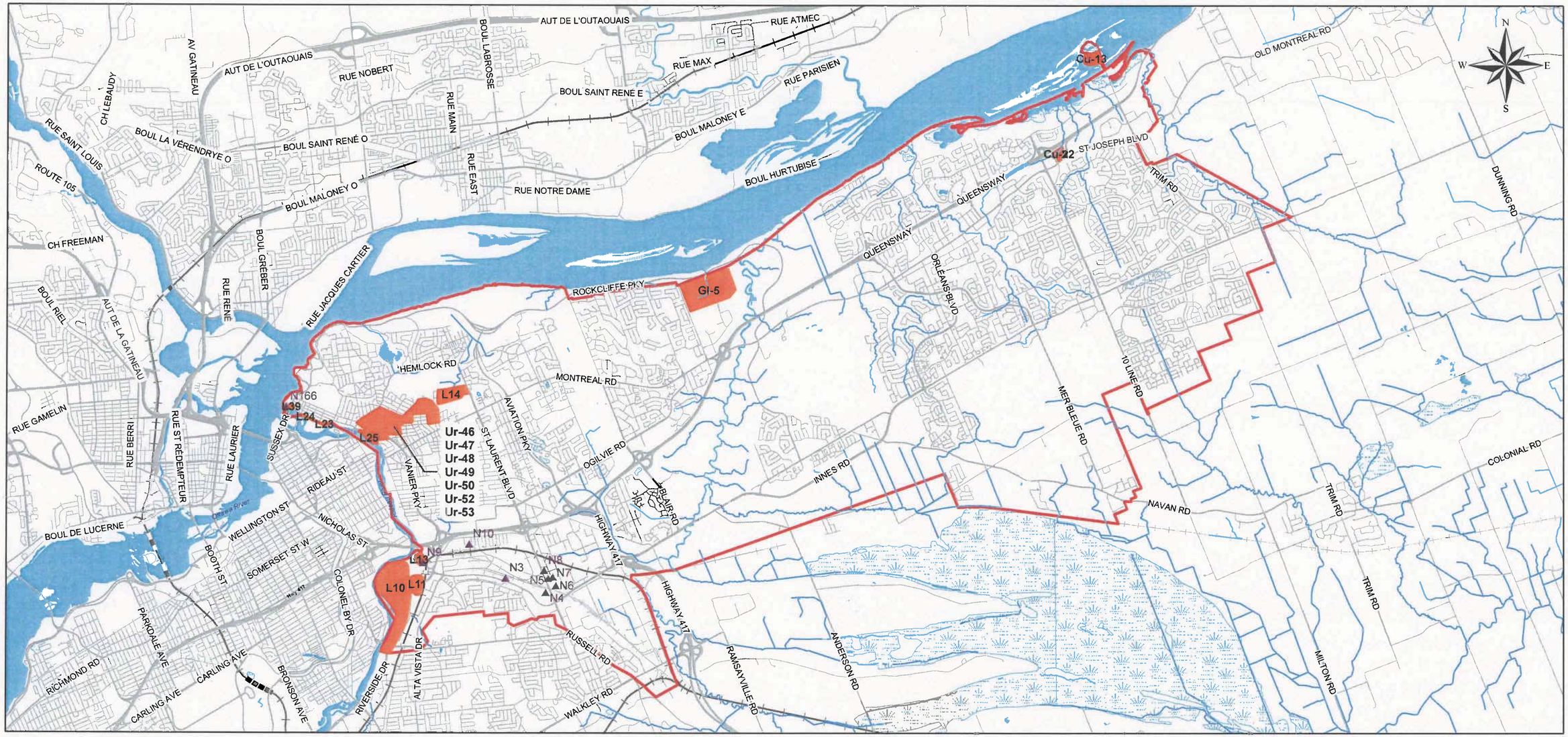
The Greens Creek ANSI is a 425 ha wooded area located in the mid-western portion of the study area; it extends from Innes Road to the Ottawa River where the creek discharges. The Greens Creek forest cover is a complex of deciduous and mixed woodland, with young to submature sugar maple, trembling aspen, eastern hemlock, white spruce and white pine on drier slopes. Four key wetland and creek functions associated with Greens Creek ANSI include fish and wildlife habitat, natural water quality improvements, flood storage and natural linkages.

Blackburn Hamlet DND Forest

The Blackburn Hamlet DND Forest is a 20 ha area sand based forest site situated in the western part of the study area between Blackburn Hamlet and the Francon Quarry. The ANSI is dominated by mature and submature sugar, American Beech and eastern Hemlock, with a diverse ground flora containing a relatively large number of regionally uncommon plant species more typical of dry, sandy hardwoods on the Canadian Shield of western Quebec.

Urban Natural Areas

Ten (10) Urban Natural Areas (UNA) were identified within the study area. The UNA study was initiated by the City of Ottawa in 2005 and later updated in 2008. The UNAs are given an environmental rating of high, moderate and low based on their ecological condition. The UNA number along with the respective ranking is shown in Table 3-1. Descriptions of the UNA's provided by Niblett Environmental Assessment (NEA) and based on the 2005 and 2008 reports, follow.



LEGEND

- EXPANDED STUDY AREA
- FORMER LANDFILL SITE
- FORMER INDUSTRIAL SITE
- WATERBODY
- WATERCOURSE
- WETLAND

2.5 0 2.5
SCALE 1:80,000 KILOMETRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT NO. 11-1121-0144/3000

REFERENCE

BASE DATA PROVIDED BY CITY OF OTTAWA
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9

PROJECT
ORLEANS TRANSMISSION WATERMAIN

TITLE
Areas of Potential Environmental Concern

Golder Associates
Ottawa, Ontario

PROJECT No. 11-1121-0144			SCALE AS SHOWN	REV. 0
DESIGN	BGS	July 2011	Figure 3-5	
GIS	AS	July 2011		
CHECK				
REVIEW				

Path: N:\Active\GIS\Clients\Delcan\OrleansTransmissionMain\GIS\MXDs\11-1121-0144\Working\Phase 3000\11111210144-3000-1.mxd

NAD83, MTM ZONE 9

369900 370900 371900 372900 373900 374900 375900 376900 377900 378900 379900

5037040 5036040 5035040 5034040 5033040 5032040 5031040 5030040

DUCK ISLAND PSW
Upper and Lower Duck Islands
DUCK ISLANDS
Billberry Creek Valley west of quarry woods
Billberry Creek
Convent Glen
Rachelle Park
Rockcliffe Parkway
Airbase Woods
Beacon Hill North
Kingsdale Park
NRC Woods North
Chapel Hill Park
Louis Perrault Park
Forestglen Park
Rockcliffe Park East
Manor Park
McKay Lake
Viscount Alexander Park
Nivens Woods
Rothwell Heights
Ski Hill Park
Rothwell Heights Park
Beacon Heights
Beaconwood
Rothwell Village
FRANCON QUARRY
Voyager Creek
Ottawa
Beechwood Cemetery
Montfort Woods
Quarries
Lindenlea
Richelieu Park
ST. LAURENT - MONTREAL ROAD
Beacon Hill South
Cardinal Heights
Green Creek
Lafarge 1
Lafarge 2
BLACKBURN HAMLET DND FOREST
Vanier
Carson Woods
Bathgate Road Woods
NRC Woods South
Carson Grove
Centre Park
Blackburn Hamlet
Church Woods at Innes
Blackburn
Innes Park
GREENS CREEK CONSERVATION AREA
Kingsview Park
Overbrook
Castle Heights
Forbes
Aviation Parkway North
City Park Woods
Aviation Parkway South
Cyrville Drain
Queensway Park
Cyrville
Pineview
By-Pass Woods
Mud Creek (GrCk)
Presland Park Woods
Hurdman's Bridge
Eastway Gardens
Eastway Gardens Woods
Rideau
MER BLEUE
Mer Bleue BOG
Bog
MER BLEUE PSW
Black Creek
Corriveau Park
Riverview Park
River Road Woods
Old Innes Road Woods, marginal - include for now?
Green Creek
Borthwick Creek
Hospital Woods East
Mather Award Drain
Hospital Woods West
Ottawa
BORTHWICK SPRINGS

369900 370900 371900 372900 373900 374900 375900 376900 377900 378900 379900

NIBLETT ENVIRONMENTAL ASSOCIATES INC. NAD83, MTM ZONE 9 WWW.NIBLETT.CA | WWW.NEAGIS.COM

Figure 3-6: Natural Heritage Features

PN: 11-069
ORLEANS SECONDARY TRANSMISSION
OTTAWA, CANADA

KEY MAP OF THE PROVINCE OF ONTARIO

KEY MAP OF MNR DISTRICT

© WPR

1 cm = 350 meters
Kilometers
0.4 0.2 0 0.4 0.8 1.2 1.6

- Watercourse
- ANSI
- Evaluated Wetlands
- High Rating- UNA
- Moderate Rating- UNA
- Low Rating- UNA
- No Rating- UNA
- Subwatershed Boundaries
- Greenbelt

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wpridham@niblett.ca
general@niblett.ca

Table 3-1: Urban Natural Areas

UNA #	UNA Name	Ranking
69	Queensway Park	Low
77	By-pass Woods	High
78	Church Woods at Innes	Moderate
164	Eastway Gardens Woods	Moderate
68	Aviation Parkway South	Moderate
163	Coronation Park	Moderate
74	City Park Woods	Moderate
73	NRC Woods South	Moderate
82	Forestglen Park	High
83	Chapel Hill Park	High

UNA 68: Aviation Parkway South

This swampy woodlot is 10.3 ha in size. Severely fragmented and divided by a major roadway corridor, this site has a low overall rating for ecological significance. No interior habitat is present and contains several invasive species. This woodlot contains a low native diversity; those that thrive include green ash (Fraxinus pennsylvanica), American elm (Ulmus americana), yellow birch (Betula alleghaniensis), red maple (Acer rubrum) and sugar maple (Acer saccharum). Only one uncommon species was found in this area, the eastern red cedar (Juniperus virginiana).

UNA 69: Queensway Park

This 0.8 ha woodlot is comprised of low diversity small, young low and upland deciduous woodlot on clay substrate. Dominant species include the green ash (Fraxinus pennsylvanica) and American elm (Ulmus americana) with sparse native ground vegetation. The data sheet notes that this community may have been a former swamp forest and had no significant features and species.

UNA 73: NRC Woods South

This young to submature deciduous swamp forest contains small areas of upland forest and is 26.8 ha in size. It has limited connectivity and contains evidence of extensive forest cutting throughout. A small area of interior habitat was identified in the centre of the woodlot (approximately 3 ha). Native diversity includes red maple (Acer rubrum), trembling aspen (Populus tremuloides) and green ash (Fraxinus pennsylvanica).

Five regionally significant or uncommon plant species were identified in this area. These include different-leaved water starwort (Callitriche verna L.), Foxtail sedge (Carex alopecoidea Tucker), rough avens (Geum Laciniatum Murr.), interrupted fern (Osmunda claytoniana) and smooth blackberry (Rubus Canadensis).

UNA 74: City Park Woods

City Park Woods is a small swamp forest woodlot that is only 0.8 ha in size. No interior habitat exists due to the small size of the area and low native flora exists. Species dominating the communities included Green ash, American elm and glossy buckthorn. One uncommon species exists, the three petal bedstraw (Galium trifidum).

UNA 77: By-pass Woods

This 17.6 ha woodlot is comprised of a small, low, deciduous swamp forest with rich biodiversity on level, sand and clay-based substrate with no standing water in Blackburn Hamlet. There is a total of 10 ha of interior habitat. Dominant species include young trembling aspen (Populus tremuloides), white birch (Betula papyrifera), sugar maple (Acer saccharum), in sand substrate and young to submature red maple (Acer rubrum) with eastern white cedar (Thuja occidentalis) in lower sites in sand and clay substrate.

There were two provincially rare vascular plants, the long sedge (Carex folliculata) and the New England sedge (C. novae-angliae), in swamp forest habitat; one other regionally rare species, Kalm's hawkweed (Hieracium kalmii var. fasciculatum), in swamp forest habitat; and two regionally uncommon plant species in swamp forest habitat. The exact location of these specimens is not listed on the UNA datasheets.

UNA 78: Church Woods at Innes

This 3.9 ha woodlot is comprised of a small mixed swamp forest with high biodiversity in sand substrate in Blackburn Hamlet. Dominant species include the young to submature red maple, eastern white cedar, eastern white pine (Pinus strobus) with dense undergrowth in formerly wetter sand substrate. One regionally rare species round-leaved pyrola (Pyrola americana) and one regionally uncommon plant species are found in the woodland habitat.

UNA 82: Forestglen Park

This rugged landscape contains forested area with clay substrate in deep ravines along Bilberry Creek. Forestglen Park contains a high level of ecological integrity with mature, conifer-dominated woodlands throughout the creek corridor. This area is 20.7 ha in size and is situated immediately adjacent to several other woodlands. Four hectares of interior habitat exists in the northern half of the site. This is part of a major ecological corridor between the NCC Greenbelt natural areas and natural habitats in the Gloucester-Orléans area.

The dominant species found which characterizes the vegetation communities included eastern hemlock (Tsuga Canadensis) sugar maple, trembling aspen, American beech (Fagus grandifolia), eastern white pine (Pinus strobus), eastern white cedar, yellow birch and red maple.

One regionally rare species exists (Golden saxifrage (Chrysosplenium americanum)) with 17 regionally uncommon species. These included the Whorled wood aster (Aster accuminatus), small-spiked false nettle (Boehmeria cylindrical), Short husk grass (Brachyelytrum erectum), eastern rough seed (Carex scabrata), white turtlehead (Chelone glabra), sweet woodreed (Cinna arundinacea), hay scented fern (Dennstaedtia punctilobula), Pointedleaf tricktrefoil (Desmodium glutinous), licorice bedstraw (Galium circaezans), thread rush (Juncus filiformis), white grass (Leersia virginica), ground pine (Lycopodium obscurum), sidebells wintergreen (Orthilia secunda), Canadian clearweed (Pilea pumila), Christmas fern (Polystichum acrostichoides), Smooth gooseberry (Rubus Canadensis) and New York fern (Thelypteris noveboracensis).

UNA 83: Chapel Hill Park

This 29.6 ha area contains a continuously forested landscape following deep ravines along the central branch of Bilberry Creek. Connectivity exists between adjacent UNA areas (UNA 82, 84 & 81). No interior habitat is present. The dominant native species which defines the

vegetation communities includes the sugar maple, white ash, eastern hemlock, eastern white cedar, white pine, trembling aspen, white birch, large-toothed aspen, red maple and yellow birch.

This area contains a high native species abundance while also providing habitat for three regionally rare species including the drooping sedge (carex prasina), also provincially rare, American golden saxifrage (Chrysosplenium americanum) and melic mannagrass (Glyceria melicaria).

Twenty-three regionally uncommon plant species are found: cutleaf grapefern (Botrychium dissectum), fringed brome (Bromus ciliates), white turtlehead (Chelone glabra), Umbellate wintergreen (Chimaphila umbellate), drooping woodreed (Cinna latifolia), silvery glade fern (Deparia acrostichoides), hay-scented fern (Dennstaedtia punctilobula), pointed leaf ticktrefoil (Desmodium glutinosum), fire weed (Erechtites hieracifolia), climbing buckwheat (Fallopia scandens), Spotted St. Johnswort (Hypericum punctatum), white grass (Leersia virginica), ground pine (Lycopodium obscurum), Canadian clearweed (Pilea pumila), red pine (Pinus resinosa), Christmas fern (Polystichum acrostichoides), hooked crowfoot (Ranunculus recurvatus), bristly black current (Ribes lacustre), Northern dewberry (Rubus flagellaris, clustered black snackroot (Sanicula odorata), rose twisted-stalk (Streptopus lanceolatus), New York fern (Thelypteris noveboracensis) and hobblebush (Viburnum lantanoides).

UNA 163: Coronation Park

This 2.9 ha woodlot is comprised of remnant hardwood forest with low native biodiversity on ancient shoreline escarpment in till substrate in Rideauview, Alta Vista. Dominant species include the sugar maple, red oak (Quercus rubus) and white ash with dense natural canopy regeneration below. There is one regionally rare species, tall beggar-ticks (Bidens vulgatus), in woodland habitat near Crestwood Street as well as potential for relict physiographic features associated with ancient post-glacial outflow shoreline. This woodland is noted as a superb remnant mature woodland with a well formed, tall canopy and excellent canopy regeneration below, though unusually sparse herbaceous ground flora.

UNA 164: Eastway Garden Woods

This 3.8 ha area is a narrow band of disturbed young swamp forest. No connectivity of interior habitat of any kind exists and a low native species diversity is found. The dominant species found throughout the area includes the green ash and American elm which towers over the dense bush of buckthorn below. No significant or uncommon species exists within the Eastway Garden Woods.

3.3.2 Valley Lands

The City of Ottawa Official Plan (OP), Schedule K - Environmental Constraints, identified several areas as unstable slopes. Green's Creek valleys have been identified as unstable slopes in the OP. Ravines and valley lands have been identified as natural heritage features in the OP. Due to the largely urbanized nature of the study area, valleys form a key primary and secondary corridor for wildlife movement across the landscape. In particular the Greens Creek valley provides a broad corridor for large and small mammals, birds and aquatic organisms.

3.3.3 Watercourses and Aquatic Habitat

Greens Creek flows in a northeasterly direction and is fed by several tributaries within the study area and outlets into the Ottawa River. It is a meandering creek in an incised valley surrounded by farmland and residential development. Within the study area, it is fed by both Mud Creek and Black Creek.

Mud Creek flows in a westerly direction, with the main-stem located south of Navan and Innes Road. Mud Creek is one of four major tributaries of Greens Creek and most of the Mud Creek main-stem is located within NCC lands and therefore has had limited development pressures (Rideau Valley Conservation Authority (RVCA), 2008). Mud Creek originates from the provincially significant Mer Bleue wetland with additional inputs from agricultural drains within the headwaters. Water is turbid within the main-stem of Mud Creek and the stream morphology is primarily flat and punctuated with riffle-pool sections. The bottom substrate is comprised largely of clay and silt, with large portions of the substrate comprised entirely of hard-pan clay.

Black Creek, as with Mud Creek, is one of the four major tributaries of Greens Creek and also originates from the Mer Bleue wetland. It flows in a westerly direction, and merges with Greens Creek approximately 400 m east of Cyrville Road.

Table 3-2 represents a summary of historical fisheries data for Greens Creek and Mud Creek (RVCA, 2009; RVCA, 2008).

Table 3-2: Fish Species from Greens Creek and Mud Creek

Common Name	Scientific Name
Black crappie	*Pomoxis nigromaculatus*
Blacknose dace	*Rhinichthys atratulus*
Bluegill	*Lepomis macrochirus*
Bluntnose minnow	*Pimephales notatus*
Brook stickleback	*Culaea inconstans*
Central mudminnow	*Umbra limi*
Common shiner	*Luxilus cornutus*
Creek chub	*Semotilus atromaculatus*
Emerald shiner	*Notropis atherinoides*
Fathead minnow	*Pimephales promelas*
Golden shiner	*Notemigonus crysoleucas*
Johnny darter	*Etheostoma nigrum*
Largemouth bass	*Micropterus salmoides*
Logperch	*Percina caprodes*
Longnose dace	*Rhinichthys cataractae*
Northern pike	*Esox lucius*
Northern redbelly dace	*Phoxinus eos*
Pearl dace	*Margariscus margarita*
Pumpkin seed	*Lepomis gibbosus*
Rock bass	*Ambloplites rupestris*
Sauger	*Sander canadensis*
Spottail shiner	*Notropis hudsonius*
Trout-perch	*Percopsis omiscomaycus*
White sucker	*Catostomus commersonii*
Yellow perch	*Perca flavescens*
Unknown darter	*Etheostoma sp.*

3.3.4 Significant and Rare Species

A review of the Natural Heritage Information Centre (NHIC) website species geographic query found nine species reports within and adjacent to the study area. Below is a table listing these species and their ranking. The NHIC uses a ranking system that considers the provincial rank of an element (species or community type) as a tool to prioritize protection efforts. These ranks are not legal designations. The provincial (=subnational) rank is known as SRANK.

