LONG SAULT/INGLESIDE REGIONAL DRINKING WATER SYSTEM MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL STUDY REPORT (ESR)

23-2067
September 17, 2024

WT INFRASTRUCTURE
PRACTICAL INNOVATION

OFFICE
17-370 Stone Road West
P.O. Box 25002
Guelph, ON N1G 4T4
T: 519.400.6701
www.wtinfrastructure.ca

REPORT SNAPSHOT

Project Snapshot is a WT Infrastructure Solutions Inc. initiative to communicate the five to ten key pieces of information that are important for the reader to take away from the report. It is not intended to replace a comprehensive review of the report.

- The Regional Water Treatment Plant was commissioned in 2005 with a 20-year design maximum day design capacity of 8,575 m^3 per day. The system has reached 80% of the design capacity and proposed developments on the system are anticipated to consume the remaining committed capacity leaving limited capacity for growth within a two-to-five-year period.
- A review of the system capacity and operation has identified that the WTP is able to service the existing population without any critical system bottlenecks or deficiencies; however, the WTP will require to increase its rated capacity to 16,710 m^3/d due to the forecasted growth.
- Four potential alternatives to increase system capacity have been identified, with the majority of the alternatives requiring system upgrades within the Township property. Each alternative was assessed based on technical, natural, social and economic criteria. The preferred alternative was Alternative B - Expand Existing Water Treatment Plant with Existing Technology. The preferred alternative will require to replace the existing Low-Lift pumps with larger units, expand the existing WTP with existing ultrafiltration technology and upgrade the permeate pumps and membrane pre-filters. The estimated cost of this alternative is $6.0M ($2024).
- In order to meet the forecasted flow based on growth needs, a staging approach and implementation plan has been proposed and spread over a 20-year horizon. The low lift pumping system, the permeate pumps and membrane pre-filter upgrades will need to be completed by 2026. The membrane upgrades will also occur based on growth, starting with the addition of new membranes to the existing cassettes (Membrane-Stage 1) by the end of 2026. The Membrane upgrades will be completed by 2037 with the addition of a fourth membrane train (Membrane – Stage 3).
- Upon issuance of the Notice of Completion, agencies, stakeholders, and the general public will have a thirty (30) day period to review the ESR and the work completed to date and provide comments. Subject to the clearance of the Class EA review period, the preliminary design of the proposed components can be advanced to reduce the risk associated with design changes and unknowns.

WT INFRASTRUCTURE
PRACTICAL INNOVATION

September 17, 2024

Township of South Stormont
2 Mille Roches Road
PO Box 84
Long Sault, ON K0C 1P0

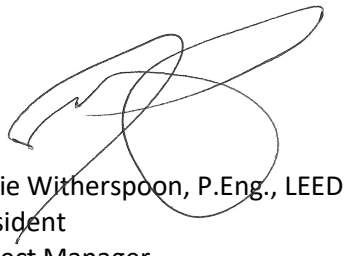
Re: Environmental Study Report (ESR)
Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Study Report
23-2067 | VERSION 1

WT Infrastructure Solutions Incorporated (WT) is pleased to submit the following report as part of the project delivery for the Long Sault and Ingleside Regional Drinking Water System Schedule "C" Municipal Class Environmental Assessment (Class EA).

In accordance with the project schedule, we have allowed for ten (10) days for client review and comments. Please let us know if you need additional time or have any questions regarding this document. We look forward to your comments and the opportunity to advance this project to completion.

Respectfully submitted,

WT INFRASTRUCTURE SOLUTIONS INCORPORATED



Jamie Witherspoon, P.Eng., LEED AP
President
Project Manager

17-370 Stone Road West
P.O. Box 25002
Guelph, ON N1G 4T4

jamie.witherspoon@
wtinfrastructure.ca

519.400.6701

@solutions_wt

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1 INTRODUCTION

1.1 Project Scope

The Township of South Stormont, located on Lake St. Lawrence, part of the St. Lawrence Seaway upstream of the Moses-Saunders Hydroelectric Generating Station west of the City of Cornwall, has experienced significant growth in recent years and proposed development is anticipated to continue the community growth over the next decade.

As both the communities of Long Sault and Ingleside were originally developed in the late 1950s as part of the St. Lawrence Seaway project, the majority of the existing servicing infrastructure dates either from the original development of the community or the early 1990s and 2000s, when the water treatment plant was upgraded.

To plan for the proposed growth, as well as ensure that the existing serviced areas are provided with an appropriate level of service, the Township will require to increase the rated capacity of the existing Water Treatment Plant.

The Township is following the Schedule C - Municipal Class Environmental Assessment Process to consult with the public, agencies and Indigenous communities and facilitate the efficient progression of the projects from planning to implementation.

1.2 Class Environmental Assessment Process

The Environmental Assessment Act of Ontario, R.S.O 1990 (EA Act) provides for the protection, conservation, and management of the environment in Ontario. The Ministry of the Environment, Conservation and Parks (MECP) is responsible for administration of the EA Act.

The Municipal Class Environmental Assessment (MCEA) is an approved Class EA under the EA Act that applies to municipal infrastructure projects including roads, water, wastewater, and transit. This process provides a comprehensive planning approach to consider alternative solutions and evaluate their impacts based on a set of criteria (e.g., environmental, transportation, socio-economic, engineering considerations) and determine mitigating measures to arrive at a preferred alternative for addressing an identified problem or opportunity.

The MCEA process, illustrated in Figure 1-1, involves a rigorous public consultation component that includes various provincial and municipal agencies, Indigenous communities, and the public.

The MCEA is undertaken prior to modifications or additions to municipal infrastructure, to consider potential impacts associated with all project aspects.

The MCEA process consists of the following phases:

- Phase 1: Identify the problem/opportunity.
- Phase 2: Identify and evaluate alternative solutions.
- Phase 3: Identify and examine alternative design concepts for the preferred solution.
- Phase 4: Formally document the planning process.
- Phase 5: Proceed to implementation of the project.

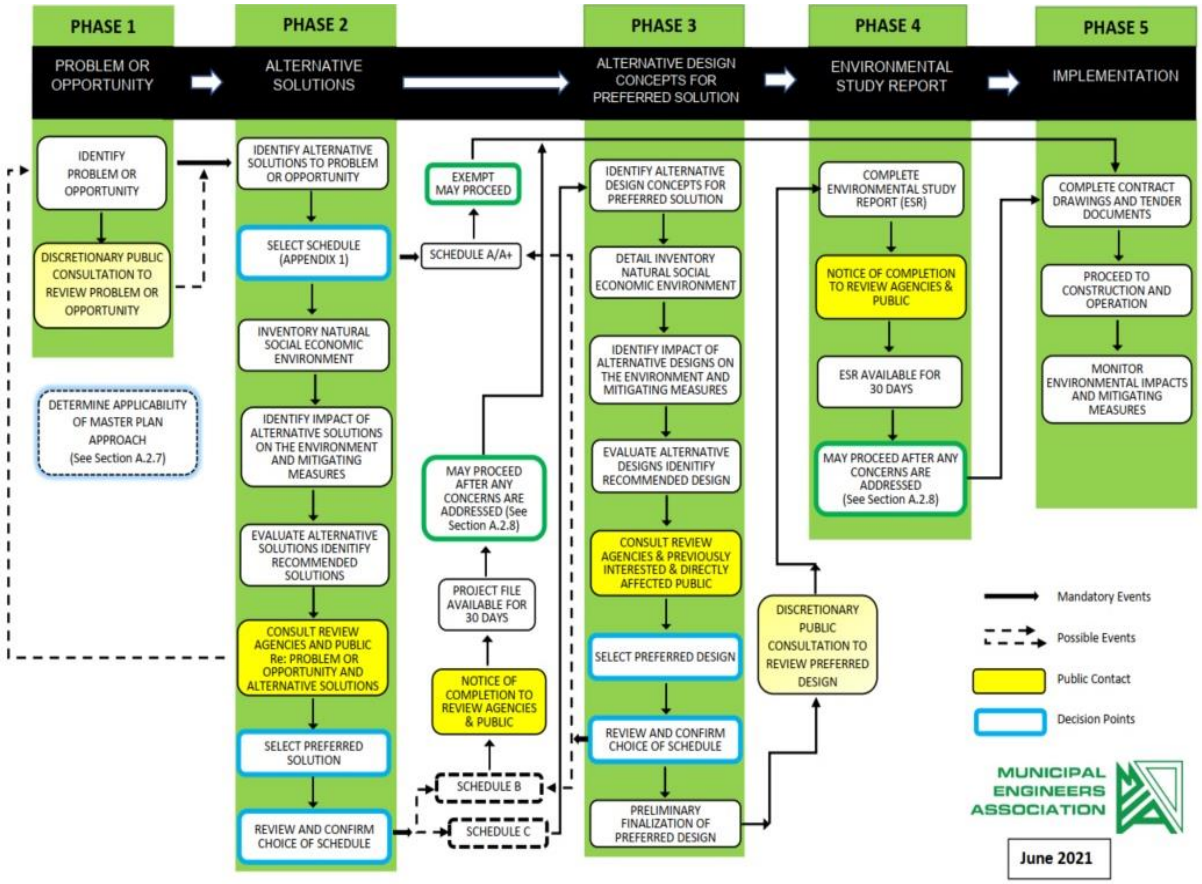


Figure 1-1 - Municipal Class Environmental Assessment Process Flowchart

Based on the nature of a project and its anticipated impacts to the surrounding environment, the MCEA document specifies four different schedules summarized in Table 1-1. The specific requirements for each project can vary, depending on the complexity of the project.

Table 1-1 - Municipal Class EA Schedules and Project Requirements

Class EA schedule	Projects
Exempt Projects	These projects, most of which were formerly classified as Schedule A and A+ projects, include various municipal maintenance, operational activities, rehabilitation works, minor reconstruction or replacement of existing facilities, and new facilities that are limited in scale and have minimal adverse effects on the environment. These projects are exempt from the requirements of the Environmental Assessment Act.
Eligible for Screening to Exempt	Some projects may be eligible for exemption based on the results of a screening process. Proponents may choose to complete the applicable screening process to determine whether their project is eligible for exemption from the EAA or proceed with the applicable Schedule B or C process.

Schedule B	Projects that have the potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with affected parties. Generally, these projects include improvements and minor expansions to existing facilities. Projects within this category are subject to Phases 1, 2, and 5.
Schedule C	Projects that have the potential for greater environmental impacts and are subject to all five Class EA Phases. Generally, these projects include the construction of new facilities and major expansions to existing facilities.

1.3 Problem/Opportunity Statement

The Township of South Stormont (Township) has and is experiencing significant growth in the communities of Long Sault and Ingleside. Moreover, the Township Official Plan allows for additional development within these areas that would exceed the capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant (WTP) located on Moulinette Island in Long Sault.

The Regional Water Treatment Plant was commissioned in 2005 with a 20-year design maximum day design capacity of 8,575 m^3 per day. The system has reached 80% of the design capacity and proposed developments on the system are anticipated to consume the remaining committed capacity leaving limited capacity for growth within a two-to-five-year period.

This study represents an opportunity to evaluate alternatives for the WTP in order to meet current and future water demand and it is intended to support the forecasted growth based on the following objectives:

- Assess future capacity requirements related to the WTP equipment and structures.
- Provide reliable water services to accommodate the projected residential, commercial, institutional, and industrial development in the communities of Long Sault and Ingleside.
- Develop a long-term strategy and capital forecast to ensure the maintenance of service for existing residents and businesses as well as to support current and future development within the community of Long Sault and Ingleside.

1.4 Regulatory Framework

Under the Municipal Act, the Province has given municipalities the power to finance and provide water and sewage services. In very general terms, municipalities may have sole responsibility, or the responsibility may be shared, for the oversight and delivery of these services. The legislative and regulatory changes of the past 15 to 20 years have improved water and wastewater quality in Ontario and ultimately these utilities are recognized as global leaders in the management and delivery of these services. These changes however have significantly increased the role and responsibility of municipalities, who as owners, oversee the management and operation of these services. A brief description of regulatory framework subject to this study is presented below.

1.4.1 Water

Key Acts and Regulations and Guidelines which water system owners and operators are subject to include:

Safe Drinking Water Act, 2002 (SDWA)

The SDWA sets the framework for safe drinking water in Ontario. It is based on a multi-barrier approach to clean water including water source protection from contamination; effective treatment; frequent

and comprehensive testing; vigilant monitoring and reporting; the training and competence of waterworks operators; a secure distribution system; and a quick response when problems are found.

Key components include drinking-water quality standards, licensing for water-testing laboratories, approvals process for private water supply systems, duties of owners, operating authorities, and an annual drinking water report published by the Minister.

Regulations under the Act include:

- Ontario Drinking Water Quality Standards (DWQMS) Regulation (O. Reg. 169/03).
- Drinking Water Systems Regulation (O. Reg. 170/03) as amended.
- Compliance & Enforcement (O. Reg. 242/05).
- Drinking Water Testing Services Regulation (O. Reg. 248/03).
- Certification of Drinking-water System Operators & Water Quality Analysts (O. Reg. 128/04).
- Financial Plans Regulation (O. Reg. 453/07) which includes requirement for water and wastewater system owners to move towards the goal of sustainable financing of the full asset life cycle.
- Licensing of Municipal Drinking Water Systems (O. Reg. 188/07).

Clean Water Act, 2006

Together with the Safe Drinking Water Act, 2002, the Clean Water Act, 2006 captures the multi-barrier response recommended by the Walkerton Inquiry. The Act seeks to protect sources of municipal residential drinking water systems by establishing multi-stakeholder, decision-making source protection committees which include municipalities. The committees are responsible for developing source water protection plans and for ensuring that activities (e.g., municipal planning decisions), conform to that source water protection plan.

Water Opportunities and Water Conservation Act, 2010

This Act intends to foster innovative water, wastewater and stormwater technologies, services, and practices in the private and public sectors; create opportunities for economic development and clean-technology jobs in Ontario; conserve and sustain water resources for present and future generations; and prepare sustainability plans for municipal water, wastewater, and stormwater services.

Infrastructure for Jobs and Prosperity Act, 2010

Specifically, O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure. Steps to incorporating responsible asset management include establishing strategic asset management policies and developing increasingly sophisticated asset management plans and technical service level targets.

Ontario Water Resources Act, 1990

The purpose of this Act is to provide for the conservation, protection, and management of Ontario's waters and for their efficient and sustainable use, to promote Ontario's long-term environmental, social, and economic well-being.

Ministry of the Environment, Conservation and Parks Design Guidelines for Drinking Water Systems, 2008.

The Design Guidelines for Drinking Water Systems are intended to provide guidance during the design of drinking water infrastructure. These guidelines include design criteria based on generally accepted good engineering practice in Ontario such as:

- Guidelines for the Design of Water Treatment Works (1982)
- Guidelines for Water Distribution Systems (1979, 1985)
- Guidelines for Water Storage Facilities (1979, 1985)
- Guidelines for Servicing in Areas Subject to Adverse Conditions (1985)
- Guidelines for Water Supply for Small Residential Developments (1985)
- Guidelines for Seasonally Operated Water Supply Systems (1985)

Provincial Policy Statement (PPS), 2020

The 2014 Provincial Policy Statement (PPS) provided updated 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 Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural environment.

Moreover, the 2014 Provincial Policy Statement issued under the *Planning Act* advises planning authorities of the need to consider development that reduces greenhouse gas emissions and reduces the potential risk of climate change related events like droughts or intense precipitation. A partial listing of applicable policies in the 2014 Provincial Policy Statement include:

- Policies 1.6.2, 1.6.6.7 — Encourage green infrastructure (e.g., permeable surfaces) and strengthen stormwater management requirements.
- Policy 1.8 — Require the consideration of energy conservation and efficiency, reduced greenhouse gas emissions and climate change adaptation (e.g., tree cover for shade and for carbon sequestration).
- Policy 3.1.3 — Requires consideration of the potential impacts of climate change that may increase the risk associated with natural hazards (e.g., flooding due to severe weather).

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.

Within the Ontario Provincial Policy Statement, there are some main provisions concerning planning for water and wastewater services. The policies are mainly based in planning for future infrastructure in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs. In particular, Planning for sewage and water services shall:

- accommodate forecasted growth in a manner that promotes the efficient use and optimization of existing infrastructure.
- ensure that these systems are provided in a manner that:
  - can be sustained by the water resources upon which such services rely.
  - prepares for the impacts of a changing climate.
  - is feasible and financially viable over their lifecycle; and
  - protects human health and safety, and the natural environment.
- promote water conservation and water use efficiency.
- integrate servicing and land use considerations at all stages of the planning process.

Endangered Species Act, 2007

The Endangered Species Act, 2007 (Endangered Species Act) provides for the protection of species that are listed as endangered, threatened, or extirpated and their habitat. The purposes of the Endangered Species Act are to:

- identify species at risk based on the best available scientific information, including information obtained from community knowledge and Aboriginal traditional knowledge.
- protect species that are at risk and their habitats, and promote the recovery of species that are at risk, and,
- promote stewardship activities to assist in the protection and recovery of species at risk.

According with the MCEA requirements, avoiding impacts to species at risk and their habitat is an integral part of protection and recovery. Where impacts cannot be avoided, an authorization in the form of a permit or an agreement or compliance with a regulatory provision (which in some cases requires registration with the ministry) can allow those activities to occur under certain conditions (e.g., creating and following a mitigation plan, providing beneficial actions for a species).

1.5 Project History

1.5.1 1950-2024

The Long Sault and Ingleside water systems were both initially developed at the time of the Seaway construction in the late 1950s. At the time, the communities were supplied via separate surface water systems drawing water from the St. Lawrence.

In the mid-2000s the water systems were combined into a regional water supply system with the primary treatment plant being located on the inside of Moulinette Island and using the former Long Sault Water Treatment Plant as a low lift pumping station. The treatment plant consists of ultrafiltration membranes, carbon filtration and chlorine disinfection. The system has a rated capacity of 8,575 m^3/day. The facility was designed for a 20-year population growth starting in 2005.

The membranes which comprise the primary treatment component of the system are modular in nature and each of the three trains was initially fitted out with 54 membrane modules out of the 72 available spaces. Since the capacity of the membranes is linearly related to the membrane area, this allows for approximately 33% additional capacity by adding new membranes to the existing tanks.

In December 2022, a stress test on the membranes was performed to confirm if the system could be run in a manner to increase capacity temporarily without additional membranes. The testing was able to demonstrate that the system has the capacity to produce more water on a temporary basis to meet peak demands. It is important to note that using this as a long-term tool is not recommended as it will shorten the lifespan of the membranes which will increase the cost of operating the system significantly.

There are other components of the plant that have an impact on plant capacity; however, the original design allowed for conditions that have not been encountered since the facility was commissioned. If the facility capacity is increased beyond the current rated capacity, the optimum contact time for carbon filtration for taste and odour control will not be met; however, taste and odour events in the St. Lawrence are no longer frequent events. In addition, the disinfection systems were designed for higher chlorine demand than are currently being encountered, which will allow for the systems to operate effectively at higher flow rates.

1.5.2 Master Servicing Plan for Water, Wastewater, Stormwater and Transportation Systems (May 2024)

The Master Servicing Plane (MSP) for Long Sault and Ingleside identified projects required to service future growth along with continuing to service existing residents. The study defined existing problems and opportunities, considered and evaluated solutions, and recommended preferred water, wastewater, stormwater and transportation and sanitary servicing strategies.

As part of the MSP, an analysis of current and future water demands was performed. The MSP analysis determined that it would be necessary to increase the ultimate plant capacity to meet an average daily flow of 9,535 m^3/d and a maximum daily flow of 16,710 m^3/d for the 20-year forecasted growth.

The recommended solutions for the water treatment system to meet the forecasted flow are presented as follows:

Long Sault

- Watermains
  - Create a watermain loop to serve both the east and west ends of the Long Sault Logistics Village development by installing a 300mm watermain on both ends. Costs will be covered by the developer.
  - Upsizing existing watermains along the east end of Moulinette Island, Jenkins Road, and Chantine Drive to meet current FUS fireflow requirements. Costs to be covered by the Township.
  - Upsizing the existing watermains along McNiff Avenue from Moulinette to connection with Jim Brownell Blvd up to 200mm. Costs will be covered by the developer.
  - Install new transmission main from the intersection of County Rd. 2 and Moulinette Rd. via Moulinette and Simcoe St. to the open space park by the splash pad/baseball diamond to the new storage site located off Johnson Cres. Southeast of the United Church property and continuing north through the municipally owned lands crossing Saunders and French to McNiff to connect to the North Community Loop. Costs to be covered by the Township.
  - Upsize developer watermain on Barry Street from Chase Meadows to Fenton Farm via future developments to 200mm. Costs will be covered by the developer.
- Storage
  - Install a new elevated storage tank in the Long Sault Pressure Zone located in the open space park land southeast of the United Church property off Johnson Cres. Costs to be covered by the Township.

Ingleside

- Watermain
  - Provide a new 250mm tee connection on the outlet from the booster station on the north side of County Rd. No. 2 and reroute 250mm along the north side of County Road No. 2. extending north on Killarney and extending a 250mm watermain east to connect with Ault Drive and a 200mm watermain west along St. Lawrence Drive to the easement back to County Rd No. 2 and continue east to the intersection of County Rd No. 2 and Farran Point Rd. Costs to be covered by the Township.
  - Replace watermain from existing 250 mm watermain at Farran Dr. and St. Lawrence Dr. along Farran Dr. to College St.to Dickinson and along Dickinson to connect with 45th Parallel Dr. and the existing Water Tower. Project can be implemented over two to three

construction years for budgetary purposes. Project costs include full reconstruction to Township Standard.
- Upsize developer watermain on Ault Drive (future) and Balsam Street (future) from Ault Drive and Beech Street to Balsam Street and Farran Drive. Costs will be covered by the developer.
- Every other cross-street or street that extends more than 300m within an intersecting watermain shall be increased to a 200mm diameter pipe or greater.

Although the expansion of the WTP was out of the scope of the MSP, this option was recommended in order to meet the future forecasted flow coming from potential developments within the boundaries of Long Sault and Ingleside. A copy of the full MSP document can be found on the Township's Website.

1.6 Existing Conditions

1.6.1 Long Sault/Ingleside Regional Drinking Water System

The Long Sault and Ingleside WTP has a rated capacity of 8,575 m^3/day, and it is equipped with 1,760 m^3 of clearwell storage and high lift pumps with a firm capacity of 239 L/s.

This facility services Long Sault via a transmission main extending across Mille Roches Island to the original distribution system, which is primarily cast iron watermain original to the post-seaway period. The watermain extends to Lakeview Heights and the industrial buildings on County Rd 36 as well as all of the development north and south of County Rd 36.

There is no elevated storage within the Long Sault Pressure Zone (Lakeview Heights to the east edge of Ingleside). The water pressure is provided exclusively from the high lift pumps at the regional water treatment facility. The system has been in operation since 2005 and, to date, there have been no extended water supply interruptions within this pressure zone.

Ingleside is serviced via a 400 mm transmission main extending from the transmission main from the Regional Water Treatment Plant in Long Sault, along Manning Rd and Colonial Rd, to the former water treatment plant in Ingleside that was repurposed as a reservoir, rechlorination, and pressure booster station.

This facility has 1,829 m^3 of treated water storage. The high lift pumps at this facility have a firm capacity of 155 L/s. The high lift pumps discharge into the Ingleside Pressure Zone which is controlled by the water level in the Ingleside Elevated Storage Tank with a capacity of 944 m^3. The elevated storage tank is original to the system and dates back to the late 1950s but has been maintained and recently rehabilitated. The majority of the core distribution system is anticipated to be original cast iron watermain as well.

In addition to the fully serviced areas of Long Sault and Ingleside, the water system provides water to the areas without sanitary servicing along the transmission main from Long Sault to Ingleside (Wales Rd, Vin Vista, Colonial Dr., Manning Rd) as well as east of Long Sault to Lakeview Heights.

1.7 Background Studies

1.7.1 Uncommitted Reserve Capacity Study

Of relevance to this study is the Uncommitted Reserve Capacity (2022) study developed by EVB. Findings from the study are reported as follow:

- Long Sault and Ingleside Water Treatment Plant (WTP): The Long Sault and Ingleside WTP is currently operating at approximately 80% of the design capacity and has 48 m^3/d of uncommitted reserve capacity, which is equivalent to 20 residential lots. The analysis is based on the maximum day flow of 6,885 m^3/d occurred on May 29th, 2020, which is equivalent to nineteen residential lots.

1.7.2 Development Charges Background Study

A detailed analysis of the residential and non-residential growth forecasts was undertaken as basis for the 2022 Development Charges (D.C.) Background Study developed by Watson & Associated Economists Ltd. A major component of this study is the forecasted growth in order to determine the D.C. that may be imposed.

The D.C. growth forecast has been developed over a 10-year (mid-2022 to mid-2032) and longer-term (mid-2022 to mid-2036) time horizon. Findings from this study are reported as follows:

- Residential Growth:
  - Population: The document reported that the population in South Stormont is anticipated to reach approximately 15,560 by mid-2032 and 16,380 by mid-2036, resulting in an increase of approximately 1,820 and 2,630 persons, respectively.
  - New Housing Forecasted Growth: Over the 2022 to 2036 forecast period, the Township is anticipated to average 88 new housing units per year.
  - Location of the Residential Growth: The report identified that approximately 55% of the forecasted residential growth will occur in Long Sault, while 25% will occur in Ingleside.
- Non-Residential Growth:
  - Gross Floor Area: The Township-wide incremental Gross Floor Area (G.F.A.) is anticipated to increase by 37.1 ha over the 10-year forecast period and 52 ha over the longer-term forecast period.
  - Location of the Non-Residential Growth: The report identified that approximately 83% of the non-residential growth will occur in Long Sault, with the Long Sault Logistic Village covering 77% of the total growth in Long Sault. The non-residential growth in Ingleside will be equal to 15%.

1.7.3 SDG Growth Studies

In order to long-term goals and broad objectives for growth and development within the United Counties of Stormont, Dundas and Glengarry, The County performed growth studies that have been reported within the United Counties of Stormont, Dundas and Glengarry (SDG) Official Plan. Findings from these studies have been reported as follows:

- Population Projections: According to population projections reported by the SDG Official Plan, The County is expected to grow by 2,300 residents over the twenty-year planning period to a 2036 Census population of 67,400 residents. This would equate to an annual growth rate of 0.2%.
- Housing Projections: The housing unit forecast is for 28,900 occupied units in 2036, representing an increase of 2,300 units over the next twenty years. This would equate to an annual growth rate of 0.4%.
- Employment Projections: Employment is expected to decline overall between 2016 and 2036 by 2,400 jobs, to a 2036 total employment of 18,000. This would equate to an annual growth rate of -0.6%.

1.8 Environmental Inventory

1.8.1 Natural Environment

Local Ecology and Aquatic Environment

In Ontario, the Ministry of Natural Resources (MNR) defines ecological units on the basis of bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect) and corresponding vegetation, creating an Ecological Land Classification (ELC) system.

Ontario's ELC system is founded on Angus Hills' Site Regions and Districts, first adopted in the 1950s. The Ontario's ecological land classification system has six units. The six ecological land classification units are reported in Figure 1-2. From largest to smallest, they are classified as follows:

- **Ecozones:** Ecozones are defined by broad climate patterns and the type of underlying bedrock, which influence ecosystem processes and the plants and animals that can occur. Ecozones are used for reporting the status and trends of aquatic stress, land cover type, and vegetative growing season.
- **Ecoregions:** Ecoregions are defined by patterns in temperature, precipitation, humidity and other climate variables and they are used to identify and assess significant wildlife habitat and report on the status and trends of forest cover and disturbance.
- **Ecodistricts:** are defined based on bedrock and topography. This determines local vegetation and habitats in each ecodistrict.
- **Ecosections:** Ecosections are defined based on patterns in slope, landforms, soil texture and soil moisture. Ecosections have not been developed or used in Ontario.
- **Ecosites:** Ecosites are based mainly on physical features (e.g., moisture, soils, etc.) that influence what plant species are present. Each ecosite has a dominant vegetation type and substrate type. Ecosites are used by sustainable forest license holders, resource managers, municipalities and conservation authorities for land use planning, sustainable forest management, and wildlife habitat management.
- **Ecoelements:** Ecoelements are the smallest of Ontario's land classification units, and they are used to understand the composition of ecosites and to support fine scale planning in southern Ontario. Ecosites contain many Ecoelements. Each Ecoelement has a single type:

- Substrate: Substrate types are the materials that plant species grow in (e.g., amount of water in the soil, depth of the soil, texture of the soil).
- Vegetation: Vegetation types are recurring groups of plants that grow in similar conditions.

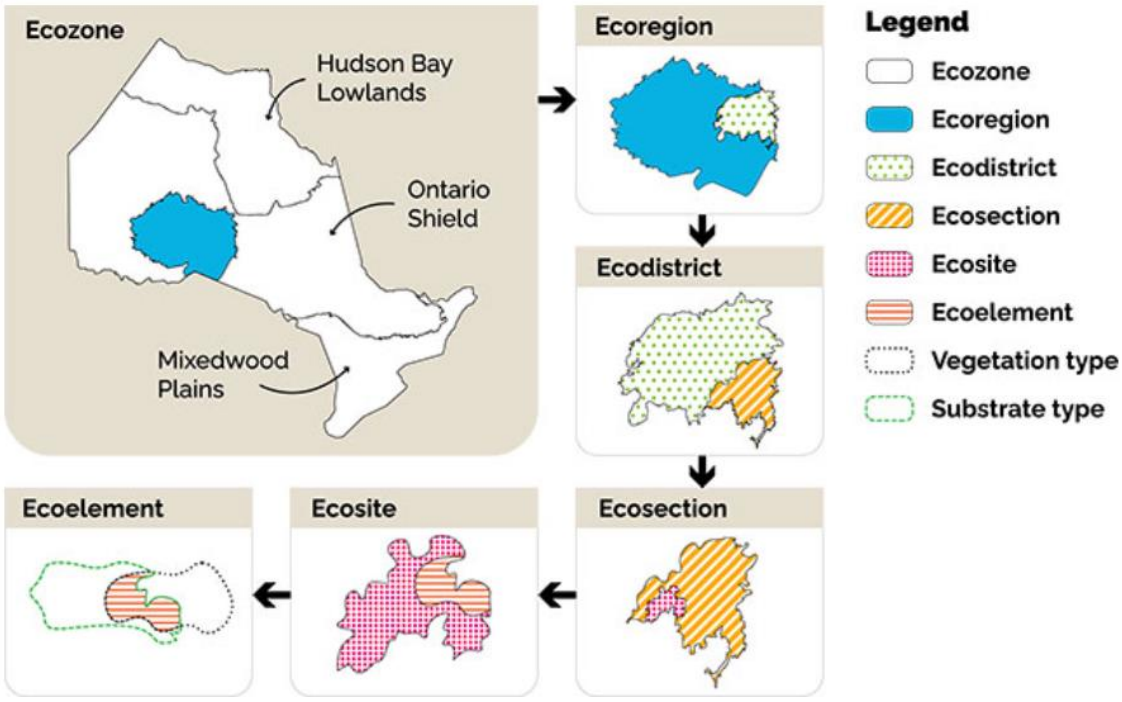


Figure 1-2 The Six Ecological Land Classification Units and Ecodistricts.

As indicated in Figure 1-3, both Long Sault and Ingleside are part of the **Southern Ontario's Mixed Wood Plains Ecozone**. The Ontario's southernmost ecozone, occupying less than 10% of the province, is defined by the limestone and dolostone bedrock that occurs south of the Precambrian Shield. This ecozone is bounded in the south and west by Lake Huron, Lake Erie, Lake Ontario, and the St. Lawrence River. The predominant type of natural disturbance in forest ecosystems is gap-phase dynamics, although major wind events and insect outbreaks can cause more extensive disturbance. In wetland systems, beavers are a major force of change. Vegetation is diverse, despite the conversion of many natural lands for agriculture and urban development. Mixed forests of deciduous and coniferous trees occur, as well as areas dominated by deciduous tree species as in Carolinian forests. Two globally imperilled ecosystems occur in the ecozone: tallgrass prairie and limestone barrens called 'alvars.' Wetlands are numerous in certain areas, although many have been drained. Plants and wildlife in this ecozone are among the most diverse in Canada, but they face significant challenges due, in large part, to habitat loss and fragmentation. Characteristic wildlife in this ecozone include White-tailed Deer, Red Fox, Coyote, Raccoon, Striped Skunk, Eastern Gray Squirrel, Great Blue Heron, Red-tailed Hawk, Black capped Chickadee, Wood Thrush, Yellow Warbler, Painted Turtle, Red backed Salamander and Smallmouth Bass. Alien invasive species are an increasing threat to native species in this ecozone.

Both communities are also part of the **Lake Simcoe - Rideau Ecoregion (6E).** The Lake Simcoe – Rideau Ecoregion extends southward from a line connecting Lake Huron in the west to the Ottawa River in the east. The underlying bedrock is primarily dolostone and limestone. Many areas along the northern fringe of this ecoregion are characterized by extensive bare bedrock plains. Alvar species are present on some of these limestone plains. Conversely, the remainder of the ecoregion is draped with thick

deposits of glacial and post-glacial sediments in the form of massive moraines (Oak Ridges) and broad till sheets. The Niagara Escarpment, most of which is included in the Lake Simcoe - Rideau Ecoregion, provides an exception to the otherwise relatively flat landscape. Wetlands and water bodies comprise 5% and 4% of the area, respectively. The ecoregion also falls within the Great-Lakes St. Lawrence Forest Region, with a greater diversity of southern species than the Georgian Bay Ecoregion. Currently, 57% of the ecoregion exists as agricultural land, with deciduous and mixed forests covering a majority of the remaining natural landscape.

The Lake Simcoe - Rideau Ecoregion (6E) is characterized by 16 Ecodistricts. Long Sault and Ingleside are part of the Kemptville Ecodistrict. The Kemptville Ecodistrict is a plain of limestone and sandstone bedrock covered shallowly to deeply with siliceous and low- base sand, low-base silt and moderate to high lime clay and loam. Champlain Sea sediments (clays and sands) dominate most of the site district, together with some areas of glacial tills.

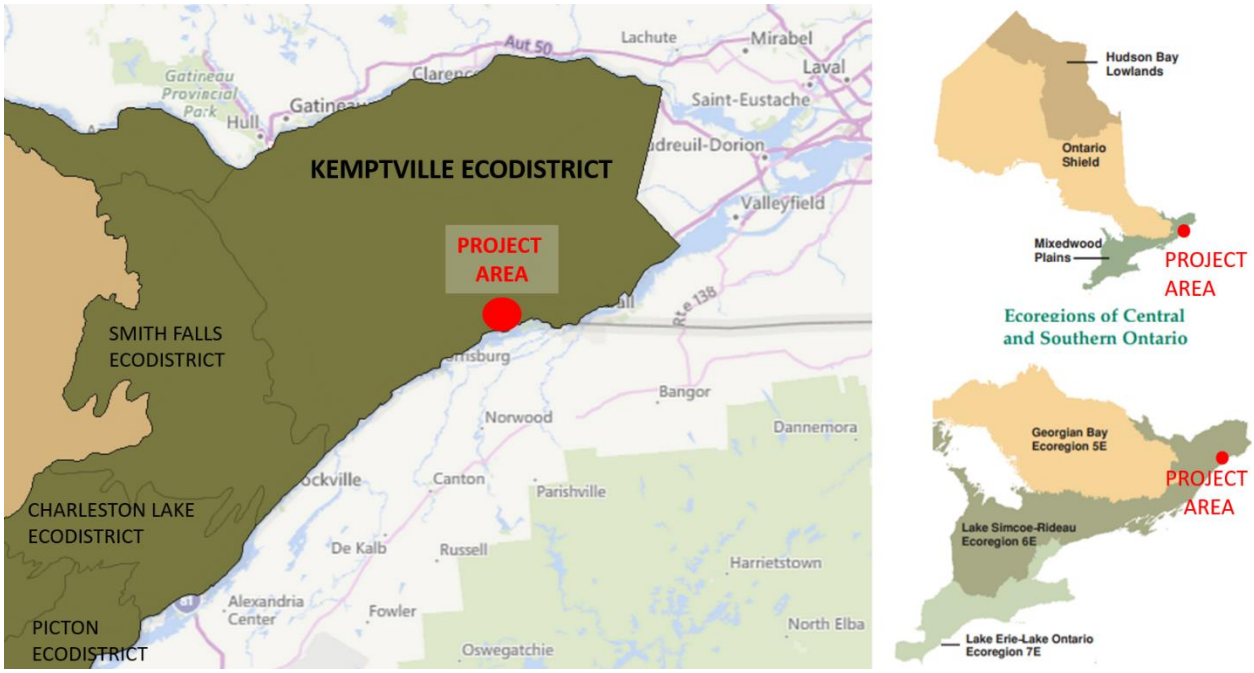


Figure 1-3 Ecological Land classification for Long Sault and Ingleside

With regard to the aquatic environment, the Ministry of Natural Resources and Forestry (MNRF) is responsible for sustainably managing and deriving economic benefit from the fisheries and water resources in the ~500,000 km of Ontario's rivers and streams. The purpose of the aquatic ecosystem classification (AEC) is to provide a universal and consistent spatial framework for Ontario's flowing waters that captures the general ecological nature of streams and rivers. The AEC reduces the complexity of these vast aquatic networks using consistent and quantitative methods to build a standardized data foundation that helps MNRF staff with landscape level planning and policy development.

Both Long Sault and Ingleside are part of the so called "St. Lawrence Waterbody" area. The St. Lawrence harbours a complex ecosystem whose physical properties vary from upstream to downstream. It includes lakes and freshwater reaches, a long estuary, and a gulf with marine features. The area is home to richly diverse habitats and an equally rich diversity of flora and fauna.

Table 1-2 reports the fish species that are part of the St. Lawrence Waterbody area accordingly to the information reported by the Ontario GeoHub.

