

Project File Report

Beachfront Water Servicing Strategy in the Area of Colony Rd, Windmill Point Ln E/W and Staniland Park Rd

Schedule B Class Environment Assessment

Town of Fort Erie

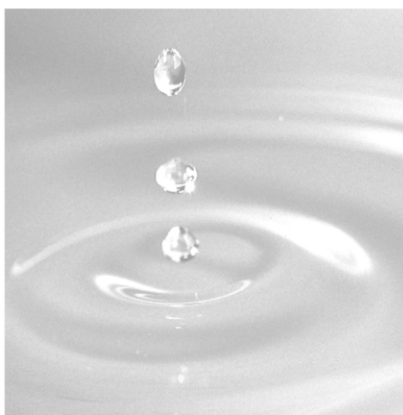
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Acronyms and Abbreviations

Term	Definition
ADD	Average Day Demand
ANSI	Areas of Natural and Scientific Interest
ASP	Archaeological Screening Process
CCME	Canadian Council of Ministers of the Environment
EA	Environmental Assessment
IPZ	Intake Protection Zone
MBCA	Migratory Bird Conservation Act
MCEA (Class EA)	Municipal Class Environmental Assessment
MCM	Ministry of Citizenship and Multiculturalism
MDD	Maximum Day Demand
MEA	Municipal Engineers Association
MECP	Ministry of the Environment, Conservation, and Parks
MMAH	Ministry of Municipal Affairs and Housing
MNR	Ministry of Natural Resources
MTO	Ministry of Transportation Ontario
NPCA	Niagara Peninsula Conservation Authority
OHA	Ontario Heritage Act
OPSD	Ontario Provincial Standard Drawing
PHD	Peak Hour Demand
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PZ	Pressure Zone
Region	Regional Municipality of Niagara
ROW	Right-of-Way
SAR	Species at Risk
SARA	The Species at Risk Act
SARO	Species at Risk in Ontario
SWP	Source Water Protection
Town	Town of Fort Erie
WHPA	Wellhead Protection Areas
WTP	Water Treatment Plant

1. Introduction

1.1. Study Background and Overview

The Town of Fort Erie is located within the Regional Municipality of Niagara, in the southern Niagara Peninsula. It is situated along the north shore of Lake Erie and the Niagara River. The Town has several distinct communities with permanent and seasonal populations residing along the lake shore.

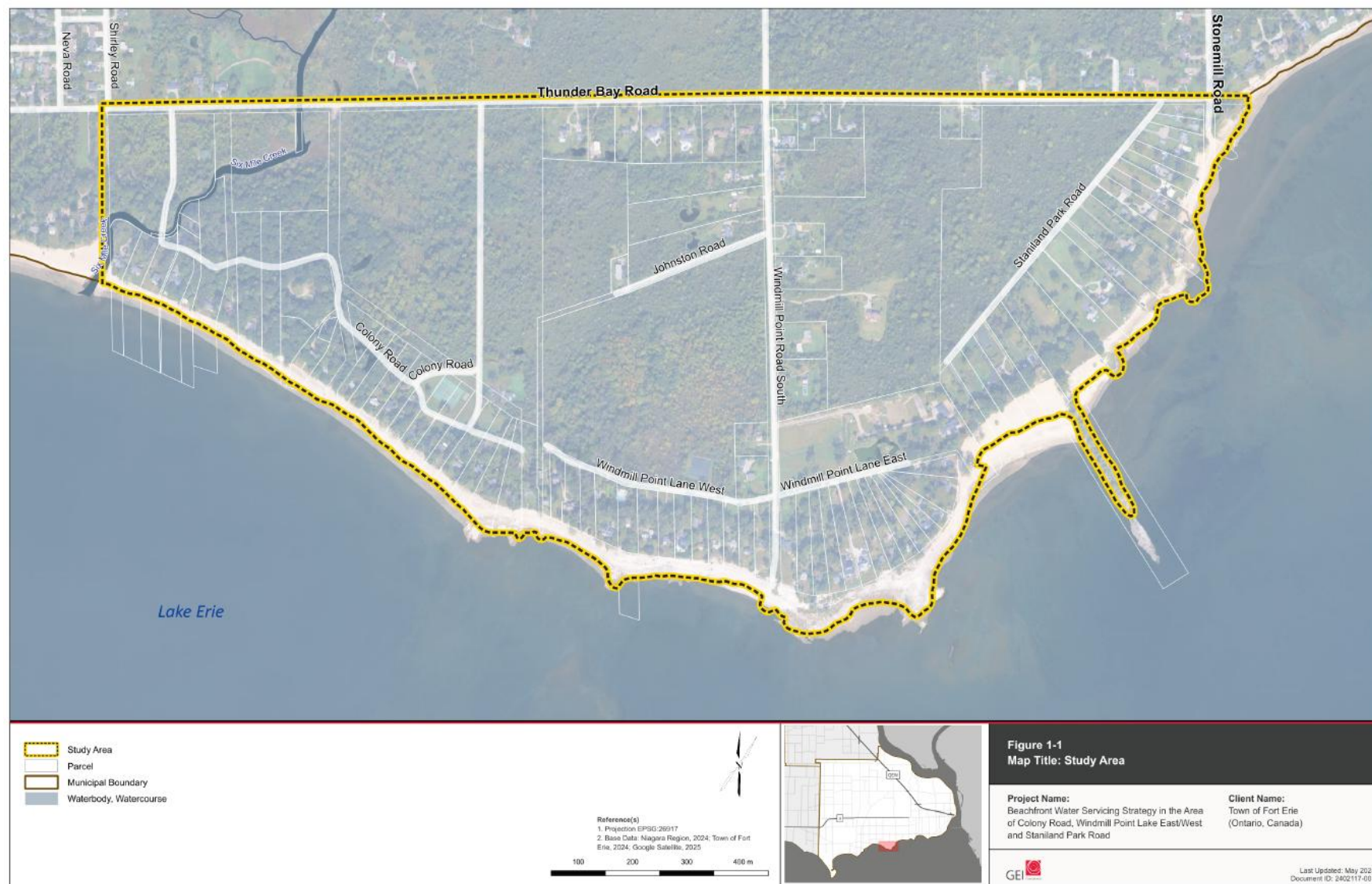
This project is focused on the Colony Road/Windmill Point/Staniland Park Road neighbourhood area. The area is currently serviced by an existing 3 km watermain which is experiencing operational, maintenance, and servicing issues due to its age and location. The Town of Fort Erie (Town) completed a Schedule B Municipal Class Environmental Assessment (Class EA) to assess water servicing strategies for the beachfront neighbourhoods along Colony Road, Windmill Point Lane East/West, and Staniland Park Road. This study identified and evaluated water servicing alternatives to develop a long-term solution to alleviate the existing operational issues while maintaining appropriate service levels for local residents.

The study area for the project is Thunder Bay Road to the north, the Private Lane south of Shirley Road to the west, Lake Erie to the south and Stonemill Road to the east.

Figure 1-1 provides a map of the study area.

This Class EA study was undertaken in accordance with the Municipal Class Environmental Assessment (MCEA) process developed by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011, 2015, 2023 and 2024), which is approved under the Ontario Environmental Assessment Act. This study was completed as a Schedule B Class EA, satisfying Phases 1 and 2 of the Class EA process. This study defined the problems and opportunities associated with the study area, developed and evaluated alternative strategies, determined a feasible solution, and identified methods to avoid or minimize impacts to the community and natural environment.

Figure 1-1. Study Area



1.2. Project File Report Structure

The purpose of this document is to outline the stepped Class EA approach and justification for the evaluation and selection of the preferred water servicing solution. The Project File Report (PFR) is organized into the following sections:

- **Section 1 - Introduction:** This section introduces the study purpose, study area and background.
- **Section 2 - Study Framework:** This section outlines the mandated steps under the MCEA process and the principles of environmental planning.
- **Section 3 - Policy Overview:** This section describes the federal, provincial, and municipal policies relevant to the study area.
- **Section 4 - Data Sources:** This section provides a summary of the various data sources used and the technical tools used during this project's MCEA process.
- **Section 5 - Existing Conditions:** This section describes the environmental baseline review and the existing infrastructure within the study area.
- **Section 6 - Technical Servicing Requirements:** This section outlines the technical requirements that must be considered through the development, evaluation and selection of the water servicing solution including design standards and construction considerations.
- **Section 7 - Screening and Evaluation Methodology:** This section outlines the screening criteria and evaluation methodology undertaken within Phase 2 of the MCEA to determine the preferred water servicing solution.
- **Section 8 - Development of Alternatives:** This section outlines the development of the water servicing alternatives undertaken within Phase 2 of the MCEA to determine preferred water servicing solution.
- **Section 9 - Evaluation of Alternatives:** This section outlines the evaluation process undertaken within Phase 2 of the MCEA to determine the preferred water servicing solution.
- **Section 10 - Preferred Alternatives, Mitigation Measures and Implementation:** This section provides an overview of the preferred water servicing solution. It also outlines the potential impacts on the physical and built environment as well as natural features i.e. wildlife habitat, groundwater, watercourses, contamination, geotechnical, archaeology, cultural heritage, traffic and climate change and any associated mitigation measures, permitting and design commitments. This section also provides the high-level scheduling and costing required to implement the project.
- **Section 11 - Communications Summary:** This section summarizes the communication and consultation process undertaken as part of this MCEA, including engagement with Indigenous Communities, stakeholder and the public as well as information on the completed Public Information Centres (PIC).
- **Section 12 - Conclusion:** This section outlines the Project File Report filing and 30-day public review process.

2. Study Framework

2.1. Municipal Class Environmental Assessment Process

Municipal infrastructure projects are subject to the Ontario Environmental Assessment Act (EA Act). The Class Environmental Assessment is an approved self-assessment process under the EA Act for a specific group or “class” of projects. Projects are considered approved, subject to compliance with an approved Class EA process. The Municipal Class Environmental Assessment (MCEA), prepared and managed by the Municipal Engineers Association (MEA), applies to municipal infrastructure projects including water, wastewater, transit and roads.

The MCEA process follows a prescriptive and phased approach that integrates consultation and engagement with Rights Holders, stakeholders, and the public. The process and underlying regulation and legislation are described in the following sections.

2.1.1. *Ontario Environmental Assessment Act*

The EA Act governs the protection, conservation, and management of the environment in Ontario and applies to public and private undertakings.

Under the EA Act, the environment is defined as:

1. air, land, or water,
2. plant and animal life, including human life,
3. the social, economic, and cultural conditions that influence the life of humans or a community,
4. any building, structure, machine, or other device or thing made by humans,
5. any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities, or
6. any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario

The EA Act establishes the overruling requirements for Environmental Assessments, including regulation of Class Environmental Assessments.

2.1.2. *Principles of Environmental Planning*

The Act sets a framework for a rational, objective, transparent, replicable, and impartial planning process based on the following five key principles:

1. **Consultation with affected parties.** Consultation with the public, government review agencies, Indigenous Peoples and other stakeholders is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.

2. **Consideration of a reasonable range of alternatives.** Alternatives include functionally different solutions, “alternatives to” the proposed undertaking and “alternative methods” of implementing the preferred solution.
3. **Identification and consideration of the effects of each alternative on all aspects of the environment.** This includes the natural, social, cultural, technical, and economic environments.
4. **Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects.** The evaluation shall increase in the level of detail as the study moves from the evaluation of “alternatives” to the evaluation of “alternative methods”.
5. **Provision of clean and complete documentation of the planning process followed, to allow “traceability” of decision-making with respect to the project.** The planning process must be documented in such a way that it may be repeated with similar results.

2.1.3. Municipal Class Environmental Assessment Process

The MCEA outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater, transit, and road projects. The process includes five phases:

- **Phase 1:** Problem or Opportunity Definition
- **Phase 2:** Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution while taking input from the public and other stakeholders into consideration
- **Phase 3:** Examination of Alternative Methods of Implementation of the Preferred Solution while taking input from the public and other stakeholders into consideration
- **Phase 4:** Documentation of the Class EA process in the form of an Environmental Study Report (ESR) for public review
- **Phase 5:** Implementation and Monitoring

Projects are classified into one of four categories depending on the degree of the expected impacts. Based on the MCEA guidance, the Town is completing this study as a Schedule B. This project will satisfy Phases 1 and 2 of the Class EA process with the completion of the Project File Report (PFR) which will support Phase 5 (Implementation) with completion of Preliminary Design, Costing, Phasing and Implementation Plan.

Schedule B projects have the potential for some adverse environmental effects. The proponent is required to undertake the first two phases of the assessment process, involving mandatory contact with directly affected Rights Holders, public, First Nations, and relevant review agencies, to ensure that they are aware of the project and that their concerns are identified and considered. A Project File Report must be prepared and made available for review by any interested person or party. If there are no outstanding concerns, then the proponent may proceed to implementation once the regulatory process has been completed. Schedule B projects generally include improvements and minor expansions to existing facilities or smaller new projects. **Figure 2-1** illustrates the MCEA planning and design process with the phases required.

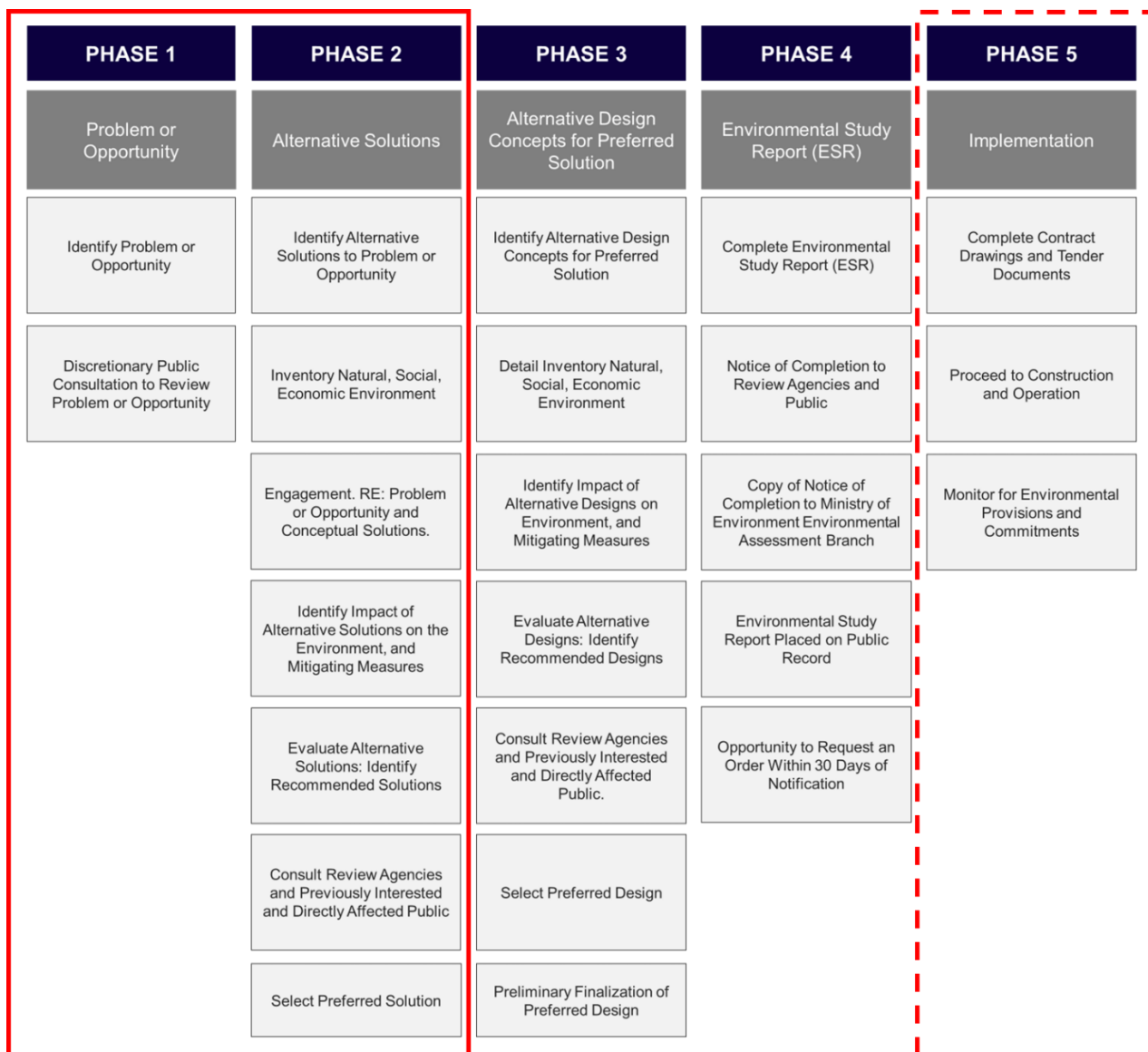


Figure 2-1. Class Environmental Assessment Process

2.1.4. Consultation and Engagement

Consultation and engagement in the MCEA process by interested and affected parties were important components to the success of this study and is mandated as part of the MCEA process. It is imperative that the EA included meaningful consultation and extensive two-way communication with all stakeholders to provide information, listen to, and work to address issues and concerns. Effective consultation with the public and stakeholders was used to obtain valuable comments and feedback on the overall study process, and better understand potential sensitivities and issues related to the Class EA. The overarching strategy for consultation included several goals and objectives that go beyond simply meeting legislative requirements:

- Presented clear and concise information at key stages of the study process
- Solicited community, regulatory, and other stakeholder input
- Identified concerns that might arise from the undertaking
- Completed a comprehensive consultation and engagement program with Indigenous Communities
- Considered all comments received when developing the preferred solution
- Met and exceeded MCEA Consultation requirements

At the onset of this study, the Town contacted the Ministry of Environment, Conservation and Parks (MECP) to confirm the applicable list of Indigenous and First Nation communities for engagement. The following Indigenous and First Nations were engaged through the Class EA process:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River – both elected and Haudenosaunee Confederacy Chiefs Council (HCCC) / Haudenosaunee Development Institute (HDI)

Additional details on the consultation process are provided in **Section 11**.