Table 3-3: Rare Species

Species	Ranking
Milksnake *(Lampropeltis triangulum)*	S3 SC
Giant Pinedrops *(Pterospora andromedea)*	S2
Lurking Leskea *(Plagiothecium latebricola)*	S2
Arrowhead Spiketail *(Cordulegaster oblique)*	S2
Eastern Red Damsel *(Amphiagrion saucium)*	S4
Vezdaea leprosa (A lichen)	S1?
Branching Bur-reed *(Sparganium androcladum)*	SH
Limestone Oak Fern *(Gymnocarpiom robertianum)*	S2
Brachythecium calcareum (a moss)	S2

Ranking
SC – Special Concern Ontario Endangered Species Act - not endangered or threatened, but may become threatened or endangered because of a combination of biological characteristics and identified threats.

SH Possibly Extirpated (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S? Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?). S? species have not had a rank assigned.

A total of 131 bird species have been identified within the study area. This information was obtained from existing literature including past bird surveys and the Breeding Bird Atlas (2001-2005). Common bird species include common grackle, American Robin, rock dove, European starling, savannah sparrow, eastern kingbird, eastern meadowlark, red-eyed vireo, veery, ovenbird, great crested flycatcher and broad winged hawk.

Area sensitive species are species that require a minimum hectarage of contiguous habitat to breed and maintain a population. Large field areas and woodlands are required by some of these species to maintain sufficient habitat. Fragmentation of woodlands in particular can

lead to loss of species that require interior forest conditions (greater than 100 metres from the edge). A total of 27 species of area sensitive species have been identified within the study area (NEA, 2011). A review of the Breeding Bird Atlas data (BSC, 2007, 2001-2005) examined the study area, and found that 11 species are considered significant on a provincial and/or national level. The status noted in Table 3-4 is reflective of the Ontario Endangered Species Act (OESA).

Table 3-4: Significant Bird Species

Common Name	Scientific Name	Status	Habitat Characteristics	Habitat within Study Area
Least bittern	*Ixobrychus exilis*	THR	Flooded wetlands with cattails and open water	none
Black tern	*Chlidonias niger*	SC	Rivers and lakes with emergent vegetation	none
Short-eared owl	*Asio flammeus*	SC	Large open fields and wetlands	none
Red-shouldered hawk	*Buteo lineatus*			
Common nighthawk		SC	Urban and rural areas with nest sites and insect foraging	Foraging habitat over city and fields, nest sites on gravel roofed buildings
Wilson's phalarope	*Phalaropus tricolor*			
Crowned night heron				
Whip-poor-will		SC	Woods, clearings and fields in remote areas	none
Chimney swift		SC	Urban and rural areas with nest sites and insect foraging	Foraging habitat over city and fields, nest sites in old brick chimneys
Canada warbler		SC	Thickets and dense edge vegetation	Possible with forest on Blackburn bypass
Peregrine falcon	*Falco peregrinus*	SC	Natural cliff nest sites and office buildings	Nest in downtown Ottawa annually, no nests within study area

THR – Threatened
SC – Special concern

3.4 Social Environment

Components of the social environment that may be affected by the proposed project include:

- Planning Policy;
- Existing Land Use; and
- Archaeological Resources.

Data collection regarding the social conditions involved reviewing official government documents and published information as well as air photo interpretation.

3.4.1 Planning Policy

Legislation plays an important role in managing planning activities. This section briefly discusses federal, provincial and municipal legislation that may affect infrastructure planning.

3.4.1.1 Greenbelt Master Plan (GMP)

The National Capital Commission's (NCC) GMP guides the preservation and evolution of the National Capital Greenbelt. The GMP sets policies for:

- a connected system of natural lands;
- protected views;
- visitor interpretation;
- a recreational pathway system;
- sustainable farming and forestry; and
- research and high-technology campuses.

The study area crosses the Greenbelt through areas known as the Eastern Farm Sector (north) and Greens Creek/Blackburn Sector. These Sectors include a wide variety of land designations including infrastructure corridors, agricultural and core natural areas (Figure 3-7). The GMP is currently undergoing a comprehensive review. During the review, changes to the land designations and/or disturbance of core natural areas, is prohibited by the NCC.

3.4.1.2 Provincial Policy Statements, 2005

Implemented under Section 3 of the Planning Act, the purpose of the Provincial Policy Statement (PPS) is to provide direction related to land use planning and development within the province of Ontario. The PPS sets the policy foundation for regulating the development and use of land while protecting resources of provincial interest, public health and safety, and the quality of the natural environment. Planning authorities "shall be consistent with" this policy and provincial plans in their decision making process. Section 1.6.1 of the PPS deals with matters relating to infrastructure as it relates to growth; "Infrastructure and public service facilities shall be provided in a coordinated, efficient and cost-effective manner to accommodate projected needs" and "planning for infrastructure and public service facilities shall be integrated with planning for growth so that these are available to meet current and projected needs". With the update of the PPS in 2005 a greater emphasis has been placed on the protection of natural heritage features and water resources. Section 2.1.2 of the PPS States that "the diversity and connectivity of natural features in an area should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features" (MMAH, 2005).

3.4.1.3 City of Ottawa Official Plan

The City of Ottawa's Official Plan provides a vision of future growth of the City and provides a policy framework to guide its physical development to the year 2031. The Official Plan serves as a basis and provides guidance on a wide range of municipal activities including the planning and approval of public works in support of future growth, such as sewage and water infrastructure, roads and transit facilities and public parks.

<u>City of Ottawa Infrastructure Master Plan</u>
The City of Ottawa's latest IMP (2009) provides input to the City's Official Plan, and focuses on all infrastructure related to potable water, wastewater and stormwater. The OWL project was identified in the 2009 IMP, as well as previous Water Master Plans.

3.4.2 Existing Land Use

Land use within the study area currently has a diverse representation from residential, industrial, institutional, recreational, agricultural, vacant land, quarry, and office space

(Figure 3-8). A recreational corridor, providing green space within the City of Ottawa, lines the Rideau River on the western boundary of the project area. An area of condensed industrial development is present along the Industrial Avenue/Innes Road Corridor, toward the south-western boundary. Utility and communication stations and corridors exist throughout the study area. The area bounded by Aviation Parkway, Innes Rd, the Ottawa River and the Rideau River has large areas of residential, institutional, and recreational space, with office space and commercial shopping areas being dispersed throughout. The St. Laurent regional shopping center is planning an upcoming expansion that will see the centre grow to approximately 121,000 meter square (1.3 million square feet). This will include a planned relocation and re-alignment of Coventry Road further to the west.

The Greens Creek ANSI is a naturally vegetated space that is located in the mid-western portion of the study area and extends from Innes Road to the Ottawa River. A large quarry, located on Bearbrook Rd, to the east of the Greens Creek Conservation Area, combined with the buffer around the creek, act as a natural division between Orléans and Ottawa's core area. Orléans is primarily comprised of residential and recreational space, with institutional and commercial centres dispersed throughout. Large amounts of vacant land currently exist in the Navan Rd./Mer Bleue Rd. area, toward the south-eastern boundary of the subject property. Isolated agricultural lands are located east of Greens Creek, with none occurring between Greens Creek and the Rideau River.

Existing Ownership

Within the study area, land ownership is a combination of public and private lands. Large institutions and regional centres and active agricultural leases are within the boundaries (Figure 3-9).

GATINEAU

HULL

ORLÉANS

AYLMER

OTTAWA

Ottawa River

KANATA

NEPEAN

GLOUCESTER

0.8 km / 10 min.

3.3 km / 10 min.

6.5 km / 10 min.

0 1 2 3 4 5 6 7 8 9 10 km

Legend

Continuous Natural Environment

- Core Natural Area
- Natural Area Buffer
- Natural Area Link

Vibrant Rural Community

- Cultivated Landscape
- Rural Landscape

Compatible Built Facilities

- Buildable Site Area
- Infrastructure Corridor

- Greenbelt Additions

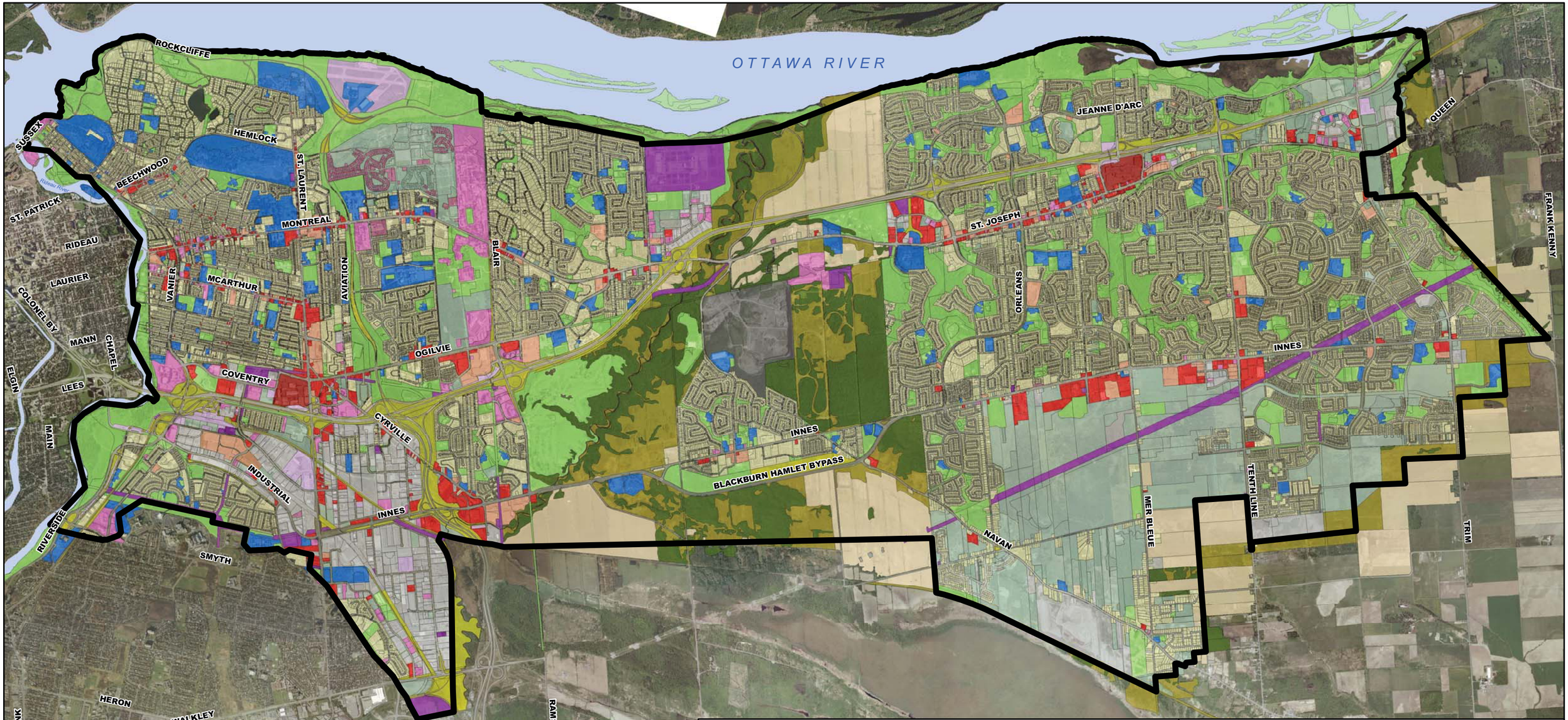
National Capital Commission / Commission de la Capitale nationale

Canada

The National Capital Greenbelt

1996

Figure 3-7: Land Designations



Legend

- Study Area
- Residential
- Regional shopping centre
- Community shopping centre
- Other Commercial
- Institutional
- Industrial
- Transportation
- Utility
- Communications
- Office
- Recreation
- Open space
- Idle and shrub land
- Agriculture
- Pits and quarries
- Vacant land
- Vacant building
- Forest
- Wetland

Orléans Watermian Link (OWL):

Class Environmental Assessment and Functional Design Study

Figure 3-8: Land Use

0 1 2 Km

Ottawa

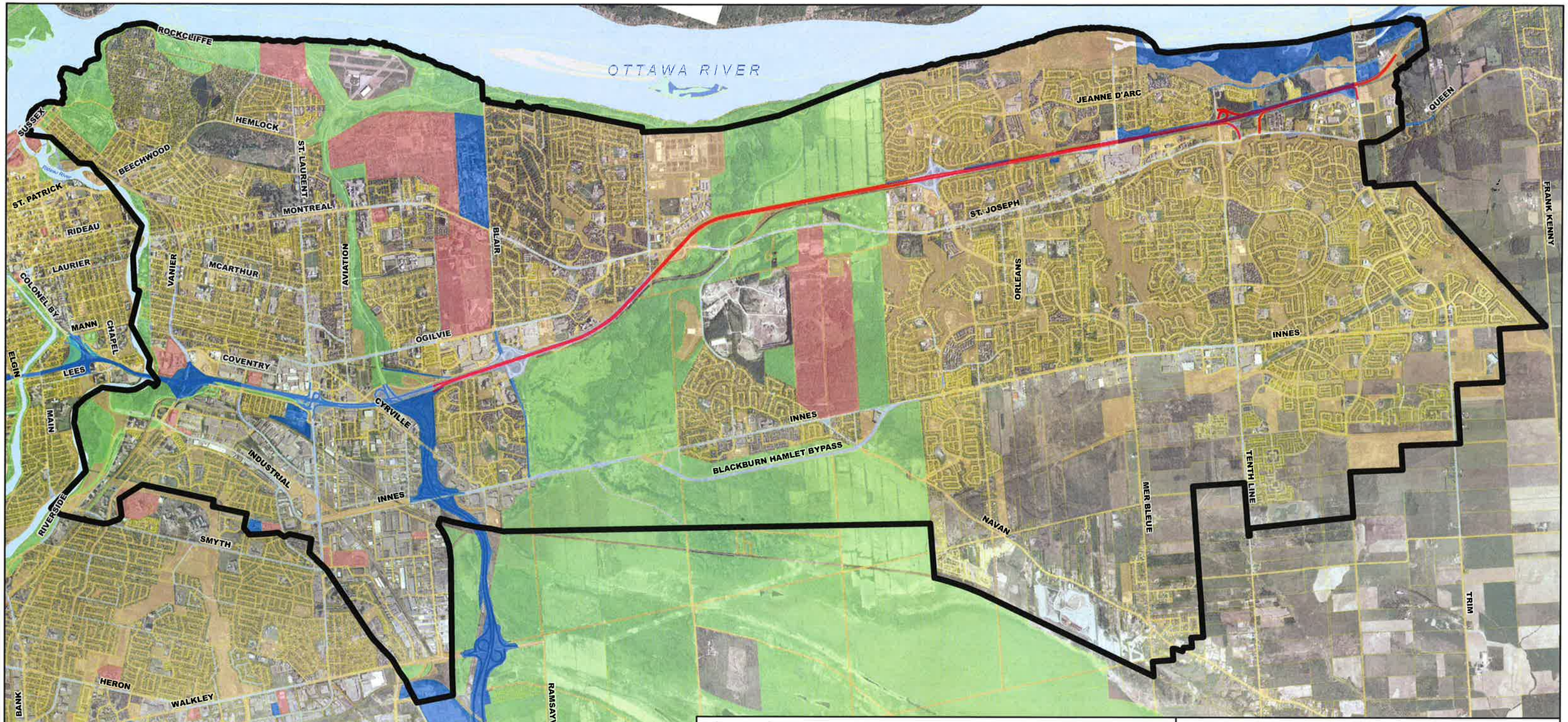
3.4.3 Transportation Infrastructure

There are several primary transportation routes through the subject area (Figure 3-10). Highway 417 is a major collector highway which turns nearly 90 degrees from a North-South to East-West direction, near the south-western boundary of the subject area. This 90 degree turn, is where Highway 417 and Highway 174 connect. Where Hwy 417 turns to carry traffic in a North-South direction, Hwy 174 provides a link between Ottawa and Orléans in an East-West direction.

The Aviation Parkway and Rockcliffe Parkway are the only federally owned transportation routes within the subject area. The Aviation Parkway connects Hwy 417 with the Rockcliffe Parkway, and carries traffic in a North-South direction between Hwy 417 and the Ottawa River. The Rockcliffe Parkway follows the Ottawa River along the northern boundary of the study area, and carries traffic in an East-West direction, connecting Ottawa's city centre in the west with Orléans in the east. There is currently a study underway to assess the location of a new interprovincial bridge across the Ottawa River. The Study is currently looking at three locations.

- Kettle Island;
- Lower Duck Island; and
- Gatineau Airport/McLaurin Bay.

The Downtown Ottawa Transit Tunnel (DOTT) will see the conversion of part of the current rapid transit system from Bus Rapid Transit (BRT) to electric LRT technology. It also involves construction of a new LRT tunnel to replace the existing on-street BRT operation which uses reserved bus lanes in the Albert and Slater Street corridors. The tunnel will allow for improved transit operations by separating transit from other traffic, and provide increased transit capacity. The project is scheduled to start construction in early 2013.



Legend

- Study Area
- NCC
- Federal
- Municipal
- Provincial
- Unknown Public Owner
- Properties
- Provincial Highway
- City Freeway

Orléans Watermain Link (OWL):

Class Environmental Assessment and Functional Design Study

Figure 3-9: Public Ownership

0 1 2 Km

Ottawa

Corridor Continues Across Ottawa River

Corridors Continue Across Ottawa River

OTTAWA RIVER

ROCKCLIFFE

SUSSEX

HEMLOCK

BEECHWOOD

Rideau River

ST. PATRICK

RIDEAU

LAURIER

COLONEL BY

MANN

CHAPEL

ELGIN

LEES

MAIN

RIVERSIDE

SMYTH

HERON

WALKLEY

BANK

AIRPORT

CONROY

HUNT CLUB

HAWTHORNE

RUSSELL

ST. LAURENT

MONTREAL

VANIER

MCARTHUR

AVIATION

BLAIR

COVENTRY

OGILVIE

CYRVILLE

INDUSTRIAL

INNES

BLACKBURN HAMLET BYPASS

RAMSAYVILLE

ST. JOSEPH

ORLEANS

JEANNE D'ARC

QUEEN

FRANK KENNY

INNES

NAVAN

MER BLEUE

TENTH LINE

TRIM

Legend

- Study Area
- Future Interprovincial Crossing Corridor 5
- Future Interprovincial Crossing Corridor 6
- Future Interprovincial Crossing Corridor 7
- DOTT Alignment
- Provincial Highway
- City Freeway
- Railway

Orléans Watermain Link (OWL):

Class Environmental Assessment and Functional Design Study

Figure 3-10: Key Transportation Infrastructure

0 1 2 Km

Ottawa

Delcan

3.4.4 Archaeological Resources

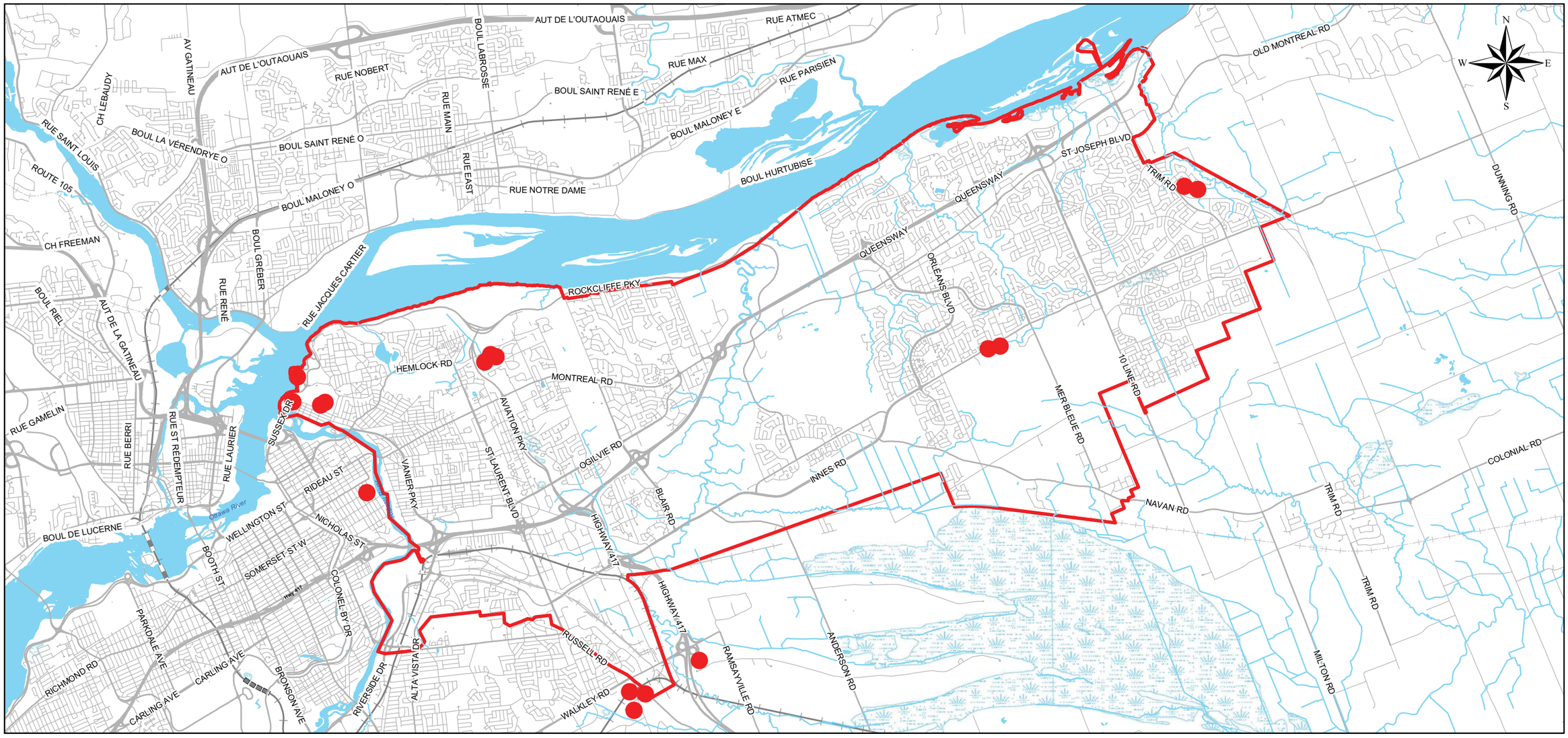
An archaeological overview was provided by Golder Associates in July 2011 that described the following:

- Known Archaeological Site
- Built Heritage
- Archaeological Potential.