Table 1-2 Fish Species present into the St. Lawrence Waterbody

	Fish Species
St. Lawrence Waterbody	Alewife, American Eel, Banded Killifish, Black Crappie, Bluegill, Bluntnose Minnow, Brook Stickleback, Brown Bullhead, Brown Trout, Central Mudminnow, Common Carp, Common Shiner, Creek Chub, Cutlip Minnow, Emerald Shiner, Fallfish, Gizzard Shad, Golden Shiner, Johnny Darter x Tesselated Darter ,Lake Chub, Lake Whitefish, Largemouth Bass, Logperch, Longnose Gar, Mooneye, Mottled Sculpin, Muskellunge, Northern Pike, Pumpkinseed, Rainbow Smelt, River Redhorse, Rock Bass, Sauger, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Stonecat, Threespine Stickleback, Trout-Perch, Walleye, White Perch, White Sucker, Yellow Perch

Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI) are areas of land and water containing natural landscapes or features which have been identified as having values related to protection, natural heritage appreciation, scientific study, or education. There are 2 kinds of ANSIs:

- **Earth science ANSIs:** Are geological in nature and contain significant examples of bedrock, fossils, landforms, or ongoing geological processes.
- **Life science ANSIs:** Represent biodiversity and natural landscapes. They include specific types of forests, valleys, prairies, wetlands, native plants, native animals, and their supportive environments. Life science ANSIs contain relatively undisturbed vegetation and landforms and their associated species and communities.

Figure 1-4 identifies ANSI Areas located within or near to the project areas. Although three ANSI areas have been identified outside the boundaries of Ingleside, no ANSI areas have been reported within the boundaries of both Long Sault and Ingleside.

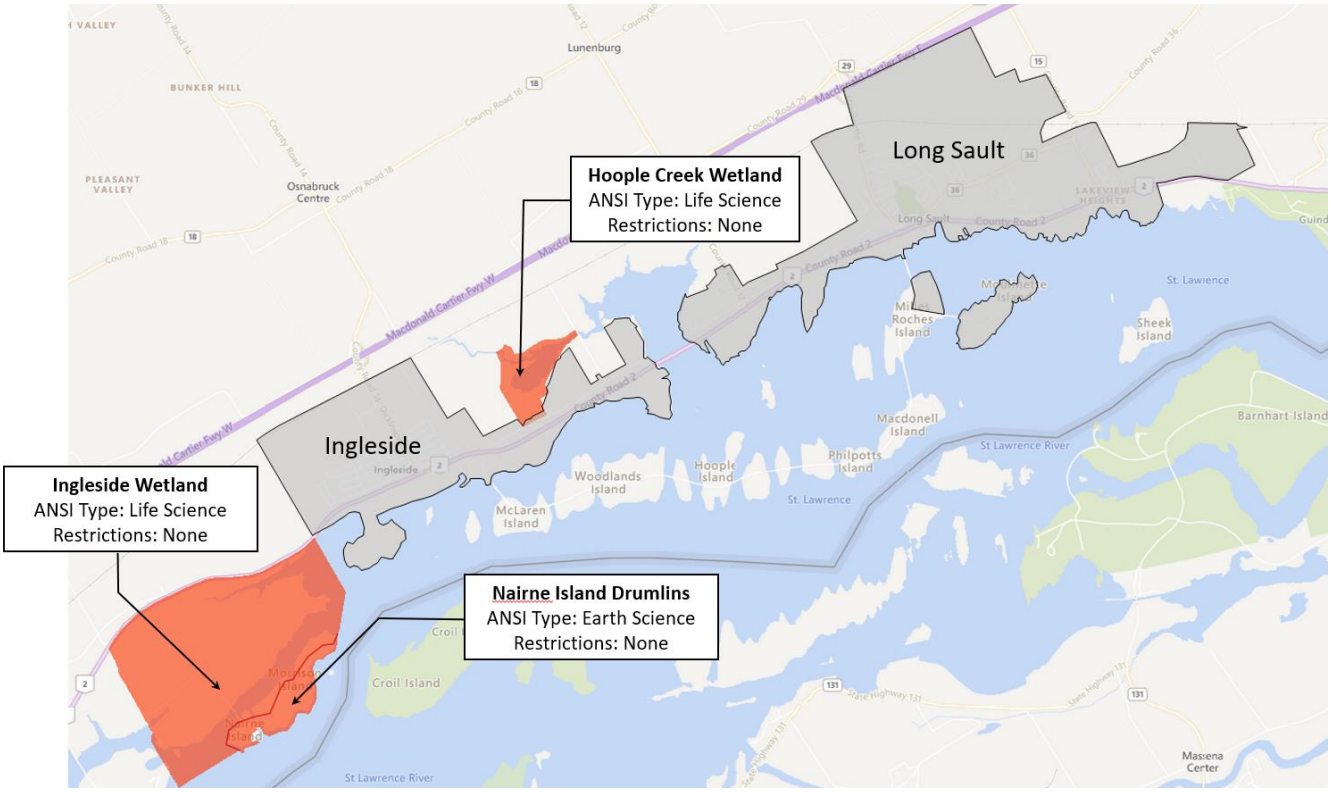


Figure 1-4 Areas of Natural and Scientific Interest within Long Sault and Ingleside

1.8.2 Social Environment

Community Demographics

The Township's age distribution profile generally aligns with that of the United Counties, although with a lower proportion of young adults particularly those between the ages of 25 and 34 years. The largest age cohort in both the Township and SDG are those residents between the ages of 55 and 59 years.

As can be seen in Figure 1-5, Long Sault is reflecting the same age distribution trend identified within the community of South Stormont with the largest age of residents being between the ages of 55 and 59 years while the largest age distribution in Ingleside in slightly high being between the ages of 60 and 64 years.

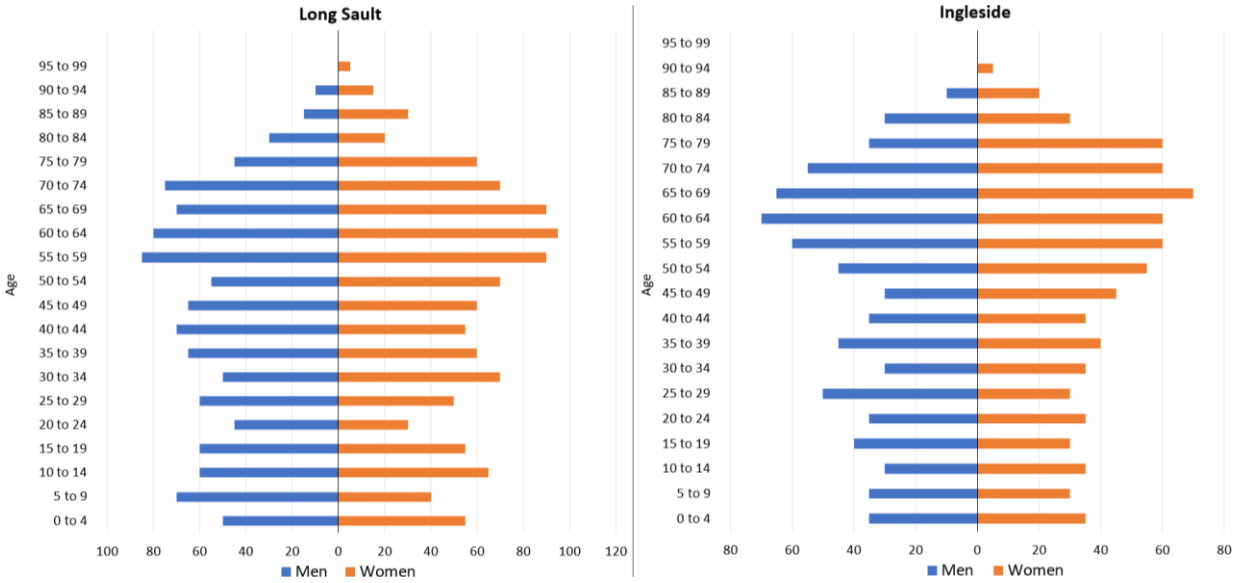


Figure 1-5 Age Distribution Comparison between the Township of South Stormont and United Counties of SDG (Source: Canada Census 2021)

The average age of the population in Long Sault and Ingleside is 45.2 and 47.8 years, respectively, based on 2021 Census data. This is slightly higher than Ontario's average age at 41.0 years, signifying a higher concentration of older adults within the southern urban centres. Specifically, in both Ingleside and Long Sault, more than 30% of the population is over the age of 65 and less than 15% of the population is under 15 years of age.

Cultural Heritage

The Ontario Heritage Act (OHA), R.S.O. 1990, c.018) is the guiding piece of provincial legislation for the conservation of significant cultural heritage resources in Ontario. The OHA gives provincial and municipalities governments the authority and power to conserve Ontario's heritage. The following are key concepts for any discussion pertaining to cultural heritage resources:

- **Cultural Heritage Value or Interest (CHVI)**, also referred to as Heritage Value, is identified if a property meets one of the criteria outlined in O. Reg. 9/06 namely historic or associate value, design, or physical value and/or contextual value. Provincial significance is defined under Ontario Heritage Act (OHA) O. Reg. 10/06.
- **Built Heritage Resource (BHR)** can be defined in the PPS as: "a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including Indigenous community. Built heritage resources are located on property that has been designated under Parts IV or V of the Ontario Heritage Act, or that may be included on local, provincial and/or federal and/or international registers" (MMAH 2020:41).
- **Cultural Heritage Landscape (CHL)** is defined in the PPS as: "a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites, or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or

interest under the Ontario Heritage Act or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.)" (MMAH 2020:42).

- **Protected heritage property** is defined as "property designated under Parts IV, V or VI of the Ontario Heritage Act; property subject to a heritage conservation easement under Parts II or IV of the Ontario Heritage Act; property identified by the Province and prescribed public bodies as provincial heritage property under the Standards and Guidelines for Conservation of Provincial Heritage Properties; property protected under federal legislation, and UNESCO World Heritage Sites" (MMAH 2020:49).

The Township keeps a Municipal Heritage Register that outlines properties of cultural heritage value and are identified as being important to the community. As indicated in Figure 1-6, no Heritage Points of Interest (POI) have been identified within the boundaries on Ingleside. On the other hand, three Heritage POIs have been identified within the boundaries of Long Sault. Those are listed as follow:

- **Lost Villages Museum:** located in Ault Park on Fran Laflamme Drive, 3 kilometres east of Long Sault, Ontario, the museum site consists of ten heritage buildings, moved, and restored to Ault Park from The Lost Villages and surrounding townships by the members of The Lost Villages Historical Society. Both the interiors and exteriors of the buildings have been restored, and they have been assembled in a village-like setting at Ault Park. The buildings commemorate the inundation of lands to the south of the museum complex on July 1, 1958.
- **Ault Park & Museum:** Located at 16383 Ault Park Rd in Long Sault, this single detached brick building with a Mansard style roof was originally built for George C. Forbes as a reading room (library) for the Village of Newington in 1901. This building one of the most historic buildings in the Township of South Stormont, constructed as a public institution. The Forbes Memorial Reading Room was given as a gift to the community of Newington in the name of Mrs. Peter Forbes (Isabella), mother of George C. Forbes. On October 7, 1901, a meeting was held for the purpose of starting a Public Library on the grounds donated by Dr. Munroe. The only condition was that it should always be kept open to all races and creeds.
- **St. Lawrence Valley Cemetery:** Located on 15570 County Road 2, the St. Lawrence Valley (Union) Cemetery is an all-denominational, not-for-profit, charitable cemetery that was established in 1957 as a direct result of the St. Lawrence Power Project of the Ontario Hydro Electric Commission with involvement from the governments of Canada and the United States. The purpose of the project was to construct, maintain and operate power development works in the International Rapids section of the St. Lawrence River, which necessitated the flooding of the land where eighteen cemeteries were located.

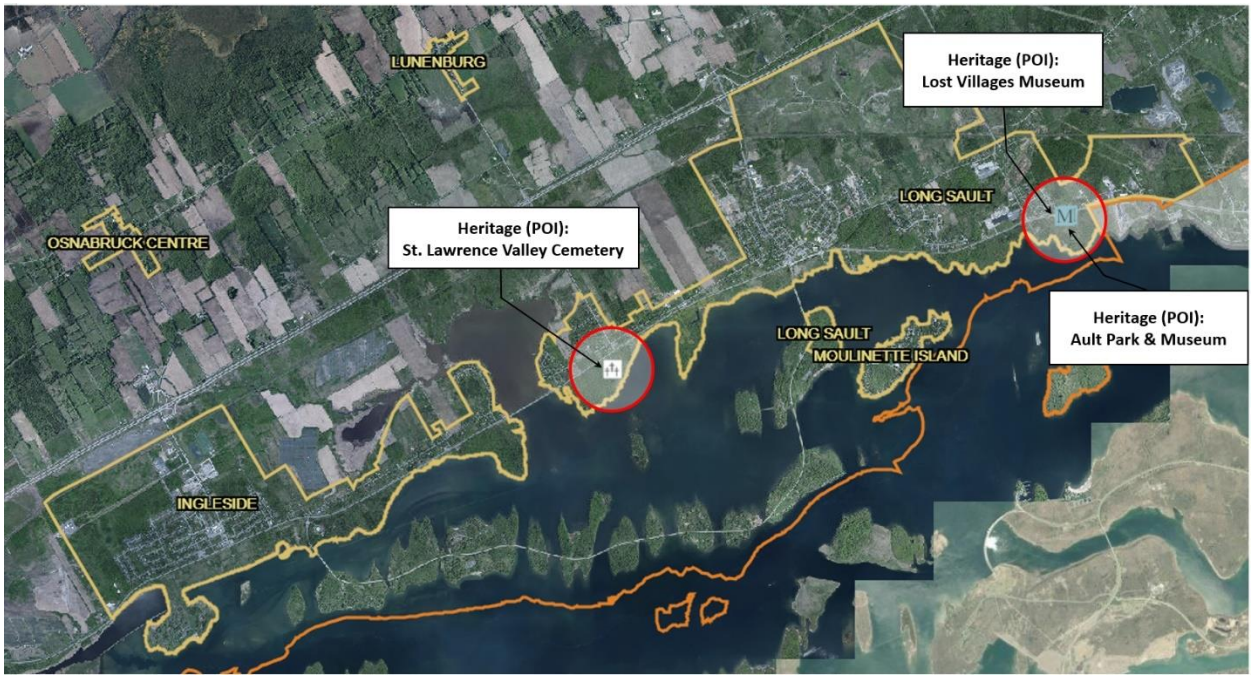


Figure 1-6 Heritage Point of Interest (POI) in Long Sault and Ingleside

1.8.3 Economic Environment

Population Economic Position

According to the 2021 census, Long Sault and Ingleside have an average household income (after-tax) of $78,500 and $74,000, respectively, which is lower than the Township of South Stormont ($81,000) as a whole, but higher than the household income in The United Counties of Stormont, Dundas and Glengarry (SDG) ($66,000). Approximately forty percent (40%) of the people living in Long Sault and Ingleside have an income of $100,000 or more, compared to thirty percent (30%) of households in SDG.

The prevalence of households that fall under the Low-Income Cut-Off After Tax (LICO-AT) within Long Sault and Ingleside is 1.2% and 1.3%, respectively which less than the provincial average (5.3%).

Affordability Factors

Table 1-3 reports the water rates for both Ingleside and Long Sault compared with Rosedale Terrace/St. Andrews/Eamers Corners and Hamlet of Newington customers within the Township boundaries.

Water rates in areas serviced by the Long Sault/Ingleside water systems are comprised of a consumptive charge per cubic metre of metered water volume and a minimum quarterly water bill. In addition to the water billing rates, there is a charge levied on existing constituents for the repayment of existing debt issued for the expansion of the water systems.

Table 1-3 Current Water Rates within the Township of South Stormont

	Water Rates		
	Long Sault and Ingleside	Rosedale Terrace / St. Andrews West/Eamers Corners	Hamlet of Newington
per m^3	$1.428	$1.709	$2.121
per m^3 (>6,000 m^3 annually)	$1.141	n/a	n/a

Minimum Bill	Based on 38.5 m^3 per quarter
Minimum Bill (Multiple Dwelling Unit)	Based on 25.7 m^3 per quarter

The Township's water services non-rate revenue is collected via capital levy payments (related to existing debt and for new connections) and fines/penalties. Fines and penalties are forecast to increase with annual inflation. Capital levy payments for existing debt are forecast to decrease from $362,000 to $191,000 by the end of the period, consistent with the repayment schedule. Municipal Act Capital levies for new connections to the system are forecast based on the existing rates (plus inflation) and the anticipated new connections to the system. The greatest source of revenue is secured from the consumptive water rates (i.e. $/$m^3$ of water consumption) and minimum bills.

The total annual operating revenues (consumptive rate revenue) are forecast to increase from $1.5 million in 2020 to $2.7 million by 2029.

In 2019, a typical residential customer with average demand patterns would have a total annual water bill of $188 in Long Sault/Ingleside. As per the water financial plan and the rate forecast, the consumptive rate would increase to $1.982 per m^3 of water consumption by 2029. These changes would result in an increase to the annual bill for Long Sault/Ingleside customers of 6.8% per year or a $17 average annual increase.

On the other hand, in 2019, a typical residential customer with average demand patterns (i.e. 182 m^3 water volume) would have a total annual wastewater bill of $421.

As each household will be required to pay for the cost of servicing implementation with available after-tax income, the 2021 Census Data on the 2020 household income was used to identify the median after tax household income in order to determine the affordability of the water servicing extension project.

Using the most recent Census Data, the following measures of affordability will be used:

- If the annual household cost of the extending service is equal to, or less than 5% of the median after-tax household income, the project would be considered affordable.
- If the annual household cost of the extending service is greater than 5% but less than 10% of the median after tax household income, the project would require additional analysis to determine affordability, including:
  - Consideration of local support of servicing extension.
  - Consideration of additional financial support from the Township in order for the project to proceed to meet the affordability threshold of 5%.
- If the annual household cost of the extending services is equal to or greater than 10% of the median after tax household income, the project would be deemed unaffordable for both the Town and the benefitting property owners.

The 2021 Census Data outlined that the Long Sault and Ingleside median after-tax income of households is $78,500 and $74,000, respectively.

	Long Sault	Ingleside
Median after Tax Income per household (2020)	$78,500	$74,000
Affordable (≤ 5%)	$3,925/yr. per household	$3,700/yr. per household
Unaffordable (>10%)	$7,850/yr. per household	$7,400/yr. per household

2 DESIGN CRITERIA

2.1 Population Growth

The Township of South Stormont has experienced population growth since 2001. Based on population projections included in the SDG Official Plan and the Township of South Stormont Waterfront Master Plan (2021), population within the Township of South Stormont is growing faster than expected and it is expected to continue to grow over the long term.

Both domestic and emergency water supply needs are based on population and flow requirement. According to the 2016-2021 Census, the population in Long Sault and Ingleside increased by approximately 10.5% and 7.5% in 5 years, respectively. This resulted in an annual growth rate of 2.1% in Long Sault and 1.5% in Ingleside.

Based on the Development Charges developed by Watson & Associates Economists Ltd. (2022), the population in Long Sault and Ingleside is expected to reach approximately 3,842 and 2,186, respectively, by mid-2036.

Table 2-1 identifies current and future population within the service area of Long Sault and Ingleside.

Table 2-1 Long Sault and Ingleside: Current and Future Population

	Long Sault		Ingleside		Comments
	Population	Annual Growth Rate	Population	Annual Growth Rate	
2016	1,951	2.1%	1,384	1.5%	Based on the 2016-2021 Census
2021	2,154		1,487		
2026	2,649	3.9%	1,691	2.6%	Based on the Development Charges developed by Watson & Associates Economists Ltd (2022)
2031	3,257		1,922		
2036	3,842		2,185		
2041	4,922		2,485		Assumed according to the Development Charges by Watson & Associates Economists Ltd (2022)

2.2 Planned and Forecast Development

The United Counties of Stormont, Dundas and Glengarry Official Plan was adopted on July 17, 2017, with the intent to provide the strategy and policy framework to guide development and growth over a 20-year time horizon.

The County Official Plan is an upper tier Plan with detailed policies that reflect provincial, County, and local interests. Local Municipalities rely on the County Official Plan as a single tier Official Plan and may further distinguish land use categories, detailed development requirements, or specific land use districts by means of a secondary plan or a zoning By-law which are intended to articulate the structure of the community and how the community is intended to evolve over time in accordance with that structure.

Secondary Plans allow a more detailed level of planning than found in an Official Plan. A Secondary Plan applies to a specific area of a Municipality and is adopted into the Official Plan as an amendment. This gives the Secondary Plan the same status as an Official Plan document.

Of relevance to this study is Schedule 'A', Land Use Designations, which designates Long Sault and Ingleside as Urban Settlement Areas as reported in Figure 2-1 and Figure 2-2. Within Urban Settlement Areas, the Residential, Commercial and Employment Districts are areas where the primary permitted land uses are residential, commercial, and industrial, respectively. In particular, with respect to the Employment Districts, uses may include a mix of industrial uses, manufacturing, construction, warehousing, offices, employment supportive commercial uses, public service facilities and institutional uses.

As can be noted in Figure 2-1, two Special Land Use Areas have been identified in the Long Sault settlement area:

- **Special Land Use Areas - SLA4b**: on the south side of Highway 401, extending south to the Canadian National Railway corridor, from County Rd 35 to County Rd 15 immediately north of the Urban Settlement Area of Long Sault as shown on Schedule SLA4b to allow for Employment uses.
- **Special Land Use Areas - SLA4c:** The Long Sault County Rd 36 Special Study Area includes lands north of County Rd 36 and west of County Rd 15 within the Rural District that are adjacent to the Long Sault settlement area boundaries. The Township of South Stormont, in consultation with the County, will initiate a comprehensive review to determine whether the Long Sault County Rd 36 Special Study Area should be added to the Long Sault urban boundary.

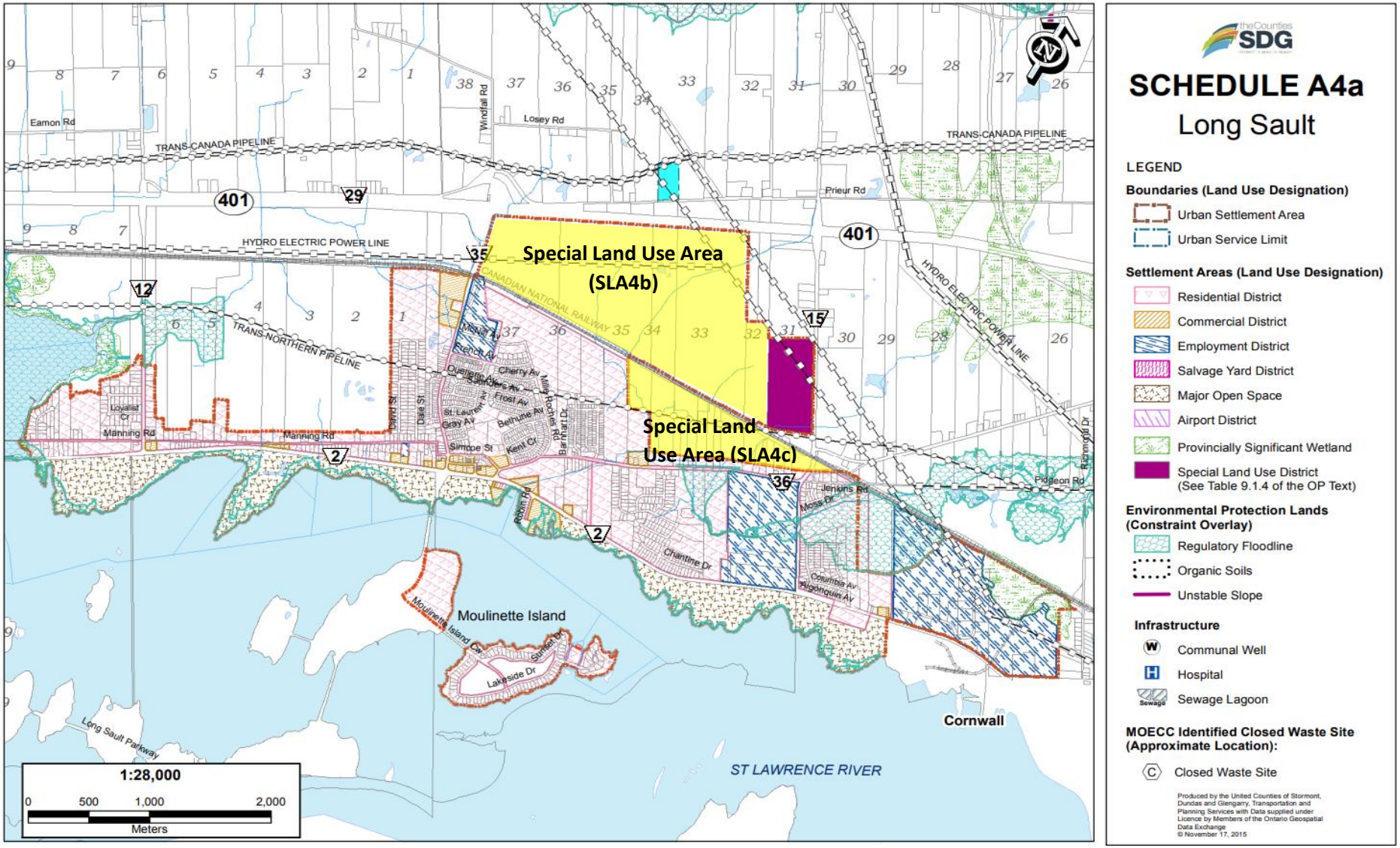


Figure 2-1 Long Sault Land Used Designation

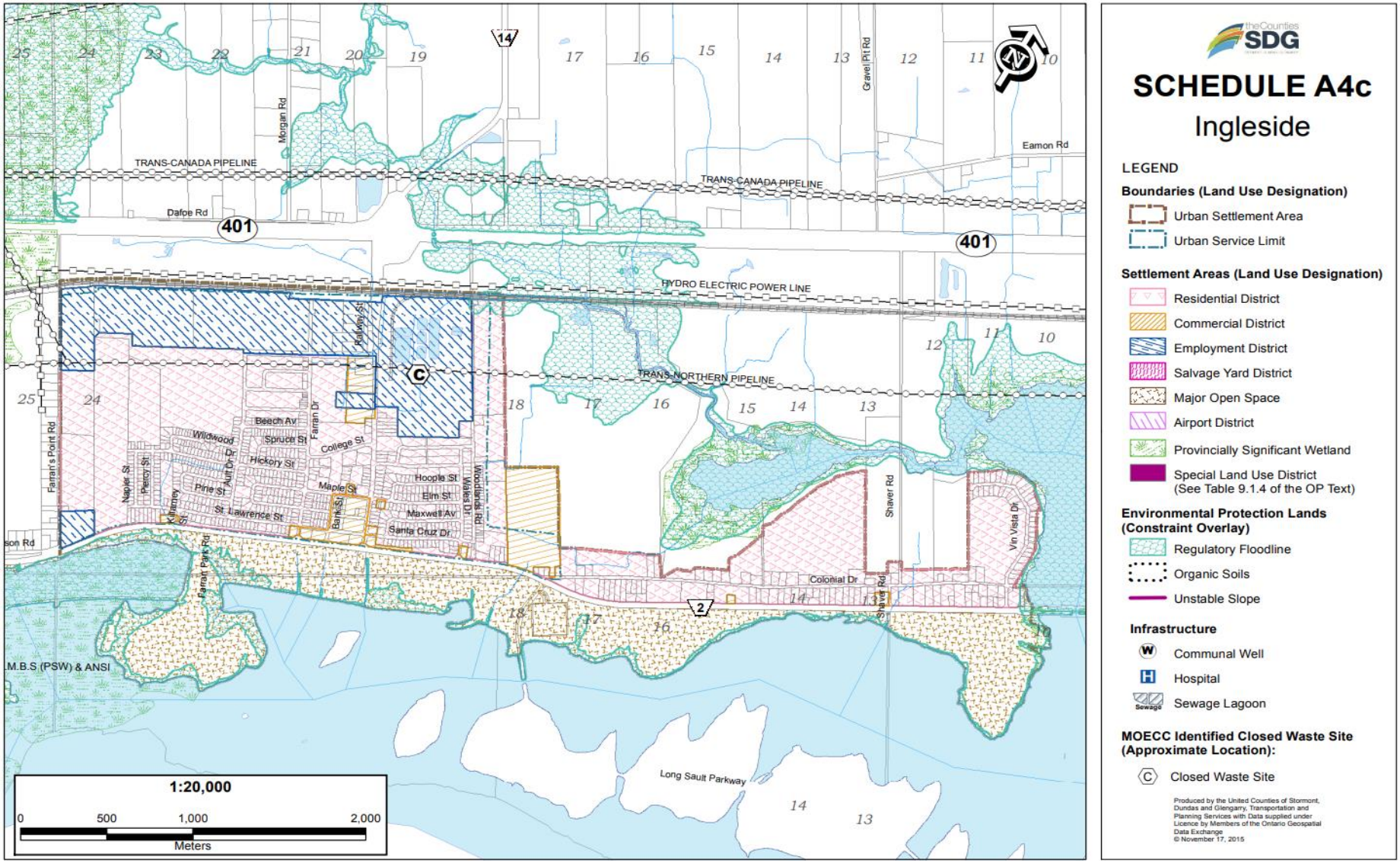


Figure 2-2 Ingleside Land Used Designation

2.2.1 Existing Conditions

Currently, the total number of existing residential and commercial lots within the project area is 2,200, distributed as follows:

- Long Sault Area
  - 1391 Residential Units
  - 62 Non-Residential Lots

Of the total residential units and non-residential lots within the Village of Long Sault, 901 residential units and 36 non-residential lots are serviced by wastewater.

- Ingleside Area
  - 748 Residential Units
  - 40 Non-Residential Lots

Of the total residential units and non-residential lots within the Village of Ingleside, 672 residential units and 39 non-residential lots are serviced by wastewater.

2.2.2 Current Planned Development

Figure 2-3 identified the planned development within the Long Sault boundaries. To date, no planned development is currently identified within the Ingleside area. Subject to approvals and economic conditions, the timeline for the identified development was assumed as follow:

- **5-20 Year Timeframe: Planned Development -** This timeframe is characterized by areas that have development applications currently in place.
- **> 20 Year Timeframe: Build-out -** This timeframe is characterized by areas that do not have development applications currently in place but are identified for future development.

Based on review of background information and the Township Subdivision Tracker, the current planned development in Long Sault is equal to 678 new residential units and 276 ha of industrial and commercial development, identified as follows:

- Residential Development
  - Fenton Farm Development: 43 residential units
  - Parkway Estates Development (Phase 3 and Phase 4): 82 residential units
  - Whitetail Avenue Development: 16 residential units
  - Chase Meadows Development 426 residential units
  - Moulinette Road Subdivision: 111 residential units
- Non-Residential Development
  - Long Sault Logistics Village Development (Phase 1 and Phase 2): 274 ha of industrial development – 1,200 potential employees
  - Long Sault Gas Station: 0.75 ha of commercial development
  - Sixsmith Drive: 1.5 ha of commercial development

Although not active development applications are currently in place in Ingleside, several committed areas were identified as potential medium-term development. It must be noted that, as there are no current plans for those areas, the number of units for residential developments were calculated assuming 0.1 ha as per typical existing lots.

- Residential Development
  - Residential area west of Farran Drive and north of Beech Street: 126 units.
  - Residential area north of Hoople Street: 74 units.
- Non-Residential Development

- Industrial area south of the CN railway: 25 ha of industrial development.

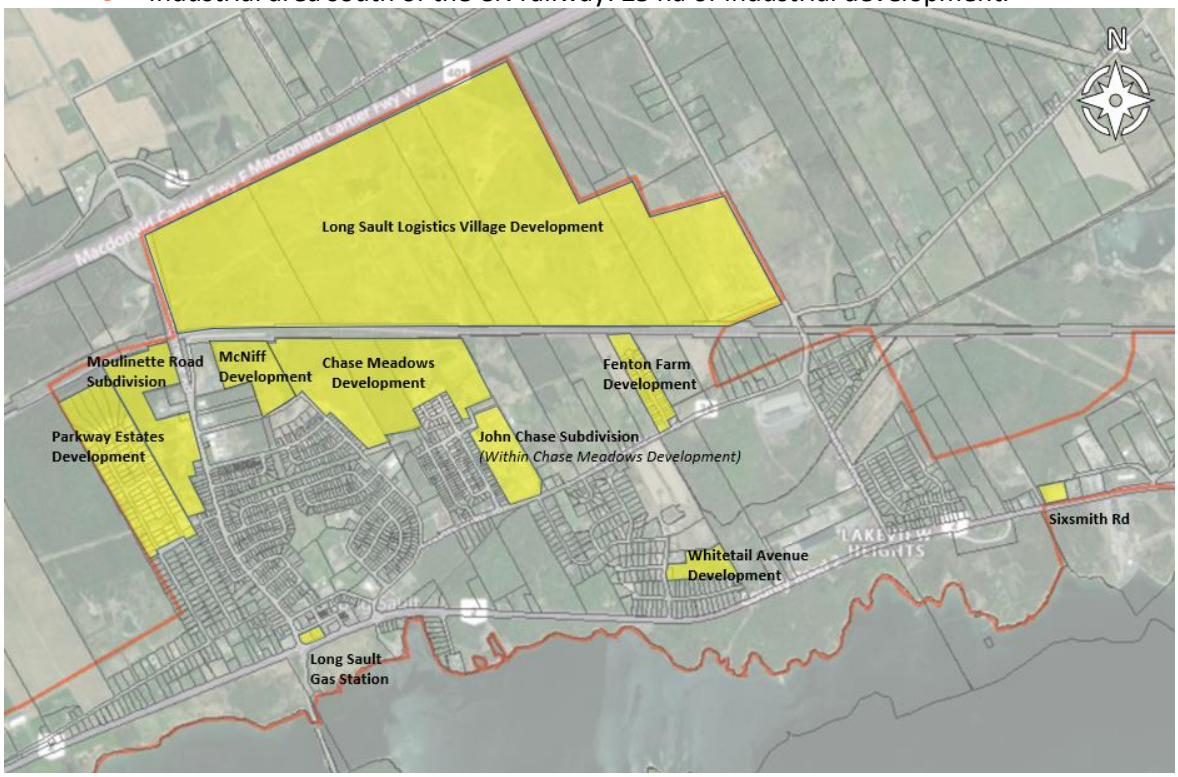


Figure 2-3 Long Sault Planned Development

2.2.3 Build-out Conditions

Table 2-2 identifies potential development under build-out conditions according to the Zoning By-Law 2011-100 and its amendments for both Long Sault and Ingleside.

For calculations of potential units and residents, the following assumptions have been applied:

- 0.1 ha as per typical existing lot size with exception of rural zones where the minimum lot size was identified as 0.4 ha as per the Township Subdivision Guidelines
- 3 person per units according to the Township Subdivision Guidelines.

The timeline for the identified planned development is between 10 to 20-years.

Table 2-2 Potential Development under Build-out Conditions for Long Sault and Ingleside

	Long Sault			Ingleside		
	Land Available	Potential Units	Potential Residents	Land Available	Potential Units	Potential Residents
Residential Development	115 ha	565	2,000	160 ha	1,400	4,200
Industrial and Commercial Development	65 ha	N/A	N/A	30.5 ha	N/A	N/A

2.2.4 Sensitivity of Growth Impacts

One of the challenges with the development of infrastructure to support growth is the potential impacts of changes to the conditions that promote or inhibit growth. In order for municipal

infrastructure to support growth, it needs to be in place in advance or concurrently with the development. However, the timeline for development and municipal infrastructure do not necessarily correspond. Typically, from land acquisition to the connection of the first constructed house is a two-to-three-year process (minimum). Conversely, municipal projects that are exempt from the Class EA process will take a minimum of two years from inception to delivery with larger scale projects such as pumping stations and plants taking three to five years from inspection to commissioning. As such, in order to meet demands, the Township may need to start enabling projects one to three years in advance of development commencing. There is an inherent risk that Township funded enabling works are constructed and development is delayed or cancelled without payment of development charges to defer the project costs, thus increasing the Township debt load.

The sensitivity of growth impacts or in other words the variability of impacts on municipal infrastructure of either more or less growth than anticipated can be significant. As part of the evaluation and prioritization of projects, it is important for the Township to be proactive in mitigating that risk through agreements with developers and where possible partnering with developers to share the upfront costs of projects to minimize the risk to ratepayers of projects being deferred by the development community. This is particularly the case with large developments such as Chase Meadows and Long Sault Logistics Village which may represent 20 – 75% of the current average day demand.

2.3 Water Demand

For the purposes of a master servicing study, water demand considers two key components: domestic water demand, and fire flow. Domestic Water Demand is day to day water use and includes metered flow, non-revenue water and lost water. Metered flow is the water that is measured and billed to existing connections. Fire flow is event-based demand required by the Fire Department or onsite sprinkler systems to fight a fire in order to protect the public and mitigate the risks of loss and damage to buildings. The design limitation for water systems in Canada for communities such as Long Sault and Ingleside is fire flow as watermains, and pumping systems are sized to convey fire flow with adequate flow and pressure to the fire location. Domestic demand has little to no impact on pipe size in these communities.

2.3.1 Existing Water Demand Conditions

The water demand in the study area is primarily residential with limited commercial (~250 m^3/day ~6%) with the exception of Lactalis in Ingleside which used an average of 1,770 m^3/day (approximately 40%) of the system average day demand. Table 2-3 illustrates the existing water demand trends in the Regional System.

Table 2-3: Existing Water Demand Trends

Year	Average Day Flow (m^3/d)	Maximum Day Flow (m^3/d)	Maximum Day Factor
2017	3,827	5,001	1.31
2018	4,249	6,107	1.44
2019	4,320	6,285	1.45
2020	4,317	6,885	1.59
2021	4,175	6,138	1.47

2022	4,546	5,982	1.32
2023 (YTD)	4,450	6,464	1.45
Annual Change (%)	+2.5%		

The existing water demand seasonal variability in the two communities is displayed in Figure 2-4 below. This graphic illustrates the seasonal variation of water demand that is associated with summer peak use and fall/winter low demand period. The impact of a single large industrial user (Lactalis) on the system, which would typically use a consistent volume of water per day, is that the maximum day factor is depressed. Following the MECP guidelines for a population of approximately 4,000, the maximum day peaking factor would be 2.00, where the current maximum day peaking factor in recent years has been between 1.32 and 1.59. However, it should be noted that the maximum day factor for Lactalis is 1.45, which is similar to the remainder of the community. A low maximum day factor can be indicative of a significant lost water issue because of a high base discharge. This will be discussed further in the non-revenue water section of the report.