2.2. Section 16 Order Requests

At the conclusion of the Class EA process, a concerned party may ask the Minister to make a Section 16(6) Order if:

- They have outstanding concerns that a project going through a Class EA process may have a potential adverse impact on constitutionally protected Aboriginal and treaty rights.
- They believe that an Order may prevent, mitigate, or remedy this impact.

A Section 16(6) Order request cannot be made to simply delay or stop the planning and implementation of a project that is going through the MCEA process. Prior to making a Section 16(6) Order request, the concerned party should first try to resolve any concerns directly with the project proponent, in this case, the Town of Fort Erie.

During the 30-day public comment period, anyone can review the documentation, submit any comments or concerns to the proponent, and request a Section 16(6) Order. The request must be made before the public comment period is complete.

2.3. Problem and Opportunity Statement

The problem and opportunity statement defines the starting point in the undertaking of the Class EA study and assists in the defining of the scope of the project. The problem and opportunity statement for this Class EA was the following:

The Beachfront Water Servicing Strategy in the Area of Colony Rd, Windmill Pt Ln E/W and Staniland Park Rd study will identify and develop a water servicing solution which continues to provide a safe

drinking water supply and supports fire protection for residents while minimizing long-term operational risk at an affordable and financially sustainable cost to the Town of Fort Erie.

The following provides a list of key constraints and Class EA that was considered during the Class EA:

- **Operational Risks:** The existing watermain's proximity to Lake Erie presents operational risks, including historic shoreline erosion and movement which have exposed portions of the watermain and/or reduced the watermain's ground cover, increasing the potential for watermain failure due to damage from the public and/or from the surrounding environment. The existing watermain is also at further risk of washout from wave and storm action leading to a major watermain break. *Alternative strategies considered options to mitigate these risks and/or to relocate the watermain away from the lakeshore.*
- **Maintenance Risks:** Accessing the existing watermain for maintenance/inspection is restricted/challenging due to its location largely outside of public right-of-ways (ROW), its proximity to the beach and private residents, and the lack of a continuous public ROW within the neighbourhood. Limitations with access leads to delays in identification and resolution of issues. *Alternatives developed considered improving access and ease of maintenance.*
- **Water Pressure and Fire Flow Concerns:** The existing watermain, due to its small diameter (100/150mm), its degraded condition (symptom of material – cast iron / asbestos cement & age), and its overall length of 3 km, results in difficulty maintaining pressure and fire flows. A review of historic hydrant tests indicate that the majority of existing hydrants provide a fire flow of less than 30 L/s. *A key element of this Class EA was the identification of pressure and fire flow requirements for the study area and ensuring suitable levels of service are met.*
- **Property Impacts and/or Acquisition/Easement Requirements:** The existing watermain (and its associated easement) is largely located south of the existing private roads, since it runs along the waterfront or through the individual properties. The local roads within the study area (Colony Road/Windmill Point/Staniland Park Road) are private. However, as 'Private Fire Lanes', they currently still allow the Town to access the roads, as needed for firefighting purposes. The existing roads throughout the study area are generally very narrow (less than 10 m), not continuous, and located far from residential properties. *To address many of the operational and maintenance risks, this Class EA considered alternatives to relocate the watermain. Early and continuous communications with impacted landowners and the neighbourhood associations was essential to understand issues and consider their input in the evaluation process.*
- **Protecting the Natural Environment & Construction Risk:** The study area is subject to many natural heritage features such as forest cover, sand dunes, waterways, Six Mile Creek and Lake Erie. *Alternative solutions considered options to minimize construction impacts, where possible.*
- **Financial Viability:** The study area watermain replacement presents substantial implementation constraints that have the potential to substantially escalate the cost of a traditional watermain replacement project. *This Class EA considered financial viability vs. the service levels in the evaluation of alternatives.*

3. Policy Overview

3.1. Federal Legislation and Policy

3.1.1. *Species at Risk Act*

The *Species at Risk Act* (SARA) focuses on restoring and maintaining populations of species that are at risk of extinction or extirpation due to human activity such as habitat destruction, hunting, introduction of competing species, or other anthropogenic causes.

The SARA incorporates several prohibitions to protect individuals of listed threatened (THR), endangered (END), or extirpated species at risk (SAR). Species listed on *Schedule 1 – List of Wildlife Species at Risk* are protected under the provisions of SARA. The SARA applies to species located on federal land, such as Canadian oceans and waterways, national parks, First Nations reserve lands, and also applies to at-risk migratory birds and aquatic species (fish and mussels) anywhere they occur, including on privately or provincially owned land.

Relevance to this study: There is potential for at-risk migratory birds and aquatic species to occur within the study area. Therefore, SARA was considered in this study. Relevant follow-on studies will be conducted during detailed design and construction, as required.

3.1.2. *Fisheries Act*

The *Fisheries Act* outlines the framework for the management and regulation of fisheries and the conservation and protection of fish and fish habitat (including by the prevention of pollution). The *Act* restricts activities that cause “death of fish, other than by fishing” as well as the “harmful alteration, disruption, or destruction (HADD) of fish habitat”¹.

Relevance to this study: Six Mile Creek has known fish and fish habitat. DFO request for review may be required for activities that cross watercourses which have potential HADD to fish and fish habitat. Any activities impacting watercourses with known SAR will require a request for review from DFO, during detailed design prior to construction.

3.1.3. *Migratory Birds Convention Act*

The *Migratory Birds Convention Act* (MBCA) was established in 1917, and last amended in 2024, to protect migratory birds, their eggs, their nests and prohibit the deposit of harmful substances in waters and areas frequented by them. The MBCA lists protected families and subfamilies of migratory birds and lays out legislation surrounding activities that may impact migratory birds or nests, including when and where activities may occur.

¹ Fisheries and Oceans Canada (2024, November 27). Fisheries Act (RSC 1985 c F-14). Retrieved February 14, 2025, from <https://laws-lois.justice.gc.ca/eng/acts/f-14/>

Relevance to this study: There is potential for at-risk migratory birds to occur within the study area. Therefore, impacts and mitigation for migratory birds was considered in this study. Relevant follow-on studies will be conducted during detailed design and construction, as required.

3.2. Provincial Legislation and Policy

3.2.1. Provincial Policy Statement

The Provincial Policy Statement (PPS) provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment.

In 2020, the PPS received a revision to better integrate economic, social, and environmental considerations; respond to rural and northern challenges; clarify policies to better support implementation; and provide direction for emerging issues. The update introduced a streamlined framework for land-use planning, leveraging the housing supportive policies from the 2020 version and the intensification goals of the *Growth Plan*. The 2024 update reflects the province's focus on accelerating housing development, particularly its goal of building 1.5 million homes by 2031. The 2024 PPS came into effect October 2024, replacing both the 2020 PPS and the *Growth Plan*. The 2024 PPS marks a shift towards local autonomy in planning while incentivizing infrastructure projects that enable rapid housing and economic growth. Where applicable, the 2024 PPS provides opportunities for infrastructure projects supporting transit, utilities, and settlement expansion that align with the growth goals.

The PPS includes both general and infrastructure-related policies relevant to water services that are considered as part of this Class EA.

Relevance to this Study: The 2024 PPS defines the parameters under which a project should be implemented in a sustainable manner.

3.2.2. Endangered Species Act

The *Endangered Species Act* was originally written in 1971 and last amended in 2021. Similar to the *Federal Species at Risk Act (SARA)*, the *Act* aims to provide protection to plant and animal species that are at risk of extinction or extirpation from Ontario.

Species thought to be at risk in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Ministry of Natural Resources and Forestry (MNRF), species will be added to the provincial list of endangered, threatened or extirpated species in compliance with the *Act*. The *Endangered Species Act* immediately provides habitat protection to all species listed as threatened, endangered or extirpated.

The *Endangered Species Act* provides guidance on determining whether anthropogenic activities, such as construction, could impact regulated species and considers biology and behaviour of the species, details of the activity, and how the activity may affect the species' ability to carry out its life processes.

Relevance to this Study: There is potential for terrestrial and aquatic provincial SAR species to occur. Therefore, impacts and mitigations for known Endangered Species was considered in this study. Relevant follow-on studies will be conducted during detailed design and construction, as required.

3.2.3. Ontario Heritage Act

The Ministry of Citizenship and Multiculturalism (MCM) and municipalities are enabled to designate properties or areas of cultural heritage value or interest, to conserve its significance through the *Ontario Heritage Act* (OHA).

Relevance to this Study: The study area includes potential heritage sensitivities. Therefore, impacts and mitigations for areas of cultural heritage sensitivity was considered in this study. Relevant follow-on studies will be conducted during detailed design and construction, as required.

3.2.4. Conservation Authority

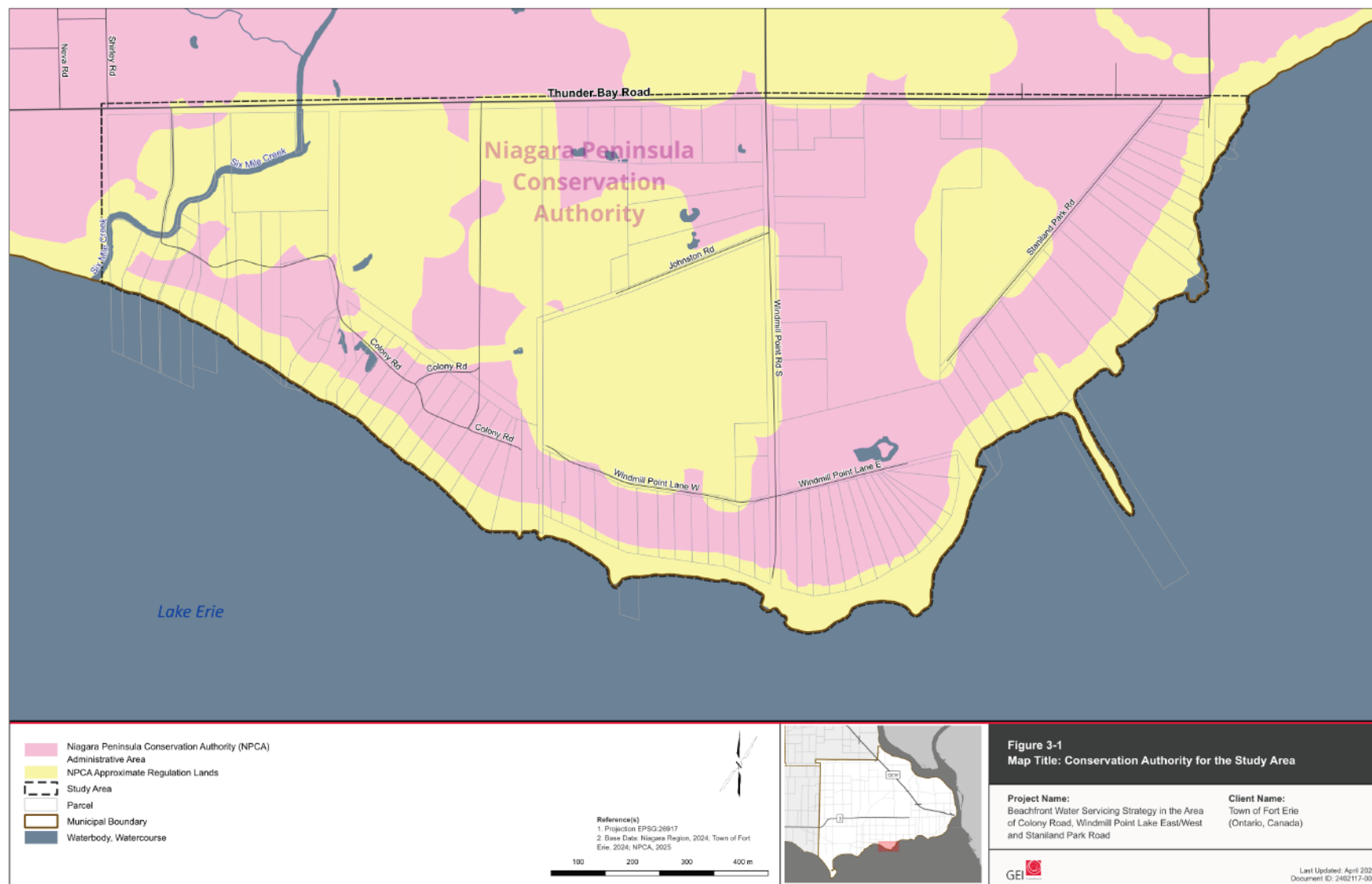
Conservation Authorities are local agencies that have a crucial role in managing natural resources, hazardous land management, and ensuring sustainable development within their jurisdictions. These agencies have several responsibilities and functions in the land use planning and development process.

In April 2024, *O. Reg. 41/24* consolidated previously individual conservation authority regulations into a single regulation. Key changes include:

- Oversight of conservation authorities has shifted to the MECP. NPCA continues to regulate lands impacted by natural hazards within its jurisdiction.
- Change to the list of prohibited activities requiring a permit and introduction of permit exemptions for low-risk development activities.
- Adjustment of regulated allowance from provincially significant wetlands (PSWs) (120m to 30m).
- Change to the permit application and request for review.

Relevance to this Study: The study area falls under the jurisdiction of Niagara Peninsula Conservation Authority (NPCA) (**Figure 3-1**). NPCA have been consulted in the evaluation and selection of the preferred solution.

Figure 3-1. Conservation Authority for the Study Area



3.2.5. Safe Drinking Water Act and Clean Water Act

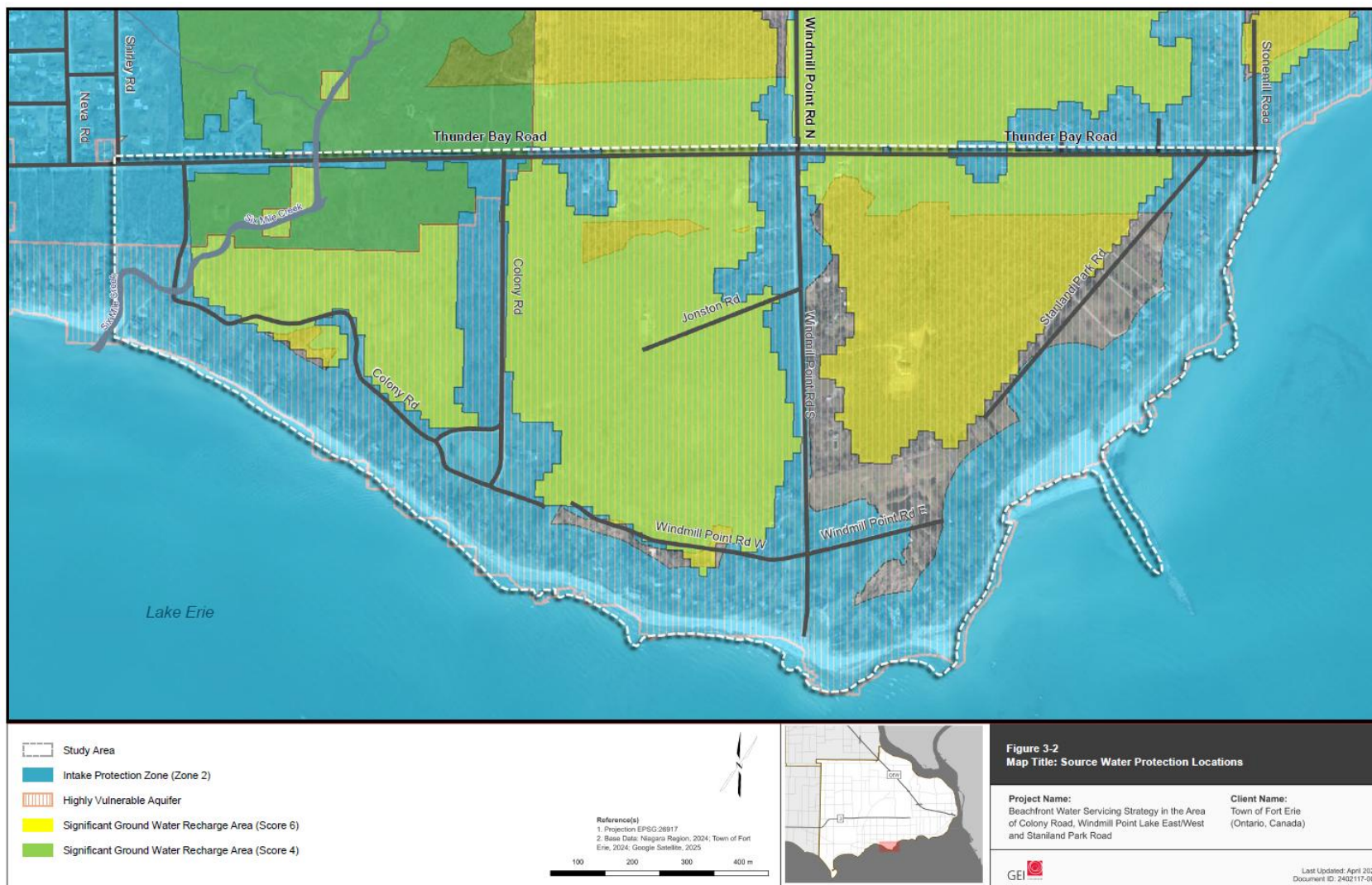
The *Safe Drinking Water Act* was developed in response to the Walkerton E. Coli outbreak and was adopted in 2002. This *Act* provides for the protection of human health and the prevention of drinking water hazards through the control and regulation of drinking water systems and drinking water testing.

The *Clean Water Act* (O. Reg 287/07) was adopted with the objective to protect existing and future sources of drinking water including rivers, lakes, and underground aquifers. Under this *Act*, the Source Water Protection (SWP) plans identify the following vulnerable areas:

- **Wellhead Protection Areas (WHPA):** areas on the land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years.
- **Intake Protection Zones (IPZ):** areas on the water and land surrounding a municipal surface water intake.
- **Significant Groundwater Recharge Areas (SGRA):** areas characterized by porous soils that allow the water to seep easily into the ground and flow to an aquifer.
- **Highly Vulnerable Aquifers (HVA):** aquifers that can be easily changed or affected by contamination from both human activities and natural processes as a result of (a) its intrinsic susceptibility, or (b) by preferential pathways to the aquifer.
- **Event Based Areas (EBA):** areas where spills from a specific activity within an EBA would cause a significant risk to the drinking water source.

