Ingleside Wastewater Treatment Plant Expansion Environmental Assessment

JOB#: 17109 | 17.09.2017
SUBMITTED BY: EVB Engineering

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1 EXECUTIVE SUMMARY

The Ingleside Wastewater Treatment Plant (WWTP) is owned by the Township of South Stormont (Township) and operated by Caneau Water and Sewage Operations (Caneau). It services the community of Ingleside, which includes a large cheese production facility, owned by Kraft-Heinz Foods.

While the Township was updating its uncommitted reserve capacity for the Ingleside WWTP, it was determined that the plant was nearing its capacity. The Township then initiated a Capacity Needs Assessment (2016) for the Ingleside WWTP and determined that there were hydraulic restraints within the plant ending the possibility of rerating the plant.

The Township has initiated the environmental assessment process to identify the preferred solution and design to address the issues that have been identified in their problem statement:

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont is considering alternative ways in which the wastewater treatment plant can be improved to meet the demands of the existing population as well as the potential growth in a 20-year horizon.

Among the solutions the Township is exploring, are the following alternative solutions:

Alternative Solution A – Do Nothing

Alternative Solution B – Optimization of the Ingleside WWTP

Alternative Solution C – Expansion of the Existing Site

Alternative Solution D – Construction on a New Site

Alternative Solutions A & B do not provide a comprehensive solution to the problems identified. Alternative Solution C & D do provide a comprehensive solution, however

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there are fewer negative impacts on the natural, social and economic environments with the implementation of Alternative Solution C. Therefore, it is recommended that alternative designs be considered for the implementation of Alternative Solution C as the preferred solution.

The alternative designs for consideration will include the expansion of the Ingleside WWTP as:

- Conventional Activated Sludge
- Extended Aeration
- Membrane Bioreactor

As all three technologies involve the expansion of the Ingleside WWTP on the existing site, a highlights of the environmental consideration are provided in Table 10.1.

Table 10.1 – Environmental Considerations

Natural Environment	Social Environment
The construction will occur entirely within the existing property limits and will have little impact on the natural environment.	Potential improvement of the effluent quality
No in-water work is required therefore there is no impact to the aquatic life.	Stage 1 Archeological Investigation found no significant items of interest
	Potential for the reduction of odour and noise emanating from the plant
	Expanded plant will support growth in the community for the next 20 years.

Table 10.4 provides the life cycle cost analysis for the three technologies and Figure 5 displays the comparison in graphical format.

Table 10.4 – 20 Year Present Worth of Alternate Technologies

Technology	CAS	EA	MBR
Capital Cost	$9,182,720	$9,882,780	$8,870,940
PW Operating Cost	$17,470,196	$18,168,949	$25,084,271
LCC	$26,652,916	$28,051,729	$33,955,211
	LOWEST COST ALTERNATIVE		

Recommendation

The preferred design for the expansion of the Ingleside WWTP on the existing site can be described as:

- Upgrades to the Raw Sewage Pumping Station to facilitate the design hydraulic loadings for the expanded plant.
- New headworks, including redundant automated screens and vortex grit removal.
- Implementation of the Conventional Activated Sludge process which includes:
  - Construction of two new primary clarifiers
  - Retrofit of the existing aerobic digesters for use within the conventional activated sludge design parameters
  - Retrofit of the existing secondary clarifiers as flocculation tanks with the ability for alum and polymer addition
  - Construction of two new secondary clarifiers
- Construction of a new UV disinfection system.
- Construction of a gravity settler to pre-thicken waste activated sludge ahead of the aerobic digesters.
- Expansion of the existing aerobic digesters.
- Expansion of the existing biosolids storage facilities.

Building Expansion to house the support systems: blowers, pumps, chemical feed systems, emergency power system, etc.

2 INTRODUCTION

2.1 Background

The community of Ingleside is within the Township of South Stormont and lies on the shores of the St. Lawrence River approximately 55km west of the Ontario/Quebec border. It is serviced by both municipal water and wastewater. Figure 2 illustrates the Key Plan for the Village and Figure 2 illustrates the site plan for the Ingleside Wastewater Treatment Plant (WWTP). The water plant was commissioned in 2002 and services both the community of Ingleside and the community of Long Sault. The wastewater treatment plant was commissioned in 1997 and, after 20 years of operation, is reaching its hydraulic capacity.

The Township of South Stormont has engaged the services of EVB Engineering Inc. to undertake a Schedule “C” EA for the expansion of the facility.

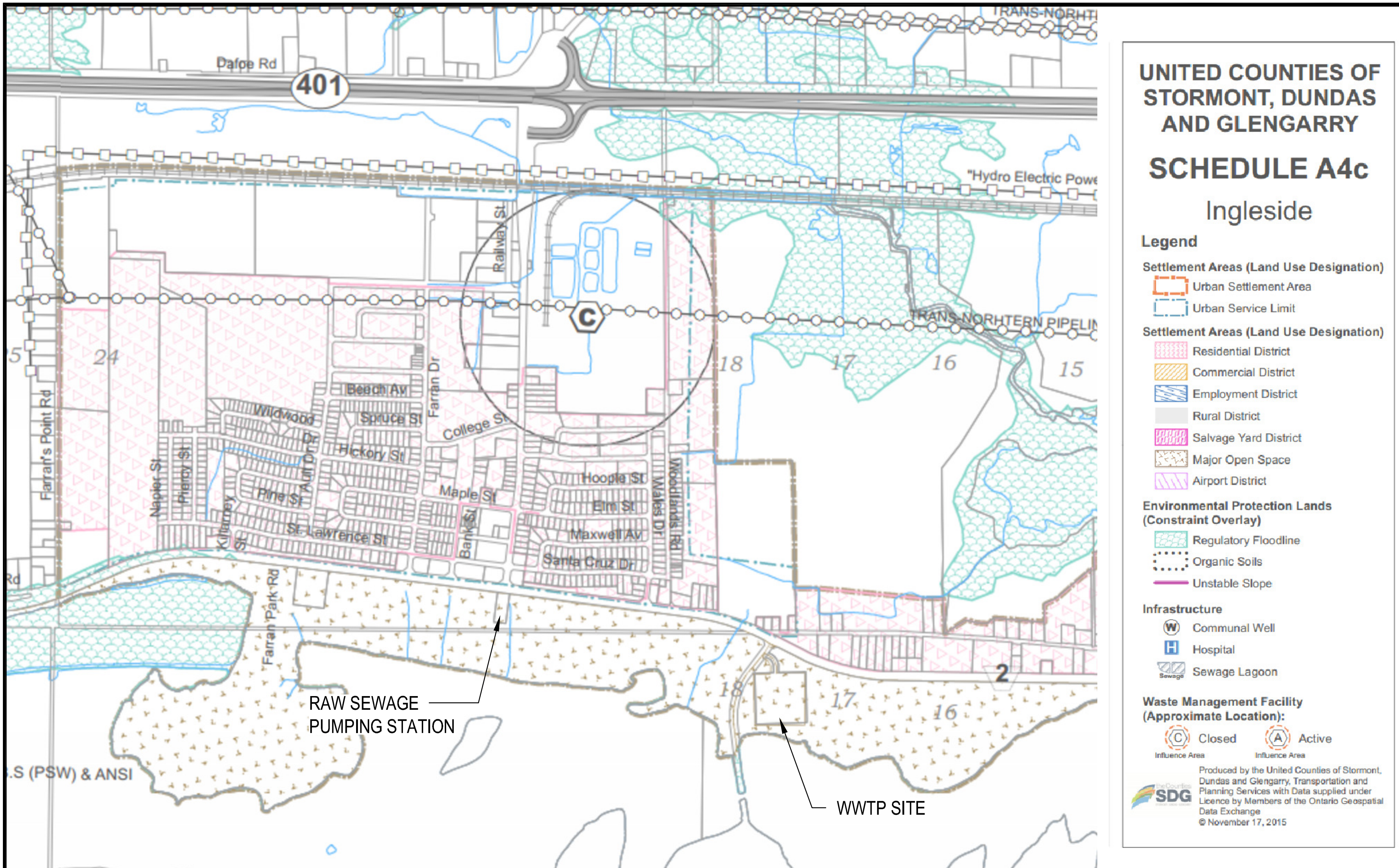
2.2 The Ingleside Wastewater Treatment Plant

The existing Ingleside WWTP was constructed in the mid-1990s and commissioned in 1997. It provides secondary level of treatment by processing the wastewater through an extended aeration process. The plant is rated for an average daily flow of 4,045 m^3/d and a peak daily flow of 10,027 m^3/d. A copy of the Certificate of Approval is in Appendix A.

The system is composed of the following components (refer to Figure 3 for a process flow diagram).

2.2.1 Raw Sewage Pumping Station

A Raw Sewage Pumping Station (RSPS) is located at the south corner of Highway No. 2 and Dickinson Drive. The RSPS is a wet-well style pumping station with three VFD driven submersible pumps which transfer all wastewater from the Ingleside Wastewater Collection System to the Ingleside WWTP via a 1,025m long, 400mm diameter forcemain.



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PROJECT:

INGLESIDE WWTP

TITLE:

KEYPLAN

SCALE: N.T.S.

JOB NO: 17109

DATE: 2017/10/24

DRAWING NO. FIG.1

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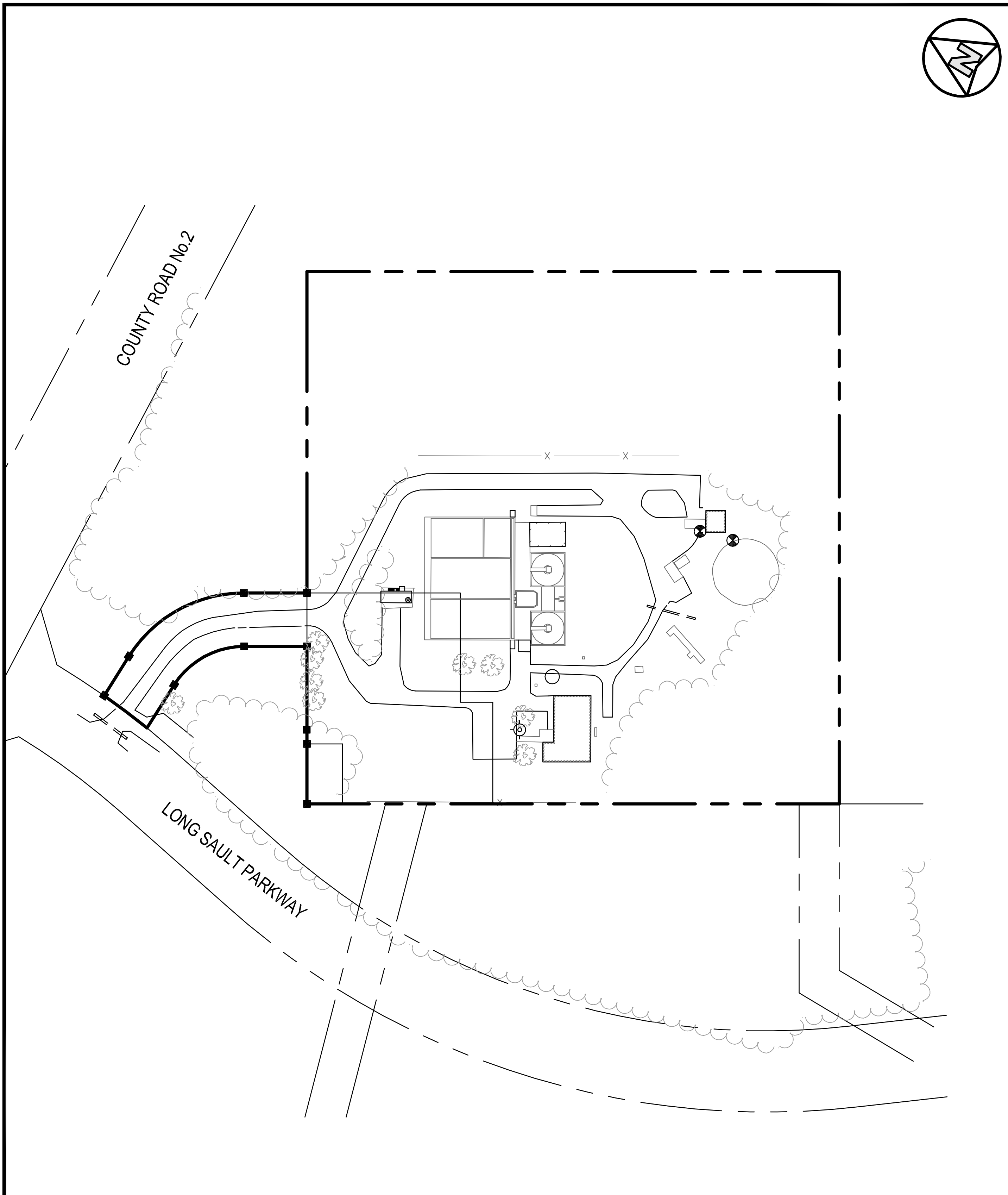
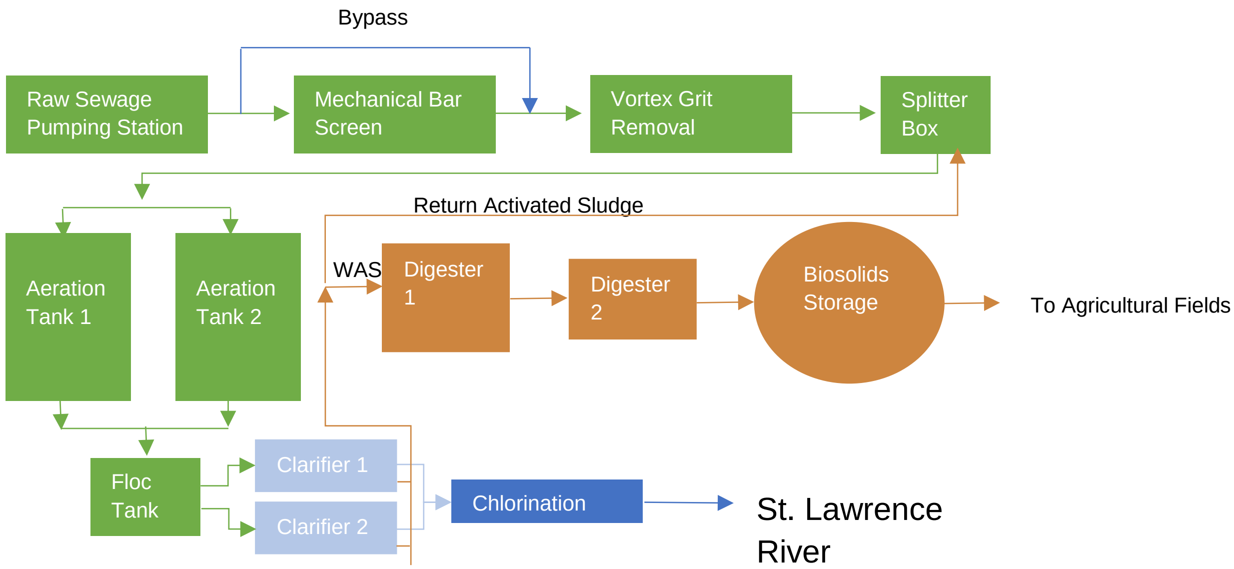


M:\2017\17109 - Ingleside EA\6.0 Dwg\2.0 Civil\3.0 Non-production\3.1 FGS\Preliminary Design\17109-FIG-2.dwg Oct 24, 2017-2:24pm BY:(Ken.White)

EVB ENGINEERING 208 PITT STREET CORNWALL, ONTARIO CANADA, K6J 3P6 TEL: 613-935-3775 FAX: 613-935-6450 WEBSITE: EVBengineering.com	PROJECT: INGLESIDE WWTP	SCALE: 1:2000 JOB NO: 17109
	TITLE: SITE PLAN	DATE: 2017/10/24 DRAWING NO. FIG.2

Figure 3 – Process Flow Schematic for Ingleside WWTP



2.2.2 Headworks

The headworks for the Ingleside WWTP are elevated, to facilitate gravity flow through the plant. It consists of two (2) screening channels (1 duty and 1 standby), one equipped with an automatically cleaned bar screen and the other with a manually raked bar screen. Followed by a single vortex grit separator which discharges into the aeration tank inlet distribution channel.