There are a total of 16 archaeological sites registered by the Ministry of Culture Database that are within or immediately adjacent to the study area. This includes four pre-contact and 12 historic archaeological sites (Figure 3-11).

Built heritage resources are significant buildings, structures, monuments, installations or remains associated with architectural, cultural, social, political, economic or military history and identified as being important to the community (Figure 3-12). Properties that have been given a designation under the Ontario Heritage Act are shown in yellow with a red border. In addition to designated heritage properties, there are many properties that have been identified as having potential heritage significance but have not been formally designated. These are properties that have been "listed" in the City's built heritage inventory; these properties have been shown in yellow with no boarder. Two Heritage conservation districts have been identified within the study area which includes the New Edinburgh and Rockcliffe Heritage Conservation Districts. Heritage conservation districts are neighbourhoods, or areas of special architectural value that the City of Ottawa recognizes as having historical value.

Archaeological potential within the study area is shown on Figure 3-13. At this stage of assessment, the areas of archaeological potential are illustrated and discussed in general terms. During the Stage 1 archaeological assessment, the selected corridor's archaeological potential can be evaluated in greater detail. The areas of archaeological potential are areas within 250 metres (m) of known archaeological sites, areas within 300 m of a natural water source, areas of elevated topography, known burial sites or cemeteries, areas within 100 m of transportation corridors, and heritage properties listed or designated under the Ontario Heritage Act.



LEGEND

- KNOWN ARCHAEOLOGICAL SITES
- EXPANDED STUDY AREA

2.5 0 2.5

SCALE 1:80,000 KILOMETRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT No. 11-1121-0144/4000

REFERENCE

BASE DATA PROVIDED BY CITY OF OTTAWA
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9

PROJECT

ORLEANS TRANSMISSION WATERMAIN

TITLE

KNOWN ARCHAEOLOGICAL SITES

Golder Associates
Ottawa, Ontario

PROJECT No. 11-1121-0144			SCALE AS SHOWN	REV. 0
DESIGN	BL	July 2011	Figure 3-11	
GIS	AS	July 2011		
CHECK	HJD	July 2011		
REVIEW	HJD	July 2011		

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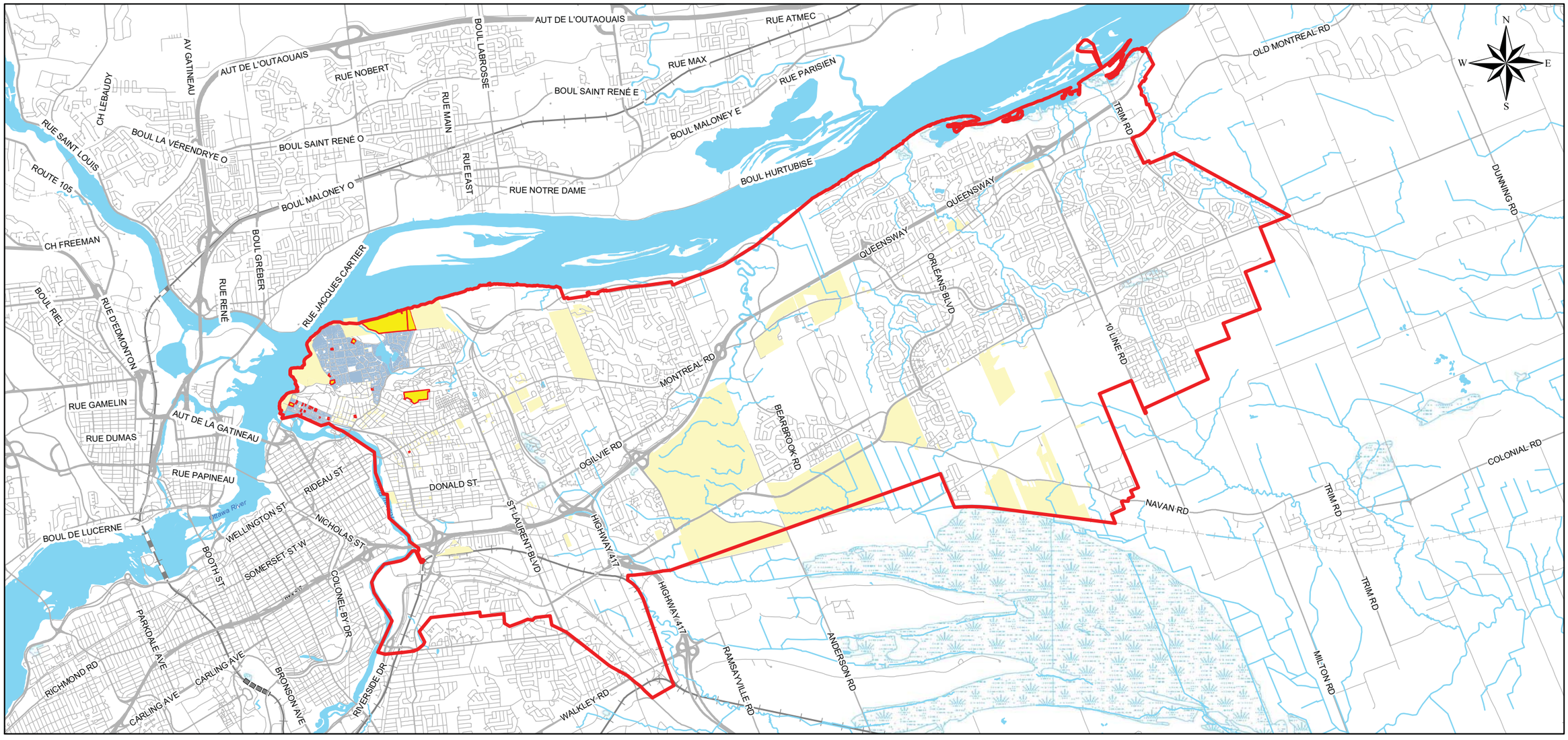

LEGEND

- EXPANDED_STUDY_AREA
- DESIGNATED HERITAGE PROPERTY (IV)
- DESIGNATED HERITAGE CONSERVATION DISTRICT (V)
- LISTED HERITAGE PROPERTY (ALL GRADES)
- ROAD
- EXPRESSWAY
- WATERCOURSE
- WATERBODY
- WETLAND

2.5 0 2.5

SCALE 1:80,000 KILOMETRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT No. 11-1121-0144/4000

REFERENCE

BASE DATA PROVIDED BY CITY OF OTTAWA
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9

PROJECT

ORLEANS TRANSMISSION WATERMAIN

TITLE

BUILT HERITAGE

Golder Associates
Ottawa, Ontario

PROJECT No. 11-1121-0144			SCALE AS SHOWN	REV. 0
DESIGN	BL	July 2011	Figure 3-12	
GIS	AS	July 2011		
CHECK	HJD	July 2011		
REVIEW	HJD	July 2011		

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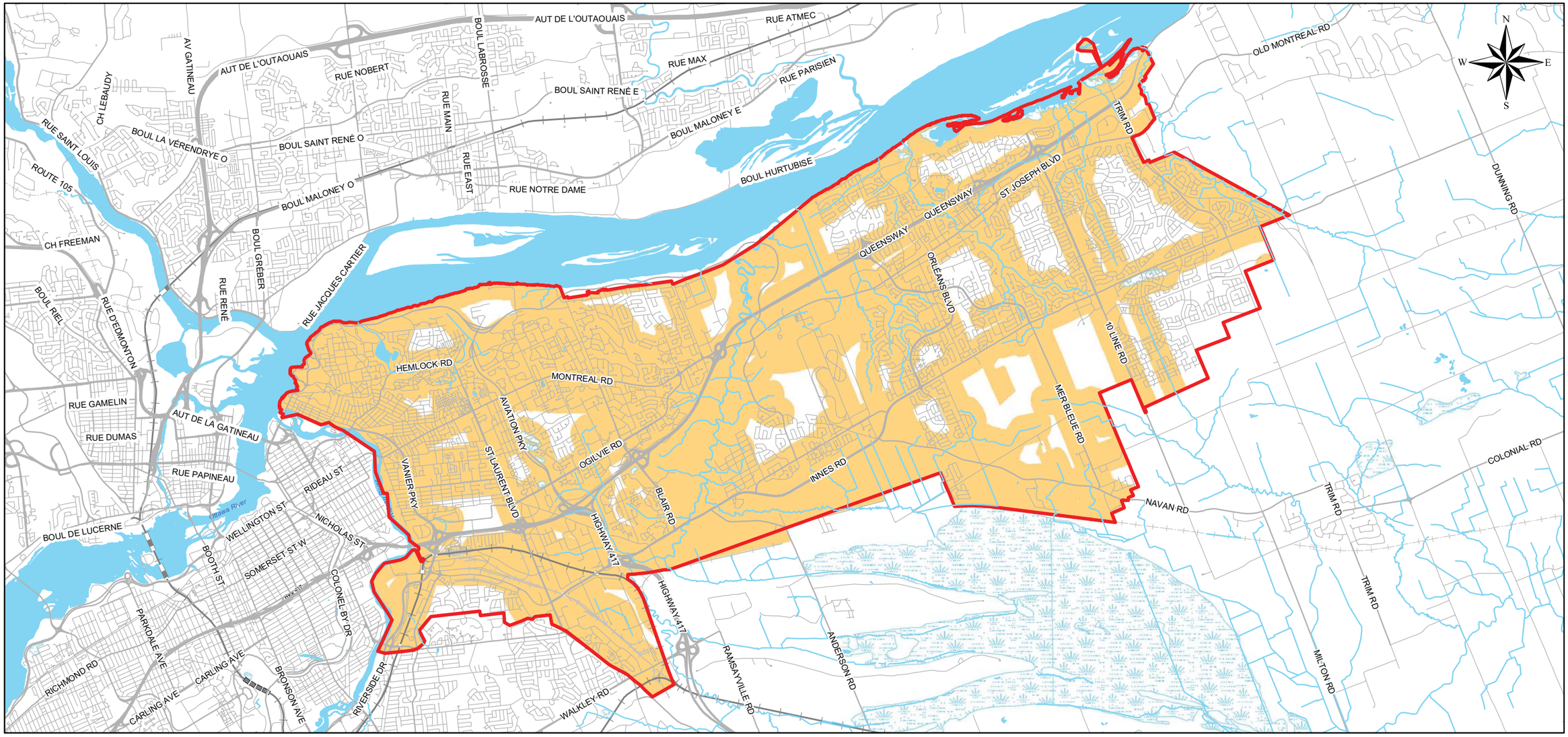

LEGEND

- WATERCOURSE
- EXPANDED STUDY AREA
- ROAD
- EXPRESSWAY
- WATERBODY
- WETLAND
- ARCHAEOLOGICAL POTENTIAL

2.5 0 2.5

SCALE 1:80,000 KILOMETRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT No. 11-1121-0144/4000

REFERENCE

BASE DATA PROVIDED BY CITY OF OTTAWA
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9

PROJECT

ORLEANS TRANSMISSION WATERMAIN

TITLE

ARCHAEOLOGICAL POTENTIAL

Golder Associates
Ottawa, Ontario

PROJECT No. 11-1121-0144			SCALE AS SHOWN	REV. 0
DESIGN	BL	July 2011	Figure 3-13	
GIS	AS	July 2011		
CHECK	HJD	July 2011		
REVIEW	HJD	July 2011		

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3.5 Technical Conditions

Various technical conditions were considered in the identification of alternative solutions. These conditions include:

- Infrastructure Master Plan (1997, 2003 and 2009)

  The IMP identified the need for the OWL, primarily from a reliability perspective, as a secondary water transmission system watermain is required from the City's core area to the EUC to provide water should an emergency condition occur along the current primary system. The IMP showed the OWL schematically as going easterly from the core area of the water system (Blair Road and Ogilvie Road area), through the Greenbelt, and tying in to the existing watermain in the vicinity of St-Joseph and Jeanne D'Arc Boulevards. As the OWL is primarily needed for reliability reasons, the trajectory of the watermain must be kept somewhat separated from the existing watermain that supplies water to the EUC (i.e. it cannot follow the same St-Joseph Boulevard route as the existing watermain).
- Water Supply System Optimization Study (WSSOS)

  The WSSOS was completed in 2008 and provided the City with a plan until 2031 that optimized the overall water system infrastructure. The OWL project was one of the major recommendations in the study.
- Growth projections and the planning horizon

  With the need for the OWL clearly identified in the IMP and the WSSOS, the sizing of the OWL was determined to provide the reliability needs of the EUC while taking into account future water demand and EUC growth projections related to planning forecasts.
- Existing and proposed distribution system configuration

  Although the IMP had shown a schematic alignment for the watermain, a more detailed review of all possible alignments was required to make certain that the long term water distribution system infrastructure configuration met the needs of the existing and future planning horizon, considering various hydraulic, transmission main separation, and water quality criteria.
- Operation and Maintenance

  There are a number of operations and maintenance (O&M) components of the water distribution system that are critical to the supply of safe and reliable water to city of Ottawa customers. The following sub-headings provide some details of these.
  - access for O&M;

    Access to all water infrastructure is required for maintenance or emergency repairs. Regular maintenance is required for distribution line valves, air valves and drain chambers to make certain equipment is in proper operating order when maintenance is required. As such, vehicular access to these valves and chambers is required.
  - chloride exposure

    The life of a watermain is dependent on many factors, including the types of soils it is buried in. If possible, watermains are constructed and installed in an environment that would have minimal chloride exposure, thereby extending the life of the watermain material.
  - potential low velocities under interim conditions

    Of outmost importance for a drinking water system is water quality. The alignment of the OWL has to be such that potable water quality will not be compromised. Water quality is impacted by the detention time within the water distribution system and as such, the OWL alignment and sizing can have an impact on water quality.
  - ability to maintain "open zone" conditions in failure situations

In drinking water systems, pressure zones are required to maintain minimum and maximum water pressures to provide for customer use and fire protection purposes. “Open” pressure zones are those that have a reservoir or elevated tank that allow the water pressure to “float” based on the water elevation with the storage facility. In Ottawa, each individual pressure zone (and associated storage facility) is supplied water by a pumping station. A closed pressure zone is an area that does not have a storage facility and requires a pump to be operating continuously to maintain the water pressure within the pressure zone. The advantage of having an “open” pressure zone is that when a power failure occurs and the pumping station pumps may cease to operate, the water pressure in the zone is maintained by the water within the reservoir, and pressure fluctuations are attenuated. In closed pressure zones, when a power failure occurs, a backup power system is required to make certain the pumps continue to operate and some form of pressure control (variable speed pumps or pressure control valve) is required to maintain the pressure needed within the pressure zone.

3.5.1 Municipal Infrastructure and Major Utilities

The study area is primarily developed and fully serviced. Water, sanitary sewers and storm sewers extend across the area in addition to major utilities such as hydro corridors and natural gas pipelines. Major municipal infrastructure and utilities are illustrated in Figure 3-14.

OTTAWA RIVER

ROCKCLIFFE
SUSSEX
HEMLOCK
BEECHWOOD
ST. LAURENT
MONTREAL
RIDEAU
LAURIER
COLONEL BY
MANN
CHAPEL
VANIER
MCARTHUR
AVIATION
BLAIR
OGILVIE
COVENTRY
LEES
CYRVILLE
MAIN
RIVERSIDE
INDUSTRIAL
INNES
SMYTH
BANK
HERON
WALKLEY
AIRPORT
CONROY
HUNT CLUB
HAWTHORNE
RUSSELL
RAMSAYVILLE
BLACKBURN HAMLET BYPASS
JEANNE D'ARC
ST. JOSEPH
ORLEANS
INNES
QUEEN
FRANK KENNY
TENTH LINE
MER BLEUE
NAVAN
TRIM

Legend

- Study Area
- Gasline 300mm+
- Watermain 600mm+
- Combined Sewer 750mm+
- Sanitary Sewer 750mm+
- Storm Sewer 750mm+
- Powerlines

Orléans Watermain Link (OWL):

Class Environmental Assessment
and Functional Design Study

Figure 3-14: Major Municipal Infrastructure

0 1 2 Km

N

Ottawa

Delcan
TRANSPORTATION • INFORMATION TECHNOLOGY • WATER

4 ALTERNATIVE SOLUTIONS

4.1 Development of Alternative Solutions

Technical and Environmental reviews were used to identify constraints and opportunities that provided input into the development of alternative routes. The key issues in which influenced route locations included:

- Proximity of the proposed link to the existing 1220 mm EUC transmission main;
- Extent of Leda clays, and the potential risks that these clays pose in terms of maintaining a secure supply of water to the EUC;
- Location of water pumping and storage facilities;
- Configuration of City road ROW;
- Hydraulic performance;
- Major utility and water body crossings;
- Green's Creek; and
- Transportation corridors crossing the Greenbelt (Ottawa Road (OR) 174, Innes Road).

Seven alternative routes were developed and screened and presented to the TAC for review. These alternatives are illustrated on Figures 4-1 to 4-7. These are also shown in larger scale in Appendix A.

