



MORRISON HERSHFIELD

North Island Link Watermain

Class Environmental Assessment

Ottawa, ON

Presented to:

Mr. John Bougadis, M.A.Sc., P.Eng.

Senior Project Manager, Infrastructure
Planning

City of Ottawa

Planning, Infrastructure and Economic
Development Department 110 Laurier
Avenue, West

Ottawa, ON, K1P 1J1

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TABLE OF CONTENTS

	Page i
EXECUTIVE SUMMARY	1
1. INTRODUCTION AND BACKGROUND	1
1.1 Project Overview	1
1.2 Background	1
2. STUDY PROCESS	2
2.1 Municipal Class Environmental Assessment	2
2.2 Canadian Environmental Assessment Act (CEAA)	4
2.3 Consultation	4
3. PROBLEM OR OPPORTUNITY	6
3.1 Project Need and Justification	6
4. STUDY AREA AND EXISTING CONDITIONS	7
4.1 Study Area	7
4.2 Natural Environment	9
4.2.1 Subsurface Conditions	9
4.2.1.1 Geotechnical Conditions	9
4.2.1.2 Hydrogeology	9
4.2.1.3 Water Wells	13
4.2.2 Areas of Potential Environmental Concern	13
4.2.3 Terrestrial Features and Wildlife	13
4.2.3.1 Wetlands	14
4.2.3.2 Significant Valleylands	14
4.2.3.3 Significant Woodlands an Critical Habitat	15
4.2.3.4 Significant Wildlife Habitat Areas	16
4.2.3.5 Migratory Birds	17
4.2.3.6 Species at Risk	17
4.2.3.7 Life Science Sites and Areas of Natural and Scientific Interest	20
4.2.3.8 Trees and Landscaping	20
4.2.4 Fisheries and Aquatic Habitat	20
4.2.4.1 Watercourses	22
4.2.4.2 Species at Risk and Critical Habitat	26
4.3 Transportation	27
4.3.1 Roadways	27

TABLE OF CONTENTS (Continued)

	Page	
4.3.2	Recreation & Pedestrian/Cycling Routes	27
4.3.3	Navigable Waters	28
4.4	Socio-Economic Environment	30
4.4.1	Cultural Heritage	30
4.4.1.1	Archaeological Potential	30
4.4.1.2	Built Heritage Resources	32
4.4.1.3	Rideau Canal	32
4.4.2	Existing Land Use	34
4.4.3	Businesses and Community Services	34
4.4.4	Emergency Services	34
4.5	Infrastructure and Utilities	36
4.5.1	Sanitary and Storm Sewers	36
4.5.2	Watermains	38
4.5.3	Gas	38
4.5.4	Rogers	38
4.5.5	Hydro Ottawa	38
4.5.6	Bell	39
4.6	Constraints and Opportunities	42
5.	EVALUATION OF ALTERNATIVES	44
5.1	Alignment Options	44
5.2	Short-listed Alignment Options	45
5.2.1	Evaluation of Short-listed Alignment Options	46
6.	PREFERRED ALTERNATIVE	52
6.1	Major Construction Activities	54
6.2	Major Operational Activities	55
7.	IMPACTS, MITIGATION MEASURES AND MONITORING	56
7.1	Assessment and Evaluation Approach	56
7.2	Interactions	56
7.3	Built-in Mitigation Measures	58
7.3.1	Erosion and Sediment Control	58
7.3.2	Spills Response and Action Plan	59
7.3.3	Environmental Protection Plan	59
7.3.4	Dewatering Management Plan	59

TABLE OF CONTENTS (Continued)

		Page
7.3.5	Management of Contaminated Materials	60
7.3.6	Unexpected Discovery of Archaeological Resources	60
7.3.7	Construction and Traffic Management Plan	61
7.3.8	Noise, Air Quality and Vibration	61
7.3.9	Tree Survey and Tree Preservation Plan	62
7.3.9.1	Species at Risk Updates	62
7.3.9.2	Public Communications Plan	63
7.4	Site Specific Mitigation Measures	63
7.5	Monitoring	63
7.6	Assessment and Evaluation Results	63
8.	NEXT STEPS	73
8.1	Functional Design	73
8.2	Implementation	73
8.3	Approvals	73
8.3.1	Licence of Operation (Parks Canada)	73
8.3.2	Evaluation of Environmental Effects (Parks Canada)	73
8.3.3	Navigation Protection Act (NPA) Notice of Works Form (Transport Canada)	74
8.3.4	Permit-To-Take-Water (MOECC)	74
8.3.5	Ontario Endangered Species Act Permit (MNRF)	74
8.3.6	Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit (RVCA)	75
8.4	Notice of Completion	75
8.5	Revisions to Schedule B Project Files	75
9.	CONSULTATION	77
9.1	Technical Advisory Committee	77
9.2	Government Agencies	78
9.3	Aboriginal Consultation	79
9.4	Public Consultation	79
9.4.1	Manotick Village Community Association Meeting	80
9.4.1.1	Notification	80
9.4.1.2	Attendance	80
9.4.1.3	Format	80

TABLE OF CONTENTS (Continued)

	Page
9.4.1.4 What we Heard	81
10. SUMMARY AND CONCLUSION	82
11. REFERENCES	84

TABLE OF CONTENTS (Continued)

Page

LIST OF FIGURES

Figure 2.1: Class EA Process	3
Figure 4.1: NIL Study Area	8
Figure 4.2: Bedrock Elevation	11
Figure 4.3: Geological Formations	12
Figure 4.4: Key Vegetation and Wildlife Features	19
Figure 4.5: Downstream Overview from Barnsdale Bridge	21
Figure 4.6: Upstream Overview from Barnsdale Bridge	22
Figure 4.7: Aquatic Resources	24
Figure 4.8: Transportation Network	29
Figure 4.9: Archaeological Potential	31
Figure 4.10: Cultural Heritage Identified Resources	33
Figure 4.11: Land Use (2010)	35
Figure 4.12: Sanitary and Storm Pipes	37
Figure 4.13: Water Distribution System	40
Figure 4.14: Constraints and Opportunities	43
Figure 5.1: Long List of Alternatives	44
Figure 5.2. Short-listed Alignment Options	46
Figure 6.1. Alternative B Watermain Sizing and Proposed North Island Link	53

LIST OF TABLES

Table 4-1: Groundwater level and hydraulic conductivity	10
Table 5-1: Screening Criteria	45
Table 5-2: Evaluation of Alternatives	48
Table 7-1: Project-Environment Interactions	57
Table 7-2. Project Impacts, Mitigation Measures, and Monitoring	66
Table 9-1: Record of Technical Advisory Committee Meetings	78



TABLE OF CONTENTS (Continued)

LIST OF APPENDICES

APPENDIX A: Preliminary Geotechnical and Hydrogeological Investigation – Golder Associates

APPENDIX B: Letter: Information Request – Developments – Ministry of Natural Resources and Forestry

APPENDIX C: Draft Stage 1 Archaeological Assessment – Past Recovery Archaeological Services Inc.

APPENDIX D: Draft Cultural Heritage Resource Assessment – Past Recovery Archeological Services Inc.

APPENDIX E: Public and Agency Consultation

EXECUTIVE SUMMARY

The City of Ottawa retained Morrison Hershfield to complete a Municipal Class Environmental Assessment (EA) and subsequent Functional Design Study for the proposed watermain project referred to as the “North Island Link”. This Class EA study examined inter-connecting the Manotick Watermain Link to an existing watermain on Rideau Valley Drive between Bravar Drive and Barnsdale Road, involving a proposed crossing of the west channel of the Rideau River.

Public and stakeholder consultation forms an important part of the Municipal Class EA process. The consultation process for the North Island Link presented route Options A and B to the public and agencies. Both Options start at the planned initial phase of the Manotick Watermain Link, which is located at the southeast corner of David Bartlett Park, and will be sized as a 610 mm diameter main. The North Island Link route is proposed to follow an alignment along the southern border of David Bartlett Park (Option B), and continue north on McLean Crescent to Barnsdale Road where it crosses the Rideau River to Rideau Valley Drive North. This route will connect to the existing Rideau Valley Drive Watermain. The watermain will also connect the existing McLean watermain on McLean Street in Hillside Gardens to the proposed North Island Link Watermain.

The assessment of environmental impacts associated with the project (pre-construction, construction, and operation) has been completed with the information available to-date. The assessment indicates that with the incorporation of prescribed mitigation measures, the North Island Link project will not create any significant negative environmental impacts. Positive impacts associated with municipal servicing for local residents has been identified. The total cost estimate for this watermain Link is \$ 6.7 M.

This Class EA report describing the preferred alternative will be brought forward to Ottawa City Council for review and approval of the preferred alternative. Once approved, the EA report will be placed on the public record for a 30 day public review period. Provided there are no objections, the functional design portion of the project will be completed. Detailed design and construction will follow; this is currently anticipated to commence in 2019.

1. INTRODUCTION AND BACKGROUND

1.1 Project Overview

The City of Ottawa has initiated the North Island Link (NIL) Watermain Class Environmental Assessment (Class EA) and Functional Design Study. The main objective of the project is to link the existing watermain on Rideau Valley Drive to the proposed Manotick Watermain Link at the north end of Long Island. The NIL will provide additional capacity and reliability of water supply to the village and to urban area south of the Jock River through a 610 mm watermain loop. This Class EA study examines inter-connecting the Manotick Watermain Link to the existing watermain on Rideau Valley Drive between Bravar Drive and Barnsdale Road, which involves an additional watermain crossing of the Rideau River.

Included in the NIL watermain project is a connection to the existing McLean watermain located on McLean Street in Hillside Gardens. The functional design study is documented in a separate report.

1.2 Background

The City of Ottawa completed a Class EA of the Manotick Watermain Link in December of 2014. The Class EA examined the extension of water services to the Village of Manotick to provide redundancy and reliability to the Manotick community, and to provide the potential for current residents to gain access to the central water supply system. A recommendation was made for the alignment of a 610 mm diameter watermain along River Road from the Riverside South Community to a crossing of the Rideau River at Water Collins Park to Bravar Drive to Long Island. The alignment was recommended to continue to a second crossing of the Rideau River at the south end of Long Island to join the existing distribution system at the intersection of Antochi Lane and Manotick Main Street.

The City of Ottawa, in consultation with stakeholders, determined that the recommended link be phased-in. A portion of the watermain from Riverside South to Bravar Drive will proceed to detailed design and construction, with the remainder deferred based on demand. The 2013 Infrastructure Master Plan included the North Island Link inter-connecting the Manotick Watermain Link to the existing watermain on Rideau Valley Drive. That link is the focus of this study.

2. STUDY PROCESS

2.1 Municipal Class Environmental Assessment

The Municipal Class Environmental Assessment (MCEA) is an approved planning and design process developed to ensure the intent of the Ontario *Environmental Assessment Act* (EAA) is met. The MCEA requires project alternatives be assessed; the potential social, economic, and natural environmental effects be identified; mitigation and protection measures be considered; and that the public, agencies, and interest groups be given an opportunity to consult when undertaking certain municipal infrastructure projects.

The Class EA process is self-directed, whereby municipalities that follow the process meet the requirements of the EAA. Since projects undertaken by municipalities vary in their environmental impact, they are further classified within the Class EA in terms of Schedules, as summarized below:

Schedule A projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities.

Schedule A+ projects are pre-approved however, the public is to be advised prior to project implementation. The manner, in which the public is advised, is determined by the proponent.

Schedule B projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and relevant review agencies, to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities.

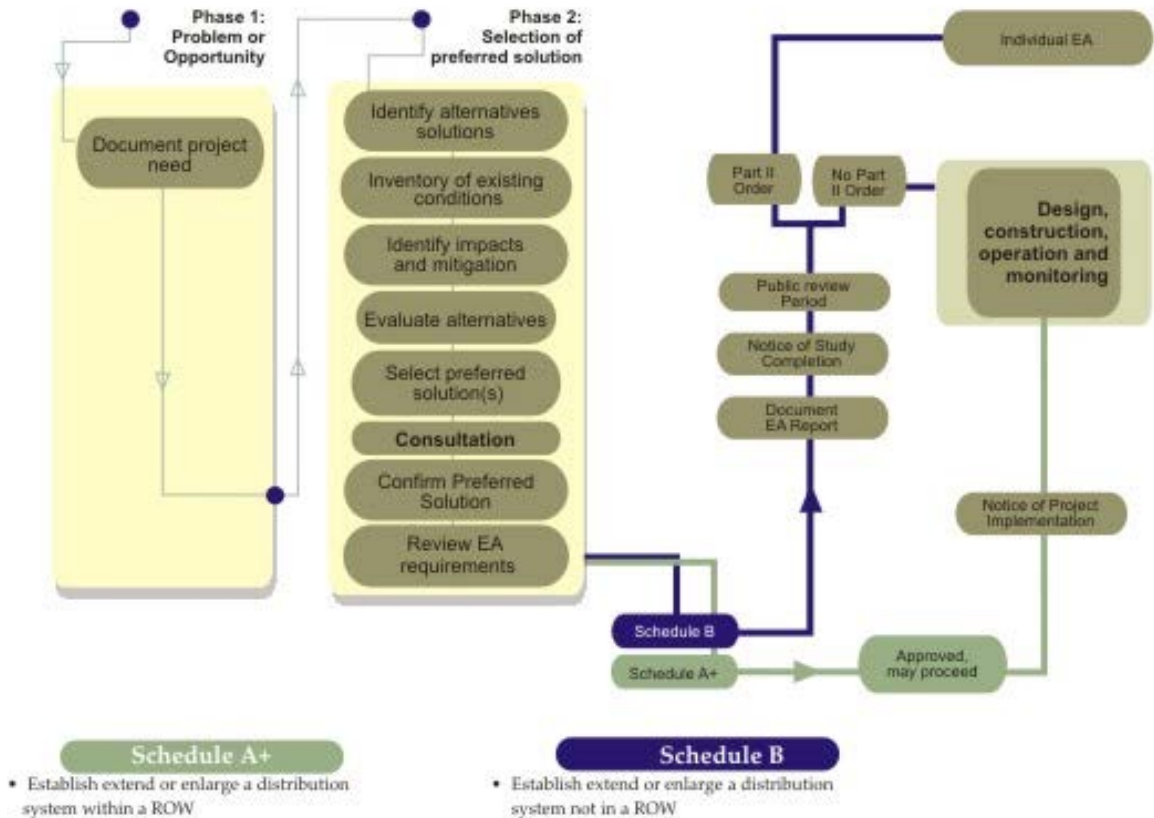
Schedule C projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an

Environmental Study Report be prepared and filed for public and agency review. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities.

The selection of the applicable Schedule is determined by the anticipated environmental impact of the project, which may include the anticipated cost of the project. The proposed NIL watermain project:

Will establish, extend or enlarge a water distribution system and all works necessary to connect the system to an existing system or water source, where such facilities are not in either an existing road allowance or an existing utility corridor. For this reason, this project is considered a Schedule B project and will require a screening process as described above (**Figure 2.1**).

Figure 2.1: Class EA Process



2.2 Canadian Environmental Assessment Act (CEAA)

Under the CEAA 2012, a federal environmental assessment must be completed if the project is listed in the *Regulation Designating Physical Activities* or if there is a ministerial order. The NIL Watermain is not a project that is listed as a designated project nor has there been a ministerial order. As such, a Federal EA is not required. However, federal approvals/ authorizations may be required including a Licence of Occupation and an In-Water Works Permit from Parks Canada (PC) for work within 30 metres of the Rideau River/Canal. Section 67 of the CEAA 2012 requires that a federal authority must not exercise any power or perform any duty or function conferred on it that could permit a project to be carried out, in whole or in part, on federal lands, unless the authority determines that the carrying out of the project is not likely to cause significant adverse environmental effects.

As part of the assessment and evaluation for the NIL Watermain, federal interests were considered to inform any federal authority making a determination as to the potential for significant effects from the project.

2.3 Consultation

A key component of the EA process is the coordination and integration of consultation. The planning and coordination of the infrastructure and environmental mitigation requirements for the project, in consultation with the community, stakeholders and review agencies will help to ensure that the objective of the City and those consulted are fulfilled. The Class EA process requires consultation with affected parties early on and throughout the planning process.