2.2.3 Extended Aeration Tanks

There are two (2) rectangular aeration tanks, each measuring 29.8m x 14.8m x 4.6m side water depth. Each aeration tank is equipped with baffles to provide a plug flow pattern and a fine bubble diffuser system.

2.2.4 Clarification System

Following the aeration tanks, mixed liquor suspended solids (MLSS) flow into a flocculation tank where alum and polymer are added to assist with the clarification of the MLSS. The flocculation tank measures 5.5m x 5.5m x 2 m side water depth and contains a 0.75HP low speed paddle mixer to assist with the flocculation process.

Flocculated MLSS flows from the floc tank to an inlet distribution channel ahead of the two square secondary clarifiers. Each secondary clarifier measures 12.2m x 12.2m x 4.3m side water depth. Clarifier effluent flows to the disinfection facilities and settled sludge is either pumped to the aeration tanks, as Return Activated Sludge, or to the aerobic digesters, as Waste Activated Sludge.

2.2.5 Chlorine Disinfection

The chlorination facilities consist of a water chamber which is equipped with submersible pumps for water reuse within the facility. Following the effluent water chamber there is a long channel equipped with a 229mm Parshall flume which provides final effluent flow measurement. Sodium hypochlorite is added at the effluent water chamber. Currently, the facility does not dechlorinate.

Final effluent is discharged to the St. Lawrence River via a 1,137m long 750mm diameter outfall sewer equipped with a 25m long diffuser section with two (2) 200mm diameter diffuser ports.

2.2.6 Aerobic Sludge Digestion

Waste sludge is transferred to a two-stage aerobic digester for stabilization. The primary digester measure 14.8m x 19.55m x 4.6m side water depth providing 2/3s of the total aerobic digester volume. The secondary digester measures 14.8m x 9.8m x 4.6m side water depth.

Each digester is equipped with coarse bubble diffusers to provide aeration and submersible pumps to transfer sludge.

2.2.7 Biosolids Storage

All stabilized biosolids are sent for storage to a circular open storage tank, having a diameter of 24m and a 3.5m side water depth. Seasonally, a third party is contracted to remove the biosolids from the facility for application to approved agricultural lands for which the Township has a Nutrient Management Plan.

2.2.8 Other Systems

The Ingleside WWTP also has a sludge thickening building equipped with a centrifuge and chemical feed systems which is not in current use.

A 100 kW standby diesel generator is installed at the facility to provide backup power in the event of a power failure.

2.3 Existing Conditions

2.3.1 Geographic Location

The community of Ingleside is in the Township of South Stormont, in the United Counties of Stormont, Dundas and Glengarry. It is approximately 19 km west of the City of Cornwall along the northern shore of the St. Lawrence River. The community consists of approximately 674 residential units, a cheese plant, a shopping mall, churches, schools, restaurants and other small commercial outlets.

Highway 401 and Highway 2 pass through Ingleside, running east-west, which links the community with the Trans-Canada highway system.

The St. Lawrence River lies to the south of the community, and is a major international waterway providing a shipping corridor between the Great Lakes and the Atlantic Ocean.

2.3.2 Geophysical Environment

The bedrock that underlies the Ingleside area is of Ordovician age. The rock formation consists principally of horizontal lying beds of limestone and dolomite. In general, the bedrock principally is overlain by sand and clay of the Uplands and Carp series, respectively.

The soils in the area consist generally of sand and glacial tills. The sediments are a grey-brown, silty clay soil with a weathered crust underlain by a discontinuous silty find sand and a layer of silty clay.

2.3.3 Topography

The topography of the community is relatively flat. There is a ridge running to the north of the community. Land south of the ridge gently slopes to the shores of the St. Lawrence River. Areas north of the ridge slope to Hoople Creek. Ground elevations in the community range from approximately 79 to 83m above sea level.

2.3.4 Terrestrial Environment (at the Existing Site)

Work is underway and will be incorporated into the final version of the Environmental Study Report.

2.3.5 Heritage Resources

A Stage 1 Archeological Investigation was completed as part of the 1993 Environmental Assessment. The investigation determined that there is one historic site, circa 1879, located at the proposed site of the raw sewage pumping station. The report did not suggest that any significant archeological remains will be affected on the site of the existing WWTP.

2.3.6 Source Water Protection

The Ingleside WWTP is not in a source water protection zone. Municipal water service is provided in the Village via the South Stormont Regional Water Treatment Plant, located in Long Sault, whose intake protection zone (IPZ-2) is located approximately 4km downstream of the Ingleside outfall.

The next closest IPZ, located within the Great Lakes - St. Lawrence Water System, is located approximately 20km upstream at the South Dundas Regional Water Treatment Plant, located in Morrisburg, Ontario.

2.3.7 Condition of the Outfall

The Township retained the services of ODS Marine to conduct an in-water inspection of the visible components of the outfall. On November 7, 2017, ODS Marine completed the inspection and documented the inspection in video format. Both diffusers were located, as shown on the existing drawings and were in good repair requiring no further maintenance. The existing outfall will be utilized as part of the expanded plant as long as there are no hydraulic constraints.

2.4 Growth

In order to determine the design basis for the expanded facilities at the Ingleside WWTP, we need to establish the growth requirements within the service area for the next 20 years.

There are primarily three components for consideration for servicing the community:

1. Residential Growth
2. Industrial – Commercial – Institutional (ICI) Growth
3. Kraft-Heinz Ingleside Facility

2.4.1 Residential Growth

Historically, the Township's Building Department has issued approximately 10 building permits for new houses every year. Given that there are currently 674 residential lots (2016 Uncommitted Reserve Capacity Update), this indicates a growth rate of 1.4% per year.

The 2016 Uncommitted Reserve Capacity Report also determined that the average wastewater generation rate per residential lot is 1.575 m^3/lot/d. This average will be used to help determine the additional capacity for residential growth in the expanded plant

Based on the potential for growth from the Business Park, the design basis includes the potential growth of 2% per year for 20 years within the residential sector.

2.4.2 Industrial – Commercial – Institutional Growth

The Township currently owns 40 hectares of land zoned for future Industrial – Commercial – Institutional (ICI) uses. Wastewater generation rates for this type of property varies depending on the ultimate use. For example, for the following non-residential zoning classes, typical wastewater generation rates range from:

Commercial	ADF: 16.8 m^3/ha/d	PDF: 54.6 m^3/ha/d (PF = 3.25)
Light Industrial	ADF: 22.5 m^3/ha/d	PDF: 73.1 m^3/ha/d (PF = 3.25)
Heavy Industrial	ADF: 38 m^3/ha/d	PDF: 123.5 m^3/ha/d (PF = 3.25)
Wet Industrial	ADF: 55 m^3/ha/d	PDF: 178.8 m^3/ha/d (PF = 3.25)

The wastewater quality will also vary significantly depending on the type of industry residing on the property (i.e. warehousing, dairy, textiles, wood products, etc.).

Based on the typical rates presented above, Table 2.1 provides the design basis for servicing this property.

Table 2.1 – Industrial – Commercial – Institutional Growth

Land Use	Average Daily Flow (m^3/d)	Peak Daily Flow (m^3/d)
Commercial	672	2,184
Light Industrial	900	2,925
Heavy Industrial	1,520	4,940
Wet Industry	2,200	7,150

To provide flexibility for the land use within the business park, it has been proposed that the design basis include the servicing of this park at 20 m^3/ha/day which will allow for the develop of the business park with a mix of commercial and light industries.

2.4.3 Kraft-Heinz Ingleside Facility

When the Ingleside WWTP was upgraded in the 1990s, Kraft-Heinz had identified a need for a maximum daily flow capacity of 2,069 m^3/d. Kraft-Heinz was approached to identify their needs for wastewater treatment for the design period of this project. Kraft-Heinz cannot commit to a requirement at this time, therefore, we are proposing to carry forward two growth scenarios to service this facility:

Growth Scenario #1 – Increase Kraft-Heinz capacity to 2,500 m^3/d

Growth Scenario #2 – Increase Kraft-Heinz capacity to 3,000 m^3/d

3.0 THE ENVIRONMENTAL ASSESSMENT PROCESS

In Ontario, municipal roads, water, wastewater and master planning projects are subject to the provisions of the Municipal Class Environmental Assessment (2000, amended in 2007, 2011 & 2015). The Class Environmental Assessment (Class EA) is an approved planning document which describes the process which municipalities must follow to meet the requirements of the Environmental Assessment Act (EAA) of Ontario. By following the Class EA process, the municipality does not have to apply for an individual environmental assessment under the Act. The Class EA approach allows for the evaluation of the environmental effects of carrying out a project and alternative methods of carrying out a project, includes mandatory requirements for public input, and expedites the environmental assessment of smaller recurring projects.

The Class EA planning process was developed to ensure that the potential social, economic and natural environmental effects are considered in planning roads, water, stormwater and sewage projects. Since roads, sewage, stormwater management and water projects undertaken by municipalities under the Class EA planning process vary in their environmental impact, such projects are classified in terms of schedules.

- Schedule A projects are limited in scale, have minimal adverse effects and include most municipal operations and maintenance activities. These projects are approved and may proceed to implementation without any further requirements under the provisions of the Class EA planning process.
- Schedule A+ projects are similar in size and scope to Schedule A activities. Schedule A+ activities require municipalities to advise the public of the project implementation and provide them with an opportunity to comment to municipal council.
- Schedule B projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process involving mandatory contact with directly affected public and with relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to

implementation. If, however, the screening process raises a concern which cannot be resolved, then the Part II Order ("bump-up") procedure may be invoked; alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking. Typically, Schedule B projects involve extensions to existing municipal infrastructure such as sewage collection systems and water distribution systems.

- Schedule C projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA process. Schedule C projects require that an Environmental Study Report be prepared and submitted for review by the public. If concerns are raised that cannot be resolved, the "bump-up" procedure may be invoked, which may result in the requirement to complete a full environmental assessment. Refer to Section 3.5 for further discussion of the Part II Order ("bump-up") procedure. Typically, these projects involve the construction of municipal infrastructure such as wastewater treatment facilities, new sewage collection and water distribution systems, and water treatment facilities.

Exhibit A.2, from the Class Environmental Assessment publication, presents a flow chart which illustrates the Planning and Design Process for Municipal Roads, Water and Wastewater Projects. The precise path to be followed in the process is dependent on the nature of the project and more particularly the schedule in which the project falls. As the proponent proceeds through the planning process beginning with Phase 1 (Problem Definition) and advances towards the end of Phase 2 (Evaluation of Alternative Solutions), the preferred alternative solution is determined. Having determined the preferred alternative solution, the appropriate project schedule and process to be followed for the completion of the project is also determined in this case, Schedule C.

Phase 1 defines the nature and extent of the problem and the project opportunity. Often a discretionary public meeting is held to inform interested parties of the EA planning process and to discuss the problem.

Phase 2 involves the identification of the alternative solutions. Also included are an inventory of the natural, social, and economic environment; the identification of the impacts of alternative solutions on the environment; the identification of mitigative measures; an evaluation of alternative solutions; consultation with review agencies and the public regarding the identified problem and alternative solutions; the identification of the preferred alternative solution; and confirmation of the path or schedule to follow for the balance of the Class EA process. Public consultation is mandatory at this phase and includes review agencies and the affected public. The appropriate EA schedule for the project is also identified.

Phase 3 involves the identification of alternative designs for the selected alternative solution. Also included are a detailed inventory of the natural, social, and economic environment relating to the selected alternative solution; the identification of the impacts of alternative designs on the environment; the identification of mitigative measures; consultation with review agencies and the public regarding the alternative designs; and the identification of the recommended alternative design. Public consultation is mandatory at this phase and includes review agencies and the affected public.

Phase 4 represents the culmination of the planning and design process as set out in the Class EA. Phase 4 involves the completion of the documentation including the Environmental Study Report (ESR), if required, and the Notice of Completion. The ESR documents all the activities undertaken through Phases 1, 2 and 3 including the Consultation. The ESR is filed with the Clerk of the municipality and placed on the public record for at least 30 days to allow for public review. The public and mandatory agencies are notified through the Notice of Completion, which also discloses the Part II Order ("bump-up") provisions.

Phase 5 is the implementation phase of the Class EA process, and includes final design, construction plans and specifications, tender documents, and construction and operation. It also includes monitoring for environmental provisions and commitments (e.g. mitigative measures) as defined in the ESR.

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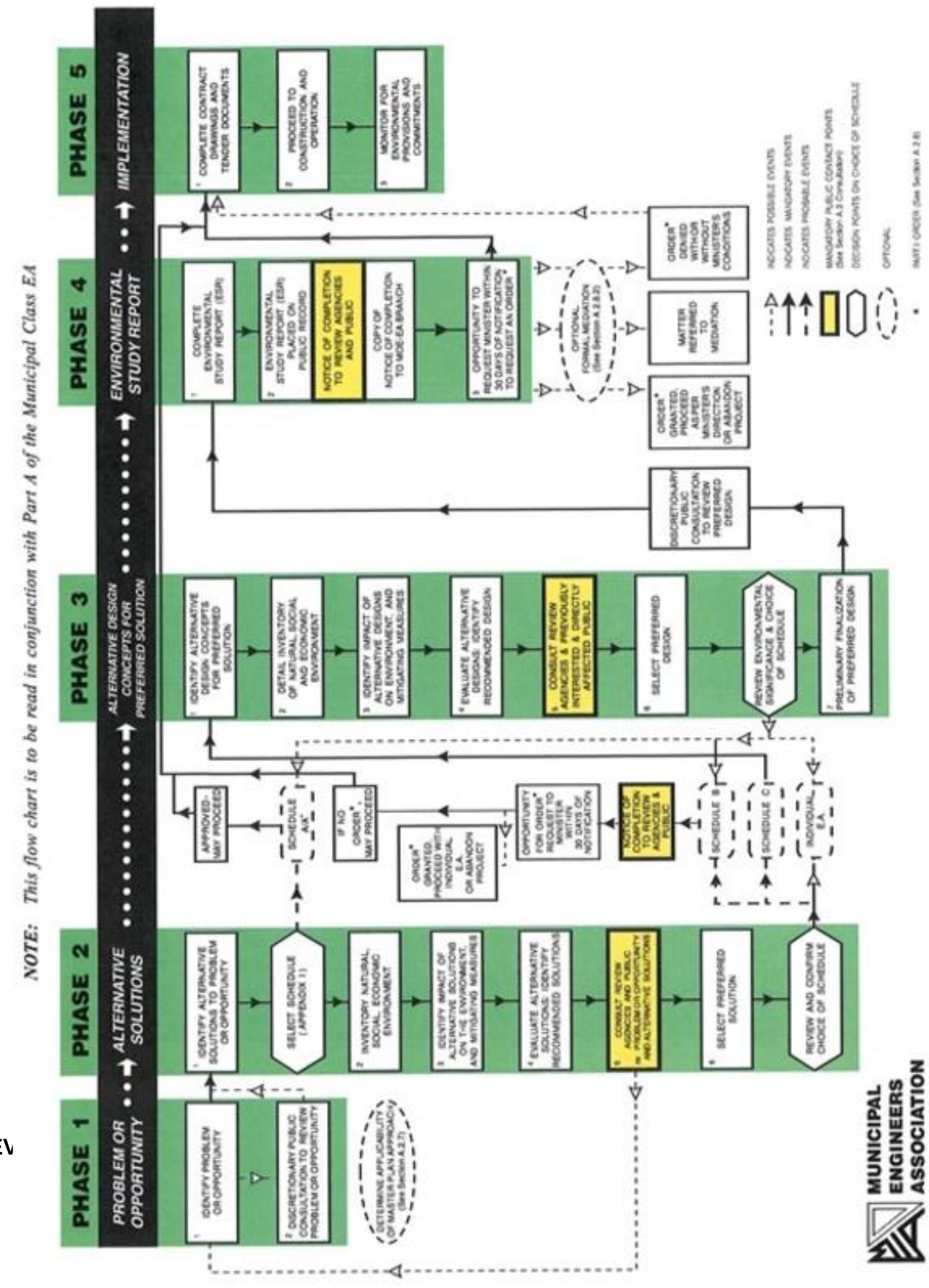
Exhibit A.2 - Municipal Class EA Planning and Design Process



4. PROBLEM STATEMENT

4.1 Ingleside Wastewater Treatment Plant Performance Data

All influent flow is via the Raw Sewage Pumping Station. There is a flow meter on the forcemain, and a summary of the past five-year average daily flow is shown on Table 4.1.