Relevance to this Study: The study area is located within an HVA, SGRA and IPZ (Level 2) (**Figure 3-2**). NPCA have been consulted in the evaluation and selection of the preferred solution.

Figure 3-2. Source Water Protection Locations



3.3. Municipal Legislation and Policy

3.3.1. Niagara Region Official Plan

The 2022 Niagara Official Plan is a long-range land use planning document that sets out what the Region protects while managing where and how the Region will accommodate the anticipated growth. As of March 31, 2025, the Niagara Official Plan is no longer a Regional Plan. It is now an official plan of the 12 local municipalities in Niagara.

Relevance to this Study: This study aligns with the Region's Official Plan objectives and policies around water servicing and land use planning.

3.3.2. Town of Fort Erie Official Plan

The Town's current Official Plan was approved in 2011 and provides direction on types of land uses permitted, housing, economic development, transportation, agriculture and protecting the natural environment. The Town is currently updating their Official Plan to align with the 2024 PPS. The updated Official Plan will establish a new vision and support policy framework for how growth will be managed over the next 25 + years.

Relevance to this Study: This study aligns with the Town's Official Plan objectives and policies around water servicing and land use planning.

3.3.3. Town of Fort Erie Water Distribution Master Plan

The Town is responsible for their local water distribution systems including watermains, hydrants, main valves and services. The 2017 Water Distribution Master Plan is a prioritized action plan for the Town to improve customer service levels and support long-term growth and sustainability of their water infrastructure. The Master Plan provides a 10-year Capital Plan to support the 2017 budget as well as a 100-year Capital Plan to review and confirm the funding sustainability of the water infrastructure (2015 Asset Management Plan).

Relevance to Study: The recommendations in the Town's Master Plan were considered in the development and evaluation of water servicing for this study.

3.3.4. Niagara Region Water and Wastewater Master Plan

The Niagara Region is currently completing the 2026 Water and Wastewater Master Servicing Plan (update to their 2021 Water and Wastewater Master Servicing Plan) that will identify water and wastewater infrastructure needs to the year 2051, while maintaining levels of service. Niagara Region currently services the urban area of the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara on the Lake, Niagara Falls, and Fort Erie. It is responsible for water treatment, transmission mains, storage facilities and major booster pumping stations as well as wastewater treatment, trunk sewers and sewage pumping stations. Local watermains and sewers are the responsibility of each of the lower tier municipalities.

Relevance to Study: The recommendations in the Region's 2021 Master Plan were considered in the development and evaluation of water servicing for this study.

4. Data Sources

4.1. Planning Horizon Data

As summarized in the previous 2021 Niagara Region Water and Wastewater Master Servicing Plan Update, and further verified in the ongoing Town of Fort Erie Official Plan Review, this project's study area (as seen in **Figure 5-1**) is outside the urban boundary and is not projected to experience any population/employment growth.

For the 2021 Niagara Region Water and Wastewater Master Servicing Plan Update, the planning horizons included projections from the existing conditions (2021) to future 2051 and also included a Post-2051 Buildout scenario. As such, the Fort Erie hydraulic model does include each of these scenarios (2021, 2051 & Buildout). Since no growth is projected to occur in the study area, hydraulic modelling conducted for this project only considered the existing conditions.

4.2. Technical Tools

4.2.1. *Water Hydraulic Model*

The hydraulic model used for this project was last updated as part of the Region's 2021 Water and Wastewater Master Servicing Plan Update. At that time, a local system update was completed for the Fort Erie water system model which included:

- Local water network review and update
- Demand allocation using water billing records
- Model calibration using hydrant testing data
- Validation of the extended period simulation modelling using SCADA records.

As mentioned in **Section 4.1**, the hydraulic model includes scenarios for a wide range of future conditions, including Existing (2021), Future (2051) and Future Buildout (Post-2051), as well as a range of demand conditions (average day demands (ADD) and maximum day demands (MDD)).

In general, the available water model was suitable for use in this project. However, due to the unique focus of this project on the Colony Road, Windmill Point Lane East/West, and Staniland Park Road watermain, a refined demand allocation using recent data was conducted along with a validation of the accuracy of the pipe roughness (C-Factors) along this specific stretch of watermain.

Lastly, due to the seasonality of water consumption along this route, the project team also included an additional demand scenario to the model which included winter ADDs along the Colony Road, Windmill Point Lane East/West, and Staniland Park Road. This identification of the typical low demands was critical to ensure that any solution identified would be able to achieve suitable water turnover to maintain the targeted water quality standards in the Town, without the need for flushing.

With these minor updates, the model was suitable to be used for assessing pressures, fire flow availability and water age for the different alternatives considered in the study.

4.2.2. GIS Mapping

A wide range of GIS data was made available and used during the project as a tool to review existing features and land use policies in the study area. This data is used in various maps produced throughout the project. Data included environmental features (such as significant woodlands; watercourses; greenbelt designated areas; environmental protection areas; etc.), water system features (such as hydrants; watermains; valves), and other features (such as municipal boundaries; property parcel fabric; the settlement area / urban boundary).

4.3. Historic Data

4.3.1. Fire Flow Records

As part of the current conditions review and the model review/validation, a review of historical fire flow (hydrant flow test) records along the Colony Road, Windmill Point Lane East/West, and Staniland Park Road watermain was conducted. These fire flow records were provided for each of the existing hydrants along these streets. These records of fire flow availability from tests are seen in **Figure 4-1**.

For areas outside the urban boundary (such as the study area), the Town of Fort Erie's Master Plan has a targeted level of service for fire flows of achieving >50 L/s. Therefore, the fire flow records were compared to the targeted level of service. With a large amount of the tested records indicating lower than 50 L/s, the data was used to demonstrate that the existing watermain and hydrants do not effectively satisfy the problem statement of supporting fire protection for residents. Instead, current fire protection is supplemented by the use of tanker/pumper trucks.

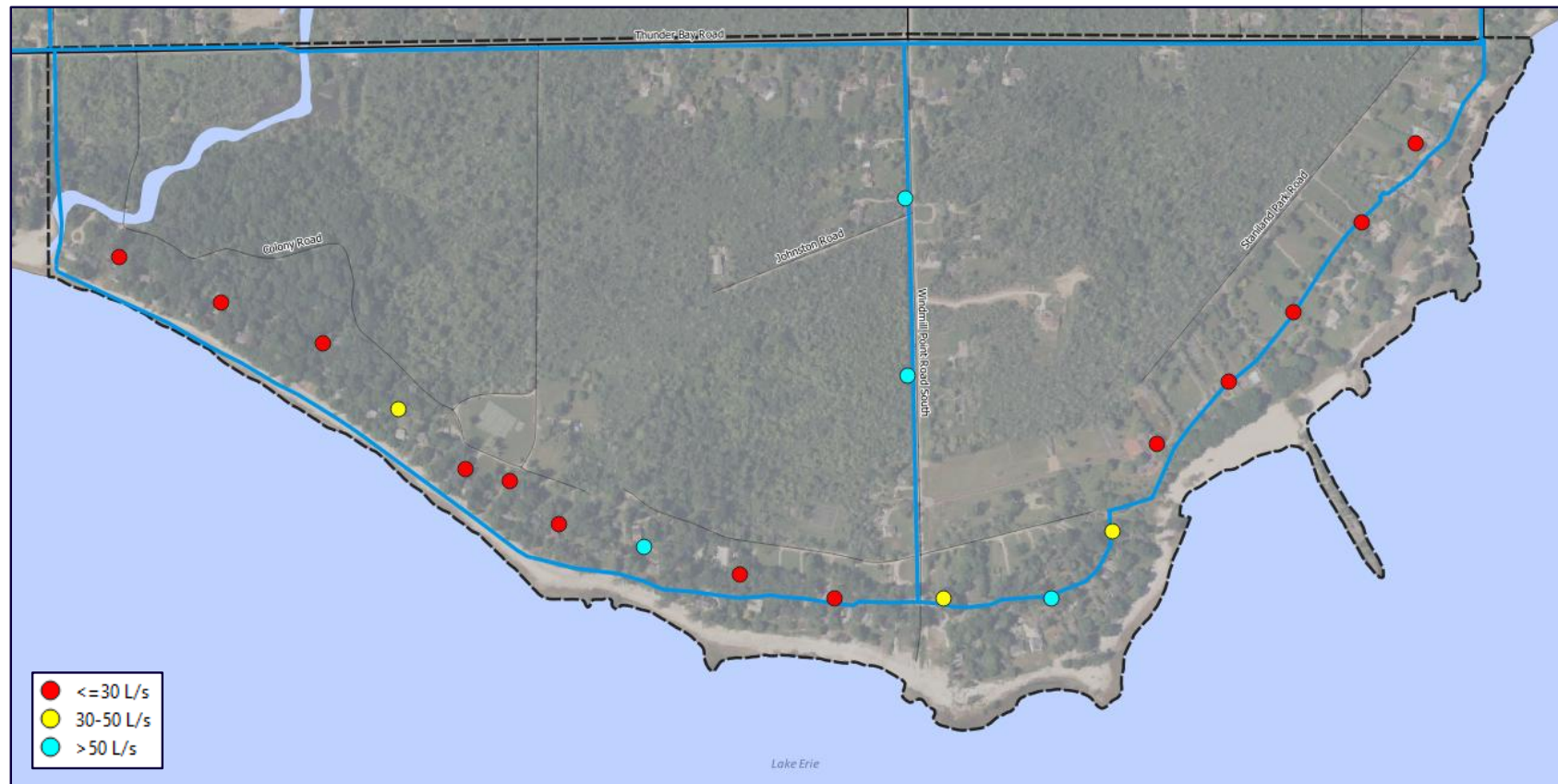


Figure 4-1. Historical Fire Flow Availability Records (Hydrant Tests)

4.3.2. Water Billing Records

Similar to the hydrant testing records, the project team also conducted an assessment of recent (2023) billing consumption data for the customers along the Colony Road, Windmill Point Lane East/West, and Staniland Park Road watermain.

Periods of low water consumption often leads to challenges with water turnover and hence water quality challenges. Currently, operations staff conduct frequent flushing in the area to help with this turnover. The monthly billing data was compiled for the addressed to allow us to better understand the monthly variations in water consumption. This monthly variation is considered unique in this part of the system because a number of the residents are seasonal, rather than year-round. The monthly consumption along the Colony Road, Windmill Point Lane East/West, and Staniland Park Road watermain is shown in **Figure 4-2**.

Based on the assessment, it was clear that the average annual consumption was much higher than the minimum monthly consumption. Understanding the water consumption during the lowest months of the year allowed the project team to create a unique scenario in the model that considered these low consumption months. This was critical in assessing whether the proposed alternatives were expected to resolve water quality challenges year-round.



Figure 4-2. Monthly Billing Data (for Combined Customers along the Subject Watermain)

5. Existing Conditions

5.1. Existing and Future Land use

The study area is located in a small rural community with various land use designations including rural, rural residential and environmental protection (**Figure 5-1**). Population within the study area varies seasonally, with higher populations during the summer months compared to the winter months. The study area is located outside the urban boundary; no growth is anticipated to 2051. The study area is not located within any secondary plan areas.

5.2. Existing Water System

The study area's water system includes three sections of watermain:

Section 1: a 150 mm PVC watermain that travels south along the road allowance and entrance of 2949 Thunder Bay Road to a connection with the 150 mm diameter HDPE DR11 watermain that travels along the west bank of the Six Mile Creek outlet, then under the creek bed to the connection on the east bank of the creek outlet at 2933 Colony Road. This section of watermain was constructed in 2001.

Section 2: a 150 mm diameter cast iron watermain that traverses the lakeshore in the sandy beach area from 2933 Colony Road to 2673 Colony Road, each property is serviced from the beach area. This section is subject to significant maintenance and operational risk due to fluctuation in sand cover and lake levels.

Section 3: a 150 mm diameter cast iron watermain that meanders along lawn areas, near houses and ancillary buildings, such as garages from 2673 Colony Road to Staniland Park Road, and ultimately to Stonemill Road. This section is subject to access issues due to private property permissions, and significant maintenance constraints and risk due to proximity to dwellings and auxiliary buildings as well as topography through the area.

Figure 5-2 provides an overview of the study area's existing water system in relation to the full Fort Erie existing water system.

The current conditions of the water system within the study area include:

- Operational and maintenance risks due to its location (access) and condition and exposure to the elements due to the fluctuation of the depth cover along the lakeshore.
- Challenges in maintaining adequate water pressure, fire flow, and water quality due to the configuration and age of the infrastructure.
- Construction complications due to age and density of the naturalized area, as well as the narrow road access.
- Increased frequency of flushing required during months with low occupancy (seasonal occupancy)

Figure 5-1. Land Use Designation



Figure 5-2. Existing Water System

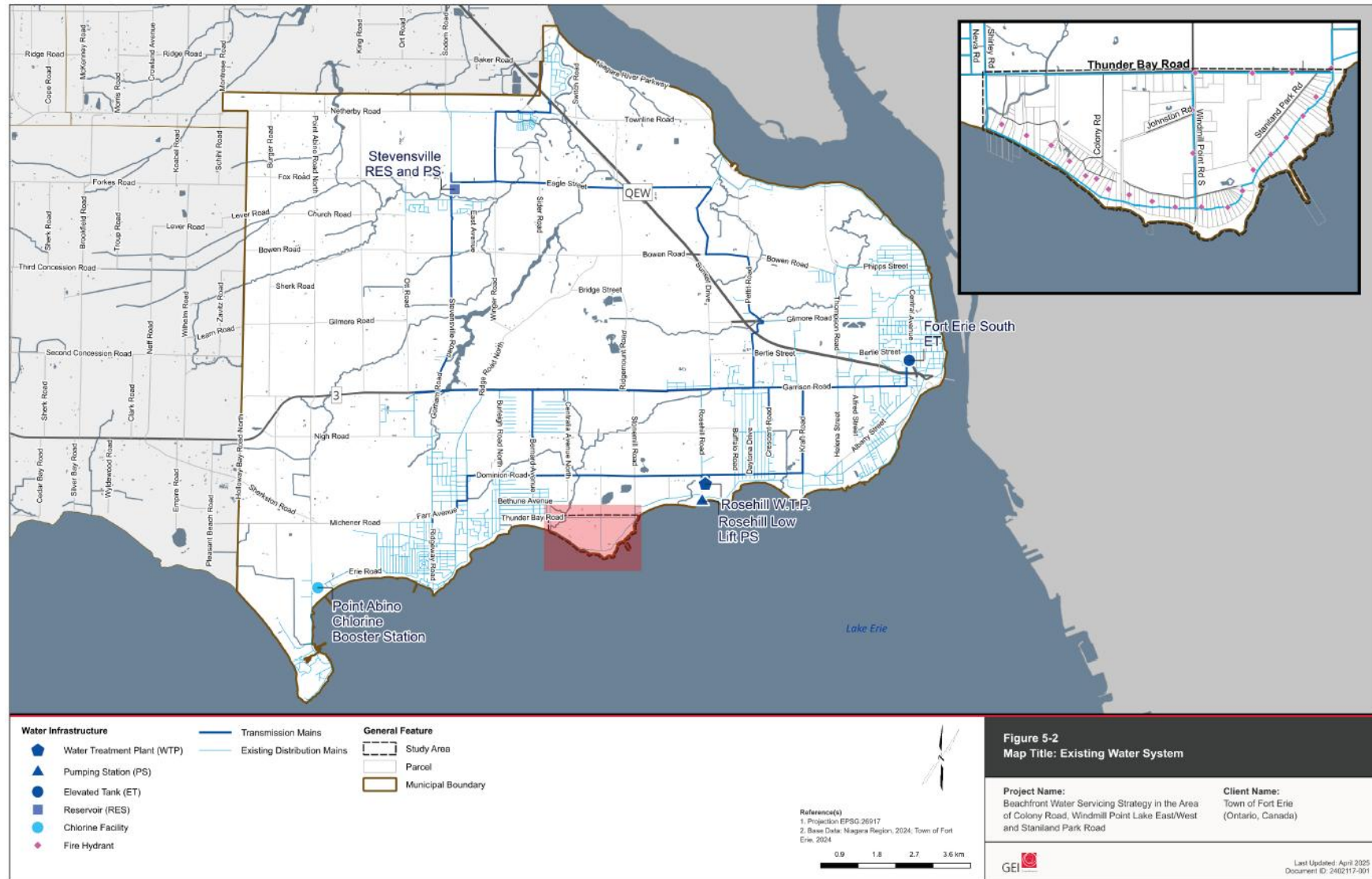
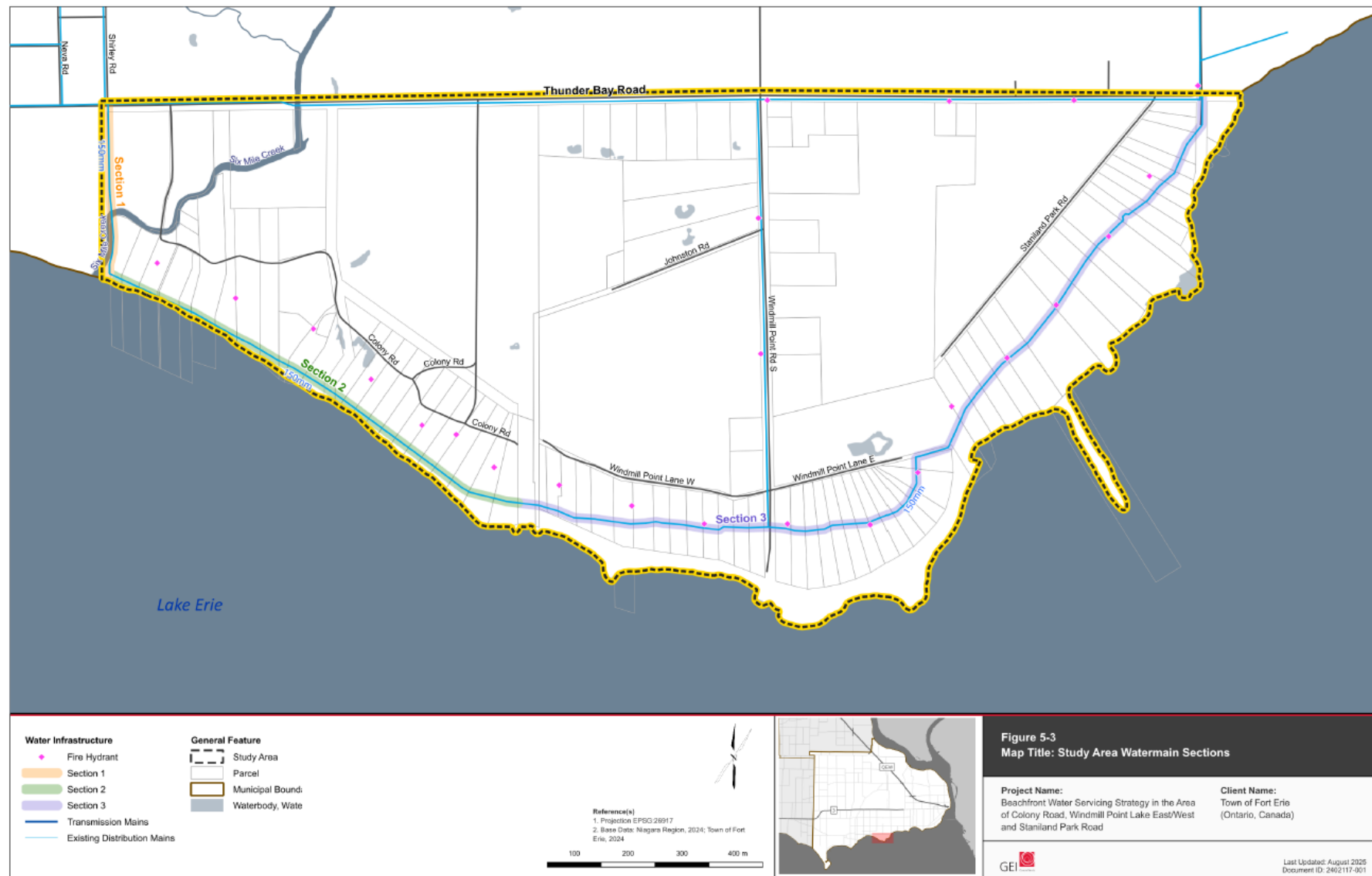


