



**Windsor Pipeline Replacement  
Project: Environmental Report**

FINAL REPORT


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## Sign-off Sheet

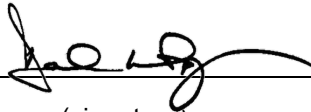
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## Executive Summary

As of January 1, 2019, Union Gas and Enbridge Gas Distribution have amalgamated into one utility with the legal name Enbridge Gas Inc (Enbridge Gas). As part of the Enbridge Gas continual pipeline monitoring and integrity programs, Enbridge Gas is proposing to replace the existing Windsor natural gas pipeline.

The proposed project involves replacing approximately 60 km of the existing Windsor natural gas pipeline, an 8- to 10-inch diameter pipeline, with a new 6-inch diameter pipeline to be constructed following the general same route as the existing pipeline but will be located entirely within existing municipal road allowances. A new permanent easement would not be required. New permanent easements may be required for the installation of, approximately, five new valve sites. The proposed project will occur between the intersection of Concession 8 and County Road 46 (located in the Town of Tecumseh) and the existing Enbridge Gas Port Alma Transmission Station (located in the Municipality of Chatham-Kent).

The existing Windsor natural gas pipeline would be decommissioned. Aerial crossings would be removed, and the pipeline would be a combination of removal and abandoned in place in accordance to CSA Z662. Decommissioning would occur after the proposed project construction and customer tie-ins to the new pipeline have been completed.

Enbridge Gas has retained Stantec Consulting Ltd. (Stantec) to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities as well as decommissioning of the existing pipeline. The environmental study included a consultation program, an impact assessment, and a cumulative impact assessment.

Enbridge determined that where the existing pipeline is located within or adjacent to municipal road allowances the preliminary preferred route would continue to be within road allowance but in a slightly different location. In the three areas where the existing pipeline follows a cross country route not within municipal road allowance, alternative route options were identified that followed other municipal road allowances. A route reconnaissance was completed on September 28, 2018 by Stantec and Enbridge staff to identify the proposed route based on constructability and environmental constraints. Detailed design will also be influenced by supplemental studies (including environmental studies) and site-specific requests from landowners and agencies.

A consultation program was conducted for the project to engage with federal and provincial agencies, conservation authorities, municipal staff, Indigenous communities, special interest groups, and directly affected and adjacent landowners. The consultation program included notices in local newspapers, project mailouts and Information Sessions held on February 20 and 21, 2019. Enbridge Gas and Stantec have also been in direct contact with agency and municipal staff. Enbridge Gas has committed to on-going consultation with directly affected and interested parties throughout the detailed design and construction phases and will continue to respond to concerns through the life of the project.



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The potential effects and impacts of the project on physical, biophysical and socio-economic features have been assessed. In the opinion of Stantec, the recommended program of supplemental studies, mitigation and protective measures are considered sufficient to protect the features encountered.

Where appropriate, post construction monitoring will be conducted to assess whether mitigation and protective measures were effective in both the short and long term.

The potential cumulative effects of the project were assessed by considering development that has a high probability of proceeding just prior to or concurrent with construction of the project. The cumulative effects assessment determined that, provided the mitigation and protective measures outlined in this report are implemented and that concurrent projects implement similar mitigation and protective measures, potential cumulative effects are not anticipated to be significant.

With the implementation of the recommendations in this report, on-going communication and consultation, and adherence to permit, regulatory and legislative requirements, potential adverse residual environmental and socio-economic impacts of the project are not anticipated to be significant.





## Abbreviations

AA	Archaeological Assessment
ANSI	Area of Natural and Scientific Interest
BGS	Below ground surface
CKHA	Chatham-Kent Health Alliance
CKPUC	Chatham-Kent Public Utilities Commission
CLI	Canada Land Inventory for Agriculture
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CRA	Commercial, Recreational, or Aboriginal
DFO	Fisheries and Oceans Canada
EASR	Environmental Activity and Sector Registry
ECP	Environmental Construction Plan
ELC	Ecological Land Classification
Enbridge Gas	Enbridge Gas Inc. operating as Union Gas
END	Endangered
ER	Environmental Report
ERCA	Essex Region Conservation Authority
ERIS	Environmental Risk Information Services
ESA	<i>Endangered Species Act</i>
ESC	Erosion and sediment control
GIS	Geographic Information System
HDD	Horizontal Directional Drill
IPZ-3	Intake Protection Zone-3



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LIO	Land Information Ontario
LTVCA	Lower Thames Valley Conservation Authority
MBCA	<i>Migratory Birds Convention Act</i>
MECP	Ministry of Environment, Conservation and Parks
MENDM	Ministry of Energy, Northern Development and Mines
MOECC	Ministry of Environment and Climate Change
MNR	Ministry of Natural Resources
MNRF	Ministry of Natural Resources and Forestry
MTCS	Ministry of Tourism, Culture and Sport
MTO	Ministry of Transportation
NHIC	Natural Heritage Information Centre
NPS	Nominal pipeline size
OBBA	Ontario Breeding Bird Atlas
OEB	Ontario Energy Board
OHA	<i>Ontario Heritage Act</i>
OPCC	Ontario Pipeline Coordinating Committee
O. Reg.	Ontario Regulation
ORAA	Ontario Reptile and Amphibian Atlas
PTTW	Permit to Take Water
PSOC	Potential Sources of Contamination
PSW	Provincially Significant Wetland
RoW	Right-of-way
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SC	Special Concern
SC	Stream Crossing



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Stantec	Stantec Consulting Ltd.
SWH	Significant Wildlife Habitat
THR	Threatened
TSSA	Technical Standards and Safety Authority
WHPA	Wellhead Protection Area
WWR	Water Well Record(s)



## 1.0 INTRODUCTION

### 1.1 PROJECT DESCRIPTION

As of January 1, 2019, Union Gas and Enbridge Gas Distribution have amalgamated into one utility with the legal name Enbridge Gas Inc (Enbridge Gas). As part of the Enbridge Gas continual pipeline monitoring and integrity programs, Enbridge Gas is proposing to replace the existing Windsor natural gas pipeline.

The proposed project involves replacing approximately 60 km of the existing Windsor natural gas pipeline, an 8- to 10-inch diameter pipeline, with a new 6-inch diameter pipeline to be constructed following the general same route as the existing pipeline but will be located entirely within existing municipal road allowances. A new permanent easement would not be required. New permanent easements may be required for the installation of approximately five new valve sites. The proposed project will occur between the intersection of Concession 8 and County Road 46 (located in the Town of Tecumseh) and the existing Enbridge Gas Port Alma Transmission Station (located in the Municipality of Chatham-Kent).

The existing Windsor natural gas pipeline would be decommissioned. Aerial crossings would be removed, and the pipeline would be a combination of removal and abandoned in accordance to CSA Z662. Decommissioning would occur after the proposed project construction and customer tie-ins to the new pipeline have been completed.

Enbridge Gas has retained Stantec Consulting Ltd. (Stantec) to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities as well as decommissioning of the existing pipeline. The environmental study will fulfill the requirements of the Ontario Energy Board's (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition (2016)* (OEB Environmental Guidelines). The environmental study process included consultation and engagement with landowners, municipalities, agencies, Indigenous communities, and other interested parties through notices, mailouts, meetings, and Information Sessions.

For the remainder of this report, the construction and operation of the proposed pipeline is referred to as 'the project'.

### 1.2 ENVIRONMENTAL STUDY

#### 1.2.1 Objectives

A multidisciplinary team of environmental planners and scientists from Stantec conducted the environmental study. Enbridge Gas provided environmental support and engineering expertise throughout the study.

The environmental study was completed in accordance with the OEB Environmental Guidelines, as well as relevant federal and provincial environmental guidelines and regulations.



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The principal objective of the environmental study was to outline various environmental mitigation and protection measures for the construction and operation of the project while meeting the intent of the OEB Environmental Guidelines. To meet this objective, the environmental study was prepared to:

- Identify a preferred route that minimizes potential environmental impacts in areas where the existing Windsor pipeline is not located within a road allowance
- Complete a detailed review of environmental features along the preferred route and assess the potential environmental impacts of the project on these features
- Establish mitigation and protective measures that may be used to minimize or eliminate potential environmental impacts of the project
- Develop a consultation program to receive input from interested and potentially affected parties
- Identify any necessary supplemental studies, monitoring and contingency plans

## 1.2.2 Process

The environmental study was divided into three main phases:

### **Phase I: Identify a Preliminary Preferred Route and associated Project Study Area**

The environmental study began by defining a project study area (Figure 1, Appendix A). Enbridge determined that where the existing pipeline is located within or adjacent to municipal road allowances the preliminary preferred route would continue to be within road allowance but in a slightly different location (Figure 2, Appendix A). In the three areas where the existing pipeline follows a cross country route not within a municipal road allowance, alternative routes were identified that followed other municipal road allowances. A route reconnaissance was completed on September 28, 2018 by Stantec and Enbridge staff to identify the proposed route based on constructability and environmental constraints.

### **Phase II: Gather Information regarding the Study Area and Conduct a Consultation Program**

The next phase in the environmental study process was to gather relevant environmental and socio-economic background data relevant to the study area. Specific information requests were made to several agencies to assist with identifying environmental features, constraints, the potential for presence of Species at Risk (SAR) and their habitat, and eventually with developing mitigation and protective measures based on predicted effects and potential impacts. The gathering of information continued throughout the project.

Feedback on the preliminary preferred route was sought through newspaper notices, letters, and Information Sessions held on February 20 and 21, 2019. Following the Information Sessions, based on feedback received, the preliminary preferred route was confirmed as the preferred route.

### **Phase III: Environmental Report**

Phase III involved determining potential environmental and socio-economic impacts and cumulative effects that would result from the project and developing mitigation and protective measures,



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supplemental studies, monitoring and contingency plans to avoid or reduce potential impacts. The environmental study concluded with the preparation of this Environmental Report (ER).

### 1.2.3 The Environmental Report

The environmental study has relied on technically sound and consistently applied procedures that are replicable and transparent. As mentioned above, the study was also undertaken in accordance with the OEB Environmental Guidelines, as well as relevant federal and provincial environmental guidelines and regulations. The ER, which documents the environmental study, will form the foundation for future environmental management activities related to the project.

The ER is organized into the following sections:

- 1.0 Introduction:** provides a description of the project and the environmental study
- 2.0 Routing:** provides an overview of the pipeline route evaluation and selection process
- 3.0 Consultation Program:** describes the consultation program
- 4.0 Impact Identification, Assessment and Mitigation:** describes the existing conditions, predicts potential effects and impacts, recommends supplemental studies, mitigation and protective measures, and considers net impacts
- 5.0 Cumulative Effects:** provides an analysis of potential cumulative effects associated with the proposed project
- 6.0 Monitoring and Contingency Plans:** describes monitoring and contingency plans to address potential environmental impacts of the proposed project
- 7.0 Conclusion:** provides a discussion and consideration of the potential environmental impacts associated with the proposed project

The ER also includes references, and appendices for documentation.

### 1.2.4 The OEB Regulatory Process

Once complete, the ER is circulated to affected municipalities, conservation authorities and to the Ontario Pipeline Coordinating Committee (OPCC) for their review and comment. The OPCC is an inter-ministerial committee that includes provincial government ministries, boards, and authorities with potential interest in the construction and operation of hydrocarbon transmission and storage facilities. The ER is also circulated to landowners, Indigenous communities, and other interested parties. The ER will accompany a future Enbridge Gas 'Leave-to-Construct' application to the OEB for the proposed project.

Upon receiving the application, the OEB will hold a public hearing. Communication about the hearing will include notices in local newspapers and letters to directly affected landowners, both of which will outline how the general public and landowners can get involved with the hearing process. If after the public hearing the OEB finds the project is in the public interest it will approve construction of the project. The OEB typically attaches conditions to approved projects. Enbridge Gas must comply with these conditions at all stages of the project, including during construction and site restoration.



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## 1.2.5 Additional Environmental Regulatory Processes

Enbridge Gas will also be required to obtain additional environmental permits and approvals from federal and provincial agencies and provide notifications to municipalities, as outlined in Table 1-1 below. This ER will serve to support these permit and approval applications and notifications.



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**Table 1-1: Summary of Potential Environmental Permits/Regulatory Requirements**

Permit/Approval Name	Administering Agency	Description
<b>FEDERAL PERMITS AND APPROVALS</b>		
Clearing of Vegetation under the <i>Migratory Bird Convention Act</i> (MBCA) (1994)	Environment Canada	No permit is necessary; however, precautions need to be taken so that no breeding birds or their nests are harmed or destroyed during the bird nesting season. Nest sweeps will be required at a maximum of 7 days prior to vegetation removal during the MBCA bird nesting season (April 1 to August 31).
Review and authorization under the <i>Fisheries Act</i> (1985)	Fisheries and Oceans Canada (DFO)	DFO review and possible <i>Fisheries Act</i> authorization is required at watercourse crossing containing species protected under the <i>Species at Risk Act</i> (SARA) (2002). The DFO may authorize activities that have the potential to affect fish or mussel species protected under the SARA (2002). As per Section 35 (1) of the <i>Fisheries Act</i> (1985), "No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. As per Section 35 (2)(b) of the <i>Fisheries Act</i> (1985), there are some exceptions under which a person may carry on a work, undertaking or activity without contravening subsection (1), including an authorization from DFO, which typically includes a number of conditions.
Permitting under the SARA (2002)	DFO	A SARA permit is required to capture, handle and relocate SARA Schedule 1 fish or mussel species during construction. As indicated in Section 32 (1) of the SARA (2002), "No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species." As indicated in Section 73 (1) of the SARA (2002), "The competent minister may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed wildlife species, any part of its critical habitat or the residences of its individuals."
<b>PROVINCIAL PERMITS AND APPROVALS</b>		
Development Permits under <i>Ontario Regulations 158/06</i> (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), as per the <i>Conservation Authorities Act</i> (1990)	Essex Region Conservation Authority (ERCA)	Required for works within ERCA Regulated Areas, including shorelines, watercourses, wetlands and hazardous lands (flooding and erosion hazards, and unstable soils and bedrock).
Development Permits under <i>Ontario</i>	Lower Thames Valley	Required for works within LTVCA Regulated Areas, including shorelines, watercourses,





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**Table 1-1: Summary of Potential Environmental Permits/Regulatory Requirements**

Permit/Approval Name	Administering Agency	Description
<i>Regulations 152/06</i> (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), as per the <i>Conservation Authorities Act</i> (1990)	Conservation Authority (LTVCA)	wetlands and hazardous lands (flooding and erosion hazards, and unstable soils and bedrock).
Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) (surface and groundwater) under the <i>Ontario Water Resources Act</i> (1990)	Ministry of the Environment, Conservation and Parks (MECP)	Under Ontario Regulation (O. Reg.) 64/16 and O. Reg. 63/16, the MECP requires a PTTW for dewatering in excess of 400,000 L/day, and an EASR for dewatering between 50,000 and 400,000 L/day. This can include trench dewatering and taking water for hydrostatic testing from a pond, lake, etc. There are some exceptions for surface water takings where active or passive surface water diversions occur such that all water taken is returned to within another portion of the same surface water feature.
Permitting or registration under the <i>Endangered Species Act</i> (ESA) (2007)	MECP	An ESA permit or Registration is required for activities that could impact species protected under the ESA. Consultation will occur with the MECP to determine ESA permitting requirements.  As indicated in Section 9 (1) a of the ESA (2007), “No person shall kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species.”  As indicated in Section 17 (1), “the Minister may issue a permit to a person that, with respect to a species specified in the permit that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species, authorizes the person to engage in an activity specified in the permit that would otherwise be prohibited by section 9 or 10.”
Archaeological clearance under the <i>Ontario Heritage Act</i> (OHA)	Ministry of Tourism, Culture, and Sport (MTCS)	A Stage 1-2 archaeological assessment (AA) is required along the right-of-way (RoW) to identify areas of archaeological potential prior to any ground disturbances and/or site alterations. Depending on the results of the Stage 1-2 AA, Stage 3 and 4 AA’s may be required. The completed archaeological assessment reports are forwarded to the MTCS for review and comment.
Review of Built Heritage and Cultural Landscape under the OHA	MTCS	A Heritage Overview Study will be completed to determine the presence of built heritage and cultural landscapes. If identified, a Heritage Impact Assessment is required to determine the effects of the project on heritage resources and recommend mitigation measures, if necessary.



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**Table 1-1: Summary of Potential Environmental Permits/Regulatory Requirements**

Permit/Approval Name	Administering Agency	Description
<b>MUNICIPAL PERMITS AND APPROVALS</b>		
Noise By-Law 41-2004 and By-Law Amendments 43-2005 and 178-2017	Municipality of Chatham-Kent	Project activities should adhere to local noise by-laws.
Noise By-Law 69-99 and By-Law Amendment 106-2007	Town of Lakeshore	
Noise By-Law 2002-07	Town of Tecumseh	



## 2.0 ROUTING

### 2.1 THE PROCESS

The route selection process was undertaken in accordance with the OEB Environmental Guidelines which identify the environmental and socio-economic features, and the routing principles, to be considered. Enbridge Gas provided the route for the pipeline replacement, which, focused on the utilization of the existing road allowances along the existing pipeline route, route adjustments were developed to avoid three on easement cross country section of the existing pipeline. A routing study was not completed because the pipeline will be generally replaced within the existing road allowances in the immediate vicinity of the existing pipeline.

### 2.2 STUDY AREA

The terminal points of the proposed pipeline defined the western and eastern study area boundaries. The location of the western tie-in is a new pressure regulating station proposed for the south side of County Road 46, east of Concession Road 8, (located in the Town of Tecumseh). The eastern terminal point tie-in is the existing Enbridge Gas Port Alma Transmission Station (located in the Municipality of Chatham-Kent). The northern and southern extent of the study area was determined as the existing pipeline route, along with expanded 'decommissioning study areas' where the pipeline across agricultural land would be decommissioned and the new alternatives would be considered along municipal road easements.

Starting near the intersection of County Road 46 and Concession Road 8, the existing pipeline route follows County Road 46 east to Rochester-Townline Road, the crosses agricultural land to Lakeshore Road 309. The existing pipeline then follows Lakeshore Road 309 east to Wheatley Road where it crosses agricultural land to Goodreau Line. The existing pipeline then travels east on Goodreau Line to Simpson Line, where it crosses agricultural land to the existing Port Alma Transmission Station. The proposed pipeline would be situated within these existing road allowance easements; the currently proposed side of road is presented in the mitigation photomosaic (see Appendix H). The final location of the pipeline within the road allowance, including side of road, is still to be determined in consultation with the municipalities and affected landowners.

The proposed project route follows the same route as the existing Enbridge Gas Windsor pipeline with the exception of three areas where the pipeline travels across agricultural land. The existing pipe in these cross-country stretches would be decommissioned. Cross-country decommissioning study area one (1) is in the vicinity of the Comber Transmission Station and travels east from the intersection of County Road 46 and Rochester Townline Road to the intersection of South Middle Road and Lakeshore Road 309. Cross-country decommissioning study area two (2) is located between Lakeshore Road 309 and Goodreau Line in the vicinity of Wheatley Road. Cross-country decommissioning study area three (3) is located between Port Alma Station and the intersection of Goodreau Line and Simpson Line. The study area in these locations includes a 30 m wide buffer centered on the existing Windsor pipeline.



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There are new stations to be built or expanded in relation to the project. The final locations for these stations are still to be determined. It is expected that the study area identified in relation to the proposed pipeline route is sufficient to cover any new station locations.

The proposed study areas are shown on Figure 1, Appendix A.

### 2.3 IDENTIFY PRELIMINARY PREFERRED ROUTE

Enbridge Gas provided the preliminary preferred route, which considered pipeline route alternatives in three locations where the existing pipeline follow a cross county path within easement.

A field reconnaissance was undertaken by personnel of Enbridge Gas and Stantec on September 28, 2018 to review the three cross-country decommissioning study areas. This field reconnaissance also verified the features that had been mapped and documented any additional features that were not identified in the records review but that nonetheless required mapping. The field reconnaissance determined that at:

- Cross-country decommissioning study area one, the route should follow south on Rochester-Townline Road to South Middle Road, then east on South Middle Road to Lakeshore Road 309
- Cross-country decommissioning study area two, the route should follow south on Wheatley Road to Goodreau Line
- Cross-country decommissioning study area three, the route should follow east on Simpson Line to Port Road, then south on Port Road to the Port Alma Transmission Station

The preliminary preferred route is shown on Figure 2, Appendix A.

### 2.4 CONFIRMATION OF THE PRELIMINARY PREFERRED ROUTE

Input on the preliminary preferred route was sought through consultation (see Section 3). As no feedback was received that would cause a change in the preliminary preferred route, it was confirmed as the preferred route (Figure 4, Appendix A). The preferred route is currently illustrated within a general location. Enbridge Gas will undertake detailed design to determine the exact location of the running line, permanent easement, temporary land use requirements and road/watercourse crossing methods. Detailed design will also be influenced by supplemental studies (including environmental studies) and site-specific requests from landowners and agencies. In general, this micro-siting exercise will seek to avoid sensitive natural features to the extent practicable.



## 3.0 CONSULTATION PROGRAM

### 3.1 OBJECTIVES

Consultation and engagement is an essential requirement of the OEB Environmental Guidelines. Consultation and engagement is the process of identifying interested and potentially affected parties and informing them about the project, soliciting information about their values and local environmental and socio-economic circumstances, and receiving advice about key project decisions before those decisions are finalized.

The consultation program for this project included the following objectives:

- Identify interested and potentially affected parties early in the process
- Inform and educate interested parties about the nature of the project, potential impacts, proposed mitigation measures and how to participate in the consultation program in a clear, concise, relevant and timely manner
- Provide a forum for the identification of issues
- Identify how input will be used in the planning stages of the project
- Summarize issues for resolution, and resolve as many issues as feasible
- Revise the program to meet the needs of those being consulted, as feasible
- Develop a framework for ongoing communication during the construction and operation phase of the project

### 3.2 IDENTIFYING INTERESTED AND POTENTIALLY AFFECTED PARTIES

The identification of interested and potentially affected parties was undertaken using a variety of sources, including the OEB's OPCC Members List, the MECP's Environmental Assessment Government Review Team Master Distribution List, and the experience of Enbridge Gas and Stantec. Indigenous communities were identified through provision of a Project Summary to the Ministry of Energy, Northern Development and Mines in October 2018 (see Appendix B).

In addition, the parties listed below were among those considered when developing the initial stakeholder contact lists:

- Federal and provincial agencies and authorities, including the ERCA, LTVCA and members of the OPCC
- Municipal personnel
- Special interest groups
- Indigenous communities
- Directly affected and adjacent landowners



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The initial contact list was updated as the environmental study progressed because of changes in personnel, correspondence received and attendees at meetings and Information Sessions. The final Agency and Indigenous Contact List is located in Appendix B1.

Directly affected and adjacent landowners were identified through a search of municipal tax rolls and were tracked in a Landowner Contact List. Enbridge Gas also undertook direct consultation with landowners and elected officials. Members of the public who provided feedback or who attended an Information Session were tracked in a Public Contact List.

### 3.3 COMMUNICATION METHODS

#### 3.3.1 Newspaper Notices

A Notice of Information Session was published on February 5, 2019 in the Kingsville Reporter and on February 7, 2019 in the Essex Free Press, respectively. The Notice described the project, provided a map, noted the format, times and locations of the Information Sessions, and listed project contact information. The Notice was also delivered to homes located along the preliminary preferred route and within the study area.

Copies of tear sheets from the newspaper notices are located in Appendix B2.

#### 3.3.2 Letters and Emails

Letters and emails were sent to all parties identified on the Agency and Indigenous Contact List, Public Contact List and Landowner Contact List on February 1, 2019 to provide information on the project, the preliminary preferred route, and on the Information Session. Appended to the letters and emails was a map of the preliminary preferred route.

Generic copies of the letters noted above are located in Appendix B3.

#### 3.3.3 Display Boards, Newsletter and Exit Questionnaire

Display boards were developed for the Information Sessions. The display boards at the Information Sessions provided information on the project, the regulatory process, the preliminary preferred route, anticipated environmental and socio-economic impacts and mitigation, and next steps. A newsletter was prepared for distribution at the Information Sessions to summarize the content provided on the display boards.

An exit questionnaire was also provided to Information Session attendees. The exit questionnaire requested feedback on potential impacts, the preliminary preferred route, and the content of the Information Session.

Copies of the display boards, newsletters and exit questionnaires are in Appendix B4.



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### 3.3.4 Project Webpage

A project webpage was developed on the Enbridge Gas website ([uniongas.com/projects/windsor-line-replacement](http://uniongas.com/projects/windsor-line-replacement)). The webpage contains information on the project, the regulatory process and Enbridge Gas' commitment to the environment. Communication materials were regularly updated on the webpage as the environmental study progressed. The project website was communicated to interested and potentially affected parties on the newspaper notices, display boards and newsletters.

## 3.4 CONSULTATION EVENTS

### 3.4.1 Meetings

Meetings about the project have occurred between Enbridge Gas and agency staff, key stakeholders, Indigenous communities and directly impacted landowners, and will continue as the project progresses towards detailed design and construction.

### 3.4.2 Information Sessions

The Information Sessions were held at two locations. The first occurred on February 20, 2019 from 4:00 p.m. to 8:00 p.m. at the Ciociaro Club in the Town of Tecumseh. The second Information Session occurred on February 21, 2019 from 4:00 p.m. to 8:00 p.m. at the Comber & District Community Centre in the Town of Lakeshore.

The purpose of the Information Sessions were to:

- Inform the community about the project
- Outline the preliminary preferred route
- Provide attendees the opportunities to ask questions and comment on the project
- Respond to questions and comments

At each Information Session, Enbridge Gas and Stantec representatives were present to provide details on the project, answer questions and receive comments. Display boards and newsletters were provided to inform attendees about the project, and exit questionnaires were provided to encourage feedback (see Section 3.3.3). Nineteen completed exit questionnaires were received.

The Town of Tecumseh Information Session registered 31 attendees and the Town of Lakeshore Information Session registered 41 attendees. Attendees who registered their attendance were added to the appropriate contact list to receive future project notices. Attendees at the Town of Tecumseh Information Session were mainly landowners in the area of the preferred route who had questions about the project (tree damage, compensation, traffic impacts, location of facilities, etc.). Attendees at the Town of Lakeshore Information Session were mainly farmers along the preliminary preferred route who had similar questions about the project.



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## 3.5 INPUT RECEIVED

The consultation and engagement program allowed interested or potentially affected parties to provide input into the project. Input was evaluated and integrated into the project. The following sections summarize key input received.

A comment-response summary table and a copy of all written comments and responses are located in Appendix B5.

### 3.5.1 Public Input

Thirty-three (33) comments were received from the public at the time of writing this ER. The main areas of input included:

- Traffic, noise and dust impacts and mitigation measures
- Monetary compensation for loss of crops, business, landscaping and/or enjoyment of property
- Unique features along the route
- Existing utility lines
- Status and removal of easements on private property

### 3.5.2 Agency Input

Four (4) comments were received from agencies at the time of writing this ER.

- The ERCA requested that they be contacted to identify any “open cut” water crossings as permits will be required.
- The MTCS requested a copy of the materials provided at the open houses.
- The Technical Standards and Safety Authority (TSSA) requested confirmation that Enbridge will submit an Application for Review of Pipeline Project to the OEB.
- The Ministry of Transportation (MTO) provided a list of their general requirements for the project.

### 3.5.3 Municipal Input

Two (2) communications were received from municipalities at the time of writing this ER. Comments were:

- The Town of Leamington commented that they own a former rail corridor that is now part of the Trans Canada Trail network and wanted to confirm any impacts to the trail. They also wanted to confirm if the project will impact services provided to the greenhouse sector along Highway 77.
- The Town of Tecumseh requested to be consulted on the alignment of any plant within the County Road 46 RoW; they also noted concerns with the planned gas substation on the northwest corner of County Road 46 and 8<sup>th</sup> Concession Road as they are currently designing a trunk sanitary sewer and transmission watermain on County Road 46.





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### 3.5.4 Indigenous Input

No comments were received from Indigenous communities at the time of writing this ER.

### 3.5.5 Interest Group Input

No comments were received from interest groups at the time of writing this ER.

## 3.6 REFINEMENTS BASED ON INPUT

At each stage of the consultation program input received was compiled, reviewed, and incorporated into the environmental study process. Responses were provided, as applicable, to questions and comments received.

Enbridge Gas has committed to on-going consultation with directly affected and interested parties during detailed design and construction and will continue to respond to concerns through the life of the project. Input from agencies was reviewed and considered during the identification of potential impacts and determination of mitigation and protective measures.

The Enbridge Gas lands department will work with landowners to address specific concerns they may have regarding tile drainage repairs, monetary compensation, land access during construction, field crew access, and safety. Discussions between Enbridge Gas, County of Essex, the Municipality of Chatham-Kent and the Towns of Tecumseh and Lakeshore are ongoing regarding road crossing methods and depth of cover.

It is not uncommon for residential homes to be located adjacent to natural gas pipelines. The proposed pipeline will be designed to meet or exceed all safety regulations and codes. In addition, Enbridge Gas has a rigorous safety and integrity program so that the pipeline is constructed and maintained to operate safely.



## 4.0 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION

### 4.1 METHODOLOGY

The potential effects and impacts of the project on physical, biophysical and socio-economic features have been assessed along the proposed pipeline route. With an understanding of pipeline construction and operation activities (see Sections 4.1.1 and 4.1.2), the assessment:

- Describes the environmental and socio-economic setting along the proposed pipeline route, decommissioning locations and valve sites
- Predicts the effects and associated impacts of pipeline construction and operation activities
- Recommends supplemental studies, mitigation and protective measures (including pipeline construction methods and timing, site-specific mitigation, environmental protection measures, and compensation measures)
- Outlines the net impacts that are likely to remain

The inventory of existing environmental conditions, determination of effects and impacts, and mitigation and protective measures are a reflection of:

- Comments expressed during the consultation program
- Information available from published and unpublished literature
- Maps and digital data
- Mitigation guidance documents
- Field assessments conducted by Stantec technical staff
- The pipeline development experience of Enbridge Gas and Stantec

By necessity, the analysis, integration, and synthesis of the data is an iterative process since information becomes available at various stages of the study and at different mapping scales. The level of detail of data and mapping increases as the study moves from analysis of the study area, to analysis of alternative corridors, to a site-specific survey of features along the proposed pipeline route. The data available at the current stage of the environmental study is appropriate for predicting effects and potential impacts and recommending mitigation and protective measures.