Figure 4-1: Alternative 1-Canotek Road

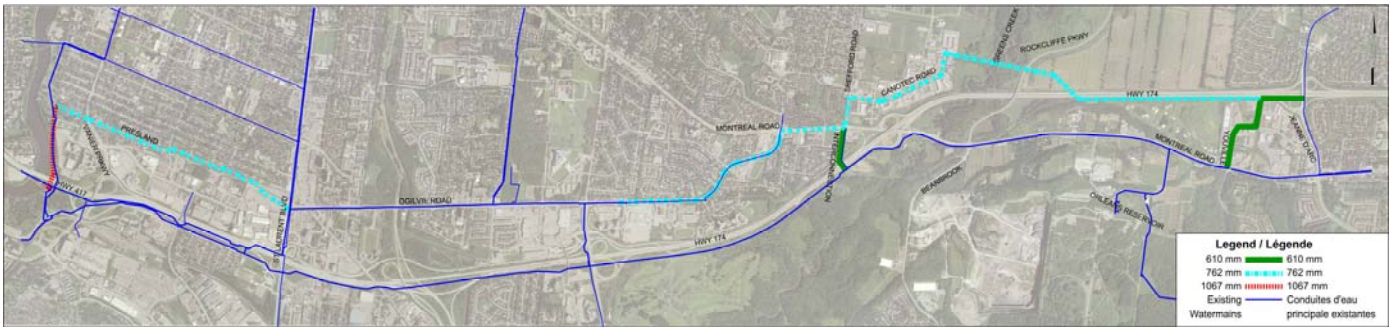


Figure 4-2: Alternative 2 – Ogilvie Extension

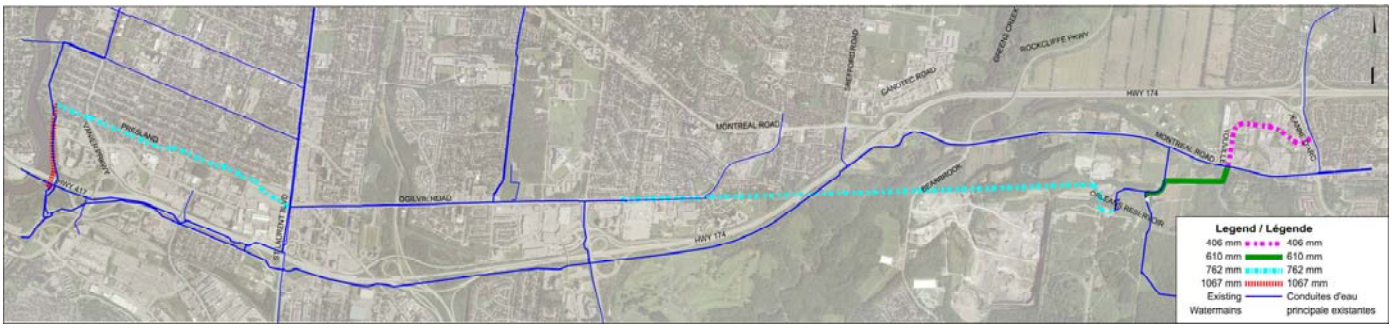


Figure 4-3: Alternative 3 – Innes Road

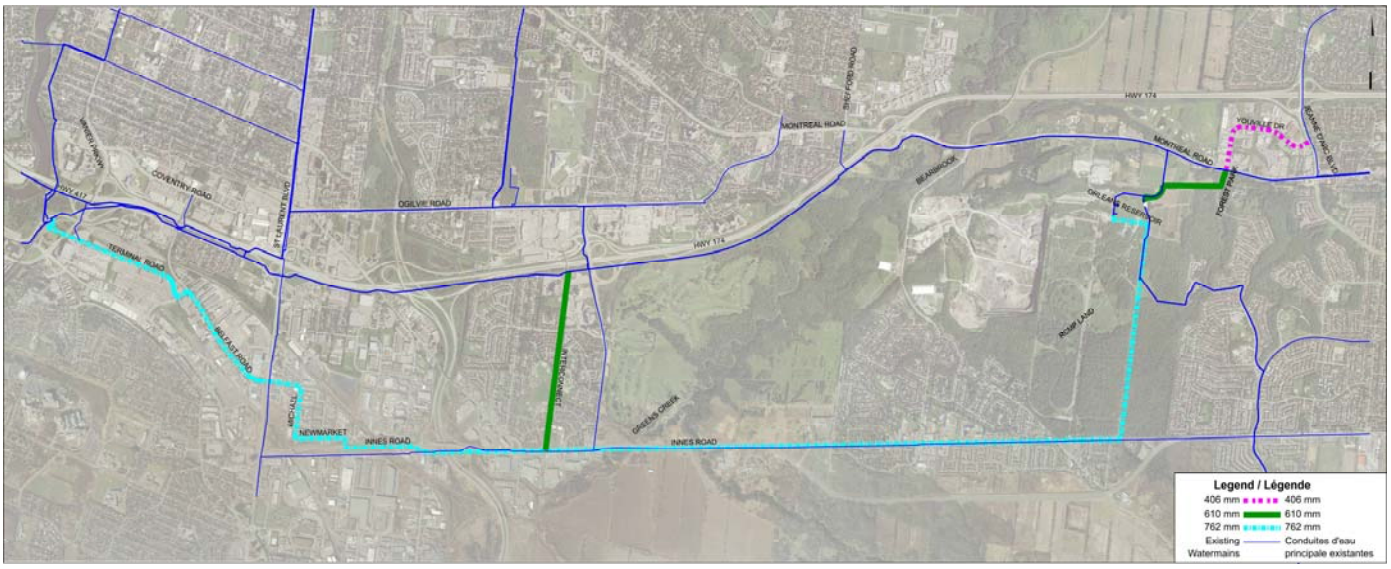


Figure 4-4: Alternative 4 – Orléans Cumberland Collector (OCC) Right-of-Way

Figure 4-5: Alternative 5 – Innes/Canadian National Railway (CN) Right-of-way

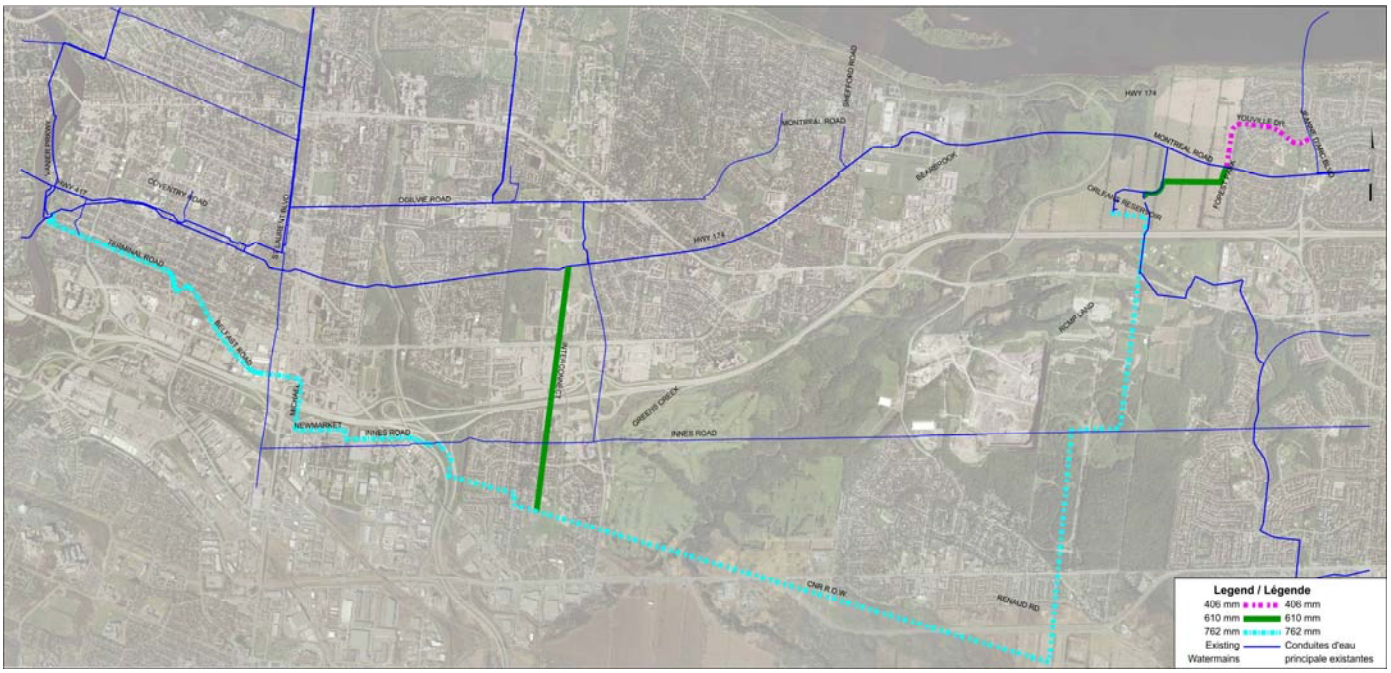


Figure 4-6: Alternative 6 – Ottawa Road 174

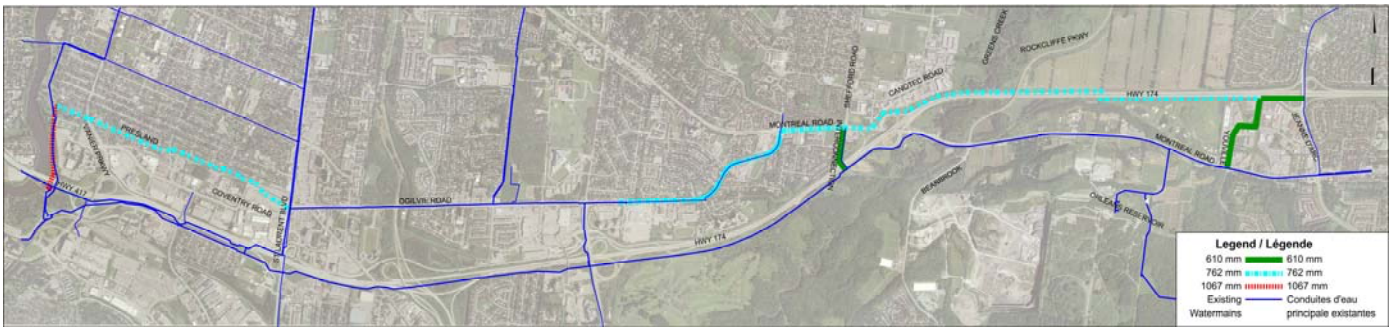
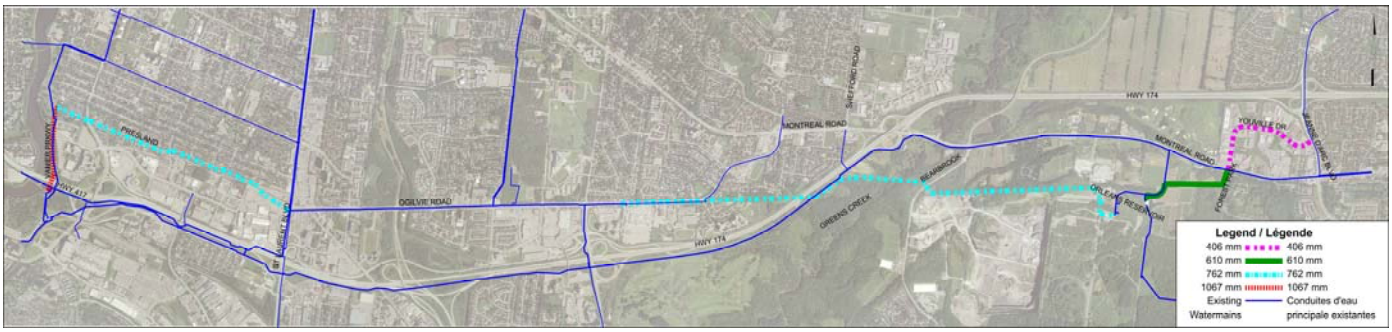


Figure 4-7: Alternative 7 – Ottawa Road 174/Hydro Corridor



4.2 Evaluation of Alternative Solutions

The evaluation of alternative solutions involved four basic steps:

1. Selection of evaluation criteria and indicators;
2. Weighting of criteria;
3. Impact assessment and ranking of each alternative with respect to criteria; and
4. Selection of the preliminary preferred solution.

4.2.1 Evaluation Criteria

The alternatives were evaluated with consideration for technical, natural, social and cost factors utilizing 25 criteria listed in Table 4-1. Included in the table is the rationale for the selection of the criteria and the indicator that will be used to assess the impacts/rate the effect.

Table 4-1: Evaluation Criteria

	Criteria	Rationale	Indicators
Technical Performance	Water Quality	Protection of water quality	• Length of watermain (water age)
	Operation	Maintain/develop operational flexibility through tie ins, looping and pressure zone management	• Operational flexibility
		Alignment location will affect the ability to provide services to adjacent land owners	• Opportunities for customer servicing
	Maintenance	Safe and ready access needs to be provided to valve chambers for ongoing maintenance	• Accessibility
	Compatibility with Existing and Future Watermain System	Comparison of standard connections versus hot/live taps	• Ease of connection
	Compatibility with Existing and Future Utilities	Avoid service disruptions	• Conflicts with existing utilities
		Avoid service disruptions and redesign requirements	• Conflicts with future utilities
	Compatibility with Existing and Future Infrastructure	Avoid service disruptions	• Conflicts with existing infrastructure
		Avoid service disruptions and redesign requirements	• Conflicts with future infrastructure
	Hydraulic performance	Maintain appropriate pressure conditions independent of vertical and horizontal alignments	• Minimum pressures under various conditions • Maximum pressures under various conditions
Social Environment	Reliability	Ability to provide service reliability to the EUC by 2013[1]	• Scheduling of construction through Greenbelt
		Improve reliability	• Separation from existing feedermain
	Compatibility with Existing / Planned Communities	Protect and maintain accesses to land uses	• Displacement of, or loss of access to, existing land uses
		Protect and maintain existing and future land uses	• Compatibility with existing and future use of land
	Land Acquisition	Land acquisition is a cost as well as a process that needs to be incorporated into the schedule and budget planning	• Estimated amount of required land and number of owners involved
	Construction disruption	Minimize duration of construction period	• Construction duration
		Identify and minimize the easement requirements	• Easements required
		Minimize traffic disruptions	• Traffic disruptions
	Effects on Built Heritage Features and Archaeology	Minimize disruption in areas of archaeological potential	• Impact on identified and/or potential archaeological resources (i.e., area of land/feature which will be affected)
		Minimize potential impacts to heritage features	• Impact on identified heritage features including buildings and landscapes

[1] This criteria reflects the potential delay in the ability to obtain approvals necessary to cross the Greenbelt.

	Criteria	Rationale	Indicators
	Public policy compliance	Plan and design a solution in accordance with public policy	• Consistency with public policy
Natural Heritage	Effects on natural heritage features	Minimize disruption to natural heritage features	• Loss/impact on significant species (flora/fauna)
			• Potential impact on non-significant natural areas (i.e., common woodlots, common fields, and common habitats)
			• Loss/impact on significant habitat (PSW, ANSI)
	Effects on fisheries	Minimize disruption to fish and fish habitat	• Extent of disruption to fish habitat
	Effects on valleylands	Minimize disruption to valley lands and corridor function	• Extent of disruption of valleylands and corridors
	Effects on surface water quality	Minimize disruption to natural heritage features	• Number of new water crossings
	Effects on species at risk	Minimize / avoid disruption to species at risk and their habitat	• Habitat disruption of rare species
Physical Constraints	Geotechnical constraints	Avoid elevated bedrock or potential for rock or ground conditions which could impact on the feasibility of construction methodologies and duration	• Extent of construction in bedrock
		Avoid the presence of softer clay which would impact on excavation stability, shoring, and backfilling operations	• Extent of construction in unstable soils
	Hydrogeological constraints	Potential for significant groundwater inflow to the excavations would impact on the construction and feasibility	• Extent of construction in areas of elevated groundwater
	Contamination	Avoid areas of environmental concerns which could impact the soil and groundwater quality in the area of the proposed work and would impact on the design, construction and health and safety concerns	• Proximity to areas of contamination
Costs	Capital cost	Select and alternative alignment which is an acceptable solution to those who will ultimately pay for implementation and to identify public sector capital funding needs	• Estimated (Class D) hard construction costs
	Operation and maintenance costs	Minimize public sector operational budgeting needs	• Comparative evaluation of estimated cost of operation and maintenance costs
	Constructability	Reduce risk of major failure during construction due to design complexity or environmental conditions	• Construction complexity
		Permit requirements can be time and resource consuming and should be identified early in the process for planning purposes and to ensure commitments are met	• Permit requirements
		The project is lengthy and the ability to phase sections will be influenced by cost, hydraulics, and proximity to existing and / or potential connections	• Flexibility of interconnections / Phasing

4.2.2 Criteria Weighting

Weights were assigned to the criteria by the TAC and each alternative was then scored based on the effect on the criteria.

Ranking/weighting criteria is a subjective task, with the results reflecting the values of the group/individual who assigns the weighting. For this study, each member of the TAC, and the key discipline representatives from the Study Consultant Team reviewed the criteria ranking/weighting procedure to establish the relative importance of the criteria groups. The individual results were then blended into one weighting scenario to be used for the evaluation of the alternative alignments as follows:

- National Capital Commission (NCC);
- Ottawa Planning and Growth Management (PGM);
- Ottawa Environmental Services Department (ESD);
- Ottawa Infrastructure Services Department (ISD); and
- Study Consultant Team.

The weighting sets were considered in evaluating the sensitivity of the evaluation results to variability in criteria weighting.

Table 4-2: TAC Weighting

Criteria Category	Group Weightings					
	NCC	PGM	ESD	ISD	Study Team	Average
Technical Performance	0	25	30	43	27.5	25
Effect on Social Environment	18	25	25	15	18.75	20
Effect on Natural Heritage	77	15	10	10	17.5	26
Effect on Physical Environment	5	10	10	10	17.5	11
Cost	0	25	25	22	18.75	18
Total	100	100	100	100	100	100

4.2.3 Impact Assessment and Ranking

Each alternative was evaluated and assessed a comparative score out of 10 for each criteria indicator with 10 representing the least impact/best result. Where quantitative information was not available, the following assessment definitions were applied.

Table 4-3: Qualitative Evaluation Definitions

Terms describing		Definition
Negative Impacts	Positive Impacts (i.e., Benefits)	
None/No	None/No or Least	The impact is judged to be either completely non-existent, or has the least impact compared to all the alternatives in the table.
Negligible/Low	Limited	The impact exists, but is of a magnitude small enough that it has little effect, or is of limited benefit.

Terms describing		Definition
Negative Impacts	**Positive Impacts (i.e., Benefits)**	
Slight	Reasonable	The impact exists and is of relatively low magnitude, but enough to have a measurable effect or contribution.
Some	Good	The impact exists and as an effect that is of a moderate magnitude, or provides a moderate contribution.
Significant	Best	The impact exists and has an effect that is relatively large, or has the most impact when compared to other alternatives.

Based on a screening level evaluation as summarized in Table 4-4, Alternatives 3 and 5 would have low technical performance and high overall costs. Both involve greatest length of watermain with the lowest opportunities for customer servicing. Alternative 4 had high natural and social impacts related to crossing the Greenbelt and land acquisition requirements. The remaining four alternatives had pros and cons in the various criteria groups and scored relatively close together. These four alternatives were carried forward as a short list for more detailed assessment.