The purpose of the consultation with stakeholders is to review potential environmental impacts with them; allow them an opportunity to provide input to the identification of the problem or opportunity and alternative solutions; and to assist in the selection of a preferred solution. A Technical Advisory Committee consisting of representatives from several City of Ottawa groups was formed to provide input and direction to the project consulting team.

A proactive and flexible approach to public and agency consultation was adopted to ensure the interests of stakeholders and the community were addressed. Communication with the community and public were on-going throughout the process.

Greater detail of the consultation and information presented to stakeholders and the public is presented in Section 9 of this report.

3. PROBLEM OR OPPORTUNITY

3.1 Project Need and Justification

The purpose of the proposed NIL Watermain is to provide reliability and redundancy in the water distribution system, as well as to provide additional water capacity for growth in the Village of Manotick. Presently, the areas in Manotick supplied by the City's central water distribution system include the Village Core (the commercial centre), Hillside Gardens, which includes the St. Leonard Catholic School and the Minto Mahogany development. With the approval of the Manotick Watermain Link, the North Island Link is required to provide redundancy on both the east and west sides of Manotick, as well as on the island itself.

The need for this project was identified in the 2013 Infrastructure Master Plan (IMP) updates. A failure of the existing watermain in specific vulnerable locations could temporarily diminish the supply to specific parts of Manotick.

4. STUDY AREA AND EXISTING CONDITIONS

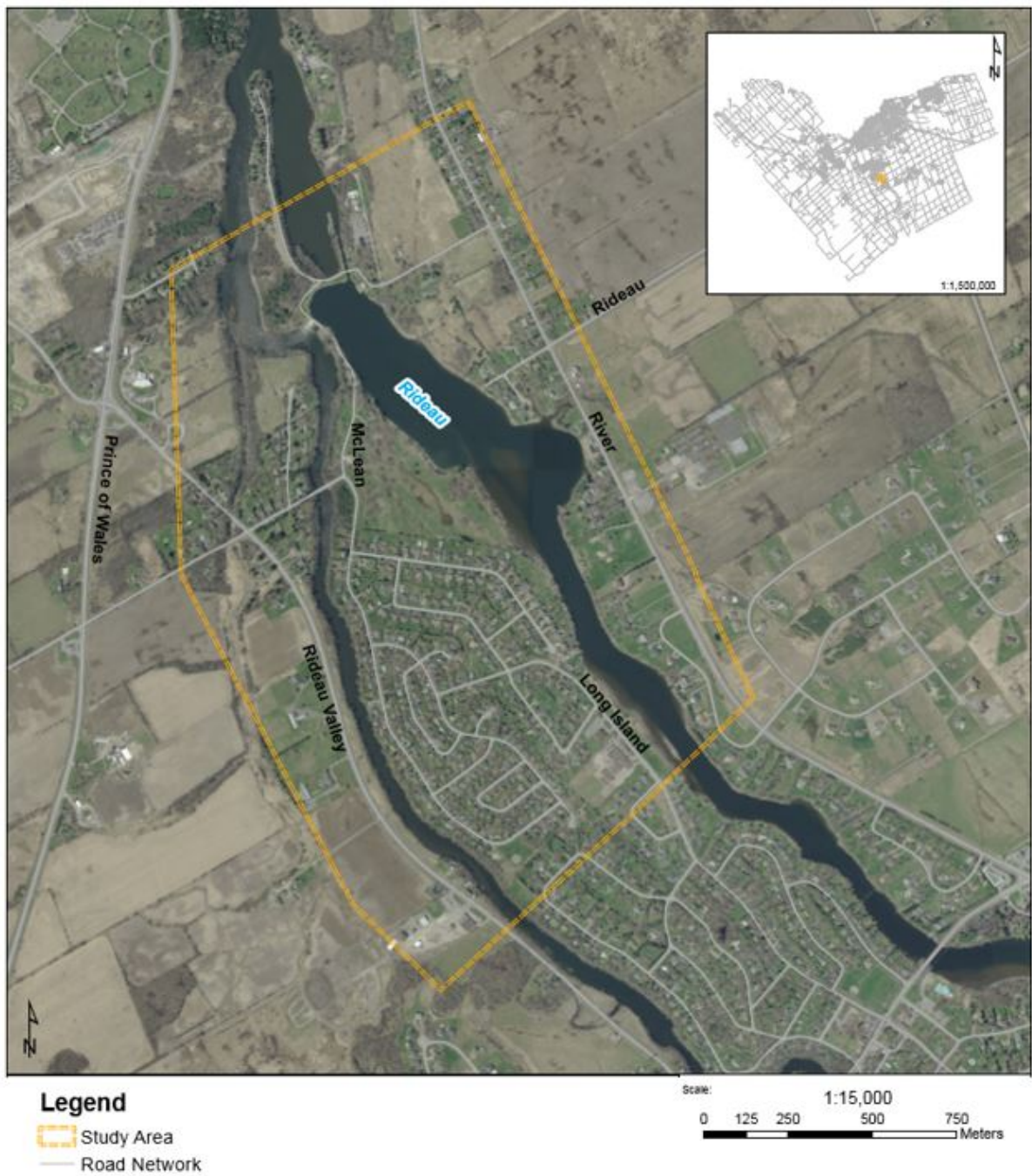
This section of the report represents the studies and investigations undertaken to date on the existing natural and social conditions within the study area. It is intended to document the baseline conditions of the area against which the potential environmental effects of the alternatives can be assessed. Overall, the baseline data was collected and analysed 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;
- Allow for future predictions of how adverse effects can be mitigated and beneficial effects enhanced; and
- Provide a basis for designing monitoring programs.

4.1 Study Area

The study area is located within the City of Ottawa and reaches just north of Nicolls Island Road, southerly to south of Long Island Road, easterly to east of River Road, and westerly to west of Rideau Valley Drive North with the north westerly limit at Nicolls Island (**Figure 4.1**). It should be noted, the spatial boundaries of the study area may vary depending on the environmental features investigated in order to address environmental effects and operational issues; to accommodate coordination with relevant on-going studies and projects; and to identify infrastructure needs and future connections. The following sections describe the existing conditions within the study area.

Figure 4.1: NIL Study Area



4.2 Natural Environment

4.2.1 Subsurface Conditions

The subsurface conditions within the Study Area have been documented by Golder Associates and are presented in the report “Preliminary Geotechnical and Hydrogeological Investigation Functional Design of Proposed North Island Watermain Link, Bravar Drive to Rideau Valley Drive, Ottawa, Ontario” (December 2015), located in **Appendix A**. The report was prepared using existing geotechnical data for the study area collected from Geologic mapping published by Geologic Survey of Canada, from field work carried out between November 11 and 13, 2015, as well as from Golder’s records from previous subsurface investigations. A summary of the 2015 Golder findings follows.

4.2.1.1 Geotechnical Conditions

During the field work conducted in November 2015, three boreholes (15-1, 15-2, and 15-3) were advanced to depths of about 5.3 to 14.4 metres below the existing ground surface (**Figure 4.2**). This is consistent with the bedrock elevation level data obtained from the City of Ottawa GIS database.

The subsurface conditions encountered in the boreholes is consistent with the GIS data received from the City of Ottawa and generally consisted of pavement and/or topsoil and/or fill underlain by silty clay over glacial till over fresh dolostone bedrock of the Oxford formation(**Figure 4.3**). More specifically, the underlying bedrock consisted of thin to medium-bedded grey dolostone with black shale interbeds.

The approximate depth to the bedrock surface varies in depth range and formation across the Study Area. At Borehole 15-1 the bedrock surface is mapped at 14.4 metres depth below surface although Golder notes auger refusal on inferred bedrock surface. Borehole 15-2 identified the bedrock surface at 9.1 metres depth below surface. Borehole 15-3 did not reach bedrock as it only advanced to a depth of 5.3 metres depth below surface.

4.2.1.2 Hydrogeology

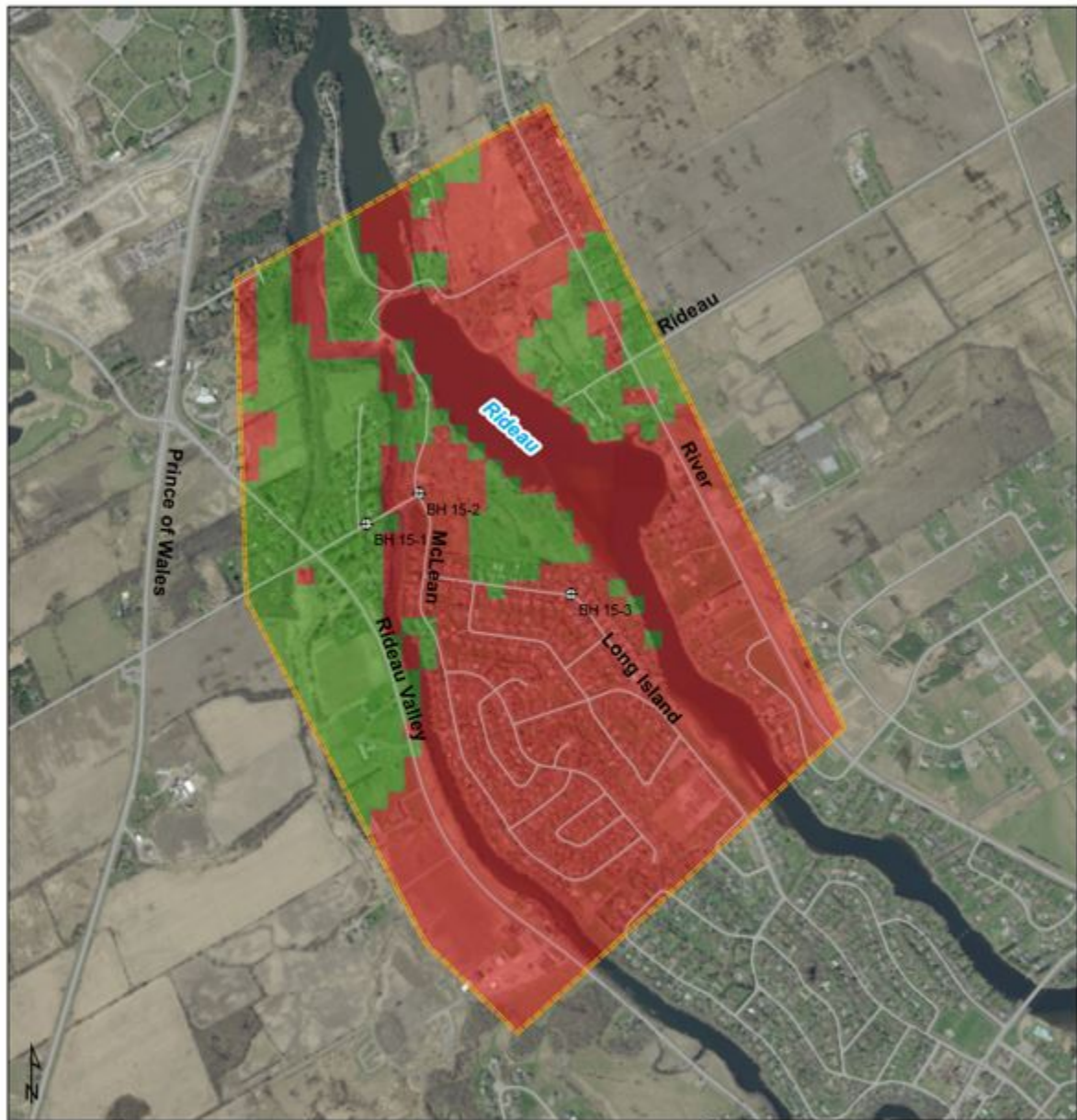
As part of the geological investigation, Golder completed field work and groundwater sampling. The field work was supervised by an experienced technician, and one sample of groundwater from each of the boreholes was submitted for basic chemical

analysis. Monitoring well were sealed into each borehole to allow subsurface groundwater level and in-situ hydraulic conductivity testing. The groundwater conductivity was measured on November 24, 2015 (Golder, 2015). The measured groundwater level and hydraulic conductivity are presented in the following table.

Table 4-1: Groundwater level and hydraulic conductivity

Borehole Number	Geologic Unit of Screened Interval	Groundwater Level Depth (m)	Groundwater Level Elevation (m)	Hydraulic Conductivity ($\times 10^{-3}$ cm/s)
15-1	Glacial Till	5.0	82.6	4×10^{-5}
15-2	Glacial Till	4.0	81.6	9×10^{-5}
15-3	Glacial Till	1.6	88.0	3×10^{-6}

Figure 4.2: Bedrock Elevation

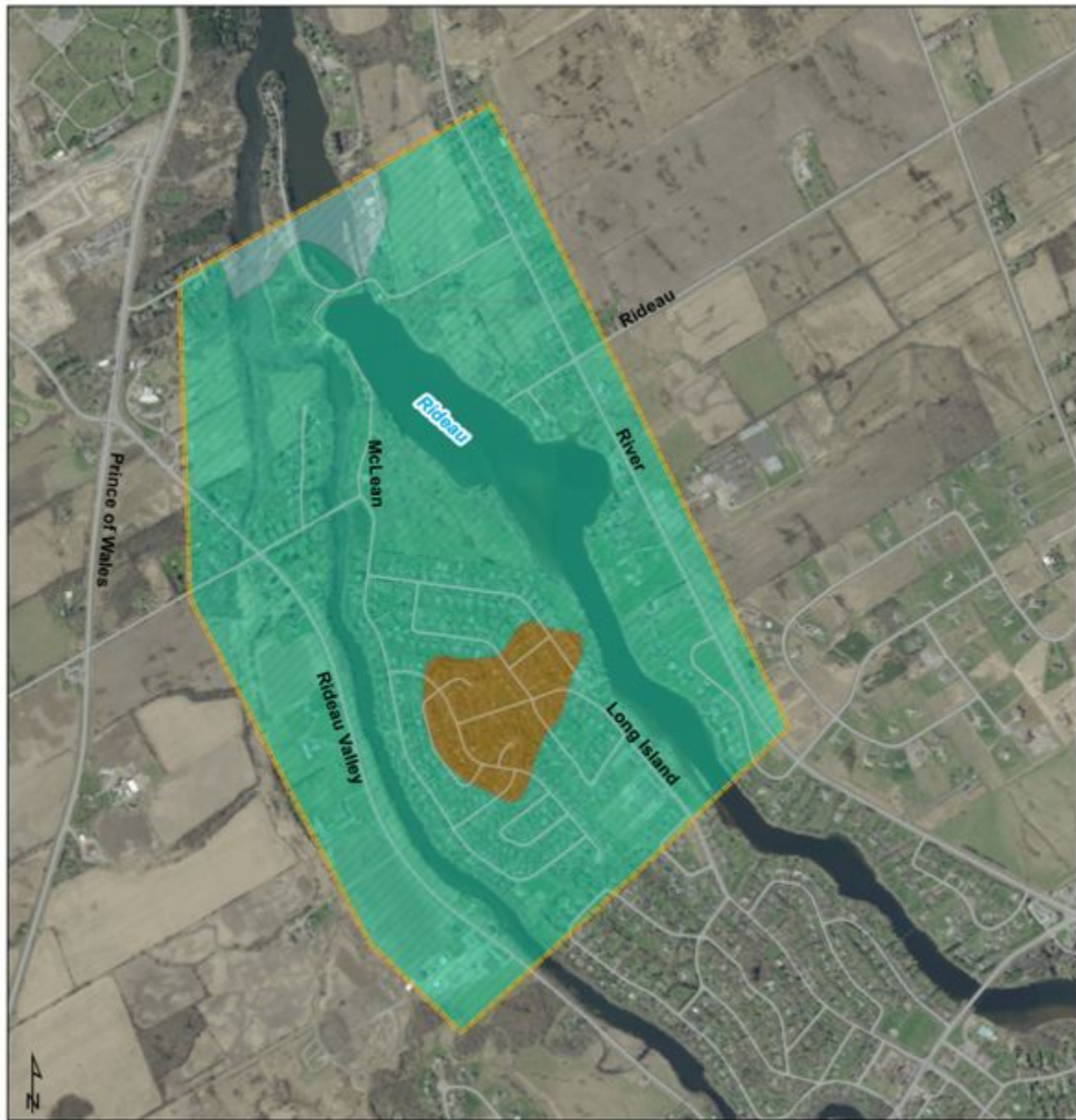


Legend







- | | |
|-------------------|--------------------------|
| Study Area | Bedrock Elevation |
| Road Network | 50 to 75 |
| Borehole Location | 75 to 100 |

Scale: 1:15,000
0 125 250 500 750 Meters

Figure 4.3: Geological Formations



Legend

- | | |
|--|--|
|  Study Area | Primary Genesis & Material |
|  Road Network |  glaciomarine, clay, silt |
|  Oxford Formation |  glaciomarine, clay, silt, sand |
| Diamicton | |
|  glacial, diamicton | |

Scale: 1:15,000
0 125 250 500 750 Meters

4.2.2 Water Wells

According to the Groundwater Information Network (NRCan, 2014) there are 45 water wells located within the study area. Of these 45, two wells are public use and one is used for livestock with the remaining identified as being used for domestic purposes (**Figure 4-14**). All residences not serviced by the City's water distribution system are on private wells.