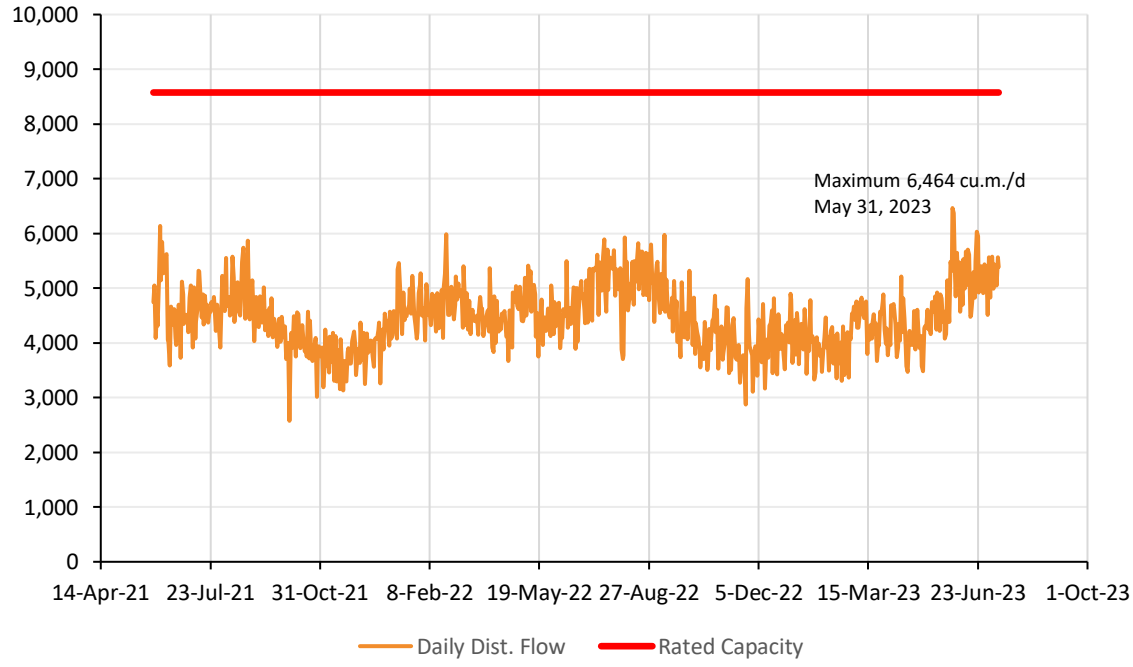


Figure 2-4 Current Water Demand Characteristics

2.3.2 Non-Revenue Water

Non-revenue water is water that the municipality produces but does not get paid for. Examples of non-revenue water include leakage, water used for fire or maintenance purposes (flushing) that is not metered and documented, unmetered users, theft (meter by-pass or hydrants) and potentially meter inaccuracies due to age or condition. Non-revenue water as a percentage of the total water production can vary depending on the size of the distribution system, age of the infrastructure, water accounting practices and scarcity of water in the area.

Globally, the lower end of non-revenue water is approximately 5% of the total, with a well managed tight system falling around 10%; however, 20-40% non-revenue water is not uncommon in Ontario. A recent article in Environmental Science and Engineering (June 2023) authored by Township staff

indicated that in 2018, non-revenue water was above 60%. Through a comprehensive program of leak detection and water audits, they were able to reduce the non-revenue water percentage to 30% from 2018 to 2022.

Non-revenue water is an important factor in the assessment of infrastructure in terms of both efficiency and cost recovery. The water and wastewater systems are utilities that are not dissimilar to gas or electricity in terms of the user pay principle. The user pay principle is essentially that the more a connection uses, the more they should pay as a reflection of their individual use. The Long Sault and Ingleside water systems were metered as part of the upgrades in the early 2000s.

A review of the water metering data for the period of 2021 and 2022 illustrates the distribution of treated water use in the community. The data indicates that the non-revenue water in the South Stormont system represents approximately 30% of the total water production. In the evaluation, it was identified that there are municipal uses (flushing, fire fighting, street cleaning) that are currently not formally documented; however, it is the Township's intent to improve record keeping and to track these uses more closely. Additionally, the Township has previously undertaken leak detection investigations but depending on the size of the leaks in the system they may be below the identifiable threshold.

It is anticipated that the majority of the non-revenue water is associated with small leaks in the aging cast iron watermain in the system. The estimated non-revenue water represents a leak of approximately 16 L/s, which divided across the 53.7 km of watermain, equates to approximately 0.3 L/s per km of watermain. As such, it would only take a few leaks in the system to account for this volume of loss; however, small leaks are difficult to locate using standard approaches. Furthermore, a single watermain break can discharge several hundred cubic metres of water which is not necessarily accounted for by the Township but can have an impact on the data.

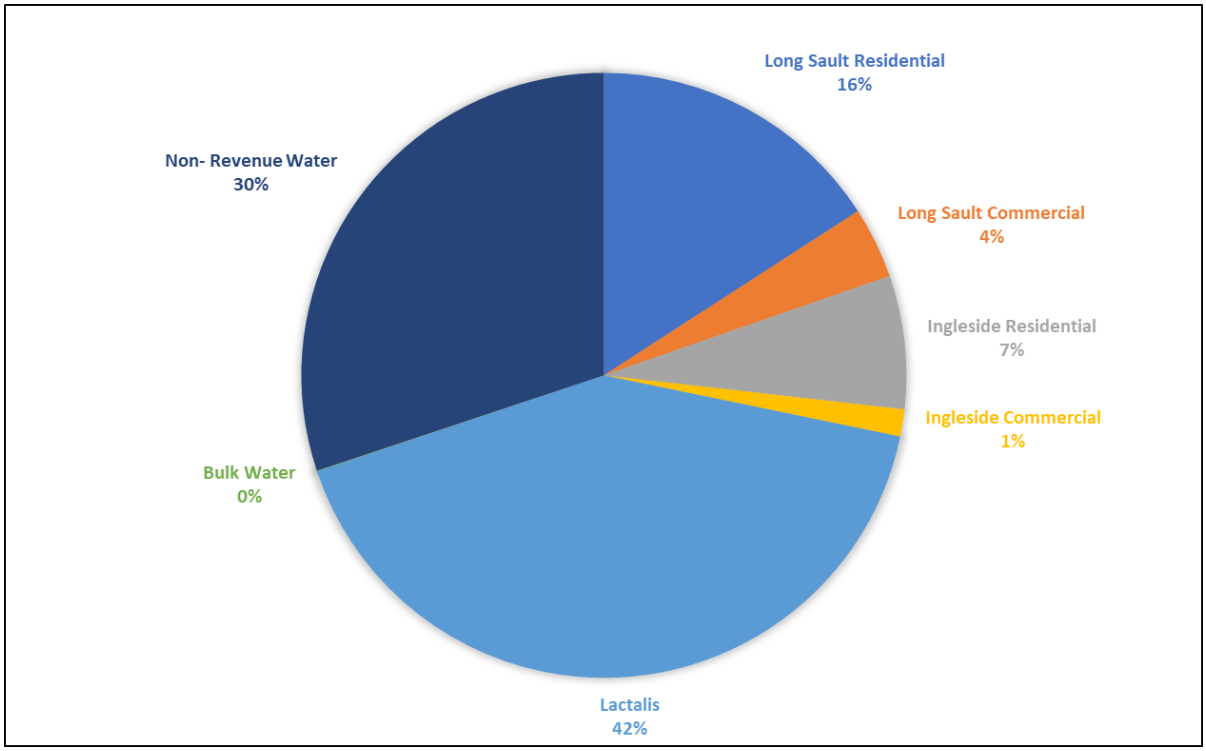


Figure 2-5: 2021-2022 Distribution of Water Use

The reduction in non-revenue water that is not associated with a beneficial use (i.e. leaks) will allow for an increase in the available capacity for generating revenue and supporting development demands. The reduction and elimination of non-revenue water in a system is difficult to achieve, but monitoring of the quantity and variation of non-revenue water can help target opportunities to achieve reductions which then becomes available for revenue-based consumption. The Township should prioritize the ongoing monitoring of the non-revenue water in the system including tracking the impacts of watermain replacement projects and watermain breaks.

2.3.3 Forecast Water Demand

As identified in Section 2, the population of the two communities in 2021 was 2,154 in Long Sault and 1,487 in Ingleside for a total population of 3,641. The 2041 population for the community is forecast to be 4,922 in Long Sault and 2,485 in Ingleside for a total population of 7,407, which represents a 100% population increase.

This is significant as the original water system design allowed for 17% water demand growth from an average day in 2001 of 4,823 m^3/d to 5,646 m^3/d in 2021. As indicated in Section 1.8.1, the 2021 average day demand was 4,175 m^3/d. This is approximately 14% less than the 2001 water demand, which is indicative of lower water demand from new residences and the impacts of metered water. Additionally, in recent years, there have been high maximum day events that represent greater than the 99th percentile of flows; however, the MECP calculations for uncommitted reserve capacity require that those peak numbers be used which results in limitations on reserve capacity.

Based on a review of available data, design standards and discussion with Township staff, average and maximum daily flow rate parameters used to estimate future water demand are presented below. According to the MECP and Township Subdivision Guidelines those parameters were obtained using the following design standards:

- Average Residential Flow = 450 Lpcd (~0.45 m^3/person/day)
- Average Persons per Unit = 3 person/unit
- Average Industrial, Commercial and Institutional Flow = 28 m^3/ha/d
- Peaking Factor: 2.0 as per MECP Guidelines.

Table 2-4 summarizes water demand based on current conditions, planned development, and build-out conditions. Subject to approvals and economic conditions, the timeline for the identified planned development and build-out conditions was assumed to be as follows:

- Planned development: between 5-20 years.
- Build out: > 20 years.

For the purposes of this study, it is assumed that the current demand from existing residences and ICI users will neither increase nor decrease with time. Additionally, for existing users, the maximum day factor will be set at 1.6 to be consistent with current demand. This is conservative because infrastructure renewal will result in reductions in non-revenue water in the system and it is evident by the historical water demands that the current average day is less than the average day 20 years ago. We have allowed for an average day demand for Lactalis of 1,800 m^3/day.

The other significant development that impacts future water demands is the Long Sault Logistics Village (LSLV) and servicing the Long Sault Parkway. The LSLV lands represent approximately 274 ha of development lands which, using conventional allowances of 28 m^3/ha, would result in a flow of 7,672 m^3/d being associated with these lands. This is not reasonable as the single development would represent the existing rated capacity of the water system.

In review of the water demand with the developer and similar developments in Eastern Ontario, they are mostly warehouse and logistics facilities with no planned wet industries. The estimated demand presented in their functional servicing plan is 181.3 m^3/d. For design purposes, the 400 m^3/d will be used to allow for some flexibility in future water use in that system.

The Township has also fielded requests from the St. Lawrence Parks Commission (SLPC) regarding future water and wastewater connections to the Long Sault and Ingleside ends of the Parkway. This flow will account for a maximum day of 925 m^3/d.

Table 2-4: Forecast Water Demand

	Long Sault		Ingleside		Regional Water Supply Water Demand
	Number of units / Land Available for Commercial and Industrial	Water Demand	Number of units / Land Available for Commercial and Industrial	Water Demand	
Existing Residential Units / Commercial & Industrial lots					
Serviced by municipal systems	904 units (Residential) 34 lots (Non residential)	ADF: 1,500 m³/d MDF: 2,400 m³/d	723 units (Residential) 40 (lots (Non residential)	ADF: 3,000 m³/d MDF: 4,800 m³/d	ADF: 4,500 m³/d MDF: 7,200 m³/d
Not Serviced by municipal systems	417 units (Residential) 19 lots (Non residential)	ADF: 590 m³/d MDF: 950 m³/d	155 units (Residential) 3 lots (Non residential)	ADF: 220 m³/d MDF: 350 m³/d	Not Serviced Units/Land * Average Flow * MDF
Total Existing Potential Connections (A)	1,321 units (Residential) 53 lots (Non residential)	ADF: 2,090 m³/d MDF: 3,350 m³/d	878 units (Residential) 43 lots (Non residential)	ADF: 3,220 m³/d MDF: 5,150 m³/d	ADF: 5,310 m³/d* MDF: 8,500 m³/d*
Development areas (5-20 years)					
Planned development (B)	678 units + LSLV + SLPC + 2 ha ICI lands	ADF: 4,000 m³/d MDF: 7,645 m³/d	SLPC	ADF: 225 m³/d MDF: 565 m³/d	ADF: 4,225 m³/d MDF: 8,210 m³/d
20-year Design Flow Conditions (A+B)	1,999 residential units + 53 non-residential units + LSLV + SLPC + 2 ha ICI lands	ADF: 6,090 m³/d MDF: 10,995 m³/d	878 units (Residential) 43 lots (Non residential) SLPC	ADF: 3,445 m³/d MDF: 5,715 m³/d	ADF: 9,535 m³/d MDF: 16,710 m³/d
Build-out (> 20 years)					
Ultimate Build-out Conditions (C)	565 units / 65 ha	ADF: 2,583 m³/d MDF: 5,166 m³/d	1400 units / 30.5 ha	ADF: 2,744 m³/d MDF: 5,488 m³/d	ADF: 5,327 m³/d MDF: 10,654 m³/d
Ultimate Build-out Design Flows (A+B+C)	2,564 residential units + 53 non-residential units + LSLV + SLPC + 67 ha ICI land	ADF: 8,673 m³/d MDF: 22,156 m³/d	2,278 units (Residential) 43 lots (Non residential) SLPC + 30.5 ha ICI land	ADF: 6,189 m³/d MDF: 11,203 m³/d	ADF: 14,860 m³/d MDF: 33,360 m³/d

** Note: This is within the current design capacity of the existing system.*

2.3.4 Fire Flow

Fire flow demand is based on the population of the community and additional demands as identified for industrial/commercial needs. Historically, MECP guidelines were used to calculate fire flow demands and storage requirements. The current industry standard is to use the Fire Underwriter's Survey (FUS) Water Supply for Public Fire Protection (2020) calculations based on the type of buildings being protected. The vast majority of the communities are single family residential with a mix of wood frame and masonry construction.

Using the FUS simple method, which is appropriate at this scale, the required flow for a fire on the water system would be between 6,000 – 8,000 L/m (100 – 133 L/s). This is significantly higher than the historical 38 L/s that was the basis of the MECP design guidelines.

Fire storage is based on population and flow requirement as defined in the MECP guidelines. The original system design was based on a design population of 6,086 with a design fire flow of 159.7 L/s for three hours. The design allowed for a reduction in municipal storage due to the local fire storage at the existing industrial complexes (Avonmore Road and Lactalis). This resulted in a storage of 1,725 m^3.

Year	Population Served	Fire Flow Required (L/s)	Fire Flow Duration (hours)	Total Fire Storage Required (m^3)
2024	4,045	126	2	906
2029	4,826	141	2	1,013
2034	5,625	153	2	1,104
2039	6,819	165	3	1,784
2044	8,380	177	3	1,910

The projected 2044 population for the two communities is 8,380 which equates to a 177 L/s for three hours. This equates to a fire flow storage requirement of 1,910 m^3.

A modelling study has been conducted during the development of the Master Servicing Plan (2024). The Master Servicing Study identified that the plant would meet the 20-years forecasted flow. However, additional storage volume would be required to meet build-out flow (> 20 year) within the servicing area.

In terms of pump capacity, Long Sault currently does not have any elevated or additional pressurized storage, so the entire flow must come from the high lift pumps at the plant. Therefore, either the pumping system capacity must be increased or elevated storage needs to be in place to meet build-out flow (> 20 year) within the servicing area. For Ingleside, the true available pumping capacity is the booster station capacity plus the elevated storage contribution. As identified during the Master Servicing Plan, additional pumping capacity is not required until well past the 20-year study period. Due to the age of the existing reservoir and anticipated timeline for build-out, it is most likely that the existing elevated storage will be replaced to meet future requirements; however, that is beyond the timeline of this project.

For additional information, a copy of the full MSP document can be found on the Township's Website.

3 WTP SYSTEM COMPONENTS EVALUATION

The Regional WTP process utilizes the St. Lawrence River as a surface water source and consists of a low lift pumping station, pre-filtration, ultrafiltration membranes, carbon filtration and chlorine disinfection. A Process Diagram for the system is depicted below in Figure 3-1.

A capacity assessment of each unit process component was performed to evaluate the capabilities of the existing facility to meet current and future wastewater flow as well as effluent requirements. Table 4-1 lists the estimated rated capacities for the major unit processes.

The assessment was based on historical plant operational data, plant design criteria, approved ECA capacities, and typical MECP design guidelines. A description of each system component is provided in the following sections.

Table 3-1 Regional WTP - Major Unit Process Summary

System Component	Description	Total Capacity (m^3/d)	Notes
Intake	▪ 1500mm diameter concrete pipe and wooden intake structure. ▪ Raw water intake pipe is 360mm in diameter and 138m long from intake to low-lift Pumping Station (LLPS)	19,181 m^3/d	
Raw Water Pumping	▪ Three (3) vertical turbine pumps each rated at 69.4 L/s at a TDH of 25.8 m	11,992 m^3/d (~138.8 L/s)	Two duty, one standby
Raw Watermain	▪ 350 mm diameter raw water pipe.	19,181 m^3/d (~222 L/s)	
Membrane Pre-filters	▪ Two500-micron membrane pre-filters are located in the LLPS. Each has a rated capacity of 138.9 L/s	12,000 m^3/d (~138.9 L/s)	One duty, one standby
Membrane Filtration	▪ Three (3) concrete membrane filter tanks, each with two (2) ultra filtration membrane cassettes with a total membrane area of 4,514 m2 per tank capable of permeating water at a peak design warm water flux rate of 51 Lmh.	9,823 m^3/d (~113.7 L/s)	Two duty, one standby
Permeate Pumps	▪ Three (3) end-suction centrifugal permeate pumps, each rated at 69.4 L/s at 28 m TDH	11,992 m^3/d (~138.8 L/s)	Two duty, one standby
Granular Activated Carbon	▪ Three (3) granular activated carbon contactors	13,764 m^3/d (~159.3 L/s)	Three on duty
Primary Disinfection	▪ A two-compartment baffled chlorine contact chamber with a flow length of 60 m and an active volume of 553 m3.	10,930 m^3/d (~126.5 L/s)	Assumed both compartments are in use
Treated Water Storage	▪ A two-compartment baffled clear well storage with a total active volume of 1,760 m3 providing a chlorine contact time of approximately 180 minutes at maximum daily flow and maximum water depth.	11,872 m^3/d	Assumed both compartments are in use
High Lift Pumping	▪ Four (4) vertical turbine pumps with variable speed drives, each rated at 79.7 L/s at a TDH of 66m.	20,660 m^3/d (~239 L/s)	Three duty, one standby

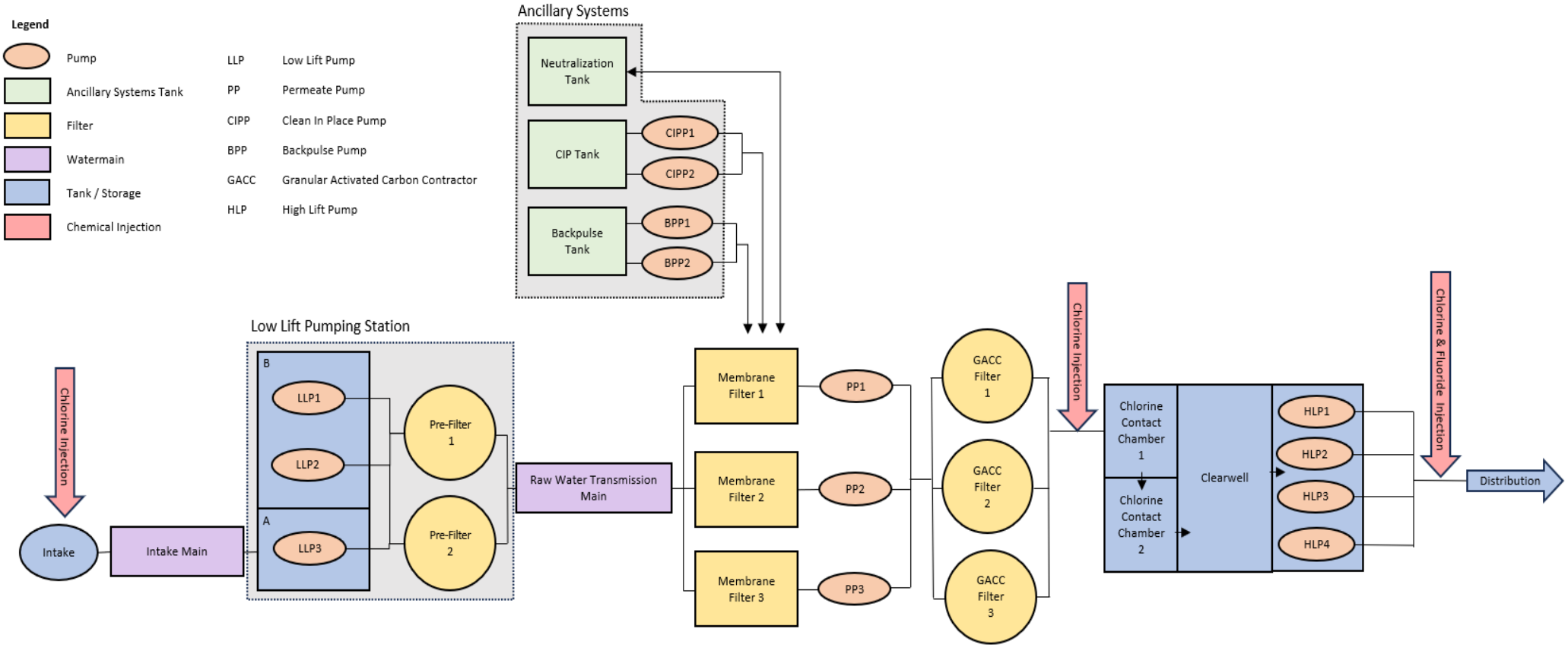


Figure 3-1 Regional WTP Process Diagram

3.1 Raw Water Supply

The Regional WTP uses the St. Lawrence River as its raw water supply. The raw water supply system is responsible for conveying raw water from the St. Lawrence River to the WTP building located approximately 300m away on Moulinette Island. A low lift pumping station is placed between these two locations to pump water from the level of the St. Lawrence to the membrane filtration tanks. This system consists of four main components:

- Intake
- Low Lift Pumps
- Membrane Pre-Filters
- Raw Water Transmission Main

3.1.1 Intake

The raw water intake is made up of a 1500 mm diameter reinforced concrete pipe and wooden intake structure situated vertically in the Lake St. Lawrence. The structure contains four 1200 mm high by 460 mm wide intake ports with 10 mm clear opening stainless-steel screens located 2.9 m above the river bottom at the average water level.

Figure 3-2 shows the Historical water level of the Lake St. Lawrence at the Long Sault Dam. The recorded historical average water level was 73.62m. The historical lowest water level was 71.36m recorded in February 1978.

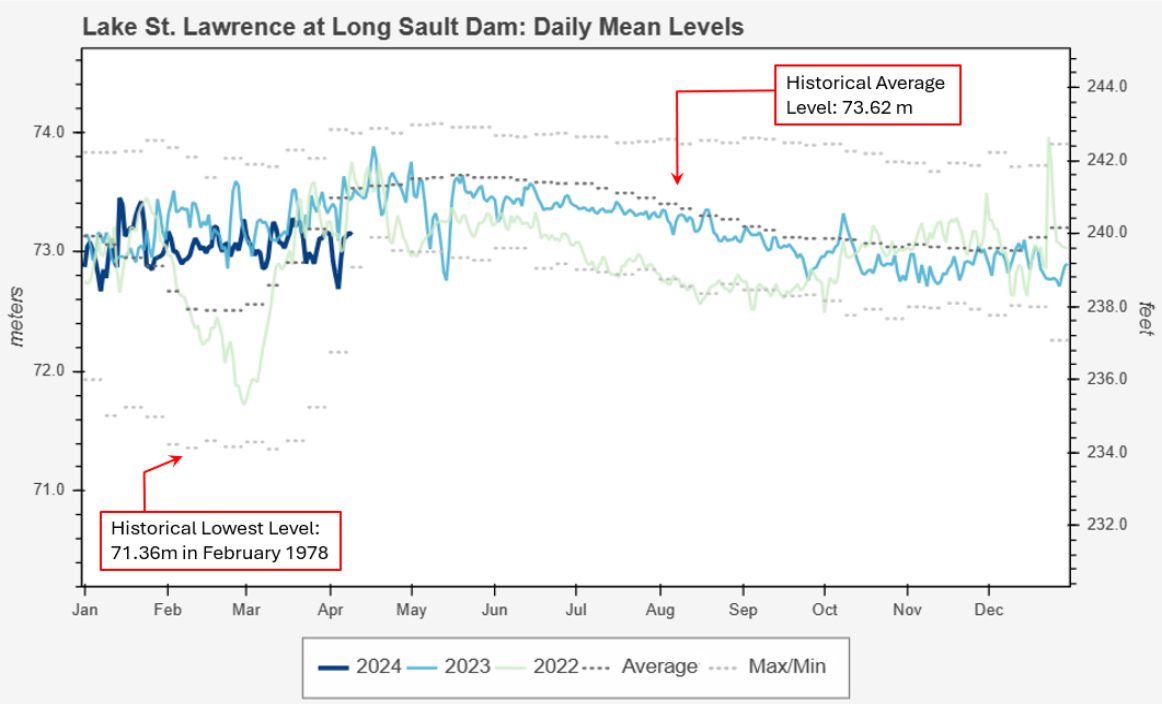


Figure 3-2 Lake St. Lawrence: Historical statistics based on available period of record (1960-2022). Source: International Lake Ontario-St. Lawrence River Board

Following the intake structure, the water flows to the low lift pumping station (LLPS) through a 138 m long and 356 mm I.D. cast iron intake pipe. Along this pipe, sodium hypochlorite is injected as a form of zebra mussel control.

Table 4-2 reports the rated capacity of the intake at different water levels, comprised between the average and lowest water levels recorded. The intake capacity was calculated according to the Hazen-Williams equation and described as follows:

$$\Delta P = \frac{k * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

Where,

ΔP = Head loss due to difference in elevation (m) between the Lake water level and Low water level alarm (70 m) in the wet well

k = constant based on unit system (SI Unit = 10.675)

L = length of pipe (m)

C = pipe roughness coefficient (assumed to be 100 according to the MECP Design Guidelines for Drinking Water Systems, 2008)

D = pipe diameter (m)

Table 3-2 Intake rated capacity at different water levels.

Water Level (m)	∆ P (m)	Intake Capacity (L/s)	Current Water Demand (L/s)	20-yr forecasted flow (L/s)	Comments
73.62	2.9	258	100	193	Recorded Average Water Level (AWL) from 1960-2022
73.52	2.8	254			Water Level: 0.1 m increment from recorded AWL
73.42	2.7	250			
73.32	2.6	246			
73.22	2.5	242			
73.12	2.4	238			
73.02	2.3	234			
72.92	2.2	230			
72.82	2.1	225			
72.72	2.0	221			
72.62	1.9	216			
72.52	1.8	212			
72.42	1.7	208			
72.32	1.6	203			
72.22	1.5	198			
72.12	1.4	193			
72.02	1.3	188			
71.92	1.2	183			
71.82	1.1	178			
71.72	1.0	173			
71.62	0.9	167			
71.52	0.8	161			
71.42	0.7	155			
71.36 (LWL)	0.64	152			Recorded Lowest Water Level (LWL) from 1960-2022

The intake has a rated capacity of 258 L/s at an average water level of 73.62 m, and a capacity of 152 L/s at the historical low post-regulation water level of 71.36 m. Although the intake capacity seems to not satisfy the 193 L/s 20-yr forecasted flow during the lowest water level recorded in 1978, it must be noted that the historical records of water levels in the St. Lawrence River over the past 80 years reveal cyclic variations, with typical lower water level curvature during summer/fall period; the lowest spike occurring during 1978 seems to be a single event likely related to manual variation of the Long Sault Dam level. Moreover, based on the review of water demand flow data from 2021 to 2022, it is evident that the water demand from January to March is typically near to 50% of the current WTP rated capacity, equal to approximately 4,641 m^3/d (~54 L/s). It is expected that the WTP would maintain the same trend during the forecasted period. Therefore, the existing intake capacities are suitable and meet the proposed 20-year forecasted WTP design flow rate.

3.1.2 Low Lift Pumps

The existing LLPS is located at the WTP site and includes two raw water pump wells, each sized at 4.6m long x 4.0m wide x 9.0 m deep, and three vertical turbine pumps each rated at 69.4 L/s at a total dynamic head (TDH) of 25.8 m. Each pump is suited with variable speed electrical motor drives and control valves to in order to feed the membrane system at a rate corresponding to the amount of permeate being produced.

The static lift from the water level to the membrane tanks will be, on average, 9.14 m based on the historical average from Environment Canada. At sustained pumping at the maximum design rate, the equilibrium level of the raw water wet well will be as follows:

- Average Water Level (73.62): 70.56 m
- Low Water Level (71.36): 68.46 m

The existing low-lift pump are near to the end of their lifespan and would require to be upgraded within the next five years.

3.1.3 Membrane Pre-Filters

Two 500-micron membrane pre-filters are located in the LLPS to screen any particles that may damage the membrane filtration system later in the treatment process.

The pre-filters are automatically self-backwashing. The water used during the backwash is discharged back to the St. Lawrence via the plant effluent outfall. The pre-filters operate as one duty and one standby, and each has a rated capacity of 138.9 L/s.

The pre-filters would be able to meet forecasted capacity up to the 2028. Then, an upgrade would be required. However, there is evidence of corrosion on these units, and they will need to be upgraded due to condition prior to reaching their ultimate capacity.

3.1.4 Raw Water Transmission Main

A 350 mm diameter transmission main is used to convey water 158 m from the LLPS to the WTP building.

At the maximum low-lift pumping discharge rate of 138.9 L/s and velocity of 1.4 m/s, a head loss of 1.6m occurs. At maximum capacity of 222 L/s as dictated by the raw water intake, and velocity of 2.3 m/s, the total head loss into the raw watermain will be 6.5 m.

The guidelines indicate that the maximum velocity of the raw water intake line (pumped water) should be 3.0 m/s. The existing system currently meets the velocity requirements.

3.2 Membrane Filtration System

Membrane ultrafiltration equipment is used as primary filtration in the Regional WTP. Three concrete membrane filter tanks are present and operate as two on duty, and one on standby. The membrane system used in the facility is the ZeeWeed 1000. The main components of the membrane system include:

- Membrane Filter Units
- Permeate Pumps
- Ancillary Systems
- Permeate Piping

3.2.1 Membrane Filter Units

Each of the existing membranes tank is equipped with two membrane cassettes. Each cassette contains 54 membranes, each membrane with a surface area of 41.8 m^2 for a total membrane surface area of 4,514 m^2 per tank. Each membrane unit has a capacity of 5,525 m^3/day, providing a combined total of approximately 11,051 m^3/day when two units are operating. The total number of membranes that could be installed in each tank is 72, equivalent to an available empty capacity of approximately 1,841 m^3/day per tank.

The membrane filter units use a vacuum driving force to pull water through the membrane pores. The maximum operating transmembrane pressure (TMP) is 83 kPa, equivalent to a total head loss of approximately 8.5m. Removal of particulates is achieved when water is forced through the membrane leaving any contaminants that are removed either suspended in the membrane tank or caked onto the membrane surface. Filter cake reduces available pores space on the membrane and a greater transmembrane pressure (TMP) is required to maintain flow and achieve desired treatment. The maximum TMP the filters can operate under is -82 kPa. Once this pressure is exceeded, a backpulse cycle occurs to recover the membrane filtration capacity.

The existing membrane filters configuration would be able to meet forecasted capacity requirements up to 2028, then additional membranes module would need to be added to maximize capacity with the existing cassettes. This option would provide partial capacity up to the 2034. Then, a different membrane size or additional membrane train would be required.

3.2.2 Permeate Pumps

There are three end-suction centrifugal permeate pumps each rated at 69.4 L/s at 28 m TDH. The permeate pumps remain operating during all times except during backpulse. The permeate pumps feed the permeate into the granular activated carbon contactors (GACC) filters located downstream.

The TDH from the membrane filter units to the GACCs was determined to be approximately 20 m. The pump curves show that permeate pump capacity can be increased to about 80 L/s at 24 m TDH.

It must be noted that the existing pumps are approximately 20 years old, thus near the end of their lifespan. Therefore, an upgrade would be required within the next two years.

3.2.3 Ancillary Systems

The ancillary systems include a membrane back pulse system and a clean-in-place (CIP) system. During the backpulse and CIP processes, the permeate pumps are turned off.

The backpulse system collects treated water into the 11,000 L backpulse storage tank to clean and remove any filter cake on the membrane surfaces to recover their capacity. Two backpulse pumps are present but only one pump is used during the backpulse process. Each pump is rated at 59.7 L/s at 28

m TDH. In addition to the backpulse pumps, an air scour is also used to clean the membranes during the backpulse process using air blowers. Each blower is rated at 26 L/s and is discharged directly into the membrane tanks. At the current plant design flow rate, membrane backpulse takes place approximately every 120 minutes for a duration of one minute.

A CIP system is used to chemically clean the membrane system on a monthly basis. Treated water is stored in a 7,500 L tank and pumped into the permeate pump lines back to the membrane tanks. The CIP pumps are rated at 22.2 L/s at 13 m TDH. Following the CIP pumps are two sodium hypochlorite injection points, and one citric acid injection point. Sodium hypochlorite is used roughly every 30 days to oxidize organic deposits on the membrane and remove them, whereas citric acid is used on a 90-day interval to remove mineralized deposits and other lasting particles.

3.2.4 Permeate Piping

Once the permeate exits the membrane filters, it enters a 150 mm diameter 316L stainless steel pipe and passes through a butterfly valve, maintaining a velocity of 3 m/s along the line.

The guidelines indicate that the maximum velocity of filtered water line should be 2.0 m/s to avoid scouring within the line. The velocity within the existing permeate piping line is currently higher than the MECP standards velocity of 2 m/s per typical effluent filter. However, due to high removal of membrane filters, scouring would not be a concern.

Upon passing through the butterfly valve, it passes through a quick connect coupling and passes through an expansion into a 250 mm 316L stainless and to the permeate pumps, maintaining a velocity of 1.2 m/s. Once the permeate has travelled through the permeate pumps it travels through multiple contractions and expansions and into the GACs.

3.3 Taste and Odour Control

Taste and odour control is achieved by GACs. This process is necessary as water from the St. Lawrence contains geoism and 2-methylisoborneol (MIB) which causes a musty-earthy taste and odour. The two main components of the taste and odour control system are:

- Carbon Filtration
- Carbon Filtration Piping

3.3.1 Carbon Filtration

Currently the plant contains three GACCs placed in a parallel sequence with all three on duty. The dimensions of each GACC are 3.05 m diameter x 3.66 m side wall. Literature values for geosmin and MIB varies greatly from 5 ng/L to 20 ng/L meaning that a reduction from 0 to 92% for both substances are required depending on the incoming concentrations. The River Institute study determined that a minimum empty bed contact time (EBCT) of 8.2 minutes is required to achieve an average removal of 66% for MIB and 78% for geosmin for filters that are between 2-12 months old. Each GAC filter is rated for a maximum flow of approximately 53.1 L/s or 4,588 m^3/d resulting in a total filtration capacity of around 13,760 m^3/day when all three filters are operating. As this system is for an aesthetic parameter, N-1 redundancy is not necessary. Backwashing of the filters is a manually initiated approach and could be completed off-peak using storage for water supply in order to maintain contact time and treatment.

The GAC units will be backwashed from a dedicated treated water line from the high lift pumps. Operators monitor the GAC filters to determine when backwashing is required. In general, the filters are backwashed weekly. Additionally, media performance is monitored to verify when replacement should occur. In general, media replacement occurs every 2-5 years depending on a variety of factors such as organic load in the membrane permeate and chlorine residual entering the GAC filters.

3.3.2 Piping

As previously indicated, the GAC filters operate in parallel with permeate feeding into each filter. Piping allows for filters to be isolated to be put on standby and allows the filtration system to be isolated for backwashing procedures.

When operating in filtration mode, permeate enters the GAC filter from the top and exits from the bottom by a 200 mm diameter 304L stainless steel piping, maintaining a velocity of 1.7 m/s. This is within the MECP standard velocity of 2 m/s. Under these conditions, it is expected that the pressure drops across the filters remain between 48.2 kPa (7 psi) and 68.9 (10 psi).

During backwash mode, filtration mode piping is isolated using the appropriate valves and backwash piping is opened to allow for treated water from the high lift pumps to flow up through the filters. This water enters and exits back through the 200 mm diameter 304L stainless steel pipes where the backwashed effluent is sent to a sump pit and treated as effluent. The maximum pressure drop across the unit during backwash is approximately 103.5 kPa (15 psi).

3.4 Disinfection

The disinfection system uses sodium hypochlorite for primary and residual disinfection due to simple and efficient operation of the plant. The disinfection process follows the filtration process and has two main components:

- Chlorine Feed Systems
- Chlorine Contact Tank

3.4.1 Chlorine Feed Systems

Sodium hypochlorite with 12.5% concentration is injected into the treated water prior to entering the chlorine contact chambers. Sodium hypochlorite is kept in two 4,500 L storage tanks in the chemical room to allow for a 30-day capacity at the current operating maximum daily flow. Diaphragm pumps used for primary disinfection are located following the GAC units and are each rated at 0.26 L/min with one on duty and one on standby. Current operations provide up to 88 L/day of sodium hypochlorite for primary disinfection.

Residual disinfection is required to maintain chlorine residual is the distribution system. Like primary disinfection, two diaphragm pumps, one duty and one standby, inject sodium hypochlorite at the high lift pump discharge point. Each pump is rated at 0.11 L/min and current operations require approximately 21 L/day to achieve the distribution residual.