Specific information requests were made to several agencies throughout the project. The information collected assisted in identifying environmental features and constraints located on and adjacent to the proposed pipeline route, the potential presence of SAR and their habitat, predicting effects and potential impacts, and developing mitigation and protective measures. Where agencies requested that information be kept confidential, such as the precise location of rare, threatened, vulnerable or endangered species and archaeological sites, such information has been withheld from the report or mapped in such a way that specific site locations cannot be determined.



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Preliminary site-specific field surveys were completed during preparation of the ER. This information was used to review background and third-party information, and to assist in developing mitigation and site-specific protective measures.

The existing conditions maps (Appendix C) have been generated from base mapping provided from Enbridge Gas (2010) and data obtained from Land Information Ontario (LIO). Conservation Authority regulated area data was obtained from ERCA and LTVCA. Scales have been adjusted from the original source to better represent the features mapped. Stantec has digitally reproduced features added to the base maps. Additional mapping sources are identified on the respective map, and in the references.

There are instances where field investigations are recommended along the proposed pipeline route before construction. Given the location of the project components and experience of Stantec in providing environmental services for natural gas pipelines, these supplemental studies are not expected to change the conclusions regarding potential adverse residual impacts. The environmental and socio-economic information presented in the ER is based on sources cited throughout.

## 4.1.1 Construction

### Constructing the Proposed Pipeline

The pipeline construction process includes various activities. For areas where an open trench is required, the following activities will be undertaken:

1. A pre-construction crew typically prepares the site by removing trees and shrubs as required from construction areas prior to the breeding bird nesting period (April 1 - August 31) with the intent of limiting the clearing as much as feasible. Tree and shrub removal typically occurs during the winter of the year of construction to avoid the breeding bird nesting period.
2. The first activity typically prepares the construction area by installing environmental (silt fencing) and safety fencing (orange construction fence) at the required locations. Aspects of any traffic management plans, such as the installation of signage and the establishment of alternative vehicle/pedestrian access, are also implemented at this time.
3. The trench is excavated with the use of a hoe excavator or trencher. Laneway and driveway access is maintained as requested and where feasible.
4. Pipe is laid on pipe supports on the working side of the construction zone adjacent to the area to be trenched.
5. Various segments of the pipe are welded together and lowered into the trench.
6. The installed pipeline and trench is backfilled with suitable material.
7. Following mainline pipeline installation, a tie-in crew will complete road and watercourse crossings to connect the mainline sections. Road crossings will be completed by HDD method or open cut. During open cut construction, the road will be temporarily closed, and the pipeline installed using steps 4 through 6. Watercourse crossings will be completed using trenchless installations methods (e.g. HDD, Boring) or open cut with a dam and pump to maintain flow. Trenchless pipeline installation will be considered were feasible and appropriate.



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8. The pipeline is hydrostatically tested with surface water from nearby sources or water trucked to the site from approved suppliers. Once hydrostatic testing has been completed the water is drained to a suitable area and according to permitting requirements, the pipeline is dried, purged of air and then filled with natural gas.
9. A service crew will connect new services to the new line.
10. Re-establishment of pre-construction conditions, including clean-up and repairs to roads, driveways, fences; disposal of debris; and seeding of disturbed areas, ditch banks and drainage feature crossings. Landscaping plans may also be developed for site restoration if necessary.
11. Post-construction monitoring to monitor the success of mitigation measures, including implementing additional mitigation measures as necessary to correct any issues.

Components of the project will be constructed using trenchless techniques; this may include watercourse crossings, road crossings and locations where field conditions favor using trenchless installation methods over trenching. The primary trenchless installation technique to be used for the project will be Horizontal directional drilling (HDD), which involves drilling a pilot bore hole underground horizontally and back-reaming the bore hole to the drill rig while pulling the pipe along through the hole.

### Decommissioning the Existing Pipeline

1. Site Preparation: The first crew to enter the construction site is typically the survey and staking crew who delineate the boundaries of the RoW and temporary work areas. Safety fence is installed at the edge of the construction RoW where public safety considerations are required, and aspects of the traffic management plan are implemented (i.e., signs, vehicle access)..
2. Clearing: Next, the clearing crew braces and cuts fences crossing the RoW. This crew also clears brush, trees and crops on the RoW to permit the removal of the existing pipeline where necessary .
3. Where the existing pipeline is located in agricultural land and needs to be removed the grading crew prepares the RoW for access by construction equipment. At this stage, the topsoil (on agricultural lands) or the duff layer (on natural lands) is stripped by bulldozers and graders then segregated so it will not be mixed with the subsoil later removed from the trench. Once the pipe is removed the subsoil is put back in the trench and compacted.
4. Trenching: Once topsoil stripping and grading are completed, a trench will be excavated using a hydraulic hoe to expose the existing pipeline. Laneways and driveways are left over the trench as long as feasible where requested by the landowner. In agricultural areas, tiles that are cut during the trench excavation are flagged and repaired as quickly as practical.
5. Pipe Removal: The existing pipeline is lifted out of the trench. Once the pipe is removed from the trench, it is cut and placed into bins at road crossings. The bins are then loaded onto trucks and removed for salvage. Select sections of pipe may be abandoned in place in accordance to CSA Z662, such as at watercourse, road crossings or front yards .
6. Backfilling: The backfilling crew will backfill the empty trench using the originally excavated subsoil and the pipe abandoned in place will be filled with a non-shrink grout or concrete.
7. Clean up: subsoil will be worked, leveled and picked of debris ie: stones etc. and then topsoil pulled and levelled.



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8. In agricultural lands where tile drainage has been disturbed they will be either replaced or repaired

9. All front yards and driveways will be cleaned and repaired to pre-condition or better

### 4.1.2 Operation

Pipeline operation consists of pressurized natural gas flowing through the pipeline. Mainline valves located at the proposed stations will serve to shut off and isolate the pipeline for maintenance and security purposes. Additional above-ground facilities along the pipeline include post-mounted signs identifying the pipeline, fence stiles, foot bridges for ditch crossings, and "test boxes" located along fence lines at roads that are used to assess the adequacy of the corrosion protection system.

Once the pipeline is operational, the following activities are undertaken to patrol and maintain the pipeline:

- Performing Standard Operating Practices on distribution mains and stations.
- Completing inspection of the entire pipeline by Enbridge Gas once a year to check for exposed pipelines, evidence of damage to aboveground equipment and piping, evidence of damage to underground piping and gas leaks, and identify any unassociated construction activity near the pipeline RoW
- Checking cathodic corrosion protection – an electric current that runs along the length of the pipeline to prevent the development of corrosion
- Reviewing operating conditions of pipeline facilities such as valve sites

## 4.2 PHYSICAL FEATURES

### 4.2.1 Bedrock Geology and Drift Thickness

#### Existing Conditions

The bedrock geology of the proposed pipeline route is comprised of limestone, dolostone and shale of the Hamilton Group and the Dundee Formation (OGS, 1991) (see Figure 1 in Appendix C).

As shown on Figure 2 in Appendix C, the average drift thickness down to the bedrock ranges from approximately 30 m for the western portion of the route to 70 m in the vicinity of Port Alma. Similarly, a review of available Water Well Records (WWR) within 500 m of the proposed pipeline route indicates the depth to bedrock is between approximately 22 to 58 m below ground surface (BGS) (Figure 5, Appendix C).

#### Potential Impacts

The planned excavation depth of the project is approximately 1 m below grade, with the potential to exceed this depth for watercourse and road crossings. Based on the shallow nature of the excavations and the significant depth to bedrock shown in the published information, bedrock is not likely to be encountered. As such, no potential impacts are anticipated.



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## Mitigation and Protective Measures

Because no potential impacts are anticipated, no mitigation or protective measures are required.

## Net Impacts

No significant adverse residual impacts to bedrock geology and drift thickness are anticipated.

## 4.2.2 Surficial Geology and Physiography

### Existing Conditions

The topography of the proposed pipeline route is generally flat to gently sloping. It is located within the St. Clair Clay Plain physiographic region of southern Ontario and is characterized by beveled till plains (Chapman and Putnam, 1984). Two small sections of beach deposits are mapped near the Port Alma Transmission Station in the east, and near the Sandwich Compressor Station in the west (Figure 3, Appendix C).

Surficial geology mapping indicates that the eastern half of the pipeline crosses glaciolacustrine-derived silty to clayey till (Figure 4, Appendix C). The western half of the pipeline crosses massive well laminated fine-textured glaciolacustrine deposits. There are isolated areas of the silty to clayey till along the western half of the pipeline and older alluvial deposits within the tributaries associated with the Ruscom River, the Belle River and the Puce River (OGS, 2010).

### Potential Impacts

Disturbance to the overburden along the proposed pipeline may cause surface soil erosion and/or watercourse sedimentation during construction and post-construction. Trench slumping may occur during construction.

### Mitigation and Protective Measures

Surface soil erosion can occur in the absence of vegetative cover. Where there is potential for soil erosion, the need for and location of erosion and sediment control (ESC) measures should be determined by an inspector with appropriate qualifications and installed prior to the commencement of work in the area.

When land is exposed, the exposure should be kept to the shortest practical period. Natural features should be preserved to the extent practical. Temporary vegetation and mulching should be used to protect areas as appropriate. Where required, natural vegetation should be re-established as soon as practical.

The contractor must obtain adequate quantities of materials to control erosion. Additional supplies should be maintained in a readily accessible location for maintenance and contingency purposes. ESC structures should be monitored to maintain their effectiveness through the life of construction and post-construction rehabilitation.



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Extreme precipitation events could result in damage to ESC measures which could lead to erosion. When site conditions permit, ESC measures should be repaired and re-installed on erosion susceptible surfaces. If the erosion is resulting from a construction-related activity, the activity should be halted immediately until the situation is rectified.

To avoid the trench from slumping, trench walls should be sloped and should be monitored during wet conditions for the potential to slump.

Slope stability should be reviewed at watercourse crossing locations. Watercourse banks should be seeded and stabilized immediately following crossing. ESC and stabilization measures should be maintained during construction, restoration and rehabilitation until vegetative cover is established. Where evidence of erosion exists, corrective control measures should be implemented as soon as conditions permit. Permits obtained under O.Reg. 158/06 from ERCA or O.Reg. 152/06 from LTVCA may contain conditions pertaining to ESC.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts to or from the overburden material are anticipated.

### 4.2.3 Hydrogeology

#### Existing Conditions

Based on physiographic (Chapman and Putnam, 1984) and surficial geology mapping (OGS, 2010), the proposed pipeline route will traverse fine textured glaciolacustrine deposits, and localized modern alluvial deposits at some tributaries of the Ruscom River, the Belle River and the Puce River. Aquifer vulnerability mapping by the Essex Source Protection Region and the Thames-Sydenham Source Protection Region indicates low aquifer vulnerability with minimal significant groundwater recharge areas along the pipeline route. There are no highly vulnerable aquifers along the pipeline route. There are two areas of significant groundwater recharge which are present at the eastern and western ends of the route, in the vicinity of Port Alma Transmission Station and the Sandwich Compressor Station, which primarily correspond to areas with coarser textured material (Appendix C, Figures 3 and 4). There is one area of significant groundwater recharge present to the east of the Belle River (ERSPC, 2015 and TSSPC, 2015).

The MECP WWRs within 500 m of the pipeline section indicate approximately 135 water supply wells, 68 of which are domestic (Appendix C, Figure 5). A review of 110 MECP WWR for which water level data was available indicated that 21 MECP WWR are installed within the overburden at depths ranging from 27 m BGS to 52 m BGS. The groundwater level measured in these wells ranged from 1.8 m BGS to 16.8 m BGS.

Regional groundwater flow near the proposed pipeline route in the overburden aquifer is generally to the north towards Lake St. Clair (WHI, 2007), with groundwater flow near the eastern extent of the pipeline possibly to the south towards Lake Erie. Local groundwater flow conditions are impacted by surface water features.



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Within the Essex Region Source Protection Area and Thames-Sydenham Source Protection Area, all municipal drinking water intakes use surface water from Lake Erie, Lake St. Clair, the Detroit River or other sources to supply drinking water to the residents and other water users in the region. The proposed pipeline does not cross through any wellhead protection areas (WHPA) since there are no municipal groundwater supply systems nearby. A review of nearby surface water system intake protection zones (IPZs) indicates that the proposed pipeline does not cross any IPZ-1 or IPZ-2 for a surface water system (ERSPC 2015 and TSSPA 2015). The majority of municipal drains and roadside ditches along the pipeline route are part of the IPZ-3 for the municipal systems; however, the proposed pipeline is not considered a significant source water threat within an IPZ-3.

Appendix C, Figure 5 shows groundwater conditions.

### Potential Impacts

#### Hydrostatic Testing and Dewatering/Sand-pointing

A hydrostatic test will be undertaken for the proposed pipeline.

Where trenches encounter shallow groundwater conditions or following a large precipitation event, removing water from the trench (known as dewatering) may be necessary. During trench dewatering, discharge water will be released to the environment. An uncontrolled discharge of water could cause downstream flooding, erosion, sedimentation or contamination.

#### Private Water Wells

There are approximately 135 water supply wells within 500 m of the proposed pipeline route, 68 of which are domestic. The majority of these private domestic supply wells are bedrock wells and are located more than 50 m from the proposed pipeline route, with only 30 WWR mapped within a 50-m radius. Of the 30 WWR mapped within a 50-m radius, seven (7) were screened within the overburden, at depths ranging from 29 m BGS to 45 m BGS. Depending on the proximity to wells, the depth of the well installation and the groundwater levels encountered during excavation, trench dewatering has the potential to impact water well quality or quantity at some of the overburden supply wells.

#### Municipal Water Supply

The proposed pipeline does not extend through any WHPAs associated with any municipal groundwater supply system but does extend through the IPZ-3 for the nearby surface water systems.

Based on *the Clean Water Act (2006)*, there are no significant chemical, pathogen or dense non-aqueous phase liquids source water threats to municipal supply sources based on the construction or operation of the proposed pipeline.

### Mitigation and Protective Measures

#### Hydrostatic Testing and Dewatering/Sand-pointing

For groundwater dewatering, the MECP allows registration under the EASR for construction dewatering projects where groundwater takings will be greater than 50,000 L/day and less than 400,000 L/day; however, should groundwater takings exceed 400,000 L/day, a PTTW may be required from the MECP.





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If surface water is used as the source water for the hydrostatic test, a PTTW application would be required and would include an assessment of the capacity of the source to provide the required water without impacting the ecosystem, and recommendations for mitigation measures such as screened water intakes to limit intake of debris and organisms and energy dissipation/erosion control measures during discharge to limit erosion and sedimentation.

To reduce the potential for erosion and scouring at discharge locations during construction dewatering/sand-pointing and/or hydrostatic testing, energy dissipation techniques should be used. Discharge piping should be free of leaks and should be properly anchored to prevent bouncing or snaking during surging. Protective measures may include dewatering at low velocities, dissipating water energy by discharging into a filter bag or diffuser, and utilizing protective riprap or equivalent. If energy dissipation measures are found to be inadequate, the rate of dewatering should be reduced or dewatering discontinued until satisfactory mitigation measures are in place. Discharge should be monitored to make sure that no erosion or flooding occurs.

To assess the potential for introduction of contaminated water to soils or bodies of water, testing of hydrostatic and trench dewatering discharge water should be considered. Testing requirements can be influenced by the nature and quality of the source water used, any additives to the test water, the nature of the pipeline, and pipeline contents. An environmental consultant should be consulted to determine what testing is necessary for the discharge water.

### Private Water Wells

A private well survey will take place to assess domestic groundwater use near the preferred pipeline and a private well monitoring program may be recommended for residents who rely on overburden groundwater supply for domestic use.

### Municipal Water Supply

There are no nearby municipal supply wells, and therefore additional mitigation measures are not required to protect groundwater drinking supply sources.

During construction, the primary concern to surface water quality is the potential for a contaminant spill during a large storm event. To address this concern, the following mitigation measures are proposed:

- Refueling of equipment should be undertaken 50 m from wetlands and watercourses to reduce potential impacts to surface water and groundwater quality in the event that an accidental spill occurs. If a 50 m refueling distance is not possible, under approval from on-site environmental personnel, special refueling procedures for sensitive areas should be undertaken that include, at a minimum, using a two-person refueling system with one worker at each end of the hose.
- To reduce the impact of potential contaminant spills, the contractor should implement spill management protocols such as secondary containment of any temporary fuel storage and preparation of a spill response plan.
- Work should be limited or stopped during and immediately following significant precipitation events (i.e. 100 year storm event), at the discretion of on-site environmental personnel.



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### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on groundwater are anticipated.

### 4.2.4 Extractive Resources: Aggregates and Petroleum Pools

#### Existing Conditions

A review of the Essex County Official Plan (2014), the Town of Lakeshore Official Plan (2010) and the Municipality of Chatham-Kent Official Plan (2018) indicates that no aggregate resources are located within the study area. However, the Municipality of Chatham-Kent Official Plan identifies an abandoned petroleum pool within the study area.

A map of extractive resources is located in Appendix C, Figure 6.

#### Potential Impacts

Since the proposed pipeline route is located more than 300 m from the nearest active petroleum pool, no impacts to petroleum pools are anticipated. The pipeline is also not anticipated to constrain development of any aggregate site.

#### Mitigation and Protective Measures

Because no potential impacts are anticipated, no mitigation or protective measures are required.

### Net Impacts

No significant adverse residual impacts on extractive resources are anticipated.

### 4.2.5 Soil and Soil Capability

#### Existing Conditions

There are 3 soil types identified along the proposed pipeline route; Brookston Clay, Caistor Clay and Bottom Lands (OMAFRA, 2019a). The Soil Survey of Essex County (Richards et al., 1949) describes these soils in the following way.

The Brookston clay soil series are formed from lacustro-morainic materials. It is the poorly drained member of the Huron catena and has a fairly high organic matter content. There can be grit and small stones throughout the profile but occasionally there are none in the upper three feet.

The Caistor series is a member of the Haldimand catena and imperfectly drained. The soils developed from ground moraine till. The parent material is high in limestone, but the shale present has a pronounced effect on the profile.

Bottom Land series is comprised of soils adjacent to streams and subject to flooding, with variable characteristics and poorly differentiated horizons. The soil strata usually consist of intermixed fine and coarse textured materials.



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Soil capability for agriculture is mapped by Agriculture and Agri-Food Canada. Lands classified as Class 1 are the most agriculturally productive, while those classified as Class 7 have the lowest capability for agriculture. Class 1 to 5 agricultural lands are generally arable, while classes 1 through 3 are defined by the Ontario Ministry of Agriculture, Food and Rural Affairs to be prime agricultural soils for common field crop production.

Table 4-1 shows the soil types mapped along the proposed pipeline route, the percentage of the proposed pipeline route that the soil covers and the Canada Land Inventory for Agriculture (CLI) rating of each soil type. The CLI rating of most of the agricultural lands along the proposed pipeline route is Class 2. Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices (AAFC, 2005). Soil types associated with the Belle River and Ruscom River are Class 3 and 5, with moderately severe to very severe limitations that restrict crops and require special conservation practices or both. The remainder is labeled as water, road or Not Mapped. Approximately 98% of the proposed pipeline route length is defined as prime agricultural soils.

**Table 4-1: Soil and Soil Capability along Preliminary Preferred Route**

Soil Type	% of Route	CLI Class
Brookston/Brookston Clay	98	2
Caistor Clay	1	3
Bottom Land	0.5	5
Built up Area	0.5	N/A

Maps of soil type and soil capability are in Appendix C, Figures 7 and 8, respectively.

### Potential Impacts

The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. Where there is interaction with agricultural land, there are potential impacts to topsoil as a result of construction including compaction, loss of organic matter and degraded soil structure. Where feasible, topsoil will not be removed from the site. Excess subsoil may be removed from the site.

Trenching and construction activities across agricultural land have the potential to affect soil quality and agricultural capability. The movement of heavy machinery on wet soil may cause rutting, compaction, and mixing of topsoil with subsoil. When exposed, soils are more prone to erosion due to the loss of vegetative cover. Improperly salvaged topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion, which can potentially decrease crop yields.

Where equipment is moving from one agricultural field to another there is the potential for the spread of soil pests/diseases to previously unimpacted fields.



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### Mitigation and Protective Measures

#### Excess Soil

It is noted that the MECP has proposed regulating the movement of excess soils in the province of Ontario. Though not project is not expected to generate significant quantities of excess soil, Enbridge should retain or consult with a qualified person who is knowledgeable in the current excess soils guidelines, in order to make recommendations for the management of excess soils for this project.

#### Wet Soil Shutdown

To the extent feasible, construction activities should occur during drier times of the year. Agricultural lands affected by heavy rainfall events should be monitored for wet soil conditions, to avoid the potential for topsoil and subsoil mixing and loss of structure. Construction activities should be temporarily halted on lands where excessively wet soil conditions are encountered. Enbridge Gas's on-site inspection team should determine when construction activities may be resumed.

If a situation develops that necessitates construction during wet soil conditions, soil protection measures should be implemented, such as confining construction activity to the narrowest area practical, installing surface protection measures, and using wide tracked or low ground pressure vehicles.

#### High Winds

During construction activities, weather should be monitored to identify the potential onset of high wind conditions and to preserve topsoil. In the event that high winds occur, the contractor should implement protective measures such as:

- Suspend earth moving operations
- Apply dust suppressants or vegetate the piles
- Protect soil stockpiles with a barrier or windscreen

In conjunction with the above measures, all required materials and equipment should be readily accessible and available for use as required.

#### Soil Stripping

Within agricultural lands Enbridge Gas should discuss with the landowner the proposed method of handling topsoil on their property. Landowner requests, and preferences for additional stripping or no stripping, should be accommodated where practicable. Topsoil depths should be measured prior to stripping so that the proper depth of topsoil is removed and replaced. Where stripping is undertaken on agricultural lands, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. Where the pipeline crosses woodlands the organic and duff layer should be stripped where feasible, given local substrate conditions. Where stripping is undertaken in woodlots, organic material and subsoil should be stripped and stockpiled separately to avoid mixing.

If clean-up is not practical during the construction year, it should be undertaken in the year following construction, starting once the soils have sufficiently dried. Interim soil protection measures should be implemented in sensitive areas to stabilize the RoW for over-wintering.



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## Soil Compaction

Within agricultural lands where soil has been compacted by the construction process, an agrologist should determine where decompaction may be necessary. Compaction can be alleviated by using farm equipment such as an agricultural subsoiler prior to replacing the topsoil. Sub-soiling with an agricultural subsoiler, followed by discing, chisel ploughing and cultivating, to smooth the surface, should be considered on agricultural lands. In high traffic areas of the RoW where deep compaction persists, additional deep tillage or subsoiling may be required on a site-specific basis. Soil density and/or penetrometer measurements on and off the easement may be used as a means of assessing the relative degree of soil compaction caused by construction along the RoW as well as determining that the RoW has been sufficiently decompacted.

## Soil Pests/Diseases

In consultation with the landowner and an agrologist, Enbridge Gas will develop and implement an agricultural soil sampling plan for potential pests and/or diseases that are known to the area. If the results indicate an issue or concern, in consultation with the landowner, Enbridge Gas will work with the agrologist to develop a best practice protocol.

Any imported topsoil used for rehabilitation will also have a composite sample analyzed for identified concerns before it is placed on the easement.

## **Net Impacts**

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on soil or soil capability are anticipated.

### **4.2.6 Agricultural Tile Drains**

#### **Existing Conditions**

Along the proposed pipeline route there are multiple properties mapped as containing agricultural tile drains. The majority of the proposed easement length (64%) is mapped as containing systematic agricultural tile, while 1% is mapped as consisting of random agricultural tile. The remaining 35% is not mapped as containing agricultural drainage tile (OMAFRA, 2019b). A map of agricultural tile drains is located in Appendix C, Figure 9.

#### **Potential Impacts**

The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. Where there is interaction with agricultural land, construction activities, including trenching and the movement of heavy machinery, have the potential to crush and/or sever agricultural tile drains.



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### Mitigation and Protective Measures

Enbridge Gas should undertake consultation with landowners of agricultural fields to confirm where systematic tile drainage is present. If tile drainage is present, Enbridge Gas should undertake standard mitigation during trenching, including:

- Develop site specific tile plans with an independent tile contractor
- Conduct pre-tiling, and install header tile to maintain tile system function
- Excavate the pipeline trench to a depth that allows clearance between the top of the proposed pipeline and the bottom of existing drainage systems
- Record and flag severed or crushed tile drains
- If a main drain, header drain, or large diameter drain is severed, maintain field drainage and prevent flooding of the work area and adjacent lands through temporary repairs
- Cap the downstream side of severed drains that cross the trench to prevent the entry of soil, debris and rodents, as required
- Repair damaged and severed drains following construction
- After repair and before backfilling, invite the landowner to inspect and approve the repair

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on agricultural tile drains are anticipated.

### 4.2.7 Natural Hazards

#### Existing Conditions

Natural hazards are elements of the physical environment that have the potential to affect a project in an adverse manner. Potential natural hazards along the proposed pipeline route are limited. Natural hazards that may occur are seismic activity and flooding.

The proposed pipeline route lies within the southern Great Lakes Seismic Zone (Natural Resources Canada, 2016). This zone has a low to moderate level of seismicity when compared to the more active seismic zones to the east, along the Ottawa River and in Quebec. Over the past 30 years, on average, 2 to 3 magnitude 2.5 or larger earthquakes have been recorded in the southern Great Lakes region. By comparison, over the same time period, the smaller region of Western Quebec experienced 15 magnitude 2.5 or greater earthquakes per year.

Three moderately sized (magnitude 5) events have occurred in the 250 years of European settlement of this region, all of them in the United States - 1929, Attica, New York, 1986, near Cleveland, Ohio, and 1998, near the Pennsylvania/Ohio border. All three of these earthquakes were widely felt but caused no damage in Ontario.

A map of the floodplain and regulation limits of ERCA and LTVCA is located in Appendix C, Figure 10.



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## Potential Impacts

The probability of significant seismic activity in the area traversed by the proposed pipeline is low; therefore, no potential impacts are anticipated.

The likelihood of a flooding event interfering with pipeline construction is reduced by construction occurring outside of the spring freshet. A flooding event during construction could result in construction delays, soil erosion, sedimentation of a watercourse, trench slumping, and damage or loss of construction equipment and contamination of a watercourse as a result of equipment entering a watercourse. The nature of these impacts would depend on the spatial extent, duration, and magnitude of the flooding event.

## Mitigation and Protective Measures

If flooding necessitates a change in the construction schedule, affected landowners and regulatory agencies should be notified and construction should continue at non-affected locations. Temporary workspaces should be located above the floodplain to the extent practical, unless necessary for watercourse crossings. All work in the floodplains will be subject to a permit under O.Reg.158/06 from ERCA or O.Reg.152/06 from LTVCA.

## Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from natural hazards are anticipated.

## 4.3 BIOPHYSICAL FEATURES

### 4.3.1 Aquatic Features

#### Existing Conditions

The proposed pipeline route passes through three upper tier watersheds (Cedar, Lower Thames, and Rondeau) that consist of ten subwatersheds including:

- The Little River Subwatershed
- Pike Creek Subwatershed
- Puce River Subwatershed
- Belle River Subwatershed
- Duck Creek Subwatershed
- Moison Creek Subwatershed
- Ruscom River Subwatershed
- LTVCA 1 Subwatershed
- LTVCA 3 Subwatershed
- LTVCA 4 Subwatershed



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These subwatersheds lie within the jurisdiction of two Conservation Authorities, including seven subwatersheds in the ERCA regulated area, and three subwatersheds in the LTVCA regulated area (Appendix C, Figure 10). Subwatershed boundary information was requested from the ERCA and LTVCA to identify the watershed where each crossing is located. At the time of preparing this report, LTVCA had not provided this information. For the purposes of this report, subwatersheds located within the LTVCA jurisdiction consist of the Quaternary Watersheds identified in the LIO database and have been given a naming convention of LTVCA 1 through LTVCA 4. Refer to Figure 10 in Appendix C for watershed and subwatershed areas.

The proposed pipeline route crosses 29 watercourses, identified as stream crossings (SC1 - SC26, SC29, SC78 and SC80). In addition to the watercourse crossings, there are 53 watercourses that flow parallel to the pipeline within the RoW identified as S27, S28, S30 to S82 (Table 4-3). Each of the proposed watercourse crossings are identified with an individual station ID where the pipeline crosses the channel and habitat assessments were conducted. Watercourses located within the RoW but not crossed by the pipeline, were assessed along the channel within the reach flowing parallel to the pipeline. In cases where the watercourse is parallel to the pipeline for extended distances, multiple Stations were created to document habitat along the entire reach. Stations were created approximately every 1 km, when there was a habitat change or at the confluence of two drains in the RoW. All watercourses within the Study Area are managed as municipal drains and have a DFO drain classification (Table 4-3).

Spring site investigations were conducted on April 3, 4, and 5, 2019, at the proposed crossing locations to confirm the presence of mapped watercourses and identify crossings that may not be in the LIO database under spring conditions. Data collected during field investigations was used to provide a preliminary identification of potential that a watercourse supports fish that are part of or support a Commercial, Recreational, or Aboriginal (CRA) fishery. Additional field investigations will be conducted in summer 2019 to further refine the fish habitat designation at each crossing. A watercourse supports a CRA fishery if it meets one or more of the following criteria:

- Mapping from LIO database suggests that watercourse is directly connected to fish habitat downstream.
- Conditions of channel suggest that flow is permanent.
- Absence of visible barriers to fish passage (i.e., steep slopes, waterfalls).
- Presence of aquatic species at risk indicated by Department of Fisheries and Oceans (DFO) aquatic species at risk mapping (DFO 2017).
- Habitat documented during field investigations is suitable to support fish.
- Fish were observed near the crossing during field investigations.
- Instances where the LIO database indicates that the drain is tiled and therefore not present on the surface were determined to not support a CRA fishery.