4.2.3 Areas of Potential Environmental Concern

Within the Study Area, according to data received from the City of Ottawa, there are areas of historical land use that present potential environmental concern. Two areas include the wholesale of electrical and electronic machinery, equipment and supplies, while the remaining areas include mechanical specialty work, wholesale of agricultural supplies and exterior close in work.

4.2.4 Terrestrial Features and Wildlife

A relatively small portion of the proposed Study Area remains forested as the majority of the landscape has been altered from its natural condition by decades of agricultural, commercial and residential development. Natural habitats are typically isolated from each other by active or regenerating agricultural lands, roads, and residential development.

Available information was collected and reviewed including recent air photography, key natural features GIS mapping, wetland mapping, Official plan schedules, Natural Heritage Information Centre (NHIC), Significant Wildlife Habitat Technical Guide (MNRF, 2000), Atlas of the Breeding Birds of Ontario (OBBA): 2001-2005 (Bird Studies Canada), Ontario Reptile and Amphibian Atlas (ORAA), Land Information Ontario (LIO), and other correspondence or files. The City of Ottawa, Rideau Valley Conservation Authority, and the Ministry of Natural Resources – Kemptville District were contacted to collect available information and confirm the issues to be addressed.

Terrestrial ecologist/botanist performed limited reconnaissance level site visits of areas of particular concern to confirm the data collected in the literature review and to

collect additional information on site conditions. One site visit was performed on December 8, 2015, and another on January 25, 2016.

For the purpose of investigating potential impacts to terrestrial ecosystems, the study area was defined as within the proposed ROW and adjacent lands for 120 m, unless a sensitive receptor greater than a distance of 120m was likely to be adversely affected. The terrestrial field inventory was carried out in accordance with the City of Ottawa's EIS Guidelines (2012).

4.2.5 Wetlands

The Provincial Policy Statement (PPS), 2014, prohibits development and site alteration in significant wetlands, also referred to as Provincially Significant Wetlands (PSW's). Significant wetlands are identified by the MNRF using evaluation procedures established by the Province, to determine the significance of the wetland. After being identified, wetlands must then be designated as such in municipal official plans for the PPS protection provisions to apply.

According to the MNRF and NHIC, there are no designated PSW's within 120 m of the project area and the City of Ottawa has not designated any locally significant wetlands. Several non-significant wetlands exist within the western most tip of the project area, straddling Barnsdale Road on the west side of Rideau Valley Drive (**Figure 4.4**). Although these wetlands are not regarded as significant according to provincial standard, they do provide important hydrological function and valuable wildlife habitat.

4.2.6 Significant Valleylands

As defined in the City of Ottawa Official Plan, significant valleylands are natural areas that occur in a valley or other landform depression that has water flowing through or standing for some period of the year. Significant valleylands consist of streams, valleys and associated stream-derived features (i.e., floodplains, valley slopes, and meander belts) of either glacial or post glacial origin.

As indicated in the Official Plan, there are no defined significant valleylands located within the project area.

4.2.7 Significant Woodlands an Critical Habitat

Significant Woodlands are areas which are ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history.

The MNRF has identified a Significant Woodland located approximately 80 m northwest of the project area. The criteria used to designate this as a Significant Woodland were woodland size, water protection, and proximity to other significant habitats. The scientific rational used to develop the criteria are as follows:

Size - If woodland cover is:

- < 5%, then woodlands > 2 ha are significant;
- between 5% and 15%, then woodlands > 4 ha are significant;
- between 15% and 30%, then woodlands > 20 ha are significant;
- between 30% and 60%, then woodlands > 50 ha are significant;
- > 60%, then consider other factors; and
- The largest woodland in the planning area should also be identified as a significant woodland.

Water Protection:

- Minimum woodland size = 0.5 ha
- Woodlands should be considered significant if they: are located within a sensitive or threatened watershed or a specified distance (e.g. 50 m or top of valley bank if greater) of a sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse or fish habitat

Proximity to Other Significant Habitats - If woodland cover is:

- < 5%, then woodlands > 0.5 ha and within 30 m of a PSW, ANSI, significant woodland, or fish habitat are significant;
- between 5 % and 15%, then woodlands > 2 ha and within 30 m of a PSW, ANSI, significant woodland, or fish habitat are significant;
- between 15% and 30%, then woodlands > 8 ha and within 30 m of a PSW, ANSI, significant woodland, or fish habitat are significant;

- between 30% and 60%, then woodlands > 20 ha and within 30 m of a PSW, ANSI, significant woodland, or fish habitat are significant; and
- > 60%, then woodlands > 50 ha and within 30 m of a PSW, ANSI, significant woodland, or fish habitat are significant.

This area is shown on **Figure 4.4** as a Significant Ecological Area and is included in the City of Ottawa's Natural Heritage System Overlay on Schedule L2 –South, of the Official Plan.

According to the City of Ottawa's Official Plan (OP), development and site alteration will not be permitted within 120 m of the boundary of identified significant habitat of endangered and threatened species unless the ecological function of the adjacent lands has been evaluated and the Environmental Impact Statement demonstrates that there will be no negative impact on the significant habitat of endangered and threatened species or on its ecological functions (OP, Section 4.7.8).

The adjacent lands within 120m of the Significant Ecological Area that would be disturbed by the project are along the existing road and/or right-of-way which do not support critical habitat.

4.2.8 Significant Wildlife Habitat Areas

Significant Wildlife Habitat Areas are defined as areas where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.

David Bartlett Park, a large green space within the project area may possibly provide habitat for a number of birds, small mammals, and invertebrate species. The wooded areas located along the small western channel are also potentially wildlife areas as they contain standing snags with cavities, which are important for cavity nesting birds and mammals, including bat SAR. The area identified for the watermain route, however, is a maintained grassed area and does not currently support any significant wildlife habitat areas noted above.

4.2.9 Migratory Birds

According to the Ontario Breeding Bird Atlas (OBBA), 97 bird species have been recorded within a 10 km radius of the project area. Many of these species are protected by the *Migratory Birds Convention Act* (1994). This Act protects the birds, their eggs, and nests from being killed, injured, or harassed without a permit.

4.2.10 Species at Risk

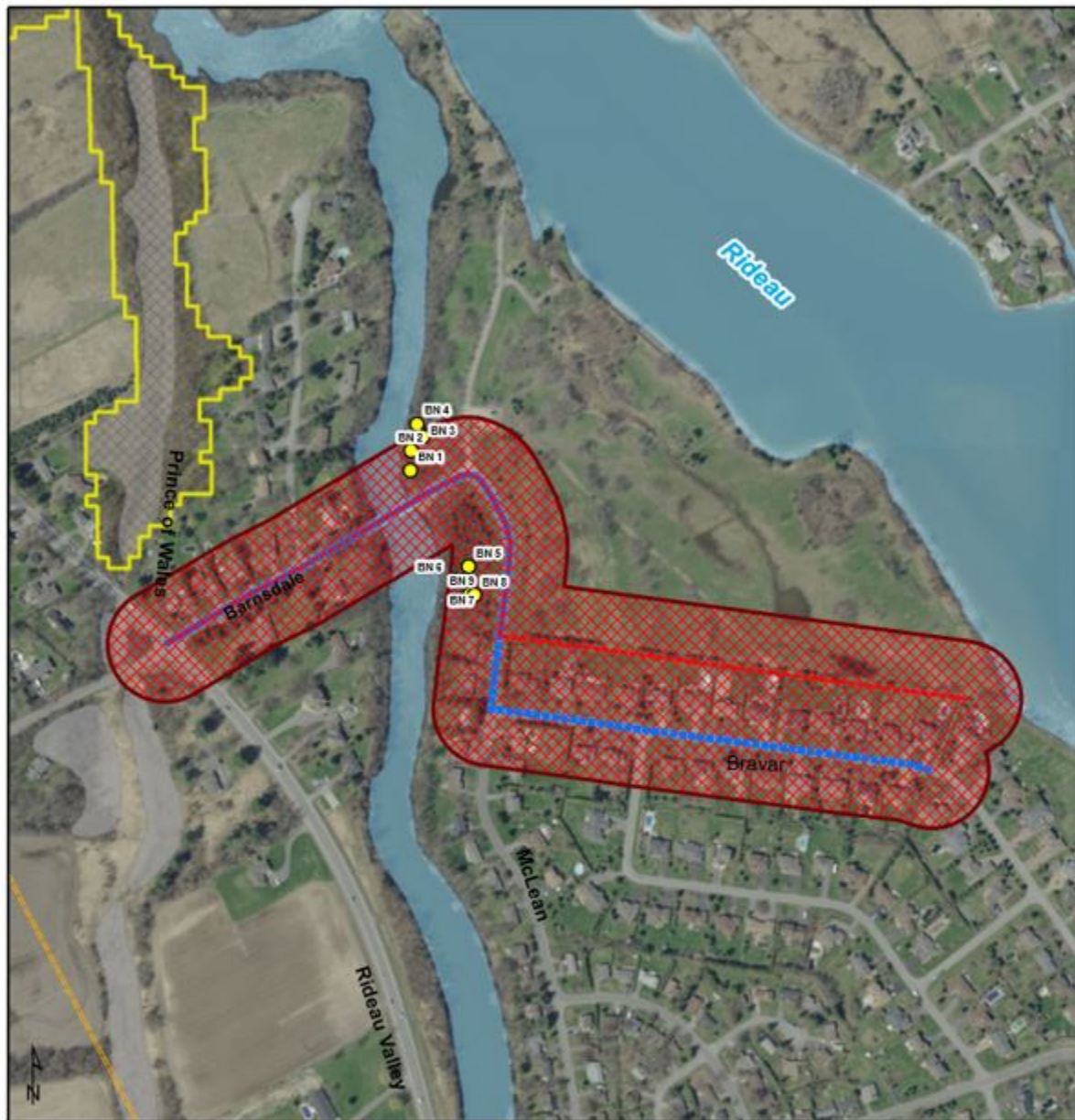
The Ontario *Endangered Species Act, 2007* (OESA) provides for the protection of SAR in Ontario. Section 9 of the Act prohibits the killing, harming, harassing, taking, possessing, transporting, collecting, buying, selling, leasing or trading or offering to buy, sell, lease or trade any species listed as endangered, threatened or extirpated on the Species at Risk in Ontario (SARO) List. Mitigations are required to ensure that all endangered and threatened species potentially within the project area are not killed, harmed, or harassed during the proposed project undertakings and that their habitat is protected according to the Act.

Based on a thorough background review of MNR, OBBA, and historic records from the NHIC, several SAR are either known to occur within or adjacent to the project area or are suspected to be present, either seasonally or year round. The following SAR may potentially be present within the study area:

- Bank Swallow (*Riparia riparia*)
- Barn Swallow (*Hirundo rustica*)
- Blanding's Turtle (*Emydoidea blandingii*),
- Butternut (*Juglans cinerea*)
- Bobolink (*Dolichonyx oryzivorus*)
- Eastern Meadowlark (*Sturnella magna*)
- Henslow's Sparrow (*Ammodramus henslowii*)
- Least Bittern (*Ixobrychus exilis*)
- Loggerhead Shrike (*Lanius ludovicianus*)
- Eastern Small-footed Myotis (*Myotis leibii*)
- Little Brown Myotis (*Myotis lucifugus*)
- Northern Myotis (*Myotis septentrionalis*)

During the field investigations, nine (9) Butternut trees were identified on the north side of the secondary channel of the Rideau River. Four of these Butternuts were observed on the northwest corner of Barnsdale Rd and Cecil Rowan Lane and the additional five Butternuts were observed on the northeast corner of Barnsdale Rd and McLean Cres. Butternut is listed as an endangered species under the OESA, which protects both the tree and its habitat. **Figure 4.4** displays the locations of identified Butternuts within the project area as well as other opportunities and constraints.

Figure 4.4: Key Vegetation and Wildlife Features



Legend

Study Area Options

- - - North Island Link - Option
- - - North Island Link - Option B
- Study Area Option - 50m

- Significant Ecological
- Non-evaluated Wetland
- Manotick Butternut Field Survey Locations

Scale: 1:5,000
 0 37.5 75 150 225 Meters

In addition to the above mentioned SAR, special concern species have also been documented to occur either on the site or nearby. Species listed as special concern are not protected under the OESA. However, some of these species may be protected under the *Fish and Wildlife Conservation Act*. Species of special concern that may be present within or adjacent to the project area are as follows:

- Black Tern (*Chlidonias niger*)
- Eastern wood-pewee (*Contopus virens*)
- Monarch (*Danaus plexippus*)
- Olive-sided Flycatcher (*Contopus cooperi*)
- Short-eared Owl (*Contopus cooperi*)
- Snapping Turtle (*Chelydra serpentina*)
- Wood Thrush (*Hylocichla mustelina*)

4.2.11 Life Science Sites and Areas of Natural and Scientific Interest

Life Science Sites and Areas of Natural and Scientific Interest (ANSIs) areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. ANSIs play an important role in the protection of Ontario's natural heritage, since they best represent the full spectrum of biological communities, natural landforms and environments across Ontario.

According to the MNRF and the NHIC, there are no Life Science Sites or ANSIs, within or adjacent to the project site.

4.2.12 Trees and Landscaping

Many large and notable trees (trees over 50 cm diameter breast height) are found throughout the project area including on private property and within the David Bartlett Park.

4.2.13 Fisheries and Aquatic Habitat

Field investigations as well as background data collection from the RVCA, MNRF and the City of Ottawa, was carried out by MH fisheries biologist. Based on the trenchless design option that has been proposed for constructing the watermain crossing, in-

water work is not anticipated. Due to the absence of in-water work, the existing fish community at the Barnsdale Bridge location was not assessed beyond the acquisition of background information and the areas potentially impacted by the proposed works (i.e., nearshore and riparian habitat were surveyed). The field investigation at the Barnsdale Road Bridge was conducted on December 23, 2015. (**Figure 4.5** and **Figure 4.6**).



Figure 4.5: Downstream Overview from Barnsdale Bridge



Figure 4.6: Upstream Overview from Barnsdale Bridge

4.2.14 Watercourses

The Rideau River flows in a northerly direction through the study area, branching off in two channels upstream of Long Island at the Village of Manotick, and converging at the north end of Nicolls Island. As a result of the river divergence at Long Island, the primary channel flows to the east of the island and the secondary channel flows to the west. The general study area for the NIL Watermain Functional Design and EA Study encompasses one water crossing over the secondary channel of the Rideau River, to the west of Long Island.

A field assessment of fish and fish habitat was completed at the Barnsdale Road Bridge on the Rideau River as shown in **Figure 4.7**. At this location, the channel is approximately 40 m wide with an approximate water depth of 1 m under the east end of the bridge (Long Island) and approximately 1.5 – 2 m deep under the west end of the bridge where the thalweg was evident. The substrate consists predominantly of

rock rubble and scattered boulders interspersed with gravel throughout the upstream and downstream channels of the bridge.

The east shoreline consists of dense grasses and cattails along the channel margin, with a dense riparian zone composed primarily of Manitoba Maples (*Acer negundo*). The well vegetated riparian zone on Long Island, east of the bridge, creates a healthy buffer between the river and David-Bartlett Park. The west channel bank is a moderately steep grade with residential properties at the top of the bank. A dense riparian buffer composed of deciduous (primarily Manitoba Maple) and coniferous trees (spruce and cedar) separates the residential properties from the river. Between the bridge abutments and the channel, large blast rock was installed on the steep slope to provide bank stabilization.