Figure 5-3. Study Area Watermain Sections



5.3. Natural Environment

A desktop natural heritage study, included in **Appendix A.1**, was completed to identify natural heritage features and their extent within and adjacent to the study area and focused on current conditions of the study area. The results of the study were used to guide the evaluation process, identify potential mitigation requirements, and confirm if additional investigations are required. The study concluded the study area is predominantly made up of significant natural heritage features including Provincially Significant Wetlands, woodlands, valleylands, significant wildlife habitat and habitat for endangered and threatened species. A map of vegetation within the study area is shown in **Figure 5-4**. More detailed mapping is provided in **Appendix A.1**.

The following constraints have been identified through the desktop background review:

- Multiple mapped natural heritage features, including:
 - Provincially Significant wetlands, as part of the Six Mile Creek Wetland Complex
 - Six Mile Creek bisects the western portion of the study area, flowing into Lake Erie
 - Woodlands are identified throughout the study area
 - Significant valleylands, as part of the Six Mile Creek valleyland
- White-tailed deer wintering area throughout the study area
- Shoreline of Lake Erie identified as Waterfowl Winter Concentration Area
- Six Mile Creek as a direct fish habitat
- Potential for 9 SAR, 11 species of special concern
- Potential for species that are regionally or locally rare

Next steps during the detailed design phase require further characterization of the limits and quality of the natural heritage features as well as an impact assessment based on the selected alternative.

Figure 5-4. Natural Environment Overview



5.4. Archaeological Assessment

A Stage 1 archaeological assessment, included in **Appendix A.2**, was carried out to evaluate the potential for archaeological resources within or adjacent to the study area. This was completed by reviewing geographic, land use, and historical information of the project area and relevant surrounding area, and by reviewing the Ontario Archaeological Sites Database maintained by the Ministry of Citizenship and Multiculturalism (MCM) to determine if there were any known archaeological sites within a 1 km radius of the study area.

The Stage 1 archaeological assessment determined there are no previously registered archaeological sites located within 1 km of the study area, however, the study area exhibits archaeological potential, and a portion of the study is considered an archaeological sensitive area. A previous Stage 1-2 archaeological assessment was conducted on 3 rectangular parcels of land that overlap the current project area at 124 Windmill Point Road. No archaeological resources were identified, and no further archaeological assessment was recommended.

A Stage 2 archaeological assessment is required during detailed design for all areas that cross the selected alignment that exhibit archaeological potential, as seen in **Figure 5-5**. The map provides the locations where a Stage 2 AA (test pit survey) will likely be required in green (to be confirmed with field verification). Since Stage 1 AA was a desktop study, further field verification will be required during detailed design for any locations where the selected alignment crosses low/wet areas within the study area to determine whether a Stage 2 AA is required, shown in light blue in **Figure 5-5**.

A Stage 2 AA will require test pit surveys at five metre intervals prior to any proposed construction activities. These areas will also require a visual inspection during the Stage 2 assessment to confirm there is no archaeological potential on account of deep and extensive land disturbance. Indigenous Communities will be invited to participate in the Stage 1 archaeological assessment field investigations and report review process.

For areas where no construction works are proposed or where the study area does not retain archaeological potential, no Stage 2 archaeological assessment is required, however further assessment should be conducted if proposed work extends beyond the current study area.



Figure 5-5. Areas of Archaeological Potential

5.5. Cultural and Built Heritage Assessment

A Cultural Heritage report, included in **Appendix A.3**, was completed to present a list of previously identified built heritage resources and cultural heritage landscapes identifying baseline cultural heritage conditions.

The results of background historical research and a review of secondary source material, including historical mapping, indicate a study area with a rural and residential land use history dating back to the early nineteenth century, and a rise in recreational use along the waterfront in the twentieth century. Based on registries and databases, there are no known built heritage resources and no known cultural heritage landscapes in the study area. There are four areas with heritage sensitivity identified during the background information review, as seen in **Figure 5-6**. Two areas of interest, the northeastern corner of the study area where early residential structures may still be extant and the historical location of a windmill/gristmill along the shoreline at Windmill Point, were identified as having heritage potential. In addition, Lake Erie and an unnamed tributary that runs north-south through the study area have the potential to be identified as cultural heritage landscapes.

For the areas that cross or are near the preferred alignment, further investigation during detailed design may be required to determine their level of cultural heritage interest and whether an impact assessment is required.



Figure 5-6. Areas with Cultural Heritage Sensitivity

5.6. Geotechnical and Hydrogeological Conditions

A background report on geotechnical and hydrogeological conditions of the study area was completed and is included in **Appendix A.4**. A background review was completed using information available by a range of publicly available information and previous subsurface investigations, including MECP records, MTO Foundation Library, and mapping from the Ontario Geological Survey. The review describes the local geology, anticipated subsurface conditions, and an evaluation of alternatives from a geotechnical and hydrogeological perspective, however this preliminary assessment is based solely on a background review and actual conditions may vary significantly and require verification through a site-specific subsurface investigation. For both permitting requirements and to support detailed design, a subsurface investigation consisting of boreholes and monitoring wells will be required.

Soil conditions across the study area are primarily characterized by relatively impermeable silt or clay deposits. Near the shoreline, the presence of beach sands points to cohesionless deposits, as corroborated by the surficial geology mapping. The bedrock within the area, primarily part of the Detroit River Group, is found at relatively shallow depths. In some areas, bedrock may be present near surface, however due to the typical depth watermain installations, it is not expected to be a major constraint. It should be expected that any deep excavations into the bedrock would require the use of hydraulic breakers or even blasting to mechanically break through the bedrock.

Groundwater in the project area is influenced by the proximity to Lake Erie, with a lake level that typically ranges between 174 and 175 m. The maximum elevation within the study area is about 180 m, indicating that groundwater levels are likely generally near the surface. The presence of extensive wetland features mapped within the area further supports the existence of shallow groundwater conditions. With the expected relatively shallow groundwater throughout the study area and in areas of fine-textured deposits (silts and clays), dewatering is expected to be minimal due to the relatively impermeable nature of these types of deposits. Any construction conducted closer to the shoreline may require more significant construction dewatering.

The existing watermain appears to be located within coarse-textured lacustrine deposits in the western half and eolian deposits in the eastern half, while the area north is predominantly fine-textured glaciolacustrine deposits. The study area includes extensive areas of mapped wetlands which is expected to include near surface soils of organic/peat deposits. Silt and clay-based soils can be more difficult to work with and would likely require removal off-site.

A subsurface investigation consisting of boreholes and monitoring wells will be required during detailed design to support the finalizing of the design and construction. An excess soil management plan will also be required prior to construction to ensure excess soil during construction is properly managed and meets all regulatory requirements.

6. Technical Servicing Requirements

6.1. Town's Design Standards

The following summarizes some of the Town's related design standards that were targeted to be achieved/met as part of the proposed servicing of the area:

- Maximum working pressure shall not exceed 690 kPa (100psi).
- Minimum working pressure shall not fall below 275 kPa (40psi) under normal operating conditions, nor fall below 140 kPa (20psi) under fire flow conditions.
- The Town's level of service fire flow goal in a residential area outside the urban boundary is to achieve >50 L/s (while maintaining >20psi).
- The Town's level of service for water age is preferably below 2 days in order to ensure suitable chlorine residual.
- Dead-end mains shall be avoided by looping all mains. Where dead end mains occur, a fire hydrant shall be installed for flushing purposes.
- Hydrant spacing in low to medium density residential areas shall be a maximum of 150m.
- The Town will allow for the installation of PVC/plastic services for the homeowner's portion of the water service (instead of the Town's typical design standard of copper lines) in order to significantly reduce the cost of the material. The caveat is that usually, homes are grounded from surcharging and storms via the watermain. When the water service is replaced with plastic pipe, an electrical contractor is required to ground the electrical system via a grounding plate/rod installed in the ground.

6.2. General Construction Considerations

As part of the evaluation, the study area was assessed to determine possible impacts during construction of each alternative.

The existing roads are winding, partially paved, and single lanes on uneven terrain. The vegetation surrounding the road is dense, with large trees and brush adjacent to the drive lane. Some properties along Colony Road, Windmill Point Lane and Staniland Park Road have single access to the property. The layout within properties varies within the study; septic locations are unknown, some properties are built up with multiple structures, some have dense vegetation coverage, and there are sand dunes in some areas.

The existing watermain alignment lies along the shore of Lake Erie and within properties. The existing fire hydrants lie within the existing properties, at times difficult to access.

Due to the conditions of the study area and access restrictions, there may be an opportunity for trenchless construction, however this will be considered in the evaluation of the alternatives.

7. Screening and Evaluation Methodology

Phase 2 of the Class EA process identifies alternative solutions to address the problem and opportunity statement by considering the existing challenge from an environmental, social/cultural, technical and economic perspective. This phase also includes the evaluation of alternatives and identification of a recommended solution. The preliminary preferred solution was presented to the public and stakeholder at PIC No. 2 and following the public event, the preferred solution was confirmed.

The following section describes the process to identify, develop, and evaluate the alternatives solutions, summarized in **Figure 7-1** below.

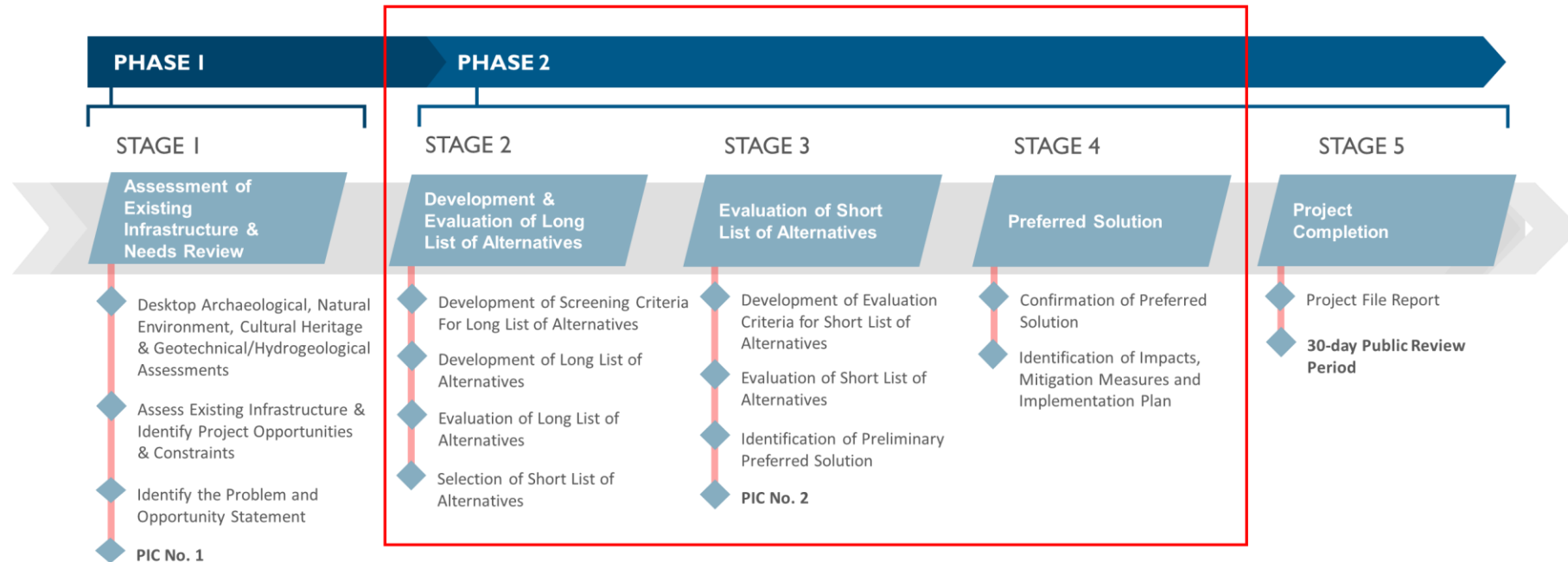


Figure 7-1. Evaluation Process

7.1. Screening Approach

Following the EA process, a long list of alternatives was developed to address the project servicing needs. Feasibility screening criteria was developed to align with the problem and opportunity statement and the alternatives were screened against these criteria with consideration for water servicing viability, fire flow, access/maintenance, and water quality. An alternative was carried forward to the short list of alternatives only if it met all criteria; if an alternative did not meet one or more criteria it was not carried forward for detailed evaluation. **Table 7-1** summarizes the feasibility screening criteria.

Table 7-1. Feasibility Screening Criteria

Feasibility Screening Criteria	Definition
Meets Fire Flow Objectives	Supports a level of fire protection that is considered suitable and achievable by the Town's Fire Department.
Improves Access and Maintenance	Reduces issues related to maintenance requirements, access issues, and water quality management (flushing) needs.
Improves Water Quality Management	Provides residents with safe and reliable drinking water supply sources that meet provincial standards.

The alternatives were screened using the following "pass or fail" scoring:

- Criterion is satisfied
- Criterion is not satisfied

7.2. Evaluation Approach

Once the feasibility screening was complete, a short list of alternatives was established and evaluated against the following four categories:

- Technical Feasibility
- Natural Environment Considerations
- Social/Cultural Considerations
- Financial Viability

Table 7-2 summarizes the evaluation criteria, which were established using the problem and opportunity statement and project objectives as a basis. Each alternative was reviewed and scored according to the evaluation criteria.

Table 7-2. Evaluation Criteria Definitions

Criteria	Definition
Technical Feasibility	
Provides a Safe Drinking Water Supply	Provides residents with a safe and reliable drinking water supply that meets provincial standards.
Supports Fire Protection	Supports a level of fire protection that is considered suitable and achievable by the Town's Fire Department.

Criteria	Definition
Minimizes Operations and Maintenance Risks	Reduces issues related to maintenance requirements, access issues, and water quality management (flushing) needs.
Minimizes Conflict with Existing Infrastructure	Adheres to relevant requirements for construction and operation within proximity to existing infrastructure, utilities, and private properties.
Complexity of Implementation	Minimizes risk associated with constructability such as scope, time required construction, feasibility of design, flexibility in project timing and phasing, etc.
Ease of Property/Land Acquisition	Minimizes disruption to implementation process due to property and land acquisition requirements (expropriation of land / land purchase, temporary / permanent easements).
Natural Environment Considerations	
Minimizes Impact to Environmental and Natural Heritage Features	Limits disruption to existing environmental features and ensures the preservation and protection of aquatic resources and natural features within the affected environment. Minimizes loss of mature trees and other vegetation. Considers impact to climate change and GHG emissions.
Protects Wildlife and Species at Risk (SAR)	Minimizes potential impact to wildlife including SAR within the affected area and construction zone. Implementation should minimize effects on function of habitat (i.e., nesting sites, hibernation areas, foraging areas, areas of significant wildlife travel) for locally significant wildlife, including endangered or threatened species.
Social/Cultural Considerations	
Manages and Minimizes Construction (Short-term) Impacts	Limits disruption to residents caused by construction works, including creation of noise / dust / vibrations, impact to traffic flow, limited access to properties (temporary), etc.
Manages and Minimizes Long-term Impacts to Residents	Minimizes long-term impacts to existing and / or future residents including service disruption, traffic, aesthetics, and landscaping. Limits / mitigates impacts on internal plumbing service.
Protects Archaeological and Cultural Heritage Features	Limits potential impacts to areas previously determined to have high archeological potential, moderate / unknown archeological potential, or low / no archeological potential; limits potential impacts to a structure, property, district, feature, or landscape that has been previously identified to be of cultural heritage value or interest; limits potential impacts to Indigenous Peoples, including areas of cultural significance.
Financial Viability	
Minimizes Capital Cost	Minimizes the capital cost of the infrastructure needs.
Minimizes Operations and Maintenance Costs	Minimizes ongoing operations and maintenance costs related to the area.