3.4.2 Chlorine Contact Tank

The facility contains a two-compartment baffled chlorine contact chamber with a flow length of 60 m and active volume of 553 m^3. The chamber has stainless steel sluice gates that separate each compartment to allow for a chlorine contact time of 50.2 minutes. Each chamber has a baffle factor of 0.7. The chlorine chambers have a rated capacity of approximately 10,930 m^3/day. If only one chamber is in operation, then the baffle factor is reduced to 0.5 and the flow capacity becomes 3,900 m^3/day.

According to the *MECP's Procedure for Disinfection of Drinking Water in Ontario,* at least 0.5-log removal or inactivation of Giardia cysts and 2-log removal or inactivation of viruses must be provided through the disinfection portion of the overall water treatment process.

The chlorine contact chamber must be sized to allow for a minimum of 0.5 log removal of Giardia under design conditions as required by the Procedure for Disinfection of Drinking Water in Ontario (O.Reg.

170/03). The average pH of the St. Lawrence is between 7.5 and 8.0 and the minimum temperature is 0.5˚C. Therefore, for design purposes, a pH of 8.0 and a temperature of 0.5˚C have been used.

Table 4-3 illustrates the required chlorine contact time (CT) at current design rate. The formula used to calculate the CT is as follows:

$$CT = minimum\ disinfectant\ residual\ \left(\frac{mg}{L}\right) * \frac{storage\ reservoir\ size\ (L) * baffle\ condition}{Peak\ hourly\ flow\ \left(\frac{L}{min}\right)}$$

Table 3-3 Required Parameters for CT calculation.

	Current Design	20-yr forecasted	Comments
Design Rate	5,955 L/min	11,605 L/min	Current Design rate: Section1.1 20-yr forecasted flow: Section 2.2
Chlorine Contact Tank Volume	553,000 L		Assuming two chambers in operation and no upgrades are provided for the 20-yr forecasted flow
Baffling Factor	0.7		Typical Value
Recommended optimum target for free chlorine residual	1 mg/L		Plant target
Minimum temperature of the water	0.5 °C		Worst Case Scenario
pH of Water	8.0		Typical pH value according to background information
Calculated Contact Time (CT)	65 mg*min/L	33.3 mg*min/L	((Storage reservoir size *Baffle condition) / (Peak hourly flow))*Recommended chlorine residual

At current design rate the calculated CT of 65 mg*min/L exceeds the required MECP CT of 51 mg-min/L for Giardia inactivation and 6 mg-min/L for virus inactivation. Therefore, the CT requirements are met, and adequate disinfection is achieved for the WTP.

Under the 20-yr forecasted flow, the calculated CT will meet the required CT for inactivation of viruses, but it is lower than the required MECP CT for Giardia inactivation. With a contact time of 51 mg-min/L as per MECP requirements, a total of 592 m^3 of volume would be required to maintain a Free Chlorine Residual of 1 mg/L with the forecasted flow. There is a need for an additional 40 m^3 of volume for contact time. The 40 m^3 of additional volume is considered to be less than the low water volume (dead space) in the Clearwell. Therefore, 10% of the Clearwell volume could be used to provide the additional contact time required in case of emergency. Moreover, it must be noted that the chlorine contact chamber has a length to width ratio of approximately 40:1 which would be ideal for Plug Flow Baffle Factor of 1. A baffle factor of 1 will increase the calculated contact time to 48 mg*min/L, thus requiring less Clearwell volume to be used.

The chlorine contact tanks are able to meet the 20-year forecasted flow.

3.5 Clearwell Storage

The two-compartment baffled clear well storage was designed with a surface area of approximately 400 m^2 and a sidewall depth of 5.3 m allowing for a total volume of 2,120 m^3. The clear well contains two compartments to allow for cleaning and maintenance to take place if required.

The clear well would provide additional contact time to maintain a chlorine residual of 1 mg/L. Assuming a baffle factor of 0.7, the clear well has a rated capacity of 11,870 m^3/day. Table 4-4

summarizes the provided contact time based on the variation of volume into the tank at current design rate. The same assumption listed in Table 4-3 have been used.

Table 3-4 Required contact time based on volume of water in the tank.

Water Level Percentage	Tank Volume at water level (m3)	Calculated CT	CT for inactivation of Giardia	CT for inactivation of viruses
100%	2,120	249	51 mg-min/L	6 mg-min/L
75%	1,590	187		
50%	1,060	125		
25%	530	62		
10%	53	6		

Therefore, the Clearwell tank would be able to provide additional CT for Giardia inactivation up to 25% of the tank volume. Inactivation of viruses would be met up to 10% of the tank volume.

The existing Clearwell tank is able to meet the 20-year forecasted flow.

4 SYSTEM BOTTLENECKS

The assessment was based on historical plant operational data, plant design criteria, approved ECA capacities, and typical MECP design guidelines. Figure 4-1 identifies the capacity of each major process component assessed against the existing plant rated capacity and 20-yr forecasted flow. Results of the capacity assessment are summarized in Table 5-1.

As identified in the table below, the Low-Lift pumps and Membrane system will require to be upgraded in order to meet forecasted flow. Due to the need to expand the rated capacity of the treatment plant, these upgrades will require a Schedule C Municipal Class EA.

Table 4-1 Identified bottlenecks of existing major system components.

System Component	Required Upgrades	Comments
Intake	The raw water intake is able to convey up to 19,181 m^3/d and therefore no upgrades are required.	No Upgrades Required
Raw Water Pumping	- Three (3) vertical turbine pumps each rated at 69.4 L/s at a TDH of 25.8 m	**Upgrades Required**
Raw Watermain	The 350 mm diameter raw watermain is able to convey the 20-yrforecasted flow and up to 19,181 m^3/d (~222 L/s). Therefore, no upgrades are required.	No Upgrades Required
Membrane pre-filters	The existing self-backwashing automatic pre-filters are near to the end of their lifespan and would not be able to meet the forecasted flow. Therefore, an upgrade is required.	**Upgrades Required**
Membrane Filtration	The membrane system would not be able to meet the 20-yrs forecasted flow. There would be a possibility to expand the number of membranes modules from 54 to up to 72 which would result in approximately 33% additional capacity by adding new membranes to the existing tanks. Therefore, an upgrade is required.	**Upgrades Required**
Permeate Pumps	The existing permeate pumps are near to the end of their lifespan and would not be able to meet the forecasted flow. Therefore, an upgrade is required.	**Upgrades Required**

Granular Activated Carbon	The three (3) granular activated carbon contactors would not meet the optimum contact time for taste and odour control; however, taste and odour events in the St. Lawrence are no longer frequent events and therefore an upgrade would not be necessary.	No Upgrades Required
Primary Disinfection	The two-compartment baffled chlorine contact chamber has a total active volume of 553 m^3. With a required contact time of 51 mg-min/L, an additional 40 m^3 of volume is required for contact time to maintain a Free Chlorine Residual of 1 mg/L with the forecasted flow. 10% of the Clearwell volume will be used to provide the additional contact time required in case of emergency. This volume is considered to be less than the low water volume (dead space) in the Clearwell.	No Upgrades Required
Treated Water Storage	The projected 2044 population for the two communities is 8,380 which equates to 177 L/s for three hours. This equates to a fire flow storage requirement of 1,910 m^3. The Township is currently undertaking a Master Servicing Study to address fire flow and water storage requirements. The Master Servicing Study identified that the plant would meet the 20-years forecasted flow. However, additional storage volume would be required to meet build-out flow (> 20 year) within the servicing area. Solutions to address water storage requirements are provided in the Master Servicing Plan.	Out of the scope for this project.
High Lift Pumping	The four (4) vertical turbine pumps with variable speed drives, each rated at 79.7 L/s at a TDH of 66m. The pumps at the Long Sault Plant are configured to permit maximum day flow for both communities plus fire flow for Long Sault to be pumped into the distribution system.	No Upgrades Required

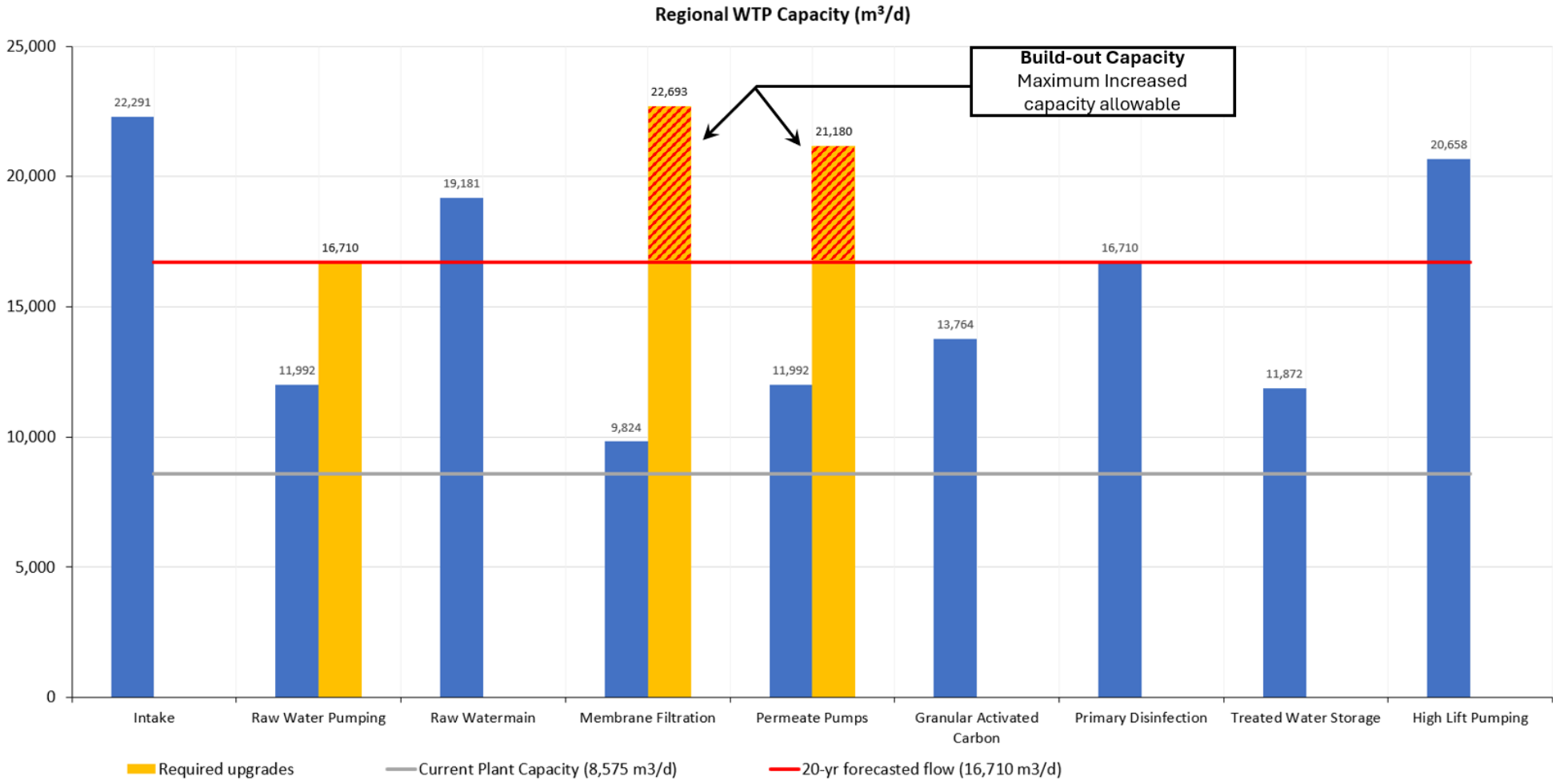


Figure 4-1 Capacity assessment results for each major process units at the Regional WTP

5 IDENTIFICATION OF ALTERNATIVES

As previously indicated, the infrastructure in Long Sault and Ingleside was not originally designed for large community expansions. The Regional WTP was designed for a 20-year population growth starting in approximately 2005. The combinations of treatment process components reaching their design capacity combined with the development will require that several actions be taken to ensure the capacity is available when the proposed development will occur. The following section identify potential alternatives in order to serve current and future growth within the community of Long Sault and Ingleside.

5.1 Regional Water Treatment Plant

Providing more water supply capacity can be done in different ways and could mean expanding the Long Sault/Ingleside Regional WTP or making other investments in the water system. It is expected that any construction will be limited to the WTP property, except for Alternative D. In particular, the identified alternatives have been categorized as follows:

- **Alternative A** – Do Nothing
- **Alternative B** – Expand Existing Water Treatment Plant with Existing Technology
- **Alternative C** – Expand Existing Water Treatment Plant with Alternative Technology
- **Alternative D** – Build New Treatment Plant in Ingleside

The pros and cons of each of the aforementioned alternatives have been outlined in Table 5-1. The next sections provide a detailed description of each of the proposed alternatives.

Table 5-1 Advantages and Disadvantages of the Proposed Alternatives

	Description	Advantages	Disadvantages
Alternative A: Do Nothing	No proposed upgrades	▪ No additional Costs Required	▪ Plant Capacity is limited to the current rated capacity of 8,575 m^3/day ▪ Restricts future residential growth ▪ Does NOT allow for servicing of the Long Sault Logistics Village ▪ Low/No Cost Alternative
Alternative B: Expand Existing Water Treatment Plant with Existing Technology	Fill out existing membrane cassettes with new membranes	▪ Plant Capacity is increased to 16,335 m^3/day (190% of existing capacity) ▪ No restriction on future growth ▪ Does allow for servicing of the Long Sault Logistics Village ▪ No construction work is required outside of existing buildings ▪ Operational costs and knowledge are similar to current operation.	▪ Construction phasing within the existing plant may increase the risk of water treatment capacity limitations during construction period only.
Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	Expand plant with new technology in new building	▪ Plant Capacity can be increased as required maintaining the existing membrane plant for redundancy. ▪ No restriction on future growth ▪ Does allow for servicing of the Long Sault Logistics Village ▪ Construction would be limited to the existing site	▪ Although construction would be limited to the existing WTP property, new buildings would be required. ▪ Additional complexity due to multiple treatment technologies. ▪ Higher risk of impacts due to construction.
Alternative D: Build New Treatment Plant in Ingleside	Expand capacity by installing new membrane plant in Ingleside.	▪ Plant Capacity can be increased as required maintaining the existing membrane plant in Long Sault. ▪ No restriction on future growth ▪ Does allow for servicing of the Long Sault Logistics Village ▪ Construction would be completed on the existing booster station site.	▪ Higher Cost Alternative ▪ New intake would be required at significant cost and environmental risk. ▪ Additional operational costs due to two locations and loss of economies of scale. ▪ Higher risk of impacts due to construction.

5.1.1 Alternative A: Do Nothing

The "Do Nothing" or null alternative is always an alternative that is reviewed to ensure that the project is in fact necessary. The "Do Nothing" scenario means that no changes or improvements to the existing system will be considered. The "Do Nothing" alternative is carried forward into the evaluation process as a base case. It is recognized that the Do Nothing alternative will not meet the future servicing needs of the study area and will result in severely limiting future growth. The Do Nothing alternative will maximize the use of existing plant equipment but will not meet the future servicing needs.

5.1.2 Alternative B: Expand Existing Water Treatment Plant with Existing Technology

Membrane System

The membrane system would not be able to meet the 20-yrs forecasted flow. However, it must be noted that the existing membranes were recently upgraded in 2020 and 2021. The lifespan of membranes is a crucial consideration for treatment efficiency and their lifespan is typically about 7 years. The existing membranes are 3 years old and can be used for approximately another 4 years at optimal system operation.

Therefore, to increase the capacity of the existing membrane filtration system capacity, a staging approach has been proposed as follows:

- **Stage 1: Increase the number of membranes modules by the addition of new membranes to the existing cassettes.** Each of the existing membranes tank is equipped with two membrane cassettes. Each cassette contains fifty-four membranes, each membrane with a surface area of 41.8 m^2 for a total membrane surface area of 4,514 $m^{2\ per}$ tank. There would be a possibility to expand the number of the existing membranes modules up to 72 by adding additional membranes of the same size. This will increase the total surface area from 4,514 m^2 to 6,019 m^2 per tank capable of permeating water at a peak design warm water flux rate of 51 Lmh. This option will lead to achieving a total of approximately 14,735 m^3/d. This upgrade should occur within 2028.
- **Stage 2: Increase the number of membranes modules by new cassettes with larger membrane modules.** Each of the existing membrane tanks will be equipped with two new cassettes containing sixty membrane modules per cassette. Each membrane would have a surface area of 51.5 m^2. This will increase the total surface area from 6,019 m^2 to 6,180 m^2 per tank capable of permeating water at a peak design warm water flux rate of 51 Lmh. This option will lead to achieving a total of approximately 15,129 m^3/d. Stage 2 will be able to meet the 20-yr forecasted flow. This upgrade should occur within 2034.
- **Stage 3: Adding a fourth membrane train.** This option could be used to provide build-up capacity beyond the 20-year forecasted flow. A new membrane train will be added by using the existing 3.8 m long x 2.1 wide x 2.8 m deep neutralization tank. The new tank will be equipped with two new cassettes containing sixty membrane modules per cassette. Each membrane would have a surface area of 51.5 m^2 capable of permeating water at a peak design warm water flux rate of 51 Lmh. This option will lead to achieving a total of approximately 22,693 m^3/d. This would increase growth potential within the servicing area. This upgrade should occur within 2037.

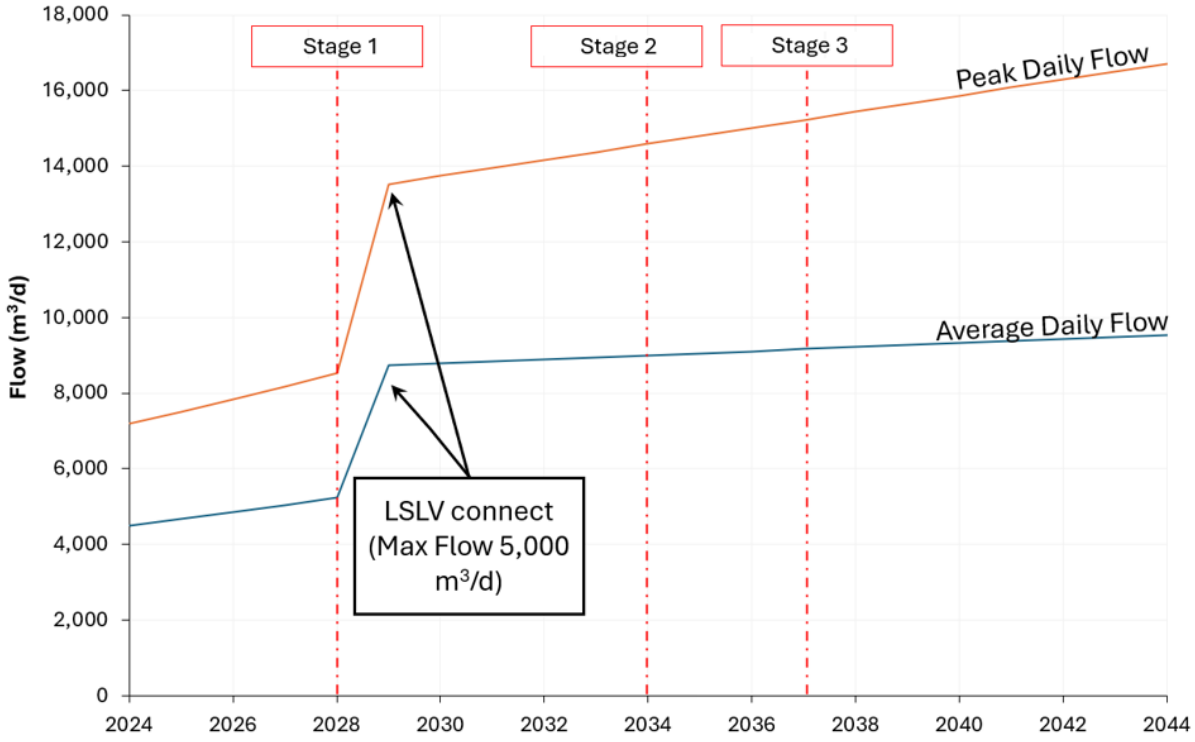


Figure 5-1 Staging Upgrades Timeline

Permeate Pumps

The existing permeate pumps are near the end of their lifespan and would not be able to meet the forecasted flow. Therefore, a pump upgrade would be required to meet future flow conditions.

Table 7-2 summarizes the permeating pump requirements based on the membrane upgrades listed in the previous section.

Table 5-2 Permeate Pumps required capacity.

	Number of pumps	Flow Rate	TDH	HP/rpm
Stage 1	3 (one per train)	250 m³/hr	28m	40HP,1200 rpm
Stage 2	3 (one per train)	350 m³/hr	28m	50HP,1800 rpm
Stage 3	4 (one per train)	350 m³/hr	28m	50HP,1800 rpm

The existing permeate pumps will be replaced one every year or one every other year depending on growth. The overall goal would be to replace all the existing pumps over the next three to six years to avoid the risk of aging infrastructure.

It is anticipated that the estimated costs covered by the Township for this alternative is $6.0 M (+/- 25%) including engineering and contingency.

5.1.3 Alternative C: Expand Existing Water Treatment Plant with Alternative Technology

This alternative will require the construction of a new building to be located within the boundaries of the existing WTP area. The new building will be sized to accommodate the new treatment process equipment required to increase the WTP capacity and the forecasted flow. Potential alternative treatment processes to be applied will be as follows:

- **Conventional Chemically Assisted Filtration Treatments:** the term “conventional filtration” traditionally applies to water treatment plants in which coagulation, flocculation and

clarification take place upstream of filtration. Typical conventional filtration systems involve the use of the following treatment technologies:

- **High-Rate Clarification with Plate (or Tube) Settlers:** High-rate clarification is a process whereby coagulated and flocculated water is allowed to pass through a quiescent tank, which allows sufficient time for the floc particles to settle to the floor of the clarifier under the influence of gravity. The clarification tanks are equipped with high-rate plate or tube settler modules that allow the tanks to perform at high loading rate. The plate settler modules are fabricated units with a series of inclined plates (60 degrees), or tubes mounted in bundles. The coagulated and flocculated water must pass upwards through these bundles to leave the clarifier. The plates are placed a few centimeters apart, significantly reducing the distance particles need to settle before they are removed. This allows the basin to operate at a much higher loading rate than it otherwise would be able to without the plates in place.
- **Ballasted Flocculation/Clarification (Actiflo):** Actiflo is a compact process that operates with microsand as a seed for floc formation. Microsand provides surface area that enhances flocculation and also acts as a ballast or weight to aid a rapid settlement. Coagulant (alum, ferric chloride, etc.) is added to the raw water in a coagulation tank. The coagulated water then enters the second tank where polymer and mirosand are added. In this tank, the microsand provides a large contact area for floc formation. The destabilized suspended particles bind to the microsand using polymer bridges. In the third tank, called the maturation tank, the particles agglomerate and grow into high density flocs. The ballasted floc rapidly settles to the bottom of the settling tank and are removed from the treated water. The settling efficiency is further increased by the use of lamellar tubes. The sand/sludge slurry is collected at the bottom of the tube settler and pumped to a hydrocyclone for separation. Energy from pumping is effectively converted to centrifugal forces within the body of the hydrocyclone causing chemical sludge to be separated from the higher density microsand. The recovered microsand is recycled to the injection tank for reuse while the sludge is continuously discharged for handling and disposal.
- **Dissolved Air Flotation (DAF):** DAF is a process that uses minute bubbles generated from dissolved air to attach and float flocculated particles (flocs) to the top of the clarification basin for removal. Chemically coagulated water goes through flocculation prior to meeting a recycled stream which releases many air bubbles for attachment to the flocs forming 'float' or sludge. The float is removed by a mechanical skimming device or by flooding (hydraulic removal) upon thickening at the surface, thereby physically separating the solids from the water, and clarified effluent exits the DAF tank near the bottom. About 5% to 10% of the effluent is pumped and recycled to the front of the DAF tank.
- **Granular Media Filtration:** Granular media filtration is a physical process used in water treatment to remove suspended impurities. The technique uses beds of granular material, typically sand or similar substances, to filter out contaminants. As water flows through this granular bed, impurities are trapped within the gaps, delivering cleaner water. The granular media filtration process is typically preceded by a sequence of steps that prepare the water for filtration. Initially, coagulation and flocculation processes are conducted, involving the addition of chemicals to the water, leading to the formation of larger, easily removable particle aggregates. Sedimentation follows, where gravity pulls down these particle aggregates, creating a clearer water layer ready for filtration. The filtration process

then takes place, with the water passing through the granular media bed, leaving impurities behind.

- **Direct Filtration:** The direct filtration water treatment scheme does not include sedimentation and in some cases flocculation. Compared to conventional treatment, direct filtration has lowered capital costs, reduced space requirements, decreased sludge quantities, and reduced coagulant dosages.

Pros and cons of each technology are provided in the table below. A comparison with the membrane filtration system is also provided.

Table 5-3 Advantages and Disadvantages of Potential Biological Treatment Technologies

	Advantages	Disadvantages
Membrane filtration (as per Alternative B)	▪ Effectively produce high-quality effluent ▪ Small footprint (half size of ASP systems) ▪ Produce less sludge, and this sludge contains less water compared to some other processes ▪ Ease of operation ▪ Operator is already familiar with this system	▪ Necessitate membrane cleaning ▪ High energy consumption due to membrane aeration and maintenance
High-Rate Clarification with Plate (or Tube) Settlers	▪ Simplicity of the system due to reduced number of moving parts ▪ Low more concentrate sludge production ▪ Flexibility in handling varying influent flow rate conditions ▪ Low maintenance	▪ Large footprint solution ▪ High capital costs ▪ Deeper basin requirements to accommodate underflow velocities
Ballasted Flocculation/Clarification (Actiflo)	▪ Robust system, capable of treating a wide ▪ range of raw water characteristics ▪ Smaller footprint than conventional clarifier process and DAF	▪ Expensive ▪ Proprietary system, which means the Township could only deal with one supplier ▪ Requires skilled operator: specific combination of coagulant, polymer, and micro-sand to work well. Micro-sand handling process requires to be addressed properly.
Dissolved Air Flotation (DAF)	▪ More efficient than SBR ▪ Can be fully automated ▪ Small Footprint (bigger than Actiflo)	▪ Expensive ▪ Prone to poor performance if exposed to higher turbidity ▪ Requires more maintenance
Granular Media Filtration	▪ The process is versatile ▪ Cost-effective ▪ Simple to operate	▪ Requires regular maintenance ▪ Has limitations in removing dissolved contaminants
Direct Filtration	▪ The process is versatile ▪ Cost-effective ▪ Simple to operate ▪ Low footprint	▪ Not as effective at removing certain types of contaminants, such as dissolved organic matter or very fine particles ▪ Higher Maintenance: The filters can clog more quickly, requiring more frequent maintenance and replacement ▪ Water Quality Variability: Its effectiveness can be highly dependent on the quality of the source water.

It is anticipated that the estimated costs covered by the Township for this alternative is in the range of $10.0-15.0 M (+/- 25%) including engineering and contingency, depending on the selected technology to be used.

5.1.4 Alternative D: Build New Treatment Plant in Ingleside

This alternative will require the construction of a new WTP sized to meet the additional flow coming for future growth and not able to be conveyed to the existing Long Sault WTP due to capacity constrains.

The new WTP will have a rated capacity of 4,225 m^3/d average flow and 8,135 m^3/d maximum daily flow. The new treatment plant will require the construction of the following system components:

- New Building
- Intake system
- Low-lift Pumps
- Treatment Process
  - Primary Treatment
  - Secondary Treatment
  - Primary Disinfection Treatment
  - Treated Water Storage
  - Control System
- High Lift Pumps

The new water treatment plant will be located in Ingleside as shown in Figure 5-2. It is anticipated that the estimated costs covered by the Township for this alternative is $20.0 M (+/- 25%) including engineering and contingency.

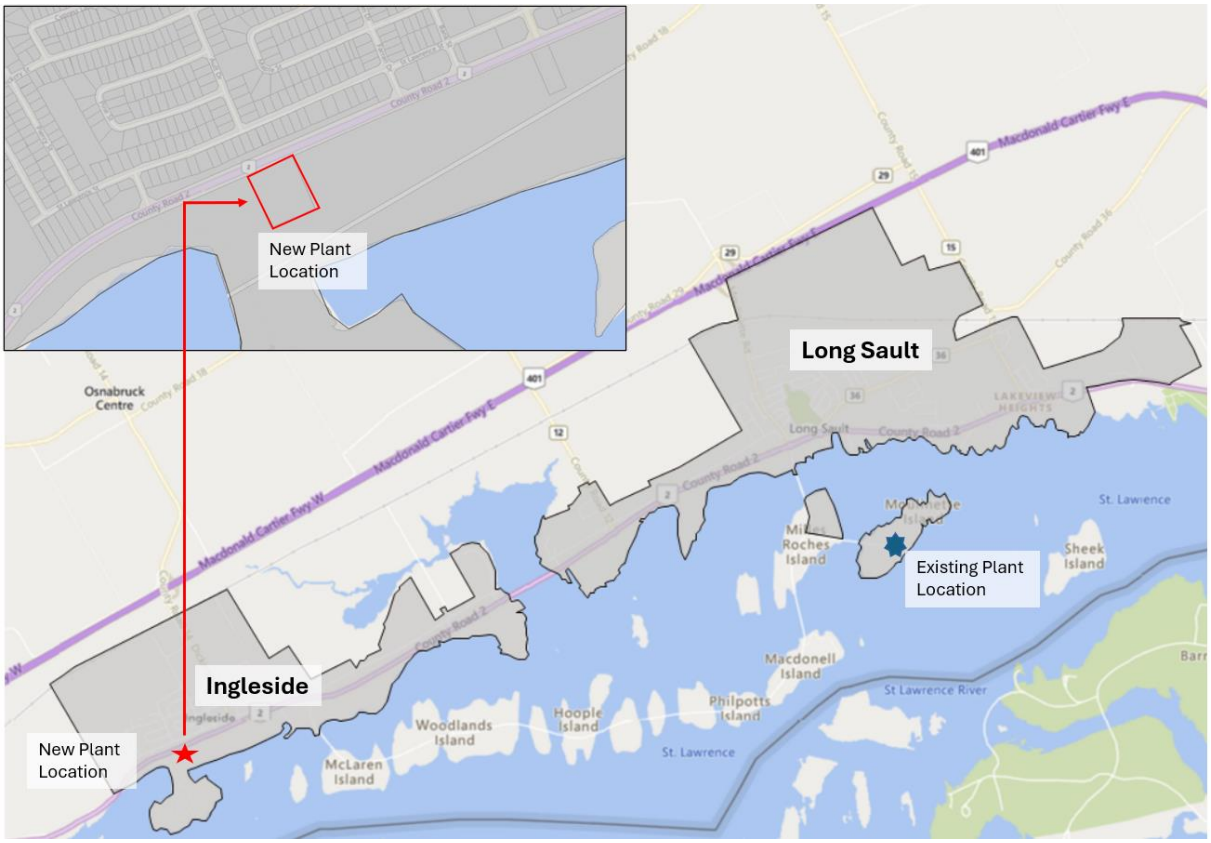


Figure 5-2 Potential New Treatment Plant Location in Ingleside

5.2 Required Upgrades Common to All Alternatives

5.2.1 Low-lift Pumping

The existing vertical turbine low-lift pumps will not be able to accommodate future flow. As the low lift pumping system are installed upstream and consists of raw wastewater mechanical processing, the design of these units is critical for successful operation.

The selection of the most appropriate pump is an important component of the process. Because low-lift pumps are installed upstream, they are typically sized to handle peak flow rate. The main goal of the low lift pumping system is to achieve a consistent flow rate to the downstream processes. This operation is typically beneficial from an energy standpoint if the pumps would operate at or near the pumps' best efficiency point. Therefore, pumps should be selected as having the maximum efficiencies at the average head condition while meeting the maximum flow and pressure conditions.

5.2.2 Membrane Pre-Filter Units

Two 500-micron membrane pre-filters are located in the LLPS. Each filter has a rated capacity of 138.9 L/s. As mentioned in Section 4, the pre-filters would be able to meet forecasted capacity up to the 2028. Then, an upgrade would be required. The new pre-filters would need to be sized to meet up to 200 L/s.

The pre-filters consist of a conical drum with a number of threaded holes containing one of many types of straining media. The drum is supported on a rotating shaft fitted with bearings and is contained in a body having a vertical backwash slot opening adjacent to the drum surface.

The liquid to be strained enters the inlet connection located in the lower portion of the body and flows around the outer surface of the drum. The suspended particles are retained in the media pockets, and the clean liquid passes through the media to the inside and bottom opening of the drum. The clean water can then continue through the outlet connection located diametrically opposite the inlet.

As each row of straining media passes the backwash slot, a reversal of flow occurs, flushing the suspended particles from the media pockets. This reversal of flow is caused by a pressure differential between the interior of the strainer and the atmosphere. The backwash flow rate is exceptionally low and will vary, depending on the number of suspended particles in the liquid.

An automatic control can be furnished to permit intermittent backflushing. This control consists of an electric or pneumatically operated ball valve, actuated by a timer and/or a pressure differential switch.

6 CLIMATE CHANGE

Climate change and related extreme weather events continue to create changing weather conditions which will impact municipalities' infrastructure. The scientific community expects that the increase in temperature and severe weather events due to climate change will lead to increased intensity and frequency of future storm events.

The Provincial Policy Statement contains several policies that require land use planning and infrastructure projects consider their impact on climate change. Some of the applicable policies require that land use planning and infrastructure projects:

- Policy 1.6.6.1: prepare for the impacts of a changing climate.
- Policy 1.8.1: support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of a changing climate through land use and development patterns.

- Policy 3.1.3: prepare for the impacts of a changing climate that may increase the risk associated with natural hazards.

Typically, there are two approaches to address climate change. These include climate change mitigation, thus reducing a project's impact on climate change, and climate adaptation by increasing the local ecosystem's resilience to climate change.

In this study, the selection of the preferred design alternative presents an opportunity to mitigate the impacts on climate change. As most of the proposed alternative will be within the plant footprint, this project is considered to be a small-scale project with regard to the construction footprint. Moreover, it does not involve the reconstruction of existing disturbed area.

Climate change has the potential to result in increased storm events that can lead to flooding. Increased numbers of high intensity rainfall events will mean higher flows of stormwater reporting to the WTP and requiring treatment. The IDF data released for the Cornwall Station #6101874 during the 2015 was selected for the base period for this analysis. In table 6-1 and Table 6-2, the projected rainfall intensity data for the 2044 and 2084 were compared to the Cornwall Station data to quantify the average percent increase for the 1:2-year through 1:100-year return periods for the 5-minute, 10-minute, 15-minute, 30-minute, 1-hour, 2-hour, 6-hour, 12-hour and 24-hour storm durations. Please note that the 2044 and 2084 data used was representative of the worst-case scenario which includes time series of emissions and concentrations of the full suite of greenhouse gases, aerosols, and chemically active gases, as well as land use and land cover factors identified as Representative Concentration Pathways (RCPs).

The resulting average percent increases from the base period data was calculated to be 7% for 2044, and 15% for 2080, considering all emissions scenarios. The percent increases varied between each emissions scenario but remained consistent for each return period/duration combination. Based on our review of the available literature, there is a high level of uncertainty among approaches for projecting future IDF curves, and it should be noted all approaches are experimental in nature and represent a best effort to predict future trends. It appears there is not one definitive approach to adjust IDF curves to account for climate change. However, adjusting the current IDF curves by a percent increase is proposed as a conservative strategy to be used during the design of servicing infrastructure.

As climate change has the potential to result in increased storm events that can lead to flooding, an increase of impermeable areas may impact the risks of flooding during the long period. However, it must be noted that the majority of the proposed alternatives, with exception of Alternative D – Build a New Treatment Plant in Ingleside, do not increase paved surfaces (impermeable areas); therefore, a long-term increased risk to surface flooding is not anticipated. If the selected alternative will result in an increase of impermeable areas, Low Impact Development (LID) strategies such as retaining walls, stormwater swales, porous pavement and utilization of existing site stormwater infrastructure to manage runoff, will be evaluated as part of an overall comprehensive stormwater plan that will be developed during detailed design.

Climate change may also affect water levels within the St. Lawrence River on a cyclical basis. Currently, the flood mapping as provided by the International Lake Ontario-St. Lawrence River Board, shows that the site is within the flooded areas. As a result, it is recognized that future high-water levels, coupled with wave uprush, could impact the WTP. If the preferred alternative would be the construction of a new WTP, protection from flooding to all building and structure accesses, including doorways, windows hatches and vents will need to be provided during detailed design by constructing these components above flood elevation (including wave uprush). On the other hand, if the preferred alternative will be upgrading the existing WTP within the plant footprint, it will be assessed if the

existing building and structure accesses will exceed the flood elevation. It is imperative that the facility must be fully operational during future high lake level events.

With regard to the power consumption, it is expected that there will be an increase in hydro and electric power requirements to operate the upgraded WTP. All the proposed alternatives will require additional treatment process components or system upgrades that will increase the plant electricity demand. However, according to Independent Electricity System Operator (2023), most of the electricity in Ontario is derived from non-greenhouse gas (GHG)-generating sources with less than 10% of Ontario's forecasted electricity production resulting in GHG emissions. Therefore, the related impacts to climate change are considered to be minimal.

To summarize, to address potential climate change impacts and increase the WTP resilience to climate change, different measures will be integrated in the selected alternative, including:

- **Adaptation to flooding risks.**
  - Build new process structures and buildings above the floodplain limit, with a buffer to accommodate future floods.
  - Relocating equipment away from flood-prone areas
  - Verify and update emergency measures for flooding.
- **Adaptation to increased precipitation and impact on source water quality.**
  - Design processes to allow for increase in chemical dosing and other operational parameters in case of degraded source water quality.
  - Adapt chemical supply planning based on modified usage.
  - Consider changes in proportion of process wastewater.
- **Adaptation to low water levels due to drought**
  - Design low-lift pumps and basin considering potential low water levels.
  - Ensure that existing raw water intake (or any new proposed raw water intake) is at the deepest point, minimizing the risk of frazil ice formation.
- **Adaptation to degraded source quality due to drought.**
  - Design robust treatment processes which can handle increased solids loading.
  - Integrate process water usage efficiency in design.
  - Encourage water conservation.