Table 4.1 – Historic Hydraulic Loading

Year	ADF (m^3/d)	% of Capacity
2012	3,789	93.5%
2013	4,286	106%
2014	3,985	98.3%
2015	3,629	89.5%
2016	3,781	93.3%
Rated	4,054	

The raw sewage quality and final effluent quality are presented in Table 4.2.

Table 4.2 – Historic Quality Performance Data (mg/L)

	BOD5		TSS		TP		TKN	
Year	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2012	179	3.3	257	9.8	17.9	0.78	61.5	3.61
2013	225	2.2	367	6.3	17.5	0.77	66.2	2.46
2014	206	2.7	306	6.4	16.7	0.84	61.1	1.28
2015	162	2.1	221	4.9	16.6	0.73	65.6	1.02
2015	150	2.1	220	6.0	17.2	0.79	61.8	1.18
Effluent Limits		25		25		1.00		

Additional flow and quality data is contained in Appendix B

4.2 Ingleside Wastewater Treatment Plant Needs Study

In 2015, the Township recognized the potential issues with the Ingleside WWTP and commissioned a capacity assessment of the Ingleside WWTP to determine if there was a potential to re-rate the WWTP and to determine the capacity/condition of the individual components of the plant. Details of the Needs Study are in Appendix D.

Summary of the Ingleside WWTP Capacity Assessment

1. The assessment results indicated that the facility is operating with ± 5% of the average daily flow rated capacity of the plant. The plant has exceeded the peak rated flow on nine (9) different events in the last 3 – 4 years.
2. Headworks area of the plant is overloaded at the current peak flow conditions. The screen is by-passed during these events partially due to the vortex unit hydraulics. Flooding and channel over-topping and leakage of the system occurs when approaching and at the peak flow conditions.
3. The aeration tanks and secondary clarifiers are operating above their respective hydraulic capacities resulting in surcharging of various plant components. The solids treatment is limited by the process pumping arrangement and retention time within the individual basins which results in inefficient and labour intensive operations as well as increased coagulant chemical consumption.
4. The aerobic digester equipment has not been completely installed and components have failed on numerous occasions. The biosolids storage facilities are undersized which require operations to utilize the upstream unit processes for solids storage during the seasons where field application is not available.

The Ingleside WWTP is operating at/near the plants' rated capacity. Components of the facility are surcharging and flooding during wet weather flows and peak flow events. The liquid conveyance process does not have additional capacity to operate within the MOECC guidelines beyond the rated capacity of 4,045 m^3/d average daily flow and 10, 037 m^3/d peak daily flow. The solids treatment process is operating above capacity resulting in inefficient solids treatment and destruction, labour intensive operations as well as elevated chemical consumption rates.

4.3 Problem Statement

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont is considering alternative ways in which the wastewater treatment plant can be improved to meet the demands of the existing population as well as the potential growth in a 20-year horizon.

4.4 Design Basis

The following table contains the design basis for the plant expansion. It details two growth scenarios for the various design flow rates Kraft-Heinz.

Table 4.9 – Design Basis

Component		ADF	BOD	TSS	TP	TKN
		m^3/d	mg/L			
GROWTH SCENARIO #1	Existing	4,054	177	274	17	63
	Residential Growth	473	190	210	7.0	25
	Kraft-Heinz	439	250	328	26	95
	Industrial Park	400	190	210	7.0	25
	Septage	15	5,000	3,500	200	750
	DESIGN BASES #1	5,400	198	276	16.7	61
GROWTH SCENARIO #2	Existing	4,054	177	274	17	63
	Residential Growth	473	190	210	7	25
	Kraft-Heinz	939	250	328	26	95
	Industrial Park	800	190	210	7	25
	Septage	15	5,000	3,500	200	750
	DESIGN BASES #2	6,300	202	277	17	62

Table 4.10 provides the proposed design objectives and effluent limits

Table 4.10 – Proposed Design Objectives and Effluent Limits

Parameter	Design Objective	Effluent Limit
Biological Oxygen Demand, BOD_5 (mg/L)	15	25
Total Suspended Solids, TSS (mg/L)	15	25
Total Phosphorus[1], TP (mg/L)	0.5	0.7
Total Residual Chlorine (mg/L)	Non-detect	0.02
Total Ammonia Nitrogen[2] (mg/L) **Summer** **Winter**	 <2 <2	 4.1 8.5
***E.coli* (counts per 100 mL)**	100	200
pH	6.5 – 8.5	

1 Total Phosphorus effluent limit established based on maintaining the same loadings of total phosphorus to the St. Lawrence River, based on the expanded capacity of the new plant.

2 Total Ammonia concentrations determined based on achieving an unionized ammonia concentration of less than 0.1 mg/L to be non-acutely lethal to rainbow trout and daphnia Magna, as determined in the following section.

4.1.1 DETERMINATION OF EFFLUENT LIMITS FOR TOTAL AMMONIA NITROGEN

To achieve a non-acute lethality of un-ionized ammonia, the unionized ammonia concentration needs to be less than 0.1 mg/L.

The effluent quality criterion for total ammonia (NH_3^T) was determined by substituting the known limit for NH_3^U, pKA, and pH into the equation for unionized ammonia. A conservative value for pH of 8.11 was utilized based on monitoring from the Ingleside Water Treatment Plant (WTP) and a temperature of 20 ^{0}C was selected as a summertime water temperature. For other periods, a temperature of 10 ^{0}C was selected.

The method provides for equilibrium being established between the total (NH_3^T) and unionized ammonia (NH_3^U) components. The log equilibrium constant (pKA), which is governed by pH and temperature, was calculated by the following equation (MOE 1994):

where,

T_{20} = 20 + 273.16 = 293.16 0K

pKa_{20}= 0.09018 + (2,729.92 / 293.16) = 9.40

NH_3^T = 0.2 ($10^{9.40-8.11}$ + 1) = 4.1 mg/L (summer)

T_{10} = 10 + 273.16 = 283.16 0K

pKa_{10} = 0.09018 + (2,729.92 / 283.16) = 9.73

NH_3^T = 0.2 ($10^{9.73-8.11}$ + 1) = 8.5 mg/L (non-summer)

5.0 Alternative Solutions

There are many solutions available to deal with the problems that existing at the Ingleside WWTP, however, the preferred solution will be identified through the consideration of its impacts on the natural, social and economic environments of the Township. A detailed impact analysis and methods of mitigation of negative environmental effects with respect to the preferred solution will be examined.

Social effects such as aesthetics, community visibility, heritage, recreation, health and enjoyment of property will be considered in conjunction with natural effects on terrestrial and aquatic life as well as groundwater, surface water and soils. Various alternatives have different economic effects, which will also be assessed in arriving at the preferred solution.

This study will evaluate the following Alternative Solutions:

Alternative Solution A – Do Nothing

Alternative Solution B – Optimization of the Ingleside WWTP

Alternative Solution C – Expansion of the Existing Site

Alternative Solution D – Construction on a New Site

5.1 Alternative Solution A: Do Nothing

The "Do Nothing" scenario means that the plant in Ingleside continues to operate based on its current configuration. This alternative solution means that growth in the Village will need to be controlled to ensure that the design capacity of the plant is not exceed which could have detrimental effects on the plants ability to meet its effluent limits. It will limit not only residential growth in the Village but commercial and industrial as well. The "Do Nothing" alternative is not feasible, unwise and not recommended as it does not address the problem that has been defined in this study.

5.2 Alternative Solution B: Optimize of the Ingleside WWTP

As identified in Section 4.2 of this report, the Township had retained the services of an engineering consulting company to undertake a needs study of the Ingleside WWTP. The findings of this report concluded that there were significant hydraulic issues with various components of the wastewater treatment plant and there was no opportunity to increase the hydraulic loadings through the treatment process without compromising the effluent quality.

This alternative solution does not provide a comprehensive solution to the problems identified in this report.

5.3 Alternative Solution C: Expansion of the Existing Facility

To facilitate additional hydraulic loading at the existing Ingleside WWTP, an expansion of the facility is required. Should this alternative solution become the preferred solution, the following design alternatives (secondary treatment technologies) should be evaluated for incorporation into the existing tankage:

Alternative Design #1 – Conventional Activated Sludge

Alternative Design #2 – Extended Aeration

Alternative Design #3 – Membrane Bioreactor

In addition to the secondary treatment technologies to be evaluated, disinfection technologies and sludge digestion technologies should also be evaluated, including:

Disinfection Technology #1 – Chlorination/Dechlorination

Disinfection Technology #2 – Ultraviolet Disinfection

Sludge Digestion Technology #1 – Aerobic Digestion

Sludge Digestion Technology #2 – Autothermal Thermophilic Aerobic Digestion

The impact of this solution on the natural, social and economic environments is summarized in the following section.

5.3.1 Impacts on the Natural, Social and Economic Environment

Natural Environment

It is expected that the infrastructure associated with Alternative C – Expansion on the existing site - will have minimal impact on the natural environment, as a large portion of the existing site has already been disturbed. There will be some loss of vegetation on the east side of the property to make space available for additional tankage. See Table 6.1 for a comparison of the environmental impacts.

During construction, there will be the typical range of potential environmental impacts including:

- Surplus excavation material – site geology and interception of groundwater flow,
- Removal of trees and damage to vegetation,
- Noise, dust, surface water and air quality.

Many of these impacts can be mitigated through appropriate construction methods which can be incorporated into the construction specifications. To further mitigate potential impacts from construction, a comprehensive pollution and sediment management plan should be incorporated into the construction specifications for implementation by the contractor.

Social Environment

There would be minimal negative long-term social impacts as a result of this alternative as there would be no additional loss of shoreline property or other property requirements. The implementation of this alternative solution will ensure that the wastewater infrastructure is available to support the existing and future users of the system.

With the expansion on the existing site, improvements in technology may mitigate existing noise and odour emissions to levels lower than the existing ones.

During construction, there would be impacts associated with noise, dust, and traffic. Again, these can be mitigated somewhat by an appropriate construction management plan and good public relations.

Economic Environment

The estimated capital and operating costs associated with this alternative are significant. Since this alternative is occurring on the existing infrastructure, it provides the potential to reutilize the existing infrastructure which results in a significantly lower capital cost.

A benefit associated with this alternative would be the provision of sustainable wastewater treatment for the Village of Ingleside.

5.4 Alternative Solution D: Construct a New Treatment Plant

The construction of a new WWTP will require the selection of an alternate site. The alternate site would be located somewhere along the northern shore of the St. Lawrence River to facilitate to the discharge of treated effluent back to the river. No site has been identified at this time, as there are significant economic implications for selecting this Alternative Solution over Alternative Solution C, as many components of the existing system can be integrated into Alternative Solution C.

Should this Alternative Solution be recommended, all the technologies considered for Alternative C should be reviewed for Alternative D.

5.4.1 Impacts on the Natural, Social and Economic Environment

Natural Environment

It is expected that the infrastructure associated with Alternative D – Construction on a new site - will have the largest impact on the natural environment, both on the proposed site of the new construction, within the water for the construction of a new outfall and along the route of the forcemain from the pumping station to the new site. See Table 6.1 for a comparison of the environmental impacts.

During construction, there will be the typical range of potential environmental impacts including:

- Wetland, stream and marsh crossings – effects on habitat, vegetation,
- Surplus excavation material – site geology and interception of groundwater flow,
- Removal of trees and damage to vegetation,
- Noise, dust, surface water and air quality.

Many of these impacts can be mitigated through appropriate construction methods which can be incorporated into the construction specifications. To further mitigate potential impacts from construction, a comprehensive pollution and sediment management plan should be incorporated into the construction specifications for implementation by the contractor.

Social Environment

Depending on the location of the new site, there would be negative long-term social impacts as a result of this alternative as there would be a potential for a loss of shoreline property and other property requirements. There would be the introduction of new noise associated with the operation of the plant which would potentially impact the adjacent properties to the new site.

During construction, there would be impacts associated with noise, dust, and traffic. Again, these can be mitigated somewhat by an appropriate construction management plan and good public relations.

Economic Environment

The estimated capital and operating costs associated with this alternative are significant. Since this alternative considers a new site, none of the existing infrastructure on the current site can be reutilized which results in a significantly higher capital cost.

A benefit associated with this alternative would be the provision of sustainable wastewater treatment for the Village of Ingleside.

6 Evaluation of Alternative Solutions

Table 6.1 provides an evaluation of the alternative solutions based on social, natural and economic criteria.

Table 6.1: Analysis of Alternatives

ENVIRONMENTAL FRAMEWORK	ALTERNATIVE A & B	ALTERNATIVE C	ALTERNATIVE D
	"Do Nothing" and "Optimize Plant"	Expand on Existing Site	Construct on New Site
NATURAL ENVIRONMENT CRITERIA			
Impact of Construction Through Environmentally Sensitive Areas	Not Applicable	The construction will occur entirely within the existing property limits and will have little impact on the natural environment.	An Environmental Inventory would be required on the new property to ensure no environmentally sensitive areas are impacted.
Impact on Groundwater	No anticipated impact	No anticipated impact	No anticipated impact
Impact on Aquatic, Fish Habitat	No anticipated impact	No anticipated impact	A new outfall will impact aquatic life and fish habitat.
SOCIAL ENVIRONMENT CRITERIA			
Health	Effluent currently meets the effluent limits dictated in the ECA.	Potential for further improvement of the effluent quality.	Potential for further improvement of the effluent quality.

ENVIRONMENTAL FRAMEWORK	ALTERNATIVE A & B	ALTERNATIVE C	ALTERNATIVE D
	"Do Nothing" and "Optimize Plant"	Expand on Existing Site	Construct on New Site
Cultural/Heritage Resources	Not Applicable	A Stage 1 Archaeological Investigation was completed and found no significant items of interest.	A Stage 1 Archaeological Investigation would be required.
Aesthetics	There have been complaints regarding the noise emitted from the current site, however, they have been mitigated though improvements to the blower intakes. No further changes to the aesthetics are expected.	Newer technologies may further reduce the odour and noise levels emitted from the existing facility.	There will be a potential for noise and odour impacts on properties adjacent to the new site.
Land Uses	Not Applicable	Construction will be confined to the existing property.	Construction will be confined to open road allowances and public property. Property acquisition may be required.

ENVIRONMENTAL FRAMEWORK	ALTERNATIVE A & B	ALTERNATIVE C	ALTERNATIVE D
	“Do Nothing” and “Optimize Plant”	Expand on Existing Site	Construct on New Site
Impact of Construction	Not Applicable	Construction will produce noise and dust and increased truck traffic to the site.	Construction will produce noise and dust, and increase truck traffic in the area of construction
Growth and Development	Growth will soon be limited in the Village of Ingleside	The wastewater treatment plant will support current needs and growth for 20 years.	The wastewater treatment plant will support current needs and growth for 20 years.
ECONOMIC ENVIRONMENT CRITERIA			
Total Project Cost(1)	Not Applicable	\$23M - \$29M	\$32M - \$36M
Annual Operation and Maintenance Costs	Not Applicable	Will increase proportionately to flow	Will increase proportionately to flow
RECOMMENDED ALTERANTIVE			
		RECOMMENDED	

(1) Capital cost are based on 2017-unit rates. No allowance is made for funding assistance.