8. Development and Evaluation of Long List of Alternatives

As part of the long list of alternatives, six alternatives were developed that align with the problem and opportunity statement, which are summarized in **Section 8.1**.

8.1. Long List of Alternatives

Table 8-1 below provides a description of the six alternatives identified.

Table 8-1: Long List of Alternatives

ALTERNATIVE	WATER SERVICING	FIRE FLOW
Alternative 1	Maintain existing infrastructure (do nothing).	Maintain existing hydrants
Alternative 2	Conduct watermain lining in low-risk areas; Conduct watermain replacement, along the same/similar alignment but with deeper watermain, in high-risk areas	Maintain and/or relocate existing hydrants.
Alternative 3	Replace entire length with deeper watermain along the same/similar alignment	Maintain and/or relocate existing hydrants.
Alternative 4	Relocate watermain generally along existing roadways	Replace with new hydrants along new watermain route.
Alternative 5	Relocate watermain with small diameter servicing generally along existing roadways	Fire flows to be supported by pumper/tanker trucks, rather than hydrants necessitating localized roadway expansions to allow for fire tanker and pumper truck operations.
Alternative 6	Replace municipal service with individual private servicing, such as water cisterns or wells	Fire flows to be supported by pumper/tanker trucks, rather than hydrants, necessitating localized roadway expansions to allow for fire tanker and pumper truck operations

Table 8-2 presents the opportunities/benefits and challenges/constraints for each of the long list of alternatives.

Table 8-2. Long List of Alternatives: Opportunities and Challenges

Alternative	Opportunities/Benefits	Constraints/Challenges
Alternative 1: - Maintain Existing Infrastructure; - Maintain Existing Hydrants	- Does not require new private property connections - No additional construction required - No property purchase or easement changes required	- Requires frequent flushing to maintain chlorine levels - Continued fire flow limitations; tanker trucks used as a backup means of supporting fire flows. Continued poor access for tanker trucks limits the ability to provide continuous fire flow. - Does not address key operations and maintenance risks - Part of the existing watermain impacts functionality of the beach
Alternative 2: - Conduct watermain lining in low-risk areas; - Conduct watermain replacement, along the same/similar alignment but with deeper watermain, in high-risk areas; - Maintain and/or relocate existing hydrants.	- Replacement with a new/lined watermain is expected to partly improve fire flow and water quality conditions - Watermain depth can partly mitigate some operations and maintenance risks - Construction impacts are in existing areas; off-season construction work can mitigate disruption - Simplicity of private service line reconnections - No property purchase or easement changes anticipated - Lower capital cost than full replacement	- Does not address key operations and maintenance risks. Subject to similar risks as existing watermain. - Challenging area for construction (beachfront & private land) - Some flushing likely still required to maintain chlorine levels - Partial fire flow limitations expected to remain; tanker trucks to remain as a backup - Watermain depth may be impacted by groundwater - Environmental impacts to section being replaced
Alternative 3: - Replace entire length with deeper watermain along the same/similar alignment; - Maintain and/or relocate existing hydrants	- Replacement with a new watermain is expected to improve fire flow and water quality conditions - Newer, deeper watermain will have fewer operations and maintenance risks - Construction impacts are in existing areas - No property purchase or easement changes anticipated	- Does not address key operations and maintenance risks. Access limitations remain along beachfront and within private property - Challenging area for construction - Environmental impacts along the replacement watermain route - High capital cost
Alternative 4: Relocate watermain generally along existing roadways;	- Replacement with a new watermain is expected to improve fire flow conditions - Relocation to existing roadways will largely improve issues of access and maintenance	- Impact to natural environment and tree removal along route - Requires reconstruction and replacement of water services

Alternative	Opportunities/Benefits	Constraints/Challenges
Replace with new hydrants along new watermain route	- Improved water quality with new watermain - Limits impacts to existing properties to be related to service line replacements	- Further investigation required to confirm the feasibility of implementation with open-cut construction on narrow roadways - High capital cost - Changes to existing easement are anticipated
Alternative 5: - Relocate watermain with small diameter servicing generally along existing roadways; - Fire flows to be supported by pumper/tanker trucks, rather than hydrants, necessitating localized roadway expansions to allow for fire tanker and pumper truck operations.	- Use of tanker trucks can provide fire flow consistent with level of service target for rural properties - Watermain relocation to existing roadways will largely improve issues of access and maintenance - Improved water quality with new watermain; flushing not expected to be required with small diameter watermain - Solution is implementable with directional drilling	- Requires reconstruction and replacement of water services - Localized roadway expansions are required to allow for fire tanker and pumper truck operations - Large amount of turns along the route are expected to limit the benefits of directional drilling, compared to open-cut - High capital cost - Residents will no longer have traditional fire protection (hydrants) - Changes to existing easement are anticipated
Alternative 6: - Replace municipal service with individual private servicing, such as water cisterns or wells; - Fire flows to be supported by pumper/tanker trucks, rather than hydrants, necessitating localized roadway expansions to allow for fire tanker and pumper truck operations.	- Use of tanker trucks can provide fire flow consistent with level of service target for rural properties - Access and maintenance issues, related to the Town watermain, are alleviated with private servicing - The need for maintenance (i.e. flushing, repairs, sampling) by the Town is eliminated - Solution provides the ability to implement individualized private service solutions based on property needs	- Significant challenges (access; space; proximity to septic; etc.) and potential disruption to landscaping to install individual private household services in an existing built-up area - Localized roadway expansions are required to allow for fire tanker and pumper truck operations. - Maintenance responsibilities would be with residents (upkeep of cisterns/wells; etc.) - High capital cost for upfront installations (cisterns/wells) - Residents will no longer have traditional fire protection (hydrants)

8.2. Long List Screening

The long list of alternatives was screened according to the screening methodology outlined in **Section 7.1** and the opportunities and challenges identified in **Section 8.1**. **Table 8-3** summarizes the screening results of each alternative and criterion; 'No' indicates the criterion was not satisfied and 'yes' indicates the criterion was satisfied.

Table 8-3. Screening Results for Long List of Alternatives

Alternative	Meets Fire Flow Objectives	Improves Access & Maintenance	Improves Water Quality	Screening Result	Summary of Key Opportunities & Constraints
1	No	No	No	Not Carried Forward	- Current condition of the watermain limits available flow capacity, and location of existing hydrants does not allow for full functionality of the hydrants; fire flow supplemented by tanker / pumper trucks. - Existing alignment complicates access for maintenance, repair, and/or construction activities. - Requires significant flushing efforts to fix quality issues.
2	Yes	No	No	Not Carried Forward	- Lining and replacement with new watermain likely to improve fire flow conditions. - Does not improve access or maintenance of existing alignment along beachfront and through properties on Staniland Park Rd. - Lining may not improve quality issues. - Further investigation would be needed to determine feasibility of watermain lining due to size, age, bends, break history, and potential tuberculation.
3	Yes	No	Yes	Not Carried Forward	- Replacement with new watermain likely to improve fire flow conditions - Does not improve access issues with existing alignment along beachfront and through properties on Staniland Park Rd - Improved water quality with new watermain; occasional flushing may still be required during periods of low water usage - Further investigation needed to determine feasibility of implementation along the current alignment
4	Yes	Yes	Yes	Carried Forward	- Replacement with new watermain likely to improve fire flow conditions. - Relocating to existing roadways will largely improve issues of access and maintenance. - Improved water quality with new watermain; occasional flushing may still be required during periods of low water usage.

Alternative	Meets Fire Flow Objectives	Improves Access & Maintenance	Improves Water Quality	Screening Result	Summary of Key Opportunities & Constraints
5	Yes	Yes	Yes	Carried Forward	- Use of tanker trucks provides fire flow consistent with target level of service for rural residential properties. - Relocating to existing roadways will largely improve issues of access and maintenance and minimizes construction impacts. - Improved water quality with new watermain; flushing likely not required with small diameter watermain.
6	Yes	Yes	Yes	Carried Forward	- Use of tanker trucks provides fire flow consistent with target level of service for rural residential properties. - Access and maintenance issues for Town are alleviated with private servicing. - Improved water quality with private servicing; regular water testing required by owner.

Alternatives 4, 5, and 6 were carried forward following the long list screening. These alternatives are further described and evaluated in **Section 9**.

9. Evaluation of Short List of Alternatives

Three servicing solutions were carried forward following the screening of the long list of alternatives: Alternatives 4, 5, and 6. A detailed evaluation was subsequently completed according to the evaluation methodology outlined in **Section 7.2**.

9.1. Short List of Alternatives

The following sections provide an overview of the three shortlisted alternatives.

Table 9-1 provides an overview of the key physical and technical differentiators between the different alternatives.

Table 9-1. Key Alternatives Differentiators

Component	Alternative 4	Alternative 5	Alternative 6
Infrastructure Needs Summary	2.75km of 150mm WM install (open-cut); road restoration; hydrants & service connections; 50m trenchless crossing	2.8km of 50mm WM install (trenchless); road restoration; service connections; launch/receiving pits	84 Private Cisterns (delivery & install); Excavation & landscaping; Household pumps & UV disinfection
Total Watermain Length (m) ¹	2,800	2,800	0
Open Cut Length (m) ²	2,750	0	0
Trenchless Length (m)	50	2,800	0
Approximate Number of Hydrants ³	17	0	0
Number of Private Property Installs (Cisterns)	0	0	84
Approximate Number of Trenchless Launching and Receiving Pits	2	15	0
Approximate Construction Cost (\$)	\$3.8 M	\$6.6 M	\$3.5 M

1: Total length is measured from Colony Road at Thunder Bay Road to Staniland Park Road at Thunder Bay Road.

2: Actual total, open cut, and trenchless lengths will be confirmed during detailed design.

3: Actual number of required hydrants will be confirmed during detailed design.

9.1.1. Alternative 4 (150mm Watermain & Fire Hydrants)

As part of Alternative 4, the existing watermain would be relocated from its current route to along existing roadways. However, it is noted that due to the current roadways being disconnected in select places, the watermain would also cross properties to join disconnected roads, such as between Colony Road and Windmill Point Lane West, and between Windmill Point Lane East and Staniland Park Road. In general, the length of the watermain would be installed by open-cut construction, except for the Six Mile Creek crossing, which would be a tunnelled segment.

In this scenario, the watermain would remain 150 mm in diameter. With a 150mm diameter watermain, traditional fire flow protection (hydrants) can be maintained, as such, the project also considers the

relocation of fire hydrants along the existing roadway. The new fire hydrants would be spaced no more than 150 m apart along the roadway, such that it meets the Town's Water System Design Guidelines.

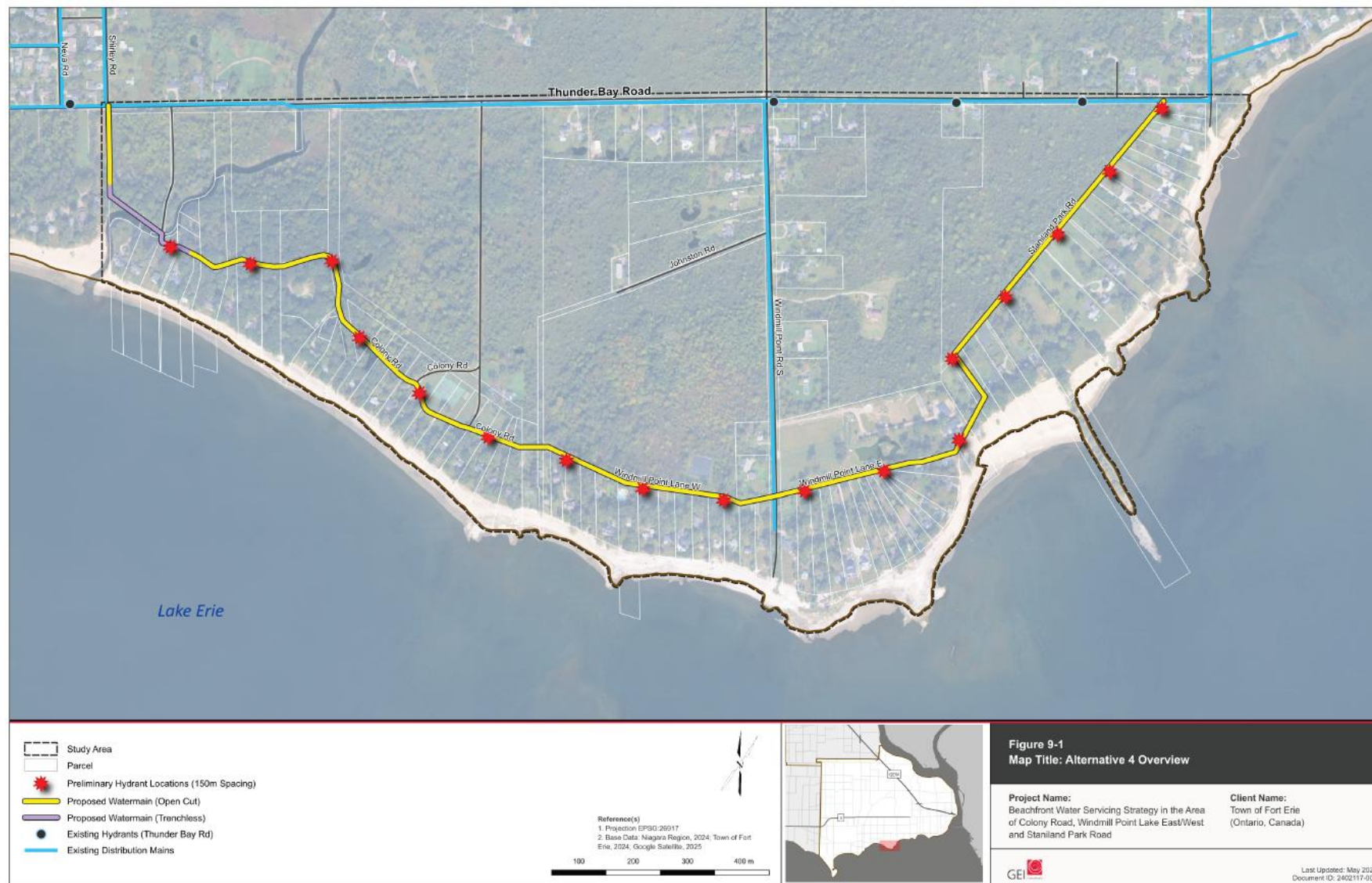
The 150 mm diameter watermain provides acceptable water quality, and pressures while allowing for fire protection via fire hydrants. Hydraulic modelling indicates that, with the watermain upgrade, the entire route can achieve fire flows greater than 50 L/s at all hydrants, which would provide an improvement on existing conditions. Furthermore, modelling indicates that the current system's need for flushing operations is driven by the poor condition of the existing watermain. As such, with a new replacement watermain, water quality would be improved since the improved capacity of the watermain helps to create through-flow from east to west in the new watermain.

Limited conflicts with existing infrastructure are anticipated due to the current lack of infrastructure along the roadway. There would be a moderate impact to private properties as new service lines would be required since the watermain would now be relocated to the north side of the homes. A portion of the new service lines (up to the property lines – a maximum of 10 metres from the watermain) would be paid for by the Town and the remainder would be coordinated and paid for by the homeowner, consistent with the Town's current practices. Upon completion and commissioning of the new watermain, the existing watermain segment along the beach would be removed. Other watermain segments are anticipated to be abandoned in place.

The timing and complexity of construction would be increased by the need for open cut installation within the narrow single lane roadway. It would also pose access difficulties for residents in areas with one direction of access, such as the eastern end of Colony Road, Windmill Point Lane West/East, and Staniland Park Road. Due to the need to maintain continued access for residents, the construction timeline would be increased compared to other watermain replacements. Due to the seasonality of some properties within the study area, the ideal construction timing is expected to be outside of the months of peak usage (i.e. June, July, and August), with phasing for the west portion (Colony Road and Windmill Point Lane West) up to Windmill Point North/South, followed by east phasing including Windmill Point Lane East and Staniland Park Road.

Within the study area, there are several significant natural heritage features, including Provincially Significant Wetlands as part of the Six Mile Creek Wetland Complex, Significant Woodlands, Significant Valleylands and Fish Habitat associated with Six Mile Creek, White-tailed deer wintering areas, Waterfowl Winter Concentration Areas along the shoreline, and Habitat for Endangered or Threatened Species. During detailed design, additional field verification may be required to help confirm features and identify ways to mitigate impacts where possible. Open cut construction along the roadway would be expected to lead to some loss of mature trees and vegetation, for which offsetting may be considered following construction. Open cut construction would also have the potential for the greatest impact to the function of the habitats for locally significant wildlife. Field investigations including site specific surveys are required along the preferred alignment during detailed design to further characterize the limits and quality of the natural heritage features within the area and identify additional impacts and mitigation measures.

Figure 9-1. Alternative 4 Overview



9.1.2. Alternative 5 (50 mm Watermain & Tanker Trucks)

As part of Alternative 5, the watermain would be downsized to a local 50 mm watermain and would also be relocated from its current route to along existing roadways. As with Alternative 4, since the current roadways are disconnected in select places, the watermain would also cross properties to ensure a continuous watermain loop along Colony Road, Windmill Point Lane and Staniland Park Road. With a 50 mm diameter watermain, traditional fire flow protection (hydrants) cannot be provided. As such, fire protection would instead have to be provided by a combination of pumper / tanker trucks that can bring water supply from the nearby Thunder Bay Road watermain / hydrants. However, in order to achieve continuous fire supply, this type of pumper/tanker truck operation requires improved road access so that there are clear turnaround locations along the route. As such, this alternative also includes the additional of fire truck passing / turnaround lanes (widening at select intervals).