Additional information used to assess habitat sensitivity included using the DFO drainage classification developed for the Municipal Drain Class Authorization Process. Drainage classification is determined by a combination of flow periodicity (i.e., permanent vs. intermittent), thermal regime, fish species present,





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and time since the last drain cleanout. The classification system provides an indication of fish habitat sensitivity in the drain and the level of approval required for drainage maintenance. For the purposes of this project, drainage classification was used to identify if a drain was classified as fish habitat and if sensitive habitat is present in the drain. **Error! Reference source not found.** provides a summary of the drainage classification system (DFO 2014).

**Table 4-2: Drain Classification Summary (DFO 2014)**

Drain Classification	Flow	Thermal Regime	Species	Time Since Last Cleanout
A	Permanent	Cold/Cool/Unknown	No trout or salmon	N/A
B	Permanent	Warm	Top Predators and/or Ecosystem Indicators	Less than 10 years
C	Permanent	Warm	Forage Fish	N/A
D	Permanent	Cold/Cool/Unknown	Trout and/or Salmon	N/A
E	Permanent	Warm	Top Predators and/or Ecosystem Indicators	Greater than 10 years
F	Intermittent	N/A	N/A	N/A
T	Tiled	N/A	N/A	N/A

The following drain types are located at watercourse crossings along the preferred route:

- Six Class C drains, including SC10, SC14, SC16, SC19, SC20, and SC21
- Two Class E drains, including SC3, and SC17
- Fifty Class F drains, including SC1, SC4, SC5, SC8, SC9, SC11, SC12, SC15, S27, S28, S30 to S39, S41 to S50, S52, S53, S55, S61 to S63, S67 to S76, S78, and S80 to S82
- Ten drains classified as Class T (Tiled) drains where a feature was assessed at the crossing location, including SC7, SC29, S40, S51, S54, S56 to S59, and S79

The remaining watercourses crossed along the preferred route did not have a DFO drain classification.

The following is a summary of the watercourses within the Study Area organized by subwatershed. Details for each watercourse are provided in Appendix D. Fish species documented in available background data are provided in Table 4-4.

### Little River Subwatershed (Stream Crossings: SC1 to SC4 and SC78. Within RoW: S79)

There are five watercourse crossings and one watercourse flowing parallel to the pipeline in this subwatershed. Minnows (Cyprinids) were observed at the culvert in SC2. Except for SC4 which was dry, watercourses within this subwatershed contained either flowing or standing water at the time of field investigations. The watercourses are classified as Class E, or Class F, drains, or were Not Rated (NR). Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain



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Classifications, however there is potential for the 9<sup>th</sup> Concession Drain (SC3), which has a drain class E to have low water or dry conditions in summer.

### Pike Creek Subwatershed (Stream Crossings: SC5 to SC9, SC29, SC80. Within RoW: S27, S28, and S30)

There are seven watercourse crossings and three watercourses flowing parallel to the pipeline in this subwatershed. All watercourses had flowing water during the spring assessment. Watercourses in this subwatershed were classified as drain Class F, Class T or NR. Although two watercourses (SC7, SC29) were classified as Class T drains, a surface water feature was observed with flowing water at the time of field investigations with conditions suggesting permanent flow at these locations. These locations will be assessed in the summer to determine if water and fish are present in these channels.

### Puce River Subwatershed (Stream Crossings: SC10, and SC11. Within RoW: S31 to S36 and S81)

There are two watercourse crossings and three watercourses flowing parallel to the pipeline in this watershed. S31 to S34 are stations along Middle Road Drain and S35 and S36 along 4<sup>th</sup> Concession Drain. All watercourses had flowing or standing water in the channel during the spring assessment. Watercourses in this subwatershed were classified as drain Class C and drain Class F. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### Belle River Subwatershed (Stream Crossings: SC12, and SC13. Within RoW: S37 to S40)

There are two watercourse crossings and three flowing watercourses parallel to the pipeline in this watershed. S38 and S39 were stations along the Seguin Drain. All watercourses had flowing or standing water in the channel during the spring assessment. Watercourses in this subwatershed were classified as drain Class F, Class T, or NR. Belle River has a record of aquatic SAR (Spotted Sucker) (DFO 2019). Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications. The Belle River Drain is classified as drain Class NR, however, conditions observed during spring field investigations suggest that flow is permanent.

### Duck Creek Subwatershed (Stream Crossings: SC14. Within RoW: S41 and S42)

There is one watercourse crossing and two watercourses parallel to the pipeline in this subwatershed. SC14 (Duck Creek) is classified as drain Class C and has a record of aquatic SAR (Grass Pickerel) (DFO 2019). S41 and S42 had standing water in the channel and are classified drain Class F. DFO SAR mapping shows Grass Pickerel habitat at SC42, however, much of the channel was dry during spring field investigations and lacked connectivity to Duck Creek, which is not suitable to support Grass Pickerel. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### Moison Creek Subwatershed (Stream Crossings: SC15 and SC16. Within RoW: S43)

There are two watercourse crossings and one watercourse parallel to the pipeline in this subwatershed. SC16 (Moison Creek) is classified as drain Class C and has a record of aquatic SAR (Grass Pickerel). SC15 (Moison Creek Branch) is classified as drain Class F and has a record of Grass Pickerel. At the time of the spring habitat assessment, SC15 had standing water in the channel with no connection to watercourses in the RoW. The RoW was dry in east and west directions from SC15. SC15 is likely to be



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dry in summer and unlikely to provide suitable habitat to Grass Pickerel. SC43 (Bondy Drain) was a flowing watercourse with connection to Moison Creek through a culvert at Lakeshore Road 231. Bondy Drain is classified as Class F drain and is documented as providing habitat to Grass Pickerel. There is potential for fish to migrate into Bondy Drain from Moison Creek. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### Ruscom River Subwatershed (Stream Crossings: SC17 to SC20. Within RoW: S44 to S52, and S82)

There are four watercourse crossings and seven watercourses parallel to the pipeline in this subwatershed. Stations S44 to S45 are located along Middle Road Drain Extension and S48 to S50 are located along Knister Drain. Crossing SC17 (Ruscom River) is classified as drain Class E. DFO mapping indicates there are records of aquatic SAR (mussels) and Critical SAR Habitat (DFO 2019). The Middle Road Drain Extension, Middle Road Drain, Armstrong Brown Drain and Knister Drain found within the RoW to the east and west of Ruscom River are also identified as providing aquatic SAR habitat. These drains are drain Class F and were flowing during the spring assessment. The main channels of Middle Road Drain and Knister Drain are directly connected to the Ruscom River, and fish migration barriers were not observed, and as a result, fish are anticipated to move freely between these habitats. The remaining watercourse crossings in this watershed are classified as Class C drains or are NR. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### LTVCA 1 (Stream Crossings: SC21 to SC26. Within RoW: S22 and S53 to S75)

There are six watercourse crossings and twenty-two watercourses parallel to the pipeline in this subwatershed. S71 and S72 are stations along Burton Drain. Big Creek Drain – West Branch (SC21) is classified as a Class C drain and the remaining watercourses being NR. Flowing or standing water was observed at most stream crossings within this subwatershed. Watercourses within the RoW are classified as Class F, or Class T drains, or are NR. Conditions observed during spring field investigations indicate that watercourses along the pipeline route in this watershed are likely intermittent and likely to be dry during the summer. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### LTVCA 3 (Within RoW: S76 and S77)

Only two watercourses flowing parallel to the pipeline are found in this watershed. Both watercourses were flowing during the spring assessment and both are classified as Class F drains. Habitat observed during spring field investigations at each crossing is consistent with the DFO Drain Classifications.

### LTVCA 4 (No watercourses crossed or within RoW)

There are no watercourse crossings or watercourses parallel to the pipeline within the RoW in this watershed.



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**Table 4-3: Watercourses Crossings and Watercourses Flowing Parallel to the Pipeline within RoW Along the Proposed Pipeline Route**

Crossing ID	Conservation Authority	Official Name	Legal Status	Drain Type	DFO Class Authorization Type
<b>WATERCOURSE CROSSINGS (SC)</b>					
SC1	ERCA	Hurley Relief Drain	Municipal Drain	Open	F
SC2	ERCA	Washbrook Drain	Municipal Drain	Open	NR
SC3	ERCA	9th Concession Drain	Municipal Drain	Open	E
SC4	ERCA	Little River Drain	Municipal Drain	Open	F
SC5	ERCA	Sullivan Creek Drain	Municipal Drain	Open	F
SC6	ERCA	Gzowski Drain	Municipal Drain	Open	NR
SC7	ERCA	Pike Creek Drain	Municipal Drain	Closed/Tiled	T
SC8	ERCA	Croft Drain	Municipal Drain	Open	F
SC9	ERCA	8th Concession Centreline Drain	Municipal Drain	Open	F
SC10	ERCA	Puce River Drain	Municipal Drain	Open	C
SC11	ERCA	4th Concession Drain	Municipal Drain	Open	F
SC12	ERCA	Taylor Outlet Drain	Municipal Drain	Open	F
SC13	ERCA	Belle River Drain	Municipal Drain	Open	NR
SC14	ERCA	Duck Creek	Municipal Drain	Open	C
SC15	ERCA	Moison Creek Branch	Municipal Drain	Open	F
SC16	ERCA	Moison Creek	Municipal Drain	Open	C
SC17	ERCA	Ruscom River	Municipal Drain	Open	E
SC18	ERCA	Alexander Drain	Municipal Drain	Open	NR
SC19	ERCA	Malden Road Drain Outlet	Municipal Drain	Open	C
SC20	ERCA	Malden Road Drain Outlet Extension	Municipal Drain	Open	C
SC21	LTVCA	Big Creek Drain - West Branch	Municipal Drain	Open	C
SC22	LTVCA	Storey Drain	Municipal Drain	Open	NR



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**Table 4-3: Watercourses Crossings and Watercourses Flowing Parallel to the Pipeline within RoW Along the Proposed Pipeline Route**

Crossing ID	Conservation Authority	Official Name	Legal Status	Drain Type	DFO Class Authorization Type
SC23	LTVCA	Robb-Dales Drain	Municipal Drain	Open	NR
SC24	LTVCA	Plouffe & McKeown Drain	Municipal Drain	Open	NR
SC25	LTVCA	East Branch of Big Creek Drain	Municipal Drain	Open	NR
SC26	LTVCA	Government Drain	Municipal Drain	Open	NR
SC29	ERCA	West Townline Drain (Mooney Creek)	Municipal Drain	Closed/Tiled	T
SC78	ERCA	Hurley Drain	Municipal Drain	Open	F
SC80	ERCA	Ruston Drain	Municipal Drain	Open	F
<b>WATERCOURSES FLOWING PARALLEL TO THE PIPELINE WITHIN ROW (S)</b>					
S27	ERCA	O'Keefe Drain	Municipal Drain	Open	F
S28	ERCA	Gzowski Drain	Municipal Drain	Open	F
S30	ERCA	Doyle Drain	Municipal Drain	Open	F
S31	ERCA	Middle Road Drain	Municipal Drain	Open	F
S32	ERCA	Middle Road Drain	Municipal Drain	Open	F
S33	ERCA	Middle Road Drain	Municipal Drain	Open	F
S34	ERCA	Middle Road Drain	Municipal Drain	Open	F
S35	ERCA	4th Concession Drain	Municipal Drain	Open	F
S36	ERCA	4th Concession Drain	Municipal Drain	Open	F
S37	ERCA	18-19 Side Road Drain	Municipal Drain	Open	F
S38	ERCA	Seguin Drain	Municipal Drain	Open	F
S39	ERCA	Seguin Drain	Municipal Drain	Open	F
S40	ERCA	Concession 1A Drain	Municipal Drain	Closed/Tiled	T
S41	ERCA	Diemer-Kwiatkowski Drain	Municipal Drain	Open	F



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**Table 4-3: Watercourses Crossings and Watercourses Flowing Parallel to the Pipeline within RoW Along the Proposed Pipeline Route**

Crossing ID	Conservation Authority	Official Name	Legal Status	Drain Type	DFO Class Authorization Type
S42	ERCA	West 2nd Concession Road N of County Road 46 Drain	Municipal Drain	Open	F
S43	ERCA	Bondy Drain	Municipal Drain	Open	F
S44	ERCA	Middle Road Drain Extension	Municipal Drain	Open	F
S45	ERCA	Middle Road Drain Extension	Municipal Drain	Open	F
S46	ERCA	Middle Road Drain	Municipal Drain	Open	F
S47	ERCA	Armstrong Brown Drain	Municipal Drain	Open	F
S48	ERCA	Knister Drain	Municipal Drain	Open	F
S49	ERCA	Knister Drain	Municipal Drain	Open	F
S50	ERCA	Knister Drain	Municipal Drain	Open	F
S51	ERCA	Bellmore D&W Drain	Municipal Drain	Closed/Tiled	T
S52	ERCA	Malden Road Drain	Municipal Drain	Open	F
S53	ERCA	Bellemore Drain	Municipal Drain	Open	F
S54	LTVCA	Metz-Calder Drain	Municipal Drain	Closed/Tiled	T
S55	LTVCA	Government Drain #2	Municipal Drain	Open	F
S56	LTVCA	Mellow Drain	Municipal Drain	Closed/Tiled	T
S57	LTVCA	Lathuille Drain	Municipal Drain	Closed/Tiled	T
S58	LTVCA	East 9th Concession Drain	Municipal Drain	Closed/Tiled	T
S59	LTVCA	Labonte – Breault Drain	Municipal Drain	Closed/Tiled	T
S60	LTVCA	18-19 Sideroad & Hill Drain	Municipal Drain	Open	NR
S61	LTVCA	Keith Drain	Municipal Drain	Open	F
S62	LTVCA	Broullette-Donais Drain	Municipal Drain	Open	F
S63	LTVCA	Dawson Drain	Municipal Drain	Open	F



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**Table 4-3: Watercourses Crossings and Watercourses Flowing Parallel to the Pipeline within RoW Along the Proposed Pipeline Route**

Crossing ID	Conservation Authority	Official Name	Legal Status	Drain Type	DFO Class Authorization Type
S64	LTVCA	Baker Drain	Municipal Drain	Open	NR
S65	LTVCA	Horton Drain	Municipal Drain	Open	NR
S66	LTVCA	Trembley Drain	Municipal Drain	Open	NR
S67	LTVCA	Government Drain	Municipal Drain	Open	F
S68	LTVCA	Cook Drain & Branch	Municipal Drain	Open	F
S69	LTVCA	Phillip Drain	Municipal Drain	Open	F
S70	LTVCA	Phillip Drain	Municipal Drain	Open	F
S71	LTVCA	Burton Drain	Municipal Drain	Open	F
S72	LTVCA	Burton Drain	Municipal Drain	Open	F
S73	LTVCA	Unnamed Drain	Municipal Drain	Open	F
S74	LTVCA	Unnamed Drain	Municipal Drain	Open	F
S75	LTVCA	Burton Drain	Municipal Drain	Open	F
S76	LTVCA	Cooper Drain East	Municipal Drain	Open	F
S77	LTVCA	McKim Drain West 71-72	Municipal Drain	Open	NR
S79	ERCA	Shuttleworth Drain	Municipal Drain	Closed/Tiled	T
S81	ERCA	Brady Outlet Drain	Municipal Drain	Open	F
S82	ERCA	Armstrong Brown Drain	Municipal Drain	Open	F

Notes:

n/a – not applicable

DFO Drain Classification:

Type C – Permanent with no sensitive species present

Type F – Intermittent or Ephemeral

Type T – Tiled

Type E – Permanent with sensitive fish species present

Type NR – Not Rated

DFO Drain Classification record retrieved from Land Information Ontario (LIO 2019a)



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**Table 4-4: Fish Species within the Study Area**

Fish Species		Subwatershed									
Common Name	Latin Name	Little River	Pike Creek	Puce River	Belle River	Duck Creek	Moison Creek	Ruscom River	LTVCA 1	LTVCA 3	LTVCA 4
<i>Black Bullhead</i>	<i>Ameiurus melas</i>			x	x				x		
<i>Black Crappie</i>	<i>Pomoxis nigromaculatus</i>					x		x			
<i>Blackside Darter</i>	<i>Percina maculata</i>							x			
<i>Bluegill</i>	<i>Lepomis macrochirus</i>			x		x		x			
<i>Bluntnose Minnow</i>	<i>Pimephales notatus</i>			x		x	x	x	x		
<i>Brassy Minnow</i>	<i>Hybognathus hankinsoni</i>			x							
<i>Brook Stickleback</i>	<i>Culaea inconstans</i>					x					
<i>Brown Bullhead</i>	<i>Ameiurus nebulosus</i>			x		x					
<i>Central Mudminnow</i>	<i>Umbra limi</i>			x		x		x	x		
<i>Channel Catfish</i>	<i>Ictalurus punctatus</i>					x					
<i>Common Carp</i>	<i>Cyprinus carpio</i>		x	x		x	x		x		
<i>Creek Chub</i>	<i>Semotilus atromaculatus</i>							x	x		
<i>Fathead Minnow</i>	<i>Pimephales promelas</i>		x	x			x				
<i>Freshwater Drum</i>	<i>Aplodinotus grunniens</i>			x		x					
<i>Ghost Shiner</i>	<i>Notropis buchanani</i>					x					
<i>Gizzard Shad</i>	<i>Dorosoma cepedianum</i>					x		x	x		
<i>Golden Shiner</i>	<i>Notemigonus crysoleucas</i>		x	x		x		x			
<i>Goldfish</i>	<i>Carassius auratus</i>		x	x		x		x			
<i>Green Sunfish</i>	<i>Lepomis cyanellus</i>		x	x	x	x		x	x		
<i>Johnny Darter</i>	<i>Etheostoma nigrum</i>				x			x	x		
<i>Largemouth Bass</i>	<i>Micropterus salmoides</i>			x							
<i>Logperch</i>	<i>Percina caprodes</i>			x					x		
<i>Longnose Gar</i>	<i>Lepisosteus osseus</i>								x		





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**Table 4-4: Fish Species within the Study Area**

Fish Species		Subwatershed									
Common Name	Latin Name	Little River	Pike Creek	Puce River	Belle River	Duck Creek	Moison Creek	Ruscom River	LTVCA 1	LTVCA 3	LTVCA 4
<i>Northern Hog Sucker</i>	<i>Hypentelium nigricans</i>				x						
<i>Northern Pike</i>	<i>Esox lucius</i>		x								
<i>Pumpkinseed</i>	<i>Lepomis gibbosus</i>		x	x	x	x		x	x		
<i>Quillback</i>	<i>Carpoides cyprinus</i>			x				x	x		
<i>Redfin Shiner</i>	<i>Lythrurus umbratilis</i>							x	x		
<i>Rock Bass</i>	<i>Ambloplites rupestris</i>			x		x					
<i>Spotfin Shiner</i>	<i>Cyprinella spiloptera</i>			x		x		x	x		
<i>Spottail Shiner</i>	<i>Notropis hudsonius</i>			x							
<i>Tadpole Madtom</i>	<i>Noturus gyrinus</i>			x	x				x		
<i>White Bass</i>	<i>Morone chrysops</i>					x		x	x		
<i>White Crappie</i>	<i>Pomoxis annularis</i>			x	x	x		x	x		
<i>White Perch</i>	<i>Morone americana</i>					x					
<i>White Sucker</i>	<i>Catostomus commersonii</i>		x	x	x	x		x	x		
<i>Yellow Bullhead</i>	<i>Ameiurus natalis</i>								x		
<i>Yellow Perch</i>	<i>Perca flavescens</i>							x	x		

Note: Records of fish community were not available for Little River, LTVCA 3 or LTVCA 4.



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### **Fish Community Data Retrieved from Land Information Ontario (LIO 2019b).**

#### Aquatic Species at Risk

According to DFO's aquatic SAR mapping (DFO 2019), aquatic SAR have been identified along the proposed pipeline route.

Belle River (SC13) contains records for Spotted Sucker (DFO 2019). Spotted Sucker is listed as Special Concern under the *Endangered Species Act* (ESA) (Ontario 2019a) and under Schedule 1 of the Species at Risk Act (SARA) (Government of Canada, 2011a) and does not receive protection under both acts. Critical habitat is not found in this watercourse (DFO 2019). Spotted Sucker is described as inhabiting long, deep pools of small to medium sized river over clay, sand or gravel substrates. Riffle habitat is used for spawning (COSEWIC 2005a). Suitable habitat for Spotted Sucker is present in Belle River at the proposed crossing.

Duck Creek (SC14), tributary West 2nd Concession Road N of County Road 46 Drain (S42), Moison Creek (SC 16) and tributaries Moison Creek Branch (SC15) and Bondy Drain (S43) contain records for Grass Pickerel. Grass Pickerel is listed as Special Concern under the ESA (Ontario 2019b) and Schedule 1 of the SARA (Government of Canada, 2011b) and does not receive protection under these acts. Critical habitat is not found in these watercourses (DFO 2019). Habitat for Grass Pickerel is described as slow to no flow, less than 2.0 m depth and abundant aquatic vegetation including small clear productive streams with mud bottoms (COSEWIC 2005b). Suitable habitat for Grass Pickerel was observed at SC14, SC16, and S43.

Ruscom River (SC17), Middle Road Drain (S46), Knister Drain (S48, S49, S50), Armstrong Drain (S47, S82) and Middle Road Drain Extension (S44, S45) contain records for the freshwater mussel, Mapleleaf. The Mapleleaf is listed as Special Concern under the ESA (Ontario 2019c) and Threatened under SARA (Government of Canada, 2011c). The main branch of the Ruscom River is identified as providing Critical Habitat for the Mapleleaf. Tributaries to Ruscom River do not provide Critical habitat (DFO 2019). As the Mapleleaf is listed as Threatened under the SARA, it receives full protection of the act.

#### **Potential Impacts**

The proposed pipeline route crosses 29 watercourses. Summer habitat assessments will be conducted in summer 2019 to confirm aquatic habitat conditions and fish communities. The results of the surveys will be used to confirm mitigation and protection measures.

Industry standard watercourse crossing methods that meet the requirements of DFO for fish and fish habitat protection will be used during construction. These plans include "isolated" watercourse crossing methods such as the Dam and Pump crossing method, and trenchless crossing methods such as the HDD method.



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### Dam and Pump Crossing

The Dam and Pump Crossing method isolates water flow from the construction area and also avoids the majority of the technical risks inherent in other crossing techniques, such as damage to pipe integrity, achieving good cathodic protection, being accessible for maintenance, and increased cost and schedule. Construction of an open cut crossing has the potential to affect fish directly through impacts on water quality (erosion, sedimentation, and accidental spills), disruption/harassment (vibration and noise) and loss of habitat. Indirect impacts include restrictions to habitat use and fish passage. Long term impacts can include changes to habitat such as substrate, increased erosion potential, loss of in-stream cover and riparian shading.

### Horizontal Directional Drilling

HDD may be utilized to install the proposed pipeline underneath a watercourse at select crossing locations. The HDD process involves drilling a pilot bore hole underneath the watercourse and back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier, and synthetic polymers. Potential impacts that may result from HDD include the escape of drilling mud into the environment, tunnel collapse, or the inadvertent release of fluid to the surface. HDD may also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline.

### **Mitigation and Protective Measures**

Mitigation and protective measures for erosion and sediment control are outlined in Section 4.3.2 and accidental spills in Section 4.3.3.

Temporary vehicle crossings and dam and pump pipeline crossings should be completed following the measures outlined in industry standards and company specifications for construction.

The following general mitigation measures, or equivalent, are recommended at watercourse crossings along the preferred pipeline route. Additional, activity-specific measures related to the crossing methods are provided following the general mitigation measures. All measures presented are intended to be consistent with DFO's measures to avoid serious harm (DFO 2016), but DFO's website (<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>) should be consulted immediately prior to construction to confirm that the construction plan is consistent with the most up-to-date list of DFO avoidance measures.

### ***General Mitigation Measures***

- In-water work for warmwater habitats is typically permitted from July 1 to March 15 (no work from March 16 to June 30) (MNRF 2013).
- Watercourses should not be obstructed in a way that impedes the free movement of water and fish.
- Prior to removal of the vegetation cover, effective mitigation techniques for erosion and sedimentation should be in place to protect water quality. Disturbance to the area during construction should be limited and grubbing activities should be delayed until immediately prior to grading operations.



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- Soil exposure should be reduced prior to commencing construction, and the period that soil remains exposed for grading should be limited. Exposed soils surrounding watercourses should be seeded immediately following construction.
- Temporary erosion and sediment control measures should be maintained and kept in place until work within or near a watercourse has been completed and stabilized. Temporary sediment control measures should be removed at the completion of the work but not until permanent erosion control measures have been established.
- Construction material, excess material, construction debris and empty containers should be stored a minimum of 30 m from watercourses and watercourse banks.
- Equipment maintenance and refueling should be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble or concrete material, into a watercourse, unless otherwise specified in the contract.
- Deleterious substances (fuel, oil, spoil) should be stored >30 m from the watercourse. Any such material that inadvertently enters a watercourse should be removed in a manner satisfactory to the environmental inspector.
- In the unlikely event of a spill, spills containment and clean-up procedures should be implemented immediately. Enbridge will contact the MECP Spills Action Centre. The MECP Spills Action Centre is the first point of contact for spills at the provincial and federal level.
- Conditions of water crossing permit(s), if applicable, will be adhered to.
- Additional supplies should be maintained on-site, in a readily accessible location, for maintenance and contingency purposes. Prior to construction, adequate quantities of the materials listed below, or comparable substitutions, should be on site to control erosion and sediment deposition:
  - Sediment control fencing
  - Sediment control logs (i.e., SiltSoxx™)
  - Straw bales
  - Wooden stakes
  - Sand bags
  - Water energy dissipater
  - Filter cloth
  - Water pumps (including stand-by pumps and sufficient lengths of hose)
  - Culvert

### ***Horizontal Directional Drill Mitigation Measures***

HDD construction methods for pipeline water crossings will not require DFO review or Authorization under the *Fisheries Act* provided measures to avoid causing serious harm to fish are followed during construction. These measures include locating entry and exit points at sufficient distance to avoid



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disturbance to the bed and banks, locating the drill path at an appropriate depth below the channel and installation of appropriate sediment and erosion control measures (i.e., silt fencing around disturbed areas, development of a contingency plan, etc.). If these measures are followed, a project of this nature is low risk to fish and can proceed without DFO review.

Mitigation measures as they relate to employing the HDD method are as follows:

- Standard erosion and sediment control measures should be implemented around drill and pipe staging areas.
- Prior to initiating an HDD, appropriate geotechnical data should be obtained to assist in determining the drill path.
- Drilling equipment (e.g., drill rig, support equipment, sump) should be set up a minimum of 30 m from the edge of watercourses, where possible.
- Clearing of vegetation or grading of watercourse banks should not occur within 30 m from the edge of watercourses, if possible.
- A drilling mud release contingency plan should be prepared and kept on-site.
- Environmental inspectors should be present during crossing of the seven watercourses supporting aquatic species at risk. The Environmental inspectors will be present to monitor for accidental mud release into these watercourses during HDD activities.
- Suitable drilling mud tanks or sumps should be installed to prevent contamination of watercourses.
- Berms or check dams should be installed downslope from drill entry and anticipated exit points to contain the release of any drilling mud.
- Drilling mud should be disposed in accordance with the appropriate regulatory authority requirements.

### ***Bore Path Collapse Mitigation Measures***

The following mitigation measures should be applied as recommended by geotechnical studies to prevent HDD borehole collapse from occurring in susceptible soils:

- Fluid volumes, annular pressure and cutting returns should be strictly monitored to ensure bore hole plugging and fluid losses are detected and addressed immediately.
- Alternative drill paths should be evaluated to minimize exposure to challenging soil materials.
- Drilling mud should be maintained in the borehole until the pipeline is installed. This can be facilitated by positioning the entry and exit points in areas with cohesion less soils (e.g., silt-sand zones).



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### ***Drilling Mud Release (Inadvertent Returns) Mitigation Measures***

The following mitigation measures should be employed to reduce the risk of lost drilling mud circulation:

- Install appropriate berms, silt fencing and secondary containment measures (i.e., plastic tarp) around drilling and drilling mud management equipment at both bore entry and bore exit locations to contain operational spills.
- Clean up operational spills daily to prevent mobilization of drilling mud off site during rain events.
- Design the directional drill so that drilling slurry pressure is minimized, and the drilling rate is reduced in porous materials to minimize the chance of loss of circulation of the drilling slurry.
- Maintain smooth operation of the drilling string and slurry pumping systems to avoid pressure surges.
- Reduce slurry viscosity through appropriate filtering of drilled material to reduce the pressure gradient along the drill path due to frictional effects.
- Continually monitor slurry volumes to enable a quick response to any indications of lost circulation.
- Immediately contain any drilling mud that escapes onto land and transfer it into an on-site containment system.

The following materials should readily available during drilling operations and prepared to employ them in the event of a drilling mud spill or inadvertent return: sand bags, straw bales, silt fencing and a hydrovac truck.

### ***Additional Measures***

The following measures are applicable to trenched crossings:

#### Flow Diversion/Dewatering

If in-water works are required, the work area should be isolated from the remainder of the surface water feature. Downstream flows should be maintained using dam and pump techniques. When dewatering the work area, dewatering operations should be managed to prevent erosion and/or release of sediment laden or contaminated water to the waterbody (e.g. settling basin, filter bag, energy dispersion measures). An isolation/contamination plan should be designed and implemented to isolate temporary in-water work zones and maintain flow around the work zone. Maintenance of downstream flow should avoid potential upstream flooding and desiccation of downstream aquatic habitat and organisms.

#### Fish Rescue Plan

Prior to dewatering the work zone, fish trapped in the construction area should be collected and moved using capture, handling, and release techniques to reduce harm and stress. The intakes of pumping hoses should be equipped with an appropriate device to avoid entraining and impinging fish (see *Measures to Avoid Causing Harm to Fish and Fish Habitat* (2013) at the following DFO website <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>). Fish rescue plans should be developed on a site-specific basis and implemented by qualified professionals with the appropriate permitting in place (i.e. MNRF Licence to Collect Fish for Scientific Purposes).