It is recommended that Alternative C – Expansion on the Existing Site, be further developed through the evaluation of alternative designs on the existing property.

Mitigative measures to address the impacts on the natural, social and economic environments are presented in Table 6.2 (in Appendix E).

7 ALTERNATIVE DESIGNS

The existing Ingleside WWTP is an extended aeration system with aerobic digestion for biosolids stabilization and chlorine for disinfection. The alternative solutions for this site include:

1. Conventional Activated Sludge
2. Extended Aeration
3. Sequencing Batch Reactors
4. Membrane Bioreactor

7.1 Alternative Design #1 – Conventional Activated Sludge

7.1.1 Process Description

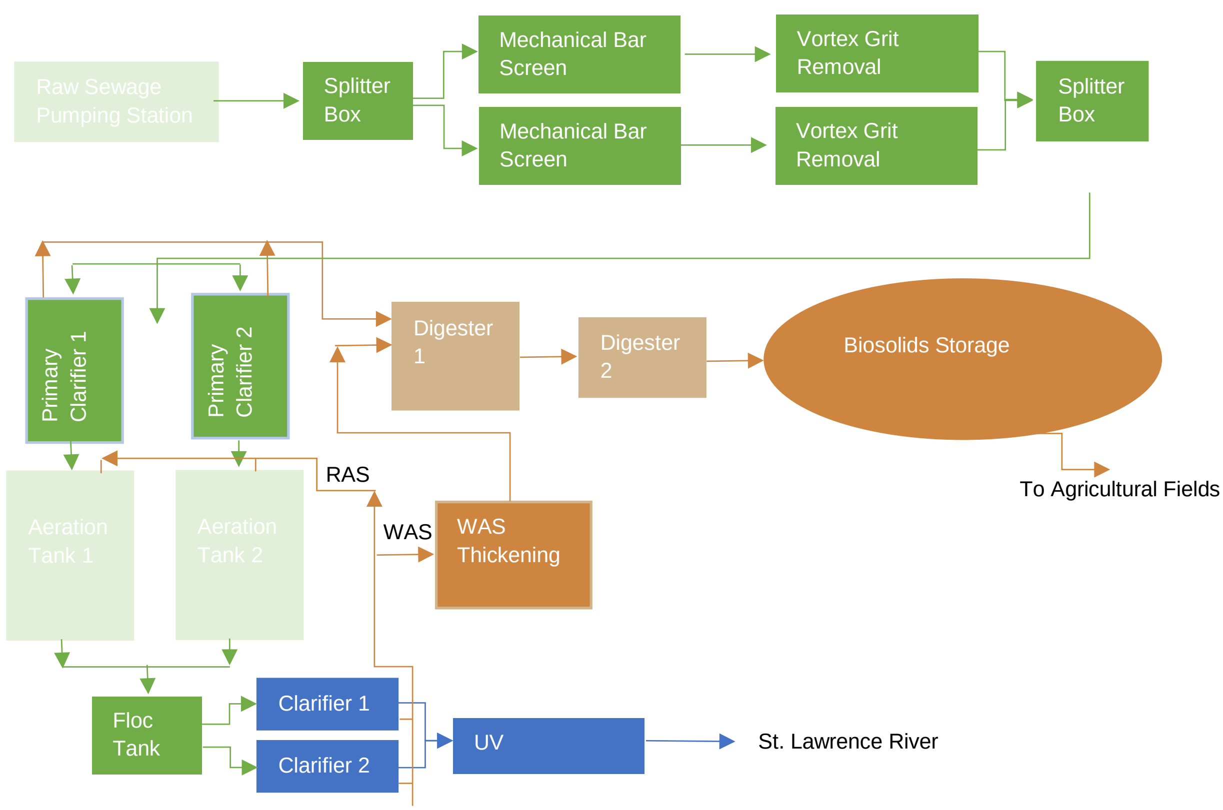
The conventional activated sludge process is a biological treatment process which produces a secondary level of treatment. The process consists of three steps:

A. **Primary Clarification:** which consists of a settling tank were solids can settle out of the process, reducing the solids and organic loading to downstream processes. Primary effluent will be removed from the settling tanks and transferred to the second stage of the process and primary sludge will be removed from the tank for stabilization. Primary sludge typically contains inorganic materials and heavy organics that easily settle from the liquid phase.
B. **Aeration:** which consists of a tank equipped with a system which increases the dissolved oxygen levels within the content of the tank to sustain a biomass which consumes the constituents within the primary effluent. The liquid content of the aeration tank is referred to as Mixed Liquor Suspended Solids (MLSS) which is transferred to the final stage of the conventional activated sludge process.
C. **Secondary Clarification:** which consists of a second set of settling tanks were solids are removed from the liquid stream. A coagulant is typically added to the MLSS prior to entering the secondary clarifiers in order the precipitate phosphorus from solution. The secondary effluent, in the case of Ingleside WWTP, will be ready for disinfection prior to

discharge to the St. Lawrence River. The sludge that settles in the secondary clarifiers consists of biological sludge and chemical sludge. Part of the solids that settles in the secondary clarifier is returned to the aeration tank to ensure that the biomass is sustained at a certain concentration to ensure optimal removal of constituents from the wastewater. The sludge that is returned to the aeration tank is called Return Activated Sludge (RAS). The secondary sludge that is not required within the system is transferred to digestion and is referred to as Waste Activated Sludge.

The Ministry of the Environment and Climate Change's document "Design Guidelines for Sewage Works (2008)", contain the design requirements for each stage of the conventional activated sludge process.

Figure 2 – Process Flow Schematic for Ingleside WWTP As Conventional Activated Sludge



7.1.2 Options

Primary Clarification: Depending on the forecasted design flow from the industrial business park and Kraft-Heinz requirements, the primary clarifier tanks can be sized as shown on Table 5.1.

Table 7.1 – Primary Clarifier Sizing

Design Parameters	Option 1	Option 2
Description	2 Clarifiers	2 Clarifiers at Higher Kraft-Heinz Flows
Peak Flow	20,300	22,050
# Clarifiers	2	2
SA (m2) (ea)	169.2	183.8
Length	26.01	22.11
Width	6.50	6.78
SWD	3.60	3.60
Freeboard	0.30	0.30
Total Depth	3.90	3.90
Cost	$2,839,000	$2,978,000
Cost /m^3	$140	$110

Aeration: The existing Ingleside WWTP provides two extended aeration basins which have been evaluated for incorporation within the Conventional Activated Sludge process. The Conventional Activated Sludge process has specific requirements for organic loading and hydraulic retention time. Our evaluation of these design parameters is compared to the MOECC Design Guidelines for Sewage Works and our findings are presented in the following table.

Table 7.2 – Conventional Activated Sludge – Aeration Tank Sizing

Existing Aeration Tanks			
Design Parameter	Measurement	Units	Comment
ADF	5400	m^3/d	
PF	18,900	m^3/d	
$BOD_{Primary\ Effluent}$	129	mg/L	
	694	kg/d	
# of Tanks	2		
Length	29.8	m	
Width	14.8	m	
SWD	4.6	m	
Volume	2028.784	m^3	(each)
	4057.568	m^3	(total)

EVB Engineering

MOECC Design Guidelines			
Parameter	Min	Max	Comment
OLR	0.31	0.72	kg BOD5 / (m^3d)
F/M	0.05	0.25	With Nitrification
HRT	6		hours
RAS	50%	200%	
MLSS	3000	5000	mg/L
Using Both Existing Aeration Tanks			
OLR	0.171	kg BOD5 / (m^3d)	UNDERLOADED
HRT	18.0	hours	Within Range
F/M	0.110		Within Range
Using One Existing Aeration Tank			
OLR	0.342	kg BOD5 / (m^3d)	Within Range
HRT	9.02	hours	Within Range
F/M	0.219		Within Range

EVB Engineering

Using Both Existing for Higher Kraft Flows			
OLR	0.538	kg BOD5 / (m^3d)	Within Range
HRT	7.75	hours	Within Range
F/M	0.21		Within Range (MLSS increased to 5,000 mg/L)
Ultimate Capacity of Both Aeration Tanks (May very depending on Industrial Flows)			
OLR	0.31	kg BOD5 / (m^3d)	
Primary Effluent BOD Loading (kg BOD/d)		1258	
Influent BOD Loadings (kg BOD/d)		1935	(35% Reduction in Primary Clarifier)
Average Daily Flow (m^3/d)		9773	(@ BOD of 198 mg/L)

In summary:

- The Conventional Activated Sludge Process can utilize the existing two aeration tanks which will be able to accommodate a future average daily flow of 9,773 m^3/d, based on current influent concentrations.

Secondary Clarification: It has been determined that the existing secondary clarifiers are significantly undersized and therefore need to be replaced. The alternatives presented reflect the same scenarios and options as were presented for the primary clarifiers.

Table 7.3 – Secondary Clarification

Scenario #2 - Secondary Clarifiers Sizing		
Design Parameters	Option 1	Option 2
Description	2 Clarifiers	Cost to Provide for Higher Kraft-Heinz Flows
Peak Flow	20,300	22,050
# Clarifiers	2	2
SA (m2) (ea)	169.2	183.8
Length	26.01	27.11
Width	6.50	6.78
SWD	3.60	3.60
Freeboard	0.30	0.30
Total Depth	3.90	3.90
Cost	$3,685,000	$3,872,000
Cost /m^3	$182	$176

7.1.3 Description of Design Alternative

To implement the conventional activated sludge process at the Ingleside WWTP, the following works are required:

- New headworks including two automated trains consisting of a mechanically raked screen and a vortex grit removal system;
- Construction of two (2) new primary clarifiers;
- Conversion of the existing aeration tanks into four equally sized aeration tanks;
- Conversion of one of the existing secondary clarifiers to be used at a flocculation tank, following the aeration tanks;
- Construction of two (2) new secondary clarifiers;
- Construction of a disinfection system (refer to Section 6);
- Construction of a waste sludge stabilization system with biosolids storage (refer to Section 7);
- Upgrades to the chemical feed systems, air supply systems and mechanical/electrical systems.

7.2 Alternative Design #2 – Extended Aeration

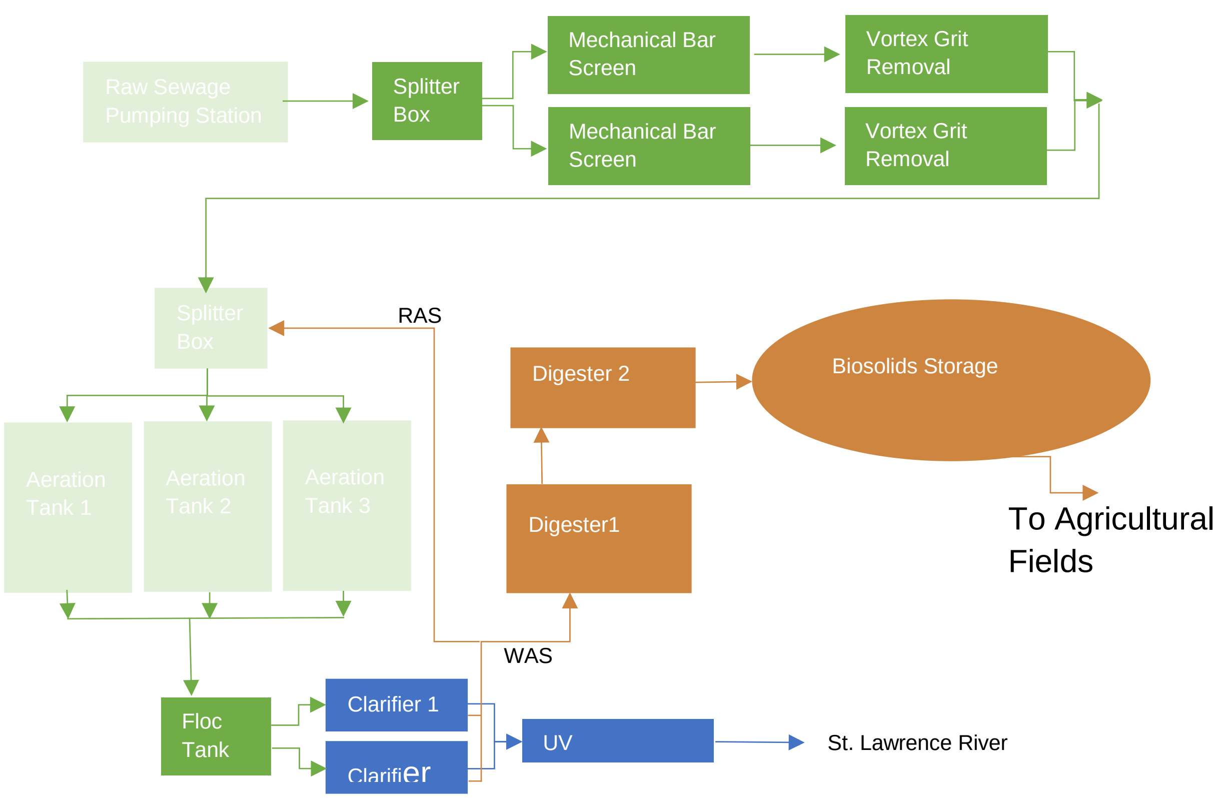
7.2.1 Process Description

The extended aeration process is a biological process which produces a secondary level of treatment. The process consists of two steps:

A. **Aeration:** similar to the conventional activated sludge plant, however much larger as the raw sewage has not been processed through a primary clarification process. Where the conventional activated sludge plant will have a minimum hydraulic retention time of 6 hours within the aeration tank, the extended aeration process requires a minimum of 16 hours.
B. **Secondary Clarification:** similar to the conventional activated sludge plant.

The Ministry of the Environment and Climate Change's document "Design Guidelines for Sewage Works (2008)", contain the design requirements for each stage of the conventional activated sludge process.

Figure 3 – Process Flow Schematic for Ingleside WWTP As Extended Aeration



7.2.2 Options

The existing Ingleside WWTP includes two extended aeration basins and one aerobic digester which have been evaluated for incorporation within the Extended Aeration process. The Extended Aeration process has specific requirements for organic loading and hydraulic retention time. Our evaluation of these design parameters is compared to the MOECC Design Guidelines for Sewage Works and our findings are presented in the following table.

Table 7.4 – Extended Aeration – Aeration Tank Sizing

Existing Aeration Tanks			
Design Parameter	Measurement	Units	Comment
ADF	5400	m^3/d	
PF	18,900	m^3/d	
$BOD_{Primary\ Effluent}$	129	mg/L	
	694	kg/d	
# of Tanks	3		Includes the Conversion of the Existing Aerobic Digesters to Aeration Tanks
Length	29.8	m	
Width	14.8	m	
SWD	4.6	m	
Volume	2028	m^3	(each)
	6086	m^3	(total)
MOECC Design Guidelines			

Parameter	Min	Max	Comment
OLR	0.17	0.24	kg BOD5 / (m^3d)
F/M	0.05	0.15	With Nitrification
HRT	>15		hours
RAS	50%	200%	
MLSS	3000	5000	mg/L
Using Both Existing Aeration Tanks			
OLR	0.264	kg BOD5 / (m^3d)	OVER RANGE
HRT	18.0	hours	Within Range
F/M	0.170		OVER RANGE
Adding Aerobic Digestor to Existing Aeration Tank			
OLR	0.177		Within Range
HRT	21.3		Within Range
F/M	0.113		Within Range
Ultimate Capacity of Three Aeration Tanks			

OLR	0.22	kg BOD5 / (m^3d)	
Influent BOD Loadings (kg BOD/d)		1339	
Average Daily Flow (m^3/d)		6763	(@ BOD of 198 mg/L)

In summary:

- The Extended Aeration Process will require the conversion of the existing aerobic digester into an aeration cell (requiring new aerobic digesters) which will be able to accommodate a future average daily flow of 6,763 m^3/d, based on existing influent concentrations.