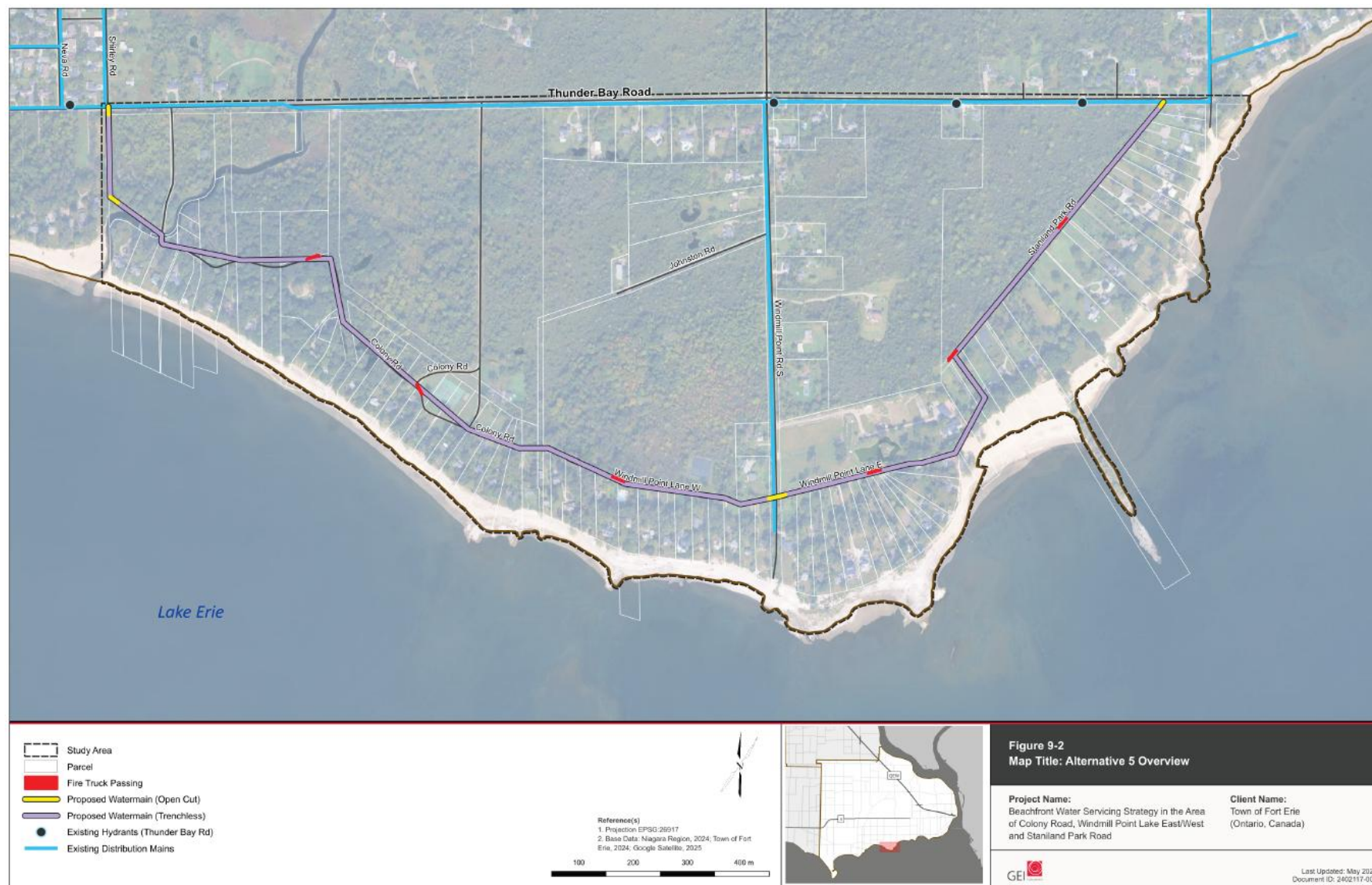
Otherwise, hydraulic modelling indicates that the 50 mm diameter watermain provides acceptable water quality, and pressures along the route. Water quality would be improved since the low volume of water held within a 50 mm watermain can more easily be turned over by the natural demands of customers along Colony Road, Windmill Point Lane and Staniland Park Road.

Similar to Alternative 4, limited conflicts with existing infrastructure are anticipated due to the current lack of infrastructure along the roadway. There would be a moderate impact to private properties as new service lines would be required since the watermain would now be relocated to the north side of the homes. A portion of the new service lines (up to the property lines – a maximum of 10 meters from the watermain) would be paid for by the Town and the remainder would be coordinated and paid for by the homeowner, consistent with the Town's current practices. Upon completion and commissioning of the new watermain, the existing watermain segment along the beach would be removed. Other watermain segments are anticipated to be abandoned in place.

For Alternative 5, the construction methodology considered is primarily trenchless construction (via directional drilling), whereby only select sections would be completed through open-cut construction. However, it is noted that due to the complex alignment of the existing roadways (large number of bends; etc.) there would need to be a large number of launch and receiving pits for the construction. This significantly increases the complexity and costs of what could otherwise have been a less disruptive method of construction.

Within the study area, there are several significant natural heritage features, including Provincially Significant Wetlands as part of the Six Mile Creek Wetland Complex, Significant Woodlands, Significant Valleylands and Fish Habitat associated with Six Mile Creek, White-tailed deer wintering areas, Waterfowl Winter Concentration Areas along the shoreline, and Habitat for Endangered or Threatened Species. During detailed design, additional field verification may be required to help confirm features and identify ways to mitigate impacts where possible. The large number of launch and receiving pits needed for trenchless construction would be expected to lead to some loss of mature trees and vegetation, for which offsetting may be considered following construction. Field investigations including site specific surveys are required along the preferred alignment during detailed design to further characterize the limits and quality of the natural heritage features within the area and identify additional impacts and mitigation measures.

Figure 9-2. Alternative 5 Overview



9.1.3. Alternative 6 (Private Servicing & Tanker Trucks)

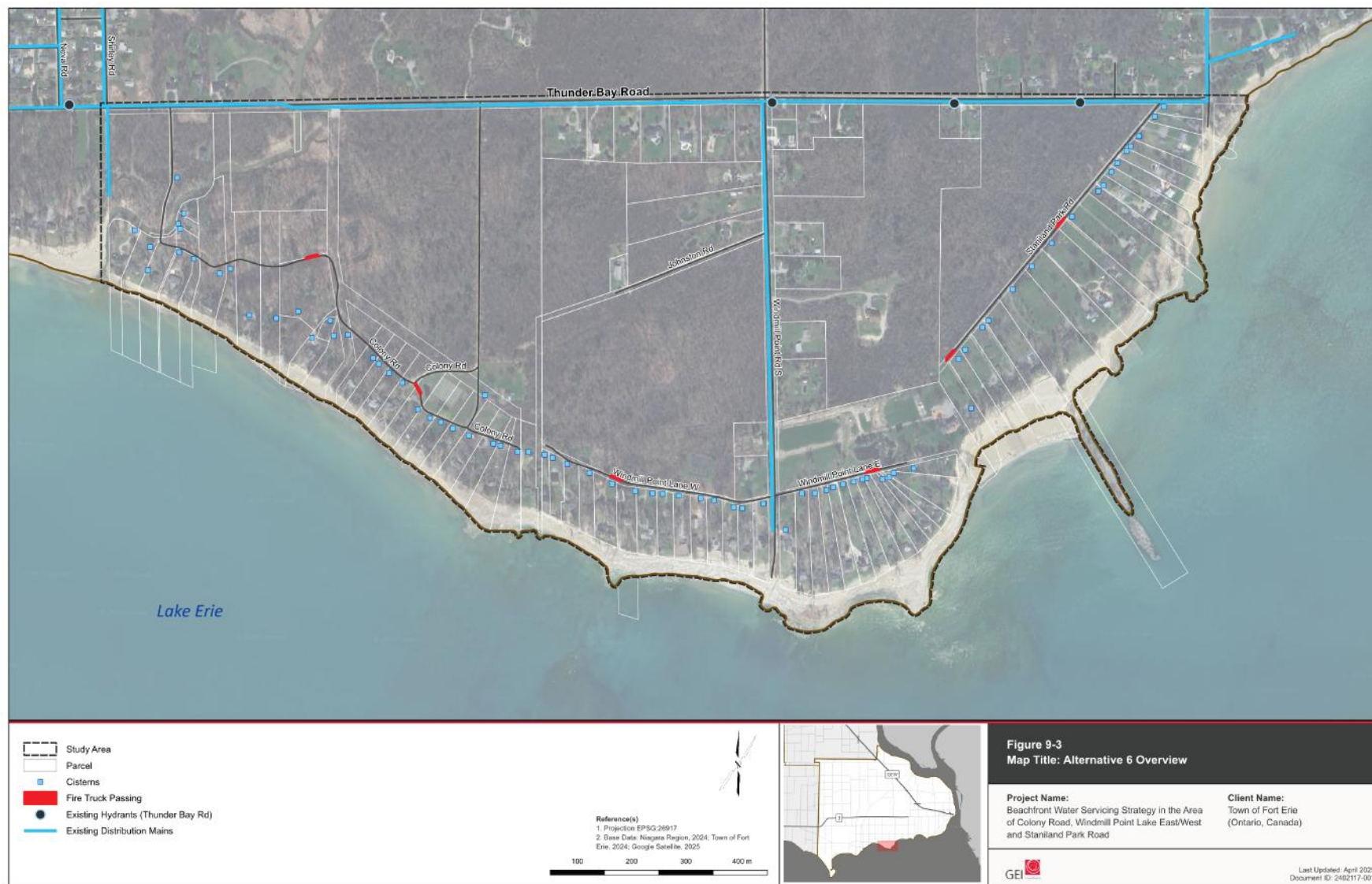
As part of Alternative 6, the traditional municipal water servicing provided to the properties along Colony Road, Windmill Point Lane East & West, and Staniland Park Road would be replaced with private servicing options. For the purposes of this assessment, private servicing was considered to be the delivery and installation of private cisterns for each of the properties in the area. With private cisterns replacing typical water service connections from a municipal watermain, some ongoing maintenance would become the long-term responsibility of the customer (maintenance of the cistern; seasonal refilling/emptying of the cistern; treatment/disinfection of water, etc.).

Similar to Alternative 5, traditional fire flow protection (hydrants) would no longer be provided as part of Alternative 6. As such, fire protection would instead have to be provided by a combination of pumper / tanker trucks that can bring water supply from the nearby Thunder Bay Road watermain/hydrants. However, in order to achieve continuous fire supply, this type of pumper/tanker truck operation requires improved road access so that there are clear turnaround locations along the route. As such, this alternative also includes the additional of fire truck passing/turnaround lanes (widening at select intervals).

As part of Alternative 6, there would be a moderate to high impact to private properties since each individual property would need to have a new site identified for a cistern and new service line connection from the cistern to the household. The properties in the study area are already built-up properties (primary house; additional structures – bunkies/sheds; septic systems; landscaping, etc.) and do not necessarily have a simple space available for the addition of a cistern. It is also noted that due to the access challenges (single land road; trees; etc.) along the route, the costs of adding a cistern would be noticeably higher than in more spacious new build rural properties. This adds to the implementation challenges and estimate costs of Alternative 6.

Within the study area, there are several significant natural heritage features, including Provincially Significant Wetlands as part of the Six Mile Creek Wetland Complex, Significant Woodlands, Significant Valleylands and Fish Habitat associated with Six Mile Creek, White-tailed deer wintering areas, Waterfowl Winter Concentration Areas along the shoreline, and Habitat for Endangered or Threatened Species. During detailed design, additional studies may be required to help identify ways to mitigate impacts where possible.

Figure 9-3. Alternative 6 Overview



9.2. Evaluation Overview

Table 9-2 provides the evaluation of the short list of alternatives including the advantages and challenges for each evaluation criteria.

Table 9-2. Evaluation of Short List of Alternatives			
Evaluation Criteria	Alternative 4	Alternative 5	Alternative 6
Technical Feasibility	• Replacement with a new watermain improves fire flow capacity (via hydrants) and pressures • Improved water quality expected due to new watermain ability to provide through-flow. • Relocation of main to existing roadways will improve access for operations and maintenance • Moderate construction complexity; open cut construction on narrow roadways	• Reliance on pumper trucks to achieve fire flow needs is consistent with minimum level of service for rural residential properties. Requires turnaround areas to be added for truck accessibility. • Improved water quality with smaller watermain helping speed up turnover • Relocation of main to existing roadways will improve access for operations and maintenance • Moderate/high construction complexity due to trenchless methods (directional drilling) requiring numerous launch and receiving pits	• Residents become responsible for cistern maintenance and water quality • Municipal flushing is expected to be reduced. • Reliance on pumper trucks to achieve fire flow needs is consistent with minimum level of service for rural residential properties. Requires turnaround areas to be added for truck accessibility. • Municipal maintenance issues are alleviated with private servicing • Moderate/high construction complexity due to difficulty in siting cisterns (due to proximity to septic beds; sand dunes; etc.) • Cisterns may require deep excavation to avoid freezing risks
Environmental Impacts	• Open cut construction mainly along road right of way expected to lead to some loss of mature trees/vegetation. Mitigation and offsetting for removed trees will be required • Six Mile Creek will be tunnelled, with shaft locations outside the floodplain to avoid impacts to this feature	• Majority of route is tunnelled reducing potential for impact to environment, however, due to number of bends along the route, there will be launch/receiving shaft locations for drilling outside of the road right of way and some areas of open cut construction which is expected to lead to some loss of mature trees/vegetation. Mitigation and offsetting for removed trees will be required • Six Mile Creek will be tunnelled, with shaft locations outside the floodplain to avoid impacts to this feature	• Siting of cistern locations may reduce potential for impact to environment, but still moderate due to number of cisterns. Installation of cisterns may result in impacts to sand dunes which may require mitigation
Social / Cultural Impacts	• Requires reconstruction and replacement of water services; longer construction time (6-8 months) and limited access to private properties during construction • Residents heavily supportive of maintaining water servicing and hydrants for fire protection • Stage 2 archeological assessment is required, however works will mainly be located within the road (previously disturbed land) • Some impacts from new service lines • Potential disruption in accessing traditional lands for hunting, fishing and gathering purposes • Potential impacts to landscapes and features that are culturally and naturally significant to Indigenous Communities, however impacts can be mitigated	• Requires reconstruction and replacement of water services; moderate construction time (4-6 months) and limited access to private properties during construction • Localized roadway expansions to allow for fire tanker and pumper truck operations. • Residents not supportive of removing hydrants (insurance/property impacts) • Stage 2 archeological assessment is required for shaft locations outside the road • Some impacts from new service lines • Potential disruption in accessing traditional lands for hunting, fishing and gathering purposes • Potential impacts to landscapes and features that are culturally and naturally significant to Indigenous Communities, however impacts can be mitigated	• Difficult constructability on private properties with impacts to residents. • Residents not supportive of removing hydrants & municipal water supply (insurance/property impacts) • Potential for increased difficulty in coordinating works for all individual properties • Solution allows individualized private service solutions based on property needs • Localized roadway expansions to allow for fire tanker and pumper truck operations. • Some impacts from private plumbing
Financial Viability	• Estimated capital cost \$3.8M (moderate)	• Estimated capital cost is \$6.6M (high)	• Estimated capital cost \$3.5M (moderate)

9.3. Evaluation Methodology

The evaluation weighting was established through consensus with the project team as well as through feedback from the consultation and engagement process. Following PIC No. 2, the environmental impact weighting increased from 20% to 30% while the financial viability was decreased from 30% to 20% to account for the ecological and cultural importance of the sensitive natural features within the study area.

Table 9-3. Evaluation Criteria Weighting

Evaluation Criteria / Weighting	Description
Technical Feasibility (30%)	• Provides a Safe Drinking Water Supply • Supports Fire Protection • Minimizes Operations and Maintenance Risks • Minimizes Conflict with Existing Infrastructure • Complexity of Implementation • Ease of Property / Land Acquisition
Environmental Impacts (30%)	• Minimizes Impact to Environmental and Natural Heritage Features • Protects Wildlife and Species at Risk (SAR)
Social / Cultural Impacts (20%)	• Manages and Minimizes Construction (Short-term) Impacts • Manages and Minimizes Long-term Impacts to Indigenous Communities • Manages and Minimizes Long-term Impacts to Residents • Protects Archaeological and Cultural Heritage Features
Financial Viability (20%)	• Minimizes Capital Cost • Minimizes Operations & Maintenance Costs

The scoring was based on the level of impact of the alternative to each of the evaluation criteria. **Figure 9-4** provides the evaluation scoring used for the short list of alternatives.

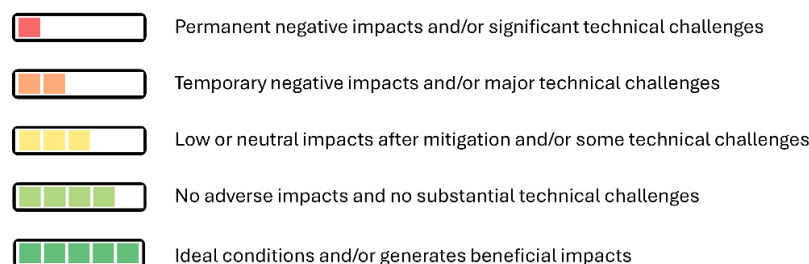


Figure 9-4. Evaluation Scoring

The detailed short list of alternatives evaluation matrix is provided in **Appendix B.1**.