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### Site Restoration and Riparian Planting

Following construction, the bed and banks of the crossing locations should be restored to pre-construction conditions to the extent possible in accordance with environmental permits. Bank slopes should be restored to match existing grades; however, alterations may be made to maintain slope stability and limit future erosion. Exposed banks should be re-vegetated with native plants to provide riparian cover and aid in erosion and sediment control. Stream beds should be restored to maintain slopes and tie in with existing grades. Bed material should be replaced to match pre-construction conditions.

### Permitting

The *Fisheries Act* prohibits causing serious harm to fish unless authorized by the DFO. This applies to work being conducted in or near water bodies that support fish that are part of or that support a CRA fishery. Since November 25, 2013, proponents must take the responsibility to determine whether or not their projects meet the DFO requirements under the Self-Assessment process. If serious harm cannot be avoided, proponents should contact DFO for a formal review and/or approval under the *Fisheries Act*. Following finalization of plans, a Self-Assessment should be completed for all project activities that have the potential to cause serious harm to fish. If it is determined that serious harm is likely to occur as a result of project-related activities, a Request for Review should be completed and submitted to DFO to determine approvals requirements under the *Fisheries Act*. Revision to the *Fisheries Act* were proposed on February 16, 2018 that may come into force in 2019. Should the proposed revisions come into force prior to construction, the proposed mitigation measures should be reviewed to ensure that they are consistent with the revised *Fisheries Act*.

The pipeline route will be located within the regulated boundary of the ERCA and LTVCA. Permits under Ontario Regulation 169/06 and 164/06, respectively, will be required prior to construction activities in the regulated boundaries. Due to the presence of aquatic SAR at SC17, the HDD drill entry and exit pits must be located at least 30 m from bank full width to avoid requiring a permit under the SARA. If activities are required below the high-water line, then the DFO must be contacted to determine if a SARA Permit is required. If crossings supporting aquatic SAR cannot be crossed using HDD, then the alternative crossing methods should be reviewed by DFO to determine if a permit under SARA is required.

### **Net Impacts**

With the implementation of standard construction methods and the above mitigation and protective measures, no adverse residual impacts on aquatic species or habitat are anticipated.

### **4.3.2 Designated Natural Areas and Vegetation**

#### **Existing Conditions**

The proposed pipeline route falls within the Niagara section of the Deciduous Forest Region (Rowe, 1972). The vegetation communities in the area have been significantly altered by anthropogenic activities (predominantly clearing and draining of land for agricultural purposes) and very few woodlots remain in this region of Ontario. Most of the lands (>90%) have been converted to agricultural use, mainly tile-drained row crop fields. There are very few woodlots present, and existing woodlots are small and



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fragmented due to agricultural activities. Approximately six woodlots are present along the proposed pipeline route. There are more than 50 locations where the construction footprint intersects hedgerows. This mainly occurs at property boundaries, along roads and along drains and watercourses. There are few hayfields, pasture or fallow fields, which may provide habitat for grassland birds. A map of designated natural areas is provided in Appendix C, Figure 12.

### Wetlands

The Ontario Wetland Evaluation System is used to identify Provincially Significant Wetlands (PSW). An evaluated wetland may be one contiguous unit or may be a series of smaller wetlands functioning as a whole. Evaluated wetlands that do not qualify as provincially significant may be designated as locally significant and may be protected through local planning and policy measures. There may also be unevaluated wetlands in an area.

A review of MNRF LIO mapping (MNRF, 2018a) and the Natural Heritage Information Centre (NHIC) database (MNRF, 2018b) indicates that the proposed pipeline route crosses one PSW at the Ruscom River: Ruscom Wetland Complex. No other wetland habitat is noted along the proposed pipeline route based on MNRF mapping. Very narrow wetland features are presumably present along drains and other watercourse features, but these have not been mapped as unique features. Vegetation and Ecological Land Classification (ELC) surveys will be completed in 2019 to assess presence or absence of wetlands within 120 m of the proposed pipeline route.

### Significant Woodlands

A woodland is defined as a treed area, woodlot or forested area. The Natural Heritage Reference Manual notes that the local planning authority has a responsibility for designating significant woodlands (MNR, 2010).

The criteria for designating significant woodlands at a provincial level includes: woodland size; ecological function (shape, proximity to other woodlands or natural features, linkages); species diversity; uncommon characteristics; and, economic and social values (MNR, 2010). It is the local planning authority's responsibility to designate significant woodlands. The proposed pipeline is located in Essex County and Chatham-Kent. The Official Plans of these two municipalities were reviewed for the criteria and identification of significant woodlands that occur within the construction footprint.

The County of Essex Official Plan (2014) states that significant woodlands are defined as "All woodlands 2 hectares in size or larger using the size criteria recommended in the Natural Heritage Reference Manual (MNR, 2010) and as per the Essex Region Natural Heritage System Strategy. Smaller woodlands may be considered significant if they exhibit composition, age or quality that is uncommon in the municipality or the region." The Municipality of Chatham-Kent Official Plan (2018) states that "all woodlands 2 hectares in size or larger are considered significant woodlands in Chatham-Kent."

Seven woodlands meeting the size criteria for significance were identified within 120 m of the proposed pipeline or existing pipeline to be decommissioned. All seven of these woodlands are located in Essex County.





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### Areas of Natural and Scientific Interest (ANSI)

Life science ANSIs are significant representative segments of Ontario's biodiversity and natural landscapes, including specific types of forests, valleys, prairies, savannahs, alvars and wetlands, their native plants and animals, and their supporting environments. They contain relatively undisturbed vegetation and landforms, and their associated species and communities. Provincially significant life science ANSIs include the most significant and best examples of the natural heritage features in the province, and many will correspond to other significant features and areas such as wetlands, valleylands and woodlands (MNR, 2010).

A review of MNRF LIO mapping (MNRF, 2018a) and the NHIC (MNRF, 2018b) showed that there are no life science ANSIs within 120m of the proposed pipeline route.

### **Potential Impacts**

The proposed pipeline route occurs primarily in municipal road allowance, however it crosses or is in proximity to seven significant woodlands and one PSW. No significant natural features intersect with the proposed temporary work areas. Field surveys will be conducted prior to construction to assess the presence or absence of wetlands. ELC and botanical surveys will be conducted prior to construction to assess the significance and boundaries of vegetation communities and to identify vascular plant species, including plant species of concern. The results of the surveys will be used to confirm mitigation and protection measures.

Where there is natural vegetation within or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, introduction or spread of invasive species, and indirect effects such as dust, erosion, and accidental spills.

### **Mitigation and Protective Measures**

Environmental mitigation and protective measures during construction include the following:

- Provide notice to the municipalities and ERCA and LTVCA prior to clearing.
- Clearing should be minimized to the extent possible in sensitive areas such as woodlots, along watercourses, and in areas of significant groundwater recharge.
- The limits of clearing should be surveyed and staked in the field, to allow for the protection of off-site natural areas and vegetation.
- All brush and trees should be felled within the project footprint.
- Clearing should be done during dry soil conditions to the extent practical to limit disturbance to vegetation and terrain.
- A screening field program of wetlands and riparian areas should be undertaken prior to construction, to determine where precautionary measures (ex. equipment washing before site access) may be necessary to mitigate for the spread of non-native species.



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- A re-vegetation program should be initiated for all vegetated temporary work areas. Enbridge Gas should consult with landowners, ERCA and LTVCA to confirm replanting plans.
- Enbridge Gas should undertake their standard tree replacement program, which involves the replanting of twice the area of woodlot removed during construction. The replacement/compensation for the removal of individual landscape trees will be completed outside of the tree replacement program and will be discussed between the landowner and an Enbridge Gas Land Agent. Tree replacement consists of species native to the area, and ideally the same species removed. Enbridge Gas encourages planting of replacement trees on the same property where the trees were removed, with the goal of enhancing a natural area and its associated wildlife habitat. If a landowner is not interested in planting trees on their property, Enbridge Gas will offer the trees to ERCA or to a local community group. Enbridge Gas will maintain the trees for a period of 5 years, or until the trees reach a 'free to grow' status as defined by a height of 1 metre (m) and tree of adjacent brush competition.
- Seeding of the disturbed temporary work areas and permanent easement should be done with a native seed mix reviewed by ERCA or LTVCA. Replaced soils will contain native seed bank, facilitating successful revegetation.
- One year following construction, planted vegetation should be inspected for survival; in areas of severe dieback, dead and diseased planted vegetation should be replaced.

Mitigation and protective measures are outlined in Section 4.4.5 for dust, Section 4.2.2 for erosion and Section 4.2.3 for accidental spills.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on designated natural areas and vegetation are anticipated.

### 4.3.3 Wildlife, Wildlife Habitat and Species at Risk

#### Significant Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle, and areas that are important to migratory and non-migratory species (MNR, 2000). Significant wildlife habitats are grouped into four categories:

1. Seasonal concentration areas
2. Animal movement corridors
3. Rare vegetation communities or specialized habitats
4. Habitats of species of conservation concern

The presence of Significant Wildlife Habitat (SWH) in the Study Area was determined in two ways. First, publicly available NHIC data was reviewed for SWH (MNR 2018b). Second, potential SWH was identified using the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNR, 2015) which



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provide descriptions of wildlife habitats and guidance on criteria for determining the presence of SWH. Details of the significant wildlife assessment are summarized below.

### Seasonal Concentration Areas

Seasonal Concentration Areas are sites where large numbers of a species gather together at one time of the year, or where several species congregate. Only the best examples of these concentration areas are typically designated as SWH. Review of the NHIC (MNRF, 2018b) database did not identify any confirmed seasonal concentration areas within the Study Area. The potential for seasonal concentration areas to occur in the Site Investigation Area is assessed in Table E-1, Appendix E. Candidate habitat for the following seasonal concentration areas may be present in the Study Area:

- Turtle wintering areas
- Bat maternity roost colonies
- Reptile (snake) hibernaculum
- Colonially-nesting breeding bird habitat

Field investigations in 2019 will assess the presence and quality of candidate seasonal concentration areas.

### Rare vegetation communities or specialized habitats

Rare vegetation communities or specialized habitats are defined as separate components of SWH. Rare vegetation communities are habitats that are considered rare or uncommon in the ecoregion, as defined in the SWH Criteria Schedules (MNRF, 2018b). These habitats may support wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. Review of the NHIC (MNRF, 2018b) database did not identify any rare vegetation communities or specialized habitats within the Study Area. Potential rare vegetation communities or specialized habitats based on the SWH Criteria Schedule for Ecoregion 7E (MNRF, 2015) are discussed in Table E-1, Appendix E. Candidate habitat for the following specialized habitats may be present in the Study Area:

- Waterfowl nesting area
- Bald Eagle and Osprey nesting, foraging and perching habitat
- Turtle nesting areas
- Seeps and springs
- Amphibian breeding habitat

Field investigations in 2019 will assess the presence and quality of rare vegetation communities or candidate specialized habitats.



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### Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNR, 2000). Rivers, creeks and drains may be used as movement corridors; these features were present within 120 m of the proposed pipeline route. Hedgerows may also serve as small linkages (MNR, 2000). Preliminary vegetation community classification indicates the presence of rivers, drains and linear hedgerows within 120 m of the proposed pipeline route.

### Habitat for Species of Conservation Concern

Habitat for Species of Conservation Concern is habitat which supports provincially-rare (S1-S3 ranked species) and provincially-designated Special Concern species. Status rankings (S-ranks) for wildlife are based on the number of occurrences in Ontario and have the following meanings:

- S1: critically imperiled; often fewer than 5 occurrences
- S2: imperiled; often fewer than 20 occurrences
- S3: vulnerable; often fewer than 80 occurrences

The NHIC database was searched to obtain recent records (2000 - present) of species of conservation concern (S1-S3 ranked species and provincially-designated Special Concern species) in the vicinity of the proposed pipeline route. The Ontario Breeding Bird Atlas (Cadman et al., 2007), the Ontario Reptile and Amphibian Atlas (Ontario Nature, 2017) and the Ontario Mammal Atlas (Dobbyn, 1994) were also searched. The exact location of species occurrences is not available from these atlases; instead, occurrences are recorded within 1 x 1 km or 10 x 10 km squares. Additional species records for the City of Windsor were provided by MNRF (correspondence dated 25 Feb 2019).

Based on a review of background information, 17 species of conservation concern are known to occur in the vicinity of the Study Area, as shown in Table 4-5: 5 plants, 1 insect, 3 reptiles, and 8 birds. The potential for species of conservation concern to be present in the Study Area is limited by habitat suitability and availability; therefore, species listed in Table 4-5 may not occur in the Study Area. An assessment of candidate habitat and/or habitat use for individual species of conservation concern will be completed during 2019 field investigations.

**Table 4-5: Terrestrial Species of Conservation Concern**

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	Source
<b>PLANTS</b>				
Climbing Prairie Rose	<i>Rosa setigera</i>	S2S3	SC	NHIC
Common Hop-tree	<i>Ptelea trifoliata</i>	S3	SC	MNRF
Green Dragon	<i>Arisaema dracontium</i>	S3	SC	MNRF
Riddell's Goldenrod	<i>Solidago ridellii</i>	S3	SC	MNRF
Shumard Oak	<i>Quercus shumardii</i>	S3	SC	MNRF



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**Table 4-5: Terrestrial Species of Conservation Concern**

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	Source
<b>INSECTS</b>				
Monarch	<i>Danaus plexippus</i>	S2N,S4B	SC	MNRF
<b>REPTILES</b>				
Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	ORAA
Snapping Turtle	<i>Chelydra serpentina</i>	S3	SC	ORAA
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	SC	MNRF
<b>BIRDS</b>				
Short-eared Owl	<i>Asio flammeus</i>	S4B, S2N	SC	MNRF
Canada Warbler	<i>Cardellina canadensis</i>	S4B	SC	MNRF
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4B, S2N	SC	OBBA
Common Nighthawk	<i>Chordeiles minor</i>	S4B	SC	OBBA
Eastern Wood-Pewee	<i>Contopus virens</i>	S4B	SC	OBBA
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S4B	SC	OBBA
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	S4B	SC	OBBA
Wood Thrush	<i>Hylocichla mustelina</i>	S4B	SC	OBBA

Sources: MNRF 2019 (MNRF), MNRF 2018b (NHIC), Cadman et. al. 2007 (OBBA), Ontario Nature 2013 (ORAA), Dobbyn 1994 (AMO)

END – Endangered - a species facing imminent extinction or extirpation

THR – Threatened - a species that is at risk of becoming endangered

SC - Special Concern - a species with characteristics that make it sensitive to human activities or natural events

S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)

S2: Imperiled—Imperiled in the province, few populations (often 20 or fewer)

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S? – Rank Uncertain

SH: Possibly Extirpated (Historical)

S#B- Breeding status rank

S#N- Non Breeding status rank

## Species at Risk

For the purpose of this report, Species at Risk (SAR) are those species identified as endangered or threatened by federal (SARA) and/or provincial (ESA) legislation. As SARA protections do not apply to the Study Area, species protected as endangered or threatened under SARA, but special concern under the ESA, are included in Table 4-5, above.

The NHIC database was searched to obtain recent records (2000 – present) of SAR from the vicinity of the proposed pipeline route. The Ontario Breeding Bird Atlas (Cadman et al., 2007), the Ontario Reptile and Amphibian Atlas (Ontario Nature, 2017) and the Ontario Mammal Atlas (Dobbyn, 1994) were also searched. The exact location of species occurrences is not available from these atlases; instead,



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occurrences are recorded within 1 x 1 km or 10 x 10 km squares. Additional species records for the City of Windsor were provided by MNRF (correspondence dated 25 Feb 2019).

Based on a review of background information, 41 SAR are known to occur in the vicinity of the Study Area, as shown in Table 4-6: 14 plants, 1 mollusc, 8 reptiles, 12 birds and 6 mammals. An assessment of candidate habitat and/or habitat use for SAR will be completed during 2019 field investigations.

**Table 4-6: Terrestrial Species at Risk (Threatened or Endangered)**

Common Name	Scientific Name	Provincial Status (COSSARO)	Source
<b>PLANTS</b>			
Butternut	<i>Juglans cinerea</i>	END	MNRF
Pink Milkwort	<i>Polygala incarnata</i>	END	MNRF
Spoon-leaved Moss	<i>Bryoandersonia illecebra</i>	END	MNRF
American Chestnut	<i>Castanea dentata</i>	END	MNRF
Eastern Prairie Fringed Orchid	<i>Platanthera leucophaea</i>	END	MNRF
Spotted Wintergreen	<i>Chimaphila maculata</i>	END	MNRF
Slender Bush-clover	<i>Lespedeza virginica</i>	END	MNRF
White Colicroot	<i>Aletris farinosa</i>	END	MNRF
Dwarf Hackberry	<i>Celtis tenuifolia</i>	THR	MNRF
Common Name	Scientific Name	Provincial Status (COSSARO)	Source
Blue Ash	<i>Fraxinus quadrangulata</i>	THR	MNRF
Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	THR	MNRF
Dense Blazing-star	<i>Liatris spicata</i>	THR	MNRF
Purple Twayblade	<i>Liparis liliifolia</i>	THR	MNRF
Willow-leaved Aster	<i>Symphotrichum praealtum</i>	THR	MNRF
<b>MOLLUSCS</b>			
Proud Globelet	<i>Patera pennsylvanica</i>	END	MNRF
<b>REPTILES</b>			
Eastern Foxsnake	<i>Pantherophis gloydi</i>	END	NHIC
Massasauga	<i>Sistrurus catenatus</i>	END	NHIC
Butler's Gartersnake	<i>Thamnophis butleri</i>	END	NHIC
Five-lined Skink	<i>Eumeces fasciatus</i>	END	NHIC
Queensnake	<i>Regina septemvittata</i>	END	MNRF
Eastern Spiny Softshell	<i>Apalone spinifera</i>	END	MNRF
Spotted Turtle	<i>Clemmys gutatta</i>	END	MNRF
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	MNRF
<b>BIRDS</b>			
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	NHIC



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**Table 4-6: Terrestrial Species at Risk (Threatened or Endangered)**

Eastern Meadowlark	<i>Sturnella magna</i>	THR	NHIC
Barn Swallow	<i>Hirundo rustica</i>	THR	NHIC
Bank Swallow	<i>Riparia riparia</i>	THR	NHIC
Yellow-breasted Chat	<i>Icteria virens</i>	END	MNRF
Prothonotary Warbler	<i>Protonaria citrea</i>	END	MNRF
Barn Owl	<i>Tyto alba</i>	END	MNRF
Eastern Whip-poor-will	<i>Antrostomus vociferous</i>	THR	MNRF
Least Bittern	<i>Ixobrychus exilis</i>	THR	MNRF
American White Pelican	<i>Pelecanus erythrorhynchos</i>	THR	MNRF
Cerulean Warbler	<i>Setophaga cerulea</i>	THR	MNRF
Chimney Swift	<i>Chaetura pelagica</i>	THR	MNRF
<b>MAMMALS</b>			
Little Brown Myotis	<i>Myotis lucifugus</i>	END	AMO
Northern Myotis	<i>Myotis septentrionalis</i>	END	AMO
Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	AMO
Tri-coloured Bat	<i>Perimyotis subflavus</i>	END	AMO
American Badger	<i>Taxidea taxus</i>	END	MNRF
<b>Common Name</b>	<b>Scientific Name</b>	<b>Provincial Status (COSSARO)</b>	<b>Source</b>
Gray Fox	<i>Urocyon cinereoargenteus</i>	THR	MNRF

Sources: MNRF, 2019a; MNRF, 2018b (NHIC); Cadman et. al., 2007 (OBBA); Ontario Nature, 2013 (ORAA); Dobbyn 1994 (AMO)

END – Endangered - a species facing imminent extinction or extirpation

THR – Threatened - a species that is at risk of becoming endangered

SC - Special Concern - a species with characteristics that make it sensitive to human activities or natural events

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S2: Imperiled—Imperiled in the province, few populations (often 20 or fewer)

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S? – Rank Uncertain

SH: Possibly Extirpated (Historical)

S#B- Breeding status rank

S#N- Non-Breeding status rank

Stantec completed a desktop assessment to evaluate the existing conditions of the proposed pipeline route. Most of the land along the proposed pipeline route is municipal road allowance, with adjacent land being used for agricultural row crops. There are seven significant woodlands along the preferred route and one PSW (Ruscom Wetland Complex). The proposed pipeline route crosses numerous hedgerows located along roadways, drains, watercourses and agricultural fields. Limited tree removal and no wetland impacts are anticipated from project activities. A general assessment of potential habitat for SAR along or adjacent to the proposed route is provided in Table E-2, Appendix E.



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### Potential Impacts

Due to the presence of woodlots, hedgerows, watercourses and open fields in proximity to the proposed pipeline route, field surveys will be undertaken before construction to assess the presence or absence of wildlife and wildlife habitat. Planned surveys include those for reptiles (snake habitat assessment), mammals (bat habitat assessment), breeding birds and SAR habitat assessments. The results of all surveys, including any additional appropriate mitigation or protection measures, will be summarized in a report and shared with the MECP to determine any regulatory requirements.

Potential impacts on wildlife and wildlife habitat from construction include direct mortality from construction vehicles, habitat destruction through vegetation removal, habitat degradation through spills and sensory disturbance of wildlife during construction.

### Mitigation and Protective Measures

Environmental mitigation and protective measures during construction include the following:

- Detailed design of the proposed pipeline should be reviewed to avoid and reduce the likelihood of impact upon wildlife habitat to the extent possible, and in particular habitats of endangered, threatened, special concern and rare species.
- Equipment and vehicles should yield the RoW to wildlife.
- Trench operations should be followed as closely as practical with backfill operations, to facilitate the movement of wildlife across the trench.
- Gaps in stockpiles should be created, in consultation with a biologist, to allow for the potential movement of wildlife across the RoW.
- Fencing should be erected around deep excavations to prevent wildlife entrapment.
- The contractor should inform their personnel to not threaten, harass or injure wildlife.
- If wildlife are encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site.
- Where practical, avoid construction in the vicinity of areas that may provide habitat for amphibians during the amphibian breeding season (March 1 – June 30).
- Habitat assessments and species occurrence surveys will be conducted for SAR. A report will be prepared to document results and recommend mitigation measures.
- Field investigations will identify potential habitat for Eastern Foxsnake and Butler's Gartersnake, which are known to occur in the area. Mitigation recommendations will be prepared upon consultation with MECP and will include the use of timing windows, inspection of construction equipment and protection of key habitat features. Mesh or netting type stabilization material will not be used for erosion control due to risk of entanglement.





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- Areas of potential bat maternity roosting habitat will be identified during field investigations. Tree removal in identified areas should be limited to the extent possible and will avoid the active season for bats (mid-April to mid-September). Mitigation recommendations for SAR bats will be prepared upon consultation with MECP.
- Construction activities with the potential to remove migratory bird habitat, such as vegetation clearing, should be avoided during the breeding season which is generally from April 1- August 31 in southern Ontario (Environment Canada, 2017). Should vegetation clearing activities be unavoidable during this window, a mitigation program should be developed, which includes measures to reduce and avoid impacts to migratory birds and their nests (Government of Canada, 2018). This program should include preventative and mitigation measures but may also include avoidance of clearing during key sensitive periods and in key locations.
- If SAR are found along the proposed pipeline route Enbridge Gas will undertake consultation with the MECP regarding the potential need for a permit under the ESA and/or species-specific mitigation.

Mitigation and protective measures are outlined in Section 4.3.2 for vegetation removal and Section 4.2.3 for accidental spills.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on wildlife, wildlife habitat and SAR are anticipated.

## 4.4 SOCIO-ECONOMIC ENVIRONMENT

### 4.4.1 Employment and Business

#### Existing Conditions

In Tecumseh, the number of people employed decreased from 12,510 in 2011 to 11,845 in 2016, while the unemployment rate decreased from 8.5% to 4.7% over the same period. The number of people employed in Lakeshore increased from 16,430 in 2011 to 18,670 in 2016, while the unemployment rate decreased from 6.9% to 4.6% over the same period. For Chatham-Kent, the number of people employed decreased from 84,125 in 2011, to 46,190 while the unemployment rate decreased from 10.2% to 7.5% over the same period. For both Tecumseh and Lakeshore, the unemployment rate was below the provincial and national average rates of 7.4% and 7.7%, respectively, for 2016. In Chatham-Kent, the unemployment rate was above the provincial and below the national average for 2016. Refer to Table 4-7 for labour characteristics.



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**Table 4-7: Labour Characteristics, Ontario, Tecumseh, Lakeshore and Chatham-Kent, 2016**

Location	Total Population 15 years and Over	Labour Force	Employed	Participation Rate (percent)	Employment Rate (percent)	Unemployment Rate (percent)
Ontario	11,038,440	7,141,675	6,612,150	64.7	59.9	7.4
Tecumseh (Town)	19,545	12,430	11,845	63.6	60.6	4.7
Lakeshore (Town)	29,380	19,585	18,670	66.7	63.5	4.6
Chatham-Kent (Municipality)	83,060	49,960	46,190	60.1	55.6	7.5

Source: Statistics Canada, 2017a.

The median total income for all census households in Tecumseh, Lakeshore and Chatham-Kent in 2016 was \$94,519, \$97,064 and \$58,264 respectively; the median income for individuals aged 15 years and over was \$42,440, \$42,817 and \$30,923 respectively (Table 4-8).

**Table 4-8: Median Income, Ontario, Tecumseh, Lakeshore and Chatham-Kent 2015**

Location	Median Household Total Income	Median Total Income of individuals - 15 Years and Over		
		All individuals	Male	Female
Ontario	\$74,287	\$33,539	\$39,889	\$28,676
Tecumseh (Town)	\$94,519	\$42,440	\$51,214	\$34,627
Lakeshore (Town)	\$97,064	\$42,817	\$52,424	\$33,543
Chatham-Kent (Municipality)	\$58,264	\$30,923	\$36,562	\$26,054

Source: Statistics Canada, 2017a, 2017b.

In 2016, the main sources of employment by industry for Tecumseh were manufacturing (21.5%), health care and social assistance (14.9%) and educational services (10.1%) (Statistics Canada, 2017a). For Lakeshore, the main sources of employment by industry were manufacturing (22.5%), health care and social assistance (11.6%), and retail trade (9.6%) (Statistics Canada, 2011c). In Chatham-Kent, the main sources of employment by industry were, manufacturing (13.2%), health care and social assistance (13.0%), and retail trade (11.5%).

Agriculture is a key industry within the Municipality of Chatham-Kent, which has prime agricultural land and the necessary conditions for many agricultural operations. The industry employed 7.7% of the labour force. In Tecumseh and Lakeshore, the industry employed 0.8% and 2.8% of the labour force, respectively, in 2016 (Statistics Canada, 2017a).



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In Tecumseh, the top 3 occupations were sales and services (20.5%) and business and finance services (13.6%), with education, law and social, community and government services and trades and transport tied for third (13.0% each). The top 3 occupations in Lakeshore were sales and services (18.7%), trades and transport (17.6%), and business and finance services (13.3%). In Chatham-Kent, the top 3 occupations were manufacturing (13.2%), health care and social assistance (13.0%) and retail trade (11.5%) (Statistics Canada, 2017a). In Tecumseh, 4.5% of the labour force was employed in construction, with 7.6% and 6.4% in Lakeshore and Chatham-Kent respectively.

### Potential Impacts

During construction, the labour force will peak at approximately 260 workers. Approximately 65% of the labour force is expected to come from Ontario and other areas of Canada, while 35% will likely be local residents. Project construction is expected to take place in the Spring/Summer/Fall of 2020 and take an estimated 7 months to complete. Enbridge Gas will schedule shifts so that employees are working six days per week for 10 to 12 hours each day. Workers will be at the work site for as long as is required to complete specific construction tasks. Operation will not change from the current operation as the project is an equivalent replacement of the existing pipeline. Project demands for labour and goods and services can result in both beneficial and adverse effects. Positive effects may not be evenly distributed among populations, with some residents in a better position to receive economic benefits than others. Similarly, adverse effects may affect some residents more than others. Residual effects on employment are related to the project's labour demand compared to the labour supply. Three types of employment are considered:

- Direct employment: labour that is hired directly for the project
- Indirect employment: labour hired by companies in order to produce and provide goods and services needed for the project
- Induced employment: labour hired by industries that produce and provide consumer items and services purchased by people who are directly or indirectly employed by the project

Labour conditions will be affected by direct, indirect and induced employment during all project phases. Given the low unemployment rates in Tecumseh and Lakeshore, and the small construction-related labour force available in those locations, direct employment for the project has the potential to constrain available construction labour in the region during construction.

The project could affect business through purchases of labour, goods and services from local businesses, including businesses owned by Indigenous peoples, and will result in increased local employment income and municipal government revenue. Local businesses will likely benefit from supplying the project with goods and services.

Land clearing and other construction-related project activities could adversely affect agricultural productivity. Other potential adverse effects on industries include impairment to the use and enjoyment of property, disruption of livestock production and issues with farm machinery and other vehicular movement.



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### Mitigation and Protective Measures

It is expected that the project will generally result in positive effects on employment by employing local and Indigenous people, and by reducing the unemployment rate in the region. These positive effects do not require mitigation, but Enbridge Gas will identify and implement various mechanisms to enhance project benefits. The project may add pressure to the construction labour market during construction. However, Enbridge Gas will be able to mitigate this effect through the reliance on labour from the wider province and Canada (65% of project labour force), and the proximity of Windsor and Chatham-Kent to help supply the local labour force, if necessary.

The potential effects of the project as a result of purchasing labour, goods and services is expected to be positive during construction and operation, so no mitigation will be required. However, Enbridge Gas has and will continue to work with local and Indigenous businesses to enhance their potential for successfully bidding on project contracts regarding the supply of goods and services, particularly for the operation phase. One initiative to help encourage further local and Indigenous content on the project is to post project purchasing requirements in advance, so that businesses can position themselves to effectively bid to supply goods and services needed for construction and operation. Increased participation of local and Indigenous businesses will enhance positive local economic effects.