Table 6-1 2044 - IDF Percentage Increase based on Climate Change

Base Period (2015) Cornwall Station Historical Data								
Minutes	T:2-years	T:5-years	T:10-years	T:20-years	T:25-years	T:50-years	T:100-years	
5	95.49	118.6	128.57	135.45	137.2	141.61	144.8	
10	68.72	87.86	96.37	102.37	103.92	107.88	110.81	
15	55.02	70.37	77.1	81.8	83.01	86.08	88.33	
30	34.59	43.54	47.94	51.29	52.21	54.64	56.58	
60	21.7	27.02	29.85	32.14	32.79	34.59	36.12	
120	12.82	16.99	20.14	23.48	24.61	28.34	32.41	
360	5.86	8.26	10.11	12.09	12.77	15.01	17.34	
720	3.43	4.84	5.87	6.94	7.29	8.08	8.67	
1440	2.18	2.85	3.25	3.61	3.72	4.04	4.33	
2044 Climate Change Projection (RCPS 8.5 - worst case scenario)								
Minutes	T:2-years	T:5-years	T:10-years	T:20-years	T:25-years	T:50-years	T:100-years	
5	101.59	127.38	138.44	146.55	148.84	154.61	157.69	
10	73.16	94.31	103.93	110.82	112.81	117.86	120.74	
15	58.58	75.55	83.17	88.55	90.09	94.09	96.34	
30	36.65	46.75	51.71	55.58	56.77	59.25	61.06	
60	22.92	28.97	32.23	34.82	35.58	37.25	38.78	
120	13.59	18.06	21.56	24.92	26.04	30.4	34.85	
360	6.16	8.79	10.79	12.79	13.41	16.07	18.69	
720	3.61	5.15	6.28	7.37	7.73	8.66	9.35	
1440	2.3	3.05	3.52	3.93	4.05	4.38	4.69	
	IDF Curves - Climate Change Percentage Increase in 2044							
Minutes	T:2-years	T:5-years	T:10-years	T:20-years	T:25-years	T:50-years	T:100-years	
5	6%	7%	8%	8%	8%	9%	9%	
10	6%	7%	8%	8%	9%	9%	9%	
15	6%	7%	8%	8%	9%	9%	9%	
30	6%	7%	8%	8%	9%	8%	8%	
60	6%	7%	8%	8%	9%	8%	7%	
120	6%	6%	7%	6%	6%	7%	8%	
360	5%	6%	7%	6%	5%	7%	8%	
720	5%	6%	7%	6%	6%	7%	8%	
1440	6%	7%	8%	9%	9%	8%	8%	
Average	**6%**	**7%**	**8%**	**8%**	**8%**	**8%**	**8%**	**7%**

Table 6-2 2084 - IDF Percentage Increase based on Climate Change

Base Period (2015) Cornwall Station Historical Data								
Minutes	T:2-years	T:5-years	T:10-years	T:20-years	T:25-years	T:50-years	T:100-years	
5	95.49	118.6	128.57	135.45	137.2	141.61	144.8	
10	68.72	87.86	96.37	102.37	103.92	107.88	110.81	
15	55.02	70.37	77.1	81.8	83.01	86.08	88.33	
30	34.59	43.54	47.94	51.29	52.21	54.64	56.58	
60	21.7	27.02	29.85	32.14	32.79	34.59	36.12	
120	12.82	16.99	20.14	23.48	24.61	28.34	32.41	
360	5.86	8.26	10.11	12.09	12.77	15.01	17.34	
720	3.43	4.84	5.87	6.94	7.29	8.08	8.67	
1440	2.18	2.85	3.25	3.61	3.72	4.04	4.33	
2084 Climate Change Projection (RCPS 8.5 - worst case scenario)								
Minutes	**T:2-years**	**T:5-years**	**T:10-years**	**T:20-years**	**T:25-years**	**T:50-years**	**T:100-years**	
5	107.55	135.83	148.43	157.57	159.6	165.43	170.12	
10	77.43	100.55	111.31	119.06	120.89	126.35	130.61	
15	61.99	80.4	89.06	95.16	96.59	100.84	104.13	
30	38.95	49.78	55.3	59.56	60.59	63.75	66.43	
60	24.4	30.84	34.46	37.3	38.03	40.29	42.36	
120	14.35	19.31	23.09	27.09	28.49	32.53	37.09	
360	6.57	9.38	11.58	13.96	14.74	17.18	19.58	
720	3.84	5.5	6.71	8	8.38	9.24	9.96	
1440	2.45	3.25	3.75	4.18	4.3	4.69	5.08	
	IDF Curves - Climate Change Percentage Increase in 2084							
Minutes	T:2-years	T:5-years	T:10-years	T:20-years	T:25-years	T:50-years	T:100-years	
5	13%	15%	15%	16%	16%	17%	17%	
10	13%	14%	16%	16%	16%	17%	18%	
15	13%	14%	16%	16%	16%	17%	18%	
30	13%	14%	15%	16%	16%	17%	17%	
60	12%	14%	15%	16%	16%	16%	17%	
120	12%	14%	15%	15%	16%	15%	14%	
360	12%	14%	15%	15%	15%	14%	13%	
720	12%	14%	14%	15%	15%	14%	15%	
1440	12%	14%	15%	16%	16%	16%	17%	
Average	**12%**	**14%**	**15%**	**16%**	**16%**	**16%**	**16%**	**15%**

8 SOURCE WATER PROTECTION

The Ontario's Clean Water Act helps protect drinking water from source to tap by preventing contaminants from entering sources of drinking water like lakes, rivers and aquifers. Vulnerability scores are used to indicate how at risk the drinking water source is to contamination. Scores in the Assessment Report are based upon the features of each intake. Characteristics such as the depth of the intake, distance of the intake from land, and the past water quality history affect its vulnerability. The higher the vulnerability score, the higher the level of concern for possible source water contamination, with a score of 10 being the highest score.

The WTP is located within the village of Long Sault, on Moulinette Island, south of the village of Long Sault. The intake is in the St. Lawrence River and is located approximately 137 m off the shore. Water is drawn from a depth of approximately 8 m. Figure 8-1 depicts the Long Sault Intake Protection Zones (IPZs). In particular:

- **IPZ-1:** This is the area closest to the intake and is the area of highest concern because contaminants entering this zone can reach the intake quickly with little or no dilution. The associated vulnerability score for this area is 7.
- **IPZ-2:** Considered the secondary protection zone, this area is calculated based upon how far water can travel in a two-hour time period. The allocation is determined by viewing flows, wind, and transport pathways. The associated vulnerability score for this area is 4.9.

A review of water quality data from regular testing at the Long Sault intake confirms that there are no current issues or that adversely impact the drinking water source.

The WTP and WTP intake are located with the Raisin-South Nation Source Protection Area. The Raisin-South Nation Source Protection Committee has completed its Source Protection Plan in consultation with local municipalities and stakeholders. The Source Protection Plan identifies ways to protect the quality and quantity of municipal drinking water sources in this part of eastern Ontario. The Plan addresses existing threats to drinking water and contains policies to prevent future risks. Proximity to well, vulnerability of IPZs and the nature of specific activities may be considered as threats to drinking water sources. Currently, no significant drinking water threats have been identified near to the WTP.

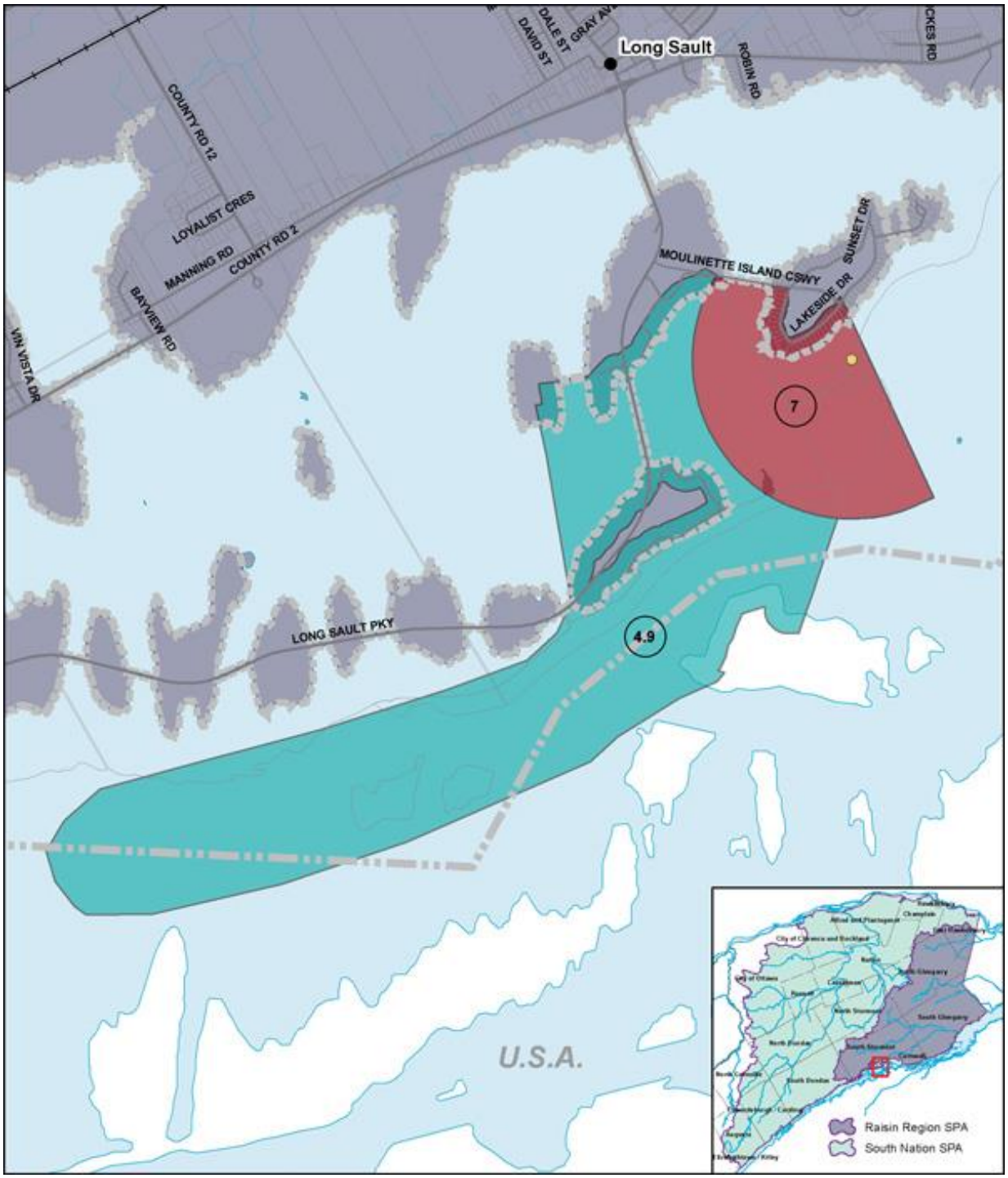


Figure 8-1 Long Sault Intake Protection Zones

10 EVALUATION OF ALTERNATIVES

10.1 Alternative Evaluation Criteria

The evaluation of alternatives is intended to be an unbiased assessment of each alternative against the defined design criteria and the Class EA environmental components that will allow for the selection of the preferred alternative. The following is a brief explanation of each of the primary criteria:

1. **Technical Environment–** This is a relative comparison of the technical effectiveness of each alternative in achieving the project goals. It is intended to address both feasibility and efficiency of the proposed alternatives. This criterion addresses the technical effectiveness in terms of the user experience, operational effectiveness, and general efficiency of approach.
2. **Natural Environment –** This is both a relative comparison and absolute assessment of impacts (positive and negative) of the proposed alternatives on the natural environment. Specifically, this is looking at the ecosystem impacts, sensitivity of the project area to change and other impacts including changes to geotechnical or hydrogeologic conditions. If the preferred alternative were to have significant absolute impacts that cannot be effectively mitigated that will impact the selection of the preferred alternative even if it is the least impactful of the actionable alternatives.
3. **Social/Cultural Heritage Environment –** This is both a relative comparison and absolute assessment of impacts (positive and negative) of the proposed alternatives on the social (residents, visitors, community, recreational opportunities) and cultural heritage (Indigenous lands, archaeological).
4. **Economic Environment** – This is both a relative comparison and absolute assessment of impacts (positive and negative) of the proposed alternative associated with the economic environment. This addresses the capital cost of the infrastructure required for each alternative as well as other economic impacts such as loss of development potential, lost opportunities associated with land acquired for municipal infrastructure and potential economic loss due to changes in business opportunities. Furthermore, the factor of affordability is a consideration in terms of the cost vs benefit to the community and if the return on investment is reasonable.

10.2 Alternative Evaluation Ranking and Weighting

The approach to determining the preferred alternative is intended to be transparent and defensible. Our approach to is score each alternative against the same parameters and then rank the alternatives relatively. The objective of this approach is to compare apples to apples. It is acknowledged that there is some level of subjectivity to this type of analysis and the explanation to support the scoring is intended to provide justification for the assessment of each parameter.

The scoring criteria that are used and examples of what will constitute each scoring situation are included in Table 10-1. Minor variations between similar alternatives will be scored based on the comparative evaluation between each alternative. For example, two alternatives that both are feasible with limited restrictions, but, relatively, the limited restrictions are less significant on one alternative than the other, then the alternative with the least restrictions would score an 8 and the alternative with slightly more restrictions would score a 7.

Table 10-1: Scoring Criteria Examples

	Score				
	0-2	3-4	5-6	7-8	9-10
Relative Impact	**Critical**	**Significant**	**Potential**	**Minor**	**Negligible**
Technical Environment	Does not provide a feasible solution.	Feasible with significant restrictions	Feasible with some restrictions	Feasible with limited restrictions	Feasible with no restrictions
Natural Environment	Definite impacts to species at risk, permanent or irreversible impacts	High potential for impacts to species at risk or natural environment, permanent/semi permanent impacts	Potential for impacts to the natural environment that may have an impact on habitat or natural features, semi-permanent or temporary	Potential for minor impacts to natural environment that can be mitigated to minimize risk.	Limited or no impacts on the natural environment
Social/Cultural Heritage Environment	Major permanent negative impacts on significant population, permanent loss of cultural features	Significant permanent or long-term impacts on social environment, potential for loss of cultural features.	Localized permanent or long-term impacts on social environment, potential for impact on cultural features.	Limited permanent or temporary impacts on social environment, limited potential for impact on cultural features.	Limited to no impacts and any impacts are readily mitigated.
Economic Environment	Unaffordable, catastrophic adverse economic impact on proponent and/or public, return on investment is beyond lifespan of infrastructure	High cost, potential for significant adverse economic impact, return on investment is a significant component of infrastructure lifespan	Relatively high cost, minor potential for adverse economic impact, return on investment is over 10 years.	Relatively low cost, potential for positive economic impact, return on investment is less than 5 years.	Lowest cost, defined positive economic impact, shortest return on investment.

Technical Assessment

The technical assessment for each of the proposed alternatives is tied to the justification and functional effectiveness of each project. The following tables illustrate the evaluation and rating of the natural environmental assessment for each of the proposed alternatives.

Table 10-2: Water Storage Evaluation and Rating - Long Sault

Alternatives	Technical Assessment	Score
Alternative A: Do Nothing	▪ Feasible. ▪ Does not solve the problem limiting potential growth for the future. ▪ Lowest capital cost alternative.	6
Alternative B: Expand Existing Water Treatment Plant with Existing Technology	▪ Feasible. ▪ Meeting study's objective allowing potential growth for the future. ▪ This alternative is compatible with existing technologies currently used on site. ▪ No additional intake required reducing impact on aquatic environment. ▪ Existing operators are skilled with operation of the existing technology	10
Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	▪ Feasible. ▪ Meeting study's objective allowing potential growth for the future. ▪ The proposed treatment technologies are compatible with the membrane technology currently used on site. ▪ No additional intake required reducing impact on aquatic environment. ▪ Existing operators will need to be trained to operate a new technology	8
Alternative D: Build New Treatment Plant in Ingleside	▪ Feasible. ▪ Meeting study's objective allowing potential growth for the future. ▪ New intake is required reducing, resulting in potential impact on aquatic environment.	7

Natural Environment Assessment

The following tables illustrate the evaluation and rating of the natural environmental assessment for each of the proposed alternatives.

Table 10-3: Water Storage Natural Environment Evaluation - Long Sault

Alternatives	Natural Environmental Assessment	Score
Alternative A: Do Nothing	▪ No major impact identified	8
Alternative B: Expand Existing Water Treatment Plant with Existing Technology	▪ Majority of the area available has been disturbed. ▪ Site is landscaped area. ▪ Does not border any sensitive areas.	10

Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	▪ Majority of the area available has been disturbed. ▪ Site is landscaped area. ▪ Does not border any sensitive areas.	10
Alternative D: Build New Treatment Plant in Ingleside	▪ Sites would remove natural areas from inventory. ▪ New Intake will result in potential impact/disturbance to the aquatic life	6

Social Environmental Assessment

From a social environmental perspective, all of these projects will have an impact during construction with localized impacts. The following tables illustrate the evaluation and rating of the social environmental assessment for each of the for each of the proposed alternatives.

Table 10-4: Water Storage Social Environment Evaluation - Long Sault

Alternatives	Social/Cultural Heritage Environment Assessment	Score
Alternative A: Do Nothing	▪ No major impact identified. ▪ Limit to potential development which will decrease new economic growth potential within Long Sault and Ingleside	6
Alternative B: Expand Existing Water Treatment Plant with Existing Technology	▪ No potential impacts to archaeological, cultural and built heritage resources as no new facility construction is required. ▪ Localized impacts with equipment installation. ▪ Development on existing site would have no long-term impacts.	9
Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	▪ No potential impacts to archaeological, cultural and built heritage resources as no new facility construction is required. ▪ Localized impacts with equipment installation. ▪ Development on existing site would have no long-term impacts.	9
Alternative D: Build New Treatment Plant in Ingleside	▪ Construction of a new plant will require developing a new site, thus resulting in localized impacts associated to the construction of a new facility. ▪ Opportunities to minimize impacts will be considered.	7

Economic Environment Assessment

The economic environment related to these projects is primarily associated with the capital cost of implementation and the benefits achieved through the implementation of the works.

Estimates used in the proposed alternatives are order of magnitude estimates for comparative purposes. Actual implemented costs are subject to final design, impacts of inflation and market conditions at the time of implementation. Estimates would be considered Class “D” or conceptual design level estimates, and the level of accuracy is typically plus or minus 20%.

The following tables illustrate the evaluation and rating of the economic environmental assessment for each of the proposed alternatives.

Table 10-5: Water Storage Economic Environment Evaluation - Long Sault

Alternatives	Economic Environmental Assessment	Score
Alternative A: Do Nothing	▪ No capital cost. ▪ Equal economic benefit to the community.	10
Alternative B: Expand Existing Water Treatment Plant with Existing Technology	▪ Capital cost of approximately $6M. ▪ No land acquisition required. ▪ Equal economic benefit to the community.	9
Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	▪ Capital cost of approximately $15M. ▪ Land acquisition required. ▪ No additional infrastructure upgrades required. ▪ Equal economic benefit to the community.	8
Alternative D: Build New Treatment Plant in Ingleside	▪ Capital cost of approximately $20M. ▪ Land acquisition required. ▪ Significant upgrades required. ▪ Equal economic benefit to the community.	7

Alternative Evaluation Summary

The following tables illustrate the evaluation of each type of servicing alternative relative to the evaluation criteria for determination of the preferred alternative.

Table 10-6: Alternative Evaluation Ranking Summary – Water Storage Alternatives

	Alternative A: Do Nothing	Alternative B: Expand Existing Water Treatment Plant with Existing Technology	Alternative C: Expand Existing Water Treatment Plant with Alternative Technology	Alternative D: Build New Treatment Plant in Ingleside
Technical	SCORE: 6 RANK: 4th	SCORE: 10 RANK: 1st	SCORE: 8 RANK: 2nd	SCORE: 7 RANK: 3rd
Natural	SCORE: 8 RANK: 2nd	SCORE: 10 RANK: 1st	SCORE: 10 RANK: 1st	SCORE: 6 RANK: 3rd
Social/Cultural Heritage	SCORE: 6 RANK: 3rd	SCORE: 9 RANK: 1st	SCORE: 9 RANK: 1st	SCORE: 7 RANK: 2nd
Economic	SCORE: 10 RANK: 1st	SCORE: 9 RANK: 2nd	SCORE: 8 RANK: 3rd	SCORE: 7 RANK: 4th
Final Score & Ranking	SCORE: 30 (75%) RANK: 2nd	**SCORE: 38 (95%) RANK: 1st**	SCORE: 35 (87.5%) RANK: 3rd	SCORE: 27 (67.5%) RANK: 4th

Therefore, the preferred alternative is Alternative B: Expand Existing Water Treatment Plant with Existing Technology.

12 PREFERRED ALTERNATIVE

12.1 Evaluation of Alternatives for the Preferred Alternative

The evaluation process includes an overall review of the alternative solutions, including technical performance of each alternative solution as well as positive and negative impacts on the natural environment, social environment, economic environment, and technical parameters identified by the Project Team. In the previous section, *Alternative B: Expand Existing Water Treatment Plant with Existing Technology* has been identified as the preferred alternative.

In the next section, potential sub-alternatives have been explored in order to optimize the identified preferred alternative and assessed according to the following criteria:

- **Design and Implementation Complexity:** This criterion describes the relative design and implementation complexity for the alternative. A score of 1 means high complexity. A score of 10 indicates that the alternative is relatively easy to implement.
- **Flexibility for Future Expansion:** This criterion describes the compatibility of the alternative to phasing plan, ease of adding new components. A score of 1 means that the alternative is no flexible and does not allow for future expansion. A score of 10 indicates that the alternative is extremely flexible for future expansion.
- **Reliability:** This criterion describes the ability of the alternative to perform with a high degree of reliability and predictability. A score of 1 means that the alternative is not reliable.
- **Capital Cost Impacts:** This criterion describes the relative capital cost of the alternative. A score of 1 means that the alternative has high capital costs.

12.1.1 Low Lift Pump System

The following alternatives have been identified in order to upgrade the existing Low lift pumping system:

- **Alternative A: Install a fourth pump as needed base on growth.**

  This alternative will require to leave in place the existing low-lift pumps and add a fourth pump as needed base on growth to provide a total rated capacity of 200 L/s at 25.8 m of TDH.
- **Alternative B: Replacing the existing low-lift pumps with large units and provide modular design capacity.**

  This alternative will require to upgrade the existing low-lift pumps with three (2 duty/1 standby) new low lift pumps, each sized to handle up to 70 L/s at a TDH of 25.8m for interim solution. The pumping systems will be sized with modular design capacity to allow for the addition of new pumps to raise the firm capacity of the system. A fourth pump will be added for ultimate design flow to provide a total rated capacity of 200 L/s at 25.8 m of TDH.
- **Alternative C: Upgrading pumps to ultimate flow.**

  This alternative will require to upgrade the existing low-lift pumps with four new pumps (3 duty/1 standby), each rated to provide 100 L/s (for a total of 200 L/s rated capacity) at 25.8m of TDH to provide a total rated capacity of 200 L/s at 25.8 m of TDH. As interim solution, only two pumps will be used.

An assessment of the aforementioned alternatives is provided in Table 11-1.

Table 12-1 Evaluation of potential sub-alternatives for low lift pumping system upgrades

	Alternative A: Install a fourth pump as needed base on growth	**Alternative B:** Replacing the existing low-lift pumps based on growth.	**Alternative C:** Upgrading pumps to ultimate flow.
Design and Implementation Complexity	**Score: 9** Increased capacity can be implemented in phases with limited new equipment and minimal interruption to water production. However, the existing pumps are approximately 20-years old and near to the end of their service life.	**Score: 9** Increased capacity can be implemented in phases with limited new equipment and minimal interruption to water production.	**Score: 8** Low lift system sized for ultimate flow This alternative will require the construction of a new low-lift pump line for the fourth pump.
Flexibility for Future Expansion	**Score: 7** This alternative is not fully able to adapt to future growth and increase in water demand as the existing pumps are approximately 20-years old and near to the end of their service life.	**Score: 10** The alternative is able to adapt to increases in water demand.	**Score: 9** The alternative is able to adapt to increases in water demand. This alternative will require the construction of a new low-lift pump line for the fourth pump.
Reliability	**Score: 7** The existing pumps are near to the end of their lifespan. Most of the upstream components are exposed to harsh operating conditions and subject to significant wear and tear through normal operation.	**Score: 9** The alternative is robust and expected to perform with a high degree of reliability	**Score: 9** The alternative is robust and expected to perform with a high degree of reliability
Capital Cost Impacts	**Score: 8** Lower capital costs. However, as the pumps are near the end of their life, higher level of maintenance is expected. Also, the pumps will expose treatment equipment to poor operating conditions, increasing mechanical stress of treatment equipment and potential wear and tear.	**Score: 10** Lower capital costs than alternative C.	**Score: 9** Higher capital costs due to the construction of a new low-lift pump line for the fourth pump
Final Score	**31**	**38**	**35**

The preferred alternative to upgrade the existing low-lift pump system is by proceeding with *Alternative B: Replacing the existing low-lift pumps based on growth.*

12.1.2 Raw Water Pre-Filtration

The following alternatives have been identified in order to upgrade the existing Raw Water Pre-Filtration system:

- **Alternative A: Maintain existing pre-filters in operation and upgrade as needed.**

  This alternative will require to leave in place the existing membrane pre-filtration system. The pre-filters will be upgraded based on growth and once signs of poor operating conditions are arising.

- **Alternative B: Upgrade filters to meet increased capacity.**

  This alternative will require to be upgraded within the next 5-years in order to meet forecasted capacity. The new pre-filters would need to be sized to meet up to 200 L/s.

An assessment of the aforementioned alternative is provided in Table 11-2.

Table 12-2 Evaluation of potential sub-alternatives for membrane pre-filtration system upgrades

	Alternative A: Maintain existing pre-filters in operation and upgrade as needed	**Alternative B:** Upgrade filters to meet increased capacity
Design and Implementation Complexity	**Score: 9** Increased capacity can be implemented in phases with equipment replaced as needed. Potential (minimal) interruption to water production.	**Score: 8** Increased capacity implemented within the next 5-years. New equipment will be required and minimal interruption to water production is expected.
Flexibility for Future Expansion	**Score: 8** The alternative is able to adapt to increases in water demand. Pre-filter will be replaced as needed based on growth and/or potential signs of failure.	**Score: 10** The alternative is able to adapt to increases in water demand. Pre-filter will be replaced to meet ultimate flow within the next 5-years.
Reliability	**Score: 7** The existing pre-filter are near to the 20-years of operation. Although no signs of failure are currently present, it is anticipated that wear and tear has occurred, and premature failure or shorter-term replacement may be required.	**Score: 9** The alternative is robust and expected to perform with a high degree of reliability
Capital Costs	**Score: 10** Lower capital costs alternative. However, as the pre-filter are near to the 20-years of operation, potential maintenance is expected.	**Score: 9** Higher capital costs Alternative C.
Final Score	**34**	**36**

The preferred alternative to upgrade the existing Raw Water Pre-Filtration system is by proceeding with *Alternative B: Upgrade filters to meet increased capacity*.

12.1.3 Membrane Filtration

The following alternatives have been identified in order to upgrade the existing Membrane Filtration system:

- **Alternative A: Fill out empty spaces with new membranes.**

  This alternative will require to expand system capacity by increasing the number of existing membranes modules up to 72, filling the empty membrane spaces within each tank. This option will lead to achieving a total of approximately 14,735 m^3/d, limiting future growth.

- **Alternative B: Move existing membranes to existing cassettes and fill out empty cassettes with new membranes.**

  This alternative will require to expand system capacity by moving the existing membranes into the empty spaces of the existing cassettes, maximizing full capacity in each cassette. New membrane modules will be added to empty cassettes, leading to achieving a total of approximately 15,129 m^3/d, limiting future growth.

- **Alternative C: Expand to four trains and reduce number of modules per cassette in interim.**

  This alternative will require to install a fourth membrane train and reduce the number of membranes modules by the addition of new cassettes with larger membrane modules. Since the fourth tank will change redundancy from 50% to 25%, each membrane tank will be equipped with 60 membrane modules rather than 72. This option will lead to achieving a total of approximately 22,693 m^3/d.

An assessment of the aforementioned alternatives is provided in Table 11-3.

Table 12-3 Evaluation of potential sub-alternatives for membrane filtration upgrades

	Alternative A: Fill out empty spaces with new membranes	**Alternative B:** Move existing membranes to existing cassettes and fill out empty cassettes with new membranes	**Alternative C:** Expand to four trains and reduce number of modules per cassette in interim
Design and Implementation Complexity	**Score: 9** The alternative has low design complexity and easier to implement.	**Score: 9** The alternative has low design complexity and easier to implement	**Score: 8** The alternative has moderate design and implementation complexity relative to the addition of a fourth membrane train
Flexibility for Future Expansion	**Score: 7** Low compatibility with the proposed growth plan but easy to add additional equipment with minimal construction and interruption to live plant production.	**Score: 7** Low compatibility with the proposed growth plan but easy to add additional equipment with minimal construction and interruption to live plant production.	**Score: 10** The alternative is fully compatible with the proposed growth plan, easy to add additional equipment with minimal construction and interruption to live plant production, expansion without complicating operation and control.
Reliability	**Score: 9** The process is robust and expected to perform with a high degree of reliability in terms of treated water quality relative to the forecasted growth.	**Score: 9** The process is robust and expected to perform with a high degree of reliability in terms of treated water quality relative to the forecasted growth.	**Score: 9** The process is robust and expected to perform with a high degree of reliability in terms of treated water quality relative to the forecasted growth.
Capital Costs	**Score: 9** The alternative has a relatively moderate capital cost.	**Score: 9** The alternative has a relatively moderate capital cost.	**Score: 8** The alternative has a relatively. higher capital cost than Alternative A and Alternative B due to the addition of a fourth membrane train.
Final Score	**34**	**34**	**35**

The preferred alternative to upgrade the existing membrane filtration system is by proceeding with *Alternative C: Expand to four trains and reduce number of modules per cassette in interim.*

12.1.4 Permeate Pumps

The following alternatives have been identified in order to upgrade the existing Permeate Pumps system:

- **Alternative A: Operate existing pumps further on their curves.**

  This alternative would require to operating the permeate pumps further on their curves, adjusting the flow rate and head to move the pump's operating point along its performance curve in order to meet forecasted flow.
- **Alternative B: Upgrade existing pumps with new pumps.**
- This alternative would require to upgrades the existing permeate pumps according to the membrane filtration upgrades in order to meet the forecasted flow. Pumps will be replaced one every year or one every other year depending on growth.

An assessment of the aforementioned alternatives is provided in Table 11-4.

Table 12-4 Evaluation of potential sub-alternatives for permeate pump system upgrades.

	Alternative A: Operate existing pumps further on their curves	**Alternative B:** Upgrade existing pumps with new pumps
Design and Implementation Complexity	**Score: 7** The alternative has low design complexity. However, to operate pumps further along their curves, adjustments will be needed in the system, such as changing the speed of the pump, adjusting valves, or modifying the piping system. Continuous monitoring is essential to ensure the pump operates within safe limits and to avoid issues (i.e. excessive wear and tear)	**Score: 9** The alternative has low design complexity and easier to implement
Flexibility for Future Expansion	**Score: 7** The alternative is fully compatible with the proposed growth plan. However, operating a pump further on its curve can increase the flow rate, which might be necessary to meet higher demand. However, it will increase mechanical stress.	**Score: 10** The alternative is fully compatible with the proposed growth plan.
Reliability	**Score: 5** Operating a pump further on its curve can increase the flow rate, which might be necessary to meet higher demand. However, this option can lead to increased mechanical stress, resulting in more frequent maintenance and reduced lifespan	**Score: 10** The process is relatively more robust compared to Alternative A, and expected to perform with a high degree of reliability
Capital Costs	**Score: 7** Although this alternative does not require the purchase of new pumps as per alternative B, thus resulting in lower capital costs, operating pumps further on their curves will lead to increased mechanical stress, resulting in more frequent maintenance and reduced lifespan	**Score: 8** This alternative will require to purchase new permeate pumps. However, due to the higher level of reliability than Alternative A, less maintenance will be required. Also, it is expected to result in longer pumps lifespan
Final Score	**26**	**37**

The preferred alternative to upgrade the existing permeate pump system is by proceeding with *Alternative B: Upgrade existing pumps with new pumps.*

12.1.5 Ancillary Upgrades

The following alternatives have been identified in order to upgrade the existing ancillary system units:

- Generator impacts
- SCADA renewal due to age.

There are limited options with these alternatives as they are driven by other components of the project.

With respect to the generator, the existing unit is a single 450 kW diesel generator including 4500 litre double-walled underground diesel storage and associated piping. There are no identified deficiencies with the existing unit; however, it is anticipated that the additional power demands as a result of the increased pumping capacity may exceed the 80% power factor requirement resulting in overloading of the generator or diminished available supply. As such, the options available will be to either add an additional generator or replace the generator with a larger generator. The existing generator is located inside the existing plant building and upsizing the generator within this space may not be possible. Therefore, an exterior generator in a soundproof enclosure and alternative fuel source (natural gas) may be considered.

The existing SCADA system is generally original to the plant construction in the early 2000s. Some of the software is or has become obsolete and as part of the expansion, upgrading the SCADA system including some instrumentation will be necessary and appropriate including upgrades to the external connected facilities (Ingleside Booster Station).

12.2 Summary of Optimized Preferred Alternative

As detailed in the previous sections, the preferred alternatives to increase the capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant (WTP) are as follows:

- Replacing the existing Low-Lift pumps with larger units sized for build-out.
- Expand the existing WTP with existing membrane technology by expanding the system to four trains and reducing the number of modules per cassette for the forecasted growth.
- Replacing the membrane pre-filter
- Permeate pumps upgrades.
- Ancillary upgrades to facilitate operations including generator expansion/replacement and SCADA renewal.

The proposed configuration of the system will be optimized in the preliminary design, but in general will include the following components:

- **Replacing the existing Low-Lift pumps with larger units**
  - A total of three (2 duty/1 standby) new low lift pumps should be installed and each pump sized to handle up to 100 L/s at a TDH of 25.8m. The pumping systems will be sized with modular design capacity to allow for the addition of new pumps to raise the firm capacity of the system.
- **Replacing the membrane pre-filter**
  - A total of two new 500-micron membrane pre-filters will need to be installed to meet forecasted capacity of 200 L/s.
- **Expand the existing WTP with existing membrane technology.**
  - Stage 1: Increase the number of membranes modules by the addition of new membranes to the existing cassettes in order to achieve a total capacity of 14,735 m^3/d by 2027.
  - Stage 2: Increase the number of membranes modules by installing new membrane modules with larger surface area in order to achieve a total capacity of 15,129 m^3/d by 2034. This may be advanced subject to development.
  - Stage 3: Adding a fourth membrane train in order to achieve a total capacity of 22,693 m^3/d by 2037. This may be advanced subject to development.
- **Permeate pumps upgrades**
  - The permeate pumping systems will be sized with modular design capacity according to the membrane staging upgrades to allow for the addition of new pumps to raise the firm capacity of the system as required.

At the preferred alternative stage, the estimates are refined to a Class “D” (+/-25%) stage due to the opportunity to optimize and understand the design further. A review of the Municipal Class EA Schedules confirms that the project components would fit within the requirements of Schedule C Class EA. The consultation and review process that has been undertaken complies with, or exceeds, the requirements of the Schedule C Class EA and, therefore, the preferred alternative can be advanced directly to implementation upon resolution of any remaining comments as a result of the notice of completion.

System Upgrades are depicted in Figure 11-1, Figure 11-2, and Figure 11-3.