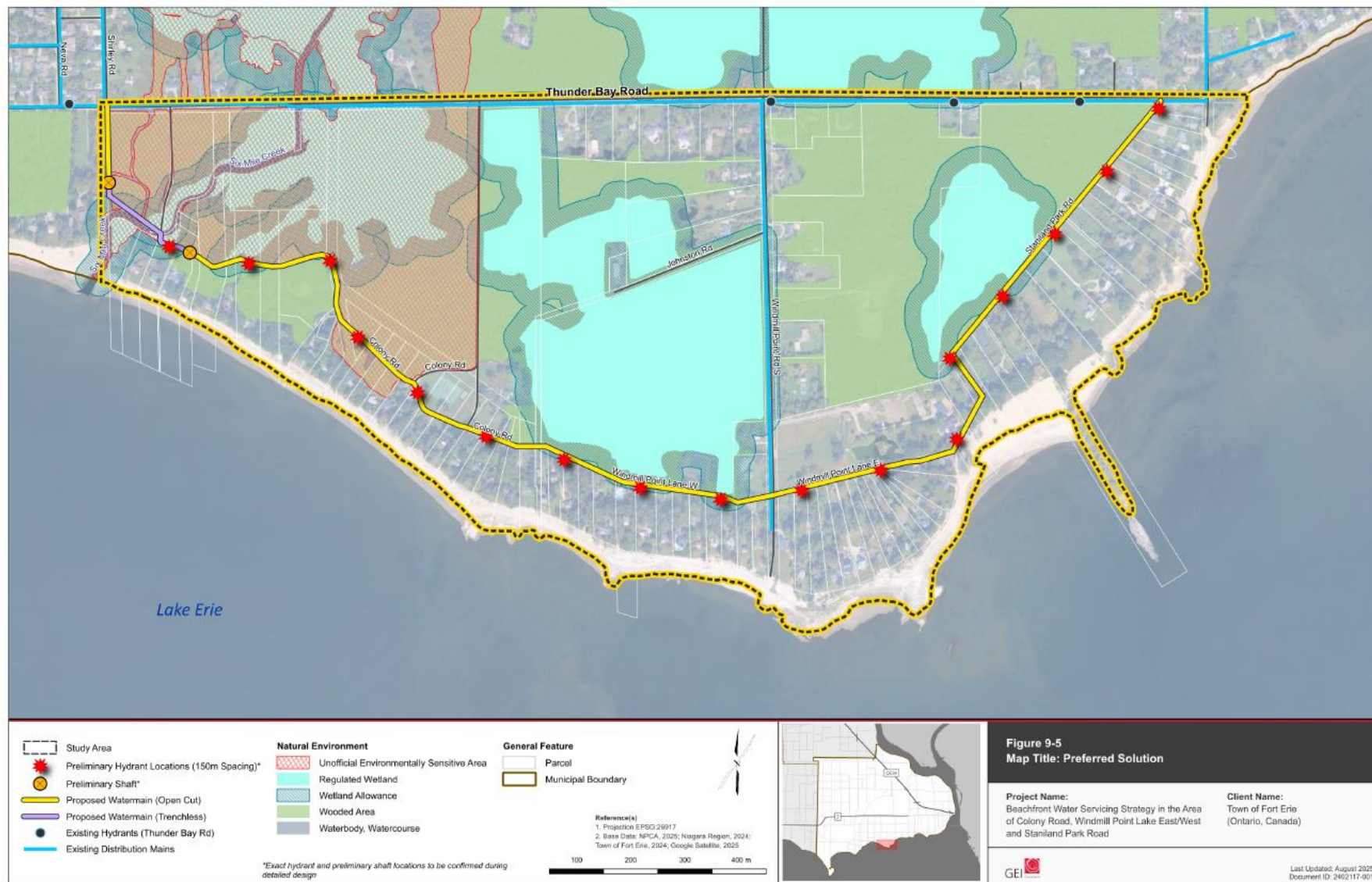
9.4. Recommended Alternative

The short list of alternatives that scored the highest was Alternative 4 - *Relocate watermain generally along existing roadways; Replace with new hydrants along new watermain route.*

Alternative 4 was selected as the recommended alternative because:

- It improves both water quality and access for operations and maintenance
- It improves fire protection, while maintaining traditional fire hydrants
- Use of open cut construction methodology which reduces overall construction complexity/risk
- Ability to stay within road right of way where possible to minimize impacts to adjacent natural features
- Strongly favoured by residents due to the preservation of Town-supplied water and hydrants
- Does not represent the highest cost alternative and is comparable to the low cost alternative.

Figure 9-5. Preferred Solution



10. Preferred Solution Impacts, Mitigation Measures, and Implementation Plan

10.1. Impacts and Mitigation Measures

10.1.1. Archaeological and Built/Cultural Heritage Resources

Based on the findings of the Stage 1 Archaeological Assessment, no further assessments are required for the areas previously subjected to an archaeological assessment or areas of previous disturbance. The majority of the preferred solution is located within the road right of way, however, a Stage 2 Archaeological Assessment will be required during Detailed Design to confirm areas with archaeological potential, including any undisturbed or grassed areas along the proposed alignment.

Based on the findings of the Cultural Heritage Screening, additional fieldwork is required during Detailed Design to confirm the presence or absence of potential cultural and/or built heritage resources along the proposed alignment, determine the level of assessment required and identify any impacts and mitigation measures required.

Representatives from the identified Indigenous Communities shall be provided an opportunity to participate in the Stage 2 Archaeological Assessment and Cultural Heritage studies, through field work participation and reviewing of reports.

In addition, if there are any archaeological and/or cultural heritage findings during construction, they will be reported to the Ministry of Tourism, Culture and Sport (MTCS) immediately and work would stop until next steps are confirmed.

10.1.2. Significant Natural Features and Species at Risk

The preferred alignment crosses a number of different environmental features, including:

- White-tailed deer wintering area
- Provincially Significant Wetland (Six Mile Creek Wetland Complex)
- Significant woodlands
- Significant valleylands (Six Mile Creek)
- Fish Habitat (Six Mile Creek)
- Candidate Habitat for Endangered and Threatened Species
- Significant Wildlife Habitat

Trenchless technology is preferred when crossing any of the above significant features to minimize impacts and mitigation measures.

To minimize any harm to wildlife and wildlife habitat, the following setbacks and mitigation measures should be implemented during the detailed design and construction process. Setbacks will be confirmed through confirmatory site visits during detailed design (see **Section 10.2.2** for more details).

- A 30 m setback from a PSW is recommended.
- A 10 m setback from a significant woodland is recommended.
- A 7.5 m setback from the stable top of the valley slope (for valley bank height's 3 m or greater) is required.
- Removal of trees and any sand dunes should be avoided to the greatest extent possible. If dunes are present that would provide habitat for Fowler's Toad, work should be timed to the active period (late May through September) to ensure they are active. Exclusion fencing should be placed around the work area and searches would be required to ensure that all toads present within the work area are removed.
- Any work requiring tree or vegetation removal would not to be timed outside of the active bat and bird periods to remain compliant with the ESA and the MBCA. As such, removals would be recommended to avoid the period from April 1 through October 31.
- Once the construction has been completed, all disturbed areas shall be rehabilitated, destabilized and revegetated to ensure the project site is restored to pre-construction conditions.

10.1.3. Fish and Fish Habitat

The preferred alignment crosses Six Mile Creek and two of its tributaries. Although the majority of the alignment is to be open-cut, the crossing of this feature is to be completed with trenchless methods (directional drilling) to minimize impacts to fish and fish habitat.

To minimize any harm to aquatic features and habitat the following setbacks and mitigation measures should be implemented during the detailed design and construction process. Setbacks will be confirmed through confirmatory site visits during detailed design (see **Section 10.2.2** for more details).

- A setback of 30 m is required next to critical fish habitat and 15 m next to important or marginal fish habitat (Six Mile Creek is identified as fish habitat)
- Develop an erosion and sediment control plan to minimize the risk of sedimentation of Six Mile Creek. The control plan can include:
 - Installation of sediment barriers on all catch basin and maintenance holes
 - Silt fence barriers
 - Stabilization of exposed soils if above the high-water mark.
- Develop a contamination and spill management response plan in the event of a sediment release or spill of a hazardous substance.
- Ensure all machinery operations are done on land above the high-water mark where possible. Refueling, washing and servicing machinery shall be completed outside of the 30 m water course boundary where fish are present.
- Consult with DFO via a Request for Review to confirm permitting and mitigation measures to be implemented during construction.

- Should it be determined that in-water works are required, the fisheries timing window shall be respected (i.e., avoid the period between October 1 to May 31 of any given year for fall spawning and March 15 to July 15 for spring spawning), in accordance with the DFO guidelines.

10.1.4. Geotechnical and Hydrogeological

The following provides some high-level considerations for the preferred alignment based on the desktop assessment:

- The existing watermain appears to be located within coarse-textured lacustrine deposits in the western half and in eolian deposits in the eastern half. This is due to the proximity of the existing watermain to the shoreline. The area north of the existing watermain is predominantly fine textured glaciolacustrine deposits.
- There are extensive areas of mapped wetlands. When constructing near a wetland, the Niagara Peninsula Conservation Authority (NPCA) Development & Interference permit for work within regulated wetlands and the Lake Erie shoreline is required. It is expected that the near surface soils in these areas will be organic/peat deposits. Organic materials are typically not geotechnically competent to support servicing when encountered.
- Groundwater is expected to be relatively shallow throughout the study area. In areas of fine textured deposits (silts and clays), dewatering is expected to be minimal due to the relatively impermeable nature of these types of deposits. If work is to be conducted closer to the shoreline, more significant construction dewatering may be required.
- Though the bedrock is relatively shallow in the study area, due to the typical depth of watermain installations (on the order of maximum 2 meters), it is not expected to be a major constraint. In areas where bedrock is encountered within the excavation depth, there may be the presence of some fractured zone which may allow for easier excavation. It should be expected that any deep excavations into the bedrock would require mechanically breaking through the use of hydraulic breakers or even blasting.
- Silt and clay-based soils can be more difficult to work with, especially during inclement weather conditions. These soils are also likely not to be suitable for re-use in settlement sensitive areas as trench backfill and would have to be removed off-site. Scheduling of earthworks to promote working during more favourable times of the year would be recommended where feasible.
- Through consultation with NPCA, there are potential backshore sand dunes in the area, which are regulated as a natural hazard and has the following geotechnical considerations:
 - Construction within a road right of way may have an impact on sand dunes. Construction mitigation measures required to ensure that the works will not compromise the dunes long-term stability.

Based on the preferred alignment, the following geotechnical and hydrogeological constraints should be considered:

Geotechnical Constraints: Cohesive deposits expected to be suitable for servicing support. Bedrock and/or organics may be encountered at surface or shallow depth during construction which must be considered (*medium level* of constraints*).

Hydrogeological Constraints: Shallow groundwater will be encountered. Cohesive deposits are expected to exhibit slower permeability, which contribute to manageable discharging volumes over a dewatering period (unless near shoreline where cohesionless deposits may exist). Construction near wetland areas may require additional consideration of natural heritage features, dewatered volumes, which may involve seasonal constraints (*medium level* of constraints*).

**Medium Level* – medium probability for solvable constraints to exist, definable through the desktop study.

During detailed design, the following will be completed:

- A subsurface investigation consisting of boreholes and monitoring wells will be required during detailed design to support the finalizing of the design and construction.
- Select pipe class, embedment, and frost-protection depth using test results and local seasonal frost penetration.
- Allow for excavation through hardclays and possible shallow bedrock; specify mechanical breaking and limited controlled blasting where refusal is indicated.
- Require removal or bridging of organics/peat in mapped wetland areas; lightweight fill or geogrid reinforcement may be warranted
- An excess soil management plan will be required prior to construction to ensure excess soil during construction is properly management and meets all regulatory requirements..

10.1.5. Climate Change

Climate changes can affect both water resources and water infrastructure. Similarly, infrastructure development can contribute to climate change by increasing greenhouse gas (GHG) emissions as a result of products used, construction activities and ongoing operation. Some examples of potential climate change impacts on water infrastructure include:

- **Temperature:** Higher temperatures and more frequent droughts can cause an increase in water demand and pressure on existing water supplies and infrastructure. An increase in droughts can also impact water quality (water supply is less diluted).
- **Precipitation Events:** An increase in the frequency and intensity of precipitation events can cause an increase in flooding and power outages, impacting water infrastructure operation.
- **Runoff:** An increase in rainfall runoff can impact water quality resulting in the need for increased water treatment processes.

Potential climate mitigation techniques considered in the selection and development of the preferred solution are:

- **Decrease in carbon footprint** (greenhouse gas (GHG) emissions) during construction through the selection and delivery of materials (e.g., recycled, or natural building materials that produce less carbon dioxide when manufactured).
- **Restoring natural/grassed areas** back to original or enhanced natural conditions, including tree replacement plans where necessary.
- **Carrying out construction activities outside of key ecological periods** to minimize damage to the natural environment and wildlife habitat (e.g., construction outside breeding bird season and high runoff periods in spring).

This project will support climate change initiatives through the following:

- **Reducing environmental risk and resource water:** The existing watermain infrastructure is aging and prone to operational and maintenance issues. Leaks, inefficiencies, and frequent repairs can lead to water loss, energy waste, and increased GHG emissions from maintenance activities. Replacing or upgrading the system with modern, resilient infrastructure will reduce these inefficiencies and help conserve water, which is a critical resource increasingly stressed by climate change.
- **Improving climate resilience:** The project enhances the climate resilience of the community by ensuring reliable access to clean water, especially for shoreline populations that may be more vulnerable to climate-related events such as flooding, droughts, or extreme weather. A robust water system is essential for public health and emergency preparedness in a changing climate.
- **Minimizing Construction Impacts:** Modern construction practices and materials can significantly reduce the carbon footprint of infrastructure projects. If the project incorporates low-carbon materials, efficient construction methods, and renewable energy sources during operation, it can further contribute to climate mitigation efforts.

10.1.6. Traffic

The preferred alignment is proposed to be open cut along the road ROW of Colony Road, Windmill Point Lane West/East, and Staniland Park Road which will cause impacts to traffic along these routes during construction. During detailed design, the proponent will prepare a Traffic Management Plan. This plan will need to consider lane reductions/detours, required signage, traffic control measures to aid the safe ingress and egress of trucks to and from the site, and mitigation of impacts to vehicular traffic along the preferred alignment, in addition to other pedestrian and cycling movements.

10.1.7. Utilities

The preferred alignment does not cross any known underground utilities however, there are hydro poles (Canadian Niagara Power Inc.) at intersections along the route. There is evidence of underground gas pipes close to the route that will need to be confirmed. During detailed design, the proponent will need to contact the relevant utilities to confirm and ensure location and impacts to infrastructure are minimized or avoided during construction and operations.

10.2. Implementation Plan

10.2.1. Permits and Approvals

Table 10-1 provides an overview of the key permits and approvals that may be required in advance of the construction activities, and which will be further explored during detailed design.

Table 10-1. Permits and Approvals

Agency	Description of Permit / Approval Required
Indigenous Rights Holders	Indigenous Rights Holders were engaged throughout this study, and engagement is documented in detail in Appendix C. The Town acknowledges the need to continue to engage with Indigenous Rights Holders as part of the next steps of this project including detailed design and construction.
Fisheries and Oceans Canada (DFO)	A Fisheries Act self-screening may be required during detailed design. A project review or authorization may apply if impacts to fish and aquatic habitat cannot be avoided or mitigated during design and construction.
Ministry of Environment, Conservation and Parks (MECP)	- A Permit to Take Water is required for any water takings over 50,000 L/day. For a taking of greater than 50,000 L/day, but less than 400,000 L/day, the Permit should be obtained via the Environmental Activity and Sector Registry. For takings greater than 400,000 L/day, a PTTW shall be required via the conventional application process. - An Endangered Species Act permit or other authorizations may be required to conduct an activity that could impact an endangered or threatened plant or animal or its habitat.
Ministry of Natural Resources (MNR)	- Wildlife Scientific Collector's Authorization permit may be required under the Wildlife Conservation Act for the handling of any wildlife during the project. - Fish relocation permits may be required if fish salvage or relocations are needed during construction. - Permit or other authorization may be required to conduct an activity that could impact an endangered or threatened plant or animal or its habitat.
Ministry of Tourism, Culture and Gaming (MTCG)	The MTCG must approve of the fieldwork and reporting completed as part of the archaeological assessment and must deem it compliant with the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists.
Niagara Peninsula Conservation Authority (NPCA)	- Permit (O. Reg 41/24) required to comply with the Regulation of development activities / interference with a watercourse / wetland. - Required for any development within 30 m of any regulated wetland - May require permits for other natural hazards (sand dunes; etc.)

Agency	Description of Permit / Approval Required
Town of Fort Erie	• Permit for tree removal may be required to injure or destroy (remove) a tree 30 cm in diameter or greater measures at 1.37 m from the ground. If a tree is within the Town's Natural Heritage System, tree removal of any size will require a tree permit. Heritage trees or species at risk are also protected and may require additional approvals in addition to the tree permit. • Road occupancy permits where relocation follows existing road allowances. • Tree protection, and replacement and planting will be as per the Town's Tree By-law (53-2025), through further consultation with Indigenous Communities.
Utilities	• Utility locates / approval from utility companies within the area to review design and confirm any required setbacks and/or mitigation measures during construction.
Private Landowners	• Permanent easements for the preferred route along Colony Road, Windmill Point Lane East & West, and Staniland Park Road. • Temporary or permanent permission to enter during construction and operation/maintenance. • Pre and post construction surveys for select properties adjacent to construction. • Ongoing consultation as the detailed design and construction progress.

10.2.2. Design Commitments

Table 10-2 provides an overview of the key design commitments required to be completed during detailed design, in advance of the construction activities.