Secondary Clarification: refer to secondary clarification under Alternative Solution #1.

7.2.3 Description of Design Alternative

To expand the existing extended aeration process at the Ingleside WWTP, the following works are required:

- New headworks including two automated trains consisting of a mechanically raked screen and a vortex grit removal system;
- Conversion of the existing aerobic digester into a third aeration tank;
- Conversion of one of the existing secondary clarifiers to be used at a flocculation tank, following the aeration tanks;
- Construction of two (2) new secondary clarifiers;
- Construction of a disinfection system (refer to Section 6);
- Construction of a waste sludge stabilization system with biosolids storage (refer to Section 7);
- Upgrades to the chemical feed systems, air supply systems and mechanical/electrical systems.

7.3 Alternative Design #3 – Membrane Bioreactor

EVB Engineering

7.3.1 Process Description

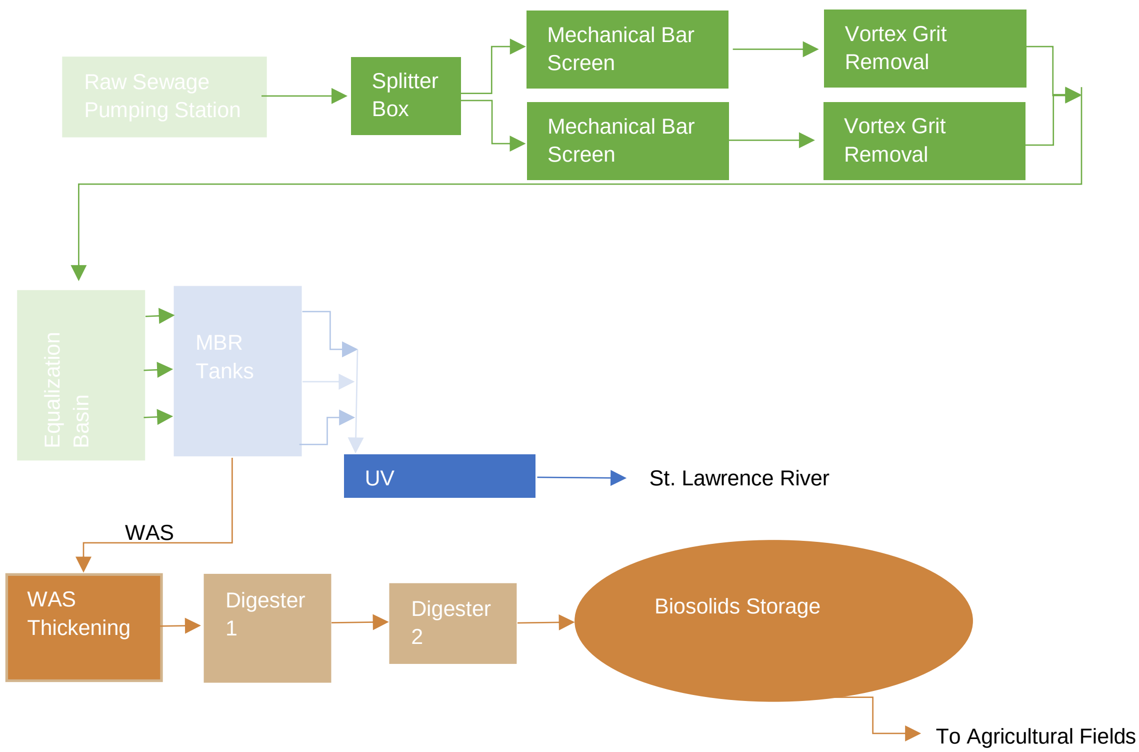
The membrane bioreactor (MBR) process utilizes suspended-growth biological treatment combined with a membrane process (like microfiltration or ultrafiltration) in a single reactor tank. This configuration eliminates the requirement for secondary clarification greatly reducing the footprint requirement of the overall plant and can achieve the equivalent to tertiary treatment effluent quality.

7.3.2 Description of Design Alternative

To expand the existing extended aeration process at the Ingleside WWTP, the following works are required:

- New headworks including two automated trains consisting of a mechanically raked screen and a vortex grit removal system;
- Conversion of the existing aerobic digester into a third aeration tank;
- Conversion of one of the existing secondary clarifiers to be used at a flocculation tank, following the aeration tanks;
- Construction of two (2) new secondary clarifiers;
- Construction of a disinfection system (refer to Section 6);
- Construction of a waste sludge stabilization system with biosolids storage (refer to Section 7);
- Upgrades to the chemical feed systems, air supply systems and mechanical/electrical systems.

Figure 4 – Process Flow Schematic for Ingleside WWTP As Membrane Bioreactor



8 Alternative Disinfection Solutions

The Ingleside WWTP currently provides disinfection using liquid chlorination. In 2012, the Canadian Government passed the "Wastewater Systems Effluent Regulation". This regulations targets tightening the effluent limits on the discharge of treated wastewater to the natural environment. This regulation identified total residual chlorine as a "deleterious substances" and requires the removal of total residual chlorine to less than 0.02 mg/L, if chlorine or one of its compounds is used to treat wastewater. The regulation provided a compliance date of January 1, 2021 for plants with a final discharge point of less than 5,000 m^3/d. Therefore, the Ingleside WWTP would have to comply by the above date, or sooner if the plants rated capacity is increased above 5,000 m^3/d.

Two technologies will be reviewed for the disinfection process at the Ingleside WWTP:

1. Chlorination/Dechlorination
2. UV Irradiation

8.1 Disinfection Alternative #1 – Chlorination and Dechlorination

Due to the increased peak flow capacity of the upgraded plant, the chlorine contact time in the existing channel needs to be assessed.

There are two effluent water basins that provide contact time for chlorination. Their measurements are as follow:

Table 8.1 – Chlorine Contact Assessment

Design Component	Measurement	Comment
MOECC Requirements		
Contact Time at ADF	15 minutes	ADF = 5,400-5,800 m^3/d
Contact Time at PDF	30 minutes	PDF = 18,900 – 20,300 m^3/d
Existing Systems		
# of Basins	2	
Length (m)	4.35	
Width (m)	3.5	
SWD (m)	2.257	
Volume of One Basin (m^3)	34.4	
Total Basin Volume (m^3)	68.7	
HRT @ ADF	17.1 – 18.3	Within MOECC Range
HRT @ PDF	4.9 – 5.2	Outside of MOECC Range

Therefore, a new chlorine contact chamber will be required providing a minimum of 212 m^3, plus dechlorination will need to be added.

Table 8.2– Capital Cost for Chlorination/Dechlorination Upgrade

Component	Component Cost
Chlorine Contact Tank Modifications	$702,000
Dechlorination Chemical Feed System	$85,000
Total Construction Cost	$787,000

The annual operating cost estimate for a chlorination/dechlorination system is estimated as follows:

- Equipment Maintenance & Repair (2.5% Capital) $ 12,250
- Labour (300 hr/yr @ $40/hr) $ 12,000
- Hydro (2 kW @ $0.15/kWhr) $ 2,600
- Chemical (Chlorine Gas and Sodium Bisulphide) $ 24,000
- Total Annual Operating Cost $ 50,850

8.2 Disinfection Alternative #2 – Ultraviolet Irradiation

An ultraviolet irradiation system requires the following components:

- Two parallel channels to house redundant disinfection systems;
- A building to protect the environment around the channels; and
- Ultraviolet Light Disinfection System (Trojan UV3000+):
    - 2 channels;
    - 1 bank per channel;
    - 3 modules per bank;
    - 6 lamps per module
    - 36 lamps in total.

The capital cost estimate for an UV system is as follows:

Table 8.3 – Capital Cost for Ultraviolet Light Upgrade

Component	Component Cost
Concrete and Civil Works	$295,000
UV Disinfection System	$512,000
Building	$122,000
Total Construction Cost	$929,000

The annual operating cost estimate for a UV system is estimated as follows:

- Labour (200 hr/yr @ $40/hr) $ 8,000
- Hydro (10 kW @ $0.15/kWhr) $13,140
- Lamp Replacement ($364 ea) $ 5,000
- Total Annual Operating Cost $26,140

8.3 Evaluation of Disinfection Processes

The following table presents the advantages and disadvantages of each disinfection process.

Table 8.4 - Advantages and Disadvantages

Technology	Chlorination	Ultraviolet
Advantages	• Well established technology • Reliable and effective against a wide spectrum of pathogenic organisms	• UV disinfection is achieved by exposure, therefore, no harmful chemicals are added to the effluent • Maintenance is relatively easy • Minimal disinfection by-products
Disadvantages	• Chlorine residual is toxic to aquatic life and subject to legislated effluent limited • All forms of chlorine are highly corrosive and toxic. Thus, storage, shipping and handling pose a risk	• Low solids and colour are required in the effluent to ensure exposure of UV rays • Higher energy costs.

Life cycle costing is provided in the following table for the disinfection technologies.

Table 8.5 – Life Cycle Cost (Disinfection Technologies)

Disinfection System	Capital Cost	Annual Operating Cost	20-Year Life Cycle Cost
Chlor/Dechlor	$787,000	$50,850	$1,499,000
Ultraviolet (UV)	$929,000	$26,140	$1,295,000

8.4 Disinfection Recommendation

It is recommended that ultraviolet irradiation be used in the expanded Ingleside WWTP, to replace the existing chlorine disinfection system.

9. ALTERNATIVE SOLUTIONS (SLUDGE STABILIZATION)

Two technologies will be reviewed for the stabilization of waste sludges at the Ingleside WWTP:

1. Aerobic Digestion
2. Autothermal Thermophilic Aerobic Digestion

The existing plants utilizes aerobic digestion for the stabilization of waste sludges prior to storage and disposal on agricultural lands. Depending on the alternative solution choose for the liquid treatment train, the aerobic digester may be required to be integrated into the liquid treatment train.

Using the design basis that has been provided in Section 4, it has been estimated that the conventional activated sludge system would generate the following amounts of waste sludge:

Table 9.1 – Waste Sludge Generation Rates

Source	Dry Solids (kg/d)	Volume of Solids (m^3/d)	Concentration of Solids
Primary Sludge	800	26.7	@ 3% Total Solids
Secondary Sludge	750	93.8	@ 0.8% Total Solids
Chemical Sludge	400	50.0	@ 0.8% Total Solids
Total Sludge	1,950		

9.1 Sludge Alternative #1 – Aerobic Digestion

Aerobic digestion is similar to the activated sludge process, where microorganisms continue to consume organics in the sludge until they are depleted and then consume their own protoplasm[1]. The end product from the digestion process is a stabilized sludge that can be applied to agricultural fields on a restricted basis.

Table 9.2 presents a cost estimate for the CAS and EA treatment options based on the following:

For the CAS process:

- The existing aerobic digester is available for reuse
- Gravity thickening is required to thicken WAS to 3% total solids prior to digestion
- Biosolids storage is not included in the evaluation

For the EA process:

- New aerobic digesters are required, as the existing aerobic digester will be converted to an aeration tank
- Biosolids storage is not included in the evaluation

Table 9.2 – Aerobic Digestion and Biosolids Storage

Component	CAS	EA
Gravity Thickener	$430,000	
Primary Aerobic Digester	$1,513,000	$3,462,000
Secondary Aerobic Digester	$106,000	$1,065,000
Aerobic Digestion Total	$2,049,000	$4,527,000

9.2 Sludge Alternative #2 – Autothermal Thermophilic Aerobic Digestion

Sludge digestion employing autothermal thermophilic aerobic digestion (ATAD) technology has a relatively low operating cost, generates its own heat, eliminates odour

1 Metcalf & Eddy. Wastewater Engineering – Treatment and Reuse, 4th Edition. McGraw Hill, NY, 2003.

in the sludge and has a reduced storage volume. The ATAD operates based on an exothermic process where sludge is subjected to temperatures greater than 55 °C with a hydraulic retention time of 7 days. Organic solids are degraded and the heat released during the microbial degradation which maintains thermophilic temperatures. The ATAD process can produce a biologically stable product while reducing both sludge mass and volume. The advantages of this technology include good biomass biodegradation, pasteurization and process stability.

The process provides 100% destruction of pathogens in the sludge (USEPA Class A) and is approved by the US Environmental Protection Agency for unrestricted land application. This designation is not recognized in Canada at this time.

The installation of an ATAD at the Ingleside WWTP would incorporate the following items:

- WAS holding tank to store 3 days of WAS prior to batch feeding into ATAD;
- A mechanical thickener and polymer feed system to thicken the WAS prior to being feed into the ATAD;
- Two (2) ATAD reactors each sized for 70% of the design capacity of the plant, along with a building to house the pumps, blowers, and other associated equipment;
- One (1) Storage, Nitrification, Denitrification Reactor (SNDR) to reduce the ammonia in the sludge prior to long term storage; and
- One (1) biofilter to treat the off-gas from the ATAD process.

Due to the nature of the waste sludge produced at the Ingleside WWTP, the ATAD system can only be utilized for the CAS alternative, as a high concentration of volatile solids is required in order to operate the ATADs in an autothermal mode. These volatile solids will not be present in the extended aeration or MBR alternatives.

Table 9.3 – Cost for Autothermal Thermophilic Aerobic Digester

Component	CAS
Thickening Building	$1,658,000
ATAD Reactors	$4,415,000
ATAD Equipment Building	$361,000
ATAD Digestion Total	$6,434,000

9.3 Digestion Process Recommendation

It is recommended that the aerobic digestion technology be used at the expanded Ingleside WWTP.

9.4 Biosolids Storage

It is recommended that the biosolids storage accommodate a minimum of 180 days of storage on site at the Ingleside WWTP. The storage can be provided in either a concrete partially buried tank or in above ground glass-lined steel tanks. Options for various configurations are presented in the following table.

Table 9.4 – Biosolids Storage Options

Dimensions	Concrete	Glass-Lined Steel		
# of Tanks	1	1 (tall)	1 (short)	2 (short)
Length	87.7 m			
Width/ Diameter	15 m	26.4m (87 ft)	37.5m (123 ft)	26.4m (87 ft)
Height	5.2 m	11.2m (37 ft)	5.9m (19 ft)	5.9m (19 ft)
Effective Volume	6,051 m^3	5,944 m^3	5,479 m^3	6,048 m^3

EVB Engineering

10. EVALUATION OF ALTERNATIVE SOLUTIONS

10.1 Natural and Social Environments

Section 6 of the ESR reviewed the natural and social environmental impacts of the expansion of the Ingleside WWTP on the existing site. Table 6.2 provides mitigative measures to reduce or eliminate any potential impacts to the natural and social environments.

Highlights of the environmental consideration are provided in Table 10.1.

Table 10.1 – Environmental Considerations

Natural Environment	Social Environment
The construction will occur entirely within the existing property limits and will have little impact on the natural environment.	Potential improvement of the effluent quality
No in-water work is required therefore there is no impact to the aquatic life.	Stage 1 Archeological Investigation found no significant items of interest
	Potential for the reduction of odour and noise emanating from the plant
	Expanded plant will support growth in the community for the next 20 years.

10.2 Economic Environment

The implementation of the preferred solution will have a large financial impact on the users of the system. The Township will be seeking funding opportunities from higher levels of government to help minimize the economic impact on the users of the system.

EVB Engineering

To ensure the economic impact for each of the technologies is properly evaluated, a life cycle cost analysis of each alternative has been completed. The following assumptions have been used for the life cycle cost analysis:

- Capital Costs are based on Growth Scenario #2
- Township will receive 66% funding for the total project cost
- Preferred Design incorporates UV Disinfection
- Preferred Design incorporates aerobic digestion
- Preferred Design incorporates 180 days of biosolids storage on site
- Consumer Price index is assumed to be 2.5% per year
- Bank Rate is 6% per year

Table 10.2 contains a summary of the capital cost.