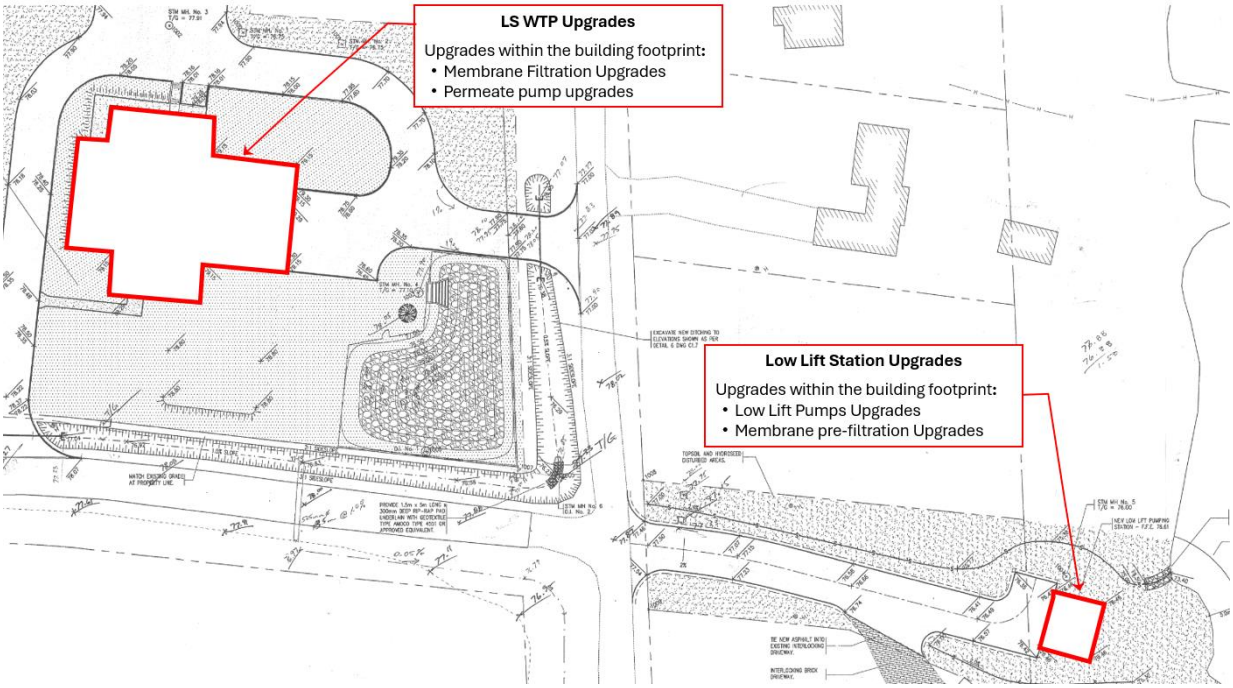


Figure 12-1 Long Sault WTP and Low lift station upgrades – Site Plan

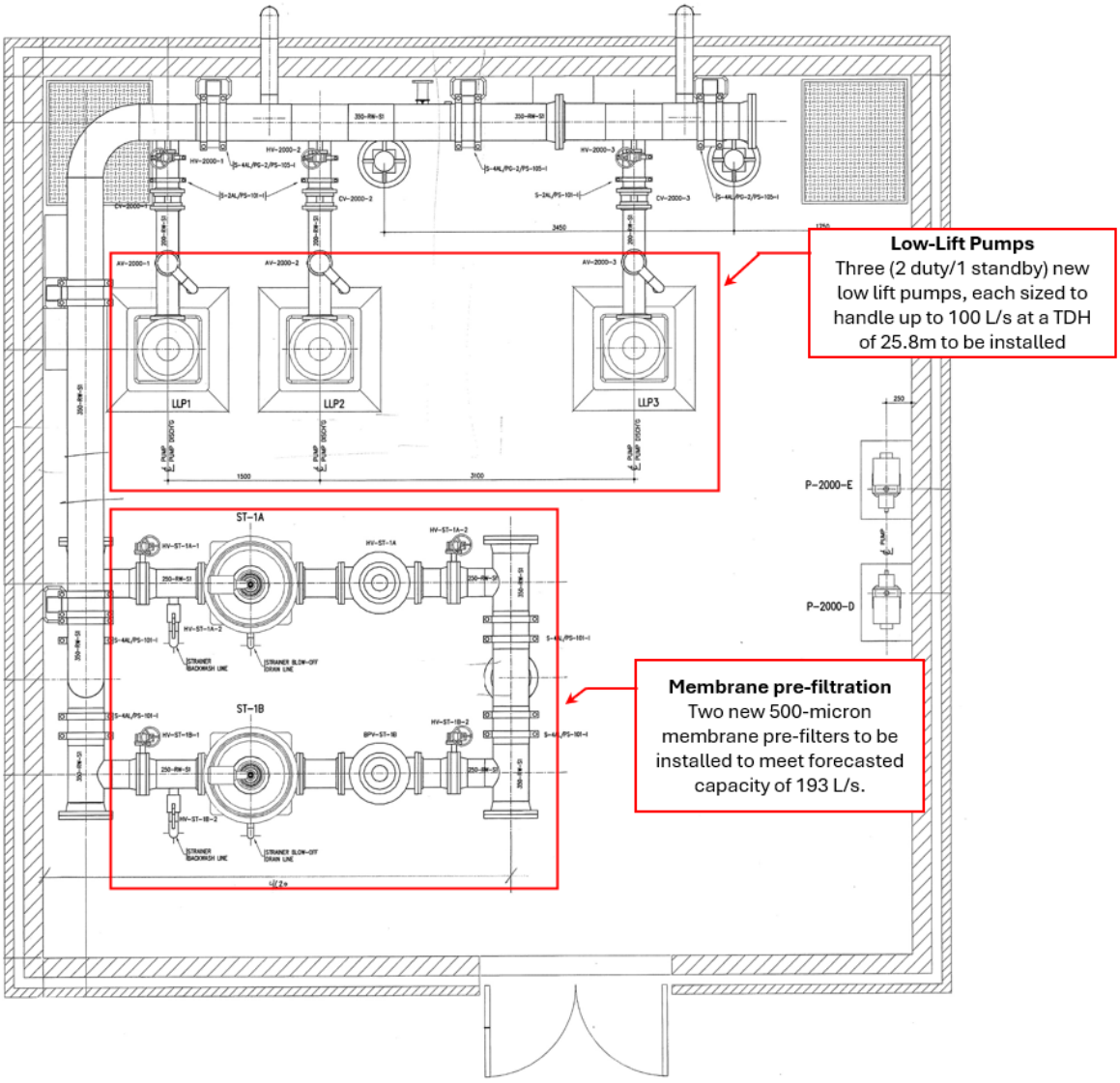


Figure 12-2 Low-Lift Station Upgrades

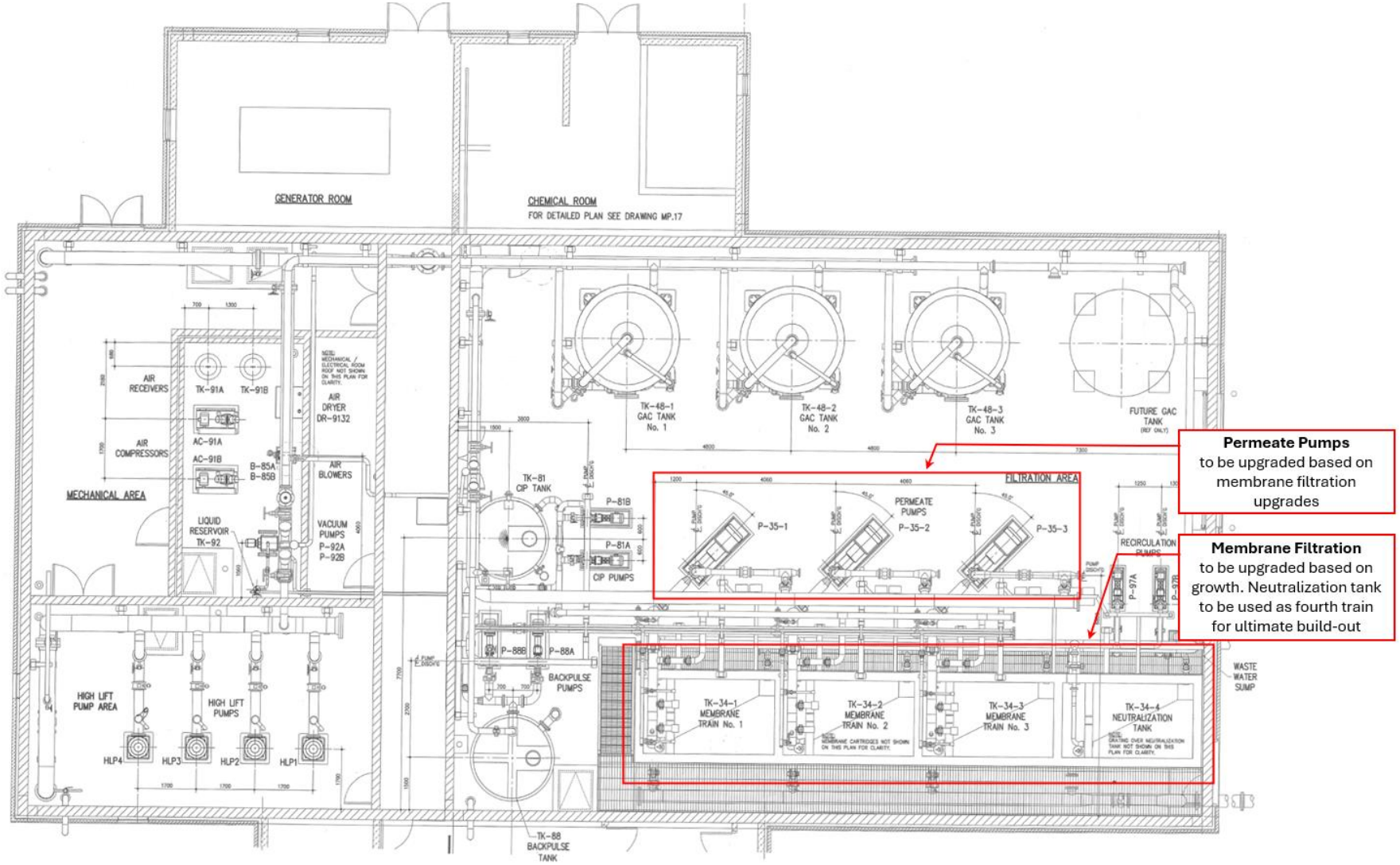


Figure 12-3 Long Sault WTP Upgrades

13 STAGING AND IMPLEMENTATION

One of the metrics of success for this project is the ability to provide the required upgrades while keeping the plant in operation. In order to achieve this goal, the following tasks for implementation would need to be completed:

- **Low Lift pumping system upgrades – to be completed by end of 2026.**
  - Replacement of the low-lift pumps should be completed one pump at the time. The replacement should start with the standby pump while maintaining the other two pumps in operation.
  - Isolate the pump line and proceed with installation of the new pump according to supplier's requirements.
  - Reconnect the isolated pump to the system.
  - Proceed with replacing one of the duty pumps. Performs steps from 2 to 4 until all the pumps have been replaced.
- **Permeate pumps upgrades – to be completed by end of 2026.**
  - Replacement of the permeate pumps should be completed one pump at the time. The replacement should start with the standby pump while maintaining the other two pumps in operation.
  - Isolate the pump line and proceed with installation of the new pump according to supplier's requirements.
  - Reconnect the isolated pump to the system.
  - Proceed with replacing one of the duty pumps. Performs steps from 2 to 4 until all the pumps have been replaced.
- **Membrane pre-filters upgrades – to be completed by end of 2026.**
  - Membrane pre-filters upgrades should be completed one filter at the time. Upgrades should start with the standby pre-filter system while maintaining the other two tanks running.
  - Isolate the membrane pre-filters and proceed with installation of the new system according to supplier's requirements.
  - Reconnect the isolated pre-filter to the system.
  - Proceed with replacing the duty pre-filter while keeping the stand-by filter in operation. Performs steps from 2 to 4 until all the pre-filters have been replaced.
- **Membrane upgrades Stage 1 – to be completed by end of 2026.**

- Membrane upgrades should be completed one tank at the time. All tankages shall be inspected, emptied, and cleaned according to supplier's requirements. Upgrades should start in the standby tank while maintaining the other two tanks running.
- Isolate the system and drain the tank first. Provide cleaning as per suppliers' requirements. Evaluate and – if needed - make repairs as required for the membrane tanks, mounting brackets, hoses, and all connections.
- Remove existing cassettes. Clean each cassette as it is removed from the system according to supplier's requirements. Place additional modules into each cassette.
- Return the cassettes to the system.
- Upload required revisions to the PLC program with adjusted set-points.
- Perform bubble test where applicable to test membrane integrity and review trans membrane pressure (TMP) on the installed membranes and compare to expected values for new membranes; complete repairs/adjustments necessary to provide new membrane performance.
- Reconnect the isolated tank to the system.
- Isolate one of the two duty tanks. Perform steps from 2 to 8 until all the tanks have been upgraded.

- **Membrane upgrades Stage 2 – to be completed by 2034 (subject to demand).**
  - Membrane upgrades should be completed one tank at the time. All tankages shall be emptied and cleaned according to supplier's requirements. Upgrades should start in the standby tank while maintaining the other two tanks running.
  - Isolate the system and drain the tank first. Provide cleaning as per suppliers' requirements. Evaluate and – if needed - make repairs as required for the membrane tanks, mounting brackets, hoses, and all connections.
  - Remove and dispose existing cassettes. Place new cassettes into the tank.
  - Upload required revisions to the PLC program with adjusted set-points.
  - Perform bubble test where applicable to test membrane integrity and review trans membrane pressure (TMP) on the installed membranes and compare to expected values for new membranes; complete repairs/adjustments necessary to provide new membrane performance.
  - Reconnect the isolated tank to the system.
  - Isolate one of the two duty tanks. Perform steps from 2 to 7 until all the tanks have been upgraded.
- **Membrane upgrades Stage 3 – to be completed by 2037 (subject to demand).**
  - Isolate the neutralization tank and provide cleaning of as appropriate. Evaluate and – if needed - make repairs as required for the tank, mounting brackets, hoses, and all connections.
  - Place new cassettes into the tank.
  - Upload required revisions to the PLC program with adjusted set-points.
  - Perform bubble test where applicable to test membrane integrity and review trans membrane pressure (TMP) on the installed membranes and compare to expected values

for new membranes; complete repairs/adjustments necessary to provide new membrane performance.
- Connect the tank to the system.

14 PUBLIC CONSULTATION

14.1 Notice of Commencement

At the onset of the project a list of entities was developed and is provided in **Appendix A**. On March 4th, 2024, a Notice of Study Commencement was issued to the agency contacts and advertised on the Township's website. The Notice of Commencement has been included in **Appendix B**.

Feedback from the issuance of the Notice of Study Commencement were collected and appended to this report.

14.2 Public Information Centres

14.2.1 Public Information Centre No. 1

The Public Information Centre was held in person on March 20th, 2024, from 5:00pm to 7:00pm. A formal presentation was provided.

Boards presenting the project information were presented and representatives from the project team and Township staff were available to answer questions during the PIC. A total of 4 individuals attended the meeting.

The attendance list, presentation materials, and comments sheets are included in **Appendix C.**

14.2.2 Public Information Centre No. 2

The Public Information Centre was held in person on July 11th, 2024, from 5:00pm to 7:00pm.

Boards presenting the project information were presented and representatives from the project team and Town staff were available to answer questions during the PIC. Two persons attended the meeting.

The presentation materials are included in **Appendix D.**

14.3 Stakeholder Consultation

Table 13-1 below provides a summary of public consultation questions, comments and answers received to date by the identified stakeholders. Refer to **Appendix D** for written correspondence received from the public.

Table 14-1 Public Stakeholder Comments and Consultation

Stakeholder	Comment	Action
Identified Stakeholder	No comments received to date.	Follow-up with identified stakeholders prior to finalization and notice of completion.

14.4 Public Agency Comments

Table 13-2 below provides a summary of public consultation questions, comments and answers received to date by Public Agency. Refer to **Appendix D** for written correspondence received from the public.

Table 14-2 Public Agency Comments and Consultation

Stakeholder	Comment	Action
Ministry of Citizenship and Multiculturalism	The MCM provided guidance regarding the Class EA process for this project. In particular, direction have been provided regarding the ministry's interests with respect to the Class EA process and listed as follows: ▪ Archaeological resources, including land and marine. ▪ Built heritage resources, including bridges and monuments, and ▪ Cultural heritage landscapes. ▪ Class EA and Consultation process.	WT reviewed the documents received by the MCM and proceeded with following all the steps for this Class EA project and communications requirements. In particular, provincial policies and regulations have been consulted together with the Township official plan, previous studies, and secondary plans. Sources of potential environmental impacts have been considered during the development and assessment of alternatives and, if any, mitigation measures have been applied.
Transport Canada	After receiving the Notice of Commencement for this project, Transport Canada provided guidance to identify if this study is included in in their environmental assessment context in order to define if further correspondence is needed.	WT and the Township reviewed the documents received and determined that not further correspondence is required.

14.5 Indigenous Community Comments

Table 13-3 below provides a summary of public consultation questions, comments and answers received to date by the Indigenous Community. Refer to **Appendix D** for written correspondence received from the public.

Table 14-3 Public Stakeholder Comments and Consultation

Stakeholder	Comment	Action
Nation Huronne-Wendat	The Nation Huronne-Wendat (Wendake) requested additional information regarding potential archaeological studies or fieldwork necessary for this project.	No archaeological studies or fieldwork was required or completed for this project as the preferred alternative did not require work outside of the existing plant buildings or site.

14.6 Notice of Completion

The Notice of Study Completion was issued on September 18th, 2024, to the agency contacts and advertised on the Township's website. The Notice of Completion is included in **Appendix F**.

15 CONCLUSIONS

The existing Regional WTP has a rated capacity of 8,575 m^3/day. The 20-year forecasted flow is expected to be 16,710 m^3/d. Therefore, the plant will require to be upgraded in order to meet the forecasted flow. The review of treatment system options to upgrade the plant capacity allows for the following system upgrades:

- Low-lift Pumps Upgrades: The existing Low-lift pumps will require to be replaced with larger units in order to handle up to 200 L/s at a TDH of 25.8m
- Pre-filters Upgrades: the existing pre-filters will require to be replaced with larger units in order to handle up to 200 L/s at a TDH of 25.8m
- Membrane System Upgrades: Due to technical effectiveness, the preferred option would be a staged approach increasing the membrane capacity as required according to forecasted development. An upgrade of the permeate pumps will be also required to meet higher flow. The proposed staging approach will be as follow:
  - 2026: Increase the number of membranes modules by the addition of new membranes to the existing cassettes.
  - 2032: Increase the number of membranes modules by new cassettes with larger membrane modules.
  - 2037: Adding a fourth membrane train.

This Environmental Study Report (ESR) represents the completion of the Schedule C Class EA process for this project and, subject to comments, it will allow the project to proceed to implementation.

16 NEXT STEPS

This document is a draft report for Township review. The next steps for the project are as follows:

- Circulate Notice of Completion and access to the report to all identified stakeholders and agencies.
- Upon issuance of the Notice of Completion, agencies, stakeholders, and the general public will have a thirty (30) day period to review the ESR and the work completed to date and provide comments. If the stakeholders feel that the project requires a higher level of study or that additional conditions be proposed on the implementation of the project, they may request to the Minister of the Environment, Conservation and Parks to issue an order regarding the project. If that has not been received following the completion of the review period, then the project may proceed to implementation.
- Subject to the clearance of the Class EA review period, the preliminary design of the proposed components can be advanced to reduce the risk associated with design changes and unknowns.
- The Township can use the budgetary information from the preliminary design to put this project into a design and construction capital budget for implementation immediately in order to meet the upcoming demands.

APPENDIX A

AGENCY CONTACT LIST

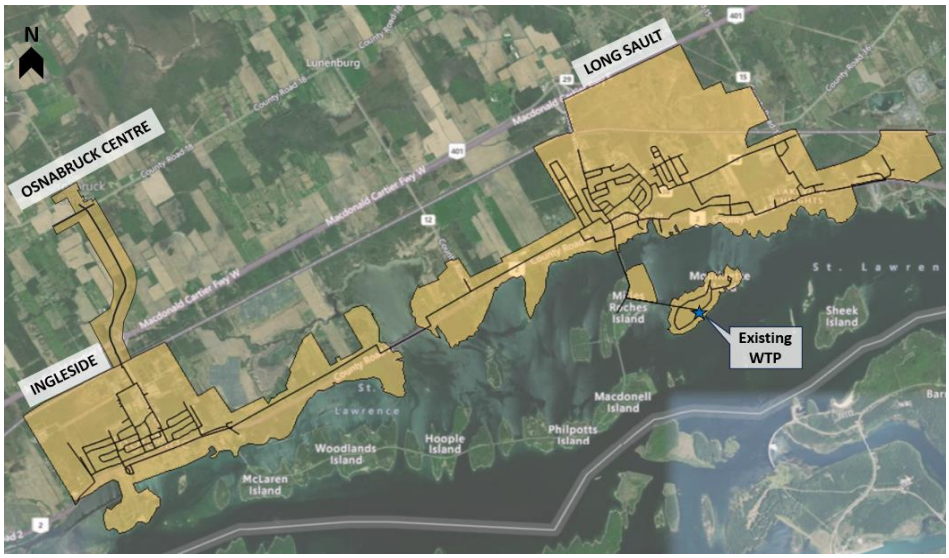
Available by Request from The Township of South Stormont

APPENDIX B

NOTICE OF COMMENCEMENT

NOTICE OF COMMENCEMENT
Long Sault/Ingleside Regional Drinking Water System
Municipal Class Environmental Assessment

Project Overview



The Township of South Stormont (Township) has and is experiencing significant growth in the communities of Long Sault and Ingleside. Moreover, the Township Official Plan allows for additional development within these areas that would exceed the capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant (WTP) located on Moulinette Island in Long Sault.

The Regional Water Treatment Plant was commissioned in 2005 with a 20-year design maximum day design capacity of 8,575 m^3 per day. The system has reached 80% of the design capacity and proposed developments on the system are anticipated to consume the remaining committed capacity leaving limited capacity for growth within a two-to-five-year period.

The Township has initiated a Municipal Class Environmental Assessment (Class EA) to evaluate and select preferred solutions to increase the rated water treatment capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant to meet future system demands. The objective will be to complete the Municipal Class EA and proceed to increase the capacity of the facility in order to meet community needs.

These alternatives may include limiting growth, expanding the existing treatment system or adding new treatment capacity. It is anticipated that this project will be considered a Schedule C Class EA due to the need to expand the rated capacity of the treatment plant.

The proposed solutions will be evaluated and prioritized considering natural, cultural, technical and economic environment, and the preferred solutions will be selected in consultation with regulatory agencies and the public.

Input from the public, agencies and other stakeholders will be sought throughout the study to identify options to address the study findings and optimize the evaluation process. This study is being conducted in accordance with the requirements of Phases 1, 2, 3 and 4 of the Municipal Class Environmental Assessment which is an approved process under the Environmental Assessment Act.

For more information, please visit the Town's website at: https://www.southstormont.ca/

PUBLIC INFORMATION CENTRE

A Public Information Centre (PIC) will be held in late February to gather input from stakeholders. All those interested in the project are invited to attend the PIC. Event details will be announced soon on the Township Website.

For further information on the project or the process or to be added to the project contact list, please contact either the Township or their Consultant below:

Jamie Witherspoon, P.Eng., LEED AP, ENV SP **Project Manager**	**Mohammed Alsharqawi, Ph.D., PMP** **Director of Public Works**
WT Infrastructure Solutions Inc Phone: (833) 984-6372 Jamie.witherspoon@wtinfrastructure.ca	Township of South Stormont Phone: (613) 534-8889 ext. 241 mohammed@southstormont.ca

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act.
With the exception of personal information, all comments will become part of the public record.

APPENDIX C

PUBLIC INFORMATION CENTRE #1
PRESENTATION MATERIALS AND REPORT

Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment

Public Information Centre No. 1

March 20th, 2024

Jamie Witherspoon, P.Eng. – President
Consultant Project Manager
WT Infrastructure Solutions Inc.
jamie.witherspoon@wtinfrastructure.ca

Mohammed Alsharqawi, Ph.D., PMP
Public Works Director
Township of South Stormont
mohammed@southstormont.ca

WELCOME!

The Township of South Stormont welcomes you to this Public Information Centre (PIC) so that we can share study objectives, findings to date, alternative solutions and next steps.

What is the purpose of this Public Information Centre?

- To present an overview of Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment
- To provide information regarding the project scope, identified needs, project opportunities and potential alternatives.
- To collect you feedback on the proposed alternatives, assessment process and next steps of this project

Please review the material and provide us with any comments you may have. Staff are available to answer your questions and receive your comments.

We Want to Hear from You! Provide your comments

Submit comments to a member of the project team.

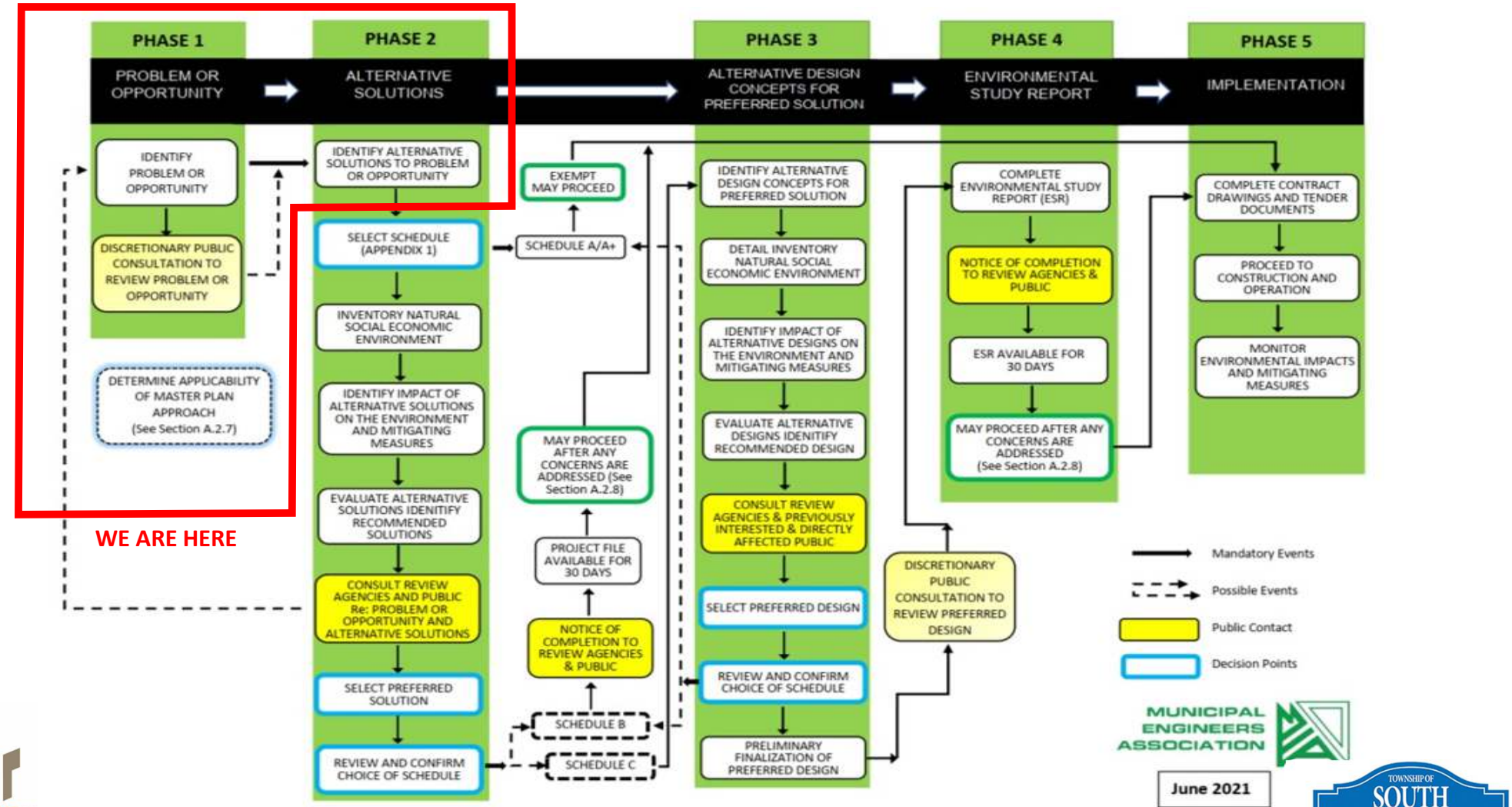
More information including copies of project notices and PIC materials can be found at:

https://www.southstormont.ca/en/index.aspx

Thank you for attending this Public Information Centre!

MUNICIPAL CLASS EA PROCESS

The Township has initiated Municipal Class Environmental Assessment (Class EA) to evaluate and select preferred solutions to increase the rated water treatment capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant to meet future system demands. This project is classified as a Schedule 'C' Municipal Class EA due to the need to expand the rated capacity of the treatment plant and it is subject to Phases 1 through 4 of Municipal Class EA process.



WT INFRASTRUCTURE
PRACTICAL INNOVATION

MUNICIPAL ENGINEERS ASSOCIATION

June 2021

TOWNSHIP OF SOUTH STORMONT

PROJECT OVERVIEW

WHAT ARE WE DOING?

The Master Servicing Plan (2024) anticipate significant growth within the boundaries of Long Sault and Ingleside. The existing Long Sault/Ingleside Regional WTP requires additional treatment capacity to accommodate the planned growth. This study is intended to support the forecasted growth, and it will consider potential cost-effective solutions alternatives to increase the plant capacity.

WHY ARE WE DOING IT?

The existing Regional WTP has a rated capacity of 8,575 m^3/d. The Master Servicing Plan (2024) recommended increasing the Regional WTP capacity to 16,710 m^3/d. Therefore, the Regional WTP will require expansion or upgrades to meet the anticipated water demands. This project is intended to provide adequate solutions to ensure that the plant will be able to meet future demands.

WHAT DOES THIS PROJECT MEAN TO YOU?

Providing more water supply capacity can be done in different ways and could mean expanding the Long Sault/Ingleside Regional WTP or making other investments in the water system. It is expected that any construction will be limited to the WTP property. More information about potential impacts will be provided as the study progresses.

PROJECT NEEDS

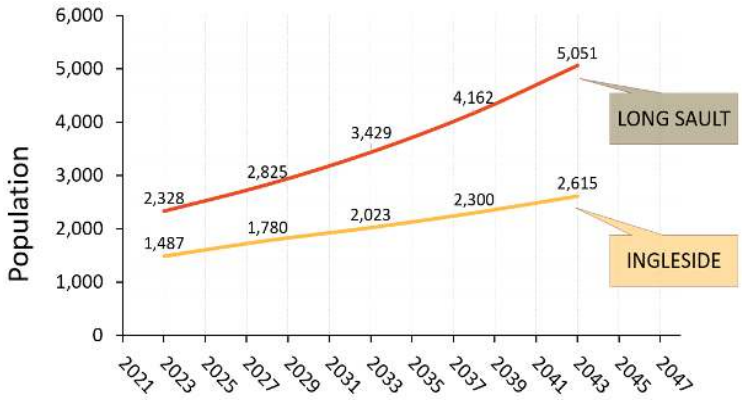
2024 — 2044

CAPACITY OF TREATMENT PROCESS COMPONENTS

The Regional WTP was designed for a 20-year population growth starting in approximately 2005. The combinations of treatment process components reaching their design capacity combined with the development will require that several actions be taken to ensure the capacity is available when the proposed development will occur.

COMMUNITY GROWTH

The Township of South Stormont has experienced population growth since 2001. Population within Long Sault and Ingleside boundaries is growing faster than expected and it is expected to continue to grow over the long term.



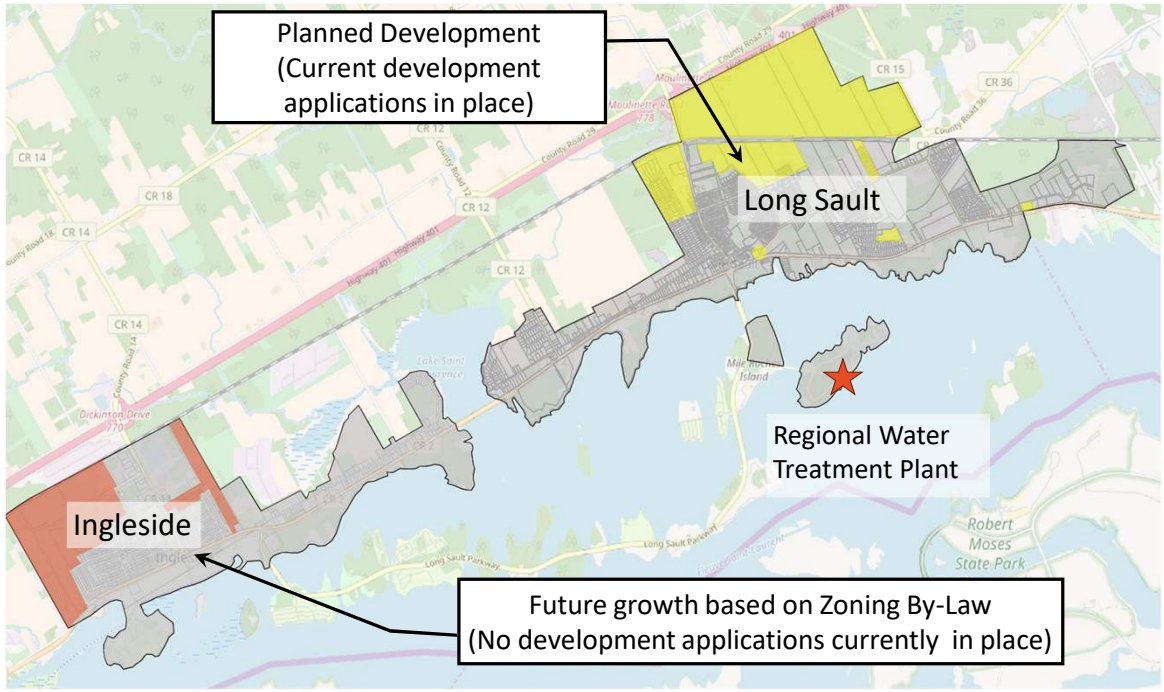
GOOD FISCAL MANAGEMENT

Understanding current and future needs of the existing WTP process components allows the Township to better prioritize fund and budget proactively rather than responding to immediate needs of process components failures.

WT INFRASTRUCTURE
PRACTICAL INNOVATION

TOWNSHIP OF SOUTH STORMONT

EXISTING CONDITIONS AND BOTTLENECKS



20- YEAR FORECASTED DEVELOPMENT

LONG SAULT

- **Residential Development = 678 units**
  - Fenton Farm Development: 43 residential units
  - Parkway Estates Development: 82 residential units
  - Whitetail Avenue Development: 16 residential units
  - Chase Meadows Development 426 residential units
  - Moulinette Road Subdivision: 111 residential units
- **Non-Residential Development = 276 ha**
  - Long Sault Logistics Village Development: 274 ha of industrial development
  - Long Sault Gas Station: 0.75 ha of commercial development
  - Sixsmith Drive: 1.5 ha of commercial development

INGLESIDE

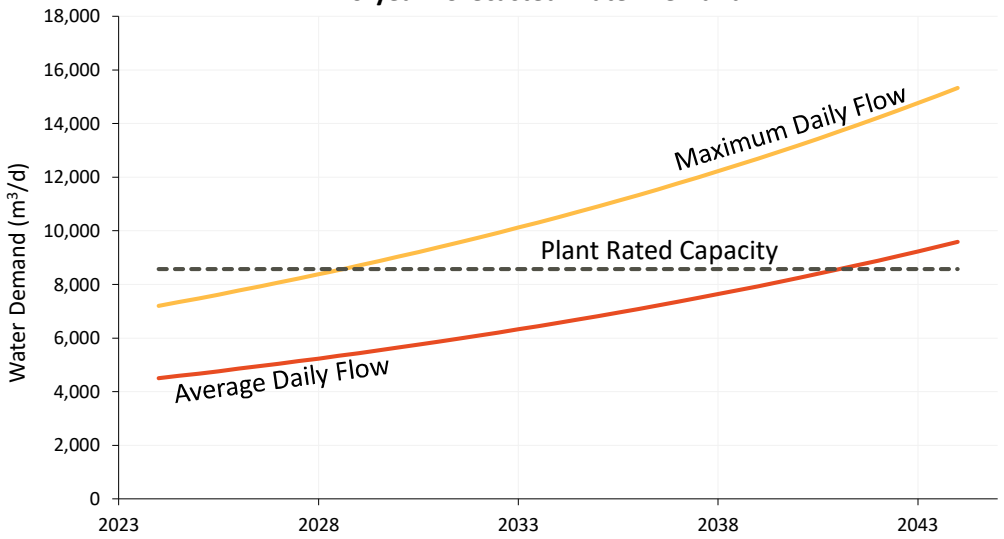
- **Residential Development**
  - Future Growth Potential: 878 residential units
- **Non-Residential Development**
  - Industrial/Commercial Areas: 43 lots

TECHNICAL CONSIDERATIONS

- The existing Regional WTP is 18 years old with 20-year design capacity. Plant was originally designed for up to 2/3 additional capacity within the existing plant building.
- Development demands will exceed capacity within 2-3 years.
- Since the water treatment facility was designed for future growth and has the capacity to be expanded, its capacity expansion will occur within the plant property. No changes to the plant footprint will be required.
- Improvements to treatment processes will be sufficient to help the efficiency and overall operation of the facility while providing additional capacity to meet future growth.

WT INFRASTRUCTURE
PRACTICAL INNOVATION

20-year Forecasted Water Demand



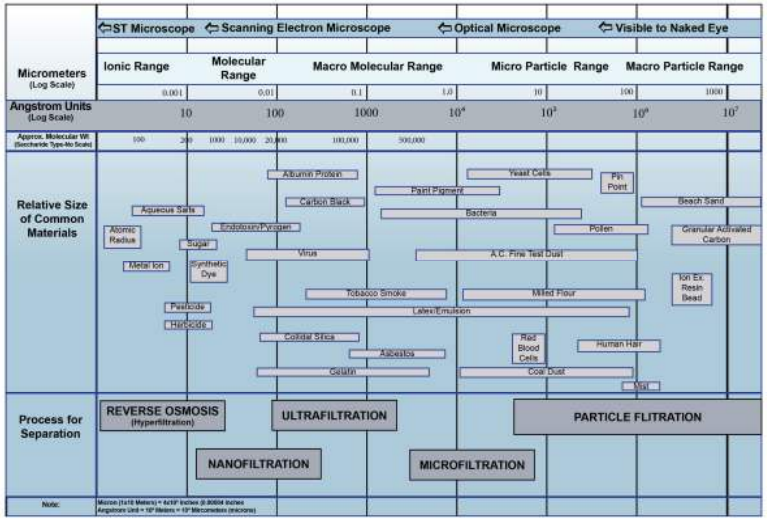
EXISTING TREATMENT SYSTEM

EXISTING PRIMARY TREATMENT SYSTEM

- **MEMBRANE FILTRATION**
  - Operates under suction
  - Ultrafiltration (0.02 µm pore size)
  - Three (3) Trains of Two (2) Cassettes each with 54 membrane modules
  - Total of 324 membrane modules
  - Current Treatment Capacity with redundancy – 8,575 m^3/day
  - Empty spaces for an additional 108 membrane modules (33% or 2,860 m^3/day.

Design Advancements will allow for additional 57% (4900 m^3/day)

Membrane Filtration Spectrum



Membrane Cassette

Membrane Module

Membrane Cassette over Membrane Tank

WT INFRASTRUCTURE
PRACTICAL INNOVATION

ALTERNATIVE SOLUTIONS

ALTERNATIVE A: DO NOTHING

- No proposed upgrades
- Plant Capacity is limited to current rated capacity of 8,575 m^3/day
- Restricts future residential growth
- Does NOT allow for servicing of the Long Sault Logistics Village
- Low/No Cost Alternative

ALTERNATIVE B: EXPAND EXISTING WATER TREATMENT PLANT WITH EXISTING TECHNOLOGY

- Fill out existing membrane cassettes with new membranes
- Plant Capacity is increased to 16,335 m^3/day (190% of existing capacity)
- No restriction on future growth
- Does allow for servicing of the Long Sault Logistics Village
- No construction work required outside of existing buildings
- Operational costs and knowledge is similar to current operation.