Figure 4.7: Aquatic Resources



Legend

Study Area Options

- - - North Island Link - Option A
- - - North Island Link - Option B
- Study Area Option 30m
- Barnsdale Road Bridge Survey Location

Fish Habitat

- Historical Warm/Cool Water Species Spawning Location (non-sensitive)
- ◆ Permanent - Low Sensitivity In-water timing window (works permitted) is July 1st - March 14

Scale: 1:5,000
 0 37.5 75 150 225 Meters

For the general project study area, including both channels of the Rideau River which flow around Long Island, the following species of warm and cool water fish were identified by the MNRF (**Appendix B**):

- Muskellunge (*Esox masquinongy*)
- Northern pike (*Esox lucius*)
- Walleye (*Sander vitreus*)
- Smallmouth bass (*Micropterus dolomieu*)
- Largemouth bass (*Micropterus salmoides*)
- White sucker (*Catostomus commersonii*)
- Greater redhorse (*Moxostoma valenciennesi*)
- Common carp (*Cyprinus carpio*)
- *Moxostoma* sp.
- North American Catfishes
- Brown bullhead (*Ameiurus nebulosus*)
- Yellow perch (*Perca flavescens*)
- Black crappie (*Poxomis nigromaculatus*)
- Rock bass (*Ambloplites rupestris*)
- Bluegill (*Lepomis microchirus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Green sunfish (*Lepomis cyanellus*)
- Fallfish (*Semotilus corporalis*)
- Creek chub (*Semotilus atromaculatus*)
- Golden shiner (*Notemigonus crysoleucas*)
- Spottail shiner (*Notropis hudsonius*)
- Common shiner (*Luxilus cornutus*)
- Logperch (*Percina caprodes*)
- Northern redbelly dace (*Chrosmos eos*)
- Finescale dace (*Phoxinus neogaeus*)
- Blacknose shiner (*Notropis heterolepis*)
- Emerald shiner (*Notropis atherinoides*)
- Bluntnose minnow (*Pimephales notatus*)
- Fathead minnow (*Pimephales promelas*)
- Brassy minnow (*Hybognathus hankinsoni*)
- Brook silverside (*Labidesthes sicculus*)
- Brook stickleback (*Culaea inconstans*)
- Entral mudminnow (*Umbra limi*)
- Banded killifish (*Fundulus diaphanous*)
- Johnny darter (*Etheostoma nigrum*)
- Tesselated darter (*Etheostoma olmstedii*)

- Tadpole madtom (*Noturus gyrinus*)

This extensive list of sport and bait fish indicates that the Rideau River supports a diverse fish community and provides a variety of important spawning, nursery, migration and foraging habitats in order to sustain the fishery.

The MNRF and RVCA noted that non-sensitive fish nursery areas exist for the following fish species within the general project limits: bluegill, smallmouth bass, banded killifish, largemouth bass, rock bass, black crappie and yellow perch. There were no spawning or nursery habitats specified at the Barnsdale Road Bridge, however, this location likely serves as a migration corridor and provides foraging habitat. It should be noted that Watson's Mill exists approximately 2.8 km upstream of the Barnsdale Road Bridge and presents a potential barrier to fish migration within the secondary channel. However, fish species are capable of migrating upstream from Nicoll's Island as this portion of the secondary channel is unobstructed.

One additional watercourse feature, was noted within and adjacent to the fish and fish habitat study area on Long Island approximately 100 m north of Bravar Drive. This watercourse is an intermittent drainage feature that is dry for much of the year. Surface drainage along the proposed routes was limited to ditchline and equalization culverts which are also dry for much of the year and do not possess fish or fish habitat.

4.2.15 Species at Risk and Critical Habitat

Overall, the habitat sensitivity within the study area surveyed is low, with no critical habitat areas observed. However, the importance and function of the habitats present increases near the confluences with adjoining tributaries which flow into the Rideau River as these areas are often more productive and used for spawning and nursery areas for fish communities from the river. The area in the immediate vicinity of the proposed works at the Barnsdale Road Bridge likely provides migration and foraging habitat, with limited spawning and nursery habitats in comparison to the primary channel of the Rideau River, which flows to the east of Long Island.

A background review of potential aquatic Species at Risk (SAR) was undertaken as part of the fish and fish habitat assessment. This review revealed no known records of aquatic SAR within the study area, however, aquatic SAR occurrences have been documented approximately 10 km upstream of Manotick in the Rideau River, near the village of Kars. The Rideau River (upstream of Manotick) also has potential to support

American eel (*Anguilla rostrate*), bridle shiner (*Notropis bifrenatus*), northern brook lamprey (*Ichthyomyzon fossor*), river redhorse (*Moxostoma carinatum*), and silver lamprey (*Ichthyomyzon unicuspis*) though none of these species are expected to be impacted by this project as their distribution is not documented within the study area.

4.3 Transportation

4.3.1 Roadways

Major transportation routes within the study area include River Road and Rideau Valley Drive, both of which are identified as truck routes. Collector roads are illustrated in accordance with the City TMP recognizing that in practice Cecil Rowan Lane currently operates as a closed roadway past the parking lot entrance to David Bartlett Park. After which the road is only accessible to a private residence and is closed by a gate that can be opened by emergency vehicles and city maintenance vehicles accessing Nicolls Island. There is no railway within the study area, nor is there a transitway or transit stations (**Figure 4.8**).

There are two bus routes in the study area: Route #99 Greenboro – Barrhaven Centre & Manotick, servicing the downtown during peak periods and Manotick twice in the PM; and Route #186 Manotick – Barrhaven Centre, servicing the area from Manotick Main, along Long Island, northwest on Jockvale, ending at Barrhaven Centre.

According to the City of Ottawa's 2013 Transportation Master Plan (TMP), there are no major transportation projects identified to occur within the study area. The closest transit projects in proximity would be a transit priority corridor along Earl Armstrong Road and nearby Park and Ride, north of Manotick. Widening of Jockvale and 4 lane roundabout at Prince of Wales/Rideau Valley Drive are planned for 2017/18 as well as rehabilitation of the Barnsdale Bridge.

4.3.2 Recreation & Pedestrian/Cycling Routes

Parks in the study area along River Road include Jeffrey Armstrong Memorial Park - west of River Road north of Nicolls Island Road; and Walter Upton-Collins Park - west of River Road north of its intersection with Knott Crescent.

On Long Island, the Long Island Road Park is the narrow stretch located between Long Island Road and the Rideau River on the eastern part of the island. David Bartlett

Park is located at the north end of Long Island while the George Mclean Park is located on the western side, bordering on the Rideau River. Along Rideau Valley Drive, north of Barnsdale Road is Beryl Gaffney Park. Shoulder bike lanes are also provided on Rideau Valley Drive.

There are no dedicated bike lanes within the study area. There are, however, multiuse pathways within Beryl Gaffney Park. In the City of Ottawa Transportation Master Plan, this is identified as a Major Pathway.

4.3.3 Navigable Waters

The *Navigation Protection Act* (R.S.C., 1985) enforces the protection of navigable waters. The Rideau River, identified in the List of Scheduled Waters of the Act, flows for 100 km through Ontario beginning near Smiths Falls and passing through Ottawa to connect with the Ottawa River. The Rideau Canal was constructed between 1826 and 1832 and connects Lake Ontario at Kingston to the Ottawa River. In 2000, the Rideau Canal Waterway was designated as a Canadian Heritage River. (Canadian Museum of Nature, 2007). The Rideau is maintained and operated by Parks Canada to preserve the canal's natural and historic features in addition to providing a navigable channel for boaters through its 24 lock stations. (Parks Canada, 2016).

Figure 4.8: Transportation Network



Legend

-  Study Area
-  Truck Routes
-  Arterial Road
-  Collector Road
-  Local Road

Scale: 1:15,000
0 125 250 500 750 Meters

4.4 Socio-Economic Environment

4.4.1 Cultural Heritage

4.4.2 Archaeological Potential

A preliminary desktop review indicated that the majority of the Study Area that is outside the main residential area has archaeological potential (City of Ottawa GIS database) The previously disturbed portions of the Right-of-Ways (ROWs) included within the Study Area have been determined to possess no archaeological potential and no further archaeological assessment of these areas is required in these areas.

Areas potentially impacted by the project and identified by Past Recovery Archaeological Services Inc. (PRAS) as possessing archaeological potential have been assessed in a Stage 1 Archaeological Assessment (**Appendix C**).



The Stage 1 archaeological assessment consisted of a review of available historical, archaeological, and environmental research relevant to the local area, including historical maps, aerial photographs, and satellite imagery. In order to augment the results of this background research and incorporate visual assessments of features of archaeological interest within the study corridor, an optional property inspection was also undertaken. The property inspection allowed Past Recovery staff to visually assess portions of the study corridor for significant (deep and intensive) disturbance, low-lying areas with permanently saturated soils, and areas of steep slope, where the potential for significant archaeological resources would be considered to be low to non-existent.

The results of the background research suggest that portions of study area exhibit potential for the presence of significant archaeological resources. Preliminary planning, however, has indicated that construction impacts related to the construction of Route Option A would be restricted to the previously disturbed portions of the Bravar Drive, McLean Crescent, and Barnsdale Road ROWs. The entire length and width of the McLean Crescent ROW along the proposed alignment of the McLean Link was determined to be extensively disturbed (**Figure 4.9**).

Figure 4.9: Archaeological Potential



Legend

-  Archaeological Potential
-  Areas of Recent Deep and Intensive Disturbance - No Archaeological Potential

4.4.3 Built Heritage Resources

A preliminary desktop review of the City of Ottawa GIS database indicated that the study area contains parcels of heritage. PRAS prepared a specific Cultural Heritage Resource Assessment Report (**Appendix D**).

The purpose of the Cultural Heritage Resource Assessment was to compile data on the existing conditions of previously identified heritage resources within the study area in order to identify opportunities and constraints related to the proposed project and guide the selection of the preferred solution. To this end, PRAS conducted historical research, reviewed previous cultural heritage resource assessments, and carried out a field review to determine the condition of known resources of confirmed or potential Cultural Heritage Value or Interest (CHVI).

The cultural heritage assessment determined that the project has the potential to impact previously identified cultural heritage landscapes, as both include a crossing of the Rideau Canal, which has been designated as a National Historic Site, a World Heritage Site, and a Canadian Heritage River System (**Figure 4.10**).

In addition, previous cultural heritage studies have identified a number of the landscape units and visual values in lands surrounding the study area as cultural heritage landscapes with the potential of exhibiting a high level of cultural heritage value or interest. An evaluation of the anticipated impacts (both direct and indirect) associated with the construction of the proposed watermains indicated that while the potential for direct impacts from the proposed undertaking was low.

4.4.4 Rideau Canal

The Rideau Canal is a designated National Historic Site of Canada (NHSC). The designation includes the system of locks, dams, weirs, swing bridges, blockhouses, and lockmaster houses. The Canal is owned by the federal government and administered by the Parks Canada Agency. The 'designated place' includes the bed of the Rideau Canal to the high water mark between the Ottawa River and the harbour in Kingston. The defined borders also include a 30 metre zone on either side of the shoreline.

Figure 4.10: Cultural Heritage Identified Resources



4.4.5 Existing Land Use

The Study Area consists of a range of land uses including residential, recreational space and agriculture as identified in the City of Ottawa Official Plan. Smaller parcels of land uses include institutional, industrial and office. The northern part of the study area include the majority of recreational space while the east and west portions mainly consist of agricultural zones. The remaining central areas consist mainly of rural and village residential with several school zones around the perimeter. The study area crosses the urban boundary at Nicolls Island Road which is designated as a Development Reserve Zone, currently depicted as vacant land (**Figure 4.11**).

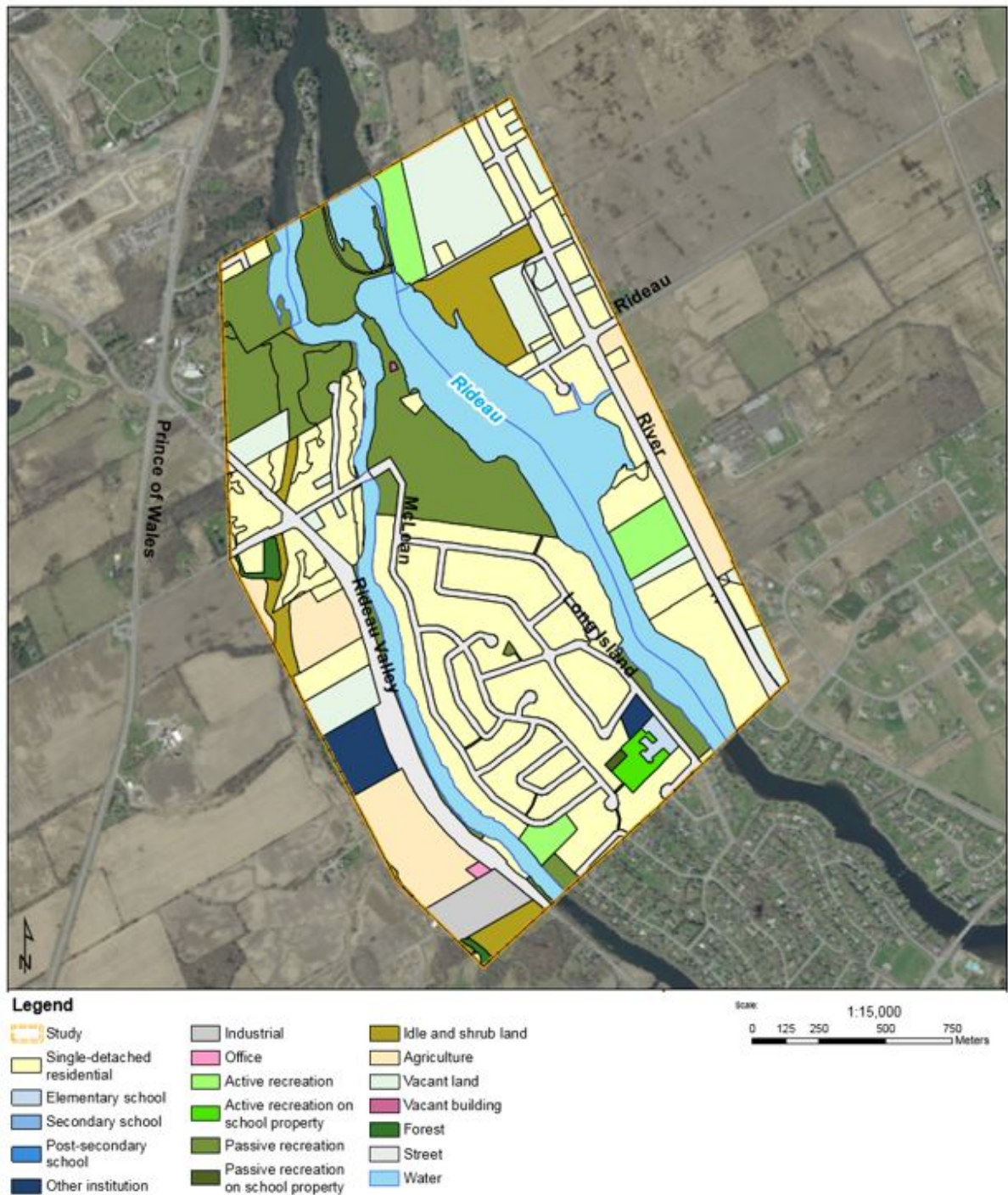
4.4.6 Businesses and Community Services

While there are no designated commercial zones in the Study Area, there are several home-based businesses such as bed and breakfasts, pet store, and other selling general merchandise in the residential areas on the island. There is one service-based business along Rideau Valley Drive. The Long Island Recreational and Conference Centre is located on the northern tip of the island. St. Leonard's Church and Catholic School is located on Long Island Drive, in the south central part of the Study Area.

4.4.7 Emergency Services

There are no Emergency Services specifically located within the Study Area. The Manotick Community Police Centre and the Main Street Manotick Fire Station (#94) both located at 5669 Manotick Main Street. Barrhaven Fire Station #47 (Greenbank/Cambrian) is also in the vicinity of the study area.