With respect to potential adverse effects on agricultural and non-agricultural businesses, Enbridge will engage with land owners and municipalities to address access to the project area, the portion of land that will be altered as part of site preparation, and long-term changes to agricultural and non-agricultural land.

### Net Impacts

With the above initiatives to encourage local and Indigenous participation on the project, it is anticipated that the effects from project on employment and business will be positive, including creating positive economic activity through new direct, indirect, and induced employment. Project expenditures on local businesses and suppliers also have the potential to positively affect the local economies. Additionally, those who have worked on the project will gain transferrable skills and experience that could help them gain employment in other industries. Consultation with businesses and landowners will address any concerns to their operations.

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on Employment and Business are anticipated.

## 4.4.2 Community Services & Infrastructure

### Existing Conditions

#### Demographics

In 2016, the Town of Tecumseh had a population of 23,229, the Town of Lakeshore had a population of 36,611 and the Municipality of Chatham-Kent had a population of 102,042 (Statistics Canada, 2017a). Lakeshore experienced a modest population increase between 2011 and 2016, slightly above the population growth in Ontario. Both Tecumseh and Chatham-Kent experienced modest decreases in population between 2011 and 2016 (Table 4-9).



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**Table 4-9: Population by Gender, Kingsville, Lakeshore and Province, 2016**

Location	Total Population	Male*	Female*	Percent Change from 2006
Ontario	13,448,494	6,559,390	6,889,105	4.6
Tecumseh	23,229	11,245	11,985	-1.6
Lakeshore	36,611	18,400	18,205	6.0
Chatham-Kent	102,042	49,540	52,110	-2.0

\*Numbers are rounded by Statistics Canada and are reported herein exactly as they are reported by Statistics Canada. Totals may not necessarily add up as a result of rounding.

Source: Statistics Canada, 2017a; 2017c.

In 2016, the average age of the population of Tecumseh was 43.3 years, the average age of the population of Lakeshore was 39.9 and the median age of the population of Chatham-Kent was 43.3 (Statistics Canada, 2017a). Ontario's median age was 41.0 (Statistics Canada, 2017a).

In 2016, 520 residents of Tecumseh identified themselves as Aboriginal, while 1,030 residents of Lakeshore and 4,070 residents of Chatham-Kent identified themselves as Aboriginal. Together this represents approximately 1.5% of the provincial Aboriginal population (374,395; Statistics Canada, 2017a).

### Permanent and Temporary Accommodations

In 2016, there were 8,885 occupied private dwellings in the Town of Tecumseh. The majority (80.9%) of homes were single-detached houses. In the Town of Lakeshore, there were 13,185 occupied private dwellings, and the majority (92.0%) of homes were single-detached houses. In the Municipality of Chatham-Kent, there were 42,170 occupied private dwellings, and the majority (76.7%) were single-detached houses. In 2016, there were 1,110 rental households in Tecumseh, 1,195 in Lakeshore and 11,975 in Chatham-Kent (Statistics Canada 2017a).

Within the Municipality of Chatham-Kent, there are seven bed-and-breakfasts and seven hotels/motels, as well as two provincial campgrounds, two private campgrounds and a municipal park with campsites (Municipality of Chatham-Kent, 2017a). There are no hotel chains in Tecumseh or Lakeshore; however, Lakeshore has 1 motel and two bed-and-breakfasts (Town of Lakeshore, 2017a).

The Town of Kingsville and the Town of Lakeshore are in Provincial Tourism Region 1 (Southwest Ontario). In 2016, the occupancy rate at temporary accommodations in Region 1 was 58.0%, an increase from 50.6% in 2008 and the highest since 2008 (MTCS, 2016).

### Municipal Services and Infrastructure

The Essex-Windsor Solid Waste Authority operates several landfills and waste transfer stations within Essex County including the Town of Tecumseh and Town of Lakeshore. These include the following three facilities: The Public Drop Off Depot (City of Windsor), Transfer Station #2 (Town of Kingsville), and the Essex-Windsor Regional Landfill (Town of Essex). At each of the three facilities, there is a Municipal



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Hazardous or Special Waste Depot (EWSWA, 2017). The Municipality of Chatham-Kent owns and operates eight transfer stations. Transfer stations accept specific types of house hazardous waste (Municipality of Chatham-Kent, 2019a). Ridge Landfill is located in Blenheim, Ontario and is privately owned and operated by Waste Connections (Municipality of Chatham-Kent, 2019a).

The Town of Lakeshore is serviced by five separate water supply systems. They include the Belle River, Stoney Point, Union, Tecumseh and Tilbury / Wheatley water supply systems (Town of Lakeshore, 2008). The Union Water Supply System is owned collectively by the Municipality of Leamington, the Town of Kingsville, the Town of Essex and the Town of Lakeshore and provides drinking water to approximately 65,000 residents within these municipalities by treating water taken from Lake Erie (Union Water, 2017). The Municipality of Chatham-Kent is serviced by 6 water treatment plants and one stand-alone water distribution system operated by the Chatham-Kent Public Utilities Commission (CKPUC) (Municipality of Chatham-Kent, 2019b). The CKPUC is a member of the Tri-County Primary Water System which supplies water to Lakeshore and has water interconnections with Lambton and Municipality of Leamington.

There are five existing wastewater service areas in the Town of Lakeshore, including the Belle River/Maidstone, Stoney Point, Comber, South Woodslee and North Woodslee Sewage Works (Town of Lakeshore, 2008). The Municipality of Chatham-Kent has 8 wastewater collection systems and 2 lagoon systems (Municipality of Chatham-Kent, 2019b).

### Health and Education Services and Infrastructure

The Towns of Tecumseh and Lakeshore are located within the Windsor-Essex County Health Unit, whose services were available to approximately 388,782 people in the regions of Windsor/Essex in 2011. There are currently two hospitals in the Windsor-Essex region: The Windsor Regional Hospital, and the Leamington District Memorial Hospital. The Windsor Regional Hospital has three main campuses: Metropolitan Campus, Ouellette Campus and the Windsor Regional Cancer Centre. The Leamington District Memorial Hospital is a rural, community hospital serving the south-east portion of Essex County (WECHU, 2019). The Chatham-Kent Health Alliance (CKHA) has over 200 beds and serves 102,000 residents in the Municipality of Chatham-Kent. The CKHA is located in Chatham, Ontario as well as the Sydenham Campus Wallaceburg District Hospital located in Wallaceburg, Ontario.

There are more than 105 elementary schools and 26 secondary schools in the Windsor Essex region which are managed by four school boards: Greater Essex County District School Board; Windsor Essex Catholic District School Board; Conseil scolaire catholique Providence (French Catholic School Board); and Conseil scolaire Viamonde (French Public Board). Ontario. The Municipality of Chatham-Kent has more than 50 elementary and secondary schools managed by three public school boards: Lambton-Kent District School Board, St. Clair Catholic District Board and Conseil scolaire catholique Providence (French Catholic School Board). There is one school located approximately 250 m north of the proposed pipeline route, Saint John the Evangelist Catholic School located in South Woodslea. No other schools were identified within 500m of the proposed pipeline route.



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### Roads and Highways

The Roads Maintenance and Operations department of the County of Essex is responsible for managing the Essex County Road system. Within Essex County, there are 730 centreline kilometers of roads. The Municipality of Chatham-Kent has approximately 1700 km of roads. These roads include various classes of highway from high volume urban arterials to rural collector roads. The proposed pipeline route is located entirely within existing road allowances.

### Policing, Fire and Emergency Response Services

Essex County has contracted their Police Services with the Ontario Provincial Police. There are three detachments in Essex County, located in the Towns of Tecumseh, Lakeshore and Essex. There is also one OPP detachment in Chatham-Kent (Ontario Provincial Police, 2019). The Municipality of Chatham-Kent also has its own Police Service which covers three deployment districts. The project is located in the south zone, deployed from Tilbury, Blenheim and Ridgetown (Chatham-Kent Police Services, 2015).

Lakeshore's Fire Department provides automobile extraction, assisting ambulance, shore-based ice/water rescue up to 300 feet off shore, operational level hazmat support and fire suppression services (Town of Lakeshore, 2017b). Chatham-Kent Fire and Emergency Services includes 20 fire stations that provide fire suppression services as well as auto extrication, medical intervention, dive calls, water and ice rescue and high angle rescue (Municipality of Chatham-Kent, 2017b).

The Tecumseh Fire Rescue Services with 20 partial-paid firefighters that response to approximately 400 calls per year. They provide firefighting, rescue, medical intervention, vehicle extrication, shore-based water rescue and confined space entry rescue (Town of Tecumseh, 2014a).

### **Potential Impacts**

The presence of temporary workers in the local communities during the six-month long construction period has the potential to increase the demand for housing and local community services and infrastructure. Non-local project workers are expected to stay in temporary accommodations, including hotels, motels, and campgrounds. They may also choose to rent cottages or apartments. The vacancy rate for temporary rentals will likely be able to accommodate the temporary increase. The short duration that the workers will reside near any one community, as well as the structure of the work shifts, will limit the need for workers to use the services and infrastructure in local communities.

The transportation of project goods, services and workers has the potential to lead to increased use of existing transportation infrastructure. Also, increased traffic volumes along local road networks could increase travel times and reduce road safety, which might lead to increased use of local emergency services due to potential vehicle accidents and workplace accidents. In addition, the production of project-related waste could place additional stress on the capacity of local landfills.



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During operation, the workforce will remain the same as current operations with no planned changes as the project is a replacement of the existing facility. Some operation workers might already reside in the local area; however, some might need to come from outside communities and may use local community and emergency services.

### Mitigation and Protective Measures

Project employees might require medical attention while staying in the area. The contractor and Enbridge Gas will have emergency response equipment and trained personnel on-site during construction. In addition, an Emergency Response Plan will be developed and implemented, which will address field health services, emergency call-out procedures and fire response plans. Safety fencing will be used where necessary to separate the work area.

Environmental mitigation will be in place to reduce the likelihood of emergency events and to prepare for the management of emergency events on site. If an emergency incident were to occur, it is anticipated that the comprehensive mitigation, contingency plans, and safety strategies will result in a localized and low-intensity response.

A Traffic Management Plan will be in place for all roads affected by construction, which at a minimum outlines measures to:

- Control the movement of materials and personnel to and from the construction site
- Post signs to warn oncoming motorists of construction activity
- Control traffic at road crossings
- Reduce on-road disturbance and land closures
- Store equipment as far from the edge of the road as practical
- Install construction barricades at road crossings

Traffic disruptions during construction will be reduced by adherence to the Traffic Management Plan. Guidelines will be developed for vehicular use on the RoW and associated access roads to avoid traffic congestion and accidents. Access to existing transportation infrastructure will be addressed through standard mitigation and will be reversible once the construction phase ends.

The capacity of waste disposal sites will be considered and if project needs are not easily accommodated, alternative disposal locations will be considered.

Enbridge Gas will provide project information to local communities and service providers so that they are prepared for any possible demand on community services and infrastructure related to a temporary population increase. Additional consultation with residents and businesses adjacent to the proposed pipeline route will be held in advance of construction commencement to discuss potential specific impacts to the property or business. Contact information for a designated Enbridge Gas representative will be available to address questions and concerns during construction. Consultation has been initiated and will continue with municipal personnel.





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## Net Impacts

Community services and infrastructure appear to have additional capacity to absorb potential increased temporary demands that may result from the project. Adverse effects on traffic will be minimal because the proposed pipeline route intersects mainly rural communities where roads currently have low levels of traffic and alternative routes are readily accessible.

Given the available capacity of the local community services and infrastructure, along with the implementation of the mitigation and protective measures outlined above, no significant adverse residual impacts on community services and infrastructure are anticipated.

### 4.4.3 Perceived Health and Well-Being

#### Existing Conditions

##### Health Indicators

Health indicators are measures that are regularly reported and provide relevant information about a population's health or the performance of the health system. This allows for comparable information between regions and can be used to track changes over time (CIHI, n.d.).

Statistics Canada and the Canadian Institute for Health Information completed a survey of health indicators to determine the perceived health and well-being of residents aged 12 years and older within the Windsor-Essex County Health Unit and the Chatham-Kent Health Unit. This health unit is a geographical region created by Statistics Canada. The Windsor-Essex County Health Unit includes both Windsor County and Essex County municipalities, and the Chatham-Kent Health Unit includes the Municipality of Chatham-Kent. The results represent qualitative perceptions of health and well-being from individuals living within these municipalities (Table 4-10).

**Table 4-10: Health Indicators, Windsor-Essex County Health Unit, Chatham-Kent Health Unit and Ontario, 2015/2016**

Indicators	Windsor-Essex County Health Unit (%)	Chatham-Kent Health Unit (%)	Ontario (%)
Perceived health, very good or excellent	61.3	55.4	61.0
Perceived mental health, very good or excellent	75.2	70	71.1
Perceived life stress, quite a lot	18.3	17.5	22.0

Source: Statistics Canada, 2018.

In 2015/2016 the population in the project area had perceptions of their health, mental health and life stress which were generally consistent with Ontario as a whole.

##### Traffic and Congestion

Existing conditions for traffic and congestion are outlined in Section 4.4.2.



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### Recreation

There are 3 community centres in Lakeshore providing many activities such as ice arenas, swimming pools and various sports for all ages. There are 40 parks, six conservation areas, and the Belle River Marina (Town of Lakeshore, 2017a). The Town of Tecumseh has one 18-hole golf course and over 200 acres of green space and trails. Tecumseh also maintains an arena, sports fields, leisure pool, disc golf course, skate park, splash pads and tennis courts (Town of Tecumseh, 2014b).

### **Potential Impacts**

Perceived health and well-being is influenced by a number of factors such as individual lifestyles, social and community networks, living conditions, general socio-economic and environmental conditions. The project has the potential to affect a number of these factors, which could change the way that local residents perceive their health and well-being. During public consultation for the project, comments were raised regarding monetary compensation by residents for loss of crops and trees, business, as well as enjoyment of property.

Since perceived health and well-being is influenced by improved economic conditions, the project is expected to have positive effects by creating direct, indirect, and induced employment, and through project spending within Essex County and the Municipality of Chatham-Kent (see Section 4.4.1). There is also the potential to enhance these benefits further by selecting local and Indigenous businesses to provide services to the project, thus increasing economic activity and the associated benefits (see Section 4.4.1). This economic stimulus could increase local spending and increase income for some residents and their families. Higher income from project employment could increase the real and perceived quality of life of some local residents.

Construction activity will temporarily affect the landscape of the construction area and could impede property access. Construction activities also have the potential to disturb the perceived aesthetic value that residents place on their property and the area in general. The potential for project activities to interfere with aesthetic value, property enjoyment, access to business, and with the production of agricultural products, could have an adverse effect on perceived health and well-being of some residents. Potential safety concerns also exist at locations where properties, residents and vehicles come in proximity to construction activities.

Potential increases in noise, dust, exhaust (see Section 4.4.5) and traffic congestion on roads could also cause stress and affect how people perceive their quality of life. Increased traffic could also impede customer access to business and access by farmers to their land.

The temporary workforce may increase demands on existing recreation facilities, including arenas and swimming pools. Since project construction is scheduled to occur during spring, summer and fall months, winter recreation activities will not be affected.

### **Mitigation and Protective Measures**

Mitigation and protective measures for air quality and noise are outlined in Section 4.4.5.



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If laneways or driveways are affected as a result of pipeline construction, they will be left in place over the trench where requested by the landowner, as long as possible. Access to residential properties and businesses should be maintained at all times to reduce stress on local residents and safety fences should be installed at the edge of the construction right of way, where public safety considerations are required.

A Traffic Management Plan will be implemented to reduce effects of project-related traffic on traffic volumes, which could reduce access to businesses and farmland (see Section 4.4.2). In addition, Enbridge Gas will work with landowners to address specific concerns they may have regarding monetary compensation and their property, such as access and tile drainage repairs.

While pipeline construction activities have the potential to temporarily affect the local landscape, restoration of the construction area will leave little evidence that a pipeline exists in the area. Vegetative buffers at watercourses and road crossings will be implemented and be compliant with applicable permits and regulations. The proposed valve stations will permanently alter the landscape in which they are constructed.

Additional consultation with residents and businesses adjacent to the proposed pipeline route will be held in advance of construction commencement to discuss potential specific impacts to the property or business. Enbridge Gas will develop an issues resolution framework to help resolve stakeholder issues that may arise during project construction and operation, and to select the appropriate mitigation measures to resolve these issues.

### Net Impacts

With planned restoration of the construction site after the proposed pipeline has been built, changes to landscapes are anticipated to be short-term. Additionally, Enbridge Gas will undertake their standard tree replacement program. This will reduce any adverse impact that construction may have on the aesthetic value placed on the land by residents. The only residual aesthetic impact will be five new valve sites. As the footprint of valve sites is small and will occur in locations where roadside infrastructure is already present, the aesthetic change is not anticipated to be of a high magnitude.

In terms of economic contributions to perceived health and well-being, the effect from local economic activity is anticipated to have a positive effect on residents' perceived health and well-being.

With the implementation of the above mitigation and protective measures, the project is not anticipated to alter the lifestyles of residents. Nor will it adversely affect social and community networks or living and environmental conditions. Therefore, no significant adverse residual impacts on perceived health and well-being are anticipated.

### 4.4.4 Infrastructure

#### Existing Conditions

Infrastructure crossed by the proposed pipeline route includes roads/highways, access roads/driveways, hydroelectric lines, a railway, and utilities. Existing conditions for roads and highways are outlined in Section 4.4.2. The proposed pipeline route intersects and runs parallel to existing overhead hydro and



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telecommunications utilities. The proposed pipeline route also traverses an overhead high-voltage hydroelectric transmission lines at three locations:

- On County Road 46, approximately 1 km east of Manning Road in Lakeshore, Ontario
- On County Road 46, approximately 0.5 km east of Belle River Road in South Woodslea, Ontario
- Near the existing Enbridge Comber Compressor Station located on Rochester Townline Road, south of County Road 46 in Comber Ontario

The proposed pipeline route also traverses an existing Enbridge Gas transmission line associated with the existing Enbridge Comber Compressor Station located on Rochester Townline Road, south of County Road 46 in Comber Ontario.

The proposed pipeline route also crosses former CN railway RoWs in three locations:

- On County Road 46, approximately 1 km west of County Road 31 in Ruscom Station, Ontario
- On Lakeshore Road 309, approximately 600 m west of Highway 77, in Comber, Ontario
- At Goodreau Line and Stevenson Road, in Coatsworth, Ontario

In these locations, the railway has been abandoned, and the tracks removed.

A variety of buried utilities such as telecommunication cables, low-voltage hydroelectric lines and watermains are located in road RoWs.

Mapped infrastructure crossed by the proposed pipeline route is located in Appendix C, Figure 13.

### Potential Impacts

The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. The proposed pipeline has the potential to interact with buildings, roads/highways, hydroelectric lines, and buried and overhead utilities. Potential impacts include damage to the infrastructure and harm to personnel.

### Mitigation and Protective Measures

Mitigation and protective measures for roads and railways are outlined in Section 4.4.2. Consultation is ongoing with Infrastructure Ontario and Hydro One regarding easements to cross the existing overhead hydroelectric lines. A permit may be required to cross abandoned railway RoW, depending on who currently owns the RoW.

The contractor will be responsible for locating and exposing existing pipelines and utilities on lands that will be affected by trench excavation. During construction, machine operators will be informed where electrical transmission lines are present overhead. Lines that may interfere with the operation of construction equipment will be identified with warning poles and red flags.



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### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on infrastructure are anticipated.

### 4.4.5 Air Quality and Noise

#### Existing Conditions

Except for the western end of the pipeline, which travels out from the industrial Oldcastle area, the landscape along the proposed pipeline route is almost entirely agricultural, open space or natural heritage. Agricultural operations have the potential to expel air emissions. Although the study area does not have a high population density, air emissions will be released through automobile use.

According to Environmental Noise Guideline (MOECC 2016), the majority of the landscape along the proposed pipeline route would be categorized as a Class 3 area, meaning “a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as a small community; agricultural area; a rural recreational area such as a cottage or a resort area; or a wilderness area.” Portions of the landscape along the proposed pipeline route in proximity to town centers and suburban areas would be categorized as a Class 2 area, meaning “an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas” with an acoustical environment dominated by the activities of people, usually road traffic during the day, and evening and night background sound defined by natural environment and infrequent human activity.

The study area experiences a low traffic volume that represents a minimal source of noise for the majority of the proposed pipeline route, with increased traffic volume in the vicinity of Enbridge’s Sandwich Compressor Station. Other minor noise sources within the study area include occasional sounds due to anthropogenic agricultural activities and occasional sounds due to anthropogenic domestic activities such as property maintenance and recreation.

#### Potential Impacts

Residential and business properties may experience noise, dust and equipment exhaust associated with construction activity. During operation, no substantial air or noise emissions are anticipated to occur.

#### Mitigation and Protective Measures

During construction, motorized construction equipment should be equipped with appropriate mufflers and silencers as available. Company and construction personnel should avoid excessive idling of vehicles; vehicles and equipment should be turned off when not in use unless required for operation. To the greatest extent practical, activities that could create noise should be restricted to daylight hours and adhere to local noise by-laws. Sources of continuous noise, such as portable generators, should be shielded or located so as to reduce disturbance to residents and businesses.



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The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc., 2005), which may include:

- Maintaining equipment in compliance with regulatory requirements
- Protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust
- Dust suppression of source areas
- Covering loads of friable materials during transport

Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles, the tracking of mud onto roads or the siltation of watercourses.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from air quality and noise are anticipated.

### 4.4.6 Contamination

#### Existing Conditions

A Contamination Overview Study (Appendix F) was completed for the project which considered the preferred pipeline route and activities within 250 m on either side to identify potential sources of contamination (PSOC). The overview included a search of public and private information databases for the investigated area by Environmental Risk Information Services (ERIS), and a limited site reconnaissance (i.e., a windshield-level survey which involved viewing the site and surrounding area from publicly accessible roadways) completed on October 24, 2018. PSOC were ranked as either low, moderate, or high depending on the distance of the potential source from the preferred route and the activity associated with the potential source.

Based on a review of the ERIS database report and the site reconnaissance, it was determined that 13 PSOC occur within 250 m of the proposed pipeline route. Of these, the potential for concern was high for four PSOC, moderate for seven PSOC and low for two PSOC.

A summary of the identified PSOC associated with the proposed pipeline route is provided in Table 4-11.



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**Table 4-11: Summary of Potential Sources of Contamination**

PSOC ID No	Description of Potential Source	Location	Approximate Distance from the Site	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
1	Current and historical fuel service facilities	4289, 4293, and 4406 County Road 46, Maidstone, Ontario	Adjacent properties to the north and south	Petroleum Hydrocarbons (PHC), Polycyclic Aromatic Hydrocarbons (PAH), and Volatile Organic Compounds (VOC)	High	Records were identified for fuel storage tanks associated with fuel service facilities at 4289 County Road 46 and 4406 County Road 46, in addition to spills of diesel fuel. Waste generation of petroleum hydrocarbon-based wastes was also identified at 4293 County Road 46. This PSOC is interpreted to be high given the location of these facilities adjacent to the Site.
2	Current and historical waste generation activities	5041 and 5100 Concession Road 8 and 4565 and 4587 County Road 46, Maidstone, Ontario	Adjacent properties to the west and south	PHC, VOC, inorganics and metals	Low	Records were identified for waste generation associated with several industrial and commercial properties at 5041 and 5100 Concession Road 8 and 4565 and 4587 County Road 46. Given the presence of waste generation and nature of the industrial/ commercial properties adjacent to the Site, this PSOC is considered to be low.
3	Former railroad	North of Sandwich Compressor Station, Maidstone; Lots 8 and 9, north side of Middle Road, Rochester, Ontario; Lots 5 and 6, Concession 8, Tilbury West	Across Site and in Study Area	PAH, PHC, VOC, Metals, and Inorganics	Moderate	During the site reconnaissance and the aerial photograph review, two former railway line crossings were observed. The presence of a former railroad represents a PSOC with a moderate potential for concern.
4	Current and historical fuel service facility	2 County Road 46, Maidstone, Ontario	Adjacent property to the north	PHC, PAH, and VOC	High	Records were identified for fuel storage tanks associated with a fuel service facility at 2 County Road 46. This PSOC is interpreted to be high, given the location of this property adjacent to the Site.
5	Repair and maintenance shop	325 County Road 46, Maidstone, Ontario	Adjacent property to the south, operations approximately 80 m south of the Site	PHC, PAH and VOC	Low	Quinlan Inc was registered at 325 County Road 46 for generation of waste oil and lubricant wastes between 2007 and 2018. The records indicated that this facility completes machinery and equipment maintenance. During the site visit, a truck yard with parked vehicles and two aboveground storage tanks (ASTs) was observed at this address. This PSOC is interpreted to be low, based on the distance from the Site (80 m).
6	Historical fuel storage tanks	1367 County Road 46	Adjacent property to the south	PAH, PHC, and VOC	Moderate	Records for two liquid fuel tanks related to a private fuel service facility were listed for the research farm located at 1367 County Road 46. Given the size of the fuel storage tanks, and the record of confirmatory sampling that has occurred at this property for petroleum- hydrocarbon contamination, the potential concern for this PSOC is interpreted to be moderate.



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**Table 4-11: Summary of Potential Sources of Contamination**

PSOC ID No	Description of Potential Source	Location	Approximate Distance from the Site	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
7	Historical fuel service facility	1687 County Road 46	Adjacent property to the south	PAH, PHC, and VOC	High	ERIS records were included for historical fuel storage tanks, associated with a fuel service facility, at 1687 County Road 46. During the site reconnaissance, this property was observed to be occupied by a tree service company. Given the historical presence of fuel storage tanks, this PSOC is considered to be high.
8	Chemical storage at auto service facility	Lot 6, Concession 8, Tilbury West	Adjacent property to the north	PAH, PHC, and VOC	Moderate	Several drums were observed outside a property identified as an auto service facility. Based on the size of the facility and limited quantity of drums, this PSOC is considered to be moderate.
9	Small engine repair shop	22902 Wheatley Road, Tilbury	Adjacent property to the east	PAH, PHC, and VOC	Moderate	Ken's Lawnmower and Small Engine Repair Shop was identified at this address during the site reconnaissance. Many lawn mowers and pieces of equipment were observed on the property. Given the size of the operation, this PSOC is considered to be moderate.
10	Former aggregate development	3719 Goodreau Line, Tilbury	Adjacent property to the north	PAH, PHC, VOC, metals, and inorganics	Moderate	Stevenson clay pit was listed as a previous clay deposit and was formerly used as an aggregate development. The presence of this facility adjacent to the Site and possible activities associated with aggregate development indicate that it represents a moderate PSOC.
11	Suspected garage and former fuel service activities	Lot 177, south of Talbot Road West, Tilbury East; 4495 Talbot Trail, Tilbury	Approximately 50 metres south and east	PAH, PHC, and VOC	High	During the site reconnaissance, a building that appeared to be a former garage was observed at Lot 177, south of Talbot Road West. Across the street, at 4495 Talbot Trail, an apparently vacant commercial property was observed with signage for a petroleum company and a fill pipe located on the property. The potential for fuel service and garage activities at this property represents a high PSOC.





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**Table 4-11: Summary of Potential Sources of Contamination**

PSOC ID No	Description of Potential Source	Location	Approximate Distance from the Site	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
12	Imported fill material and historical spills	Entire Site	On Site	PAH, PHCs, VOCs, polychlorinated biphenyls (PCBs), Metals and Inorganics, and Pesticides	Moderate	Many records existed for spills of diesel, PCB and non-PCB mineral oil, hydraulic oil, and pesticides that may have passed on to the Site. It is expected that fill materials of unknown quality were imported onto the Site for the purposes of road construction. Therefore, the PSOC associated with imported fill and spills along the Site is considered to be moderate.
13	Historical waste disposal	2804 County Road 46	Adjacent property to the north, operations approximately 50 m north of the Site	PAH, PHC, VOC, PCBs, Metals, and Inorganics	Moderate	Records in the ERIS report indicated that historical waste disposal occurred at Lantin Trucking at 2804 County Road 46 including deposition and burning of construction and demolition waste and a charge of operating a waste disposal site without a Certificate of Approval. Operations appeared to be at least 50 m north of the Site, and therefore this PSOC is considered to be moderate.



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The windshield survey did not permit a detailed assessment of the presence of PSOCs at private properties; therefore, it is possible that above ground or underground fuel storage may exist on-site or at adjacent properties.

### Potential Impacts

Construction activities, including excavation and associated trench dewatering, could expose contamination that may be present in soil or groundwater. This could result in increased mobility of existing contamination and/or increased human or ecological exposure to contaminants.

### Mitigation and Protective Measures

Based on the findings, the following recommendations are provided:

- Should excess soil be generated at the Site during future construction activities, or if contaminated soils are suspected (e.g., if observed material contained anthropogenic substances, PHC odours/staining, and debris/waste), representative soil samples should be collected and submitted for chemical analysis to determine management options and appropriate handling and health and safety guidelines.
- Should excess soil be generated at the Site during construction activities, soils that do not meet the Standards listed in Table 1 of the MECP document Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) may not be considered inert fill upon excavation, and off-site
- Management options for excess soils that cannot be reused within the Site must be considered. It is understood that salt-related parameters may not be considered to be contaminants in a road alignment, when de-icing salt has been used for winter road maintenance (O.Reg. 153/04 s.48 (3)); however, soil or water impacted by salt should be managed according to MECP guidance if it is to be removed from the right-of-way.
- Should excess water be generated at the Site during construction activities, water quality analyses should be conducted to determine appropriate management methods. This work should be done in coordination with a qualified person for environmental site assessment (QPESA) as defined by Ontario Regulation 153/04, to maintain data quality and provide an appropriate assessment of water quality.
- Should evidence of soil or water impacts be identified during construction (e.g., staining, odours, petroleum hydrocarbon sheen) samples should be collected for laboratory analyses to confirm concentrations of potential contaminants so as to develop appropriate material management, and health and safety guidelines.
- A Phase I ESA, and Phase II ESA (if recommended as part of the Phase I ESA) should be considered for any property that will be acquired by Enbridge Gas and a site-specific evaluation of PSOCs should be completed. If building demolition will be required, designated substance surveys should be completed for buildings or structures prior to demolition.