ALTERNATIVE C: EXPAND EXISTING WATER TREATMENT PLANT WITH ALTERNATIVE TECHNOLOGY

- Expand plant with new technology in new building
- Plant Capacity can be increased as required maintaining the existing membrane plant for redundancy.
- No restriction on future growth
- Does allow for servicing of the Long Sault Logistics Village
- Construction would be limited to existing site, but new buildings would be required.
- Additional complexity due multiple treatment technologies.
- Higher risk of impacts due to construction.

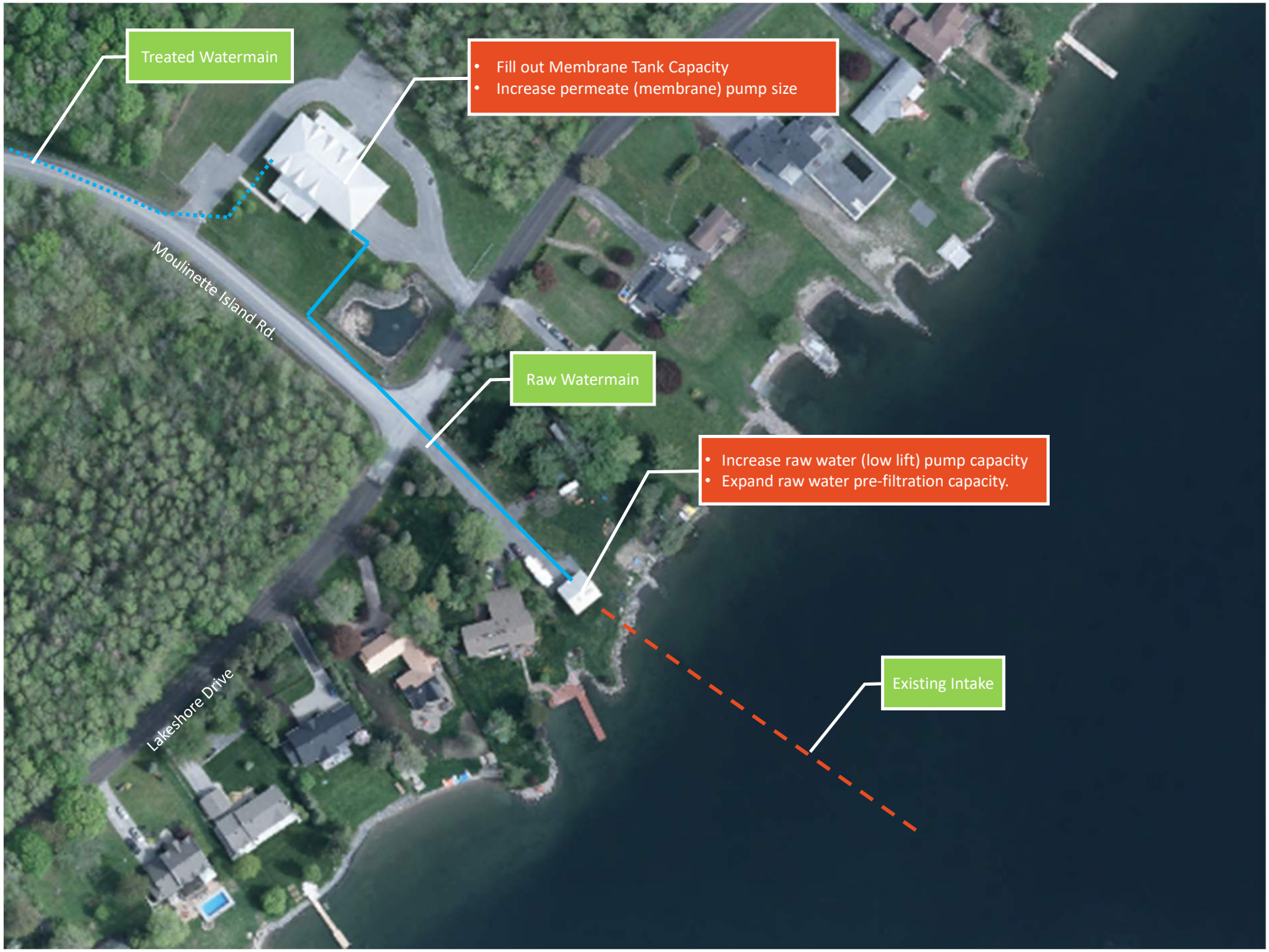
ALTERNATIVE D: BUILD NEW TREATMENT PLANT (INGLESIDE)

- Expand capacity by installing new membrane plant in Ingleside.
- Plant Capacity can be increased as required maintaining the existing membrane plant in Long Sault.
- No restriction on future growth
- Does allow for servicing of the Long Sault Logistics Village
- Construction would be completed on existing booster station site.
- New intake would be required at significant cost and environmental risk.
- Additional operational costs due to two locations and loss of economies of scale.
- Higher risk of impacts due to construction.

Alternative Evaluation and Selection of the Preferred Alternative will be confirmed in Public Information Centre No. 2

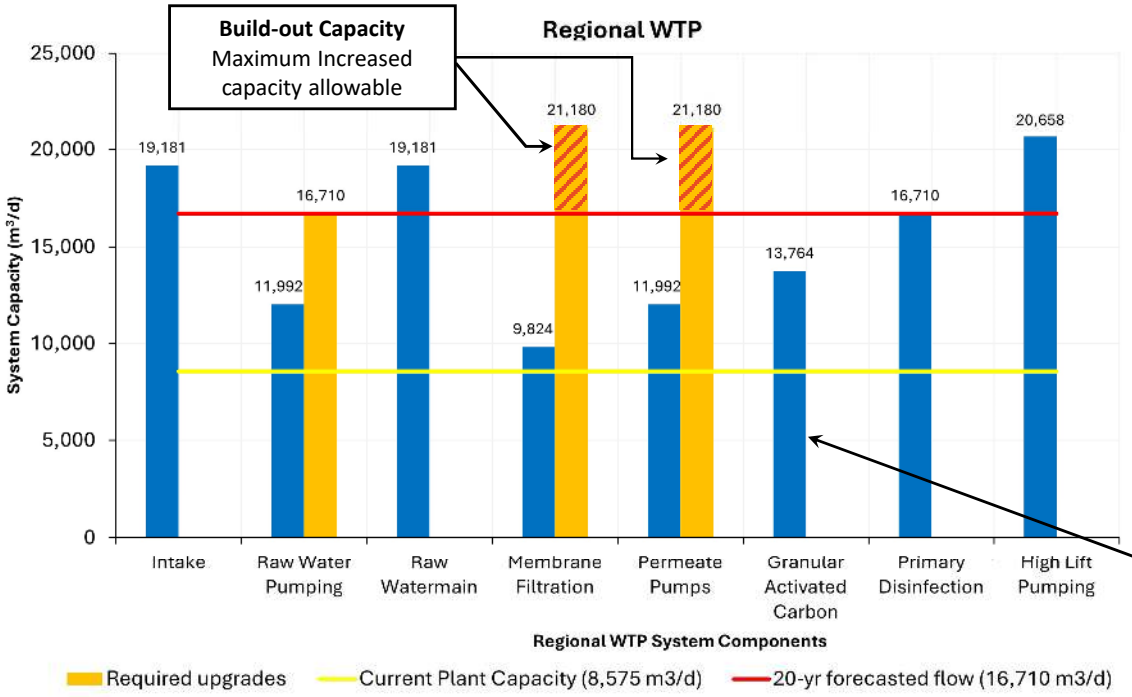
WT INFRASTRUCTURE
PRACTICAL INNOVATION

SOLUTIONS TO INCREASE PLANT CAPACITY



WT INFRASTRUCTURE
PRACTICAL INNOVATION

ALTERNATIVES SOLUTION AND EVALUATION APPROACH



- The existing Regional Water Treatment Plant has a rated capacity of 8,575 m^3/day
- A capacity assessment of each unit process component was performed to evaluate the capabilities of the existing facility to meet current and future wastewater flow as well as effluent requirements.
- Improvements to treatment processes will help the efficiency and overall operation of the facility. In particular, the following system components upgrades will be required:
  - Upgrade the raw water pumping system
  - Upgrade the membrane filtration system, including permeate pumps

Although the three (3) granular activated carbon contactors would not meet the optimum contact time for taste and odour control, taste and odour events in the St. Lawrence are no longer frequent events and therefore an upgrade would not be necessary.

Technical Approach	Planning Approach	Environmental Protection	Community Acceptability	Fiscal Responsibility
▪ The Plant requires increased capacity to accommodate additional flow from future growth. ▪ Since the plant was originally designed for up to 2/3 additional capacity within the existing plant building, upgrades to the existing system process components were considered sufficient to meet future flow needs.	▪ The WTP Upgrades Design will align with the 2024 Master Servicing Plan and Official Plan. ▪ System upgrades should have the ability to support future capacity expansions in alignment with 2044 growth. ▪ Opportunities for future capacity expansions will be considered.	▪ Solutions were developed by considering natural, social, and cultural environments. ▪ Mitigation Measures to decrease the risks of potential impacts to the environments will be considered and applied if needed.	▪ Effective consultation with stakeholders and approval agencies were advanced to develop common sense solutions.	▪ Balancing project costs and technical requirements while protecting the natural, social and cultural environments.

NEXT STEPS

How can you stay engaged and up to date on this Municipal Class EA?

- Visit the Township's project website for study updates: https://www.southstormont.ca/en/index.aspx
- Submit any questions, comments or suggestions by contacting the Study's Project Team
- Attend future Public Information Centre No. 2

WT INFRASTRUCTURE
PRACTICAL INNOVATION

TOWNSHIP OF SOUTH STORMONT

March 20, 2024

Long Sault/Ingleside
Regional Drinking Water System
Municipal Class Environmental Assessment
Information Centre (PIC) Sign-in Sheet

Time: 5:00-7:00 pm, Wednesday March 20, 2024

Place: Town Hall, 2 Mille Roches Road, PO Box 84, K0C 1P0, Long Sault, ON

PLEASE SIGN IN

NAME	ADDRESS	PHONE	EMAIL
Trevor Gustave	[redacted]		
JOHN SLITER			
Todd Manfletty			
James Peets			

Comments and information regarding this project are being collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. Except for personal information, comments submitted may be made public and included in the project documentation.

APPENDIX D

PUBLIC INFORMATION CENTRE #2
PRESENTATION MATERIALS AND REPORT

Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment

Public Information Centre No. 2

July 11th, 2024

Jamie Witherspoon, P.Eng. – President
Consultant Project Manager
WT Infrastructure Solutions Inc.
jamie.witherspoon@wtinfrastructure.ca

Mohammed Alsharqawi, Ph.D., PMP
Public Works Director
Township of South Stormont
mohammed@southstormont.ca

WELCOME!

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Please review the material and provide us with any comments you may have. Staff are available to answer your questions and receive your comments.

We Want to Hear from You! Provide your comments

Submit comments to a member of the project team.

More information including copies of project notices and PIC materials can be found at:

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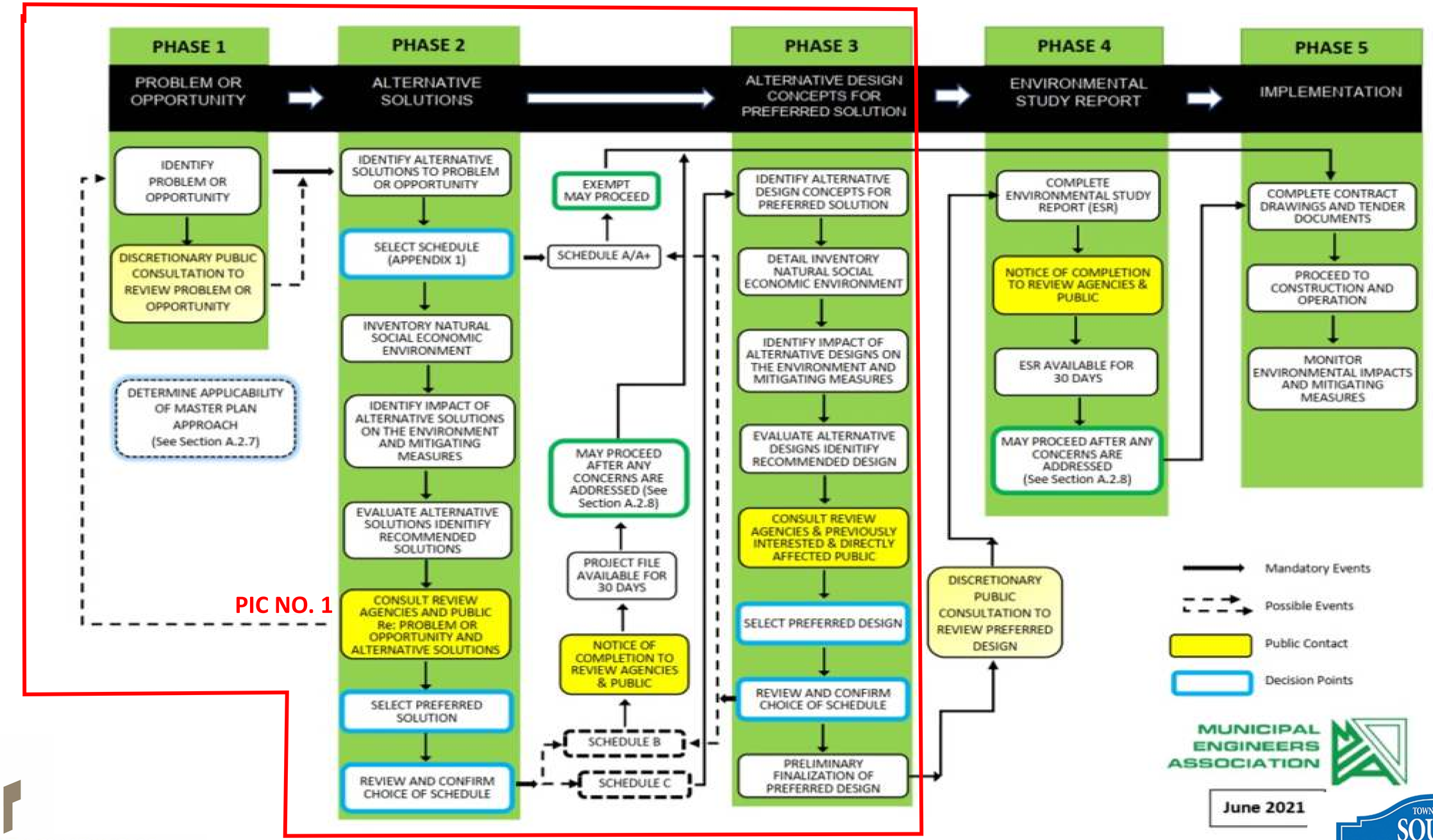
Thank you for attending this Public Information Centre!

MUNICIPAL CLASS EA PROCESS

The Township has initiated Municipal Class Environmental Assessment (Class EA) to evaluate and select preferred solutions to increase the rated water treatment capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant (WTP) to meet future system demands. This project is classified as a Schedule 'C' Municipal Class EA due to the need to expand the rated capacity of the treatment plant and it is subject to Phases 1 through 4 of Municipal Class EA process.



WT INFRASTRUCTURE
PRACTICAL INNOVATION

WE ARE HERE – PHASE 3 – ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION

TOWNSHIP OF SOUTH STORMONT

PROJECT OVERVIEW

WHAT ARE WE DOING?

The Master Servicing Plan (2024) anticipates significant growth within the boundaries of Long Sault and Ingleside. The existing Long Sault/Ingleside Regional WTP requires additional treatment capacity to accommodate the planned growth. This study is intended to support the forecasted growth, and it will consider potential cost-effective solutions alternatives to increase the plant capacity.

WHY ARE WE DOING IT?

The existing Regional WTP has a rated capacity of 8,575 m^3/d. The Master Servicing Plan (2024) recommended increasing the Regional WTP capacity to 16,710 m^3/d. Therefore, the Regional WTP will require expansion or upgrades to meet the anticipated water demands. This project is intended to provide adequate solutions to ensure that the plant will be able to meet future demands.

WHAT DOES THIS PROJECT MEAN TO YOU?

Providing more water supply capacity can be done in different ways and could mean expanding the Long Sault/Ingleside Regional WTP or making other investments in the water system. It is expected that any construction will be limited to the WTP property. More information about potential impacts will be provided as the study progresses.

PROJECT NEEDS

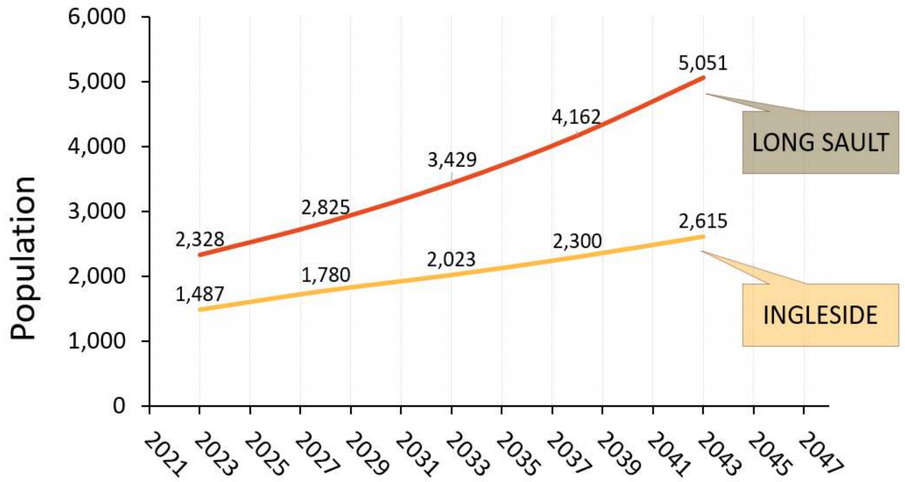
2024 — 2044

CAPACITY OF TREATMENT PROCESS COMPONENTS

The Regional WTP was designed for a 20-year population growth starting in approximately 2005. The combinations of treatment process components reaching their design capacity combined with the development will require that several actions be taken to ensure the capacity is available when the proposed development will occur.

COMMUNITY GROWTH

The Township of South Stormont has experienced population growth since 2001. Population within Long Sault and Ingleside boundaries is growing faster than expected and it is expected to continue to grow over the long term.



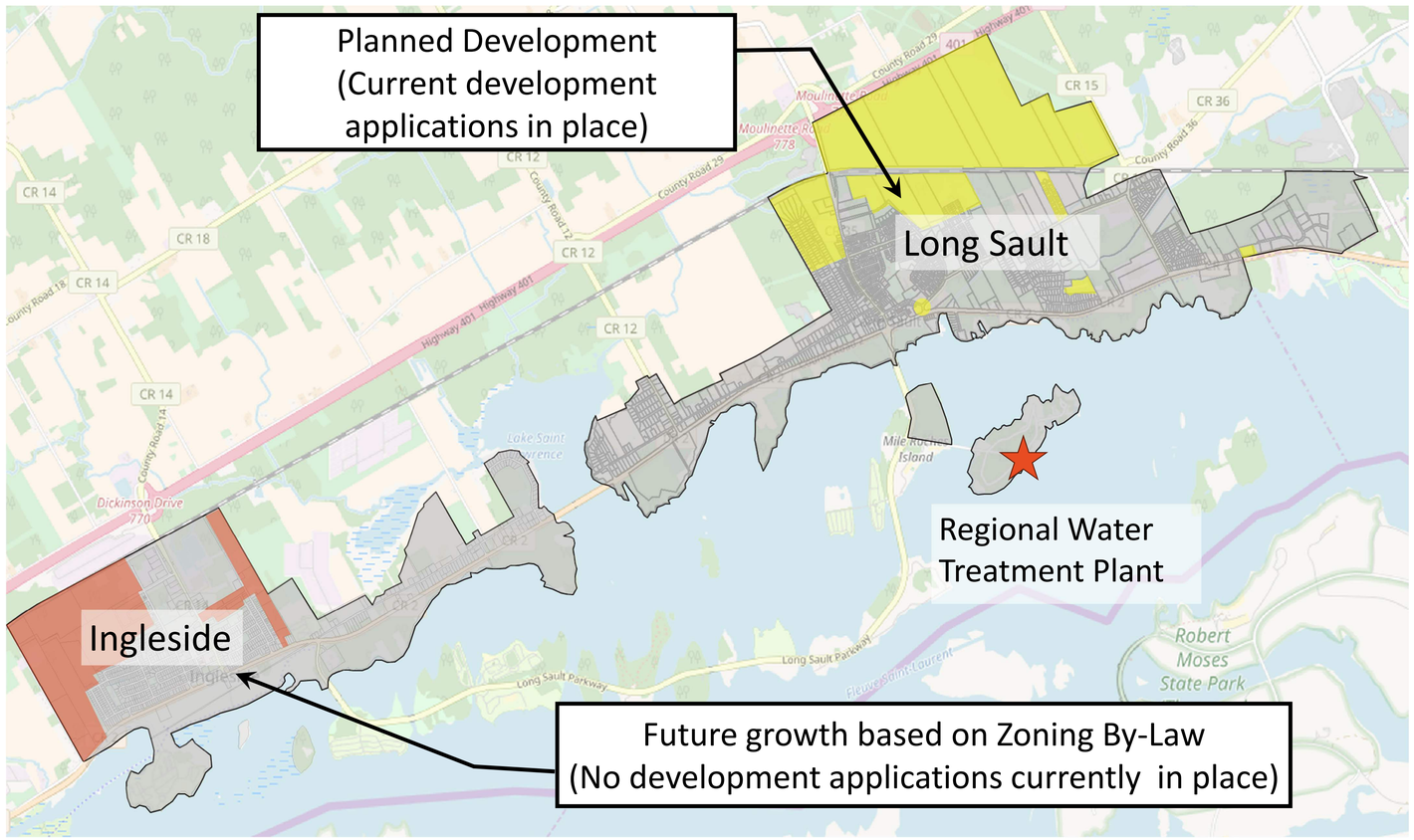
GOOD FISCAL MANAGEMENT

Understanding current and future needs of the existing WTP process components allows the Township to better prioritize fund and budget proactively rather than responding to immediate needs of process component failures.

WT INFRASTRUCTURE
PRACTICAL INNOVATION

TOWNSHIP OF SOUTH STORMONT

EXISTING CONDITIONS AND BOTTLENECKS



20- YEAR FORECASTED DEVELOPMENT

LONG SAULT

- **Residential Development = 678 units**
  - Fenton Farm Development: 43 residential units
  - Parkway Estates Development: 82 residential units
  - Whitetail Avenue Development: 16 residential units
  - Chase Meadows Development 426 residential units
  - Moulinette Road Subdivision: 111 residential units
- **Non-Residential Development = 276 ha**
  - Long Sault Logistics Village Development: 274 ha of industrial development
  - Long Sault Gas Station: 0.75 ha of commercial development
  - Sixsmith Drive: 1.5 ha of commercial development

INGLESIDE

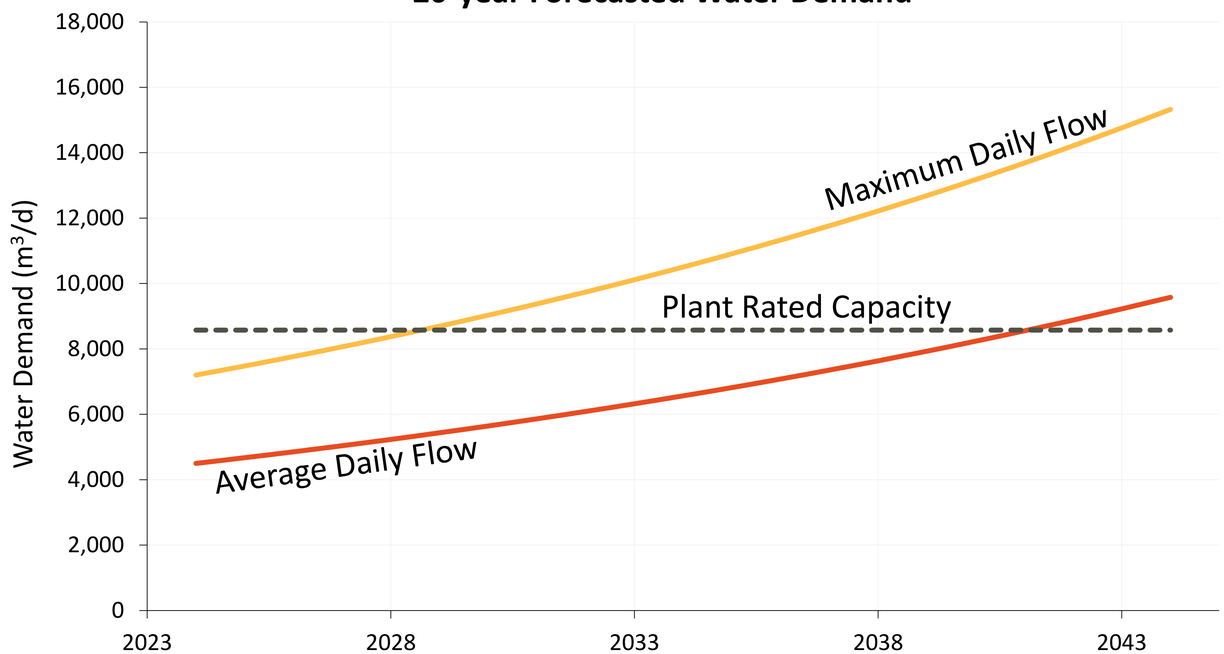
- **Residential Development**
  - Future Growth Potential: 878 residential units
- **Non-Residential Development**
  - Industrial/Commercial Areas: 43 lots

TECHNICAL CONSIDERATIONS

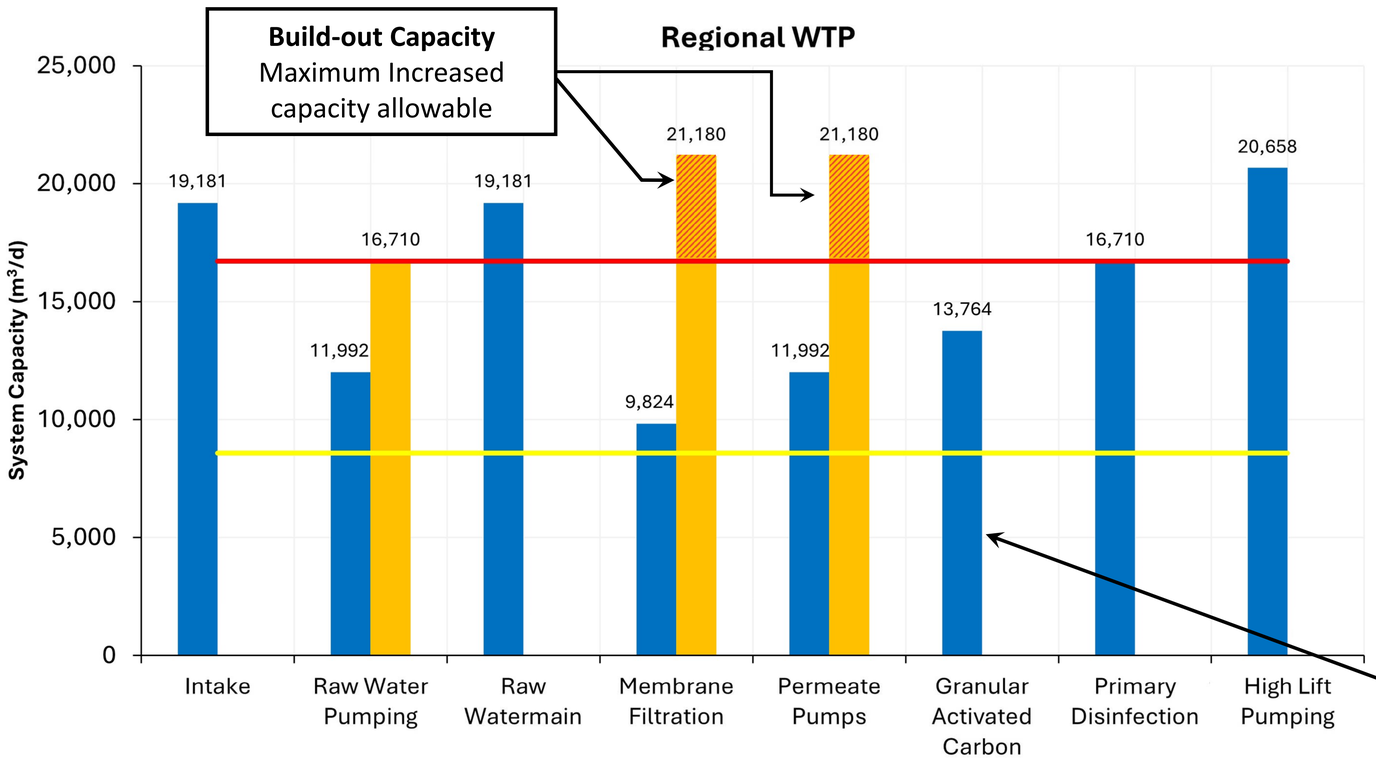
- The existing Regional WTP is 18 years old with 20-year design capacity. Plant was originally designed for up to 2/3 additional capacity within the existing plant building.
- Development demands will exceed capacity within 2-3 years.
- Since the water treatment facility was designed for future growth and has the capacity to be expanded, its capacity expansion will occur within the plant property. No changes to the plant footprint will be required.
- Improvements to treatment processes need to be sufficient to improve the efficiency and overall operation of the facility while providing additional capacity to meet future growth.

WT INFRASTRUCTURE
PRACTICAL INNOVATION

20-year Forecasted Water Demand



ALTERNATIVES SOLUTION AND EVALUATION APPROACH

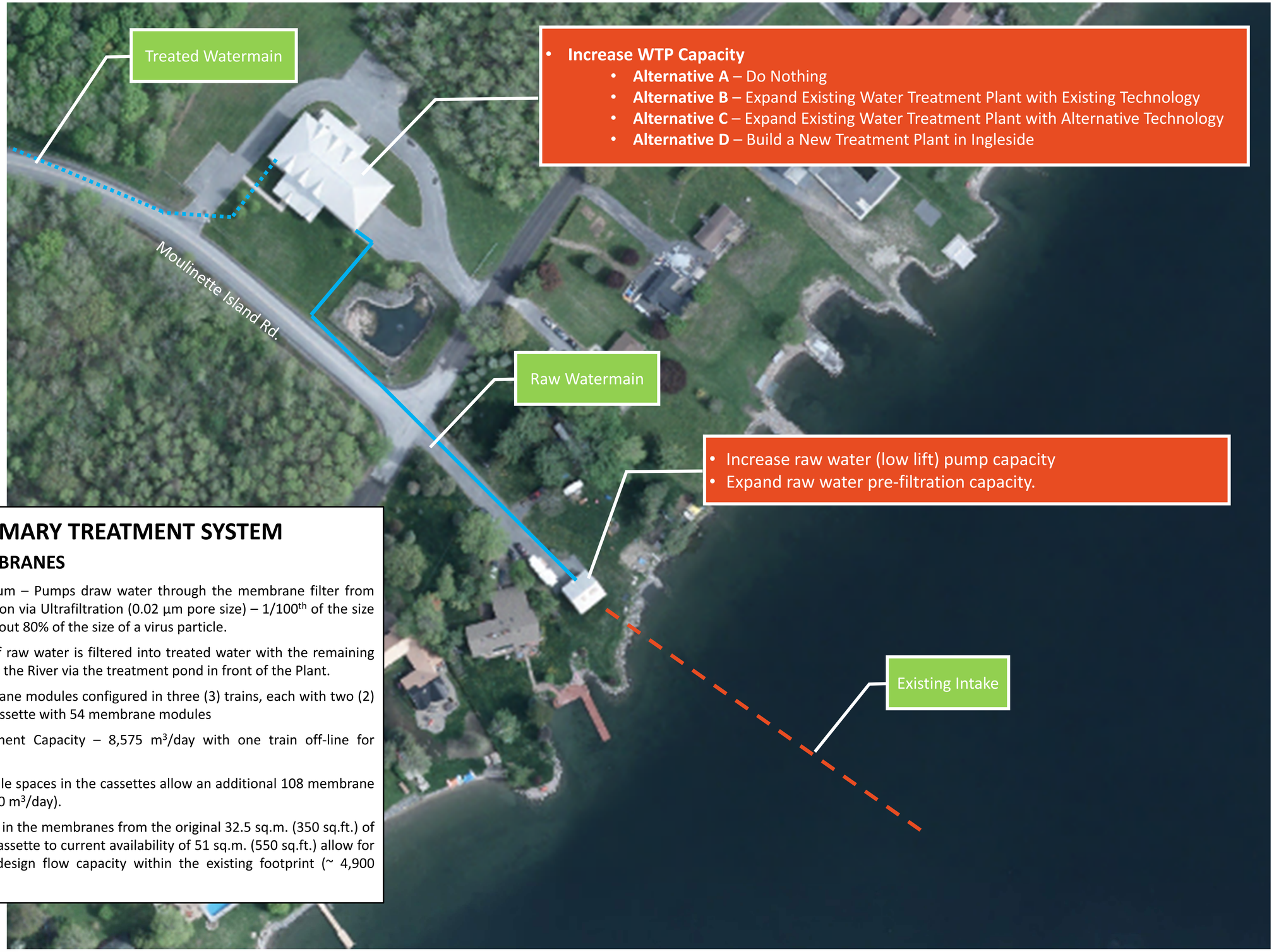


- The existing Regional Water Treatment Plant has a rated capacity of 8,575 m^3/day
- A capacity assessment of each unit process component was performed to evaluate the capabilities of the existing facility to meet current and future wastewater flow as well as effluent requirements.
- Improvements to treatment processes will help the efficiency and overall operation of the facility. In particular, the following system components upgrades will be required:
  - Upgrade the raw water pumping system
  - Upgrade the membrane filtration system, including permeate pumps

Although the three (3) granular activated carbon contactors would not meet the optimum contact time for taste and odour control, taste and odour events in the St. Lawrence are no longer frequent events and therefore an upgrade would not be necessary.

Technical Approach	Planning Approach	Environmental Protection	Community Acceptability	Fiscal Responsibility
▪ The Plant requires increased capacity to accommodate additional flow from future growth. ▪ Since the plant was originally designed for up to 2/3 additional capacity within the existing plant building, upgrades to the existing system process components were considered sufficient to meet future flow needs.	▪ The WTP Upgrade Design will align with the 2024 Master Servicing Plan and Official Plan. ▪ System upgrades should have the ability to support future capacity expansions in alignment with 2044 growth. ▪ Opportunities for future capacity expansions will be considered.	▪ Solutions were developed by considering natural, social, and cultural environments. ▪ Mitigation Measures to decrease the risks of potential impacts to the environments will be considered and applied if needed.	▪ Effective consultation with stakeholders and approval agencies were advanced to develop common sense solutions.	▪ Balancing project costs and technical requirements while protecting the natural, social and cultural environments.

PROPOSED SOLUTIONS TO INCREASE WATER TREATMENT PLANT CAPACITY



- **Increase WTP Capacity**
  - **Alternative A** – Do Nothing
  - **Alternative B** – Expand Existing Water Treatment Plant with Existing Technology
  - **Alternative C** – Expand Existing Water Treatment Plant with Alternative Technology
  - **Alternative D** – Build a New Treatment Plant in Ingleside

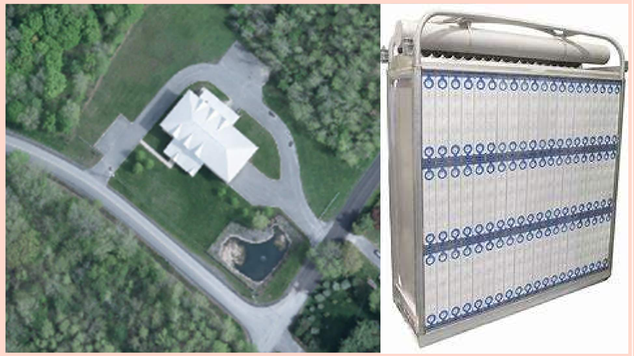
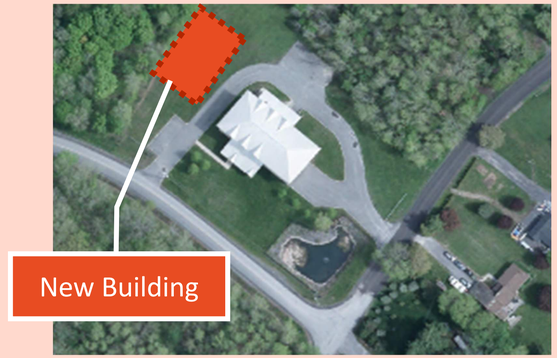
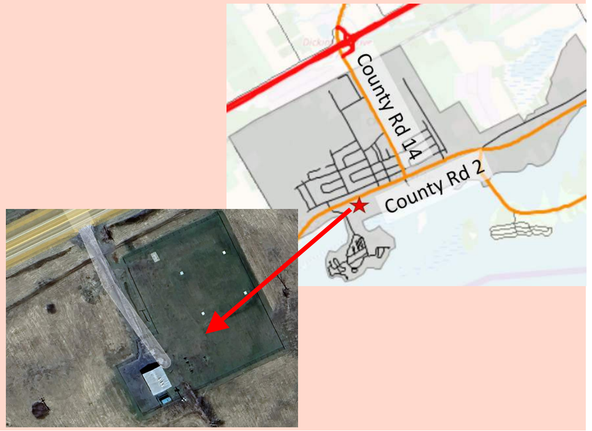
- Increase raw water (low lift) pump capacity
- Expand raw water pre-filtration capacity.

EXISTING PRIMARY TREATMENT SYSTEM

- **ULTRAFILTRATION MEMBRANES**
  - Operates under vacuum – Pumps draw water through the membrane filter from raw to treated condition via Ultrafiltration (0.02 µm pore size) – 1/100th of the size of a bacterium and about 80% of the size of a virus particle.
  - Approximately 85% of raw water is filtered into treated water with the remaining being rejected back to the River via the treatment pond in front of the Plant.
  - 324 individual membrane modules configured in three (3) trains, each with two (2) cassettes and each cassette with 54 membrane modules
  - Current Rated Treatment Capacity – 8,575 m^3/day with one train off-line for maintenance.
  - Existing unfilled module spaces in the cassettes allow an additional 108 membrane modules (33% or 2,860 m^3/day).
  - Design advancements in the membranes from the original 32.5 sq.m. (350 sq.ft.) of membrane area per cassette to current availability of 51 sq.m. (550 sq.ft.) allow for and additional 60% design flow capacity within the existing footprint (~ 4,900 m^3/day).