Table 10.2 – Capital Cost Component

Cost Component	Conventional Activated Sludge	Extended Aeration	Membrane Bioreactor
Headworks	$4,442,000	$4,442,000	$4,442,000
Primary Clarifiers	$2,978,000		
Aeration Tank Upgrades	$342,000	$516,000	$5,750,000
Flocculation Tank	$363,000	$363,000	
Secondary Clarifiers	$3,872,000	$3,872,000	
UV Disinfection	$996,000	$996,000	$996,000
WAS Thickening	$1,282,000		$1,282,000
Aerobic Digestion	$336,000	$4,608,000	$336,000
Biosolids Storage	$3,454,000	$4,646,000	$4,464,000
Contingency (30%)	$5,420,000	$5,833,000	$5,236,000
Engineering (15%)	$3,523,000	$3,791,000	$3,403,000
TOTAL PROJECT COST	**$27,008,000**	**$29,067,000**	**$26,091,000**
2/3s Funding	$17,825,280	$19,184,220	$17,220,060
MUNICIPAL SHARE OF TOTAL PROJECT COST	**$9,182,720**	**$9,882,780**	**$8,870,940**

Table 10.3 provides an opinion of the annual operating costs for the first year of operation. Please note that the second column provides the 2017 operating budget for the Ingleside WWTP.

Table 10.3 – Estimate for the Annual Operating Costs

Description	Existing	CAS	EA	MBR
Administration	$34,900	$34,900	$34,900	$34,900
Utilities	$273,520	$274,167	$316,839	$643,965
Telephone	$5,800	$5,800	$5,800	$5,800
Chemicals	$260,000	$236,000	$236,000	$284,480
Professional Fees	$12,000	$12,000	$12,000	$12,000
Repairs[1]	$75,000	$82,085	$79,785	$137,285
Sludge Disposal	$85,000	$80,750	$85,000	$93,500
Sampling	$30,000	$30,000	$30,000	$30,000
Equipment	$1,000	$1,000	$1,000	$1,000
Building/Grounds	$50,000	$50,000	$50,000	$50,000
Infrastructure Rep/Main	$30,000	$30,000	$30,000	$30,000
Contracts	$238,600	$238,600	$238,600	$238,600
Share of Costs	$11,000	$11,000	$11,000	$11,000
Insurance	$29,330	$29,330	$29,330	$29,330
ANNUAL TOTAL	**$1,136,150**	**$1,115,632**	**$1,160,253**	**$1,601,860**
20 Year Present Worth		**$17,470,196**	**$18,168,949**	**$25,084,271**

Table 10.4 provides the life cycle cost analysis for the three technologies and Figure 5 displays the comparison in graphical format.

Table 10.4 – 20 Year Present Worth of Alternate Technologies

Technology	CAS	EA	MBR
Capital Cost	$9,182,720	$9,882,780	$8,870,940
PW Operating Cost	$17,470,196	$18,168,949	$25,084,271
LCC	$26,652,916	$28,051,729	$33,955,211
	LOWEST COST ALTERNATIVE		

10.3 Recommendation

The preferred design for the expansion of the Ingleside WWTP on the existing site can be described as:

- Upgrades to the Raw Sewage Pumping Station to facilitate the design hydraulic loadings for the expanded plant.
- New headworks, including redundant automated screens and vortex grit removal.
- Implementation of the Conventional Activated Sludge process which includes:
  - Construction of two new primary clarifiers
  - Retrofit of the existing aerobic digesters for use within the conventional activated sludge design parameters
  - Retrofit of the existing secondary clarifiers as flocculation tanks with the ability for alum and polymer addition
  - Construction of two new secondary clarifiers
- Construction of a new UV disinfection system.
- Construction of a gravity settler to pre-thicken waste activated sludge ahead of the aerobic digesters.
- Expansion of the existing aerobic digesters.
- Expansion of the existing biosolids storage facilities.

Building Expansion to house the support systems: blowers, pumps, chemical feed systems, emergency power system, etc.

APPENDIX A – Certificate of Approval

MAR 1 5 2003

Ministry of the Environment | Ministère de l'Environnement

Ontario

AMENDED CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 8524-5JFP5F

The Corporation of the Township of South Stormont
4949 County Road 14, P.O. Box 340
Ingleside, Ontario
K0C 1M0

RECEIVED
MAR 1 5 2003

Site Location: Ingleside WWTP
14754 County Road 2
Township of South Stormont, United Counties of Stormont, Dundas & Glengarry

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a sewage collection, treatment and disposal system serving the community of Ingleside in the Township of South Stormont (former Township of Osnabruck), consisting of a trunk sewer, a sewage pumping station and a secondary treatment plant rated at an average flow of 4,045 m^3/d, as follows:

Trunk Sewer

- a 1420 m long 525 mm diameter trunk sanitary sewer and appurtenances, to replace and extend the existing 300 mm diameter sanitary sewer on Farran Drive, as follows:

STREET	FROM	TO
Farran Drive	St. Lawrence Street (existing 525 mm diameter sewer on Farran Drive)	Industrial Park Road
Industrial Park Road	Farran Drive	Dickinson Drive
Dickinson Drive	Industrial Park Road	Approximately 80 m south of Industrial Park Road

Sewage Pumping Station and Forcemain

- a raw sewage pumping station located to the south of the intersection of Highway No.2 and Dickinson Drive at the down-stream end of the existing 460 m long 1800 mm diameter flow equalization trunk sewer running along the bank of the St. Lawrence River, consisting of:

- a four-room superstructure extending over the former wet well and a grade level slab constructed adjacent to the wet well;

- pumping station equipment, including three (3) VFD (two duty, one stand-by) submersible sewage pumps, each rated at 70 L/s at a TDH of 19 m, with a common discharge header connected to the new forcemain described below, a magnetic flow meter installed on the discharge header, a 113 kW emergency Diesel engine power generator set, a computerized station monitoring and operation control system connected to the new sewage treatment plant monitoring and control system, and individual heating and negative pressure ventilation systems in the four rooms of the station with two (2) (one duty, one stand-by) activated carbon air filters on the exhaust from the process room ventilation system;

- an approximately 1025 m long 400 mm diameter forcemain and appurtenances running along the bank of the St. Lawrence River from the pumping station described above to the inlet channel in the Headworks of the sewage treatment plant described below (approximately 60 m east of the Long Sault Parkway), including a pumping station by-pass portable pump connection installed in a chamber constructed in close proximity of the pumping station;

Sewage Treatment Plant

- a secondary sewage treatment plant rated at an average flow of 4,045 m^3/d and a peak flow rate of 10,027 m^3/d, located adjacent to the facilities of the existing plant and consisting of the following:

Headworks

- a covered inlet channel splitting into two (2) parallel covered screen channels; one of the two channels (340 mm wide x 700 mm deep) equipped with inlet and outlet gates, and an automatically controlled mechanically cleaned curved bar screen with 12 mm openings between bars, rated at a peak sewage flow of 10,027 m^3/d, and the other (450 mm x 700 mm deep by-pass channel) equipped with inlet and outlet gates, and a manually cleaned bar screen having 12 mm openings between bars, together with individual screenings chutes discharging into a screenings bin (with an underdrain draining into the plant sewer system) for off-site disposal;

- one (1) covered, insulated and heat traced free-vortex cyclone type grit separator 1788 mm in diameter, designed for a peak sewage flow of 10,027 m^3/d, together with an effluent discharge box draining into the aeration tank inlet distribution chamber described below, a water jet installed at the bottom of the grit hopper for the deposit fluidizing during periodical grit discharge to the grit decanter bin described below;

- one (1) grit decanter bin with the under-drain and over-flow pipes discharging into the plant sewer system, periodically emptied by a dump truck for off-site disposal;

- a grit separator by-pass channel from the screen outlet channel to the aeration tank inlet distribution chamber;

Activated Sludge Aeration System

- an aeration tank inlet distribution box splitting flow between the pre-aeration channels described below;

- two (2) pre-aeration channels, each 14 m long x 1.5 m wide x 1 m side water depth, equipped with a coarse bubble diffuser aeration system connected to the compressed air supply system described below;

- two (2) parallel rectangular aeration tanks, each 29.8 m long x 14.8 m wide x 4.6 m side water depth, and each equipped with plug flow promoting cross-flow baffles, a fine bubble air diffuser system connected to the compressed air supply system described below, and an outlet channel discharging into the flocculation basin described below;

Compressed Air Supply System

- five (5) (four duty, one stand-by) positive displacement air blowers, each rated at 43.5 m^3/min, installed in the Equipment Building described below, together with air headers to the diffuser systems in aeration tank inlet distribution chamber, aeration tanks and aerobic digesters;

Phosphorus Removal Chemical Application Facilities

- one (1) bottom feed square flocculation basin 5.5 m x 5.5 m x 2 m side water depth, equipped one (1) 0.75 hp low speed vertical paddle type flocculator, and an overflow weir discharging into the secondary clarifier distribution channel;

- a coagulant storage and feed facility consisting of two (2) fiberglass reinforced plastic 46 m^3 capacity coagulant solution storage tanks installed on a concrete pad with a containment curb, and two (2) chemical metering pumps, each having a maximum capacity of 248 L/hr, with a coagulant solution feed lines to the inlet of the outlet sections of the aeration tanks and aeration tank outlet channel ahead of the flocculation tank inlet weir;

- a polymer make-up, storage and feed facility with a polymer solution feed lines to aeration tank outlet channel ahead of the flocculation tank inlet weir;

Secondary Clarifiers

- a secondary clarifier inlet distribution channel, with two (2) 300 mm diameter clarifier feed pipes to the centre wells of the secondary clarifiers described below;

- two (2) centre feed square secondary clarifiers, each 12.2 m x 12.2 m x 4.3 m side water depth, and each with sludge scraper blades mounted on a centre supported pair of rotating rake arms discharging into a sludge collection chamber constructed around the perimeter of the centre well, a scum skimmer mounted on the same rotating rake arms, discharging into the scum chamber described below, and a perimeter overflow weir discharging into the effluent water basin described below;

Secondary Sludge and Scum Pumping Facilities

- a scum chamber 9 m long x 4.2 m wide x 3.2 m side water depth, located between the two secondary clarifiers, equipped with one (1) submersible centrifugal chopper type scum pump rated at 600 L/min at a TDH of 12 m, provided for scum recirculation/mixing and periodical transfer to the primary aerobic digester described below;

- three (3) (two duty, one stand-by) dry pit centrifugal return/waste activated sludge pumps installed in the basement of the Equipment Building, each rated at 2820 L/min at a TDH of 20 m, with a common system of suction lines from the sludge collection chambers of the secondary clarifiers, and a common header with a valved discharge lines to the inlet of the aeration tank inlet distribution chamber described above and the primary aerobic digester described below;

Final Effluent Facilities

- an effluent water chamber overflowing into the final effluent channel, equipped with four (4) submersible plant service effluent water pumps (two low lift pumps feeding a system of foam control spray nozzles in the aeration tanks, and two high lift pumps serving the grit separator bed fluidizing jet, centrifuge flushing system, sludge storage tank flushing system, chemical make-up systems and yard hose connections);

- a final effluent channel, including a 229 mm throat Parshall flume with ultrasonic level sensor and recorder, discharging into the plant outfall manhole located at the plant's southern property line;

Chlorination Facilities

- effluent chlorination facility installed in the Equipment Building, consisting of two (2) 13.6 m^3 capacity sodium hypochlorite solution storage polyethylene tanks, with a remote fill line from the outside of the building, and two (2) dual head chemical metering pumps (one duty, one stand-by) with feed lines to the raw sewage inlet distribution box, secondary clarifier, effluent water chamber and return activated sludge line;

Sludge Digestion Thickening and Storage Facilities

- one (1) open rectangular primary aerobic sludge digester 14.8 m wide x 19.55 m long x 4.6 m side water depth, constructed in common structure with the aeration tanks and the secondary digester, equipped with a coarse bubble diffuser aeration system connected to the compressed air supply system described above, a manually operated supernatant decanter with a gravity discharge pipe to the plant sewer system, and one (1) submersible centrifugal sludge transfer pump rated at 12 L/s at a TDH of 7.2 m (sludge transfer to the secondary digester);

- one (1) open rectangular secondary aerobic sludge digester 14.8 m wide x 9.8 m long x 4.6 m side water depth, constructed in common structure with the aeration tanks and the primary digester, equipped with a coarse bubble diffuser aeration system connected to the compressed air supply system described above, a manually operated supernatant decanter with a gravity discharge pipe to the plant sewer system, and one (1) submersible centrifugal sludge transfer pump rated at 12 L/s at a TDH of 7.2 m (sludge transfer to the primary digester);

- a digested sludge transfer pumping station, consisting of two (2) positive displacement progressive cavity sludge pumps (one duty, one stand-by), each rated at 2.2 L/s at a TDH of 3.6 m, installed in the basement of the Equipment Building, with a system of suction and discharge piping allowing for sludge transfer from the digesters to the sludge thickening centrifuge or the sludge storage tank described below;

- a digested sludge thickening facility, located in a separate Centrifuge Building, consisting of:

    - one (1) sludge thickening centrifuge rated at 8.0 m^3/hr (feed) capable of thickening a 2.5% solid content digested sludge to a solid content of 20.0 %, including an in-line static mixer on the centrifuge sludge feed line;

    - a polymer feed system, consisting of a polymer mixing unit and a 45 gallon drum located on the ground floor of the Centrifuge Building, and one (1) chemical metering pump with a polymer feed line to the in-line static mixer;

    - a ten metric tonne hopper located on the ground floor of the digested sludge thickening facility, directly below the centrifuge, for the collection of sludge prior to disposal;

    - a thickened sludge collection pit, located in the basement underneath the centrifuge;

- one (1) open circular digested sludge storage tank, having a 24 m diameter and 3.5 m side water depth, located adjacent to the Centrifuge Building, equipped with a system of sludge feed and recirculation piping, and a manually operated supernatant decanter with a gravity discharge pipe to the plant sewer system;

- a thickened sludge transfer station, consisting of one (1) dry pit hose type sludge pump, installed in the basement of the Centrifuge Building, with a system of suction and discharge lines designed to recirculate sludge in the digested sludge storage tank;

Equipment Building

- an Equipment Building constructed in common structure with the aeration tanks, final clarifiers and scum chamber, housing air blowers, sludge and scum pumps, and chemical storage and feed facilities described above;

Plant Control Building

- a Plant Control Building housing an office and plant control room, staff facilities, laboratory, workshop, storage areas, Diesel generator and fuel storage rooms, and electrical and mechanical rooms;

Plant Control System

- a computerized plant control, monitoring and recording system, consisting of a programable process controller (central computer) installed in the Plant Control Building, and monitoring, signal transmission, and process control equipment and instrumentation associated with individual plant process facilities and equipment;

Stand-by Power Generator

- a 100 kW stand-by Diesel engine power generator set and a fuel storage facility sized to provide emergency power supply for all essential facilities of the plant, installed in the Plant Control Building;

Plant Sewerage System

- a system of sewers serving the facilities of the plant, including a submersible sewage pumping station and a forcemain discharging into the plant inlet channel;

New Plant Outfall Sewer

- an approximately 1137 m long 800 mm diameter outfall sewer running from the new Plant's outfall manhole located at the plant's property line off shore into the main channel of the St. Lawrence River between the Bredin and West Woodland Islands approximately 150 m beyond the southern shores of the islands, including a 25 m long diffuser section with two (2) 200 mm diameter diffuser ports;

all in accordance with the supporting documents listed in Schedule "A".