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### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from contamination are anticipated.

### 4.4.7 Waste Management

#### Potential Impacts

Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the construction RoW. Litter generated during construction may also become a nuisance to landowners and/or surrounding residents if not contained.

#### Mitigation and Protective Measures

The construction contractor should implement a site-specific waste collection and disposal management plan, which may include:

- Waste materials, sanitary waste and recycling transported off-site by licensed waste contractors
- The responsible management of fill (see Section 4.2.5).
- Labelling and storage of hazardous and liquid wastes in a secure area that would contain material in the event of a spill.
- Implementation of a waste management program consisting of reduction, reuse, and recycling of materials.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from waste management are anticipated.

### 4.4.8 Land Use

#### Existing Conditions

The proposed pipeline route is located in the Town of Tecumseh, Town of Lakeshore and the Municipality of Chatham-Kent. The Town of Tecumseh official plan is divided into three plans that were in place prior to the three townships amalgamating into the Town of Tecumseh. The proposed preferred route is in the former Township of Sandwich South. The former Township of Sandwich South Official Plan designates the majority of the route as agricultural area, except for the western-most portion located in Oldcastle and Baseline Road Hamlets which is designated as “Business Park” or “Hamlet Development”, and the area located southwest of the intersection of County Road 46 and County Road 19 located in Maidenstone Hamlet which is designated as “Hamlet Residential” or “Neighbourhood Commercial” (Town of Tecumseh, 2014c). Section 2.9 (i) of the Official Plan states, “all existing facilities and the development of any new facilities associated with a public utility...or a gas distribution or transmission company, shall be permitted in any land use designation except the Agricultural designation without an amendment to this Plan. The



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utility or company involved should consult the township regarding the location of any and all new facilities;" and, "The policies of this Plan do not apply to any facility to be located in a road allowance, regardless of the land use designation."

The Town of Lakeshore Official Plan (2010) designates the proposed pipeline route as occurring on agricultural land, except for the areas in North Woodslee and Ruscom which are designated as "hamlet area". According to Section 7.5 (g) of the Lakeshore Official Plan, "Public and private utilities will be permitted in all land use designations and will be installed, where possible, within public road allowances or within appropriate easements."

The Municipality of Chatham-Kent Official Plan (2018) designates the proposed pipeline route as occurring on agricultural land. According to Section 2.4.6.2.1 of the Chatham-Kent Official Plan "Oil and natural gas pipelines and related facilities...shall be permitted in any land-use designation, provided that the development satisfies applicable provincial and/or federal legislation."

### Potential Impacts

As noted above, natural gas pipelines are permitted facilities in the various municipal land uses, and thus no impacts to municipal land use designations will occur.

Potential impacts on agricultural land is discussed in Section 4.2.5 (soils) and 4.2.6 (agricultural tile drainage). Potential impacts on agricultural and non-agricultural businesses are discussed in Section 4.4.1. Potential impacts on uses of land will be interruption to access or use.

### Mitigation and Protective Measures

Mitigation and protective measures for agricultural soils, drainage and for businesses are discussed in Sections 4.2.5, 4.2.6 and 4.4.1, respectively.

Consultation has been initiated, and will continue, with municipalities as well as landowners along the proposed pipeline route in order to identify methods of minimizing disturbance to property and maintaining access to lands, to the extent possible. Enbridge will incorporate feedback from landowners when determining whether to abandon the existing pipeline by removing the pipe or abandoning the pipe in place, where feasible. Where work is to occur within conservation authority regulated areas, permits will be obtained from the ERCA as per O.Reg. 158/06 or LTVCA as per O.Reg. 152/06.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on land use are anticipated.

## 4.4.9 Archaeological Resources

### Existing Conditions

A Stage 1 Archaeological Assessment (AA) (Appendix G) has been conducted for the entire route evaluation study area. A copy of the completed Stage 1 AA report has been submitted to the MTCS for review and inclusion into the *Public Register of Archaeological Reports*.



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Initial background research compiled information concerning any known and/or potential archaeological resources within the study area. A property inspection was completed for archaeological study area (see Figure 14, Appendix C) on October 30, 2018 in accordance with Section 1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario, 2011).

The Stage 1 AA determined that much of the area retains potential for the identification and documentation of archaeological resources with small pockets of previously assessed lands. An examination of the *Ontario Archaeological Sites Database*, maintained by the MTCS, identified one registered archaeological site within one kilometer of the study area. A query of the *Ontario Public Register of Archaeological Reports* identified 13 archaeological assessments which may document work within the broad Stage 1 study area or within 50 meters of it.

### Potential Impacts

The Stage 1 AA has determined that the majority of the proposed pipeline route retains potential for the identification and documentation of pre-contact Aboriginal, post-contact Aboriginal, and Euro-Canadian archaeological resources.

A map of archaeological potential is provided in Appendix C, Figure 14.

### Mitigation and Protective Measures

Based on the findings of the Stage 1 AA, further necessary stages of archaeological assessment (i.e., Stage 2 AA) are required, which will provide for the protection and mitigation of any relevant archaeological resources, if any are found. Wherever possible, archaeological sites that are determined to have cultural heritage value and interest should be mitigated in whole or in part by avoidance and preservation. For any sensitive First Nations sites that could be subject to impact by the project, Stage 3 and Stage 4 options will be evaluated in discussions with the appropriate First Nations.

### Net Effects

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on archaeological resources are anticipated.

#### 4.4.10 Cultural Heritage Resources

##### Existing Conditions

A Cultural Heritage Assessment Report is in progress to identify heritage resources (both built heritage resources and cultural heritage landscapes) along the proposed pipeline route. Through municipal and agency consultation, and a windshield survey conducted on September 13, 2017, a total of 62 cultural heritage resources have been identified within 50 m of the proposed pipeline route and decommissioning sections (see Appendix C, Figure 15).



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### Potential Impacts

Impacts to cultural heritage resources are generally categorized as either direct (destruction or alteration) or indirect (shadows, isolation, obstruction, change in land use, and land disturbance). Along the proposed pipeline route, potential impacts to cultural heritage resources are limited to vibration damage to structural stability.

The cultural heritage assessment has not identified any cultural heritage landscapes that would be impacted by the above ground valve stations.

### Mitigation and Protective Measures

In order to reduce potential negative impacts, any potential cultural heritage resource within 40 m of the proposed pipeline route should be isolated from project activities. It is recommended that site plan controls be put in place prior to construction to prevent potential impacts as a result of the project. Given the position of the proposed route within municipal road allowance, site plan control will occur through the clear delineation of the workspace adjacent to cultural heritage resources.

It is recommended that Enbridge consult with a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration will be determined based on the expertise of the qualified individual and the findings of similar studies for other pipeline construction projects. Mitigation measures, if recommended, may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

### Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on cultural heritage resources are anticipated.

### 4.4.11 Indigenous Interests

#### Existing Conditions

There are no Indigenous communities located within the study area, however, the Ministry of Energy, Northern Development and Mines (MENDM) identified the potential for impacts to the following Indigenous communities:

- Aamjiwnaang First Nation;
- Caldwell First Nation;
- Chippewas of Kettle and Stoney Point;
- Chippewas of the Thames First Nation;
- Oneida Nation of the Thames; and,
- Walpole Island First Nation.



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Ontario, as the Crown, has a legal duty to consult with Indigenous peoples regarding projects or decisions that may adversely impact constitutionally protected Indigenous or treaty rights.

### **Potential Impacts**

Although not known to occur, the project may affect traditional territories of Indigenous communities and during construction harvesting and hunting in the construction RoW could be impeded. There is the potential to disturb culturally significant resources or artifacts. Archaeological surveys could also result in the finding of Indigenous artifacts. Potential permits and approvals required for the project (see Section 1.2.5) may trigger a duty to consult.

### **Mitigation and Protective Measures**

Enbridge Gas has sought input from the identified Indigenous communities and will continue engaging with Indigenous communities as the project moves forward. Enbridge Gas will also continue to work with their respective Economic Development departments and Enbridge Gas's contractors to find opportunities for their participation in providing goods and services during construction. Information on the current state of Indigenous engagement will be provided in the application to the OEB.

Mitigation and protective measures for archaeology are discussed in Section 4.4.9.

### **Net Impacts**

By undertaking the above engagement and archaeological assessments, no significant adverse residual impacts on Indigenous interests are anticipated.

## **4.5 SUMMARY OF RECOMMENDATIONS**

Table 4-12 provides a summary of the recommended supplemental studies, mitigation and protective measures identified in Sections 4.2-4.4.



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Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
<b>PHYSICAL FEATURES</b>		
Bedrock Geology and Drift Thickness <i>Section 4.2.1</i>	No impacts anticipated.	N/A
Surficial Geology and Physiography <i>Section 4.2.2</i>	Disturbance to the overburden along the proposed pipeline may cause surface soil erosion and/or watercourse sedimentation during construction and post-construction. Trench slumping may occur during construction.	<p>Surface soil erosion can occur in the absence of vegetative cover. Where there is potential for soil erosion, the need for and location of erosion and sediment control (ESC) measures should be determined by an inspector with appropriate qualifications and installed prior to the commencement of work in the area.</p> <p>When land is exposed, the exposure should be kept to the shortest practical period. Natural features should be preserved to the extent practical. Temporary vegetation and mulching should be used to protect areas as appropriate. Where required, natural vegetation should be re-established as soon as practical.</p> <p>The contractor must obtain adequate quantities of materials to control erosion. Additional supplies should be maintained in a readily accessible location for maintenance and contingency purposes. ESC structures should be monitored to maintain their effectiveness through the life of construction and post-construction rehabilitation.</p> <p>Extreme precipitation events could result in damage to ESC measures which could lead to erosion. When site conditions permit, ESC measures should be repaired and re-installed on erosion susceptible surfaces. If the erosion is resulting from a construction-related activity, the activity should be halted immediately until the situation is rectified.</p> <p>To avoid the trench from slumping, trench walls should be sloped and should be monitored during wet conditions for the potential to slump.</p> <p>Slope stability should be reviewed at watercourse crossing locations. Watercourse banks should be seeded and stabilized immediately following crossing. ESC and stabilization measures should be maintained during construction, restoration and rehabilitation until vegetative cover is established. Where evidence of erosion exists, corrective control measures should be implemented as soon as conditions permit. Permits obtained under O.Reg. 158/06 from ERCA or O.Reg. 152/06 from LTVCA may contain conditions pertaining to ESC.</p>





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<p>Hydrogeology                      Section 4.2.3</p>	<p><u>Hydrostatic Testing and Dewatering/Sand-pointing</u></p> <p>A hydrostatic test will be undertaken for the proposed pipeline.</p> <p>Where trenches encounter shallow groundwater conditions or following a large precipitation event, removing water from the trench (known as dewatering) may be necessary. During trench dewatering, discharge water will be released to the environment. An uncontrolled discharge of water could cause downstream flooding, erosion, sedimentation or contamination.</p> <p><u>Private Water Wells</u></p> <p>There are approximately 135 water supply wells within 500 m of the proposed pipeline route, 68 of which are domestic. The majority of these private domestic supply wells are bedrock wells and are located more than 50 m from the proposed pipeline route, with only 30 WWR mapped within a 50-m radius. Of the 30 WWR mapped within a 50-m radius, seven (7) were screened within the overburden, at depths ranging from 29 m BGS to 45 m BGS. Depending on the proximity to wells, the depth of the well installation and the groundwater levels encountered during excavation, trench dewatering has the potential to impact water well quality or quantity at some of the overburden supply wells.</p>	<p><u>Hydrostatic Testing and Dewatering/Sand-pointing</u></p> <p>For groundwater dewatering, the MECP allows registration under the EASR for construction dewatering projects where groundwater takings will be greater than 50,000 L/day and less than 400,000 L/day; however, should groundwater takings exceed 400,000 L/day, a PTTW may be required from the MECP.</p> <p>If surface water is used as the source water for the hydrostatic test, a PTTW application would be required and would include an assessment of the capacity of the source to provide the required water without impacting the ecosystem, and recommendations for mitigation measures such as screened water intakes to limit intake of debris and organisms and energy dissipation/erosion control measures during discharge to limit erosion and sedimentation.</p> <p>To reduce the potential for erosion and scouring at discharge locations during construction dewatering/sand-pointing and/or hydrostatic testing, energy dissipation techniques should be used. Discharge piping should be free of leaks and should be properly anchored to prevent bouncing or snaking during surging. Protective measures may include dewatering at low velocities, dissipating water energy by discharging into a filter bag or diffuser, and utilizing protective riprap or equivalent. If energy dissipation measures are found to be inadequate, the rate of dewatering should be reduced or dewatering discontinued until satisfactory mitigation measures are in place. Discharge should be monitored to make sure that no erosion or flooding occurs.</p> <p>To assess the potential for introduction of contaminated water to soils or bodies of water, testing of hydrostatic and trench dewatering discharge water should be considered. Testing requirements can be influenced by the nature and quality of the source water used, any additives to the test water, the nature of the pipeline, and pipeline contents. An environmental consultant should be consulted to determine what testing is necessary for the discharge water.</p> <p><u>Private Water Wells</u></p> <p>A private well survey will take place to assess domestic groundwater use near the preferred pipeline and a private well monitoring program may be recommended for residents who rely on overburden groundwater supply for domestic use.</p>



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	<p><u>Municipal Water Supply</u></p> <p>The proposed pipeline does not extend through any WHPAs associated with any municipal groundwater supply system but does extend through the IPZ-3 for the nearby surface water systems.</p> <p>Based on <i>the Clean Water Act</i> (2006), there are no significant chemical, pathogen or dense non-aqueous phase liquids source water threats to municipal supply sources based on the construction or operation of the proposed pipeline.</p>	<p><u>Municipal Water Supply</u></p> <p>There are no nearby municipal supply wells, and therefore additional mitigation measures are not required to protect groundwater drinking supply sources.</p> <p>During construction, the primary concern to surface water quality is the potential for a contaminant spill during a large storm event. To address this concern, the following mitigation measures are proposed:</p> <ul style="list-style-type: none"> <li>• Refueling of equipment should be undertaken 50 m from wetlands and watercourses to reduce potential impacts to surface water and groundwater quality in the event that an accidental spill occurs. If a 50 m refueling distance is not possible, under approval from on-site environmental personnel, special refueling procedures for sensitive areas should be undertaken that include, at a minimum, using a two-person refueling system with one worker at each end of the hose.</li> <li>• To reduce the impact of potential contaminant spills, the contractor should implement spill management protocols such as secondary containment of any temporary fuel storage and preparation of a spill response plan.</li> <li>• Work should be limited or stopped during and immediately following significant precipitation events (i.e. 100 year storm event), at the discretion of on-site environmental personnel.</li> </ul>
<p>Extractive Resources: Aggregates and Petroleum Pools <i>Section 4.2.4</i></p>	<p>No impacts anticipated.</p>	<p>N/A</p>
<p>Soil and Soil Capability <i>Section 4.2.5</i></p>	<p>The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. Where there is interaction with agricultural land, there are potential impacts to topsoil as a result of construction including compaction, loss of organic matter and degraded soil structure. Where feasible, topsoil will not be removed from the site. Excess subsoil may be removed</p>	<p><u>Excess Soil</u></p> <p>It is noted that the MECP has proposed regulating the movement of excess soils in the province of Ontario. Though not project is not expected to generate significant quantities of excess soil, Enbridge should retain or consult with a qualified person who is knowledgeable in the current excess soils guidelines, in order to make recommendations for the management of excess soils for this project.</p> <p><u>Wet Soil Shutdown</u></p> <p>To the extent feasible, construction activities should occur during drier times of the year. Agricultural lands affected by heavy rainfall events should be monitored for wet soil conditions, to avoid the potential for topsoil and subsoil mixing and loss of</p>



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	<p>from the site.</p> <p>Trenching and construction activities across agricultural land have the potential to affect soil quality and agricultural capability. The movement of heavy machinery on wet soil may cause rutting, compaction, and mixing of topsoil with subsoil. When exposed, soils are more prone to erosion due to the loss of vegetative cover. Improperly salvaged topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion, which can potentially decrease crop yields.</p> <p>Where equipment is moving from one agricultural field to another there is the potential for the spread of soil pests/diseases to previously unimpacted fields.</p>	<p>structure. Construction activities should be temporarily halted on lands where excessively wet soil conditions are encountered. Enbridge Gas's on-site inspection team should determine when construction activities may be resumed.</p> <p>If a situation develops that necessitates construction during wet soil conditions, soil protection measures should be implemented, such as confining construction activity to the narrowest area practical, installing surface protection measures, and using wide tracked or low ground pressure vehicles.</p> <p><u>High Winds</u></p> <p>During construction activities, weather should be monitored to identify the potential onset of high wind conditions and to preserve topsoil. In the event that high winds occur, the contractor should implement protective measures such as:</p> <ul style="list-style-type: none"> <li>• Suspend earth moving operations</li> <li>• Apply dust suppressants or vegetate the piles</li> <li>• Protect soil stockpiles with a barrier or windscreen</li> </ul> <p>In conjunction with the above measures, all required materials and equipment should be readily accessible and available for use as required.</p> <p><u>Soil Stripping</u></p> <p>Within agricultural lands Enbridge Gas should discuss with the landowner the proposed method of handling topsoil on their property. Landowner requests, and preferences for additional stripping or no stripping, should be accommodated where practicable. Topsoil depths should be measured prior to stripping so that the proper depth of topsoil is removed and replaced. Where stripping is undertaken on agricultural lands, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. Where the pipeline crosses woodlands the organic and duff layer should be stripped where feasible, given local substrate conditions. Where stripping is undertaken in woodlots, organic material and subsoil should be stripped and stockpiled separately to avoid mixing.</p> <p>If clean-up is not practical during the construction year, it should be undertaken in the year following construction, starting once the soils have sufficiently dried. Interim soil</p>



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		<p>protection measures should be implemented in sensitive areas to stabilize the RoW for over-wintering.</p> <p><u>Soil Compaction</u></p> <p>Within agricultural lands where soil has been compacted by the construction process, an agrologist should determine where decompaction may be necessary. Compaction can be alleviated by using farm equipment such as an agricultural subsoiler prior to replacing the topsoil. Sub-soiling with an agricultural subsoiler, followed by discing, chisel ploughing and cultivating, to smooth the surface, should be considered on agricultural lands. In high traffic areas of the RoW where deep compaction persists, additional deep tillage or subsoiling may be required on a site-specific basis. Soil density and/or penetrometer measurements on and off the easement may be used as a means of assessing the relative degree of soil compaction caused by construction along the RoW as well as determining that the RoW has been sufficiently decompacted.</p> <p><u>Soil Pests/Diseases</u></p> <p>In consultation with the landowner and an agrologist, Enbridge Gas will develop and implement an agricultural soil sampling plan for potential pests and/or diseases that are known to the area. If the results indicate an issue or concern, in consultation with the landowner, Enbridge Gas will work with the agrologist to develop a best practice protocol.</p> <p>Any imported topsoil used for rehabilitation will also have a composite sample analyzed for identified concerns before it is placed on the easement.</p>
<p>Agricultural Tile Drains  <i>Section 4.2.6</i></p>	<p>The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. Where there is interaction with agricultural land, construction activities, including trenching and the movement of heavy machinery, have the potential to crush and/or sever agricultural tile</p>	<p>Enbridge Gas should undertake consultation with landowners of agricultural fields to confirm where systematic tile drainage is present. If tile drainage is present, Enbridge Gas should undertake standard mitigation during trenching, including:</p> <ul style="list-style-type: none"> <li>• Develop site specific tile plans with an independent tile contractor</li> <li>• Conduct pre-tiling, and install header tile to maintain tile system function</li> <li>• Excavate the pipeline trench to a depth that allows clearance between the top of the proposed pipeline and the bottom of existing drainage systems</li> <li>• Record and flag severed or crushed tile drains</li> <li>• If a main drain, header drain, or large diameter drain is severed, maintain field drainage and prevent flooding of the work area and adjacent lands through</li> </ul>



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	drains.	temporary repairs <ul style="list-style-type: none"> <li>• Cap the downstream side of severed drains that cross the trench to prevent the entry of soil, debris and rodents, as required</li> <li>• Repair damaged and severed drains following construction</li> <li>• After repair and before backfilling, invite the landowner to inspect and approve the repair</li> </ul>
Natural Hazards <i>Section 4.2.7</i>	The probability of significant seismic activity in the area traversed by the proposed pipeline is low; therefore, no potential impacts are anticipated.  The likelihood of a flooding event interfering with pipeline construction is reduced by construction occurring outside of the spring freshet. A flooding event during construction could result in construction delays, soil erosion, sedimentation of a watercourse, trench slumping, and damage or loss of construction equipment and contamination of a watercourse as a result of equipment entering a watercourse. The nature of these impacts would depend on the spatial extent, duration, and magnitude of the flooding event.	If flooding necessitates a change in the construction schedule, affected landowners and regulatory agencies should be notified and construction should continue at non-affected locations. Temporary workspaces should be located above the floodplain to the extent practical, unless necessary for watercourse crossings. All work in the floodplains will be subject to a permit under O.Reg.158/06 from ERCA or O.Reg.152/06 from LTVCA.
<b>BIOPHYSICAL FEATURES</b>		
Aquatic Features <i>Section 4.3.1</i>	The proposed pipeline route crosses 29 watercourses. Summer habitat assessments will be conducted in summer 2019 to confirm aquatic habitat conditions and fish communities. The results of the surveys will be used to confirm mitigation and protection measures.  Industry standard watercourse crossing methods that meet the requirements of DFO for fish and fish habitat protection will be used	Mitigation and protective measures for erosion and sediment control are outlined in Section 4.3.2 and accidental spills in Section 4.3.3.  Temporary vehicle crossings and dam and pump pipeline crossings should be completed following the measures outlined in industry standards and company specifications for construction.  The following general mitigation measures, or equivalent, are recommended at watercourse crossings along the preferred pipeline route. Additional, activity-specific measures related to the crossing methods are provided following the general mitigation measures. All measures presented are intended to be consistent with DFO's measures to avoid serious harm (DFO 2016), but DFO's website



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	<p>during construction. These plans include “isolated” watercourse crossing methods such as the Dam and Pump crossing method, and trenchless crossing methods such as the HDD method.</p> <p><u>Dam and Pump Crossing</u></p> <p>The Dam and Pump Crossing method isolates water flow from the construction area and also avoids the majority of the technical risks inherent in other crossing techniques, such as damage to pipe integrity, achieving good cathodic protection, being accessible for maintenance, and increased cost and schedule. Construction of an open cut crossing has the potential to affect fish directly through impacts on water quality (erosion, sedimentation, and accidental spills), disruption/harassment (vibration and noise) and loss of habitat. Indirect impacts include restrictions to habitat use and fish passage. Long term impacts can include changes to habitat such as substrate, increased erosion potential, loss of in-stream cover and riparian shading.</p> <p><u>Horizontal Directional Drilling</u></p> <p>HDD may be utilized to install the proposed pipeline underneath a watercourse at select crossing locations. The HDD process involves drilling a pilot bore hole underneath the watercourse and back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of</p>	<p>(<a href="http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html">http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html</a>) should be consulted immediately prior to construction to confirm that the construction plan is consistent with the most up-to-date list of DFO avoidance measures.</p> <p><b>General Mitigation Measures</b></p> <ul style="list-style-type: none"> <li>• In-water work for warmwater habitats is typically permitted from July 1 to March 15 (no work from March 16 to June 30) (MNR 2013).</li> <li>• Watercourses should not be obstructed in a way that impedes the free movement of water and fish.</li> <li>• Prior to removal of the vegetation cover, effective mitigation techniques for erosion and sedimentation should be in place to protect water quality. Disturbance to the area during construction should be limited and grubbing activities should be delayed until immediately prior to grading operations.</li> <li>• Soil exposure should be reduced prior to commencing construction, and the period that soil remains exposed for grading should be limited. Exposed soils surrounding watercourses should be seeded immediately following construction.</li> <li>• Temporary erosion and sediment control measures should be maintained and kept in place until work within or near a watercourse has been completed and stabilized. Temporary sediment control measures should be removed at the completion of the work but not until permanent erosion control measures have been established.</li> <li>• Construction material, excess material, construction debris and empty containers should be stored a minimum of 30 m from watercourses and watercourse banks.</li> <li>• Equipment maintenance and refueling should be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble or concrete material, into a watercourse, unless otherwise specified in the contract.</li> <li>• Deleterious substances (fuel, oil, spoil) should be stored &gt;30 m from the watercourse. Any such material that inadvertently enters a watercourse should be removed in a manner satisfactory to the environmental inspector.</li> <li>• In the unlikely event of a spill, spills containment and clean-up procedures should be implemented immediately. Enbridge will contact the MECP Spills Action Centre. The MECP Spills Action Centre is the first point of contact for spills at the provincial and federal level.</li> <li>• Conditions of water crossing permit(s), if applicable, will be adhered to.</li> <li>• Additional supplies should be maintained on-site, in a readily accessible location,</li> </ul>



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Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	<p>freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier, and synthetic polymers. Potential impacts that may result from HDD include the escape of drilling mud into the environment, tunnel collapse, or the inadvertent release of fluid to the surface. HDD may also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline.</p>	<p>for maintenance and contingency purposes. Prior to construction, adequate quantities of the materials listed below, or comparable substitutions, should be on site to control erosion and sediment deposition:</p> <ul style="list-style-type: none"> <li>- Sediment control fencing</li> <li>- Sediment control logs (i.e., SiltSoxx™)</li> <li>- Straw bales</li> <li>- Wooden stakes</li> <li>- Sand bags</li> <li>- Water energy dissipater</li> <li>- Filter cloth</li> <li>- Water pumps (including stand-by pumps and sufficient lengths of hose)</li> <li>- Culvert</li> </ul> <p><b>Horizontal Directional Drill Mitigation Measures</b></p> <p>HDD construction methods for pipeline water crossings will not require DFO review or Authorization under the <i>Fisheries Act</i> provided measures to avoid causing serious harm to fish are followed during construction. These measures include locating entry and exit points at sufficient distance to avoid disturbance to the bed and banks, locating the drill path at an appropriate depth below the channel and installation of appropriate sediment and erosion control measures (i.e., silt fencing around disturbed areas, development of a contingency plan, etc.). If these measures are followed, a project of this nature is low risk to fish and can proceed without DFO review.</p> <p>Mitigation measures as they relate to employing the HDD method are as follows:</p> <ul style="list-style-type: none"> <li>• Standard erosion and sediment control measures should be implemented around drill and pipe staging areas.</li> <li>• Prior to initiating an HDD, appropriate geotechnical data should be obtained to assist in determining the drill path.</li> <li>• Drilling equipment (e.g., drill rig, support equipment, sump) should be set up a minimum of 30 m from the edge of watercourses, where possible.</li> <li>• Clearing of vegetation or grading of watercourse banks should not occur within 30 m from the edge of watercourses, if possible.</li> <li>• A drilling mud release contingency plan should be prepared and kept on-site.</li> <li>• Environmental inspectors should be present during crossing of the seven watercourses supporting aquatic species at risk. The Environmental inspectors will</li> </ul>



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		<p>be present to monitor for accidental mud release into these watercourses during HDD activities.</p> <ul style="list-style-type: none"> <li>• Suitable drilling mud tanks or sumps should be installed to prevent contamination of watercourses.</li> <li>• Berms or check dams should be installed downslope from drill entry and anticipated exit points to contain the release of any drilling mud.</li> <li>• Drilling mud should be disposed in accordance with the appropriate regulatory authority requirements.</li> </ul> <p><b><i>Bore Path Collapse Mitigation Measures</i></b></p> <p>The following mitigation measures should be applied as recommended by geotechnical studies to prevent HDD borehole collapse from occurring in susceptible soils:</p> <ul style="list-style-type: none"> <li>• Fluid volumes, annular pressure and cutting returns should be strictly monitored to ensure bore hole plugging and fluid losses are detected and addressed immediately.</li> <li>• Alternative drill paths should be evaluated to minimize exposure to challenging soil materials.</li> <li>• Drilling mud should be maintained in the borehole until the pipeline is installed. This can be facilitated by positioning the entry and exit points in areas with cohesion less soils (e.g., silt-sand zones).</li> </ul> <p><b><i>Drilling Mud Release (Inadvertent Returns) Mitigation Measures</i></b></p> <p>The following mitigation measures should be employed to reduce the risk of lost drilling mud circulation:</p> <ul style="list-style-type: none"> <li>• Install appropriate berms, silt fencing and secondary containment measures (i.e., plastic tarp) around drilling and drilling mud management equipment at both bore entry and bore exit locations to contain operational spills.</li> <li>• Clean up operational spills daily to prevent mobilization of drilling mud off site during rain events.</li> <li>• Design the directional drill so that drilling slurry pressure is minimized, and the drilling rate is reduced in porous materials to minimize the chance of loss of circulation of the drilling slurry.</li> <li>• Maintain smooth operation of the drilling string and slurry pumping systems to avoid pressure surges.</li> <li>• Reduce slurry viscosity through appropriate filtering of drilled material to reduce</li> </ul>





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		<p>the pressure gradient along the drill path due to frictional effects.</p> <ul style="list-style-type: none"> <li>• Continually monitor slurry volumes to enable a quick response to any indications of lost circulation.</li> <li>• Immediately contain any drilling mud that escapes onto land and transfer it into an on-site containment system.</li> </ul> <p>The following materials should readily available during drilling operations and prepared to employ them in the event of a drilling mud spill or inadvertent return: sand bags, straw bales, silt fencing and a hydrovac truck.</p> <p><b>Additional Measures</b></p> <p>The following measures are applicable to trenched crossings:</p> <p><u>Flow Diversion/Dewatering</u></p> <p>If in-water works are required, the work area should be isolated from the remainder of the surface water feature. Downstream flows should be maintained using dam and pump techniques. When dewatering the work area, dewatering operations should be managed to prevent erosion and/or release of sediment laden or contaminated water to the waterbody (e.g. settling basin, filter bag, energy dispersion measures). An isolation/contamination plan should be designed and implemented to isolate temporary in-water work zones and maintain flow around the work zone. Maintenance of downstream flow should avoid potential upstream flooding and desiccation of downstream aquatic habitat and organisms.</p> <p><u>Fish Rescue Plan</u></p> <p>Prior to dewatering the work zone, fish trapped in the construction area should be collected and moved using capture, handling, and release techniques to reduce harm and stress. The intakes of pumping hoses should be equipped with an appropriate device to avoid entraining and impinging fish (see <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> (2013) at the following DFO website <a href="http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html">http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html</a>). Fish rescue plans should be developed on a site-specific basis and implemented by qualified professionals with the appropriate permitting in place (i.e. MNRF Licence to Collect Fish for Scientific Purposes).</p>