Figure 4.11: Land Use (2010)



4.5 Infrastructure and Utilities

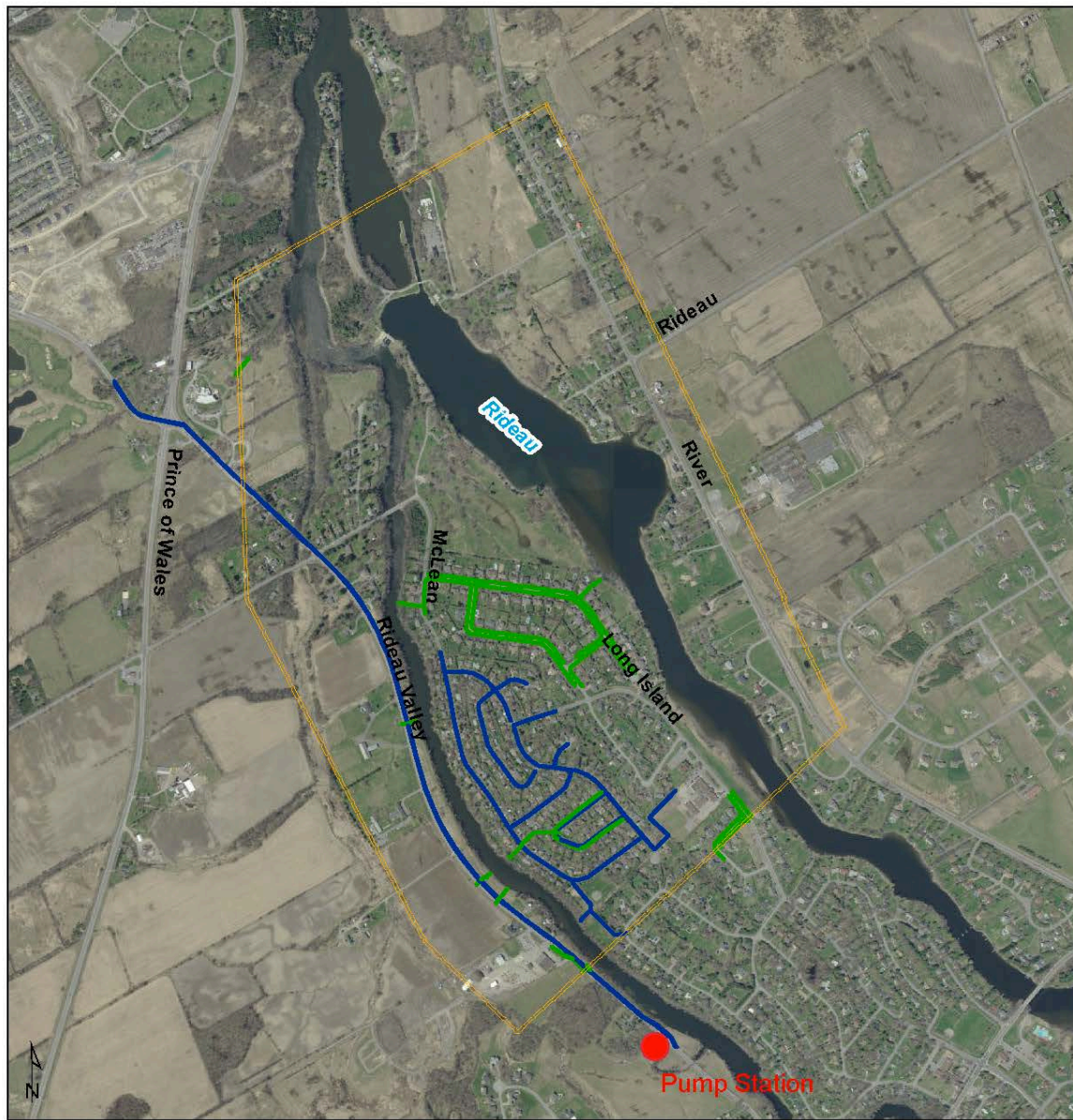
There are a number of subsurface and overhead utilities within the study area as identified in the City of Ottawa GIS database. Gas, telephone, hydro, cable, water, storm sewer, and sanitary sewer services exist at various locations within the Right-of-Way of the public streets in the study area. In addition to the more common utilities, there are a number of larger diameter sewers and watermains within the study area.

4.5.1 Sanitary and Storm Sewers




There are two areas within the village of Manotick on the east and west side of the Rideau River that are serviced by gravity sanitary sewers. The sewers convey wastewater to a sanitary pumping station located on the west side of Rideau Valley Drive. The village core area of the village of Manotick, containing commercial and residential properties, west of the Rideau River and Long Island, is serviced by a 600 mm sanitary sewer located on the west side of the roadway. Currently, only the northwest portion of Long Island is serviced with sanitary sewer. The Hillside Gardens neighbourhood of approximately 215 dwellings, is serviced by sanitary sewer which crosses the Rideau River and connects to a sanitary pumping station on the west side of Rideau Valley Drive.

A storm sewer exists on Lena Avenue and Bravar Drive which collects stormwater within a very limited area along grassed lined ditches. This storm sewer discharges to the Rideau River off of McLean Crescent (**Figure 4.12**).

Figure 4.12: Sanitary and Storm Pipes



Legend

-  Study Area
-  Sanitary Pipe
-  Storm Pipe

Scale: 1:15,000
0 125 250 500 750 Meters

4.5.2 Watermains

The village of Manotick is serviced by a single 406 mm watermain on Rideau Valley Drive within the Barrhaven Pressure Zone. The watermain continues south to Bridge Street and supplies two 305 mm watermains which services the village core and new developments located in the southern portion of the village. (**Figure 4.13**).

The northwest portion of Long Island is serviced by 254 mm diameter watermain that cross the River from the 406 mm diameter watermain on Rideau Valley Drive.

4.5.3 Gas

The natural gas pipelines within the study area are serviced by Enbridge Gas Distribution which includes the following:

- 10 mm diameter natural gas pipeline located on the east side of Long Island Road; and
- 32 mm diameter natural gas pipelines located on the east and west sides of Bravar Drive.

4.5.4 Rogers

Rogers Communications has a number of underground installations within the study area, including the following:

- Within a hydro duct on the west side of River Road for approximately 280 m, located approximately 450 m north of Nicolls Island Road;
- Within trenches on the west side of Long Island Road to the north of West Avenue; and
- Within trenches on the east and west sides of Bravar Drive.

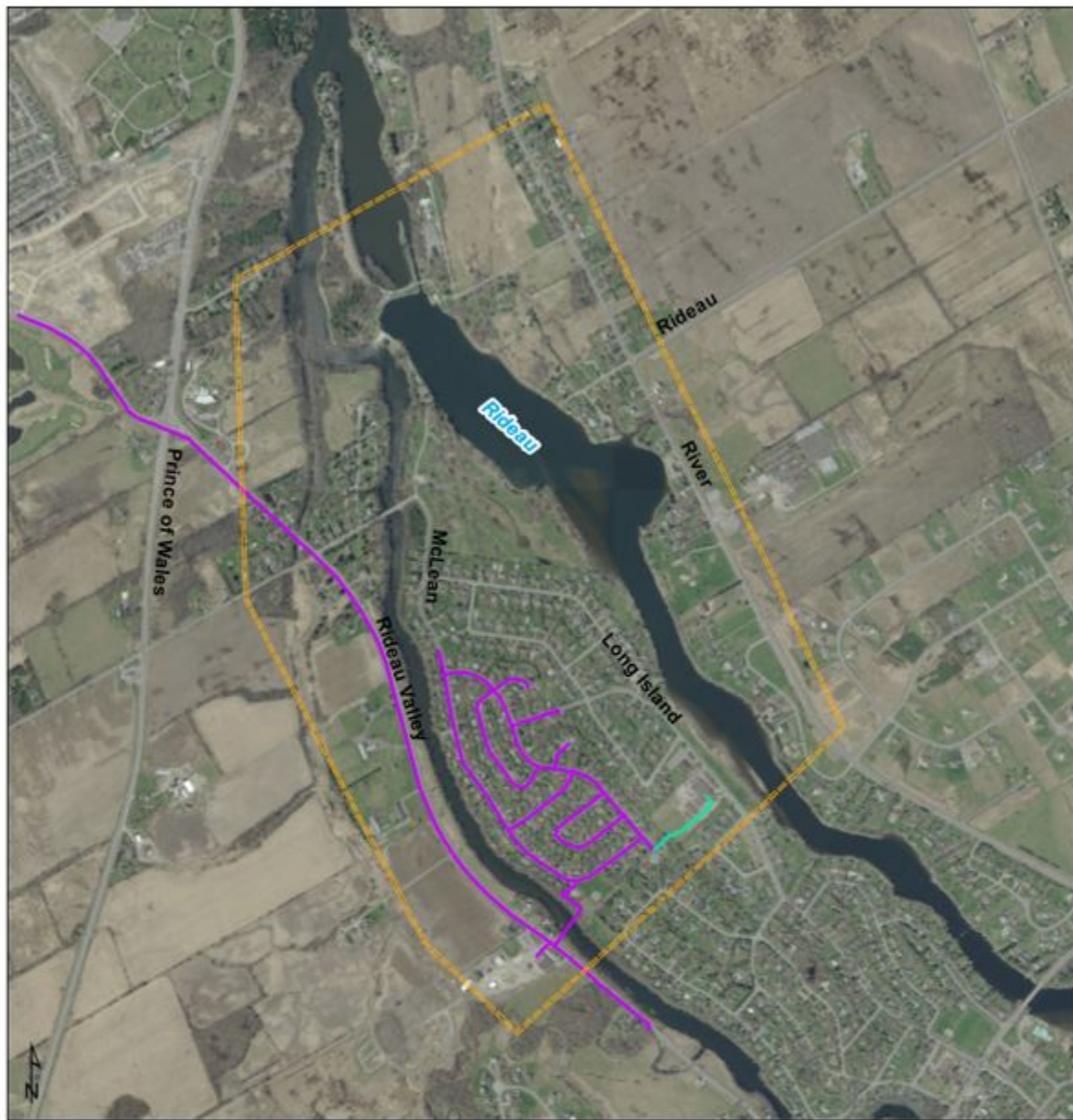
4.5.5 Hydro Ottawa

For the majority of the length of River Road within the study area, Hydro runs aboveground on the west side of the ROW, however at various locations it runs on both sides of the ROW, with various overhead road crossings along its length. The hydro infrastructure servicing Long Island includes the line aboveground on the west side of Long Island Road that crosses to the east side in the vicinity of Bravar Road.




4.5.6 Bell

There are Bell underground conduits within much of the ROWs on River Road from Rideau Road to Rideau Forest Drive.

Figure 4.13: Water Distribution System

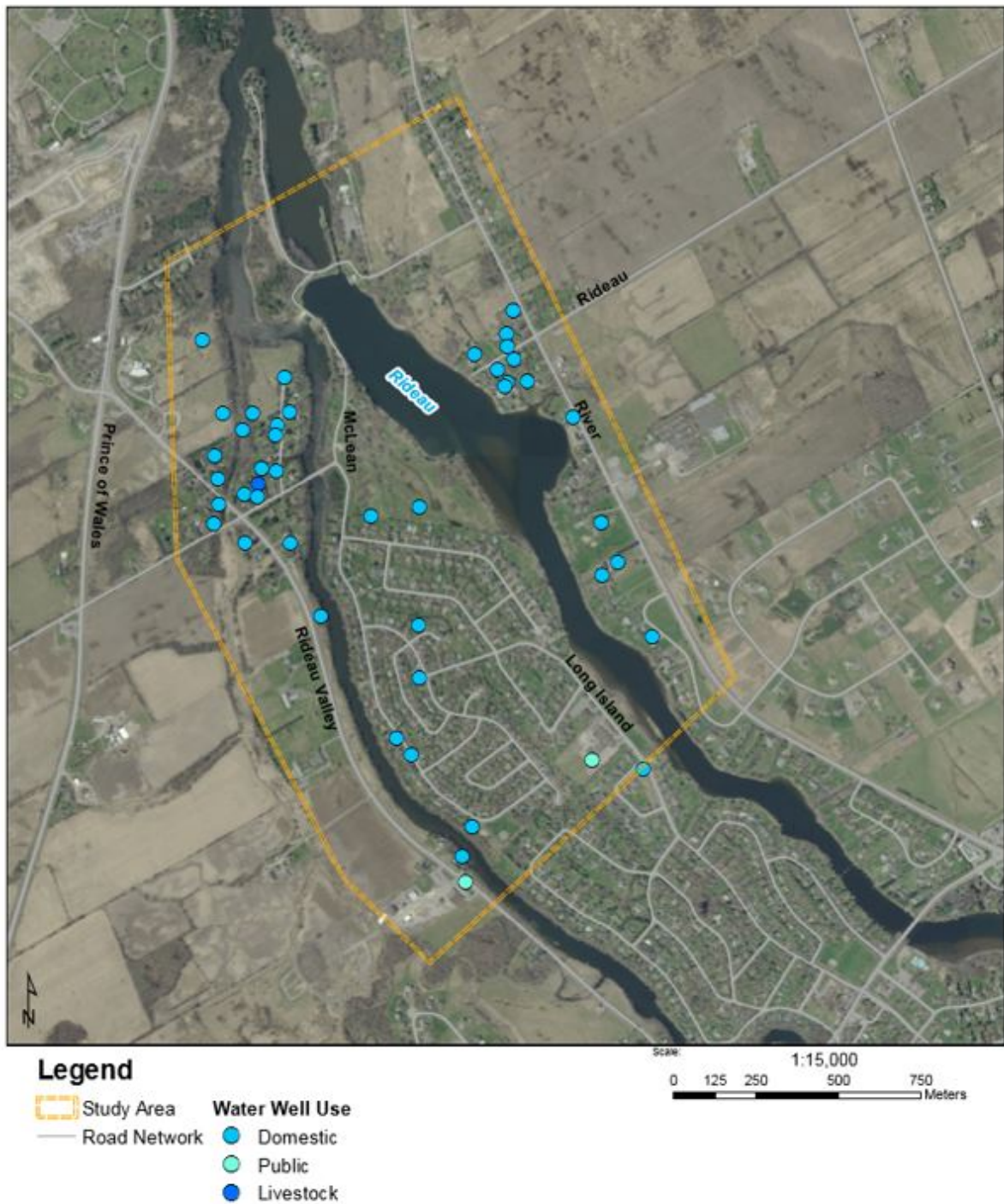


Legend

-  Study Area
-  Watermain Pipe
-  Service Pipe

Scale: 1:15,000
0 125 250 500 750 Meters

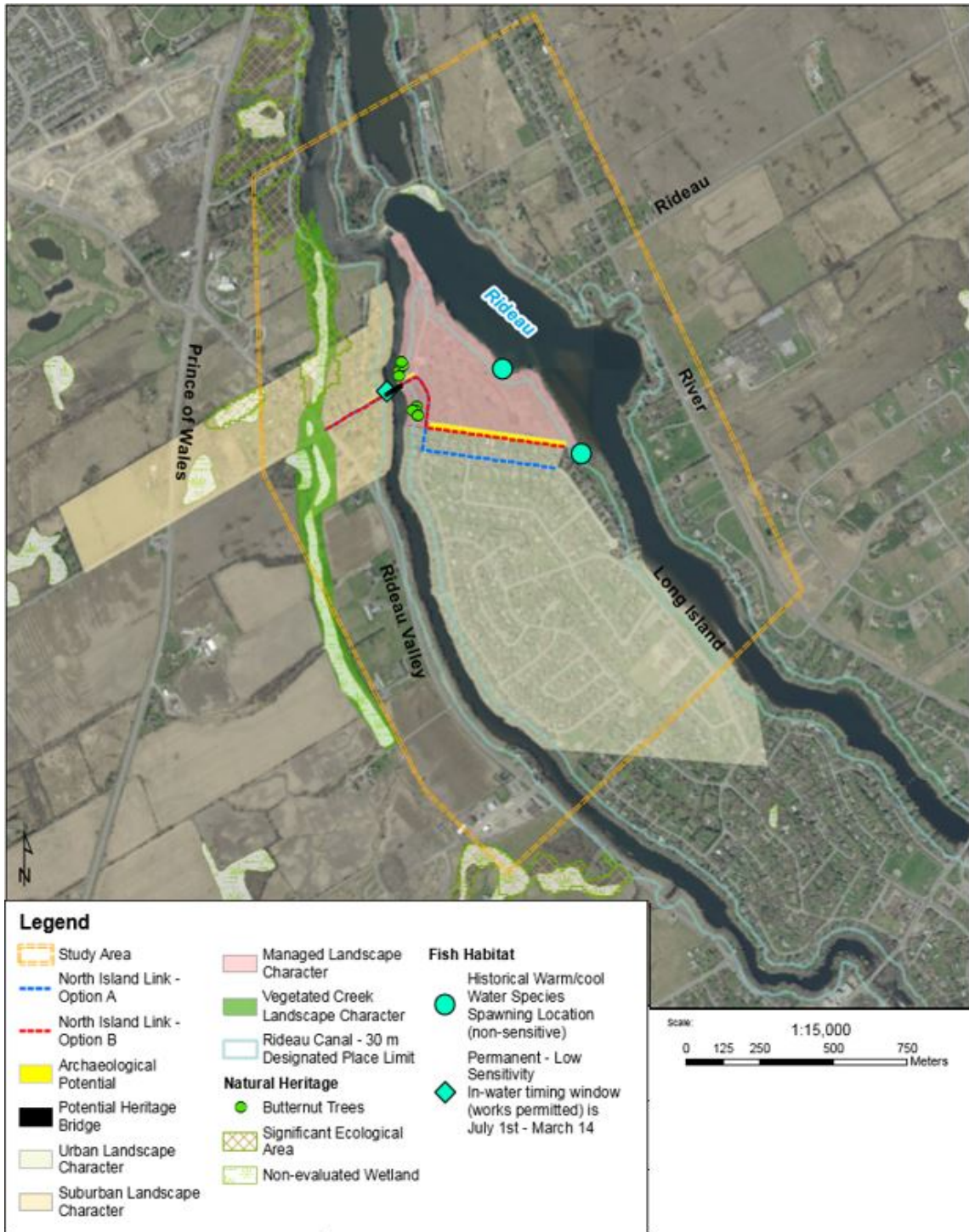
Figure 4.14: Water Well Distribution and Usage



4.6 Constraints and Opportunities

Constraints and opportunities within the Study Area were taken into consideration in the development of potential alternatives. Existing and proposed major infrastructure, as well as specific natural features, and cultural heritage were considered important to conserve and protect. **Figure 4.15** displays the constraints and opportunities identified.