Table 4-4: Evaluation of Alternatives

	Criteria	Indicator	Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 3 – Innes Road	Alternative 4 – OCC ROW	Alternative 5 – Innes/CN ROW	Alternative 6 – OR 174	Alternative 7 – OR 174 / Hydro
Technical Performance	Water Quality	Length of watermain (water age)	8	10	2	6	2	8	10
	Operation	Operational flexibility	9	9.5	4	8.5	4	9	9.5
		Opportunities for customer servicing	7	7	5	7	5	7	7
	Maintenance	Accessibility	8	6	10	8	5	8	6
	Compatibility with Existing and Future Watermain System	Ease of connection	8	9	6	8	5	8	9
	Compatibility with Existing and Future Utilities	Conflicts with existing utilities	7	6	5	7	5	7.5	5.5
		Conflicts with future utilities	10	6	8	8	6	4	4
	Compatibility with Existing and Future Infrastructure	Conflicts with existing infrastructure	6.5	6.5	8	5	8	5.5	5.5
		Conflicts with future infrastructure	9	9	7.5	7.5	8.5	6	7.5
	Hydraulic performance	Minimum and maximum pressures under various conditions	10	10	4	10	4	10	10
	Average Score		**8.25**	**7.90**	**5.95**	**7.50**	**5.25**	**7.30**	**7.40**
25	***Weighted Subtotal***		**20.63**	**19.75**	**14.88**	**18.75**	**13.13**	**18.25**	**18.50**
Social Environment	Reliability	Scheduling of construction through Greenbelt	1	10	10	1	1	10	1
		Separation from existing feedermain	6	6	10	10	10	6	5
	Compatibility with Existing / Planned Communities	Displacement of, or loss of access to, existing land uses	8	8	8	8	8	10	8
		Compatibility with existing and future use of land	6	6	6	6	6	10	6
	Land Acquisition	Estimated amount of required land and number of owners involved	7	7	5	6	7	10	8
	Construction disruption	Construction duration	7	7	4.5	6	4.5	6.5	7
		Easements required	6.5	5	6	6.5	5	8.5	5
		Traffic disruptions	6.5	6.5	4	5	5	5.5	6.5
	Effects on Built Heritage Features and Archaeology	Impact on identified and/or potential archaeological resources (i.e., area of land/feature which will be affected)	7	7	6	7	7	7	7
		Impact on identified heritage features including buildings and landscapes	8	6	6	6	8	8	7
	Public policy compliance	Consistency with public policy	10	10	10	10	10	10	10
	Average Score		**6.64**	**7.14**	**6.86**	**6.50**	**6.50**	**8.32**	**6.41**
20	***Weighted Subtotal***		**13.27**	**14.27**	**13.73**	**13.00**	**13.00**	**16.64**	**12.82**
Natural Heritage	Effects on natural heritage features	Loss/impact on significant species (flora/fauna)	4	4	6	4	2	4	4
		Potential impact on non-significant natural areas (i.e., common woodlots, common fields, and common habitats)	7	7	7	7	7	7	7
		Loss/impact on significant habitat (PSW, ANSI)	4	4	6	4	2	4	4
	Effects on fisheries	Extent of disruption to fish habitat	7	7	2	7	2	6	7
	Effects on valleylands	Extent of disruption of valleylands and corridors	6	6	6	8	4	6	6
	Effects on surface water quality	Number of new water crossings	4	4	4	4	2	4	4
	Effects on species at risk	Habitat disruption of rare species	9	9	9	9	3	9	9
	Average Score		**5.86**	**5.86**	**5.71**	**6.14**	**3.14**	**5.71**	**5.86**
26	***Weighted Subtotal***		**15.23**	**15.23**	**14.86**	**15.97**	**8.17**	**14.86**	**15.23**

	Criteria	Indicator	Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 3 – Innes Road	Alternative 4 – OCC ROW	Alternative 5 – Innes/CN ROW	Alternative 6 – OR 174	Alternative 7 – OR 174 / Hydro
Physical Constraints	Geotechnical constraints	Extent of construction in bedrock	9	8	4	9	4	9	8
		Extent of construction in unstable soils	7	7	5	7	5	7	7
	Hydrogeological constraints	Extent of construction in areas of elevated groundwater	7	7	5	7	5	7	7
	Contamination	Proximity to areas of contamination	5	6	3	4	5	5	6
	Average Score		**7.00**	**7.00**	**4.25**	**6.75**	**4.75**	**7.00**	**7.00**
11	***Weighted Subtotal***		**7.70**	**7.70**	**4.68**	**7.43**	**5.23**	**7.70**	**7.70**
	Capital cost	Estimated (Class D) hard construction costs	6	10	4	6	3	8	10
	Operation and maintenance costs	Comparative evaluation of estimated cost of operation and maintenance costs	7	10	5	6	4	8	9
	Constructability	Construction complexity	8	5	8	8	5	8	8
		Permit requirements	7	7	7	7	7	10	7
		Flexibility of interconnections / Phasing	8	10	8	8	8	8	10
	Average Score		**7.20**	**8.40**	**6.40**	**7.00**	**5.40**	**8.40**	**8.80**
18	***Weighted Subtotal***		**12.96**	**15.12**	**11.52**	**12.60**	**9.72**	**15.12**	**15.84**
100	***Total***		**62.09**	**64.37**	**54.98**	**60.32**	**44.02**	**64.86**	**62.39**

4.3 Short Listed Alternatives

The top four (4) alternatives based on the screening level assessment were carried forward for further evaluation. These alternatives were subject to refinements and additional input from the members of the TAC.

The westerly alignments for Alternatives 1, 2, 4, and 7 could be considered as interchangeable. During the refinement process all four options were re-assessed. The route along Presland Road involves the greatest interference with existing infrastructure and the greatest disruption to area residents. Connection along the Vanier Parkway had conflicts with the widening of HWY 417. Another alignment of the OWL was considered along the north boundary of the Ministry of Transportation's (MTO) 417 ROW, crossing the Vanier Parkway (and two associated westbound ramps to HWY 417) and extending the OWL through the City's baseball park property to Coventry Road. But, after further City input, this alignment was abandoned for the following reasons:

1. MTO are expanding the 417 eastbound and westbound lanes at this location;
2. MTO will be using the "open" land (north of the 417 and west of Vanier Parkway) to complete the construction staging for one or more Bridge replacements related to HWY 417 expansion; and
3. The City's long term plans for the baseball park lands are uncertain and the City does not wish to encumber the property. An alignment through the park lands would also have a negative impact on short-term property leasing negotiations.

As such, the route along River Road to Presland Road West, then south on Vanier Parkway and east on Coventry Road was selected to be the best alignment and was incorporated into all the short listed alternatives.

For the easterly alignment of the OWL, the OR 174 will be undergoing an EA for future widening, incorporating the future East Transitway. The existing road corridor section between the Rockcliffe Parkway and just west of Jeanne D'Arc Boulevard is highly constrained and will not allow inclusion of a 10 m permanent easement for the OWL, as noted in a City of Ottawa Memo from the Transportation Planning – Environmental Assessment Unit found in Appendix B. Currently, the road ROW narrows to 60 m in this section and the transportation needs will require this full width to accommodate the future widening of the OR 174. As such, a permanent easement to the north of the OR 174 ROW will be required from the NCC to accommodate the OWL at this location. Elsewhere along the OR 174, the ROW is adequate for the inclusion of a 10 m permanent easement for the OWL, to be located at the northern limits of the ROW.

As such, the refinements made to the short listed alternatives included:

- adjustments at the west end of the study area (between the Hurdman Pumping Station and St. Laurent Boulevard) to account for the large storm and sanitary sewers on Presland Road, which means that there is inadequate room for a major feedermain in this ROW; and
- OR 174 ROW requirements.

All four alignments follow the Rideau River to Presland Road West, and along Presland Road West to the Vanier Parkway, then along the Vanier Parkway to Coventry Road, and then

along Coventry Road to St. Laurent Boulevard. The refined alignments are illustrated on Figures 4-8 to 4-11. These are provided in larger scale in Appendix A – Short Listed Alternatives.

Following these refinement, the short listed alternatives were re-evaluated on a comparative basis. Additional input was received from the TAC.

Figure 4-8: Alternative 1- Canotek Road Refined

Figure 4-9: Alternative 2 – Ogilvie Extension Refined

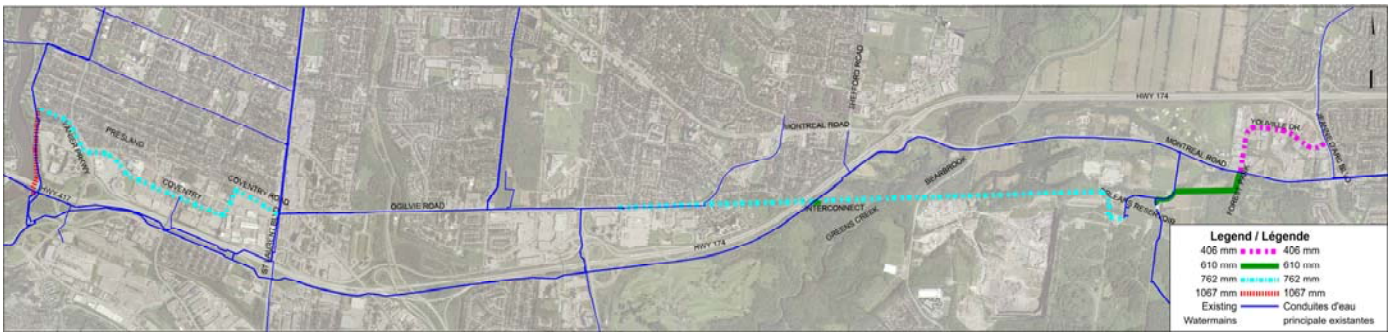


Figure 4-10: Alternative 6 – Ottawa Road 174 Refined

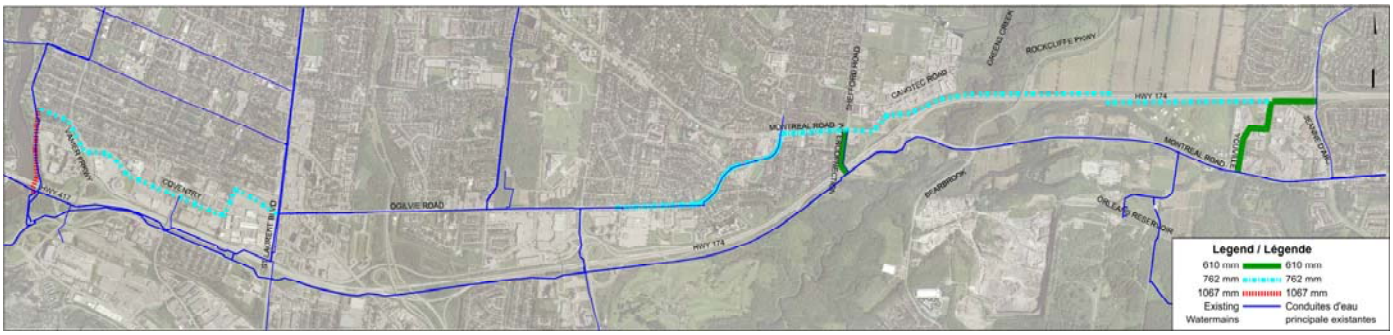
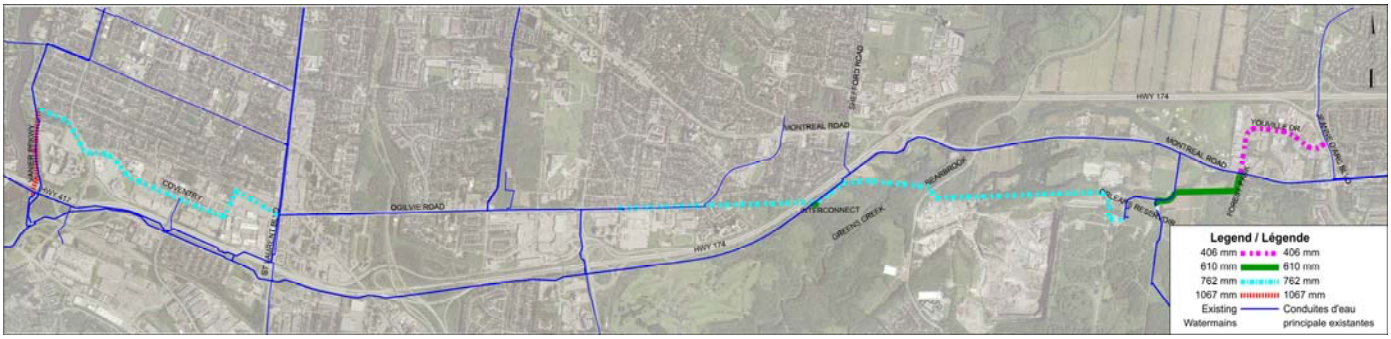


Figure 4-11: Alternative 7 – Ottawa Road 174 / Hydro Corridor Refined



4.3.1 Evaluation of Short Listed Alternatives

The short listed alternatives were reviewed with the TAC.

Additional information was received regarding operational performance considerations as well as municipal considerations related to major utilities and arterial roadways, as noted earlier in Section 4.3.

A second evaluation was undertaken and the four remaining alternatives were scored again, comparatively on a scale of 1 to 10 (Table 4-5).

The score of Alternative 6 was very similar to Alternative 1 based on the evaluation. Technically both had good hydraulic performance and similar compatibility with existing and future utilities and infrastructure. Alternative 6 has a longer segment on OR 174 and needs to take into consideration the future OR 174 widening and Transitway to a greater degree. From a social environment perspective, Alternative 6 respects the infrastructure corridor through the NCC Greenbelt at Green's Creek and utilizes primarily City ROW and easements therefore requiring less land acquisition from the NCC. Alternative 1 would require an amendment to the GMP. The impacts on the natural environment are very similar for both alternatives. The construction methodology considers tunnelling/directional drilling through the Greenbelt and overall impacts are minimal. There were no differences between the two alternatives based on the physical environmental impacts. Alternative 6 is more expensive ($48M versus $45M) but has slightly lower O&M costs.

Overall, the key differences between Alternative 1 and 6 was the Greenbelt crossing. Discussions with the NCC, the principal landowner and approval agency affected by the alignments, confirmed their endorsement of Alternative 6 based on environmental and land use impacts.

Table 4-5: Evaluation of Short Listed Alternatives

	Criteria		Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 6 – OR 174	Alternative 7 – OR 174/Hydro
Technical Performance	Water Quality	Length of watermain (water age)	8	10	8	10
			11135m	9760m	10790m	9860m
	Operation	Operational flexibility	7	10	7	10
				Ties in to Orléans Reservoir		Ties in to Orléans Reservoir
		Opportunities for customer servicing	4	8	4	8
				Opportunity for RCMP Tie in		Opportunity for RCMP Tie in
	Maintenance	Accessibility	8	2	8	2
			Some reduced accessibility through Greenbelt	Greater reduced accessibility through Greenbelt	Minimal reduced accessibility through Greenbelt	Greater reduced accessibility through Greenbelt
	Compatibility with Existing and Future Watermain System	Ease of connection	10	6	10	6
			Phasing of tie-ins to existing watermain are easier. 6 taps or Cut-ins	6 taps or Cut-ins	Phasing of tie-ins to existing watermain are easier. 6 taps or Cut-ins	6 taps or Cut-ins
	Compatibility with Existing and Future Utilities	Conflicts with existing utilities	6	6	6	6
			Crosses two 300mm+ gas lines along Hwy 417 and St. Laurent. Crosses 300mm+ gas line south of St. Joseph. Crosses power line at Coventry.	Crosses two 300mm+ gas lines along Hwy 417 and St. Laurent. Crosses 300mm+ gas line south of St. Joseph. Crosses power lines at Coventry and OR174.	Crosses two 300mm+ gas lines along Hwy 417 and St. Laurent. Crosses 300mm+ gas line at OR174 north of St. Joseph. Crosses power lines at Coventry.	Crosses two 300mm+ gas lines along Hwy 417 and St. Laurent Crosses 300mm+ gas line south of St. Joseph. Crosses power lines at Coventry and OR174.
		Conflicts with future utilities	7	7	7	7
			No known conflicts	No known conflicts	No known conflicts	No known conflicts
	Compatibility with Existing and Future Infrastructure	Conflicts with existing infrastructure	5	2	5	2
			Crosses a 1350mm sanitary sewer adjacent to the Rideau River near HWY 417. Crosses a 1500mm and 1950mm sanitary sewer between Vanier Parkway and Rideau River. Crosses a 1650 and 3000mm sanitary sewer along OR174 and again at Shefford. Crosses a 1950mm outfall adjacent to Hwy 417 and a 2700mm outfall perpendicular to Vanier Parkway. Crosses a 3600 storm sewer just west of Jeanne D'Arc and OR174. Crosses a 1220mm and 1524 Watermain near the Rideau River adjacent to HWY 417.	Crosses a 1350mm sanitary sewer adjacent to the Rideau River near HWY 417. Crosses a 1500mm and 1950mm sanitary sewer between Vanier parkway and Rideau River. Crosses a 1650 and 3000mm sanitary along OR174 at Shefford. Crosses a 1950mm outfall adjacent to Hwy 417 and a 2700mm outfall perpendicular to Vanier Parkway. Crosses a 1220mm and 1524 Watermain near the Rideau River adjacent to HWY 417. Crosses a 1500mm and a 1200m storm sewer west of OR174 and east of Blair. Crosses a 1220 watermain on the south side of OR174 west of the Montreal Rd OR174 Interchange. Crosses a 914mm watermain at St. Joseph and Youville.	Crosses a 1350mm sanitary sewer at adjacent to the Rideau River near HWY 417. Crosses a 1500mm and 1950mm sanitary sewer between Vanier parkway and Rideau River. Crosses a 1650 and 3000mm sanitary along OR174 at Shefford. Crosses a 1950mm outfall adjacent to Hwy 417 and a 2700mm outfall perpendicular to Vanier Parkway. Crosses a 1220mm and 1524 Watermain near the Rideau River adjacent to HWY 417. Crosses a 3600 storm sewer just west of Jeanne D'Arc and south of the OR174.	Crosses a 1350mm sanitary sewer adjacent to the Rideau River near HWY 417. Crosses a 1500mm and 1950mm sanitary sewer between Vanier parkway and Rideau River. Crosses a 1650 and 3000mm sanitary along OR174 at Shefford. Crosses a 1950mm outfall adjacent to Hwy 417 and a 2700mm outfall perpendicular to Vanier Parkway. Crosses a 1500mm and a 1200m storm sewer west of OR174 and east of Blair. Crosses a 1220mm and 1524 Watermain near the Rideau River adjacent to HWY 417. Crosses a 1220 watermain on the south side of OR174 west of the Montreal Rd OR174 Interchange. Crosses a 914mm watermain at St. Joseph and Youville.