Table 10-2. Design Commitments Overview

Subject Matter	Description of Next Steps to Support Detailed Design
Archaeology & Cultural Heritage	• Stage 2 Archaeological Assessment to identify any archaeological resources • Cultural Heritage Impact Assessment to confirm cultural heritage significance • Indigenous Communities to be provided the opportunity to participate in both field investigations and report review.
Natural Environment	• Environmental Impact Study including site visits during the growing season (April to September) will be required during detailed design to confirm: ○ Overall impacts and mitigation measures of the preferred alignment. ○ Limits of the wetland complex along proposed route (consultation with NPCA and/or MNR will be required if changes to wetland boundaries are identified).

Subject Matter	Description of Next Steps to Support Detailed Design
	○ Limits of woodland communities along any proposed route (consultation with Town will be required regarding identification of woodland limits). ● Assess for potential occurrence of wildlife species identified through the desktop study as well as any species important to Indigenous Communities. If suitable habitat is identified, confirmation surveys will likely be required including but not limited to: ○ Botanical inventory for White Wood Aster and Butternut ○ Habitat suitability for Fowler's Toad ○ Breeding bird surveys (to be completed in June) ○ Bat habitat assessment (to be completed during leaf off conditions between November and March) ○ Bat acoustic survey (to be completed in June). ● Tree inventory required to record the location, species, and characteristics (i.e. health, size) of the individual trees along and near the preferred alignment. ● Indigenous Communities, MECP and NPCA will be provided with the opportunity to participate in natural heritage field investigations and report review. ● Other surveys that may be required: ○ Ecological Land Classification (ELC) and Botanical Inventories ○ Amphibian and reptile surveys ○ Aquatic habitat assessment ● Erosion and Sediment Control Plan (incorporate source-water-protection constraints (IPZ-2, SGRA, HVA)) ● Contamination and Spill Management Response Plan (incorporate source-water-protection constraints (IPZ-2, SGRA, HVA))
Geotechnical & Hydrogeological	● Detailed Geotechnical & Hydrogeological subsurface investigation including: ○ Boreholes and monitoring wells. ○ Conduct index/strength testing of overburden, packer tests in shallow bedrock, and slug tests in wells, as required. ○ Install at least one data logger in the shoreline reach to capture lake-affected water levels. ● Field verification and investigation of potential sand dunes to identify the features and support construction mitigation measures. A geotechnical study

Subject Matter	Description of Next Steps to Support Detailed Design
	will be prepared to determine the risks and to avoid slope failure and erosion of the dunes. NPCA staff will also be invited to a site visit relating to this. • Prepare dewatering assessment. • For significant valleylands, if there is evidence of slope instability or if the valley slope exceeds a 3:1 ratio (horizontal to vertical), a geotechnical report prepared by a qualified engineer must be submitted with any application for new development or site alteration. • Excess Soil Management Plan
Traffic	• Traffic Management Plan
Contamination	• Phase 1 Environmental Site Assessment (ESA) to identify any potential contamination and need for more detailed Phase 2 ESA
Property	• Permanent and temporary easements will be required during construction and for long-term maintenance of the watermain
Construction	• Construction Management Plan will be prepared prior to beginning construction to address haulage of materials, impacts to street trees, restoration plans, impacts to buildings, impacts to street signage, impacts to sidewalks and any temporary lane closures required • As part of construction mitigation plans, potential adverse noise and dust impacts within the study area will be reviewed so that appropriate control measures can be put in place. • Post-Construction Monitoring Plan

The Town's Communications department will continue to inform the study contact list, Indigenous Communities, residents and the public via online notices and website updates, public notifications via email / mail, and via existing social medial channels as the project proceeds to detailed design.

More specifically, the Town will continue to inform and consult landowners whose properties cross the preferred alignment and where permanent and/or temporary easements will be required. Communications with landowners will follow any land agreements prior to work being completed where required. Overall, residents within the study area will be advised of project proceedings and be presented with the opportunity for consultation with the project team.

The Town will continue to inform and consult with the Indigenous Rights Holders, and relevant government agencies (MECP, NPCA) throughout the Environmental Impact Study and detailed design.

10.2.3. Construction Costing

The cost of the preferred solution is a function of the length of the alignment, depth of the pipe, the construction methodology, watermain appurtenances and other additional costs such as relocation of utilities, connection to existing pipes, pipe lining, property and restoration.

Table 10-3 provides a high-level cost breakdown estimate to construct the new watermain.

Table 10-3. Cost Estimates

Costing Element		Cost Estimate (\$)
Construction Costs		\$2,435,500
Design/Engineering		\$295,000
Contingency (40% for Class 4 Cost Estimate)		\$1,095,000
Total Project Cost		\$3,825,500
Expected Accuracy Range (based on Association for the Advancement of Cost Engineering (AACE) Class 4 Cost Estimates)	+ 30%	\$4,980,000
	- 10%	\$3,440,000

10.2.4. Implementation Schedule

The Town's current anticipated implementation timeline for the preferred solution is indicated below, with the intent of completing design in 2026 and construction in 2027. If phasing is required based on available budgets and affordability, then it is anticipated that the project will be completed in 3 phases, starting with Colony Road area (2027), then Windmill Point Road area (2029) and then Staniland Park (2031). The construction and phasing will be dependent on budget approval.

11. Communications Summary

Consultation with potentially affected or interested stakeholders, such as the public, review agencies, Indigenous Peoples, and other stakeholders, is an integral component of the Class EA process.

At the outset of the public consultation process, a consultation and communication program was developed with the goal to effectively obtain feedback. The primary objective of the program was to encourage meaningful consultation and two-way communication with the community, regulatory agencies, stakeholders, and staff. More specifically, the program was intended to:

- Provide consistent messaging and language for communication and engagement and project contacts for notifications and Public Information Centres (PICs).
- Provide estimated timelines for meetings, workshops, presentations, and PICs.
- Provide an outline of project documentation required, including comments management tracking, project website, and public documents.
- Provide details on how and when external agencies will be able to be involved in the project.
- Provide details for Indigenous Peoples consultation, as required.

A variety of methods were utilized including public notices, direct mailings, meetings, informative website content, and meaningful and clear information available at PICs.

The Schedule B Class EA includes four points of contact with the public:

- A Notice of Commencement providing an opportunity to review the project objectives and Class EA process.
- An invitation to comment on the study objectives, Class EA process, study area opportunities and constraints and alternative water servicing solutions (PIC 1).
- An invitation to comment on the evaluation and selection of the preferred solution (PIC 2).
- A Notice of Completion providing an opportunity to review the Project File Report.

Documentation of the Class EA consultation and communication process is summarized in the following sections.

11.1. Communications Plan and Stakeholder List

A Communications Plan and stakeholder list was developed during Phase 1 of the Project and based on knowledge of the study area and was continuously updated throughout the process to include any additional methods of communications and stakeholders including relevant agencies, Indigenous Peoples, utilities, and other special interest groups. All stakeholders were contacted throughout the duration of the study using notices and PICs.

A copy of the Communications Plan and stakeholder list are provided in **Appendix C.1**.

11.2. Project Website

A project website was produced in Phase 1, where the Notice of Study Commencement, study area, key background information, and the project team's contact information were published. A link to the project website (<https://letstalk.forterie.ca/beachfront-water-servicing-strategy-in-the-area-of-colony-road-windmill-point-lane-e-w-and-staniland-park-road>) was provided in the notices that were distributed and posted to the local newspaper. The website was continually updated throughout the study with important notices, relevant information, PIC materials, and a copy of this Project File Report at the completion of the study. There was opportunity for interested parties to subscribe to the project mailing list on the project website.

The project website had a total of 212 unique visitors with a total of 419 project website views (as of June 6, 2025).

11.3. Project Notices

11.3.1. Notice of Study Commencement

A Notice of Study Commencement was distributed via mail and email to the stakeholder list on April 2, 2024. The notice was also posted on the project website and published in the Fort Erie Observer on March 28, 2024. Contact information for the project team was provided to allow interested parties to obtain additional information or request they be added to the stakeholder contact list.

The MECP was notified directly through the filing of the Notice of Commencement to elicit important project information such as the identification of key Indigenous Peoples in the study area.

The Notice of Commencement is provided in **Appendix C.2**.

11.3.2. Notice of Public Information Centre No. 1 & 2

The Notice of Public Information Centre (PIC) No. 1 and No. 2 were distributed via email and/or mail to the stakeholders identified at the start of the project, as well as any additional stakeholders who requested to be added. The Notice of PIC No. 1 was first published on June 20, 2024, and the Notice of PIC No. 2 was first published on February 6, 2025, both on the project website and in the Fort Erie Observer local newspaper. Following the completion of the PICs, Summary Reports were prepared summarizing the notification methods, PIC content, attendance and comments received.

The PIC No. 1 and No. 2 Summary Reports, including the Notices, are provided in **Appendix C.3** and **Appendix C.4**, respectively.

11.3.3. Notice of Project Completion

A Notice of Study Completion was distributed via mail and email to the stakeholder list on April 16, 2026. The notice was also posted on the project website and published in the Fort Erie Observer on April 16, 2026. Information on the public review process was provided including the deadline for comments, link

to the Project File Report and how to request a Section 16 Order. The MECP was notified directly through the filing of the Notice of Completion process.

The Notice of Completion is provided in **Appendix C.5**.

11.4. Public Information Centre No. 1

The first Public Information Centre was held to encourage attendees to review project information and display boards. The purpose of the PIC was to present and receive feedback on:

- Study area, objectives, and problem and opportunity statement.
- Existing conditions.
- Long-list of alternative servicing options, including opportunities and constraints.

The PIC was held in person at the Fort Erie Public Library, Crystal Ridge Branch on July 15, 2024. A questionnaire was developed to allow attendees to submit comments to the project team. The questionnaire included the following questions:

- Do you have any questions or comments about the content presented today?
- Do you have any questions or comments about the study in general?

No responses were received via the questionnaire. There was a total of three attendees who signed in during the PIC event.

The PIC No. 1 Summary Report including Notice, display boards, and other materials available at the PIC are included in **Appendix C.3**.

11.5. Public Information Centre No. 2

The second and final Public Information Centre was held to present attendees with the preliminary preferred solution, solicit feedback and answer any questions and/or concerns.

The purpose of the PIC was to present and receive feedback on:

- Class EA process.
- Evaluation of short list of alternative options
- Identification of preliminary preferred solution.

The PIC was held virtually via Zoom on February 25, 2025. The PIC No. 2 live event presented project information for public review and provided an opportunity for attendees to ask questions to the project team. A Question & Answer sheet was prepared to include all questions and answers during the live event. There was a total of 36 attendees who joined the online PIC event, including 5 Town and GEI representatives.

The PIC No. 2 Summary Report including Notice, display boards, and other materials available at the PIC are included in **Appendix C.4**.

11.6. Stakeholder Meetings

The primary goal and objective of this study was to ensure meaningful consultation and to encourage two-way communication with the community, regulatory agencies, stakeholders and Town staff. Clear and effective communication, coordination and cooperation with all stakeholders started at the earliest stages and continued throughout. Different methods were used to ensure effective and efficient two-way communication including public notices (with full contact information and invitations to participate), direct mailings, informative website content, and meaningful and clear information available at the PICs.

- The Project Team met with NPCA on October 25, 2024, to review the short list of alternatives and solicit feedback on NPCA concerns, permitting and any other EA requirements. The meeting package is provided in **Appendix C.6**.

11.7. Comments Received

The Project Team continuously received comments from stakeholders throughout the Class EA process. Comments received were filed and responses were provided in a timely manner. Each comment received was filed and considered in the Class EA process. A summary of the comments received is provided in **Appendix C.7**.

11.8. Indigenous Peoples

Indigenous and First Nation communities provide valuable information to help identify solutions and measures to mitigate impacts to natural and cultural resources. The Town ensured that engagement with Indigenous Communities was as comprehensive as required and was implemented in a responsible and respectful manner, with the understanding that each Indigenous Community is unique and has their own culture, heritage, traditions, and engagement processes.

The following First Nations were engaged throughout the study:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River – both elected and Haudenosaunee Confederacy Chiefs Council (HCCC) / Haudenosaunee Development Institute (HDI)

The following summarizes the overall engagement conducted through the project:

- Notice of Commencement (April 2024) sent to Indigenous community contacts of the Six Nations of the Grand River; Haudenosaunee Development Institute; Mississaugas of the Credit First Nation; Assembly of First Nations; Association of Iroquois and Allied Indians; Metis Nations of Ontario; Niagara Region Metis Council; and Fort Erie Native Friendship Centre.
- Notice of PIC #1 (June 2024) sent to Indigenous community contacts (as above).
- Notice of PIC #2 (February 2025) sent to Indigenous community contacts (as above).

- The project team provided a project update (June 2025) allowing for an opportunity to review the preliminary preferred solution and to provide comments on the draft discipline studies completed for the project (Natural Environment Desktop Review; Stage 1 Archaeological Assessment; Cultural Heritage Screening Report; Geotechnical and Hydrogeological Desktop Review). This also included a series of commitments that the Town identified would be undertaken, at a minimum, during future detailed design stage of this project. Design stage commitments included:
 - An on-site verification of archaeological potential locations along the preliminary preferred watermain alignment.
 - Conducting a Stage 2 Archaeological Assessment at all locations along the preferred alignment that exhibit archaeological potential
 - Field verification of natural features and wildlife habitats and conducting any site-specific surveys required along the alignment to confirm impacts and mitigation measures.
 - Field verification to confirm presence or absence of potential cultural heritage resources along the preferred watermain alignment to confirm impacts and mitigation measures.
 - Install boreholes and monitoring wells along the preferred watermain alignment to confirm geological and hydrogeological subsurface properties to support detailed design and construction methodology.
- Subsequent to the project update, feedback was received (June 2025) from Six Nations, including:
 - Concerns that the environmental weighting was insufficient in the evaluation conducted.
 - Concern about wording in the PIC slide on cultural heritage that minimizes First Nation history on the land prior to the early 19th century.
 - Concern that for the social/cultural scoring, resident and First Nation concerns appear to be scored inconsistently across Option 4 and Option 6.
 - Concern that the capital costs for Option 4 should be increased to better reflect potential costs of mitigation and other potential environmental challenges.
 - A commitment to Six Nation's 10-to-1 tree replacement ratio was requested.
 - If Option 4 remained the preferred alternative, a commitment to a full Environmental Impact Study was requested at this stage of the EA, including investigations for plants and animals important to Six Nations members. Financial accommodation from the town for rights impacts (\$380,000) and Six Nations monitors during construction was indicated as a potential need.
- In order to address these concerns, the project team provided a letter response (July 2025) and took the following actions:
 - Regarding the evaluation of alternatives, the environmental impact weighting increased from an original 20% to 30% based on the feedback received. As part of this alteration, the financial weighting was reduced from 30% to 20%. Technical feasibility was maintained at 30% and Social/Cultural impacts were also maintained at 20%.
 - Environmental scoring was altered such that both Alternative 4 and Alternative 5 score worse than Alternative 6, due to the potential for higher impacts from open cut construction in Alternative 4 and from the large number of launch/shaft locations that would be needed for Alternative 5.
 - Social/cultural scoring was updated for long-term impacts in order to be more consistent with consideration of both indigenous communities impacts and local residents. So,

although Alternative 4 was heavily supported by local residents, it was updated to score more similarly to Option 5 and Option 6 than before, due to the potential impacts to First Nations.

- Consideration of mitigation and compensation costs were noted in the financial scoring.
- The request for 10-to-1 tree replacement ratio was acknowledged and being further reviewed by the Town.
- The comment about the historical First Nation's presence and stewardship of the land was acknowledged and the project team will update the relevant materials to reflect this history more accurately.
- The project team noted that as part of this Schedule B Class EA, the desktop level review of Natural Heritage is in line with the requirements, while understanding that more detailed investigations would be completed at a later phase. Project team has noted that a commitment to an Environmental Impact Study including site specific field investigations will be completed during the detailed design phase and prior to finalizing the design of the watermain. The Project File Report will also include a commitment to invite Indigenous Communities to participate in the field investigations and to review the EIS report.
- Subsequent to the project update, feedback was received (June 2025) from MCFN, including:
 - A request for an introductory meeting was made.
 - It was noted that the DOCA (Department of Consultation and Accommodation) team may request additional capacity funding from the proponent for its consultation and engagement activities.
 - No concerns with the Stage 1 Archaeological Assessment. It was requested for MCFN to be contacted for the next steps for MCFN Stage 2 in-field participation, during the design stage.
 - No concerns with the Environmental reports.
 - As part of the review of the Cultural Heritage Report, it was noted by MCFN that, although Section 3.2 does attempt to broadly outline Indigenous Land Use and Settlement in the vicinity of the study area, the report is considered to fall short by failing to recognize that several indigenous groups have occupied, controlled and exercised stewardship over the lands. Some additional content was provided in the MCFN response so that it could be updated and incorporated in a revised version of the report.
- In order to address these concerns, the project team provided a letter response (July 2025) and took the following actions:
 - The Town of Fort Erie provided several potential dates and times that could be considered for an introductory meeting.
 - The Town indicated that they will continue to notify DOCA/MCFN of any forthcoming environmental and archaeological assessments so that they are invited to participate and review these studies.
 - The Town indicated that they will work with the team to revise relevant sections of the cultural heritage report to reflect the distinctions noted.
 - Subsequent to the letter response, ASI completed updates to the Cultural Heritage Report to incorporate the suggested modifications to Section 3.2, and related items.

- These updated reports were sent to MCFN in February 2026. This was completed so that the revisions made could be reviewed by MCFN ensuring that the updated sections about Indigenous Land Use and Settlement in the vicinity are acceptable.
 - Further response from MCFN, later in February 2026, indicated that they had received the latest correspondence and that they have no further questions or comments at this time.
- Advanced notice was provided on February 25th, 2026, prior to the Project File Report being submitted for the official 30-day review, to make it easier for them to schedule reviews.

12. Conclusion

12.1. Public Review

This Project File Report (PFR) meets the requirements of a Schedule B Municipal Class EA study. The Town is filing the PFR for a 30-calendar day public review period from April 16 to May 16, 2026. All comments received and revisions to the PRF will be tracked and included in the Notice of Comments Received. The final PFR will be available on the Town's project website post-filing.