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

(1) "certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act,* and includes any schedules;

(2) "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act* as a Director for the purposes of sections 7, 52, 53, 54, 55 and 56 of said Act;

(3) "Ministry" means the Ontario Ministry of the Environment;

(4) "Regional Director" means the Regional Director of the Eastern Region of the Ministry;

(5) "District Manager" means the District Manager of the Kingston District Office of the Ministry's Eastern Region;

(6) "Owner" means The Corporation of the Township of South Stormont;

(7) "the works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate;

(8) "the sewage treatment plant" means the entire sewage treatment system, including the effluent discharge facilities;

(9) "grab sample" means an individual sample of at least 1000 millilitres collected in the appropriate container at a randomly selected time over a period of time not exceeding 15 minutes;

(10) "composite sample" means a sample made up of at least 24 individual samples taken approximately one hour apart, collected over a time period of 24 consecutive hours;

(11) "weekly sample" means a sample collected on a rotating day and time schedule within a one (1) week period to satisfactorily reflect the overall performance of the sewage works under all operating flow conditions;

(12) "daily concentration" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

(13) "monthly average concentration " means the arithmetic mean of all daily concentrations of a contaminant in the effluent sampled or measured, or both, during a calendar month:

(14) "annual average concentration" means the arithmetic mean of the monthly average concentrations of a contaminant in the effluent calculated for any twelve (12) consecutive calendar months;

(15) "average daily flow" means the total sewage flow to the sewage works over twelve (12) consecutive calendar months, or during the period of operation upon which the report is based, divided by the number of days during the same period of time;

(16) "peak flow rate" means the maximum rate of sewage flow for which the plant or process unit was designed;

(17) "annual average loading" means the value obtained by multiplying the annual average concentration of a contaminant by the average daily flow over the same period of twelve (12) consecutive calendar months.

(18) "BOD_5" means five day carbonaceous biochemical oxygen demand measured in an unfiltered sample;

(19) "Escherichia Coli" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

(20) "geometric mean density" is the nth root of the product of multiplication of the results of n number of samples over the period specified.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. **GENERAL PROVISIONS**

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. CHANGE OF OWNER

3.1 The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of *Owner*;

(b) change of address of the *Owner*;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Informations Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*;

3.2 In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

4. PERFORMANCE

4.1 The *Owner* shall ensure that the flow of sewage into the sewage treatment plant does not exceed the peak flow rate of 10,027 m^3/d at any time.

4.2 The *Owner* shall ensure that the flow of sewage into the sewage treatment plant does not exceed the average daily flow of 4,045 m^3/d for any period of time greater than twelve (12) consecutive calendar months.

4.3 Any diversion of sewage flow from any portion of the sewage works is prohibited, except:

(a) when sewage flow is in excess of the peak flow rate specified in Condition 4.1; or

(b) where it is unavoidable in preventing loss of life, danger to public health, personal injury or severe property damage; or

(c) where it is necessary for the purpose of essential maintenance of the sewage works to assure their efficient operation, provided that the effluent quality requirements set out in Condition 4.4 will not be exceeded and the *District Manager* has given a prior written approval for the bypass; or

(d) where the *Regional Director* has specifically approved it in writing.

4.4 The *Owner* shall design, construct and operate the sewage treatment plant such that the concentrations and loadings of the materials named below as effluent parameters are not exceeded in the effluent from the plant, as determined in accordance with Condition 4.5:

Effluent Parameters	Concentration	Loading
BOD_5	25 mg/L	101 kg/d
Suspended Solids	25 mg/L	101 kg/d
Total Phosphorus	1 mg/L	4 kg/d

4.5 For the purpose of determining compliance with and enforcing Condition 4.4:

(a) Non-compliance with respect to concentrations of **BOD_5** and **Suspended Solids** in the effluent is deemed to have occurred when the annual average concentration of any of the parameters, as defined in this certificate, based on all composite samples taken in accordance with Condition 5.1, supplemented by spot sampling by the Ministry's staff as necessary, during any twelve (12) consecutive calendar months, exceeds its corresponding concentration in effluent specified above in Condition 4.4.

(b) Non-compliance with respect to concentration of **Total Phosphorus** in the effluent is deemed to have occurred when the monthly average concentration of the parameter, as defined in this certificate, based on all composite samples taken in accordance with Condition 5.1, supplemented by spot sampling by the Ministry's staff as necessary, during any calendar month, exceeds its corresponding concentration in effluent specified above in Condition 4.4.

(c) Non-compliance with respect to loadings of **BOD_5, Suspended Solids,** and **Total Phosphorus** is deemed to have occurred when the annual average loading of any of the parameters, as defined in this certificate, based on all composite samples taken in accordance with Condition 5.1, supplemented by spot sampling by the Ministry's staff as necessary, during any twelve (12) consecutive calendar months, exceeds its corresponding loading from effluent specified above in Condition 4.4.

(d) Data generated in accordance with the monitoring program and the flow measurement requirements outlined in Condition 5.1 and utilized in accordance with clauses (a) through (c) above shall be deemed to be conclusive of the minimum actual concentrations of the contaminants in the effluent from the works and minimum loadings of the contaminants to the receiving waters from the effluent.

4.6 The *Owner* shall maintain the pH of the effluent from the sewage treatment plant within the range of 6.0 to 9.5, inclusive, at all times.

4.7 The *Owner* shall operate the sewage treatment plant such that the effluent is continuously disinfected so that the following concentrations of the parameters noted below are not exceeded in the final effluent discharged from the sewage treatment plant to the St. Lawrence River:

Effluent Parameter	Concentration in Effluent
Escherichia Coli	200 organisms / 100 mL (monthly geometric mean density)

4.8 The performance criteria set out in Conditions 4.1 through 4.7 shall come into effect upon start up of operation of the works.

5. MONITORING AND RECORDING

5.1 The *Owner* shall ensure that the following monitoring program is carried out upon commencement of operation of the works:

(a) A sufficient number of flow measuring devices, calibrated at regular intervals not exceeding one year to ensure their accuracy to within plus or minus 5% of actual rate of flow within the range of 10% to 100% of the full scale reading of the measuring devices, shall be installed, maintained and operated in order to measure:

(i) the quantity of sewage being conveyed to and through the sewage treatment plant;

(ii) the quantity of sewage being bypassed without treatment.

(b) The data generated in accordance with clause (a) above shall be deemed to be conclusive of the minimum flow rates for the purposes of determining compliance with and enforcing this certificate.

(c) Samples of raw sewage and final effluent from the sewage treatment plant shall be collected at designated locations and analyzed for at least the following parameters at the indicated **minimum** frequencies:

Raw Sewage	Type of Sample	Minimum Frequency
BOD_5	composite	weekly
Suspended Solids	composite	weekly
Total Phosphorus	composite	weekly
Dissolved Reactive Phosphorus	composite	weekly
Total Kjeldahl Nitrogen	composite	weekly
Ammonia plus Ammonium Nitrogen	composite	weekly
Nitrite plus Nitrate Nitrogen	composite	weekly
Alkalinity	composite	weekly
Chlorides	composite	weekly
Conductivity	composite	weekly
pH	grab	weekly

Final Effluent Parameter	Type of Sample	Minimum Frequency
BOD_5	composite	weekly
Suspended Solids	composite	weekly
Total Phosphorus	composite	weekly
Dissolved Reactive Phosphorus	composite	weekly
Total Kjeldahl Nitrogen	composite	weekly
Ammonia plus Ammonium Nitrogen	composite	weekly
Nitrite plus Nitrate Nitrogen	composite	weekly
Alkalinity	composite	weekly
Chlorides	composite	weekly
Conductivity	composite	weekly
Total Coliform	grab	weekly
Faecal Coliform or E. Coli	grab	weekly
Faecal Streptococcus	grab	weekly

In addition to the above routine sampling program, on site testing should be performed at least three (3) times a week, Monday to Friday, and results recorded for the following final effluent parameters:

-pH, Temperature, Total Chlorine Residual.

(d) Sampling locations may only be changed or abandoned and new locations may be added following commencement of operation if, in the opinion of the *District Manager*, it is necessary to do so to ensure representative samples are being collected.

(e) The sampling and analyses required by clause (c) above shall be performed in accordance with the Ministry's Policy No.08-06; "Protocol for the Sampling and Analysis of Industrial -Municipal Wastewater", Ministry of Environment, July 1993; or as described in "Standard

Methods for Examination of Water and Wastewater", 17th Edition, 1990, as amended from time to time by more recently published editions.

5.2 The *Owner* shall, for the purpose of providing data for the calculation of total loadings in effluent in accordance with Condition 4.4, measure, estimate or calculate and record the total volume of effluent discharged on the sampling day.

5.3 If the *Owner* monitors any of the effluent parameters required by Condition 5.1, at the designated locations and in accordance with Condition 5.1, more frequently than it is required by that condition, the analytical results of all such samples, both required and additional, shall be included in the calculating and reporting of the values required by this certificate, and the increased frequency, or all dates of sampling, shall also be specified in the reports.

5.4 The *Owner* shall retain for a minimum of three years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this certificate.

5.5 The *Owner* shall record the time, location, duration and estimated quantity of each bypass event along with the reasons for the occurrence.

6. OPERATION AND MAINTENANCE

6.1 In order to ensure continuous compliance with the performance criteria stipulated in Conditions 4.1 through 4.7 the *Owner* shall use best effort to operate the sewage treatment plant with the objective that the concentrations and total loadings of the materials named below as effluent parameters are not exceeded in the effluent from the plant, as determined in accordance with Condition 4.5:

Parameters	Concentration	Loading
BOD_5	15 mg/L	61 kg/d
Suspended Solids	15 mg/L	61 kg/d
Total Phosphorus	<1 mg/L	<4 kg/d
Escherichia Coli	150 organisms/100 mL	

6.2 The *Owner* shall endeavour to operate the sewage treatment plant such that the effluent will not contain any oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters and shall be essentially free of any floating material.

6.3 Based on the operational objectives stipulated above in Conditions 6.1 and 6.2, the *Owner* shall prepare an operations manual within six (6) months of introducing sewage to the sewage works and keep it up to date. Upon request, the *Owner* shall make the manual available for inspection by the *Ministry* personnel and furnish a copy to the *Ministry*.

6.4 The *Owner* shall prepare and make available for inspection by *Ministry* personnel upon request, a complete set of drawings within one (1) year of substantial completion of the sewage works. The drawings shall show the sewage works as constructed at that time.

6.5 A complete set of the record drawings, incorporating any amendments made from time to time, shall be kept by the *Owner* at the administration building of the sewage works as long as the sewage works is kept in operation.

6.6 In order to prevent or minimize any unacceptable liquid discharges and gas and odour emissions into the natural environment, the *Owner* shall ensure that contingency plans and procedures are established and adequate equipment and material are available for dealing with: emergency and upset conditions including equipment breakdowns at the sewage works, flooding; overflows of raw and partly treated sewage and spills of sludge or chemicals into or out of the sewage works. The *Owner* shall establish notification procedures to be used to contact the *District Manager* and other relevant authorities in the case of an emergency and upset conditions.

6.7 Further to Condition 6.6 above, prior to start-up of the plant, the *Owner* shall establish an operation and contingency plan for the management of sludge generated at the plant, including the anticipated quantity and quality of sludge and locations of the proposed spreading sites (confirmed by the property owners, and including preliminary field data confirming adequacy of the sites in accordance with the *Ministry's* requirements outlined in "Guidelines to Govern the Stabilization and/or Disposal of Sewage Sludge Prior to its Utilization/Disposal", and "Guidelines for the Utilization of Sewage Sludge on Agricultural Lands"), and proposed contingency measures to be undertaken in case of odour problems arising from treatment, storage or handling of sludge at the plant.

6.8 The *Owner* shall establish procedures for receiving and responding to complaints including a reporting system which records what steps were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its reoccurrence.

6.9 The *Owner* shall provide for the overall operation of the sewage treatment plant with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 435/93.

7. **REPORTING**

7.1 One week prior to the start up of the operation of the works, the *Owner* shall notify the *District Manager* in writing of the pending start up date.

7.2 The *Owner* shall report to the *District Manager* any loading, concentration or other result that exceeds an effluent limit specified in Conditions 4.1 through 4.7 orally, as soon as is reasonably possible, and in writing within seven (7) days of the exceedance.

7.3 The *Owner* shall notify the *District Manager*:

(a) of anticipated bypasses at least (10) days prior to the date of the bypass or otherwise on the earliest date possible;

(b) of unanticipated bypasses forthwith; and

(c) the notice in either case shall include information with respect to the anticipated adverse effects on the natural environment and the duration of the bypass.

7.4 The *Owner* shall prepare and submit a performance report to the *District Manager* on an annual basis, and the submission shall be made no later than 90 days following the end of each calendar year. The first such report shall cover the period from the commencement of operation of the works until the end of the first calendar year in which the works is operated. The reports shall contain the following information:

(a) a summary of all monitoring data including an overview of the success and adequacy of the sewage treatment program;

(b) a comprehensive interpretation of all monitoring data and analytical data collected relative to the works during the reporting period and a comparison to the effluent quality and quantity criteria described in condition 4;

(c) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(d) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming a part of the works;

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.

4. Conditions 4.1 and 4.2 are included to ensure that the average daily flow and the peak flow rate of sewage through the works are within the approved treatment capacity of the *Works*.

5. Condition 4.3 is included to indicate that bypasses of untreated sewage to the receiving watercourse is prohibited, save in certain limited circumstances where the failure to bypass could result in greater injury to the public interest than the bypass itself, where a bypass will not violate the approved effluent requirements, or where the bypass can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the *Ministry* to take timely abatement and enforcement action in an informed manner and will allow the *Owner* to be aware of the extent and frequency of bypass events.

6. Conditions 4.4 through 4.8 are imposed to set out the maximum concentrations and related loadings of materials which are allowed in the discharge of effluent from the works to the receiving water body. These limits are established to minimize the environmental impact to the receiver and to protect water quality, fish and other aquatic life in the receiving water body. They are based on the Ministry's publication entitled "Water Management, Policies, Guidelines Provincial Water Quality Objectives of the Ministry of the Environment and Energy-July 1994", and recommendations of the International Joint Commission on the Great Lakes.

7. Conditions 5.1 through 5.5 relating to monitoring and recording the quality and quantity of the effluent from the sewage treatment plant on the continual basis are required to enable the *Owner* to evaluate the performance of the works and to ensure that it is operated and maintained at a level which is consistent with the design objectives and other requirements of this certificate.

8. Conditions 6.1 and 6.2, are included to set out non-enforceable effluent quality objectives which the *Owner* is obligated to use best efforts to strive towards on an ongoing basis. It is the *Ministry's* experience that setting of such objectives coupled with the bona fide efforts of the operating authority to achieve them tends to assist the operating authority in complying with the generally less stringent effluent requirements specified in Condition No. 4.4 thereby serving the environmental goals set out in the reason for the latter.

9. Conditions 6.3 through 6.9 are included to ensure that the works will be operated, maintained, funded, staffed and equipped in a manner enabling compliance with the terms and conditions of this certificate, such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.

10. Conditions 7.1 thorough 7.4 are included to ensure that all pertinent information is available for the evaluation of the performance of the sewage works and that disposal of sludge generated at the sewage works is in accordance with the Provincial Sludge Utilization Guidelines and consistent with requirements of Part V of the *Environmental Protection* Act.