Figure 4.15: Constraints and Opportunities



5. EVALUATION OF ALTERNATIVES

5.1 Alignment Options

Initially, five (5) alternative alignment options were developed to connect the Manotick Watermain Link to the existing watermain on Rideau Valley Drive between Bravar Drive and Barnsdale Road (Figure 5.1).

Figure 5.1: Long List of Alternatives



This long-list of alternative routes was screened based on preliminary distinguishing criteria in order to develop a short-list of options that would be subject to a more detailed evaluation. The preliminary screening criteria for the long-list of alternative routes included:

- Private property requirements;
- Watermain conflicts;
- Length; and
- Number of watercourse crossings.

Table 5-1: Screening Criteria

Criteria	Alignment Option A	Alignment Option B	Alignment Option C	Alignment Option D	Alignment Option E
Private property requirements	No	No	Yes	Yes	Yes
Watermain conflicts	No	No	No	No	Yes
Length	Shortest	Shortest	Moderate	Moderate	Longest
Number of watercourse crossings	1	1	2	2	3
Carried Forward	Yes	Yes	No	No	No

5.2 Short-listed Alignment Options

Further evaluation was completed for the two short-listed routes (Alternative A and Alternative B) as identified in Table 5.1 above. Both options' locations involve an extension of services from the Manotick Feedermain and end at Rideau Valley Drive North, with an additional link to the McLean Watermain.

Alternative A runs along Bravar Drive while Alternative B runs parallel, just north of Alternative A and along the southern edge of David Bartlett Park **Figure 5.2**.

Figure 5.2. Short-listed Alignment Options



5.2.1 Evaluation of Short-listed Alignment Options

The evaluation of short-listed alternative alignment options addressed four (4) main considerations (criteria) including:

1. Natural Environment
2. Social Environment
3. Constructability/Feasibility
4. Economy

Each criteria was then broken down and assessed based on a group of environmental indicators. The two alternative alignment options were compared against each other. The option with the least amount of negative impact on the assessment indicator was

the preferred option. Where the options did not differ in their anticipated impact, neither option was identified as the preferred choice.

Table 5-2: Evaluation of Alternatives

Criteria	Indicator	Alternative A (Road)	Alternative B (Park)
Natural Environment	Impact on Aquatic Systems	Single crossing of the Rideau River	Single crossing of the Rideau River
	Impact on Natural Areas	Limited impacts as location is primarily within existing ROWs	Greater impact due to construction immediately adjacent to/within the parkland
	Impact on Species at Risk	Less construction within 50 m of butternut	Slightly more construction within 50 of butternut Loss of existing park vegetation
	Subsurface Conditions	Similar geotechnical impacts	Similar geotechnical impacts
		Closer proximity to existing wells	Greater distance from existing wells
	Contamination Potential	No substantial areas of potential contamination based on Historical Land Use Information	No substantial areas of potential contamination based on Historical Land Use Information
Preferred		✓	

Criteria	Indicator	Alternative A (Road)	Alternative B (Park)
Social Environment	Consistency with Planned Land Use and Infrastructure	Municipal Services that are authorized under the requirements of the Environmental Assessment Act may be permitted in all land-use designations of this Plan	Municipal Services that are authorized under the requirements of the Environmental Assessment Act may be permitted in all land-use designations of this Plan
		Typical location for watermain within road way	Watermain located at boundary of passive park
	Construction Disruption	Greater degree of local residential disruption Road and pathway removal required	Greater degree of community use disruption Easier construction access
	Property Requirements	Easement required for maintenance along pathway on private property	No private property requirements
	Businesses and Community Services	No impact on business or community services	No impact on business or community services
	Emergency Services	Emergency access to be maintained throughout construction	Emergency access to be maintained throughout construction

Criteria	Indicator	Alternative A (Road)	Alternative B (Park)
	Recreation and Pedestrian / Cycling Routes	Impacts during construction to on-street cycling and pedestrian movements Pathway removal between street and park	Impacts during construction to non-organized cycling and pedestrian movements
	Impact on Archaeology and Built Heritage Features	Less opportunity for potential impacts to archaeological resources due to previously disturbed construction areas	Limited potential for impacts to archaeological resources due to previously un disturbed construction areas
Preferred			✓
Constructability / Functionality	Construction Difficulties	Difficult to construct within connecting pathway width Asphalt reinstatement required	Easier to construct within connecting pathway width
	Infrastructure Dependence	Requires more of 610mm watermain to be constructed	Requires less of 610mm watermain to be constructed
	Operations / Servicing Opportunities	Minor differences in hydraulic loss 390° bends Individual connections permitted on Maclean Only*	Minor differences in hydraulic loss Minimizes 90° bends Individual connections permitted on Maclean Only*

Criteria	Indicator	Alternative A (Road)	Alternative B (Park)
	Maintenance	More accessible in winter	Less watermain (m) to maintain
Preferred			✓
Economy	Total Project Cost Class C	\$7.2 M	\$6.7 M
Preferred			✓
Most Preferred			✓

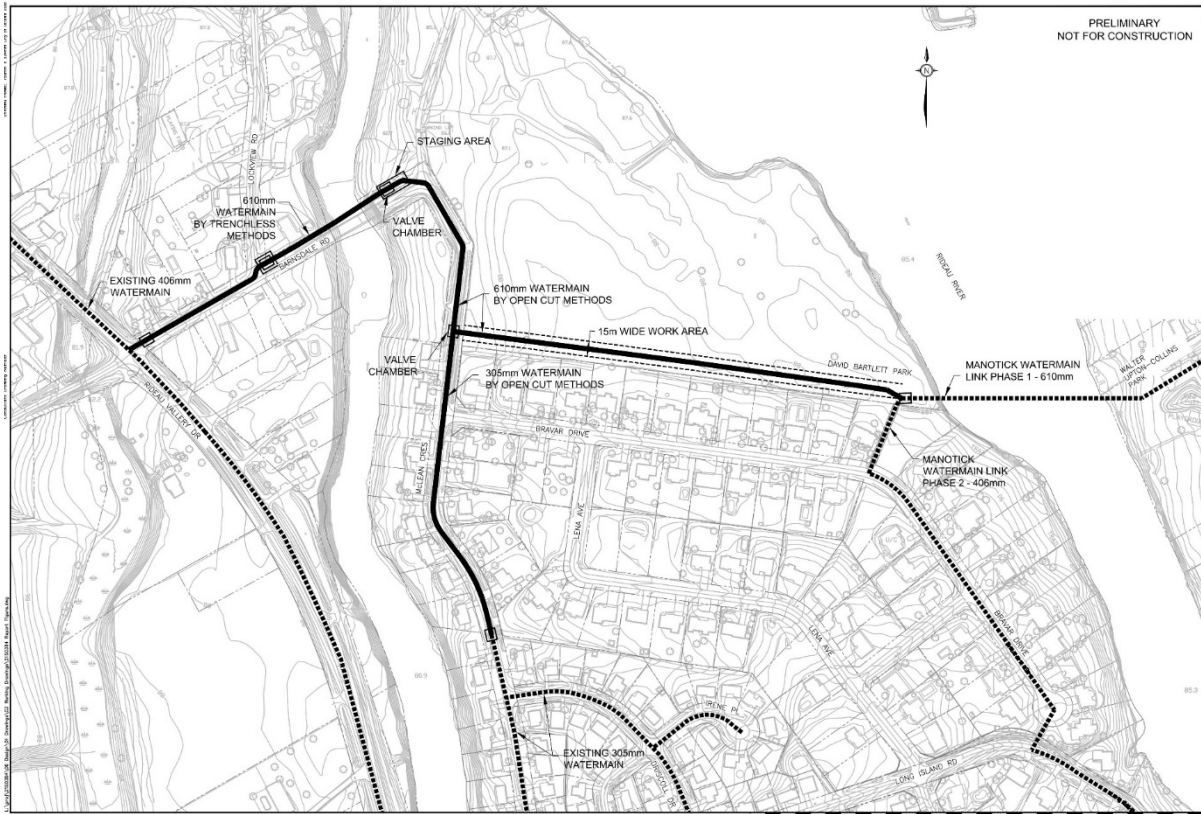
***NOTE:** Homeowners still be subject to payment of a water infrastructure charge before home connection approval.

6. PREFERRED ALTERNATIVE

The preferred alternative alignment for the NIL Watermain is Alternative B. The benefits of this alternative can be summarized as follows:

- Easier construction access;
- No private property requirements;
- Minimizes the number of required 90° bends;
- Less length of watermain (m) to maintain; and
- A smaller diameter watermain will be easier to construct within the connecting pathway width.

Figure 6.1. Alternative B Watermain Sizing and Proposed North Island Link



6.1 Major Construction Activities

Watermains installed by open cut methods:

- Within the park, the work area (approx. 15 m wide strip) will be demarcated with temporary fencing and silt fence. Trees within this area will be protected per City of Ottawa by-law requirements. Top soil from the watermain alignment will be stripped and stockpiled.
- Excavation of trench (3-4 m depth) with temporary shoring such as trench boxes.
- Dewatering of excavations will be required. Discharge will be to storm sewers after treatment (i.e. settlement). The impact of dewatering on groundwater levels will be monitored through regular readings of monitoring well water levels.
- On roads, road closures (with local access maintained) will be implemented.
- Excess excavated material will be hauled off site, and materials required for construction such as granular fill and pipes will be delivered by truck. Excess materials will be stockpiled on site in preparation for haulage, and delivered materials will be stockpiled on site in preparation for placement.
- The watermain pipes will be installed in the trench, and precast valve chambers will be installed where required.
- Commissioning of the watermain will include flushing and disinfection. Wastewater from these processes will be either treated on-site before discharge to storm sewers, trucked off-site for disposal, or discharged to the nearest sanitary sewer.
- In the park, once the trench is backfilled, the top soil will be reinstated. Landscaping will be completed through sodding, hydroseeding and/or plantings.
- On the roads, the trench will be reinstated and paved. Final re-paving will extend across one half of the road (edge of pavement to centerline).
- Final restoration will include reinstatement of signs, fences, any affected parts of driveways, lawns, etc.

River crossing (trenchless):

- Subject to further bathymetric and geotechnical investigation, it is anticipated that the river crossing will be undertaken by pipe jacking through overburden. Alternatively rock boring at greater depth, or a combination of pipe jacking and

horizontal directional drilling may be used. No in-water works are planned to be carried out.

- The trenchless construction will require staging areas (around 15 x 30m) to be established on each side of the river, and shafts to be excavated. Temporary shoring will be used to support the shafts (e.g. sheet piling or soldier piles and lagging). The staging areas and shafts will be a minimum of 30 m from the river.
- Dewatering of the shafts will be carried out as described above for the open cut excavation.
- The staging areas will be located either side of the bridge on the north side of Barnsdale Road. The staging areas will occupy the area between the property lines and road centerline, and will remain in place for several weeks. Solid board hoarding will be specified around the staging areas.
- During trenchless construction there is a risk of inadvertent return of drilling fluids (frac-out). The contractor will be required to prepare and implement an Environmental Protection Plan including monitoring of the river bed for evidence of frac-out, and keeping equipment and materials needed for cleanup readily available on site.
- Tree removal is likely to be required for the staging area east of the river.
- Spoil from trenchless construction will be removed from the site by truck.
- Permanent valve chambers will be installed in the temporary shafts before they are backfilled.
- On completion of the work, the staging areas will be reinstated with topsoil (or asphalt where within the roadway). Landscaping will be completed through sodding, hydroseeding and/or plantings.

6.2 Major Operational Activities

Once constructed, the watermain will operate with little to no intervention. Valve chambers will undergo annual maintenance that will have minimal noticeable disruptions to the surrounding area.

7. IMPACTS, MITIGATION MEASURES AND MONITORING

7.1 Assessment and Evaluation Approach

An environmental assessment is, in part, intended to assess and propose mitigation of potential impacts resulting from the proposed project on the environment. As with any human activity, there is the potential to impact the local and regional environments through the design, construction and operation of a facility or project.

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 transportation, social, and natural environments. The impact analysis involved applying the following steps:

- **Step 1** Identify and analyze instances where the project may interact with existing environmental conditions
- **Step 2** Acknowledge predetermined project activities 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.

7.2 Interactions

In order to understand the project interactions with the environment it is necessary to consider all phases of the project: pre-construction/design; construction; and operation. The following tables highlight the key activities associated with each phase and identify areas of potential interaction.

Table 7-1: Project-Environment Interactions

Phase	Activity	Environmental Interaction
Pre-Construction	Completion of detailed design and contract drawings	None anticipated
	Acquisition of land required for infrastructure	Existing Land Use
	Geotechnical investigations	Terrestrial Features and Wildlife
Construction	Excavation of trench (3-4m depth)	Subsurface Conditions Terrestrial Features and Wildlife Fisheries and Aquatic Habitat Transportation Cultural Heritage Existing Land Use Infrastructure and Utilities
	Dewatering	Subsurface conditions Terrestrial Features and Wildlife Fisheries and Aquatic Habitat Existing Land Use Infrastructure and Utilities
	River crossing (trenchless)	Subsurface conditions Terrestrial Features and Wildlife Fisheries and Aquatic Habitat Existing Land Use Cultural Heritage Transportation Infrastructure and Utilities

Phase	Activity	Environmental Interaction
	Commissioning of the watermain	Infrastructure and Utilities
	Reinstatement	Terrestrial Features and Wildlife Transportation
Operation	Maintenance	Existing Land Use Infrastructure and Utilities

7.3 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, which have the specific objective of lessening the significance of severity of environmental effects which may be caused by the project. They include standard construction practices and Best Management Practices (BMPs).

The NIL watermain 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 construction contracts and specifications. Examples of practices that should be employed, based on current standards, are described below. These measures can be “built-into” the preferred design. These mitigation measures will be updated and refined during the pre-construction, construction and operation phases of the project.