.	Criteria		Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 6 – OR 174	Alternative 7 – OR 174 / Hydro
Technical Performance		Conflicts with future infrastructure	8	10	6	10
			Use of OR 174 ROW may impact future infrastructure. Planned bus lane on OR174 from 490m east of Montreal Road to 330m west of Jeanne D'Arc (2010). Pavement overlay for Ogilvie (Blair to Montreal Rd) is scheduled for 2012-2014 - work can be coordinated.		Use of OR 174 ROW may impact future infrastructure. Planned bus lane on OR174 from 490m east of Montreal Road to 330m west of Jeanne D'Arc (2010). Pavement overlay for Ogilvie (Blair to Montreal Rd) is scheduled for 2012-2014 - work can be coordinated.	
	Hydraulic performance	Minimum and maximum pressures under various conditions	10	10	10	10
			Meets hydraulic performance requirements	Meets hydraulic performance requirements	Meets hydraulic performance requirements	Meets hydraulic performance requirements
		Average Score	**7.30**	**7.10**	**7.10**	**7.10**
25.00		***Weighted Subtotal***	**18.25**	**17.75**	**17.75**	**17.75**
Social Environment	Reliability	Compliance with the Greenbelt Master Plan	4	1	8	1
			Crosses through core area of the Greenbelt	Crosses through core area of the Greenbelt	Crosses through infrastructure corridor within the Greenbelt	Crosses through core area of the Greenbelt
		Separation from existing feedermain	10	**4**	10	1
			Excellent feedermain separation	New & existing feedermains cross each other	Excellent feedermain separation	New & existing feedermains cross each other and runs parallel for a short distance
	Compatibility with Existing / Planned Communities	Displacement of, or loss of access to, existing land uses	7	6	8	6
			NCC Greenbelt. Disruption to north entrance of RCMP building at Vanier Parkway. Disruption to west and north entrance of St. Laurent Shopping Centre. Disruption to farm field access north of OR174 and east of the Rockcliffe Parkway.	NCC Greenbelt and RCMP lands. City Park (Jasmine Park). Disruption to north entrance of RCMP building at Vanier Parkway. Disruption to west and north entrance of St. Laurent Shopping Centre. Disruption of the access to RCMP training grounds (TPOF) in the southern portion.	Greenbelt work all within City ROW. Disruption to north entrance of RCMP building at Vanier Parkway. Disruption to west and north entrance of St. Laurent Shopping Centre.	NCC Greenbelt and RCMP lands. City Park (Jasmine Park). Disruption to north entrance of RCMP building at Vanier Parkway. Disruption to west and north entrance of St. Laurent Shopping Centre. Disruption of the access to RCMP (TPOF) training grounds in the southern portion.
		Compatibility with existing and future use of land	7	5	9	5
			Disruption to existing forested buffer surrounding Greens Creek. Disruption to existing agricultural land east of the Rockcliffe PKWY.	Disruption to southern portion of RCMP property (designated as Office in the City of Ottawa 2010 Land Use)	Greenbelt work all within City ROW. Compatible with existing land use	Disruption to southern portion of RCMP property (designated as Office in the City of Ottawa 2010 Land Use)
	Land Acquisition	Estimated amount of required land and number of owners involved	6	4	7	4
			NCC Provincial (Crossing near Rideau River)	NCC Additional RCMP in East end Provincial (Crossing near Rideau River)	NCC (west end only) Provincial (Crossing near Rideau River)	NCC Additional RCMP in East end Provincial (Crossing near Rideau River)
	Construction disruption	Construction duration	7	10	7	10
			Longer distances will increase duration		Longer distances will increase duration	
		Easements required	7	5	10	5
			NCC	NCC, Hydro and RCMP		NCC, Hydro and RCMP
		Traffic disruptions	5	7	5	7
			More urban area construction		More urban area construction	

.	Criteria		Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 6 – OR 174	Alternative 7 – OR 174/Hydro
Social Environment	Effects on Built Heritage Features and Archaeology	Impact on identified and/or potential archaeological resources (i.e., area of land/feature which will be affected)	7	5	7	7
			Some potential impact	Moderate potential impact	Some potential impact	Some potential impact
		Impact on identified heritage features including buildings and landscapes	9	8	9	8
			Least potential impact		Least potential impact	
	Public policy compliance	Consistency with public policy	10	10	10	10
			Consistent with public policy	Consistent with public policy	Consistent with public policy	Consistent with public policy
	Average Score		**7.18**	**5.91**	**8.18**	**5.82**
20.00	***Weighted Subtotal***		**14.36**	**11.82**	**16.36**	**11.64**
Natural Heritage	Effects on natural heritage features	Loss/impact on significant species (flora/fauna)	4	4	4	4
			Some impacts as it crosses wooded valley with interior habitat	Some impacts as it crosses wooded valley with interior habitat	Some impacts as it crosses wooded valley with interior habitat	Some impacts as it crosses wooded valley with interior habitat
		Potential impact on non-significant natural areas (i.e., common woodlots, common fields, and common habitats)	7	7	8	7
			Impact on vegetation within construction zone. Rehabilitation post construction to offset loss.	Impact on vegetation within construction zone. Rehabilitation post construction to offset loss.	Impact on vegetation within construction zone. Rehabilitation post construction to offset loss.	Impact on vegetation within construction zone. Rehabilitation post construction to offset loss.
		Loss/impact on significant habitat (PSW, ANSI)	4	4	4	4
			Crossing within Green's Creek Life Science ANSI	Crossing within Green's Creek Life Science ANSI	Crossing within Green's Creek Life Science ANSI	Crossing within Green's Creek Life Science ANSI. .
	Effects on fisheries	Extent of disruption to fish habitat	7	4	6	4
			Some impact during construction for trench. Impact negligible for directional drilling. Least amount of water crossings.	Some impact during construction for trench. Impact negligible for directional drilling. Most water crossings.	Some impact during construction for trench. Impact negligible for directional drilling. Least amount of water crossings (but longer than Alt 1).	Some impact during construction for trench. Impact negligible for directional drilling. Most water crossings.
	Effects on valleylands	Extent of disruption of valleylands and corridors	6	4	6	3
			One significant Valleyland crossings total distance of 409 meters (Greens Creek). Clearing of vegetation in construction zone and excavation. Limited impact with rehabilitation post-construction.	One significant valleyland crossing total distance of 1318 meters (Greens Creek). Clearing of vegetation in construction zone and excavation. Limited impact with rehabilitation post-construction.	One significant valleyland crossing total distance of 435 meters (Greens Creek.) Clearing of vegetation in construction zone and excavation. Limited impact with rehabilitation post-construction.	One significant valleyland crossing total distance of 1525 meters (Greens Creek). Clearing of vegetation in construction zone and excavation. Limited impact with rehabilitation post-construction.
	Effects on surface water quality	Number of new water crossings	9	4	8	4
			One water crossings (Greens Creek). Trench across Green's Creek Sediment. Controls during construction will limit impact from sedimentation.	Five water crossings (Greens Creek and associated stream branches and unnamed watercourses/drainage south of the OR174 near Jeanne D'Arc). Trench across Green's Creek. Sediment controls during construction will limit impact from sedimentation.	Two water crossings (Greens Creek and associated stream branches). Trench across Green's Creek. Sediment controls during construction will limit impact from sedimentation.	Five water crossings (Greens Creek and associated stream branches and unnamed watercourses/drainage south of the OR174 near Jeanne D'Arc). Trench across Green's Creek. Sediment controls during construction will limit impact from sedimentation.

.	Criteria		Alternative 1 – Canotek Road	Alternative 2 – Ogilvie Extension	Alternative 6 – OR 174	Alternative 7 – OR 174/Hydro
	Effects on species at risk	Habitat disruption of rare species	10	10	10	10
			No known Species At Risk in alignment	No known Species At Risk in alignment	No known Species At Risk in alignment	No known Species At Risk in alignment
	Average Score		**6.71**	**5.29**	**6.57**	**5.41**
26.00	***Weighted Subtotal***		**17.46**	**13.74**	**17.09**	**13.37**
Physical Constraints	Geotechnical constraints	Extent of construction in bedrock	9	3	9	3
			Some construction in bedrock	Significant construction in bedrock	Some construction in bedrock	Significant construction in bedrock
		Extent of construction in unstable soils	7	7	7	7
			Low extent of construction in unstable soils	Low extent of construction in unstable soils	Low extent of construction in unstable soils	Low extent of construction in unstable soils
	Hydrogeological constraints	Extent of construction in areas of elevated groundwater	7	7	7	7
			Low extent of construction in areas of elevated groundwater	Low extent of construction in areas of elevated groundwater	Low extent of construction in areas of elevated groundwater	Low extent of construction in areas of elevated groundwater
	Contamination	Proximity to areas of contamination	5	6	5	6
			Proximity to some areas of contamination	Proximity to fewer areas of contamination	Proximity to some areas of contamination	Proximity to fewer areas of contamination
	Average Score		**7.00**	**5.75**	**7.00**	**5.75**
11.00	***Weighted Subtotal***		**7.70**	**6.33**	**7.70**	**6.33**
	Capital cost	Estimated (Class D) hard construction costs	6	10	4	9
			$45.0M	$37.1M	$48.7M	$37.7M
	Operation and maintenance costs	Comparative evaluation of estimated cost of operation and maintenance costs	7	10	8	9
			42 chambers (Air and valve) and longest watermain length	38 Chambers (air and valve)	42 chambers (air and valve) and 2nd longest watermain	41 Chambers (air and valve)
	Constructability	Construction complexity	10	5	8	6
			Greens Creek Crossing Greenbelt construction issues	1220 mm crossing. Greens Creek Crossing. Major Greenbelt construction issues. Quarry issues. Long OR 174 Tunnel.	Longer Greens Creek Crossing along 174 ROW. Greenbelt construction issues.	1220 mm crossing 1220 mm paralleling for short distance Major Greenbelt construction issues Long OR 174 Tunnel
		Permit requirements	8	7	8	7
			NCC approval required	NCC, Hydro and RCMP approval required	NCC approval required (west end only)	NCC, Hydro and RCMP approval required
		Flexibility of interconnections / Phasing	10	8	10	8
				1220 mm crossing & tie-in more difficult to phase-in		1220 mm crossing & tie-in more difficult to phase-in
	Average Score		**8.20**	**8.00**	**7.60**	**7.80**
18.00	***Weighted Subtotal***		**14.76**	**14.40**	**13.68**	**14.04**
100.00	***Total***	***Score***	**72.53**	**64.04**	**72.58**	**64.56**
		Rank	**2**	**3**	**1**	**4**

5 PREFERRED ALTERNATIVE

Based on the evaluation of alternatives, **Alternative 6** is recommended as the preferred alignment. It should be noted that the preferred alternative represents a conceptual solution, and that further refinements are possible as a result of broader consultations, and more detailed work associated with the design process to follow this study.

The alignment for Alternative No. 6 will run along two major stretches;

- In the west end of the study area, from the south side of Hwy 417 just east of the Rideau River, near the City's Hurdman pumping station, crossing Hwy 417, travelling along River Road to Presland Road West, along Presland Road West to the Vanier Parkway, along the Vanier Parkway to Coventry Road, then along Coventry Road to St-Laurent Blvd where it will connect to an existing City water feedermain; and
- In the east end of the study area, along Ogilvie Road, from Blair Place Road to Montreal Road, then along Montreal Road to approximately Shefford Road, then following the north side of OR 174 from Shefford Road to a few hundred meters west of Jeanne D'Arc Boulevard. The watermain will then cross the OR 174 up to Youville Drive, and will travel along Youville Drive eastward to connect to the watermain at Jeanne D'Arc Boulevard and will also travel westward on Youville drive to connect to the watermain on St-Joseph Boulevard.

5.1 Alternative No. 6 Alignment Refinements

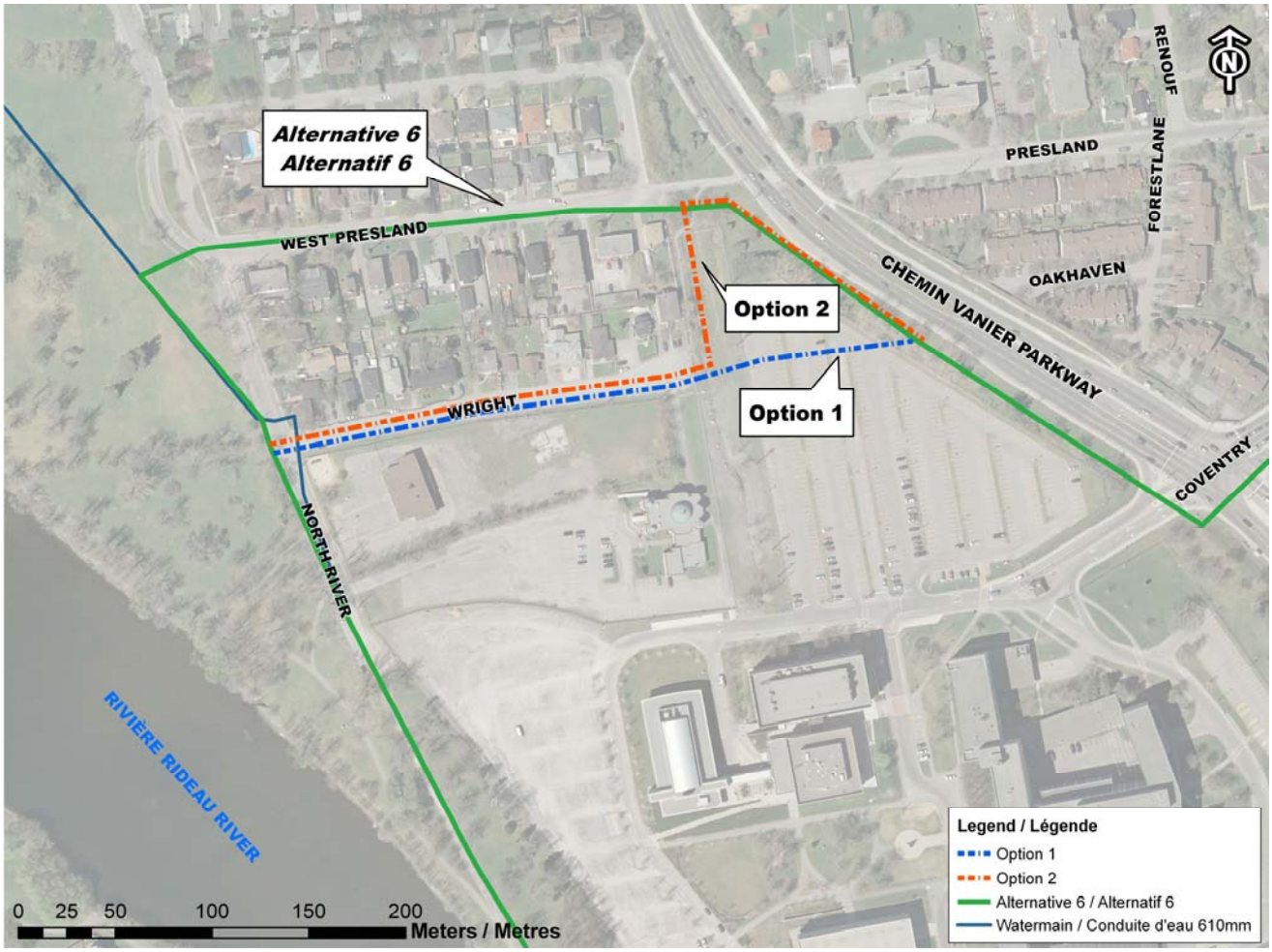
West End Refinements

The alignment in the west end was identified along existing ROW or City easements. A slightly different alignment in this vicinity to reduce overall length, construction disturbance to local residents and cost is possible if the RCMP and Public Works and Government Services Canada (PWGSC) allow the City to have the watermain cross a section of the north end of their property, next to an existing City sewer easement. The property is owned by PWGSC but the facilities on the site are occupied by the RCMP. The alignment adjustment would have the watermain following North River Road, then going east along Wright Street (instead of going east along Presland Road West), then crossing the RCMP National Headquarters parking lot to the Vanier Parkway. The proposed variation would avoid River Road north of Wright Street, which was recently subject to a major construction project. The Alternative No. 6 alignment previously described would then be followed along the Vanier Parkway to Coventry Road.

This revised alignment is shown as Option 1 in Figure 5-1. Option 2 on this figure is a third alignment alternative if disruptions to the parking area is not acceptable to PWGSC and the RCMP. The two options would not be within existing ROW or utility corridors and would be considered as Schedule B projects in accordance with the MCEA process. Both options are primarily within developed urban settings along infrastructure corridors and require property from the same single landowner. As the impacts would be considered similar to (or, on a local basis, somewhat less severe than) those identified in this EA, both of these options can be carried forward and evaluated further during the functional and detailed design of this project without additional EA requirements. The RCMP and PWGSC have agreed to continued discussions regarding the proposed refinement. Final decisions would be subject to approval by both. Of the 3 options available (Alternative 6 original alignment, Figure 5-1 Option 1 and Figure 5-1 Option 2), Option 1 on Figure 5-1 is the preferred alignment.

It should also be noted that the future alignment east of this area, along Coventry Road, is expected to change with the redevelopment of the St. Laurent shopping centre, as a result of the proposed re-alignment of this road just west of the shopping centre property. Figure 5-2 shows the proposed realignment of Coventry Road at this location. From an impact perspective, the watermain alignment will continue to follow the road ROW.

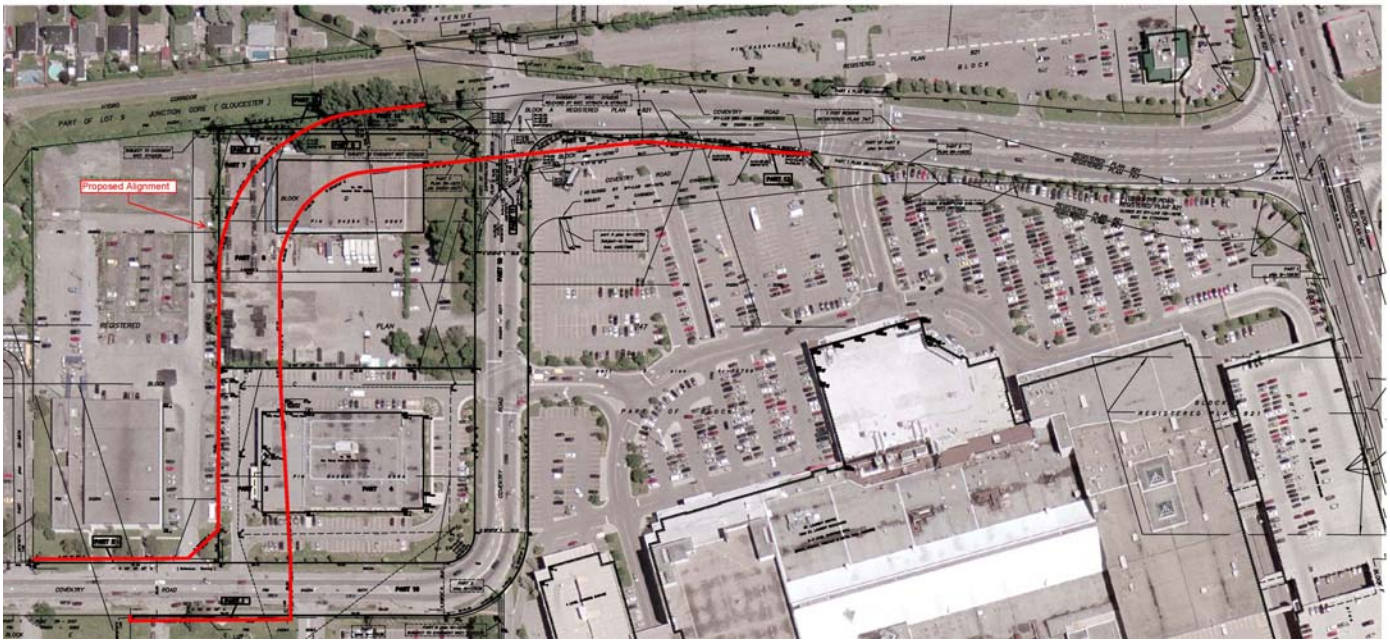
Figure 5-1: West End Alignment Options



East End Refinements

To meet the reliability needs of the EUC, the OWL requires a connection to the existing 406 mm watermain on Jeanne D'Arc Boulevard (north of St-Joseph Boulevard) and a connection to the 914 mm watermain on St-Joseph Boulevard (east of the Orléans reservoir watermain). The City noted that the south side of OR 174, between Montreal Road and Place D'Orléans has been reserved for the future LRT and as such, the OWL is required to stay on the north side of OR 174 until the crossing of OR 174 is required for the tie-in to St-Joseph Boulevard. As well, the OWL cannot tie into the Jeanne D'Arc Boulevard watermain at the location initially shown on Alternative No. 6 due to the future LRT corridor requirements.