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		<p><u>Site Restoration and Riparian Planting</u></p> <p>Following construction, the bed and banks of the crossing locations should be restored to pre-construction conditions to the extent possible in accordance with environmental permits. Bank slopes should be restored to match existing grades; however, alterations may be made to maintain slope stability and limit future erosion. Exposed banks should be re-vegetated with native plants to provide riparian cover and aid in erosion and sediment control. Stream beds should be restored to maintain slopes and tie in with existing grades. Bed material should be replaced to match pre-construction conditions.</p> <p><u>Permitting</u></p> <p>The <i>Fisheries Act</i> prohibits causing serious harm to fish unless authorized by the DFO. This applies to work being conducted in or near water bodies that support fish that are part of or that support a CRA fishery. Since November 25, 2013, proponents must take the responsibility to determine whether or not their projects meet the DFO requirements under the Self-Assessment process. If serious harm cannot be avoided, proponents should contact DFO for a formal review and/or approval under the <i>Fisheries Act</i>. Following finalization of plans, a Self-Assessment should be completed for all project activities that have the potential to cause serious harm to fish. If it is determined that serious harm is likely to occur as a result of project-related activities, a Request for Review should be completed and submitted to DFO to determine approvals requirements under the <i>Fisheries Act</i>. Revision to the <i>Fisheries Act</i> were proposed on February 16, 2018 that may come into force in 2019. Should the proposed revisions come into force prior to construction, the proposed mitigation measures should be reviewed to ensure that they are consistent with the revised <i>Fisheries Act</i>.</p> <p>The pipeline route will be located within the regulated boundary of the ERCA and LTVCA. Permits under Ontario Regulation 169/06 and 164/06, respectively, will be required prior to construction activities in the regulated boundaries. Due to the presence of aquatic SAR at SC17, the HDD drill entry and exit pits must be located at least 30 m from bank full width to avoid requiring a permit under the SARA. If activities are required below the high-water line, then the DFO must be contacted to determine if a SARA Permit is required. If crossings supporting aquatic SAR cannot be crossed using HDD, then the alternative crossing methods should be reviewed by DFO to determine if a permit under SARA is required.</p>



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<p>Designated Natural Areas and Vegetation  <i>Section 4.3.2</i></p>	<p>The proposed pipeline route occurs primarily in municipal road allowance, however it crosses or is in proximity to seven significant woodlands and one PSW. No significant natural features intersect with the proposed temporary work areas. Field surveys will be conducted prior to construction to assess the presence or absence of wetlands. ELC and botanical surveys will be conducted prior to construction to assess the significance and boundaries of vegetation communities and to identify vascular plant species, including plant species of concern. The results of the surveys will be used to confirm mitigation and protection measures.</p> <p>Where there is natural vegetation within or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, introduction or spread of invasive species, and indirect effects such as dust, erosion, and accidental spills.</p>	<p>Provide notice to the municipalities and ERCA and LTVCA prior to clearing.</p> <p>Clearing should be minimized to the extent possible in sensitive areas such as woodlots, along watercourses, and in areas of significant groundwater recharge.</p> <p>The limits of clearing should be surveyed and staked in the field, to allow for the protection of off-site natural areas and vegetation.</p> <p>All brush and trees should be felled within the project footprint.</p> <p>Clearing should be done during dry soil conditions to the extent practical to limit disturbance to vegetation and terrain.</p> <p>A screening field program of wetlands and riparian areas should be undertaken prior to construction, to determine where precautionary measures (ex. equipment washing before site access) may be necessary to mitigate for the spread of non-native species.</p> <p>A re-vegetation program should be initiated for all vegetated temporary work areas. Enbridge Gas should consult with landowners, ERCA and LTVCA to confirm replanting plans.</p> <p>Enbridge Gas should undertake their standard tree replacement program, which involves the replanting of twice the area of woodlot removed during construction. The replacement/compensation for the removal of individual landscape trees will be completed outside of the tree replacement program and will be discussed between the landowner and an Enbridge Gas Land Agent. Tree replacement consists of species native to the area, and ideally the same species removed. Enbridge Gas encourages planting of replacement trees on the same property where the trees were removed, with the goal of enhancing a natural area and its associated wildlife habitat. If a landowner is not interested in planting trees on their property, Enbridge Gas will offer the trees to ERCA or to a local community group. Enbridge Gas will maintain the trees for a period of 5 years, or until the trees reach a 'free to grow' status as defined by a height of 1 metre (m) and tree of adjacent brush competition.</p> <p>Seeding of the disturbed temporary work areas and permanent easement should be done with a native seed mix reviewed by ERCA or LTVCA. Replaced soils will contain native seed bank, facilitating successful revegetation.</p> <p>One year following construction, planted vegetation should be inspected for survival; in areas of severe dieback, dead and diseased planted vegetation should be replaced.</p> <p>Mitigation and protective measures are outlined in Section 4.4.5 for dust, Section 4.2.2</p>



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		for erosion and Section 4.2.3 for accidental spills.
Wildlife, Wildlife Habitat and Species at Risk Section 4.3.3	<p>Due to the presence of woodlots, hedgerows, watercourses and open fields in proximity to the proposed pipeline route, field surveys will be undertaken before construction to assess the presence or absence of wildlife and wildlife habitat. Planned surveys include those for reptiles (snake habitat assessment), mammals (bat habitat assessment), breeding birds and SAR habitat assessments. The results of all surveys, including any additional appropriate mitigation or protection measures, will be summarized in a report and shared with the MECP to determine any regulatory requirements.</p> <p>Potential impacts on wildlife and wildlife habitat from construction include direct mortality from construction vehicles, habitat destruction through vegetation removal, habitat degradation through spills and sensory disturbance of wildlife during construction.</p>	<p>Detailed design of the proposed pipeline should be reviewed to avoid and reduce the likelihood of impact upon wildlife habitat to the extent possible, and in particular habitats of endangered, threatened, special concern and rare species.</p> <p>Equipment and vehicles should yield the RoW to wildlife.</p> <p>Trench operations should be followed as closely as practical with backfill operations, to facilitate the movement of wildlife across the trench.</p> <p>Gaps in stockpiles should be created, in consultation with a biologist, to allow for the potential movement of wildlife across the RoW.</p> <p>Fencing should be erected around deep excavations to prevent wildlife entrapment.</p> <p>The contractor should inform their personnel to not threaten, harass or injure wildlife.</p> <p>If wildlife are encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site.</p> <p>Where practical, avoid construction in the vicinity of areas that may provide habitat for amphibians during the amphibian breeding season (March 1 – June 30).</p> <p>Habitat assessments and species occurrence surveys will be conducted for SAR. A report will be prepared to document results and recommend mitigation measures.</p> <p>Field investigations will identify potential habitat for Eastern Foxsnake and Butler’s Gartersnake, which are known to occur in the area. Mitigation recommendations will be prepared upon consultation with MECP and will include the use of timing windows, inspection of construction equipment and protection of key habitat features. Mesh or netting type stabilization material will not be used for erosion control due to risk of entanglement.</p> <p>Areas of potential bat maternity roosting habitat will be identified during field investigations. Tree removal in identified areas should be limited to the extent possible and will avoid the active season for bats (mid-April to mid-September). Mitigation recommendations for SAR bats will be prepared upon consultation with MECP.</p> <p>Construction activities with the potential to remove migratory bird habitat, such as vegetation clearing, should be avoided during the breeding season which is generally from April 1- August 31 in southern Ontario (Environment Canada, 2017). Should vegetation clearing activities be unavoidable during this window, a mitigation program should be developed, which includes measures to reduce and avoid impacts to</p>



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		<p>migratory birds and their nests (Government of Canada, 2018). This program should include preventative and mitigation measures but may also include avoidance of clearing during key sensitive periods and in key locations.</p> <p>If SAR are found along the proposed pipeline route Enbridge Gas will undertake consultation with the MECP regarding the potential need for a permit under the ESA and/or species-specific mitigation.</p> <p>Mitigation and protective measures are outlined in Section 4.3.2 for vegetation removal and Section 4.2.3 for accidental spills.</p>
<b>SOCIO-ECONOMIC ENVIRONMENT</b>		
<p>Employment and Business                      Section 4.4.1</p>	<p>During construction, the labour force will peak at approximately 260 workers. Approximately 65% of the labour force is expected to come from Ontario and other areas of Canada, while 35% will likely be local residents. Project construction is expected to take place in the Spring/Summer/Fall of 2020 and take an estimated 7 months to complete. Enbridge Gas will schedule shifts so that employees are working six days per week for 10 to 12 hours each day. Workers will be at the work site for as long as is required to complete specific construction tasks. Operation will not change from the current operation as the project is an equivalent replacement of the existing pipeline. Project demands for labour and goods and services can result in both beneficial and adverse effects. Positive effects may not be evenly distributed among populations, with some residents in a better position to receive economic benefits than others. Similarly, adverse effects may affect some residents more than others. Residual effects on employment are related to the project's labour demand compared to the</p>	<p>It is expected that the project will generally result in positive effects on employment by employing local and Indigenous people, and by reducing the unemployment rate in the region. These positive effects do not require mitigation, but Enbridge Gas will identify and implement various mechanisms to enhance project benefits. The project may add pressure to the construction labour market during construction. However, Enbridge Gas will be able to mitigate this effect through the reliance on labour from the wider province and Canada (65% of project labour force), and the proximity of Windsor and Chatham-Kent to help supply the local labour force, if necessary.</p> <p>The potential effects of the project as a result of purchasing labour, goods and services is expected to be positive during construction and operation, so no mitigation will be required. However, Enbridge Gas has and will continue to work with local and Indigenous businesses to enhance their potential for successfully bidding on project contracts regarding the supply of goods and services, particularly for the operation phase. One initiative to help encourage further local and Indigenous content on the project is to post project purchasing requirements in advance, so that businesses can position themselves to effectively bid to supply goods and services needed for construction and operation. Increased participation of local and Indigenous businesses will enhance positive local economic effects.</p> <p>With respect to potential adverse effects on agricultural and non-agricultural businesses, Enbridge will engage with land owners and municipalities to address access to the project area, the portion of land that will be altered as part of site preparation, and long-term changes to agricultural and non-agricultural land.</p>



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	<p>labour supply. Three types of employment are considered:</p> <ul style="list-style-type: none"> <li>• Direct employment: labour that is hired directly for the project</li> <li>• Indirect employment: labour hired by companies in order to produce and provide goods and services needed for the project</li> <li>• Induced employment: labour hired by industries that produce and provide consumer items and services purchased by people who are directly or indirectly employed by the project</li> </ul> <p>Labour conditions will be affected by direct, indirect and induced employment during all project phases. Given the low unemployment rates in Tecumseh and Lakeshore, and the small construction-related labour force available in those locations, direct employment for the project has the potential to constrain available construction labour in the region during construction.</p> <p>The project could affect business through purchases of labour, goods and services from local businesses, including businesses owned by Indigenous peoples, and will result in increased local employment income and municipal government revenue. Local businesses will likely benefit from supplying the project with goods and services.</p> <p>Land clearing and other construction-related project activities could adversely affect agricultural productivity. Other potential adverse effects on industries include impairment to the use and enjoyment of</p>	



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	property, disruption of livestock production and issues with farm machinery and other vehicular movement.	
Community Services and Infrastructure <i>Section 4.4.2</i>	<p>The presence of temporary workers in the local communities during the six-month long construction period has the potential to increase the demand for housing and local community services and infrastructure. Non-local project workers are expected to stay in temporary accommodations, including hotels, motels, and campgrounds. They may also choose to rent cottages or apartments. The vacancy rate for temporary rentals will likely be able to accommodate the temporary increase. The short duration that the workers will reside near any one community, as well as the structure of the work shifts, will limit the need for workers to use the services and infrastructure in local communities.</p> <p>The transportation of project goods, services and workers has the potential to lead to increased use of existing transportation infrastructure. Also, increased traffic volumes along local road networks could increase travel times and reduce road safety, which might lead to increased use of local emergency services due to potential vehicle accidents and workplace accidents. In addition, the production of project-related waste could place additional stress on the capacity of local landfills.</p> <p>During operation, the workforce will remain the same as current operations with no planned changes as the project is a</p>	<p>Project employees might require medical attention while staying in the area. The contractor and Enbridge Gas will have emergency response equipment and trained personnel on-site during construction. In addition, an Emergency Response Plan will be developed and implemented, which will address field health services, emergency call-out procedures and fire response plans. Safety fencing will be used where necessary to separate the work area.</p> <p>Environmental mitigation will be in place to reduce the likelihood of emergency events and to prepare for the management of emergency events on site. If an emergency incident were to occur, it is anticipated that the comprehensive mitigation, contingency plans, and safety strategies will result in a localized and low-intensity response.</p> <p>A Traffic Management Plan will be in place for all roads affected by construction, which at a minimum outlines measures to:</p> <ul style="list-style-type: none"> <li>• Control the movement of materials and personnel to and from the construction site</li> <li>• Post signs to warn oncoming motorists of construction activity</li> <li>• Control traffic at road crossings</li> <li>• Reduce on-road disturbance and land closures</li> <li>• Store equipment as far from the edge of the road as practical</li> </ul> <p>Install construction barricades at road crossings</p> <p>Traffic disruptions during construction will be reduced by adherence to the Traffic Management Plan. Guidelines will be developed for vehicular use on the RoW and associated access roads to avoid traffic congestion and accidents. Access to existing transportation infrastructure will be addressed through standard mitigation and will be reversible once the construction phase ends.</p> <p>The capacity of waste disposal sites will be considered and if project needs are not easily accommodated, alternative disposal locations will be considered.</p> <p>Enbridge Gas will provide project information to local communities and service providers so that they are prepared for any possible demand on community services and infrastructure related to a temporary population increase. Additional consultation with residents and businesses adjacent to the proposed pipeline route will be held in advance of construction commencement to discuss potential specific impacts to the</p>



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	<p>replacement of the existing facility. Some operation workers might already reside in the local area; however, some might need to come from outside communities and may use local community and emergency services.</p>	<p>property or business. Contact information for a designated Enbridge Gas representative will be available to address questions and concerns during construction. Consultation has been initiated and will continue with municipal personnel.</p>
<p>Perceived Health and Well-Being  <i>Section 4.4.3</i></p>	<p>Perceived health and well-being is influenced by a number of factors such as individual lifestyles, social and community networks, living conditions, general socio-economic and environmental conditions. The project has the potential to affect a number of these factors, which could change the way that local residents perceive their health and well-being. During public consultation for the project, comments were raised regarding monetary compensation by residents for loss of crops and trees, business, as well as enjoyment of property.</p> <p>Since perceived health and well-being is influenced by improved economic conditions, the project is expected to have positive effects by creating direct, indirect, and induced employment, and through project spending within Essex County and the Municipality of Chatham-Kent (see Section 4.4.1). There is also the potential to enhance these benefits further by selecting local and Indigenous businesses to provide services to the project, thus increasing economic activity and the associated benefits (see Section 4.4.1). This economic stimulus could increase local spending and increase income for some residents and their families. Higher income from project employment could increase the real and perceived quality of life of some local</p>	<p>Mitigation and protective measures for air quality and noise are outlined in Section 4.4.5.</p> <p>If laneways or driveways are affected as a result of pipeline construction, they will be left in place over the trench where requested by the landowner, as long as possible. Access to residential properties and businesses should be maintained at all times to reduce stress on local residents and safety fences should be installed at the edge of the construction right of way, where public safety considerations are required.</p> <p>A Traffic Management Plan will be implemented to reduce effects of project-related traffic on traffic volumes, which could reduce access to businesses and farmland (see Section 4.4.2). In addition, Enbridge Gas will work with landowners to address specific concerns they may have regarding monetary compensation and their property, such as access and tile drainage repairs.</p> <p>While pipeline construction activities have the potential to temporarily affect the local landscape, restoration of the construction area will leave little evidence that a pipeline exists in the area. Vegetative buffers at watercourses and road crossings will be implemented and be compliant with applicable permits and regulations. The proposed valve stations will permanently alter the landscape in which they are constructed.</p> <p>Additional consultation with residents and businesses adjacent to the proposed pipeline route will be held in advance of construction commencement to discuss potential specific impacts to the property or business. Enbridge Gas will develop an issues resolution framework to help resolve stakeholder issues that may arise during project construction and operation, and to select the appropriate mitigation measures to resolve these issues.</p>





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	<p>residents.</p> <p>Construction activity will temporarily affect the landscape of the construction area and could impede property access. Construction activities also have the potential to disturb the perceived aesthetic value that residents place on their property and the area in general. The potential for project activities to interfere with aesthetic value, property enjoyment, access to business, and with the production of agricultural products, could have an adverse effect on perceived health and well-being of some residents. Potential safety concerns also exist at locations where properties, residents and vehicles come in proximity to construction activities.</p> <p>Potential increases in noise, dust, exhaust (see Section 4.4.5) and traffic congestion on roads could also cause stress and affect how people perceive their quality of life. Increased traffic could also impede customer access to business and access by farmers to their land.</p> <p>The temporary workforce may increase demands on existing recreation facilities, including arenas and swimming pools. Since project construction is scheduled to occur during spring, summer and fall months, winter recreation activities will not be affected.</p>	
<p>Infrastructure  <i>Section 4.4.4</i></p>	<p>The proposed project will be constructed within existing municipal road allowances, with some temporary lands required for construction purposes. Where temporary lands are required limited impacts to agricultural lands may occur. The proposed</p>	<p>Mitigation and protective measures for roads and railways are outlined in Section 4.4.2. Consultation is ongoing with Infrastructure Ontario and Hydro One regarding easements to cross the existing overhead hydroelectric lines. A permit may be required to cross abandoned railway RoW, depending on who currently owns the RoW.</p> <p>The contractor will be responsible for locating and exposing existing pipelines and utilities on lands that will be affected by trench excavation. During construction,</p>



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	<p>pipeline has the potential to interact with buildings, roads/highways, hydroelectric lines, and buried and overhead utilities. Potential impacts include damage to the infrastructure and harm to personnel.</p>	<p>machine operators will be informed where electrical transmission lines are present overhead. Lines that may interfere with the operation of construction equipment will be identified with warning poles and red flags.</p>
<p>Air Quality and Noise <i>Section 4.4.5</i></p>	<p>Residential and business properties may experience noise, dust and equipment exhaust associated with construction activity. During operation, no substantial air or noise emissions are anticipated to occur.</p>	<p>During construction, motorized construction equipment should be equipped with appropriate mufflers and silencers as available. Company and construction personnel should avoid excessive idling of vehicles; vehicles and equipment should be turned off when not in use unless required for operation. To the greatest extent practical, activities that could create noise should be restricted to daylight hours and adhere to local noise by-laws. Sources of continuous noise, such as portable generators, should be shielded or located so as to reduce disturbance to residents and businesses.</p> <p>The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc., 2005), which may include:</p> <ul style="list-style-type: none"> <li>• Maintaining equipment in compliance with regulatory requirements</li> <li>• Protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust</li> <li>• Dust suppression of source areas</li> <li>• Covering loads of friable materials during transport</li> </ul> <p>Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles, the tracking of mud onto roads or the siltation of watercourses.</p>
<p>Contamination <i>Section 4.4.6</i></p>	<p>Current and historical fuel service facilities at 4289, 4293, and 4406 County Road 46, Maidstone, Ontario.</p> <p>Current and historical waste generation activities at 5041 and 5100 Concession Road 8 and 4565 and 4587 County Road 46, Maidstone, Ontario.</p> <p>Former railroad north of Sandwich Compressor Station, Maidstone; Lots 8 and 9, north side of Middle Road, Rochester, Ontario; and, Lots 5 and 6, Concession 8,</p>	<p>Should excess soil be generated at the Site during future construction activities, or if contaminated soils are suspected (e.g., if observed material contained anthropogenic substances, PHC odours/staining, and debris/waste), representative soil samples should be collected and submitted for chemical analysis to determine management options and appropriate handling and health and safety guidelines.</p> <p>Should excess soil be generated at the Site during construction activities, soils that do not meet the Standards listed in Table 1 of the MECP document Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) may not be considered inert fill upon excavation, and off-site Management options for excess soils that cannot be reused within the Site must be considered. It is understood that salt-related parameters may not be considered to be</p>



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**Table 4-12: Summary of Potential Impacts and Recommended Mitigation and Protective Measures**

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	<p>Tilbury West.</p> <p>Current and historical fuel service facility at 2 County Road 46, Maidstone, Ontario.</p> <p>Repair and maintenance shop at 325 County Road 46, Maidstone, Ontario.</p> <p>Historical fuel storage tanks at 1367 County Road 46.</p> <p>Historical fuel service facility at 1687 County Road 46.</p> <p>Chemical storage at auto service facility at Lot 6, Concession 8, Tilbury West.</p> <p>Small engine repair shop at 22902 Wheatley Road, Tilbury.</p> <p>Former aggregate development at 3719 Goodreau Line, Tilbury.</p> <p>Suspected garage and former fuel service activities at Lot 177, south of Talbot Road West, Tilbury East; 4495 Talbot Trail, Tilbury.</p> <p>Imported fill material and historical spills along the entire proposed route.</p> <p>Historical waste disposal at 2804 County Road 46</p> <p>It is possible that above ground or underground fuel storage may exist on-site or at adjacent residential, industrial, or commercial properties.</p> <p>Construction activities, including excavation and associated trench dewatering, could expose contamination that may be present in soil or groundwater. This could result in increased mobility of existing contamination and/or increased human or ecological</p>	<p>contaminants in a road alignment, when de-icing salt has been used for winter road maintenance (O.Reg. 153/04 s.48 (3)); however, soil or water impacted by salt should be managed according to MECP guidance if it is to be removed from the right-of-way.</p> <p>Should excess water be generated at the Site during construction activities, water quality analyses should be conducted to determine appropriate management methods. This work should be done in coordination with a qualified person for environmental site assessment (QPESA) as defined by Ontario Regulation 153/04, to maintain data quality and provide an appropriate assessment of water quality.</p> <p>Should evidence of soil or water impacts be identified during construction (e.g., staining, odours, petroleum hydrocarbon sheen) samples should be collected for laboratory analyses to confirm concentrations of potential contaminants so as to develop appropriate material management, and health and safety guidelines.</p> <p>A Phase I ESA, and Phase II ESA (if recommended as part of the Phase I ESA) should be considered for any property that will be acquired by Enbridge Gas and a site-specific evaluation of PSOCs should be completed. If building demolition will be required, designated substance surveys should be completed for buildings or structures prior to demolition.</p>



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**Table 4-12: Summary of Potential Impacts and Recommended Mitigation and Protective Measures**

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	exposure to contaminants.	
Waste Management Section 4.4.7	Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the construction RoW. Litter generated during construction may also become a nuisance to landowners and/or surrounding residents if not contained.	<p>The construction contractor should implement a site-specific waste collection and disposal management plan, which may include:</p> <ul style="list-style-type: none"> <li>• Waste materials, sanitary waste and recycling transported off-site by licensed waste contractors</li> <li>• The responsible management of fill (see Section 4.2.5).</li> <li>• Labelling and storage of hazardous and liquid wastes in a secure area that would contain material in the event of a spill.</li> <li>• Implementation of a waste management program consisting of reduction, reuse, and recycling of materials.</li> </ul>
Land Use Section 4.4.8	<p>As noted above, natural gas pipelines are permitted facilities in the various municipal land uses, and thus no impacts to municipal land use designations will occur.</p> <p>Potential impacts on agricultural land is discussed in Section 4.2.5 (soils) and 4.2.6 (agricultural tile drainage). Potential impacts on agricultural and non-agricultural businesses are discussed in Section 4.4.1. Potential impacts on uses of land will be interruption to access or use.</p>	<p>Mitigation and protective measures for agricultural soils, drainage and for businesses are discussed in Sections 4.2.5, 4.2.6 and 4.4.1, respectively.</p> <p>Consultation has been initiated, and will continue, with municipalities as well as landowners along the proposed pipeline route in order to identify methods of minimizing disturbance to property and maintaining access to lands, to the extent possible. Enbridge will incorporate feedback from landowners when determining whether to abandon the existing pipeline by removing the pipe or abandoning the pipe in place, where feasible. Where work is to occur within conservation authority regulated areas, permits will be obtained from the ERCA as per O.Reg. 158/06 or LTVCA as per O.Reg. 152/06.</p>
Archaeological Resources Section 4.4.9	The Stage 1 AA has determined that the majority of the proposed pipeline route retains potential for the identification and documentation of pre-contact Aboriginal, post-contact Aboriginal, and Euro-Canadian archaeological resources.	Based on the findings of the Stage 1 AA, further necessary stages of archaeological assessment (i.e., Stage 2 AA) are required, which will provide for the protection and mitigation of any relevant archaeological resources, if any are found. Wherever possible, archaeological sites that are determined to have cultural heritage value and interest should be mitigated in whole or in part by avoidance and preservation. For any sensitive First Nations sites that could be subject to impact by the project, Stage 3 and Stage 4 options will be evaluated in discussions with the appropriate First Nations.
Cultural Heritage Resources Section 4.4.10	Along the proposed pipeline route, potential impacts to cultural heritage resources are limited to vibration damage to structural stability.	In order to reduce potential negative impacts, any potential cultural heritage resource within 40 m of the proposed pipeline route should be isolated from project activities. It is recommended that site plan controls be put in place prior to construction to prevent potential impacts as a result of the project. Given the position of the proposed route



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**Table 4-12: Summary of Potential Impacts and Recommended Mitigation and Protective Measures**

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	<p>The cultural heritage assessment has not identified any cultural heritage landscapes that would be impacted by the above ground valve stations.</p>	<p>within municipal road allowance, site plan control will occur through the clear delineation of the workspace adjacent to cultural heritage resources.</p> <p>It is recommended that Enbridge consult with a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration will be determined based on the expertise of the qualified individual and the findings of similar studies for other pipeline construction projects. Mitigation measures, if recommended, may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.</p>
<p>Indigenous Interests  <i>Section 4.4.11</i></p>	<p>Although not known to occur, the project may affect traditional territories of Indigenous communities and during construction harvesting and hunting in the construction RoW could be impeded. There is the potential to disturb culturally significant resources or artifacts. Archaeological surveys could also result in the finding of Indigenous artifacts. Potential permits and approvals required for the project (see Section 1.2.5) may trigger a duty to consult.</p>	<p>Enbridge Gas has sought input from the identified Indigenous communities and will continue engaging with Indigenous communities as the project moves forward. Enbridge Gas will also continue to work with their respective Economic Development departments and Enbridge Gas’s contractors to find opportunities for their participation in providing goods and services during construction. Information on the current state of Indigenous engagement will be provided in the application to the OEB.</p> <p>Mitigation and protective measures for archaeology are discussed in Section 4.4.9.</p>



## 5.0 CUMULATIVE EFFECTS ASSESSMENT

The recognition of cumulative effects assessment as a best practice is reflected in many regulatory and guidance documents. With regard to development of hydrocarbon pipelines in Ontario, the OEB Environmental Guidelines note that cumulative effects should be identified and discussed in the ER. The cumulative effects assessment refers to the potential effects associated with the project.

Building upon the intent of the OEB Environmental Guidelines, the OEB has specified that only those effects that are additive or interact with the effects that have already been identified as resulting from the project are to be considered under cumulative effects. In such cases, it will be necessary to determine whether these effects warrant mitigation measures. The cumulative effects assessment has been prepared with consideration of this direction from the OEB.

### 5.1 METHODOLOGY

The cumulative effects assessment describes the potential cumulative effects resulting from the interaction of residual effects of constructing and operating the proposed pipeline with the effects of other unrelated projects. The other projects assessed are those that are either existing or approved and that have a high likelihood of proceeding.

Cumulative effects include the temporal and spatial accumulations of change that occur within an area or system due to past, present, and future activities. Change can accumulate within systems by either an additive (i.e., cumulative) or interactive (i.e., synergistic) manner. Positive residual effects have not been assessed in the cumulative effects assessment.

By applying the principles of avoidance, minimization, and compensation to limit project-specific effects, potential adverse residual effects on environmental and socio-economic features have been greatly limited before accounting for the effects of other unrelated projects.

The cumulative effects assessment methodology is designed to evaluate and manage the additive and interactive effects from the following sources:

- Existing infrastructure, facilities, and activities as determined from available data sets
- The proposed pipeline
- Future activities where the undertaking will proceed, or has a high probability of proceeding

Although rare in occurrence, it is plausible that accidents or emergency events may arise due to an unforeseen chain of events during the project's construction or operational life. Due to the rarity and magnitude of such events, they have not been assessed here, as they are extreme in nature when compared to the effects of normal construction and operation activities and require separate response plans. The decommissioning and abandonment of the proposed pipeline is another event that is beyond the temporal boundaries of the cumulative effects assessment and therefore has not been assessed.



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## 5.2 STUDY BOUNDARIES

### Spatial

To make assumptions about the magnitude and probability of effects, an approximate 100 m boundary around the proposed pipeline route was used for the cumulative effects assessment. The 100 m boundary has been found, through previous experience with pipeline construction, to be appropriate for the most commonly encountered net effects.

### Temporal

The temporal boundaries for the cumulative effects assessment reflect the nature and timing of project activities, and the availability of information surrounding future projects with a high probability of proceeding. The project schedule identifies three key milestone activities:

1. ER and technical design – 2019
2. Construction – 2020
3. Operation and Maintenance – 2020 to 2070\*

*\*Fifty years of operation is used as an assumption, although the pipeline may be operational beyond fifty years.*

Based upon these milestone activities, two time periods were selected for evaluation: 2020 and 2025. The year 2020 was selected to represent the construction period, and the year 2025 was selected to represent the operation and maintenance period. Forecasting beyond 2025 increases the uncertainty in predicting whether projects will proceed, and the effects associated with these projects.