WT INFRASTRUCTURE
PRACTICAL INNOVATION

ALTERNATIVE SOLUTIONS TO WATER TREATMENT CAPACITY LIMITATIONS

	Alternative A: Do Nothing	Alternative B: Expand Existing Water Treatment Plant with Existing Treatment Technology	Alternative C: Expand Existing Water Treatment Plant with Alternative Treatment Technology	Alternative D: Build New Secondary Treatment Plant in Ingleside
				
Description	No proposed upgrades. Limit growth to the capacity of the existing water treatment system.	Expand existing system within the footprint of the existing treatment plant by increasing the membrane filter area.	Expand plant with new technology in new building in addition to the existing membrane treatment system. Technology to be determined if preferred.	Expand capacity by installing new water treatment plant in Ingleside with adequate capacity to meet build-out requirements of community when combined with existing Moulinette Island facility.
Advantages	▪ No Capital Cost or increased operational cost.	▪ Plant Capacity is increased to 16,335 m^3/day (190% of existing capacity) ▪ No restriction on future growth. Allows for servicing of the Long Sault Logistics Village and proposed residential development. ▪ No construction work is required outside of existing buildings ▪ Operational costs and knowledge are similar to current operation. ▪ No potential for impacts to natural and social environment compared to existing condition.	▪ Plant Capacity can be increased as required maintaining the existing membrane plant for redundancy. ▪ No restriction on future growth. Allows for servicing of the Long Sault Logistics Village and proposed residential development. ▪ Construction would be limited to the existing treatment plant property. ▪ New treatment technology may not be proprietary resulting in more competitive costs over lifespan of the facility.	▪ Provides redundancy at a second site to limit risk in the event of a system failure. ▪ Plant Capacity can be increased as required maintaining the existing membrane plant in Long Sault. ▪ No restriction on future growth. Allows for servicing of the Long Sault Logistics Village ▪ No land acquisition required. Construction would be completed on the existing booster station site.
Disadvantages	▪ Plant Capacity is limited to the current rated capacity of 8,575 m^3/day ▪ Restricts future residential and commercial growth to what can be achieved through water conservation and system efficiency. ▪ Does NOT allow for servicing of the Long Sault Logistics Village	• Construction phasing within the existing may increase risk of water treatment capacity limitations during construction period only. • Maintains operation of proprietary treatment system.	▪ New buildings would be required resulting in potential natural environmental impacts. ▪ Additional operational complexity due to multiple treatment technologies. ▪ Higher risk of impacts due to construction due to restricted site. ▪ Higher operating costs due to building operation and different technologies.	▪ New intake would be required at significant cost and environmental risk. Ingleside site is not proximate to deep water which would either increase cost or decrease raw water quality. ▪ Additional operational costs due to two locations and loss of economies of scale. Original project eliminated Ingleside plant for this reason. ▪ New Building(s) would have a higher risk of impacting natural and social environment.
Capital Costs (+/- 25%)	**No Capital Costs**	**$5-6 million (+/-25%)**	**$10-15 million (+/-25%)**	**$15-20 million (+/-25%)**
Recommended Solutions?	**NO**	**YES**	**NO**	**NO**

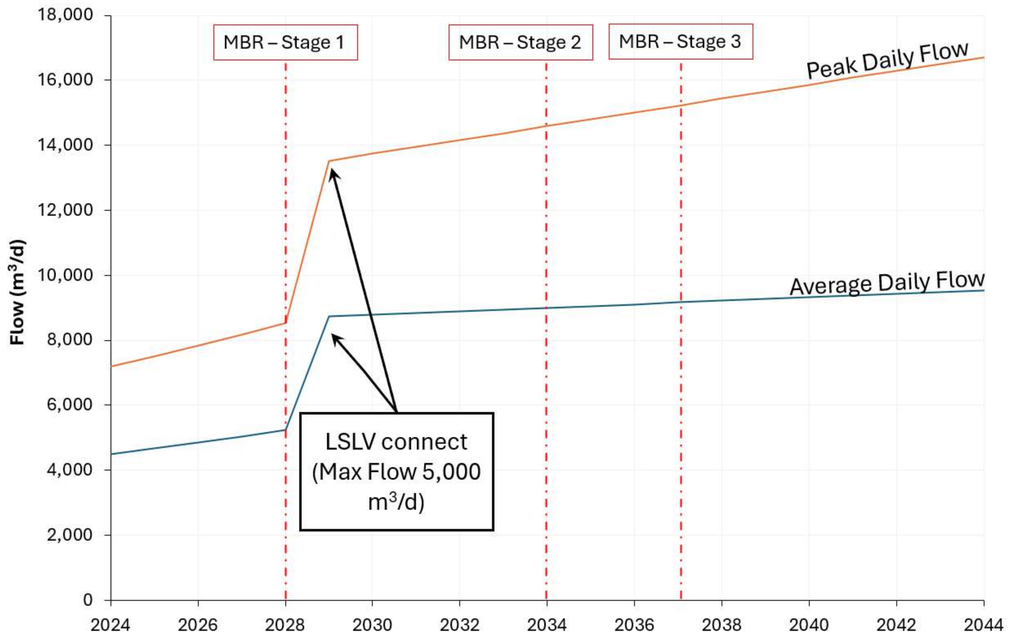
PREFERRED ALTERNATIVE: ALTERNATIVE B: EXPAND EXISTING WATER TREATMENT PLANT WITH EXISTING TREATMENT TECHNOLOGY

The original Regional Water Treatment Plant on Moulinette Island was designed for 33% additional future capacity without expanding the building and advancements in membrane technology have further increased that by an additional 60%. In order to comply with the requirements of the Municipal Class EA process, other alternatives were reviewed, but found to have a higher risk of impacting the natural (terrestrial and aquatic) and social (community, cultural, archaeological, construction impacts) environment. Furthermore, it is the lowest capital cost alternative and can be implemented in the shortest period (less than 18 months) and meets the technical requirements to service future growth for at least the next 20 years.

ALTERNATIVE CONCEPTS FOR PREFERRED SOLUTION

Alternative B - Expand Existing WTP with Existing Technology

- **Increase Low Lift Pump capacity to meet Peak Daily Flow.**
  - Low lift pumps are used to draw water from the River/Lake and pump it up to the treatment plant tanks.
  - Three (2 duty/1 standby) new low lift pumps should be installed, and each pump will be sized to handle up to 15,000 m^3/day . The main goal of the low lift pumping system is to achieve a consistent flow rate to the downstream processes. This capacity allows for adequate flow into the membranes allowing for treated water (85% of raw water) and rejected wastewater (~15% of raw water)
- **Replace the two 500-micron pre-filters**. These filters collect any larger particles and protect the membranes from damage. The new pre-filters must be sized to meet the same flow as the low lift pumps.
- **Increase the capacity of the existing membrane filtration system**. A staged approach is proposed as follows due to the 5-7 year lifespan of the membranes it doesn't make sense to add more membranes than are required for the lifespan of those membrane modules:
  - <u>Stage 1:</u> Increase the number of membrane modules by adding new membranes to the existing cassettes. This option will lead to achieving a total of approximately 14,750 m^3/d. This upgrade should occur prior to 2027.
  - <u>Stage 2:</u> Increase the number of membrane modules by adding new membranes to the existing cassettes. This option will lead to achieving a total of approximately 15,200 m^3/d. This upgrade should occur before 2034 based on projected growth.
  - <u>Stage 3:</u> Fill out the remaining membrane module spaces in the existing trains by adding new membranes to the existing cassettes. This option will lead to achieving a total of approximately 16,710 m^3/d. Stage 3 will be able to meet the 20-year forecasted flow. This upgrade should occur before 2040.
  - <u>Stage 4:</u> Adding a fourth membrane train. This option will lead to achieving a total of approximately 22,000 m^3/d. This would increase growth potential within the servicing area. This upgrade should occur after 2042.
- **Increase Permeate Pump capacity**. In order to meet the membrane filtration requirements, the pumps would be upgraded to be able to pump approximately 120 L/s in order to meet future demands. Pumps have a lifespan of approximately 20 years, but would be replaced over the next three to five years to avoid having all the pumps the same age resulting in the risk of multiple pumps needing to be replaced at the same time in the future.



WT INFRASTRUCTURE
PRACTICAL INNOVATION

TOWNSHIP OF SOUTH STORMONT

NEXT STEPS

2024

Notice of Commencement	A Notice of Commencement of this project will be sent to all the stakeholders and published on the Township website to provide project information.
Review Background Information	Collect data, review existing conditions and identify project constraints and opportunities
Identify Potential Design Solutions to Bottlenecks	Develop design solutions to bottlenecks to meet current and future needs, including treatment approach and key site requirements
Public Information Centre #1	Obtain Input from the public about preferred design approach
Develop and evaluate alternative design concepts	Develop and evaluate the alternative design concepts to implement the preferred solution
Public Information Centre #2	Obtain Input from the public on the recommended design approach
Reporting	Prepare the Environmental Study Report to document project information and the decision-making process
Notice of Completion	A Notice of Completion of this project will be sent to all the stakeholders and published on the Township website. The Township will provide approval to file the Environmental Study Report for a 30-day review period for public comment.

WE ARE HERE

2024

How can you stay engaged and up to date on this Municipal Class EA?

- Visit the Township's project website for study updates: https://www.southstormont.ca/en/index.aspx
- Submit any questions, comments or suggestions by contacting the Study's Project Team
- Attend future Public Information Centre No. 2

WT INFRASTRUCTURE
PRACTICAL INNOVATION

TOWNSHIP OF SOUTH STORMONT

July 11, 2024

Long Sault/Ingleside
Regional Drinking Water System
Municipal Class Environmental Assessment
Information Centre (PIC) Sign-in Sheet

Time: 5:00-7:00 pm, Thursday July 11, 2024

Place: Town Hall, 2 Mille Roches Road, PO Box 84, K0C 1P0, Long Sault, ON

PLEASE SIGN IN

NAME	ADDRESS	PHONE	EMAIL
DALE MOAH	[redacted]		
Jason Symington			

Comments and information regarding this project are being collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. Except for personal information, comments submitted may be made public and included in the project documentation.

APPENDIX E

STAKEHOLDER CORRESPONDENCE

Tiziana Venditto

From: Bailey McBride
Sent: Monday, January 29, 2024 1:46 PM
To: South Stormont Info
Subject: Notice of Commencement - Township of South Stormont
Attachments: 22-2067_NoticeofCommencement.pdf

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Leclerc, Erika (MCM) <erika.leclerc@ontario.ca>
Sent: Wednesday, February 28, 2024 4:36 PM
To: Bailey McBride
Cc: Barboza, Karla (She/Her) (MCM); South Stormont Info; Mohammed Alsharqawi; Jamie.witherspoon@wtinfrastructure.ca
Subject: MCM Response - Notice of Commencement - Township of South Stormont
Attachments: 2024-02-28 LongSaultIngleside RegionalDrinkingWaterSystem_MCMComments.pdf; 2024-01-29 22-2067_NoticeofCommencement.pdf

Dear Bailey McBride,

Thank you for sending the Notice of Commencement for the above-mentioned project to the Ministry of Citizenship and Multiculturalism (MCM). Please find attached MCM's initial letter on this project.

Please do not hesitate to contact us if you have any questions.

Kind regards,

Erika Leclerc (she/her)
Heritage Planner
Ministry of Citizenship and Multiculturalism
(416) 305-0757 | erika.leclerc@ontario.ca

From: ?ailey M??ride ?[?ailey? ?out??tormont??a?
Sent: ?anuary ???????? ???? ?M
To: Sout? Stormont ?h?o ?[in?o? ?out??tormont??a?
Subject: ?oti?e o??ommen?ement ??o? n??ip o?Sout? Stormont

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ?ailey? ?out??tormont??a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Tel.: 416-305-0757

Ministère des Affaires civiques et du Multiculturalisme

Unité de la planification relative au patrimoine
Direction du patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
Tél.: 416-305-0757

Ontario

February 28, 2024 EMAIL ONLY

Mohammed Alsharqawi, Ph.D., PMP
Director of Public Works
Township of South Stormont
2 Mille Roches Road
PO Box 84
Long Sault, ON K0C 1P0
mohammed@southstormont.ca

MCM File	**:**	**0021017**
Proponent	**:**	**Township of South Stormont**
Subject	**:**	**Municipal Class Environmental Assessment – Schedule C – Notice of Commencement**
Project	**:**	**Long Sault/Ingleside Regional Drinking Water System**
Location	**:**	**Township of South Stormont, United Counties of Stormont, Dundas and Glengarry**

Dear Mohammed Alsharqawi:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Commencement for the above-referenced project.

MCM's interest in this project relates to its mandate of conserving Ontario's cultural heritage, which includes:

- archaeological resources, including land and marine;
- built heritage resources, including bridges and monuments; and
- cultural heritage landscapes.

Under the Environmental Assessment (EA) process, the proponent is required to determine a project's potential impact on known (previously recognized) and potential cultural heritage resources.

Project Summary
The Township of South Stormont has and is experiencing significant growth in the communities of Long Sault and Ingleside. The Regional Water Treatment Plant was commissioned in 2005

with a 20-year design maximum day design capacity of 8,575 m^3 per day. The system has reached 80% of the design capacity and proposed developments on the system are anticipated to consume the remaining committed capacity leaving limited capacity for growth within a two-to-five-year period.

The Township has initiated a Municipal Class EA to evaluate and select preferred solutions to increase the rated water treatment capacity of the existing Long Sault/Ingleside Regional Water Treatment Plant to meet future system demands. The objective will be to complete the Municipal Class EA and proceed to increase the capacity of the facility in order to meet community needs. It is anticipated that this project will be considered a Schedule C Class EA due to the need to expand the rated capacity of the treatment plant.

Identifying Cultural Heritage Resources
While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation.

Archaeological Resources
This EA project may impact archaeological resources and should be screened using the Ministry's *Criteria for Evaluating Archaeological Potential* and *Criteria for Evaluating Marine Archaeological Potential* (if shoreline or in-water works are proposed) to determine if an archaeological assessment is needed. MCM archaeological sites data are available at *archaeology@ontario.ca*.

If the EA project area exhibits archaeological potential, then an archaeological assessment (AA) shall be undertaken by an archaeologist licenced under the *Ontario Heritage Act* (OHA), who is responsible for submitting the report directly to MCM for review.

Built Heritage Resources and Cultural Heritage Landscapes
The Ministry's *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact known or potential built heritage resources and/or cultural heritage landscapes.

If there is potential for built heritage resources and/or cultural heritage landscapes within the project area, then a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment should be undertaken for the entire study area during the planning phase and will be summarized in the EA Report. This study will:

1. Describe the existing baseline cultural heritage conditions within the study area by identifying all known or potential built heritage resources and cultural heritage landscapes, including a historical summary of the study area. The Ministry has developed a screening checklist that may assist with this exercise: *Criteria for Evaluating for Potential Built Heritage Resources and Cultural Heritage Landscapes*.

2. Identify preliminary potential project-specific impacts on the known and potential built heritage resources and cultural heritage landscapes that have been identified. The report should include a description of the anticipated impact to each known or potential built heritage resource or cultural heritage landscape that has been identified.

3. Recommend measures to avoid or mitigate potential negative impacts to known or potential built heritage resources and cultural heritage landscapes. The proposed mitigation measures are to inform the next steps of project planning and design.

Given that this project covers a large study area, MCM recommends that the Cultural Heritage Report is carried out so that step 1 described above is undertaken early in the planning process. Then, steps 2 and 3 can be undertaken once the preferred alternatives have been selected.

Cultural Heritage Reports will be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed.

Community input should be sought to identify locally recognized and potential cultural heritage resources. Sources include, but are not limited to, municipal heritage committees, historical societies and other local heritage organizations.

Cultural heritage resources are often of critical importance to Indigenous communities. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to them.

Environmental Assessment Reporting
All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MCM whether any technical cultural heritage studies will be completed for this EA project, and provide them to MCM before issuing a Notice of Completion or commencing any work on the site. If screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation **via email only** to both Karla Barboza and myself.

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | karla.barboza@ontario.ca
- Erika Leclerc, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-305-0757 | erika.leclerc@ontario.ca

Thank you for consulting MCM on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

Erika Leclerc
Heritage Planner
Erika.leclerc@ontario.ca

Copied to: Jamie Witherspoon, Project Manager, WT Infrastructure Solutions Inc.
Bailey McBride, Public Works Coordinator, Township of South Stormont
Karla Barboza, Team Lead – Heritage Planning Unit, MCM

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Tiziana Venditto

From: Bailey McBride
Sent: Thursday, February 8, 2024 2:23 PM
To: Grant [redacted]
Cc: Mohammed Alsharqawi
Subject: Notice of Commencement - Township of South Stormont
Attachments: 22-2067_NoticeofCommencement.pdf

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Info Inbox [redacted]
Sent: Tuesday, February 27, 2024 4:32 PM
To: Bailey McBride
Subject: Re: RE: Notice of Commencement - Township of South Stormont

[illegible] you [illegible]or rea[illegible]in[illegible] Ray[illegible]an[illegible][illegible]lea[illegible]e [illegible]ee [illegible]elo[illegible] [illegible]

Ray[illegible]an[illegible] indo[illegible] [illegible]and [illegible]oor[illegible]
[illegible]plea[illegible]e [illegible]onta[illegible]t [redacted]

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[illegible]plea[illegible]e [illegible]onta[illegible]t [redacted]

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[illegible]plea[illegible]e [illegible]onta[illegible]t in[illegible]o [redacted]

[illegible]an[illegible] you

Tiziana Venditto

From: Bailey McBride
Sent: Tuesday, February 27, 2024 4:33 PM
To: Chris Hemond
Subject: FW: Notice of Commencement - Township of South Stormont
Attachments: 22-2067_NoticeofCommencement.pdf

Chris,

Can you please advertise this Public Information Centre on our website and on Social Media?

Thank you!

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: Bailey McBride
Sent: Tuesday, February 27, 2024 4:31 PM
To: South Stormont Info <info@southstormont.ca>
Subject: RE: Notice of Commencement of Study on South Stormont

Good afternoon,

Please note that the Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Wednesday, March 20, 2024 from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h o in o out tormont a
Subject: otie ommen ement o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Bailey McBride
Sent: Tuesday, February 27, 2024 4:32 PM
To: South Stormont Info
Subject: RE: Notice of Commencement - Township of South Stormont
Attachments: 22-2067_NoticeofCommencement.pdf

Good afternoon,

Please note that the Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Wednesday, March 20, 2024 from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: Bailey McBride
Sent: Monday January [illegible] PM
To: South Stormont Info@southstormont.ca
Subject: Notice of Commencement for Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Michel [redacted]
Sent: Wednesday, February 28, 2024 2:27 PM
To: Bailey McBride
Subject: RE: Notice of Commencement - Township of South Stormont

Thank you very much for the notice.
i pro e i very important to our pro e t
e t re ard
Mi el

From: ailey M ride ailey outtormont a
Sent: ue day e ruary M
To: Sout Stormont h o in o outtormont a
Subject: RE oti e o ommen ement o o n ip o Sout Stormont

Good afternoon,

Please note that the Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Wednesday, March 20, 2024 from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h o in o outtormont a
Subject: oti e o ommen ement o o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Will [redacted]
Sent: Wednesday, February 28, 2024 11:30 AM
To: Bailey McBride
Subject: Re: Notice of Commencement - Township of South Stormont

Ok thanks Bailey

On Tue, Feb 27, 2024 at 4:31 PM Bailey McBride <bailey@southstormont.ca> wrote:

> Good afternoon,
>
> Please note that the Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Wednesday, March 20, 2024 from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.
>
> Kind regards,
>
> ***Bailey McBride***
>
> Public Works Coordinator
>
> Email: bailey@southstormont.ca
>
> Phone: 613-534-8889 ext. 212
>
> 2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
>
> www.southstormont.ca

From: Bailey McBride
Sent: Monday, January 29, 2024 1:46 PM
To: South Stormont Info <info@southstormont.ca>
Subject: Notice of Commencement - Township of South Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride

Public Works Coordinator

Email: bailey@southstormont.ca

Phone: 613-534-8889 ext. 212

2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0

www.southstormont.ca

Tiziana Venditto

From: Kennedy, Jake <Jake.Kennedy@rcaanc-cirnac.gc.ca>
Sent: Wednesday, February 28, 2024 9:19 AM
To: Bailey McBride
Subject: RE: Notice of Commencement - Township of South Stormont

Please remove me from your mailing list. I don't know why I am getting these emails.

[illegible]

Jake Kennedy (il/lui, he/him)

Directeur général, Direction générale des politiques et des partenariats (DGPP)
Secteur de la mise en œuvre
Relations Couronne-Autochtones et Affaires du Nord Canada (RCAANC)
[illegible] / Tél.: (873) 354-9803

Director General, Policy & Partnerships Branch (PPB)
Implementation Sector
Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
[illegible] / Tel: (873) 354-9803

From: [illegible]
Sent: [illegible]
To: [illegible]
Subject: [illegible]

Good afternoon,

Please note that the Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Wednesday, March 20, 2024 from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h o in o out tormont a
Subject: otie e o ommen ement o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Phil Barnes <phil.barnes@rrca.on.ca>
Sent: Monday, February 12, 2024 12:12 PM
To: jamie.witherspoon@wtinfrastrcuture.ca
Cc: South Stormont Info; Bailey McBride; Mohammed Alsharqawi; Lisa Van De Ligt
Subject: RE: Notice of Commencement - Township of South Stormont
Attachments: 2024-02-12-RRCA-Response-to-Notice-MCEA.pdf

Good morning,

Thank you for your notice regarding the MCEA for the South Stormont drinking water system.

Please find the attached letter from the RRCA indicating our possible regulatory role in the process.

I would be happy to help with any questions,

Kind regards,

Phil Barnes

Phil Barnes, P.Eng.
Team Lead, Watershed Management
Raisin Region Conservation Authority
613-938-3611 x 240 www.rrca.on.ca

From: ailey M ride ailey out tormont a
Sent: Monday anuary M
To: Sout Stormont n o in o out tormont a
Subject: oti e o ommen ement o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Raisin Region Conservation Authority
18045 County Road 2, P.O. Box 429, Cornwall, ON K6H 5T2 Tel: 613-938-3611 Fax: 613-938-3221 **www.rrca.on.ca**

February 12, 2024

Mr. Jamie Witherspoon, P. Eng.
Project Manager
WT Infrastructure Solutions Inc.

Via Email: Jamie.Witherspoon@wtinfrastructure.ca
CC: mohammed@southstormont.ca

Dear Mr. Witherspoon,

Re: Notice of Commencement, Long Sault/Ingleside Regional Drinking Water System, Municipal Cass Environmental Assessment (RRCA file 2024-GC-013-SST)

The Raisin Region Conservation Authority (RRCA) has received your notice for the above-mentioned Municipal Class Environmental Assessment.

The RRCA is the delegated authority to review any development within and adjacent to wetlands, floodplains, and shorelines, under the *Conservation Authorities Act*. The RRCA is also the delegated authority under the *Clean Water Act* to maintain and update the local Drinking Water Source Protection Plan and Assessment Report. Modifications to the existing water intake pipe or the installation of a new pipe may require input from our office.

I would be happy to assist with any of the above regulatory requirements if needed.

Please keep me on the contact list:
Phil Barnes, P.Eng., Team Lead, Watershed Management, Raisin Region Conservation Authority.
613-938-3611 x 240, phil.barnes@rrca.on.ca

Sincerely,

Phil Barnes, P.Eng.
Team Lead, Watershed Management

Tiziana Venditto

From: Badali, Mark (He/Him) (MECP) <Mark.Badali1@ontario.ca>
Sent: Friday, June 28, 2024 10:10 AM
To: Bailey McBride; South Stormont Info
Cc: Macki, Monika (MECP)
Subject: RE: Notice of Commencement - Township of South Stormont

Good morning,

Please be advised that my colleague Monika Macki, copied here, is now responsible for coordinating streamlined EA projects in the ministry's Southwest Region, and has taken over as the assigned MECP Regional Environmental Planner for streamlined EA projects in this geographical area. Please remove me from this project's contact list and direct all further correspondence with MECP for this project to Monika.

Thank you,

Mark Badali (he/him) | Senior Project Evaluator
Environmental Assessment Program Support | Environmental Assessment Branch
Ontario Ministry of the Environment, Conservation and Parks
Mark.Badali1@ontario.ca | (416) 457-2155

From: ailey M ride ailey out tormont a
Sent: riday une M
To: Sout Stormont h o in o out tormont a
Subject: RE oti e o ommen ement o n ip o Sout Stormont

Good morning,

Please note that a Public Information Centre for the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment has been scheduled for Thursday, July 11, 2024, from 5:00pm – 7:00pm. The Public Information Centre will be held in the Township of South Stormont Council Chambers located at 2 Mille Roches Road, Long Sault, ON K0C 1P0.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: ue day e ruary M
To: Sout Stormont h o in o out tormont a
Subject: RE oti e o ommen ement o n ip o Sout Stormont

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Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h o in o out tormont a
Subject: oti e o ommen ement o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Todd, Shannon (MTCS) <Shannon.Todd@ontario.ca>
Sent: Friday, June 28, 2024 10:01 AM
To: Bailey McBride
Subject: RE: Notice of Commencement - Township of South Stormont

Hello,

Could you please remove me from this list?

Thank you,

Shannon

Shannon Todd
Senior Coordinator | Sport Policy Branch
Ministry of Sport | Ontario Public Service
647 527 6362 | Shannon.Todd@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

As per the accessible customer service policy, please contact me if you wish to provide feedback, require accommodations, communication supports or an alternate format.

From: ailey M ride ailey out tormont a
Sent: riday une M
To: Sout Stormont h o in o out tormont a
Subject: RE oti e o ommen ement o n ip o Sout Stormont

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Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: ue day e ruary M
To: Sout Stormont h o in o out tormont a
Subject: RE oti e o ommen ement o o n ip o Sout Stormont

Good afternoon,

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Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h o in o out tormont a
Subject: oti e o ommen ement o o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Shared EA Notices (OMAFRA) <SharedEANotices@ontario.ca>
Sent: Friday, June 28, 2024 10:48 AM
To: Bailey McBride
Subject: RE: Notice of Commencement - Township of South Stormont

Hi Bailey,
I am no longer covering South Stormont for OMAFA so I'll ask you to please send all future EA circulations to
Omafra.eanotices@ontario.ca

Thanks for your attention to this
Ken Mott

Ken Mott,
Rural □lanner□□and □□e □oli□y □ Ste□ ard□□ip □ □lood Sa□ety □ Environmental □oli□y □ran□□
□oli□y □ivi□ion □ □ntario Mini□try o□□□ri□ulture□□ood □ □□ri□u□ine□□
□□□□□□□□□□□□ □ ken.mott@ontario.ca

Ontario

Our working hours may be different. Please do not feel you need to reply outside your normal working hours.

From: □ailey M□□ride □□ailey□ □out□□tormont□□a□
Sent: □riday□□une □□□□□□□□ □□□□ □M
To: Sout□ Stormont □h□b □in□b□ □out□□tormont□□a□
Subject: RE□□ oti□e o□□ommen□ement □□o□ n□□ip o□Sout□ Stormont

Good morning,

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Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: ue day e ruary M
To: Sout Stormont h b in o out tormont a
Subject: RE oti e o ommen ement o n ip o Sout Stormont

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Kind regards,

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: ailey M ride
Sent: Monday anuary M
To: Sout Stormont h b in o out tormont a
Subject: oti e o ommen ement o n ip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Bailey McBride
Sent: Monday, January 29, 2024 3:39 PM
To: Jamie Witherspoon
Cc: Ross Gellately - Alternate; Mohammed Alsharqawi
Subject: FW: Notice of Commencement - Township of South Stormont

Hi Jamie,

Please see below. Can you please advise on a response?

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey outtormonta
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: oddSannon (MS) Sannonodd ontarioa
Sent: Mondayanuary M
To: ailey M ride aileyoutormonta
Subject: RE oti e ommen ement o n ip o Sout Stormont

Hi Bailey,

I received this notice and I'm just a bit curious about how I got on this list. If you have any insights it would be greatly appreciated!

Thanks,

Shannon

Shannon Todd (she / her)
Regional Development Advisor
Ministry of Tourism, Culture and Sport
400 University Ave., 2nd Floor, Toronto, ON M7A 2R9
647-527-6362

Ontario

As per the accessible customer service policy, please contact me if you wish to provide feedback, require accommodations, communication supports or an alternate format.

From: ailey M ride [ailey out tormont a]
Sent: anuary M
To: Sout Stormont hb [in o out tormont a]
Subject: oti e o ommen ement o n ip o Sout Stormont

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ailey out tormont a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Bailey McBride
Sent: Monday, February 26, 2024 8:38 AM
To: Mohammed Alsharqawi; Jamie Witherspoon; Ross Gellately - Alternate
Subject: FW: [External/Externe]: Notice of Commencement - Township of South Stormont

Bailey McBride
Public Works Coordinator
Email: bailey@southstormont.ca
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

From: □□□ Environment □Environnement □□□□ □Enviro□nt□ t□□□□□□a□
Sent: □riday□□e□ruary □□□□□□□□ □□□□ □M
To: □ailey M□□ride □□ailey□ □out□□tormont□□a□
Subject: RE□□E□ternal□E□terne□□□ oti□e o□□ommen□ement □□o□ n□□ip o□Sout□ Stormont

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- ***Canadian Navigable Waters Act (CNWA)*** □ t□e □□t applie□ primarily to □ or□□□on□tru□ted or pla□ed in□on□over□ under□t□rou□□□or a□ro□□ navi□a□le □ ater□□et out under t□e □□t□□□e □ avi□ation □rote□tion □ro□ram admini□ter□t□e □□□ □ t□rou□□ t□e revie□ and aut□ori□ation o□□ or□□a□□e□tin□ navi□a□le □ ater□□□n□ormation

about the Program and approval process is available at http://www.tc.gc.ca/eng/programs.htm Inquiries can be directed to [redacted] or by calling (613) [redacted]

- ***Railway Safety Act (RSA)*** The Act provides the regulatory framework for railway safety, security and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing railway operations. Additional information about the Program is available at http://www.tc.gc.ca/eng/railsafety/menu.htm Inquiries can be directed to RailSafety [redacted] or by calling (613) [redacted]

- ***Transportation of Dangerous Goods Act (TDGA)*** The transportation of dangerous goods by air, marine, rail and road is regulated under the [redacted] Transport Canada is tasked on risk, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at http://www.tc.gc.ca/eng/tdg/safety/menu.htm Inquiries can be directed to [redacted] Ontario [redacted] or by calling (613) [redacted]

- ***Aeronautics Act*** This Act and the associated Canadian Aviation Regulations (CARs) govern civil aviation in Canada. Transport Canada should be notified of projects involving aerodromes and associated structures or activities that could affect aviation safety. Elevated structures, [redacted] and turbines and communication towers are examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. Some examples would be waste facilities, [redacted] may attract birds into commercial and recreational flight paths. Additional guidance can be found in the *Land Use In The Vicinity of Aerodromes* publication, available at http://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1247.htm Information about Transport Canada's Civil Aviation program can be found at http://www.tc.gc.ca/eng/aviation/ Inquiries can be directed to aviationont [redacted] or by calling [redacted] (613) [redacted]

Please advise if additional information is needed.

Thank you.

Environmental Assessment Program Ontario Region
Transport Canada / Government of Canada [redacted] Bonnie St [redacted] Toronto [redacted] M[redacted]
Environ [redacted]

Programme d'évaluation environnementale Région de l'Ontario
Transport Canada / Gouvernement du Canada [redacted] rue Bonnie Toronto [redacted] M[redacted]
Environ [redacted]

From: [redacted] [redacted]
Sent: Monday January [redacted] M
To: [redacted] Environment Environnement [redacted]
Subject: [redacted] External Externe [redacted] otice of commencement [redacted] nip o Sout Stormont

[redacted]

From: ailey M[redacted]ride [redacted]
Sent: Monday January [redacted] M
To: Sout Stormont [redacted]
Subject: External Externe [redacted] otice of commencement [redacted] nip o Sout Stormont

Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: [illegible]
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

Tiziana Venditto

From: Bailey McBride
Sent: Thursday, February 1, 2024 3:54 PM
To: Jamie Witherspoon
Cc: Mohammed Alsharqawi; Ross Gellately - Alternate
Subject: FW: Notice of Commencement - Township of South Stormont

Hi all,

Please see the inquiry below.

Kind regards,

Bailey McBride
Public Works Coordinator
Email: ▯ailey▯ ▯out▯▯tormont▯▯a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

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Subject: RE▯▯ oti▯e o▯▯ommen▯ement ▯▯o▯ n▯▯ip o▯Sout▯ Stormont

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Thank you for your email. Could you please let us know if any archaeological studies or fieldwork will be necessary as part o▯t▯i▯pro▯e▯t▯

Please note that we have updated our way of processing consultations. Any new consultation or project notice must be ▯ent to t▯e ▯ollo▯ in▯ email addre▯▯▯consultations@wendake.ca▯ ▯ e al▯o ▯indly a▯▯ t▯at you remove any ot▯er email addresses that you have on file from all your mailing lists.

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Dominic Ste-Marie
Conseiller en Gestion du Territoire

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Good afternoon,

Please see the attached Notice of Commencement regarding the Long Sault/Ingleside Regional Drinking Water System Municipal Class Environmental Assessment.

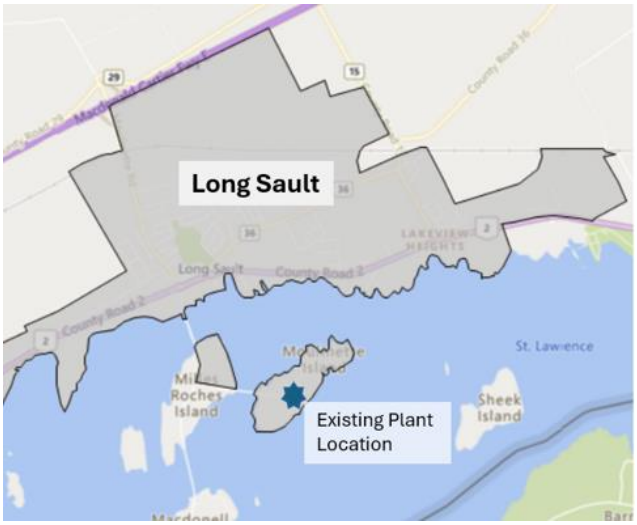
Kind regards,

Bailey McBride
Public Works Coordinator
Email: □ailey□ □out□□tormont□□a
Phone: 613-534-8889 ext. 212
2 Mille Roches Road, PO Box 84, Long Sault, ON K0C 1P0
www.southstormont.ca

APPENDIX F

NO**TICE** O**F** **C**OM**P**LETION

Long Sault/Ingleside Regional Drinking Water System Capacity Expansion
NOTICE OF COMPLETION OF ENVIRONMENTAL STUDY REPORT



The Township of South Stormont (Township) has completed an assessment of alternatives to expand the water production capacity to service the communities of Long Sault and Ingleside as well as extended water distribution networks servicing Osnabruck Centre, Lakeview Heights and serviced properties between these communities along the alignment of the water distribution system. The study was conducted in accordance with the requirements of **Phases 1 to 4 of the Municipal Class Environmental Assessment Process** which is an approved process under the Environmental Assessment Act.

In 2022, it was identified that the existing Regional Water Treatment Plant located on Moulinette Island near Long Sault as shown on the figure to the left had exceeded 80% of its rated capacity (8,575 m^3/day). Furthermore, the uncommitted reserve capacity which considers identified developments and serviced, but not connected lots increased the committed capacity of the system to approximately 99.5% of the rated capacity, limiting future development opportunities. A review of the Township Official Plan and proposed developments in both Long Sault and Ingleside indicated that the 20-year anticipated water demand will increase to 16,710 m^3/day.

Several alternatives were reviewed including do nothing, expand the existing plant with the current technology, expand the existing plant with an alternative technology and construction of a new plant in Ingleside to meet the project objectives of increased capacity expansion. Based on an assessment of each of the alternatives against the natural, social and economic environment, it was determined that the preferred alternative is to expand the capacity of the existing system by upgrading the existing system through increasing the capacity of the pumping and treatment systems within the footprint of the existing plant buildings.

The Township has planned this project under Schedule C of the Municipal Class Environmental Assessment. The Environmental Study Report has been completed and by this Notice is being placed on the public record for review and comment. Subject to comments received as a result of this notice and the receipt of necessary approvals, the Township intends to proceed with the construction of this project starting in 2025 with anticipated completion in 2026. The estimated cost of the works is $5 million. The Environmental Study Report is available for review at: www.southstormont.ca and a hard copy will be available at the Township Office: 2 Milles Roches Road, Long Sault, ON from 8:30 am to 4:30 pm. Monday to Friday.

Interested individuals or organizations may provide written comments to the Township on the proposed works within 30 calendar days (October 18th, 2024). Comments should be directed to:

Jamie Witherspoon, P.Eng., Project Manager	**Debi Lucas, Chief Administrative Officer**
WT Infrastructure Solutions Inc	Township of South Stormont
T: (833) 984-6372 E: Jamie.witherspoon@wtinfrastructure.ca	T: (613) 534-8889 ext. 200 E:debi@southstormont.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Indigenous and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name. Requests should specify what kind of order is being requested; how an order may prevent, mitigate or remedy those potential adverse impacts; and any information in support of the statements in the request. The request should be sent in writing or by e-mail to:

Minister of the Environment, Conservation and Parks	**Director, Environmental Assessment Branch Ministry of Environment, Conservation and Parks**
777 Bay Street, 5th Floor, Toronto, ON M7A 2J3 minister.mecp@ontario.ca	135 St. Clair Avenue, 1st Floor, Toronto, ON M4V 1P5 EABDirector@ontario.ca

Requests to the Ministry should also be sent to the Consultant and Township by mail or by e-mail.

This Notice issued on September 18th, 2024

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act.

With the exception of personal information, all comments will become part of the public record.