Figure 5-2: Proposed Re-Alignment of Coventry Road



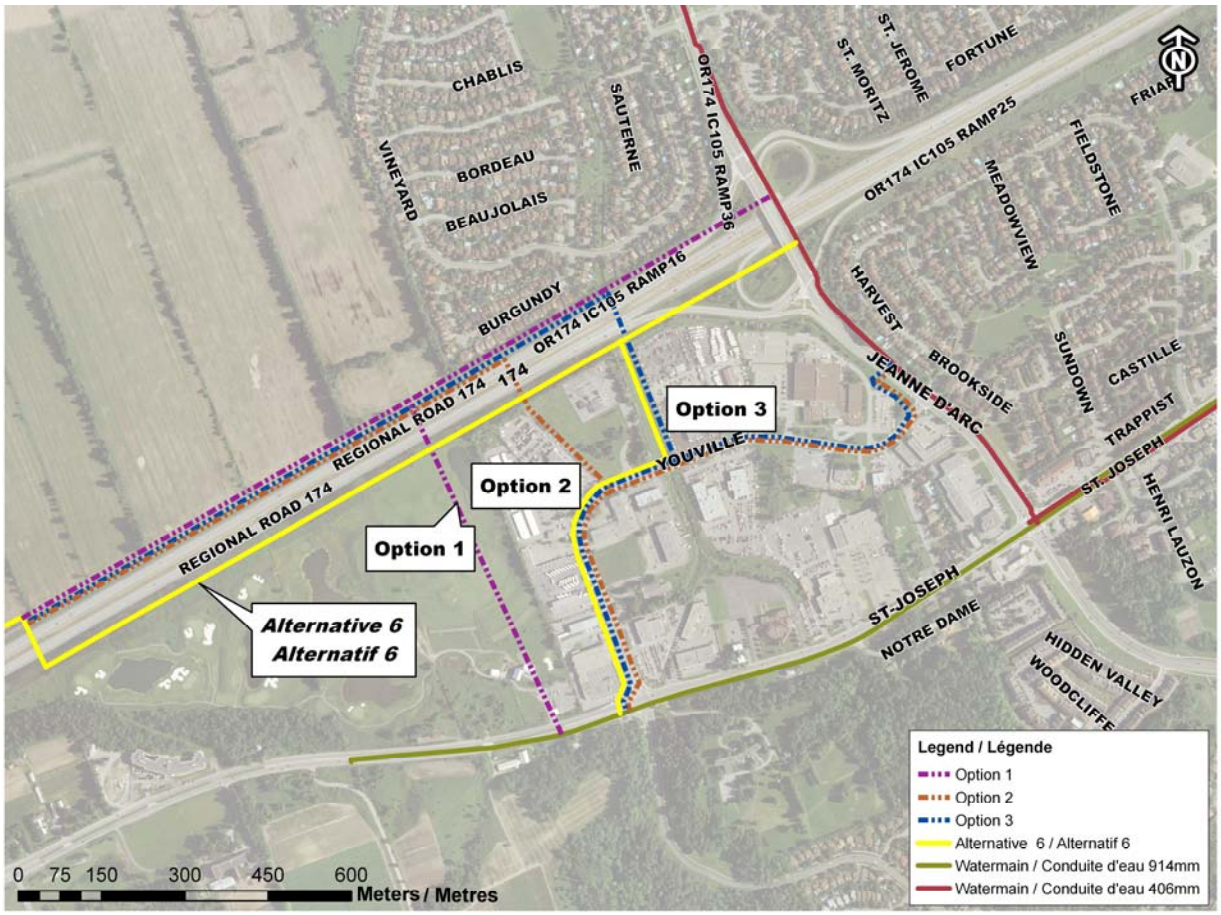
An alternate alignment for Alternative No. 6 considered connecting the OWL from OR 174 to St. Joseph Boulevard via the adjacent golf course in order to avoid community traffic impacts (Option No. 1 on Figure 5-3) on Youville Drive. This option would however be more difficult for access and maintenance of the OWL. It also would then require a complex crossing of the Jeanne D'Arc interchange with OR 174 (north side of OR 174) in order to connect to the existing watermain that is located on the east side of Jeanne D'Arc Boulevard. As such, this option was not considered further.

Two other options exist for the OR 174 crossing locations and connection points to the Jeanne D'Arc Boulevard and St-Joseph Boulevard watermains. The first option involves having the OWL on Hydro One property (Option 2 on Figure 5-3), and the other involves the OWL installed next to a municipal drainage channel located in a City ROW (Option 3 on Figure 5-3). Both of these options would then travel along Youville Drive to connect to the Jeanne D'Arc watermain (to the east) and to the St-Joseph watermain (to the west and south). This new watermain on Youville Drive would be in addition to the existing 300 mm watermain on Youville Drive.

Alignment through the Hydro One property would be preferred (Option 2 on Figure 5-3) because of easier construction, lower costs, and better access to the watermain for O&M requirements. Discussions on the availability of this Hydro One property are still ongoing, which requires an approximate 10 metre easement for the watermain in this location.

Should the Hydro One property not be available for the OWL, the OR 174 crossing will have to take place along the drainage ditch, immediately east of the Hydro One property (Option 3 on Figure 5-3). As the impacts would be considered similar to those identified in this EA, both of these options will be carried forward and evaluated further during the functional and detailed design of this project without additional EA requirements.

Figure 5-3: East End Alignment Options



5.2 Impact Assessment and Evaluation Approach

The values and conditions identified in the documentation of existing conditions were used as the basis for assessing the effects of the preferred alternative on the social, physical and biological environments. The impact analysis involved applying the steps presented in Table 5-1.

Table 5-1: Impact Assessment Approach

Step 1	Identify and analyze instances where the project may interact with existing environmental conditions
Step 2	Acknowledge predetermined project activities or characteristics that act as *built-in mitigation* measures.
Step 3	Identify the *residual* environmental effects, if any.
Step 4	Identify opportunities for further *mitigation of residual* effects, if possible/practical.
Step 5	Determine the *significance of the residual* environmental effects, after further mitigation.

5.3 Interactions

In order to understand the project interactions with the environment it is necessary to consider all phases of the project: pre-construction/design; construction; and operation. The following highlights some of the key activities associated with the implementation of the project.

General
The new watermain will replace a section of an existing 610 mm watermain (1959 vintage) along River Road, just north of HWY 417.

The functional design alignment (horizontal and vertical) will avoid existing utilities to the extent possible and the OWL will connect into side street watermains, as determined by current City standards.

Ogilvie Road
The existing watermain along Ogilvie Road needs to remain in operation during the construction of the OWL, as this is the City's "contingency" watermain should an emergency repair be required on the existing 1220 mm feedermain along OR 174 (between Blair Road and Shefford Road). As well, existing services and connections along Ogilvie Road will need to be maintained.

Montreal Road
The OWL along Montreal Road will be in addition to the existing 305 mm watermain, from Ogilvie Road to Shefford Road.

OR 174 – Between Shefford and Green's Creek
A small access road, off of Montreal Road or Rainbow Street, will be required along this alignment of the OWL to allow operations and maintenance access to the valve and access chambers on this section of watermain.

OR 174 – Green's Creek Crossing
The Green's Creek Crossing will be a major undertaking. It has been assumed that the approximate 330 metre crossing will be completed by tunneling. Due to the topographic nature of the area, tunnel shafts, approximately 20 metres deep, would be required at both ends. Detailed natural environment and geotechnical data will be required for this crossing

to minimize impacts. Steep vertical bends will be required at both ends of the crossing to meet the topographic requirements.

During the design stage of the OWL, the outcome of the findings of the existing natural environment conditions and geological conditions may provide opportunities to cross the Green's Creek area by other means other than tunneling, such as open-cut or elevated "bridging".

OR 174 – Rockcliffe Parkway Crossing

It is assumed that the OWL will be tunneled under the Rockcliffe Parkway. An access Road will be required off of the west side of the Rockcliffe Parkway to allow for the operations and maintenance of the valves and chambers west of the Parkway and east of Green's Creek.

OR 174 – Rockcliffe Parkway to Natural Gas Transmission Main

From the east side of the Rockcliffe Parkway to the natural gas transmission main, west of Jeanne D'Arc Blvd, additional ROW width will be required to maintain the same overall OR 174 ROW width as on the west side of the Rockcliffe Parkway. Additional land of approximately 10 metres wide will be required from the NCC for a large stretch of this section. The OWL is intended to be constructed under or along the existing farming access road, thereby reducing the need for an additional operations and maintenance road.

Natural Gas Transmission Main to OR 174

Due to the alignment of the existing gas transmission main, the OWL will have to make a slight jog to the north by approximately 5 to 10 meters, travel parallel to the gas main for approximately 320 meters, then cross the gas main at this point. Additional ROW or an easement will be required from the NCC for this alignment requirement. Any special design features of the OWL due to the proximity of the natural gas transmission main will be taken into account during the design phase.

OR 174 Crossing to Youville Drive

The construction of the crossing of the OR 174 will be by tunneling. The preferred location is to cross at the western most section of the existing Hydro One Transmission Station property, then travelling along the Hydro One property up to Youville Drive.

Youville Drive

For overall water system reliability reasons, the construction of the OWL's eastern section along Youville Drive, with a connection to Jeanne D'Arc Boulevard must be completed and fully operational before the connection to the existing 914 mm St-Joseph Boulevard watermain takes place. The exact location of the connection to the Jeanne D'Arc Boulevard watermain will be decided during the design phase.

The following tables highlight the key activities associated with each phase and identify areas of potential interaction.

Table 5-2: Pre-Construction/Design Interactions

Activity	Environmental Interaction
Field Investigations	Surface Water Wildlife Terrestrial Resources Roads and Traffic
Completion of detailed design and contract drawings	None anticipated
Acquisition of land required for the right-of-way and supporting infrastructure.	Land Use Land Ownership City Budgeting

Table 5-3: Construction Interactions

Activity	Environmental Interaction	
Relocating hydro, telephone, and utilities	Surface Water Terrestrial Resources Land Use Land Ownership	Noise Air Quality Roads and Traffic
Clearing and grubbing trees and vegetation within the grading limits for the construction project	Surface Water Wildlife Terrestrial Resources	Noise Air Quality Archaeological Resources
Stripping the layer of topsoil and trenching and installing watermain, chambers and access roads	Surface Water Contamination and Hazardous Materials Fisheries and Aquatic Habitat Wildlife	Terrestrial Resources Noise Air Quality Archaeological Resources Land Use
Final grading and topsoil application	Surface Water Noise	Air Quality
Installing remaining landscape features such as sodding or hydra-seeding, tree and shrub plantings	Terrestrial Resources	

Table 5-4: Operational Interactions

Activity	Environmental Interaction	
Annual maintenance	Land use	Roads and Traffic

5.4 Built in Mitigation Measures

In this assessment, "built-in mitigation" is defined as actions and design features incorporated in the pre-construction, construction, and operational phases that have the specific objective of lessening the significance or severity of environmental effects which may be caused by the project.

The OWL will be designed and implemented with the benefit of contemporary planning, engineering, and environmental management practices. Regard shall be had for the

legislation, policies, regulations, guidelines, and best practices of the day. Where possible, mitigation measures will be prescribed in the construction contracts and specifications. Examples of practices that should be employed, based on current standards, are described below. These measures can be considered "built into" the preferred design for the OWL. They will be updated and refined as required during the design, pre-construction, construction, and operation phases of the project.

Erosion and Sediment Control Plan

The purpose of the erosion and sedimentation control plan is to determine the degree of erosion and sedimentation that would occur under normally anticipated weather conditions during the life of the project, and to develop and implement mitigative strategies to control any foreseen areas determined to be pre-dispositioned to the problem. This would include: the identification of planting and slope rounding specifications within the contract tender; identifying and specifying seeding and sodding locations; identifying areas requiring slope benching or retaining structures in the detailed design process; and post construction monitoring and mitigative practices.

Construction and Traffic Management Plan

A Construction and Traffic Management Plan will be developed to manage the surrounding and adjacent roads transportation function for all travel modes including equipment and material deliverables at various times during the construction period. The objective of the plan will be to maintain safe and clear pedestrian routes, maintain existing traffic as close as possible to its current conditions, and outline the road signage program.

Archaeological Assessment and Monitoring

Based on the existing conditions, there were areas identified as having archaeological potential. Accordingly, it is recommended that a Stage 2 Archaeological Assessment be conducted for those areas by a licensed archaeologist prior to construction. During the actual construction, it may be necessary for a licensed archaeologist to monitor deep excavations with the Stage 2 assessment results determining this level of monitoring. If during the course of construction archaeological resources are discovered, the site should be protected from further disturbance until a licensed archaeologist has completed the assessment and any necessary mitigation has been completed.

Emergency Response Plan

The preparation of an Emergency Response Plan to be used by the contractor will be included to allow full access to emergency services during the construction period, so that at any given time there is a method to access all adjacent land uses. Additionally, the Emergency Response Plan should include provisions for providing temporary services to end users in the event of a construction related service outage or other service disruption. A Spills Response and Reporting Plan will be prepared and adhered to by the contractor. Spills or discharges of pollutants or contaminants will be reported immediately. Clean up shall be initiated quickly to ensure protection of the environment.

Environmental Protection

It will be the responsibility of the Contractor to ensure that no contamination, waste or other substances, which may be detrimental to aquatic life or water quality, will enter a watercourse as either a direct or indirect result of construction. In this regard, any floating debris resulting from construction which accumulates on watercourse beds and watercourse

banks is to be immediately cleaned up and disposed of. Any spills or contamination, waste or other substances which may be detrimental to aquatic life or water quality will also be immediately cleaned up.

Any work which will cause or be the cause of discharge to watercourses is to be prohibited. At all times, construction activities are to be controlled in a manner that will prevent entry of deleterious materials to watercourses. In particular, construction material, excess material, construction debris and empty containers are to be stored away from watercourses and the banks of watercourses.

Management of Contaminated Materials

The MOE and Construction Manager are to be notified immediately upon discovery of any contaminated material encountered within the construction area. If contaminated materials or contaminated groundwater are encountered within the construction limits, these are to be removed and disposed of in accordance with all applicable Acts and Regulations. Treatment and discharge of contaminated groundwater are also to be in accordance with applicable legislation and regulations.

Geotechnical Investigations

Geotechnical investigations will be required to confirm groundwater and subsurface conditions and potential impacts that will need to be considered in the detailed design phase of the project. Geotechnical investigations will also be required to undertake the pavement design. Foundation investigation will be required for structural design of new structures and extension of culverts, if required.

5.5 Site Specific Mitigation Measures

Following the incorporation of the Best Management Practices (BMPs), site specific, mitigation measures were identified. Often these mitigation measures are sufficient to reduce potential negative effects to an insignificant or negligible status.

5.5.1 Natural Environment

Landscape Plan and Tree Inventory

The alignment crosses wooded valley with interior habitat and will result in the loss of vegetation within the construction corridor. A tree survey prior to construction should be undertaken to identify any vegetation worthy of retention or suitable for transplanting. A Landscape Plan should be prepared identifying species and locations for reinstatement of vegetated areas. Planting lists will need to be considerate of the underlying infrastructure and potential access requirements.

Rare Species Inventories

Habitat is present in the study area that supports the potential for rare species such as the Bobolink. Rare species inventories should be conducted to determine the presence of any species in accordance with the Ministry of Natural Resources (MNR) protocols. If found, Mitigation Plans will need to be developed and permits may be required under the Ontario Endangered Species Act.

Fluvial Geomorphology

The potential for unstable soils and erosion in the Green's Creek corridor needs to be assessed in the area of the crossing. Erosive potential of the water course should be assessed to ensure that the buried infrastructure will not become exposed or interfere with the meander belt.

Geotechnical considerations

The geotechnical investigation undertaken as part of the area planning and this project indicates ground conditions in the area of Green's Creek consists of about 25 metres of clay, overlying un-sampled material, with glacial till or bedrock at about 35 metres depth. Tunneling should generally be feasible in the clay, but could be challenging considering the depth and length. Other tunnels previously constructed in the area, at similar depth, have required the use of compressed air for face support. Since the valley slopes are unstable, the shafts (and pipe) may need to be set-back by an additional distance from the slope crest (making the tunnel longer). Directional drilling or culvert extension under OR 174 (thereby allowing the OWL to cross over the culverts) might also be a feasible construction method. The ground conditions at depth need to be confirmed to inform the construction methodology and detailed design.

The ground conditions along the full length of the corridor are to be assessed during preliminary design to allow for appropriate construction methodology and design details.

Contamination

In areas identified with the potential for contamination, Phase 1/2 ESA should be conducted to confirm the presence of contamination. This will assist in the preparation of material management plans during construction.

5.5.2 Social Environment

Stage Two Archaeological Assessments

In areas where archaeological potential have been identified, Stage 1/2 Archaeological Assessments should be undertaken.

Public Communications Plan:

The requirement for the Public Communications Plan stems from the need to keep the public informed about the work in progress and the end result of the construction activity. Residents and other stakeholders must be aware of scheduled road closings and other disruptions to normal water supply service ahead of time in order that their activities can be planned with minimum disruption. The Public Communications Plan should detail how to communicate the information to the public, what information should be disseminated, and at what project stages the communication should take place.

Property Impact

Costs associated with acquiring property and property rights on which to build or provide construction easements for the construction of the OWL includes, in addition to actual property value, right-of-way preparation, legal and appraisal services and land survey. Lands under current agricultural cultivations will need to ensure that appropriate drainage is re-instated, if disturbed, and maintained.

Land Use

Areas adjacent to the OWL alignment are in various stages of developement and redevelopment. The planned land use of these future development areas will need to be considered and integrated during the future design stages in order to reduce conflicts and maximize land use opportunities.

Pedestrian Facilities

Consideration should be given to the construction of adjacent pathways that can serve as maintenance access routes to the watermain. The design will need to implement measures to control and direct the safe and secure movement of pedestrians.

5.6 Monitoring

Monitoring is important to verify the accuracy of effects predictions. Monitoring measures were recommended to determine what effects actually occurred with project implementation, and may result in the modification of mitigation measures to improve their effectiveness. Identified monitoring measures included inspection and surveillance, and compliance monitoring.

5.7 Impact Assessment and Evaluation Results

An environmental effect requires consideration of the interaction of the project (i.e. project activities) with the environment. Pre-construction, construction and operational activities were all assessed.

Professional judgment and experience formed the basis for identifying environmental effects and mitigation measures. The analysis was based primarily on comparing the existing environment with the anticipated future environment, during and after construction. Consideration was given to:

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

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

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

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

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

- not widespread;
- temporary or short-term duration (i.e., only during construction phase);

- recurring effect lasting for short periods of time during or after project implementation;
- affecting a specific group of individuals in a population or community at a localized area or over a short period; or
- not permanent, so that after the stimulus (i.e., project activity) is removed, the integrity of the environmental component would be resumed.

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

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

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

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

Spatial:

- the physical area which may be disturbed (directly, indirectly) by construction activities within work areas, as well as the physical area of the alignment (a general width of 20 meters centered on the watermain).

Temporal:

- the duration of the active construction phase of the project, scheduled to occur over a number of months at any one location and 1 year for the entire alignment.
- the completion of the OWL will be permanent infrastructure, which will operate as intended for the life span of the watermain, which is expected to be in the order of 100 years.

Table 5-5 describes the potential effects, mitigation, residual effects and their significance, and monitoring recommendations for the preferred alternative.

Project phases are identified as follows.

P- Pre-construction/Design
C - Construction
O – Operation.