## 5.3 PROJECT INCLUSION LIST

The project inclusion list was developed by reviewing publicly available information for projects and activities with the potential for effects to interact with the identified effects of the proposed pipeline within the spatial and temporal study boundaries. The following resources were reviewed:

- Canadian Environmental Assessment Agency, Canadian Environmental Assessment Registry (CEA Agency, 2019)
- Government of Ontario, Environmental Assessment Projects by Category (Government of Ontario, 2019)
- Government of Ontario, Renewable Energy Approval Projects (2018)
- MTO, Southern Highways Program (2017-2021) (MTO, nd)
- Municipality of Chatham-Kent, 2019 Capital Projects List (2019c)
- National Energy Board, Major Facilities Applications (NEB, 2019)
- OEB Applications Currently Before the Board (facilities applications only) (OEB, 2019)



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- Town of Lakeshore, Capital Projects Community Input (2019)
- Town of Tecumseh, 2018-2022 Capital Works Plan (2017)

Based on the review of publicly available resources, the project inclusion list in Table 5-1 included the following projects for consideration of cumulative effects:

**Table 5-1: Project Inclusion List for Cumulative Effects**

Project Name	Project Location	Proponent	Schedule	Project Description	Interaction with the Proposed Pipeline
Romney Wind Energy Centre <sup>1</sup>	Wheatley, Ontario	EDF Renewables	Construction 2018-2019 Commissioning Fall 2019 Operation December 2019	60 megawatt windpark consisting of wind turbines, substations, access roads and buried utilities	Buried cable is to be installed on Richardson Sideroad from Lakeshore Road 301 to Substation near Tilbury, Ontario in 2019. The operation phase of this utility overlaps with the construction and operation phase of the proposed pipeline.

1. EDF Renewables (2019)

In addition to the above, it is assumed that on-going improvements, upgrades and maintenance to municipal infrastructure such as bridges, culverts, drains or roads will occur within the spatial and temporal study boundaries.

## 5.4 ANALYSIS OF CUMULATIVE EFFECTS

Sections 4.2-4.4 of the ER consider the potential impacts of the project on specific features and conditions and propose mitigation and protective measures to eliminate or reduce the potential impacts. The cumulative effects assessment evaluates the significance of residual impacts (after mitigation) of the project along with the effects of other unrelated projects.

### 5.4.1 Construction – Year 2020

Residual project impacts which may occur during project construction are outlined in Sections 4.2-4.4. To consider the additive and interactive effects at their maximum intensity, the cumulative effects assessment assumes that construction of other unrelated projects and the proposed pipeline construction will occur concurrently.

Potential cumulative effects resulting from the proposed pipeline construction and the concurrent projects are additive effects on soil, vegetation, wildlife and wildlife habitat, air quality and the acoustic environment.

#### Soil

Soil erosion and reduced soil capability is a potential residual effect associated with construction of the project. Mitigation and protective measures for soil are outlined in Section 4.2.2. Provided that concurrent projects follow mitigation measures similar to those outlined in this report, the probability of erosion





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control failure occurring concurrently is low and based on the nature of the proposed projects the magnitude of such an event would be low. As such, adverse cumulative residual effects on the natural environment from erosion are not anticipated to be significant, and cumulative effects on soil capability are not anticipated to occur.

### Vegetation

Where there is natural vegetation within or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, and indirect effects such as dust, erosion, and accidental spills. However, with the implementation of the mitigation and protective measures outlined in this report, such as 2:1 vegetation replanting, and provided that concurrent projects follow mitigation measures similar to those outlined in this report, adverse cumulative residual effects on vegetation are not anticipated to be significant.

### Wildlife and Wildlife Habitat

Potential residual effects on wildlife and wildlife habitat associated with construction of the project are accidental direct mortality, habitat removal and sensory disturbance. Mitigation and protective measures for wildlife and wildlife habitat are outlined in Section 4.3.3. In the event of project-related wildlife deaths, the MNRF will be contacted. If mortality occurs between concurrent projects for similar species, the Ministry will be able to note the occurrences and coordinate with Enbridge Gas to adjust construction activities. Potential cumulative effects resulting from sensory disturbance (i.e., noise, air pollution and dust) are discussed below.

Provided that the above measures are undertaken, and provided that concurrent projects follow mitigation measures similar to those outlined in this report, adverse cumulative residual effects on wildlife and wildlife habitat will be of low probability and will be mitigated as coordinated through the MNRF, and therefore are not anticipated to be significant.

### Air Quality and Acoustic Environment

Potential residual effects on air quality associated with construction of the project and concurrent projects are an increase in noise and air pollutants from operation of vehicles and equipment, and an increase in dust from construction activities. Mitigation and protective measures for air quality and the acoustic environment are outlined in Section 4.4.5. Provided that the concurrent projects follow mitigation measures similar to those outlined in this report, cumulative effects will be of low magnitude and reversible. Therefore, adverse residual cumulative effects on air quality and the acoustic environment are not anticipated to be significant.

### 5.4.2 Operation and Maintenance – Year 2024

Development and maintenance activities which have a probability of proceeding during operation and maintenance of the project include:

- Road works: Future road rehabilitation and resurfacing



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- Water works: Future installation of water and wastewater pipelines
- Pipeline construction and maintenance: Future pipeline construction and maintenance of existing hydrocarbon pipelines

Operation and maintenance activities undertaken by Enbridge Gas will be completed in co-ordination with the Enbridge Gas Environmental Planning Team and will consider potential impacts on natural heritage and socio-economic environment. Appropriate mitigation measures will be developed and implemented based on the proposed maintenance work. Enbridge Gas will obtain all necessary agency permits and approvals, as required. Given the limited scale of impact of any potential operation and maintenance activities, it is anticipated that residual impacts will be minimal and that should any interaction occur with other projects, significant adverse residual effects are not anticipated to be significant.

### 5.5 SUMMARY OF CUMULATIVE EFFECTS

The potential cumulative effects of the project were assessed by considering development that has a high probability of proceeding just prior to or concurrent with construction of the project. A 100 m boundary around the project site was used to assess the potential for additive and interactive effects of the project and other developments on environmental and socio-economic features.

Municipal projects may contribute to cumulative effects within the study boundaries. Improvements to municipal infrastructure such as bridges, culverts, drains or roads may occur during the operational phase of the project. The cumulative effects assessment determined that, provided the mitigation and protective measures outlined in this report are implemented and that concurrent projects implement similar mitigation and protective measures, potential cumulative effects are not anticipated to occur, or if they do occur are not anticipated to be significant.



## 6.0 MONITORING AND CONTINGENCY PLANS

### 6.1 MONITORING

The primary objective of compliance and effects monitoring is to check that mitigation and protective measures are effectively implemented and to measure the impacts of activities associated with construction on environmental and socio-economic features. Ultimately, the knowledge gained from monitoring is used to avoid or reduce issues which may arise during construction of subsequent pipeline projects.

Previous pipeline construction experience, and a review of post-construction monitoring reports from other projects, indicates that impacts from pipeline construction are for the most part temporary. The mitigation and protective measures to eliminate or reduce impacts are well known and have been shown to be effective. With this in mind, Enbridge Gas should adhere to the following general monitoring practices:

- Trained personnel should be on-site to monitor construction and should be responsible for checking that the mitigation and protective measures and monitoring requirements within the ER are executed. Enbridge Gas should implement an orientation program for inspectors and contractor personnel to provide information regarding Enbridge Gas's environmental program and commitments, as well as safety measures;
- Recommendations and commitments made in this ER and other applicable permits and reports should be incorporated into construction activities.;
- A walking inspection of the entire pipeline route should be done approximately one year after construction to determine whether areas require further rehabilitation. Additional rehabilitation measures should be completed as necessary, and additional follow-up monitoring should be conducted.

The following sections list specific environmental monitoring activities recommended for the project.

#### 6.1.1 Exposed Soils

Where soils are exposed for construction activities, potential effects may include surface soil erosion, trench slumping, and sedimentation of watercourses. The movement of heavy machinery on wet soil may cause excessive rutting, compaction, and mixing of topsoil and subsoil. Improperly salvaged topsoil can result in mixing topsoil with subsoil, compaction, rutting and erosion, which can potentially decrease crop yields. Improper water discharge can lead to erosion, sedimentation or flooding. Monitoring of potential effects on exposed soils should occur during construction by Enbridge Gas's on-site inspection team. Restored bank slopes should be inspected one year after construction for erosion, and restoration measures should occur as necessary.



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### 6.1.2 Water Wells

Before construction, a private water well survey should take place to assess domestic groundwater use near the proposed pipeline route and determine the need for a water well monitoring program, as outlined in Section 4.3.3.

### 6.1.3 Watercourse Crossings

Watercourse crossings have the potential to affect fish, fish habitat, and water quality. Enbridge Gas's on-site inspection team should oversee all watercourse crossings and confirm that work is conducted as outlined in Section 4.3.1, and as per the conditions of relevant permits (see Section 1.2.5).

### 6.1.4 Vegetation and Wetlands

For at least one year after construction, planted vegetation should be inspected for survival. Dead and diseased vegetation should be replaced in areas of severe dieback or in areas with important environmental functions (e.g. riparian or slope cover).

### 6.1.5 Species at Risk

Should SAR be identified during vegetation, wildlife, and/or wildlife habitat field surveys, construction monitoring may need to be undertaken. The exact nature of monitoring will be determined in consultation with the MECP and DFO and will depend on the species present.

### 6.1.6 Cultural Heritage Resources

Any cultural heritage resources within 40 m of the proposed pipeline route will require site plan controls that will need monitoring. In addition, if a vibration mitigation measures are recommended, these will need to be monitored. Further details are provided in Section 4.4.10.

### 6.1.7 Residents and Businesses

Construction activities will impact directly affected landowners and surrounding residents and businesses. During construction, a designated Enbridge Gas representative will be available to monitor and respond to requests and concerns voiced by residents and business owners. Landowners affected by construction will be notified in advance of construction activities in their area, as feasible. The notification will provide the contact information for a designated Enbridge Gas representative. Enbridge will incorporate feedback from landowners when determining whether to abandon the existing pipeline by removing the pipe or abandoning the pipe in place, where feasible.

Enbridge Gas's on-site inspection team will also monitor the contractors' implementation of the Traffic Management Plan, to see that site access to residences and businesses has been maintained and that traffic is not being unnecessarily interrupted.



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While efforts will be undertaken to reduce impacts, a comment tracking system will also be implemented. An Enbridge Gas representative will record the time and date of calls, the nature of the concern, the corrective action taken, and the time and date of follow-up contact.

Following completion of construction, Enbridge Gas will contact residents and businesses along the easement to continue ongoing communications where necessary. During the first two years, particular attention will be paid to monitoring and documenting impacts associated with construction of the proposed pipeline.

### 6.1.8 Municipal Roads

Municipal roads affected by pipeline construction should be restored to their pre-construction condition as per applicable permits and/or agreements. For a period of one year after construction (i.e., first year of operation), roads should be monitored following spring runoff to check if erosion, bank slumping, road subsidence or rutting has occurred as a result of construction activities. Affected roadside ditches and drains should also be monitored to check that they are functioning properly. Further restoration activities and subsequent monitoring should be conducted as necessary.

## 6.2 CONTINGENCY

Contingency planning is necessary to prevent a delayed or ineffective response to unexpected events or conditions that may occur during construction of the proposed pipeline. An essential element of contingency planning is the preparation of plans and procedures that can be implemented if unexpected events occur. The absence of contingency plans may result in short or long term environmental or socio-economic impacts and possibly threaten public safety.

The following unexpected events require contingency planning during construction: adverse weather causing watercourse sedimentation, human error causing accidental spills, subsurface conditions causing a release of drilling fluids, and the discovery of unexpected finds. Although unexpected problems are not anticipated to occur during construction, Enbridge Gas and the pipeline contractor should be prepared to act when unexpected events occur. Construction personnel should be made aware of and know how to implement contingency measures.

### 6.2.1 Inadvertent Returns during HDD

Should watercourses be crossed by HDD, operations should be monitored continuously by qualified personnel. An emergency response and contingency plan for inadvertent fluid release should be developed by the contractor and implemented during construction. At the very least, the plan should address containment, clean-up and remediation, alternative drilling/crossing plans, disposal of waste materials, monitoring and reporting.



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### 6.2.2 Watercourse Sedimentation

Even with properly installed ESC measures, extreme runoff events could result in collapse of silt fencing, overflow or bypass of barriers, slope or trench failures, and other problems which could lead to sedimentation of watercourses.

If sedimentation occurs, immediate action should be taken to repair dysfunctional ESC features or install temporary measures that will contain the erosion as quickly as practical. When site conditions permit, permanent protection measures should be installed on erosion-susceptible surfaces. If the erosion and sedimentation results from a construction-related activity, the activity should be halted immediately until the situation is rectified.

### 6.2.3 Accidental Spills

During construction, an accidental spill of fluids may occur. The impact of the spill will depend upon the magnitude, extent, and nature of the spill and the environmental and socio-economic conditions in which it takes place. Upon release of a hydrocarbon-based construction fluid, Enbridge should immediately determine the magnitude and extent of the spill and rapidly take measures to contain it. Release of sediment should also be treated as a spill depending on the magnitude and extent. Spills should be immediately reported to Enbridge's on-site inspection team. If necessary, the MECP Spills Action Center should be notified at 1-800-268-6060.

A Spills Response Plan should be developed, reviewed with personnel, and posted in site trailers. Spill containment equipment should be readily available, especially near watercourses. Personnel should be trained in the use of spill containment equipment.

Should a spill occur in the project area the spill response contingency plan should be implemented. Specifics of the contingency plan will be documented on site.

### 6.2.4 Unexpected Finds: Archaeological or Heritage Resources and Unknown Contaminated Soils

Should previously unknown archaeological or heritage resources be uncovered or suspected of being uncovered during construction, ground disturbance in the find location should cease immediately. The MTCS and an archaeologist licensed in the Province of Ontario should be notified immediately. A site-specific response plan should then be employed following further investigation of the specific find. The response plan would indicate under which conditions the ground disturbance activity in the find location may resume.

In the event that human remains are uncovered or suspected of being uncovered during ground disturbance, the above measures should be implemented along with notifying local police, the coroner's office, and the Cemeteries Regulation Unit of the Ontario Ministry of Government and Consumer Services (1-800-889-9768).



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In the event that previously unknown materials or contaminated soils are uncovered or suspected of being uncovered, construction in the find location should cease immediately. In such an instance, Enbridge Gas should retain expert advice on assessing and developing a plan to include soil sampling, handling, disposal and remediation.



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## 7.0 CONCLUSION

The environmental study investigated data on the physical, biophysical, and socio-economic environment along the proposed pipeline route and existing pipeline to be decommissioned. In the opinion of Stantec, the recommended program of supplemental studies, mitigation and protective measures, and contingency measures are considered appropriate to protect the features encountered. Monitoring will assess whether mitigation and protective measures were effective in both the short and long term.

With the implementation of the recommendations in this report, on-going communication and consultation, and adherence to permit, regulatory and legislative requirements, potential adverse residual environmental and socio-economic impacts of the project are not anticipated to be significant.





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### 8.0 REFERENCES

AAFC [Agriculture and Agri-Food Canada], 2005. CLI Classes – Definitions. Available at:

<http://sis.agr.gc.ca/cansis/nsdb/cliclass.html>.

Cadman, M. D., Sutherland, D.A., Beck, G.G., Lepage, D., and A.R. Couturier, 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. (eds) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706pp. Available at: <http://www.birdsontario.org/atlas/index.jsp>.

Canadian Environmental Assessment Agency [CEA Agency], 2019. Canadian Environmental Assessment Registry, Browse Projects. Available at: <https://www.ceaa-acee.gc.ca/050/evaluations/exploration>. Accessed: April 29, 2019.

Chapman and Putnam, 1984. The Physiography of Southern Ontario. 3rd Edition. Published by the Government of Ontario, Ministry of Natural Resources.

Chatham-Kent Police Services, 2015. Policing Zones. Available online: <http://ckpolice.com/districts/>. Accessed on April 10, 2019.

Cheminfo Services Inc., 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared by Cheminfo Services for Environment Canada. Available online: <http://www.bieapfrempp.org/Toolbox%20pdfs/EC%20-%20Final%20Code%20of%20Practice%20-%20Construction%20%20Demolition.pdf>.

CIHI [Canadian Institute for Health Information], No date. Indicators. Available at: <https://www.cihi.ca/en/health-system-performance/performance-reporting/indicators>.

COSEWIC, 2005a. COSEWIC assessment and update status report on the spotted sucker *Minytrema melanops* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 16 pp.

COSEWIC 2005b. COSEWIC assessment and status report on the grass pickerel *Esox americanus vermiculatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).

County of Essex, 2014. Official Plan. Available at:

<http://weblink8.countyofessex.ca/weblink/browse.aspx?startid=40699&cr=1>. Accessed April 16, 2019.

DFO [Fisheries and Oceans Canada], 2016. Measures to Avoid Harm. Available at: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>.

DFO, 2019. Aquatic Species at Risk Mapping. Available at: <http://www.dfo-mpo.gc.ca/species-especies/fpp-ppp/index-eng.htm>.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

Dobbyn, J., 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists.

EDF Renewables, 2019. Romney Wind Energy Centre. Available at: <https://www.edf-re.ca/project/romney/>. Accessed: April 29, 2019.

Environment Canada, 2017. General nesting periods of migratory birds. <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html>.

ERSPC [Essex Region Source Protection Committee], 2015. Essex Region Source Protection Area, Source Protection Plan. Electronic document: <http://essexregionsourcewater.org/downloads/2015/source-protection-plan.pdf>.

EWSWA [Essex-Windsor Solid Waste Authority], 2019. Disposal. Available at: <http://www.ewswa.org/disposal/>. Accessed: April 10, 2019.

Government of Canada, 1985. Fisheries Act. R.S.C. 1985, c. F-14. Last amendment 2017. Electronic document. <http://laws-lois.justice.gc.ca/eng/acts/F-14/>

Government of Canada, 1994. Migratory Birds Convention Act, S.C. 1994, c. 22. Last amendment 2017. Electronic document. <http://laws-lois.justice.gc.ca/eng/acts/m-7.01/>

Government of Canada, 2002. Species at Risk Act. S.C. 2002, c. 29. Last amendment 2017. Electronic document. <http://laws.justice.gc.ca/eng/acts/S-15.3/>

Government of Canada, 2011a. Species at Risk Public Registry. Species List. Species Profile. Spotted Sucker (*Minytrema melanops*). Available at [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=118](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=118)

Government of Canada, 2011b. Species at Risk Public Registry. Species List. Species Profile. Grass Pickerel (*Esox americanus vermiculatus*). Available at [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=850](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=850)

Government of Canada, 2011c. Species at Risk Public Registry. Species List. Species Profile. Mapleleaf Great Lakes – Upper St. Lawrence Population. Mapleleaf (*Quadrula quadrula*). Available at [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=933](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=933)

Environment Canada, 2018. Beneficial Management Practices. Available at: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/beneficial-management-practices.html>.

Government of Ontario, 1990. Conservation Authorities Act, R.S. O. 1990, c. C.27. *O.Reg. 158/06: Essex Region Conservation Authority: Regulation of Development, Interference with Wetlands, and Alteration to Shorelines and Watercourses*. Last amendment: O. Reg. 55/13.

Government of Ontario, 1990. Ontario Heritage Act. R.S.O. 1990, c. O.18. Last amendment 2017. C. 20, Sched. 8, s. 112. Electronic document: <https://www.ontario.ca/laws/statute/90o18>.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

- Government of Ontario, 1990. Ontario Water Resources Act, R.S.O. 1990, c. O.40. Last amendment: 2017, c. 2, Sched. 11, s. 4. Electronic document: <https://www.ontario.ca/laws/statute/90o40#top>.
- Government of Ontario, 2006. Clean Water Act. S.O. 2006, c. 22. Last amendment: 2017, c. 2, Sched.11, s.1. Electronic document: <https://www.ontario.ca/laws/statute/06c22>.
- Government of Ontario, 2007. Endangered Species Act. S.O. 2007, c.6. Electronic document: <https://www.ontario.ca/laws/statute/07e06>.
- Government of Ontario, 2019a. Species at Risk. Spotted Sucker (*Minytrema melanops*). Available at <https://www.ontario.ca/page/spotted-sucker>. Accessed: April 9, 2019.
- Government of Ontario, 2019b. Species at Risk. Grass Pickerel (*Esox americanus vermiculatus*). Available at <https://www.ontario.ca/page/grass-pickerel>. Accessed: April 9, 2019.
- Government of Ontario, 2019c. Species at Risk. Mapleleaf (*Quadrula quadrula*). Available at <https://www.ontario.ca/page/mapleleaf>. Accessed: April 9, 2019.
- Government of Ontario, 2011. Standards and Guidelines of Consultant Archaeologists. Toronto: Ministry of Tourism, Culture and Sport.
- Government of Ontario, 2018. Renewable Energy Approval Projects. Available online: <https://www.ontario.ca/data/renewable-energy-projects>. Accessed: April 29, 2019.
- Government of Ontario, 2019. Environmental assessment projects by category. Available online: [https://www.ontario.ca/page/environmental\\_assessment-projects-category#section-0](https://www.ontario.ca/page/environmental_assessment-projects-category#section-0). Accessed: April 29, 2019.
- MOECC [Ministry of the Environment and Climate Change], 2016. Environmental Noise Guideline - Stationary and Transportation Sources? Approval and Planning. Available at: <https://www.ontario.ca/page/environmental-noise-guideline-stationary-and-transportation-sources-approval-and-planning>.
- MNR [Ontario Ministry of Natural Resources], 2000. Significant wildlife habitat technical guide. Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, South Central Sciences Branch. pp.151.
- MNR, March 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.
- MNRF [Ministry of Natural Resources and Forestry], 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. January 2015. 41 pp.
- MNRF, 2018a. Land Information Ontario. Available at: <http://www.mnr.gov.on.ca/en/Business/LIO/index.html>. Last accessed: September 2018.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

- MNRF, 2018b. Natural Heritage Information Centre (NHIC) Database. Available at: <http://nhic.mnr.gov.on.ca>. Last accessed: September 2018.
- MNRF, 2019a. Email correspondence between Karissa Reischke (MNRF) and Melissa Cameron (Stantec), dated 25 February 2019.
- MNRF, 2019b. LIO Constructed Drains [shapefile]. Peterborough, ON. Available at: <https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home>. Data acquired on February 1, 2019. Data published on December 17, 2018.
- MTCS [Ministry of Tourism, Culture and Sport], 2016. Regional Tourism Profiles, Available at: <http://www.mtc.gov.on.ca/en/research/rtp/rtp.shtml>.
- Ministry of Transportation [MTO], No Date. Southern Highways Program, 2017-2021. Available online: <http://www.mto.gov.on.ca/english/highway-bridges/pdfs/southern-highways-program-2017-2021.pdf>. Accessed: April 11, 2019.
- Municipality of Chatham-Kent, 2017a. Places to Stay. Available at: <https://www.chatham-kent.ca/Tourism/places-to-stay>. Accessed: April 10, 2019.
- Municipality of Chatham-Kent, 2017b. Fire Department. Available at: <https://www.chatham-kent.ca/community-services/fire-department>. Accessed: April 10, 2019.
- Municipality of Chatham-Kent, 2018. Official Plan. Available at: <https://www.chatham-kent.ca/business/planning-services/official-plan>. Accessed: April 29, 2019.
- Municipality of Chatham-Kent, 2019a. Garbage & Recycling. Available at: <https://www.chatham-kent.ca/community-services/garbage-recycling>. Accessed: April 10, 2019.
- Municipality of Chatham-Kent, 2019b. Water & Wastewater Services. Available at: <https://www.chatham-kent.ca/community-services/water-wastewater-services>. Accessed: April 10, 2019.
- Municipality of Chatham-Kent, 2019c. Memo to Mayor and Members of Council. 2019 Capital Budget. Available at: <https://www.chatham-kent.ca/Council/Meetings/2019/Documents/January/Jan-21-14a.pdf>. Accessed: April 29, 2019.
- National Energy Board [NEB], 2019. Major Facilities Applications. Available at: <https://www.neb-one.gc.ca/pplctnflng/mjrpp/index-eng.html>. Accessed: April 10, 2019
- Natural Resources Canada, 2016. Earthquake zones in Eastern Canada. Available at: <http://www.earthquakescanada.nrcan.gc.ca/zones/eastcan-en.php#SGLSZ>. Last accessed: October 20, 2017.
- OEB [Ontario Energy Board], 2016. *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines in Ontario, 7th Edition*.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

OEB, 2019. Applications before the OEB. Available at: <https://www.oeb.ca/industry/applications-oeb>.

Accessed: April 10, 2019.

OGS [Ontario Geological Survey], 1991. Bedrock geology of Ontario, Southern Sheet; Ontario Geological Survey, Map 2544, scale 1:1,000,000.

OGS, 2010. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV.

OMAFRA [Ontario Ministry of Agriculture, Farming, and Rural Affairs], 2019a. LIO [Land Information Ontario] Soil Survey Complex [shapefile]. Peterborough, ON.. Available at: <https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home>. Data acquired on February 1, 2019.

OMAFRA, 2019b. LIO Tile Drainage [shapefile]. Kingsville, ON. Available at: <https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home>. Data acquired on February 1, 2019.

Ontario Nature, 2017. Ontario Reptile and Amphibian Atlas. Available online: [http://www.ontarionature.org/protect/species/herpetofaunal\\_atlas.php](http://www.ontarionature.org/protect/species/herpetofaunal_atlas.php). Accessed: April 2019.

Ontario Provincial Police, 2019. Detachment Finder. Available online: <https://www.opp.ca/index.php?id=119&lng=en>. Accessed: April 10, 2019.

Richards, N.R., A.G. Caldwell and F.F. Morwick, 1949. Soil Survey of Essex County. Report number 11. Experimental Farm Service, Dominion Department of Agriculture and the Ontario Agricultural College. 85 pg.

Rowe, J.S., 1972. Forest Regions of Canada. Canadian Forestry Service Publication. No. 1300: 172pp.

Statistics Canada, 2017a. *Focus on Geography Series, 2016 Census*. Statistics Canada Catalogue no. 98-404-X2016001. Ottawa, Ontario. Data products, 2016 Census. Available at: <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/index-eng.cfm>. Accessed June 17, 2019.

Statistics Canada, 2017b. Income Highlight Tables. 2016 Census. Statistics Canada Catalogue no. 98-402-X2016006 Ottawa. Released September 13, 2017. Available at: <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/inc-rev/index-eng.cfm>. Accessed June 17, 2019.

Statistics Canada, 2017c. Age and Sex Highlight Tables. 2016 Census. Statistics Canada Catalogue no. 98-402-X2016002. Ottawa. Released May 3, 2017. Available at: <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/as/index-eng.cfm>. Accessed June 17, 2019.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

Statistics Canada, 2018. Table: 13-10-0113-01. Health Characteristics, two-year period estimates.

Available at: <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310011301>. Access April 10, 2019.

TSSPC [Thames-Sydenham Source Protection Committee], 2015. Thames-Sydenham and Region, Source Protection Plan. Electronic document: [http://www.sourcewaterprotection.on.ca/wp-content/uploads/sp\\_plan3/Vol%201/SPPv1.pdf](http://www.sourcewaterprotection.on.ca/wp-content/uploads/sp_plan3/Vol%201/SPPv1.pdf).

Town of Lakeshore, 2008. Water and Wastewater Master Plan. Available at:

<http://lakeshore.ca/media/files/Lakeshore%20Water%20and%20Wastewater%20Master%20Plan%20-%20Report%20Body.pdf>. Accessed: April 10, 2019.

Town of Lakeshore, 2010. Official Plan. Available at: <http://lakeshore.ca/media/files/Schedule%20A%20-%20Community%20Structure.pdf>. Accessed: April 29, 2019.

Town of Lakeshore, 2017a. Economic Development in Lakeshore. Available at:

<http://lakeshore.ca/lakeshore-2/economic-development-in-lakeshore>. Accessed: April 10, 2019.

Town of Lakeshore, 2017b. Fire. Available at: <http://lakeshore.ca/lakeshore-2/fire>. Accessed: April 10, 2019.

Town of Lakeshore, 2019. Capital Projects Community Input. Available at: <http://lakeshore.ca/lakeshore-2/capital-projects-community-input>. Accessed: April 29, 2019.

Town of Tecumseh, 2014a. Fire & Emergency Services. Available at:

<http://www.tecumseh.ca/townhall/departmental-services/fire-emergency-services>. Accessed: April 10, 2019.

Town of Tecumseh, 2014b. Parks & Recreation Services. Available at:

<http://www.tecumseh.ca/townhall/departmental-services/recreation>. Accessed: April 25, 2019.

Town of Tecumseh, 2014c. Sandwich South Official Plan. Available at:

<https://www.tecumseh.ca/sites/default/files/Sandwich%20South%20OP%20for%20Website.pdf>. Accessed: April 29, 2019.

Town of Tecumseh, 2017. 2018-2022 Public Works & Environmental Services Capital Works Plan.

Available at: [http://www.tecumseh.ca/townhall/departmental-services/Engineering\\_Services](http://www.tecumseh.ca/townhall/departmental-services/Engineering_Services). Accessed: April 29, 2019.

Union Water, 2017. Treatment Process. Available at: <http://www.unionwater.ca/treatment-process/>.

Accessed: April 10, 2019.

WECHU [Windsor-Essex County Health Unit], 2019. Your Health. Available at:

<https://www.wechu.org/your-health/find-doctor>. Accessed: April 10, 2019.



## WINDSOR PIPELINE REPLACEMENT PROJECT: ENVIRONMENTAL REPORT

### References

July 16, 2019

Waterloo Hydrogeologic Inc. (WHI) A Schlumberger Company, 2007. Six Conservation Authorities FEFLOW Groundwater Modeling Project, Final Report. Prepared for the Upper Thames Conservation Authority. July 2007.