7.3.1 Erosion and Sediment Control

Rainfall can cause erosion of the excavated/disturbed areas and allow the sediment-laden runoff to flow off-site towards catch basins, creeks, and ultimately, the Rideau River. To prevent the sediment from leaving the site, the contract should specify that an erosion and sediment control plan be prepared in accordance with the “Guidelines for Erosion and Sediment Control for Urban Construction Sites, May 1987” and the City of Ottawa Specifications. The plan should ensure that appropriate measures such, as silt barriers, filter berms, etc., are implemented. The temporary sediment/erosion control measures should be installed during, and maintained

throughout the watermain construction project. Sod replacement should be completed immediately after completion of watermain work in the boulevard and parkland areas.

Erosion and sediment control will be critical and will require constant monitoring to ensure that the plan is working effectively and that any necessary modifications are made in the event that the plan is determined not to be effective.

7.3.2 Spills Response and Action Plan

A *Spills Response and Action Plan* will highlight spills response and reporting procedures. Spills or discharges of pollutants or contaminants will be reported immediately to the land owner and any regulatory authorities (i.e., RVCA, MNRF, MOECC, DFO etc.). Clean up shall be initiated quickly to ensure the protection of the environment to the extent possible.

7.3.3 Environmental Protection Plan

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 construction works which will cause or be the cause of discharge to the watercourse is to be prohibited unless appropriate approvals are granted by governing authorities. 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.

7.3.4 Dewatering Management Plan

The Contractor will prepare and implement a *Dewatering Management Plan* including provisions for *Frac-out Response*. The plan will describe how the Contractor will address the management of excess water generated by the project including from dewatering for shaft and trenchless construction methods. Additional geological and bathymetric testing will inform this plan. The plan will include:

- Discharge will be treated prior to release to storm sewers; and

- The impact of dewatering on groundwater levels will be monitored through regular readings of monitoring well water levels.

Dewatering systems will be designed and constructed in accordance with industry best-management practices. Any contaminated groundwater will be handled and disposed of according to all applicable regulations. RVCA recommends that the water quality target be an enhanced level of protection (80% TSS removal) as the storm sewers discharge directly to the River

During trenchless construction there is a risk of inadvertent return of drilling fluids (frac-out). **Frac-out Response Procedures** included in the Dewatering Management Plan may include but will not be limited to:

- Monitoring of the river bed for evidence of frac-out;
- Keeping all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out;
- Implementation of the Frac-out Response procedures including, but not limited to, measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notification all applicable authorities, including the closest DFO. Prioritize cleanup activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
- Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.

7.3.5 Management of Contaminated Materials

The MOECC and the 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 is also to be in accordance with applicable legislation and regulations.

7.3.6 Unexpected Discovery of Archaeological Resources

In the event that previously undocumented archaeological resources and/or human remains are uncovered, the proponent or the person discovering the archaeological resources must cease alteration to the site immediately and engage a licensed

consultant archaeologist to carry out field work, in compliance with Section 48 (1) of the Ontario Heritage Act. Should deeply buried deposits be found on this property during any construction activities, the Ontario Ministry of Tourism, Culture and Sport shall be notified immediately (416-314-7178).

In the event that human remains are encountered during construction activities, local law enforcement authorities and/or the coroner will be notified immediately, followed by the Ministry of Tourism, Culture and Sport, and the Registrar of Cemeteries at the Ministry of Consumer Services (416-326-8393).

7.3.7 Construction and Traffic Management Plan

A *Construction and Traffic Management Plan* will be developed to manage the 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 and cyclist routes; maintain existing traffic adjacent to the study area as close as possible to current conditions; and to outline the road and pathway signage program.

7.3.8 Noise, Air Quality and Vibration

Varied construction activities within the study area are expected to create isolated and short term noise, air quality and vibration impacts on the environment and surrounding land uses. The construction manager will be required to develop a strategy for mitigating the effects according to good practices intended to satisfy, as feasible, the fugitive dust limits specified in O.Reg. 419, the noise limits specified in MOE NPC-115 and NPC-118 and the City of Ottawa By-laws for Noise. If applicable the plan will include good practices intended to satisfy, as feasible MOE NPC-119 and NPC-207 for ground vibrations. A list of common mitigation strategies adapted to the current project includes, but is not limited to the following:

Air emissions BMPs:

- Monitor wind conditions and plan operations to take advantage of calm wind periods;
- Minimize site storage of granular material in height and extent;
- Locate storage piles in sheltered areas that can be covered;
- Provide movable wind breaks;
- Use water spray and suppression techniques to control fugitive dust; and

- Cover haul trucks and keep access route to the construction site clean of debris.

Noise and vibration BMPs:

- Limit speeds of heavy vehicles within and approaching the site;
- Provide compacted smooth surfaces, avoiding abrupt steps and ditches;
- Keep equipment properly maintained and functioning as intended by the manufacturer; and
- If required, implement a blast design program prepared by a blast design engineer.

7.3.9 Tree Survey and Tree Preservation Plan

The City of Ottawa's Trees and Natural Areas Protection By-law is to protect and maintain trees on City property. A **Tree Survey and Tree Preservation Plan** should be completed to identify trees which may be considered significant according to By-law No. 2009-200 which trees are to be removed, and provide recommendations for protection and retention of trees, as well as compensation for trees to be removed. The intent of the by-law is to protect trees when there is construction happening around them. Soil compaction and vibrations from construction equipment can cause root damage. The Trees and Natural Areas Protection by-law requires that contractors working near trees must:

- erect a fence at the critical root zone (CRZ) of trees
- not place any material or equipment within the CRZ of the tree
- not attach any signs, notices or posters to any tree
- not raise or lower the existing grade within the CRZ of a tree without approval of Forestry Services
- tunnel or bore when digging within the CRZ of any tree
- not damage the root system, trunk or branches of any tree
- ensure that exhaust fumes from all equipment are not directed towards any tree's canopy

7.3.10 Species at Risk Updates

The Ontario Endangered Species Act is updated twice yearly. Prior to construction of the NIL watermain the OESA should be reviewed and an update of the potential SAR species present and their associated habitat should be completed prior to construction.

Furthermore, it is recommended that the MNRF – Kemptville District be contacted prior to construction for technical advice and to discuss what activities can occur without contravention of the OESA.

7.3.11 Public Communications Plan

The purpose of the *Public Communications Plan* is to keep the public informed about the work in progress and the end results of the construction activities. Residents and stakeholders should be kept aware of any scheduled service or access interruptions ahead of time so that their activities can be planned with minimum disruption. The plan should detail how to communicate the information to the public, what information should be disseminated, and in which project stages the communications should take place. Ongoing communications with the community will include the Manotick Village and Community Association and the local Councillor.

7.4 Site Specific Mitigation Measures

Once potential effects were predicted and BMPs identified, site specific mitigation measures were developed to reduce potential negative effects to an insignificant or negligible status. Mitigation includes environmental rehabilitation and replacement. Localized site-specific mitigation measures are summarized in Table 7-2 below.

7.5 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.

7.6 Assessment and Evaluation Results

As described in the methodology, 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 assessed.

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

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
- Affecting a population or a specific group of individuals at a localized area and/or over a short period of time.

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

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

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

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

The above definitions of significance were adopted for use in this assessment because many of the impacts cannot be quantified in absolute terms, although

changes and trends can be predicted. The definitions provide guidance and are intended to minimize personal bias.

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

Table 7-2 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 7-2. Project Impacts, Mitigation Measures, and Monitoring

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Geology / Soils	Excavation of trench (3-4m depth) will disturb the subgrade and subsoils	Additional investigation and geotechnical design input will be required at the detailed design stage to confirm site-appropriate construction techniques including trenchless crossing methods and shaft construction. Subgrade areas to be inspected by geotechnical personnel prior to filling or concreting.	None anticipated	Negligible	N/A
Geology / Soils	Excavated and disturbed soils including shafts, have the potential to mobilize into the environment.	Erosion and Sediment Control Plan Spills Response and Action Plan Environmental Protection Plan	None anticipated	Negligible	N/A
Geology / Soils	Unexpected discovery of contaminated material during construction	Management of Contaminated Materials Plan	None anticipated	Negligible	N/A
Hydrogeology	Potential impacts to groundwater levels from dewatering operations (trenchless construction).	Groundwater inflow into excavated trenches (up to 4m) is not expected to be significant and should be manageable with sumps in the floor of the excavations. Impervious dykes or cut-offs should be constructed at regular intervals along the pipe bedding to interrupt the continuity of the drainage path to avoid the lowering of the groundwater level in the surrounding area. The impact of dewatering on groundwater levels will be monitored through regular readings of monitoring well water levels. Dewatering Management Plan	Potential for limited short-term impacts to ground water levels.	Insignificant	Monitor groundwater levels during dewatering activities.
Waterwells	Potential impacts to drinking water wells from dewatering operations (trenchless construction).	Groundwater inflow into excavated trenches (up to 4m) is not expected to be significant and should be manageable with sumps in the floor of the excavations. Impervious dykes or cut-offs should be constructed at regular intervals along the pipe bedding to interrupt the continuity of the drainage path to avoid the lowering of the groundwater level in the surrounding area. The impact of dewatering on groundwater levels will be monitored through a pre-construction water level readings of private wells and regular readings of private well water levels.	Potential for limited short-term impacts to ground water levels.	Insignificant	Monitor groundwater levels during dewatering activities.

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Terrestrial Wildlife and Habitat	General construction activities may temporarily displace local wildlife	Appropriate fencing along the perimeter of designated work areas to limit construction impacts. If any trenches are being filled, visually inspect the trench before filling and release any wildlife that is within the trench. Advise workers to perform visual survey of machinery and work area prior to commencing work since wildlife may be found basking or hiding on or under vehicles, equipment, rocks, debris piles etc.	Potential for limited short-term avoidance of the area by wildlife	Insignificant	N/A
Migratory Birds	Tree removals during construction may result in disruption/removal of migratory bird habitat.	All vegetation removal should be undertaken outside of the bird nesting season. If removals are necessary during the timing window, vegetation must be assessed for nesting habitat prior to removing it, and in the instance that a nest is encountered; the contractor should consult with Environment Canada to determine the need for a permit or approval.	Potential for short-term localized disruption of migratory bird habitat.	Insignificant	N/A
Species at Risk and Critical Habitat (Terrestrial)	General construction activities may affect Butternut trees identified adjacent to the work area.	Exclusionary fencing/drip line protection around the identified trees to ensure construction activities do not impact trees. A certified Butternut Health Assessor will need to evaluate the category of the butternut trees Beneficial actions will be implemented including planting and monitoring requirements for seedlings based on the actual impact (harm/removal) and the category of tree.	Potential for impacts to Butternut minimized through beneficial action	Insignificant	As determined by Butternut Health Assessment.

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Species at Risk and Critical Habitat (Terrestrial)	General construction activities may temporarily displace SAR at a local level.	<p>Advise workers not to harm or harass any snakes, turtles or other wildlife.</p> <p>Advise workers to stop work and inform the Contract Administrator if any snakes, turtles or other potential Species at Risk (SAR) are encountered.</p> <p>Report all SAR sightings and encounters to the MNR District office and cease work in the immediate area until the SAR or other wildlife are out of harm's way.</p> <p>Advise workers to perform a visual survey of machinery and work area prior to commencing work since wildlife may be found hiding in or under equipment, rocks, debris piles, etc. and any individuals found shall be left to move on their own or moved properly out of harm's way in the direction they were heading.</p> <p>All workers should be provided with awareness training (e.g. factsheets) that addresses the existence of SAR on site, identification of those species and proper actions when an individual is encountered and/or needs to be moved out of harm's way.</p> <p>If a nesting snake or turtle is found the MNR shall be notified immediately and a 5 m buffer zone shall be flagged around the site and the area protected from harm during the nesting season</p>	Potential to temporarily displace SAR at a local level, unless otherwise determined by the Ecological Site Assessment.	Insignificant	To be determined by Ecological Site Assessment
Trees and Landscaping	Landscaped communities will be disturbed / removed during construction.	<p>Minimize vegetation removal</p> <p>Appropriate lengths of fencing along the perimeter of designated work areas to limit construction impacts.</p> <p>Utilize best management practices when removing vegetation.</p> <p>Consider replacement of any trees which are removed.</p>	Potential for enhancements is high.	Negligible	Monitor health of any new plantings
Watercourses	Sediment laden runoff may impact water quality of local creeks and streams.	<p>Do not perform any earthwork excavation near the river during period of flooding or heavy rains.</p> <p>The staging areas and shafts will setback from the river.</p> <p>Securely contain or remove all disturbed soils away from aquatic habitats and waterbodies.</p> <p>Prevent, by taking all the necessary precautions, any transport of fine particles in the aquatic environment beyond the immediate work area.</p> <p>Erosion and Sediment Control Plan</p> <p>Spills Response and Action Plan</p> <p>Environmental Protection Plan</p>	None anticipated	Negligible	Erosion and Sediment Control Plan

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Watercourses	Increased potential of sedimentation due to stock-piled material near the watercourse.	<p>Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs. Securely contain or remove all disturbed soils away from aquatic habitats and waterbodies. The staging areas and shafts will be a minimum of 30 m from the river.</p> <p>Spoil from trenchless construction will be removed from the site by truck.</p> <p>Erosion and Sediment Control Plan Spills Response and Action Plan Environmental Protection Plan</p>	None anticipated	Negligible	N/A
Fisheries and Aquatic Habitat	Construction works adjacent to or within the watercourse have the potential to negatively affect fisheries and aquatic habitat.	<p>No contamination, waste, or other substances, which may be detrimental to aquatic life or water quality, will be permitted to enter a watercourse.</p> <p>Manage all water from dewatering operations (trenchless construction methods) to prevent erosion and/or release of sediment-laden or contaminated water to the waterbody.</p> <p>The staging areas and shafts will be set back from the river.</p> <p>Erosion and Sediment Control Plan Spills Response and Action Plan Environmental Protection Plan Dewatering Management Plan including Frac-out Response Procedures</p>	None anticipated.	Negligible	N/A
Fisheries and Aquatic Habitat	Potential to temporarily negatively affect fisheries and aquatic habitat.	<p>Spoil from trenchless construction will be removed from the site by truck.</p> <p>Temporary shoring will be used to support the shafts (e.g. sheet piling or soldier piles and lagging). The staging areas and shafts will be a minimum of 30 m from the river.</p> <p>Staging areas to be revegetated in a manner to prevent erosion.</p> <p>Erosion and Sediment Control Plan Spills Response and Action Plan Environmental Protection Plan Dewatering Management Plan including Frac-out Response Procedures</p>	Potential for frac-out during directional drilling.	Insignificant.	Monitor in accordance with the Dewatering Management Plan including the Frac-Out Procedures.
Roadways, Pedestrian and Cycling Routes	Traffic interruptions for users of local roadways during construction.	<p>On-road road closures are to maintain local access.</p> <p>Construction and Traffic Management Plan</p>	Short-term localized disruptions may be an irritant to local road users.	Insignificant	

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Navigable Waters	Crossing under the Rideau River may impact the navigable waterway.	<p>Notice to Minister of Transport according to the <i>Navigation Protection Act</i>. Parks Canada to be aware of any activities that will require public notification for the navigability of the watercourse.</p> <p>Public Communications Plan</p>	Short-term localized disruptions are unlikely to occur.	Negligible	
Archaeological Potential	Potential for disturbance of areas with archaeological potential.	<p>Further archaeological assessment in the form of a Stage 2 property survey will be required in advance of any construction-related impacts in areas identified as exhibiting archaeological potential.</p> <p>No further archaeological assessment is required for the proposed alignment of the McLean Link.</p> <p>Should subsequent design planning result in the identification of areas of impact (i.e. below grade soil disturbances or filling) extending beyond the limits of the present study, further archaeological assessment may be required.</p> <p>Any additional archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with the Standards and Guidelines for Consultant Archaeologists (MTCS 2011).</p>	None anticipated	Negligible	N/A
Built Heritage Resources	Indirect impacts (i.e. isolation, direct or indirect obstruction, soil disturbance) to identified cultural heritage resources may result from construction. There are no anticipated direct impacts (i.e. destruction, removal, re-location, or alteration) to cultural heritage resources that would result from NIL watermain construction.	<p>The detail design will need to be sensitive to the existing cultural heritage features in particular the heritage designation of the Rideau River. Heritage Impact Assessment requirements for this resource will be based on the discussions with Parks Canada should impacts within the 35 m buffer zones be anticipated.</p> <p>Adverse impacts to cultural heritage resources should be avoided whenever possible. Where necessary, interventions should be managed in such a way that impacts are sympathetic to the value of the resource.</p> <p>Construction planning within 35 metres of identified built heritage resources (including features identified as cultural heritage landscapes) should incorporate assessments and monitoring of potential impacts from construction related vibrations so as to ensure that the structural stability of these features is not compromised.</p> <p>Any planned above-ground works to be located within or adjacent to identified cultural heritage resources should be planned so as to minimize visual impacts, wherever possible.</p> <p>Post-construction landscaping plans should include reinstatement of the terrain within or adjacent to identified cultural heritage resources to match non-impacted portions of the alignment, wherever possible.</p> <p>Permits, licenses and further assessments/ evaluations are to be determined in consultation with Parks Canada.</p>	Temporary, localized impacts may occur during construction.	Insignificant	N/A