Table 5-5: Assessment of Environmental Effects

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Natural Environment	Surface Water	Fuel spills, due to accidents during construction refueling and accidents during operation, entering the watercourses		●	●	Entire corridor	• Decrease in water quality due to accidental spills	• No refueling within 15 m of a watercourse. • Emergency Response Plan.		✓	• Some contaminants within stormwater system.	Insignificant	As per Emergency Response Plan
		Sedimentation due to construction activities		●		Watercourse crossings	• Decrease in water quality due to sedimentation	• Construction fencing at work areas near watercourses limiting area of disturbance. • Erosion and Sedimentation Control Plan. • Tunneling / subterranean construction methods	✓	✓	• Minor short-term localized degradation of water quality.	Insignificant	Monitor effectiveness of Erosion and Sediment Control Plan
	Fisheries and Aquatic Habitat	Fuel spills, due to accidents during construction refueling and accidents during operation, entering the watercourses		●	●		• Decrease in water quality due to accidental spills	• No refueling within 10 m of a watercourse. • Emergency Response Plan.		✓	• Short term population decline.	Insignificant	As per Emergency Response Plan

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Natural Environment		Sedimentation due to construction activities		●			• Decrease in water quality due to sedimentation	• Construction fencing at work areas near watercourses limiting area of disturbance. • Erosion and Sedimentation Control Plan. • Tunneling / subterranean construction methods	✓	✓	• Minor short-term localized degradation of water quality.	Insignificant	Monitor effectiveness of Erosion and Sediment Control Plan
	Terrestrial Resources	Loss of urban wildlife habitat		●		Entire corridor	• No significant habitat has been identified; however, existing urban wildlife may be displaced or disturbed during the construction of the project.	• Design a Landscaping Plan which will replace some of the habitat lost. • Tree survey to identify specimens for retention/replanting	✓		• Temporary avoidance of the area by wildlife during the construction phase.	Negligible	Monitor health of new plantings

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Natural Environment		Clearing and grubbing activities will result in the loss of existing trees, shrubs and grass.		●		Along Corridor		• Replace in accordance with the Landscape Plan • Protection of identified features and individual specimens with exclusion fencing. • Replacements – native varieties	✓	✓	• Replacement of existing landscape features	Insignificant	Monitor health of new plantings
	Valley lands	Clearing of vegetation in construction zone and excavation		●		Within valley lands	• Valleyland crossing total distance of 435 meters (Greens Creek) may disrupt vegetation and soils	• Replace vegetation with the Landscape Plan • Tunneling / subterranean construction methods	✓	✓	• Limited impact with rehabilitation post-construction	Insignificant	Monitor health of new plantings
		Infrastructure with Greens Creek			●	Greens Creek	• Potential interference with creek geomorphology and exposure of infrastructure	• Conduct fluvial geomorphological assessment	✓		• Limited impact with incorporation of results of assessment	Insignificant	Monitor creek meander in accordance with assessment recommendations
	Rare species	Habitat disruption of rare species		●		Within natural and agricultural areas along corridor	• May disrupt bobolink habitat	• Conduct rare species inventory • Prepare mitigation and compensation plan if required	✓	✓		Insignificant	Monitor any compensation necessary in accordance with MNR permit requirements

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Natural Environment	Geophysical Condition	Temporary excavations may require dewatering		●		Entire corridor	• Low extent of construction in areas of elevated groundwater	• Removal of groundwater by well filtered sumps in the excavations. • Contractor to develop and implement an Erosion and Sediment Control Plan		✓	• Potential for increased sedimentation down stream	Negligible	Monitor effectiveness of Sediment and Erosion Control Plan
		Poor soils could increase construction time and costs				Green's Creek	• Low extent of open construction in unstable soils	• Detailed geotechnical investigation and design for embankment settlement and stability	✓		• Ongoing settlement	Insignificant	Settlement Monitoring
	Contamination and Hazardous Materials	Excavation could encounter unexpected contaminated materials	●	●		Areas of potential contamination	• Localized areas have been identified as an environmental concern due to existing and previous land uses	• Undertaken Phase 2 ESA to confirm the presence of contamination	✓		• Management of contaminated materials	Insignificant	As per results of Phase 2 ESA
Social Conditions	City Budgeting	Cost to construct.	●			Along corridor	• The Class D cost estimate for design and construction is $48 million.	• Develop future capital budgets in preparation for detailed design and construction.	✓	✓	• None practical	Insignificant	None required

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Social Conditions	Regulatory Planning	The project has been incorporated into planned infrastructure development for the growth area	●			Along corridor	• The project has been incorporated into planned development to provide the ability for the community to develop according to local Official Plans and Secondary Plans.	• Construct in accordance with demand from developing communities	✓	✓	• Improved water reliability service to developing communities	Positive	
	Land Ownership and Land Use	Acquire identified lands for the construction and operation of the OWL	●			Throughout Corridor	• Lands required for the ROW will be assessed with consideration for land use and landowner interests.	• Fair market value for lands required to construct.	✓	✓	• None practical	Insignificant	None required

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Social Conditions		Disturbance of agricultural lands and drainage.	●	●	●	Agricultural lands	• The quality and productivity of agricultural lands may be affected by the temporary circulation of heavy machinery and equipment, and the staging of materials and drainage may be disrupted.	• City-PM and NCC-LM should inspect the access prior to the commencement of the works. The City will be responsible for ensuring the reinstatement of the access roads. • Assessment of the tile drains and, if required, the partial disconnection of those that may be affected by the works					Monitoring the drainage system of the agricultural lands.
	Noise	Increased levels of ambient noise due to construction equipment		●		Throughout Corridor	• Noise levels produced by stationary and moving construction equipment (dozers, trucks, loaders, scrapers) will occasionally be disruptive	• Contractor to ensure that the City by-laws are not contravened, equipment is well tuned, lubrication of moving parts, restrict unnecessary idling		●	• Effects from construction activities will be heard	Insignificant	Monitor complaints

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Social Conditions	Air Quality	Dust from construction activities		●		Through-out Corridor	• Dust and equipment exhausts will increase pollution locally during the construction period	• Termination of operations during periods of high winds. • Use of low dust generating technologies such as vacuum abrasive blasting, vacuuming surfaces to remove dust, use of temporary enclosures, and use of water/dust suppressants		●	• Dust may be an irritant to adjacent residents and pedestrians	Insignificant	Monitor complaints during construction
	Archaeological Resources	Potential for disruption/ disturbance of archaeological resources during construction	●			Areas of moderate potential	• Construction in these area could disturb artifacts	• Stage 2 Archaeological Assessment of areas identified with moderate to high archaeological potential	●		• None expected	Negligible	As per Stage 2 Assessment recommendations
	Built Heritage Features	Potential for disruption/ disturbance of built heritage features during construction	●			Built heritage features along Hazeldean	• Construction in these area could disturb artifacts	• Undertake an evaluation of the impact planned construction may have on a built heritage resource	●		• None expected	Negligible	As per Heritage Assessment recommendations

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Social Conditions	Aboriginal Land Claims	No crown lands will be transferred or sold No aboriginal activities within the project area	●	●	●	Along Corridor	• None anticipated	• None required			• None expected	Negligible	None required
Transportation Conditions	Roads and Traffic	Planning and Construction activities may result in traffic delays	●	●	●	Roadway intersections	• Roadside investigations and annual inspections may be a visual distraction to motorists. • Detours will be required during construction, particularly where the OWL will cross existing roads. This will potentially slow traffic and affect existing traffic and bus routes, being a possible irritant to drivers and transit riders.	• Construction phasing will minimize effects to traffic. A Traffic Management Plan will be prepared and adhered to by the contractor. Standard traffic control measures will be used to manage traffic flow. A public notification program will be implemented by the City. • Detours will provide a minimum of two traffic lanes for their duration. OC Transpo may need to reorganize their schedules accordingly.	✓	✓	• Possible traffic delays during constructi on.	Insignificant	Ongoing monitoring of Traffic Management Plan

Environmental Value		Project Activity /Environmental Interaction	Project Phase			Specific Location	Analysis of Environmental Effect	Mitigation Measures	Mitigation Implementation Stage		Potential Residual Effect	Level of Significance after Mitigation	Monitoring Recommendation
			P	C	O				Design	Construction			
Transportation Conditions	Pedestrian and Cycling Networks	Disruption of cycling /pedestrian movements during construction		●		Pathway intersections	• Detours will be required during construction,	• Construction phasing will minimize effects to traffic. A Traffic Management Plan will be prepared and adhered to by the contractor. Standard traffic control measures will be used to manage traffic flow. A public notification program will be implemented by the City.	✓	✓	• Possible cycling/pedestrian delays during construction	Insignificant	Ongoing monitoring of Traffic Management Plan
		Integration with cycling /pedestrian systems			●	Pathway intersections	• Opportunities for integration and extension of existing and future recreational trails and cycling routes and maintenance of continuity for recreation trails in Hydro Corridor.	• None required	✓		• Good integration with existing and future pathways	Positive	None required

6 CONSULTATION

Details from the consultation activities are contained in Appendix B.

6.1 Technical Advisory Committee

A TAC consisting of representatives from key City of Ottawa departments and the NCC, provided guidance during this study. Meetings were held at these key milestones:

- Project initiation;
- Development of alternatives;
- Identification of short list of alternatives; and
- Selection of preliminary preferred alternative.

The TAC met to review project status, comment on decisions made to date and provide input moving forward. Representatives included personnel from the following departments.

City of Ottawa

- Planning and Growth Management
- Environmental Services Department
- Infrastructure Services Department
- Real Estate and Property Management
- Operations

National Capital Commission

- Planning and Approvals
- Environmental Assessment
- Land Management
- Greenbelt Master Plan

6.2 Stakeholder Consultation

Additional consultation was undertaken, as required, with key agencies and stakeholders. Information was distributed to local approval agencies, Business Improvement Area (BIA) groups, community associations, major landowners and utility companies.

Meetings and discussions were held with agencies and City departments, including:

- RCMP
- NCC
- Hydro One
- Hydro Ottawa
- City of Ottawa Transportation Planning.

Stakeholders provided input into approvals, land availability, and access requirements.

6.3 Project Web Page

The City of Ottawa hosted a web page (Ottawa.ca/owl) for this project. The web page summarized the development and evaluation of alternatives as described herein. A project feedback form was available through the web page.

A Notice of Commencement was posted at the onset of the project providing background information and inviting members of the public to become involved.

Over 11,000 flyers were distributed to property owners in the vicinity of the project to provide information and invite comment on the project from area residents and business owners. Ads in community papers were intended to promote input via project web page. Ads were published as follows:

- Ottawa EMC East – Thursday, March 1
- L'Express – Thursday, March 1
- Orléans Star – Thursday, March 1

A sample ad is provided in Appendix B

6.4 Community Association Meetings

Community and Business Associations in City Wards through which Alternative 6 passes were contacted to gauge interest in a presentation on the study at any pre-planned Association meetings. As a result of this contact, two meetings were held with local community associations. Meetings were held with:

- Overbrook Community Association – January 19, 2012
- Convent Glen Community Association – January 9, 2012

Presentations and follow-up e-mail communication with leaders from these Community Associations are provided in Appendix B.

7 FUTURE COMMITMENTS

During the study, the City of Ottawa worked closely with the Technical Agencies to address any environmental and property-related concerns and issues. The potential impacts, mitigation measures and the associated net impacts have been identified, evaluated and assessed as documented in the previous sections. The ensuing implementation and design process will need to be implemented in accordance with the conditions as noted in this EA. In addition, there is work that will need to be undertaken during both preliminary design and detailed design. This section outlines the future commitments for the development and implementation of the project.

7.1 Property Acquisition and Easements

Property acquisition and temporary construction easements will be required for this project. For most of the alignment the project is within the City ROW. The City of Ottawa will confirm property requirements and limits early during the design phase and negotiate with affected property owners where property acquisition or permanent easements are required for the project. The necessary property will be acquired prior to the construction stages.

The City will proceed with the acquisition of temporary and permanent property needs, including temporary construction easements, as the design work proceeds and definitive property plans are developed. The process will include negotiation and expropriation for private properties, if required. For Provincial and Federal lands, the City will follow the approved land acquisition processes, working cooperatively with the respective agencies to acquire property for the project.

7.2 Design Details

The preliminary design will evaluate and assess construction methods and staging to undertake the project. The end result will be a detailed design which culminates in tender document that generally includes:

<u>Drawings</u>

- Implementation / Staging and Traffic Detours
- Alignment
- Removals
- Grading and Drainage
- Geometry and General Layout of Watermain facilities
- Services/Utility Relocations
- Typical Sections
- Non-Standard Details
- Landscaping Plan

<u>Specifications</u>

- Tender
- Form of Agreement
- Modified Ontario Provincial Standards (OPS) General Conditions
- Special Provisions

- Special Provisions General
- Standard Drawings and Standard Specifications

As part of completing the design, several additional investigations and studies have been recommended. These include:

- Detailed Geotechnical Investigations
- Tree survey
- Fluvial Geomorphological Assessment of Green's Creek
- Rare Species Inventory
- Phase 2 ESA for areas of potential environmental concern
- Assessment of the tile drains
- Stage 2 Archaeological Assessment of areas identified with moderate to high archaeological potential

7.3 Approvals

Approval of this Class Environmental Assessment does not constitute approval under other legislation required to construct the project. Specific approvals will be required for many components of the project. The following is a list of approvals and permits that may be required during the design and construction of the project that will be the responsibility of the City of Ottawa as the proponent.

7.3.1 Provincial

Permit To Take Water (PTTW)

Water takings in Ontario are governed by the *Ontario Water Resources Act* (OWRA) and the Water Taking Regulation (O. Reg. 387/04) a regulation under the Act. Section 34 of the OWRA requires anyone taking more than a total of 50,000 litres of water in a day. This includes the taking of water for any use; whether agricultural, commercial, construction, dewatering, industrial, institutional, recreational, remediation, water supply or other purposes. Construction activities may trigger the requirement for a PTTW due to many factors including: trench dewatering and dust suppression.

Ontario Endangered Species Act (OESA)

The Endangered Species Act, 2007 addresses the protection and recovery of species at risk in Ontario. If a species is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species, the Bill protects the species and their habitat. The ESA 2007 includes flexibility tools that encourage good stewardship and benefit to species at risk. The bill also includes a permit process to authorize people to engage in an activity that may not otherwise be allowed under the ESA 2007. Permits may be granted under the following circumstances:

- The activity is necessary for human health and safety;
- The purpose of the activity is to help protect or recover the species at risk;
- The activity will result in an overall benefit to the species; and
- Permits may also be granted for activities that result in significant social or economic benefit to Ontario. Even in these cases, the activity must not jeopardize the survival or recovery of a species at risk.

A permit under the OESA may be required if there are endangered species identified within the corridor. None have been identified to date, however, species status is reconsidered on a regular basis and should be reviewed prior to construction. The permit application will need to include justification for any required removals as well as a mitigation/recovery plan.

Ministry of Transportation

Highway Improvements necessitated by land development within MTO`s permit control area, as specified in the Public Transportation and Highway Improvement Act, R.S.O. 1990, c.P.50 (PTHIA), will generally be the responsibility, of the proponents. The Proponent will be responsible for the design, construction and contract administration of all Highway Improvements. The application for a permit should include:

- A secured by a Letter of Credit, where applicable;
- Design drawings and the contract package according to current MTO standards and specifications;
- MTO endorsement to award the tender to a qualified contractor;
- Provide proof of liability insurance;
- Environmental Assessment requirements; and
- Compliance with all other environmental legislation, regulations and policies, to the satisfaction of the regulatory agencies.

The crossing of Highway 417 with the watermain is within the permit control area of the MTO.

Ontario Heritage Act (OHA)

The *Ontario Heritage Act* gives municipalities and the provincial government powers to preserve the heritage of Ontario. Plans for the renovation of a building designated under Part IV of the Heritage Act must comply with the requirements set out in the Act. Part VI of the Act deals with the conservation of resources of archaeological value. The Ministry of Tourism, Culture and Sport (MTCS) also reviews archaeological reports and investigations to ensure compliance with their requirements.

Hydro

Discussions with a Hydro representative took place regarding the OWL alignment that would cross the Hydro One property on Youville Drive (Option No. 2 on Figure 5-3). Further discussions will be required with both Hydro One and Ottawa Hydro regarding this possible alignment and easement requirement during the design phase.

7.3.2 Federal

Canadian Environmental Assessment Act (CEAA)

Federal approvals required for any land transfers or easements from the Federal government (NCC, RCMP, PWGSC) may be triggers that require the completion of an environmental assessment in accordance with the CEAA.

Final property requirements will be determined during the subsequent design phase and determination of refinement options in the eastern and western sections. Regardless of the

outcome of the final design alignment, property and approvals are anticipated from the NCC.

7.3.3 Municipal

The RVCA protects and regulates important environmentally sensitive areas such as wetlands, shorelines and waterways. Regulation occurs under *Ontario Regulation 174/06—Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*. This regulation replaced *The Fill, Construction and Alteration to Waterways Regulation.* Construction near the area water courses may require permits from the RVCA.

Temporary Encroachment Permits

Temporary Encroachment Permits are required for activities, which temporarily encroach onto City of Ottawa ROW. These permits ensure that all safety measures are taken, that the construction meets the City of Ottawa standards and that all area residents and passers-by are kept safe.

Construction activities require temporary construction encroachment permits for construction related activities on City right-of-ways. Such encroachments include placement of containers, stockpiling materials, and vehicles used in the construction process including aerial, subsurface and surface types.

- Aerial encroachment is generally used to facilitate the use of tower cranes. When a crane permit (aerial encroachment) is issued, the securities must always be checked before releasing the permit.
- Sub-surface encroachment is usually used for a tie-back, rock anchor, or other type of support placed under a street or highway to support an excavation wall.
- Surface encroachment is generally used for vehicles, materials, equipment, covered sidewalks and hoarding.

Road Cut Permits

The Road Activity By-law 2003-445, often referred to as the "Road Cut" by-law, was established to ensure that any road cut within the road allowance is undertaken safely and with minimal disruption and that the reinstatement of the road allowance meets City standards. A road cut is defined as: “a surface or sub-surface cut in any part of the highway made by any means, including and excavation, reconstruction, cutting, saw-cutting, overlaying, crack sealing, breaking, boring, jacking or tunneling operations”. The By-Law imposes the requirement to obtain a permit prior to undertaking any cut into a City road allowance: road surface; sidewalks; and boulevards. In order to obtain a permit a contractor must be bonded and insured and, where the work may impact traffic or pedestrian movement, must submit for approval a traffic management plan. The by-law further establishes peak hour restrictions, establishes reinstatement standards and imposes a duty on the contractor to protect City owned trees when work is undertaken in close proximity.

7.4 Modifying the Recommended Plan

This Class EA Study report is based on a conceptual level of design for the western section and a functional design level of detail in the eastern section. The conceptual and functional design levels do not provide the same level of detail that will be available during later stages

of preliminary and detailed design. Nonetheless, the conceptual and functional designs do provide a sufficient level of detail to assess the environmental effects of the Recommended Plan. The effects identified in the EA are considered reliable to base a decision regarding approval of the proposed project.

Changes may arise in terms of study area conditions, the development of new technology or mitigation measures, or the identification of previously unknown information. The proponent will be responsible for assessing the significance of the proposed change(s) which will generally be based on further technical assessments and consideration of applicable policy as well as public and agency input as required. An assessment as to the significance of a proposed change will be based on consideration of the following issues:

- Are there any significant environmental issues?
- Are there any significant property issues?
- Is there a need to provide public documentation of any issues that have been identified?

All changes that are inconsistent with the Environmental Assessment Report would require an addendum. If the proposed change to the project is not anticipated to be significant, the change should be documented with the future design reports and made available for public review upon request.

The potential alignment options that were described in Section 4.0 need to be refined during preliminary/detailed design. These options were considered within the scope of this assessment and the ultimate option selected would be considered to be consistent with the study and not require an addendum.

7.4.1 Coventry Road

St. Laurent Shopping Centre is planning an expansion which includes the realignment of Coventry Road. As the design proceeds, co-ordination with the proponent to determine the final alignment and incorporation of the OWL needs to occur.

7.5 Public Consultation

The City of Ottawa is committed to building strong, sustainable and livable communities by investing in roads, bridges, public transit, neighbourhoods, libraries, parks and recreation facilities. The public will be kept informed of the status of the project as it proceeds to construction through Project Information Centres to be conducted after design and prior to construction.

8 SUMMARY AND CONCLUSIONS

Projects such as the proposed Orléans Watermain Link have the potential to affect the surrounding environments. The purpose of this environmental assessment is to predict these changes and suggest measures which may be taken to minimize the negative effects and enhance or broaden the positive environmental effects.

In this study, the Purpose and Need for the project were presented, existing conditions were described, and alternatives were identified and evaluated. Throughout the process, the project benefited from public and agency participation including consultation with the Technical Advisory Committee and the general public. In part, from the feedback from these meetings, the Project Team was able to identify and mitigate, where possible, localized impacts for residents/landowners immediately adjacent to the proposed project. This involvement also maximized, to the extent possible, public and agency confidence in the selection of a Preferred Alternative, as well as the process which led to relevant decisions.

During the construction phase, each individual section will be an active construction site. Traffic disruptions, noise, dust and visual interruptions will be inevitable. Ongoing communications by the City of Ottawa with the affected public will go a long way in alleviating potential concerns and ensuring that timely information about the project is disseminated. Following the construction phase, there will be a positive effects related to water supply integrity.

While the OWL project has the potential to have negative effects on the human and biophysical environments in its vicinity, these effects can be sufficiently mitigated with prescribed design features and sound environmental management practices, where possible and practical. Additional approvals that may be required as part of the subsequent detailed design process, have been identified. By incorporating the mitigation measures identified, no “significant” adverse environmental effects are expected to prevail after mitigation.

In accordance with the provisions of the Municipal Class EA Process, the study results are documented in this Environmental Assessment which is available for a 30 day public review period. During this period, there will be an opportunity for an individual to request a *Part II Order* which is a request for the project to be “bumped-up” to an Individual Environmental Assessment.

Once all approvals are in place, the project can proceed to the construction phase.

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

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