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Adjacent Land Owners	Noise, vibration and air quality from construction may be an irritant to adjacent land owners/users.	<p>The construction work will conform to the City of Ottawa noise by-law. City construction supervisor to ensure that the contractor implements the necessary controls and completes the works in accordance with the specifications.</p> <p>The contract documents will contain a provision that any initial noise complaint will trigger verification that the general noise controls agreed to, are in effect.</p> <p>In the presence of persistent noise complaints, all construction equipment should be verified to comply with the Ministry of the Environment's NPC-115 guidelines.</p> <p>In the presence of persistent complaints and subject to results of a field investigation, alternative noise control measures will be investigated.</p> <p>Air, Noise and Vibration BMPs</p>	Localized, short-term construction noise.	Insignificant	N/A
Private Property	Temporary disturbance of private property during trenching installation.	<p>Minimize disturbance of private property where possible.</p> <p>Communication and coordination with adjacent and impacted landowners. Accommodation as determined by the City of Ottawa.</p> <p>Final restoration will include reinstatement of signs, fences, any affected parts of driveways, lawns, etc.</p> <p>Public Communications Plan</p> <p>Tree Survey and Preservation Plan</p> <p>Construction and Traffic Management Plan</p>	Short-term localized disruptions to private property.	Insignificant	N/A
Park/Recreation	Temporary disturbance to David Bartlett park.	<p>Once the trench is backfilled, the top soil will be reinstated. Landscaping will be completed through sodding, hydroseeding and/or plantings.</p> <p>Tree Survey and Preservation Plan</p> <p>Public Communications Plan</p> <p>Construction and Traffic Management Plan</p>	Temporary avoidance of the construction area may be an irritant to some park users.	Insignificant	N/A
Sewers	Commissioning the new watermain will including flushing and disinfection of the new watermain with highly chlorinated water	Waste-water from commissioning will be either treated on-site before discharge to storm sewers, trucked off-site for disposal, or discharged to the nearest sanitary sewer.	None anticipated	Negligible	N/A

Environmental Condition	Environmental Effects	Mitigation Measures <i>Built-in Mitigation Measures</i>	Potential Residual Effect	Significance after Mitigation	Monitoring Requirements
Watermains	Operation of the new watermain will result in redundancy within the water distribution system.	None required	A more reliable water distribution network.	Positive	In accordance with City of Ottawa policies and procedures.
Utilities	Potential disruption of utility services if unknown utilities are severed during construction.	Conflicts will need to be determined and assessed in more detail at the design stage. Coordination with other utility companies to determine utility locations relative to the planned alignment of the proposed watermain.	None anticipated.	Negligible	N/A

8. NEXT STEPS

8.1 Functional Design

A functional design will follow the completion of the Environmental Assessment process. The functional design will outline the design requirements, finalize alignments and address critical aspects of the design.

8.2 Implementation

Construction of the NIL is anticipated to occur in 2019.

8.3 Approvals

The approvals outlined below provide a brief overview of the permits and approvals considered at this stage of design/planning for the completion of the NIL watermain project. In all cases, it is the proponent's responsibility to identify all permitting requirements and to ensure that any additional requirements from other federal, provincial and municipal jurisdictions are followed.

8.3.1 Licence of Operation (Parks Canada)

Federal approvals/ authorizations including a Licence of Occupation is anticipated from Parks Canada (PC). This licence is required for work within 30 metres of the Rideau River/Canal. The staging areas and shafts for trenchless water crossing are identified to be a minimum of 30 m from the river, however the watermain itself will pass under the Rideau River system operated by Parks Canada.

8.3.2 Evaluation of Environmental Effects (Parks Canada)

CEAA 2012 requires that a federal authority must not exercise any power or perform any duty or function conferred on it that could permit a project to be carried out, in whole or in part, on federal lands, unless the authority determines that the carrying out of the project is not likely to cause significant adverse environmental effects. Although staging areas and shafts for the trenchless water crossing are to be located a minimum of 30 m from the Rideau River, an Evaluation of Environmental may be required given that a Licence of Occupation may be required from Parks Canada.

8.3.3 Navigation Protection Act (NPA) Notice of Works Form (Transport Canada)

The *Navigation Protection Act* (NPA) authorizes and regulates interferences with the public right of navigation. A primary purpose of the NPA is to regulate works and obstructions that risk interfering with navigation in the navigable waters listed on the schedule to the Act. The Rideau River is a navigable water listed on the schedule to the Act. A work, for purposes of the NPA, is anything, whether temporary or permanent, that is made by humans, and that is in, on, over, under, through or across any navigable water in Canada.

The NPA requires owners to provide Notice to the Minister (of Transport) about certain works on navigable waters in Canada. For purposes of the Navigation Protection Program, the Notice must include a “Notice of Works” form and all required attachments and additional information. The detailed information submitted in a Notice to the Minister is required for the NPP to identify likely interferences with shipping and boating activities. A Notice is required for all work on navigable waters listed on the schedule to the NPA (except minor work).

The anticipated works are not defined as “minor works” according to the Act, and the NIL watermain is required to cross under the Rideau River (navigable under Schedule A). It is therefore anticipated that a Notice of Work Form will be required.

8.3.4 Permit-To-Take-Water (MOECC)

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 per day may be required to be registered on the Environmental Activity and Sector Registry (EASR) or to apply for a Permit-to-Take-Water (PTTW). This includes the taking of water for any use, including construction, dewatering and remediation. Depending on water volumes/rates removed, construction activities may trigger the requirement for a PTTW due to shaft construction and trenchless techniques to cross below the Rideau River.

8.3.5 Ontario Endangered Species Act Permit (MNR)

The OESA provides automatic protection to species classified as endangered or threatened. Habitat protection is also included under the Act when a species is

classified as endangered or threatened. Butternut trees are endangered and protected under this Act. By law, what you can do with a butternut tree depends on its health.

Should the Butternut Tree Health Assessment require it, a permit under the OESA may be required.

8.3.6 Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit (RVCA)

The Rideau River is within the jurisdiction of the Rideau Valley Conservation Authority. The RVCA has participated in this study's consultation process and has representatives on the project's TAC. As part of its mandate, the RVCA reviews development proposals within or adjacent to natural areas including wetlands, shorelines and waterways (*Ontario Regulation 174/06*). The RVCA oversees permits for development and ensures that fish habitat is protected and not harmfully altered.

Although trenchless techniques will be used for the watercrossing, staging areas/shafts fall within the RVCA regulation limit for this area due to the potential for unstable slopes. A permit will therefore be required and will include a review the construction procedures. RVCA also notes that permits have already been issued for the rehabilitation of the bridge. Co-ordination of the projects should be undertaken to reduce conflicts during construction.

8.3.7 Notice of Completion

The Notice of Completion is issued to complete the screening requirements for this Schedule B project. The review period associated with the Notice of Completion is 30 calendar days, where the proponent may choose to set a longer period under special circumstances such as the intervention of public holidays. The Notice of Completion clearly states the review period and the date by which all submissions or requests for an order are to be received. If no request is received within the review period specified in the Notice, the proponent may proceed to design and construction of the project.

8.4 Revisions to Schedule B Project Files

Significant modifications to Schedule B projects, as presented to the public during the screening process and as set out in the Notice of Completion shall be reviewed by the proponent. Similarly, if the period of time from filing the Notice of Completion to the

proposed commencement of construction for the project exceeds ten years, the proponent shall review the planning and design process to ensure that the project and the mitigating measures are still valid in the current planning context.

In either event, the reviews shall be documented in the Project File and the proponent shall issue a Revised Notice of Completion to all potentially affected members of the public and review agencies.

9. CONSULTATION

A key component of the EA process is the coordination and integration of public consultation. This chapter of the report outlines the consultation undertaken and provides an overview of the materials presented to the public and to the stakeholder groups/committees.

9.1 Technical Advisory Committee

The project proceeded under the direction of the City of Ottawa and benefited from the direct involvement and guidance of a Technical Advisory Committee (TAC). The TAC consisted of City and agency staff involved with the NIL Watermain Class EA. The consultant team representatives engaged regularly with the TAC to obtain input and guidance on the direction of the work.

The TAC was comprised of representatives of the following organizations:

- Core Project Team Members;
- City of Ottawa Departments, as required; and
- Rideau Valley Conservation Authority (RVCA).

The level of participation at the TAC meetings varied depending on the role and level of interest of the individual stakeholders. For example, some review agencies chose not wish to attend all of the meetings of the TAC, instead chose to provide comments on materials during each phase of the study process.

In May of 2016, agencies and utility companies with a potential interest in the project were contacted by email. A record of the consultation conducted can be found in **Appendix E**.

Table 9-1: Record of Technical Advisory Committee Meetings

Meeting	Date	Agenda Items
Kick Off Meeting	October 30, 2015	1. Background Information 2. Project Study Team 3. Project Schedule 4. Consultation Plan 5. Website 6. Review of Alternatives 7. Regular Project Meetings
TAC Meeting #1	January 19, 2016	1. Introduction of Project Team 2. Project Background and Introduction 3. Project Status and Schedule 4. Study Participants (Stakeholders/Agencies) 5. EA Process 6. Identify Conceptual Alignments 7. Preliminary Evaluation Criteria 8. Next Steps
TAC Meeting #2	May 24, 2016	1. Introduction and Background 2. Project Phases 3. Evaluation of Options

9.2 Government Agencies

As part of the consultation process for this EA, various agencies and stakeholders were contacted to inform of the purpose of the study and the Class EA process, and to request comments or concerns regarding the project. The agencies and stakeholders that were directly contacted include the following:

- Provincial
 - Ministry of Natural Resources and Forestry (MNRF)
 - Rideau Valley Conservation Authority (RVCA)
 - Ministry of the Environment and Climate Change (MOECC)
 - Ministry of Tourism, Culture, and Sport (MTCS)
- Federal
 - Department of Fisheries and Oceans (DFO)

- Parks Canada (PC)
 - Environment Canada (EC)
- Community Associations
 - The Manotick Village and Community Association
- Ward Councillors
 - Councillor Scott Moffatt (Ward 21 Rideau-Goulbourn)
- Utilities
 - Allstream
 - Bell Canada
 - Hydro Ottawa
 - Hydro One Distribution
 - Enbridge
 - Rogers Ottawa
 - Group Telecom
 - Videotron
 - TELUS
 - Canadian P2P Fibre Systems Ltd.
- Emergency Response and Schools
 - Ottawa-Carleton District School Board
 - Ottawa-Carleton Catholic District School Board
 - Ottawa Catholic School Board
 - Ottawa Fire Services
 - Ottawa Paramedic Services
 - Ontario Provincial Police, GHQ, Orillia

9.3 Aboriginal Consultation

First Nations consultation is an important component of the Class EA process. As part of this project the following First Nations have been contacted to provide information on the project and have been provided opportunities for input:

- Algonquins of Ontario Consultation Office
- Métis Nation of Ontario Head Office

9.4 Public Consultation

Various forms of communication were utilized throughout the study to keep the public informed of progress and decisions. The public were notified of opportunities for consultation via the City of Ottawa Website, newspaper ads, and public information sessions. The key points of public contact will include:

- A Notice of Study Commencement is a discretionary point of public contact during Phase 1 of the Class EA process that will be used to introduce the project and invite the public to participate in the process. A Notice of Study Commencement was issued on March 17, 2016 and placed on the City's web site.
- A Notice of Completion will be prepared advising the public of the completion of the Class EA planning process, providing information on the EA documentation and public review opportunities.

A Public Information Website was developed and available for review at the project onset. Interested parties were encouraged to provide comments to the project team regarding the materials presented on the website. A copy of the website content and a summary of comments received as a result of the Public Presentation are included in **Appendix E**.

9.4.1 Manotick Village Community Association Meeting

9.4.2 Notification

Notification of the presentation at the Manotick Village & Community Association (MVCA) Annual General Meeting (AGM) held on June 7, 2016 was communicated in the Village Voice Newsletter published by the MVCA on May 16, 2016.

Newspaper ads were also published in the EMC (English) as well as Le Droit (French) on May 19, 2016. A copy of the newspaper ads can be found in **Appendix E**.

9.4.3 Attendance

There were 14 people that signed in at the session.

9.4.4 Format

As the presentation was an agenda item at the MVCA's AGM, the format consisted of a presentation with a PowerPoint, three (3) 24" x 36" boards, a 1-page handout and time for questions. The agenda of the presentation was as follows:

- Introductions
- Project Overview
- EA Process
- Alternatives

- Preliminary Evaluation
- Next Steps

9.4.5 What we Heard

Comments were received at the presentation of the project at the Manotick Village & Community Association Annual General Meeting held on June 7, 2016. The content of comments is summarized below:

- Residents inquired as to when they connect their house to water and how much this would cost. Most people want municipal water;
- Concerns about the river crossings and the depth of drilling and potential effect on wells and septic systems;
- Barnsdale Road residents wondered if the alignment could be shifted north (apparently there is a park there on the west side of the River) so that the construction can be away from their properties; and
- 60 year resident and President of the Manotick Culture, Parks and Recreation, favours proposed access route through David Bartlett Park.

10. SUMMARY AND CONCLUSION

The purpose of this Municipal Class EA was to investigate the NIL Watermain route. The main objective was to provide a link between the existing watermain on Rideau Valley Drive to the proposed Manotick Watermain Link at the north end of Long Island. Included in the NIL watermain project is a connection to the existing McLean watermain located on McLean Street in Hillside Gardens. As this project will establish, extend or enlarge a water distribution system and all works necessary to connect the system to an existing system or water source, where such facilities are not in either an existing road allowance or an existing utility corridor. For this reason, this project is considered a Schedule B project.

A key component of the EA process is the coordination and integration of consultation. A proactive and flexible approach to public and agency consultation was adopted to ensure the interests of stakeholders and the community were addressed. In general comment received were in favour of municipal water connection.

Following a thorough investigation of the existing conditions at the study area, constraints and opportunities were taken into consideration in the development of potential alternatives. Existing and proposed major infrastructure, as well as specific natural features, and cultural heritage were considered important to conserve and protect.

Five initial alternative alignment options were developed to connect the Manotick Watermain Link to the existing watermain on Rideau Valley Drive between Bravar Drive and Barnsdale Road. This long list of alternatives was screened based on preliminary distinguishing criteria in order to develop a short-list of options that were subject to a more detailed evaluation. The two-shortlisted routes (Alternative A and Alternative B) both involved an extension of services meeting the project requirements. The option with the least amount of negative impact on each assessment indicator was the preferred option for that criteria.

The preferred alternative was determined to be Alternative B due to easier construction access, no private property requirements, and a minimization in the number of required 90° bends. Additional benefits of Alternative B include less length (m) of watermain to maintain and a smaller diameter will be easier to construct within the connecting pathway width.

The NIL watermain 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. No significant negative impacts after mitigation are anticipated.

11. REFERENCES

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FOR INFORMATION ON APPENDICES PLEASE CONTACT:

John Bougadis, M.A.Sc., P.Eng.
Senior Project Manager, Infrastructure Planning
Asset Management Branch
Planning, Infrastructure and Economic Development Department
City of Ottawa
613.580.2424 ext.14990

**APPENDIX A: Preliminary Geotechnical and Hydrogeological
Investigation – Golder Associates**

**APPENDIX B: Letter: Information Request – Developments –
Ministry of Natural Resources and Forestry**

**APPENDIX C: Draft Stage 1 Archaeological Assessment – Past
Recovery Archaeological Services Inc.**

**APPENDIX D: Draft Cultural Heritage Resource Assessment – Past
Recovery Archeological Services Inc.**

APPENDIX E: Public and Agency Consultation