SCHEDULE A

The following is a list of submitted supporting documents relied upon in the issuance of this Certificate of Approval:

1. Application for Approval of Sewage Works dated July 9, 1993.
2. Report entitled "Township of Osnabruck. Design Concept Brief. Ingleside Sewage System. MOE Project No. 3-0797-01, October 1992", prepared by McNeely Engineering Consultants Limited.
3. Report entitled "Township of Osnabruck. Ingleside Sewage System Upgrading. Environmental Study Report, April 1993", Volumes 1 and 2, prepared by McNeely Engineering Consultants Limited.
4. Letter from McNeely Engineering Consultants Limited to the MOEE Approvals Branch, dated March 30, 1993.
5. Facsimile transmission from McNeely Engineering Consultants Limited to the MOEE Approvals Branch, dated November 15, 1993.
6. Facsimile transmission from McNeely Engineering Consultants Limited to the MOEE Approvals Branch, dated November 18, 1993.
7. Report entitled "Township of Osnabruck. Farran Drive Trunk Sewer. Design Brief. MOEE Project 40-0797 Contract No. 1.", prepared by McNeely Engineering Consultants Ltd., dated September 1993.
8. Engineering drawings and specifications entitled "Township of Osnabruck. Ingleside. Farran Drive Trunk Sanitary Sewer. M.O.E.E. Project No. 40-0797. Contract No. 1.", prepared by McNeely Engineering Consultants Ltd., dated August and September 1993.
9. Report entitled "Township of Osnabruck. Ingleside Sewage Pumping Station Upgrade. Design Brief. MOEE Project 40-0797 Contract No. 2.", prepared by McNeely Engineering Consultants Ltd., dated September 1993.
10. Engineering drawings and specifications entitled "Township of Osnabruck. Ingleside Sewage Pumping Station Modifications. M.O.E.E. Project No. 40-0797. Contract No. 2.", prepared by McNeely Engineering Consultants Ltd., dated August and September 1993.
11. Report entitled "Township of Osnabruck. Outfall Sewer. Design Brief. MOEE Project 40-0797 Contract No. 3.", prepared by McNeely Engineering Consultants Ltd., dated October, 1993.
12. Engineering drawings and specifications entitled "Township of Osnabruck. Sewage System Upgrading. Ingleside Outfall Sewer. M.O.E.E. Project No. 40-0797. Contract No. 3.", prepared by McNeely Engineering Consultants Ltd., issued on October 19, 1993.
13. Application for Approval of Sewage Works dated September 1995 and final plans and specifications prepared by McNeely Engineering Consultants Limited.

14. Application for Approval of Municipal and Private Sewage Works dated February 1, 2002, accompanying documentation, final plans and specifications prepared by The Thompson Rosemount Group Inc.

15. Letter dated January 7, 2002 and signed by Marco Vincelli, P.Eng., Environmental Engineer, The Thompson Rosemount Group Inc.

16. Application for Approval of Municipal and Private Sewage Works dated October 1, 2002.

17. Letter dated October 1, 2002 and signed by Marco Vincelli, P.Eng., Environmental Engineer, The Thompson Rosemount Group Inc.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 7872-5CLTQ3 issued on August 27, 2002 and Notice of Amendment to Certificate of Approval Sewage No. 3-1279-93-957 dated October 29, 1997.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 2300 Yonge St., 12th Floor P.O. Box 2382 Toronto, Ontario M4P 1E4	AND	The Director Section 53, *Ontario Water Resources Act* Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

* **Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 27th day of February, 2003

Randy Chin
Director
Section 53, *Ontario Water Resources Act*

KC/

c: District Manager, MOE Kingston District Office
Marco Vincelli, P.Eng., The Thompson Rosemount Group Inc.

Appendix B – Historical Quantity and Quality Wastewater Data from the Ingleside Wastewater Treatment Plant

Municipality: **TOWNSHIP OF SOUTH STORMONT**

INGLESIDE WWTP

Year: 2014

Receiving Water: Lake St. Lawrence

DESIGN CAP: 4,045 m^3/d ave. - 10,027 m^3/d peak

Description: SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION

MONTH	FLOWS				BIOCHEMICAL O_2 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			AMMONIA			**DRP**		**TKN**	
	EFFLUENT FLOWS	INFLUENT FLOWS	AVG DAY FLOWS	MAX DAY FLOWS	AVE INF	AVE EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	AVG INF	AVG EFF
	m^3	m^3	m^3	m^3	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	mg/l	mg/l
JAN	118,976	129,316	4,171	7,737	258	2.30	99%	351	7.59	98%	17.8	0.87	95%	38.16	0.02	100%	10.9	0.69	61.87	1.35
FEB	85,702	92,273	3,295	4,893	179	1.88	99%	248	8.09	97%	18.8	0.82	96%	51.75	0.01	100%	15.5	0.71	63.68	1.05
MAR	110,275	118,860	3,834	5,684	162	1.88	99%	233	5.85	97%	18.5	0.98	95%	48.45	0.01	100%	12.8	0.82	62.52	1.05
APR	194,997	211,138	7,038	15,483	135	5.63	96%	173	7.64	96%	9.3	0.58	94%	18.30	2.12	88%	4.8	0.43	34.17	3.34
MAY	127,175	136,437	4,548	8,644	389	4.50	99%	597	13.57	98%	17.7	1.11	94%	31.00	0.01	100%	9.6	0.85	64.06	1.36
JUN	109,270	116,088	3,870	6,389	180	2.88	98%	227	5.48	98%	14.0	0.72	95%	33.25	0.04	100%	11.1	0.62	53.49	1.09
JUL	115,264	120,203	3,878	7,333	149	2.30	98%	166	5.95	96%	13.4	0.97	93%	44.66	0.05	100%	10.7	0.83	51.82	1.26
AUG	113,198	118,409	3,820	5,695	167	1.50	99%	304	4.11	99%	15.6	0.66	96%	43.78	0.03	100%	9.8	0.59	65.91	0.90
SEP	102,242	107,013	3,567	6,258	203	1.50	99%	333	3.96	99%	15.8	0.81	95%	43.08	0.02	100%	10.6	0.72	64.40	0.97
OCT	88,103	92,522	2,985	3,483	242	1.80	99%	310	5.85	98%	19.4	0.69	96%	46.30	0.02	100%	11.9	0.53	74.00	1.00
NOV	90,938	95,506	3,184	4,874	203	3.25	98%	322	4.87	98%	18.0	1.15	94%	44.48	0.01	100%	14.9	1.05	60.66	0.99
DEC	105,306	112,374	3,625	5,432	209	2.40	99%	407	3.31	99%	22.3	0.72	97%	40.44	0.01	100%	14.4	0.64	76.81	1.02
TOTAL	1,361,446	1,450,139																		
AVERAGE			3,984		206	2.65	99%	306	6.35	98%	16.7	0.84	95%	40.30	0.20	99%	11.4	0.71	61.12	1.28
MAXIMUM				15,483																
CRITERIA						25			25			1.00			15					
ANNUAL LOADING Kg/d						10.56			25.32			3.35								
CRITERIA						101			101			4								

Municipality: **TOWNSHIP OF SOUTH STORMONT** **Year:** 2014

INGLESIDE WWTP **Receiving Water:** Lake St. Lawrence

DESIGN CAP: 4,045 m^3/d ave. - 10,027 m^3/d peak

Description: SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION

MONTH	**NO_2**		**NO_3**		**ALKALINITY**		**CHLORIDES**		**COND.**		**pH**		**TC**	**E.Coli**	**FS**	**Temp.**	**Total Cl^2**
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	EFF	EFF	EFF	EFF	EFF
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	umhos/cm		pH units		cts/100mL	cts/100mL	cts/100mL	^{0}C	mg/l
JAN	1.1	0.1	1.1	40.8	764	327	229	246	2210	2048	7.97	7.60	263	5	4	6.9	1.10
FEB	0.7	0.1	0.4	47.6	1028	370	205	264	2518	2372	8.08	7.51	10	1	3	20.1	1.27
MAR	0.6	0.4	0.9	48.5	966	393	276	228	2718	2176	8.07	7.62	14	2	4	20.0	1.17
APR	0.6	1.5	1.6	19.5	510	287	148	178	1475	1472	7.97	7.83	818	38	78	16.2	0.72
MAY	0.4	0.3	0.6	39.9	880	388	172	189	2070	1830	8.06	7.68	221	12	86	21.8	1.10
JUN	0.1	0.1	0.3	43.2	895	308	114	226	2353	1966	8.10	7.72	28	8	18	24.6	1.18
JUL	0.3	0.1	0.3	44.8	861	362	228	210	2388	2071	8.08	8.01	41	2	6	26.9	1.17
AUG	0.5	0.3	0.7	51.9	823	336	160	216	2053	2144	8.02	7.81	4	2	2	27.6	1.12
SEP	0.4	0.1	1.3	50.7	961	385	208	224	2333	2075	8.04	7.75	14	1	1	27.0	1.00
OCT	0.7	0.1	0.8	55.5	891	318	159	216	2186	2161	8.09	7.50	5	2	2	25.1	1.12
NOV	0.3	0.1	2.9	54.1	975	415	190	241	2448	2216	8.10	7.63	8	3	3	22.6	1.37
DEC	0.1	0.1	2.2	50.1	952	389	230	228	2418	2160	8.08	7.46	12	8	11	20.7	1.10
TOTAL																	
AVERAGE	0.5	0.3	1.1	45.5	875	356	193	222	2264	2058	8.06	7.67	120	7	18	21.6	1.12
MAXIMUM																	
CRITERIA														200			
ANNUAL LOADING Kg/d																	
CRITERIA																	

Municipality:	**TOWNSHIP OF SOUTH STORMONT**	**Year:**	2015
	INGLESIDE WWTP	**Receiving Water:**	Lake St. Lawrence
		DESIGN CAP:	4,045 m^3/d ave. - 10,027 m^3/d peak
Description:	SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION		

MONTH	FLOWS				BIOCHEMICAL O_2 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			AMMONIA			**DRP**		**TKN**	
	EFFLUENT FLOWS	INFLUENT FLOWS	AVG DAY FLOWS	MAX DAY FLOWS	AVE INF	AVE EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	AVG INF	AVG EFF
	m^3	m^3	m^3	m^3	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	mg/l	mg/l
JAN	100,045	108,724	3,507	4,673	234	1.50	99%	372	5.39	99%	19.43	0.73	96%	43.98	0.01	100%	12.58	0.61	69.76	1.08
FEB	82,114	89,907	3,211	3,510	259	1.88	99%	432	6.76	98%	23.16	0.62	97%	50.43	0.01	100%	16.58	0.51	81.49	1.02
MAR	117,486	123,680	3,990	5,564	291	1.50	99%	366	5.76	98%	22.07	0.92	96%	40.33	0.01	100%	13.65	0.84	77.03	1.19
APR	156,927	171,006	5,700	8,343	159	2.30	99%	262	5.46	98%	14.31	0.98	93%	27.88	0.02	100%	10.50	0.86	48.16	1.23
MAY	105,594	113,723	3,668	4,308	163	2.38	99%	224	6.05	97%	19.09	0.84	96%	41.05	0.04	100%	13.60	0.68	70.68	1.23
JUN	127,439	127,077	4,236	7,293	126	4.38	97%	166	3.24	98%	13.23	0.73	94%	37.38	0.03	100%	8.81	0.65	53.24	1.10
JUL	104,209	98,631	3,182	3,971	123	2.80	98%	141	3.77	97%	13.96	0.57	96%	44.06	0.01	100%	10.50	0.51	62.26	0.78
AUG	96,699	97,928	3,159	5,308	81	1.50	98%	92	4.23	95%	13.56	0.65	95%	49.60	0.01	100%	10.45	0.51	57.13	0.81
SEP	87,222	89,135	2,971	5,227	71	1.50	98%	79	3.80	95%	14.91	0.62	96%	63.35	0.04	100%	12.70	0.45	69.78	0.81
OCT	86,095	89,638	2,892	3,905	130	1.50	99%	134	3.54	97%	15.19	0.61	96%	51.22	0.03	100%	11.46	0.44	66.40	1.02
NOV	96,532	100,168	3,339	4,372	134	1.50	99%	137	4.98	96%	14.84	0.64	96%	52.28	0.01	100%	10.21	0.47	70.15	0.99
DEC	110,228	114,484	3,693	5,233	174	2.70	98%	242	5.56	98%	15.44	0.81	95%	39.56	0.01	100%	10.29	0.66	60.92	1.05
TOTAL	1,270,590	1,324,101																		
AVERAGE			3,629		162	2.12	98%	221	4.88	97%	16.60	0.73	96%	45.09	0.02	100%	11.78	0.60	65.58	1.02
MAXIMUM				8,343																
CRITERIA						25			25			1.00			15					
ANNUAL LOADING Kg/d						7.69			17.71			2.64								
CRITERIA						101			101			4								

Municipality: **TOWNSHIP OF SOUTH STORMONT** **Year:** 2015

INGLESIDE WWTP **Receiving Water:** Lake St. Lawrence

DESIGN CAP: 4,045 m^3/d ave. - 10,027 m^3/d peak

Description: SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION

MONTH	**NO_2**		**NO_3**		**ALKALINITY**		**CHLORIDES**		**COND.**		**pH**		**TC**	**E.Coli**	**FS**	**Temp.**	**Total Cl^2**
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	EFF	EFF	EFF	EFF	EFF
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	umhos/cm		pH units		cts/100mL	cts/100mL	cts/100mL	^0C	mg/l
JAN	1.29	0.05	3.28	53.53	941	394	237	238	2445	2190	8.06	7.83	38	4	2	18.3	0.93
FEB	0.75	0.05	0.29	51.08	1022	358	247	336	2638	2376	7.96	7.72	68	18	6	19.3	1.04
MAR	0.29	0.05	0.15	45.65	748	440	248	273	2425	2254	7.92	7.50	35	7	4	19.2	0.86
APR	1.03	0.05	0.85	36.90	819	424	195	211	2050	1909	8.00	7.84	409	11	4	18.9	0.69
MAY	0.26	0.05	0.14	53.40	895	327	228	265	2350	2213	7.90	7.45	558	20	3	24.0	1.07
JUN	0.29	0.05	0.29	42.50	729	300	151	184	1810	1817	7.84	7.16	45	1	1	24.2	1.02
JUL	0.37	0.05	0.26	48.80	866	325	165	206	1996	2001	7.91	7.55	16	2	1	27.1	0.88
AUG	0.21	0.05	0.23	55.38	750	291	184	217	2090	2105	7.99	7.63	8	1	1	28.8	0.95
SEP	0.51	0.05	0.20	54.83	959	307	200	248	2408	2180	8.00	7.60	12	2	1	28.2	0.99
OCT	0.70	0.05	0.62	59.76	767	309	156	276	1876	2354	7.95	7.90	6	2	3	25.8	1.12
NOV	0.73	0.05	0.41	55.55	853	302	187	225	2085	2091	8.02	7.85	12	2	1	23.1	1.06
DEC	0.70	0.34	0.36	46.66	781	378	194	216	2163	2178	7.93	8.05	25	2	1	21.7	1.18
TOTAL																	
AVERAGE	0.59	0.07	0.59	50.34	844	346	199	241	2195	2139	7.96	7.67	103	6	2	23.2	0.98
MAXIMUM																	
CRITERIA														200			
ANNUAL LOADING Kg/d																	
CRITERIA																	

Municipality: **TOWNSHIP OF SOUTH STORMONT** **Year:** 2016

INGLESIDE WWTP **Receiving Water:** Lake St. Lawrence

DESIGN CAP: 4,045 m^3/d ave. - 10,027 m^3/d peak

Description: SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION

MONTH	FLOWS				BIOCHEMICAL O_2 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			AMMONIA			**DRP**		**TKN**	
	EFFLUENT FLOWS	INFLUENT FLOWS	AVG DAY FLOWS	MAX DAY FLOWS	AVE INF	AVE EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	PERCENT REMOVAL	AVG INF	AVG EFF	AVG INF	AVG EFF
	m^3	m^3	m^3	m^3	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	%	mg/l	mg/l	mg/l	mg/l
JAN	109,724	115,383	3,722	5,677	140	1.50	99%	188	6.42	97%	16.27	0.74	95%	39.03	0.02	100%	10.31	0.60	61.23	1.21
FEB	134,085	143,812	4,959	10,172	109	1.88	98%	153	7.20	95%	13.09	0.84	94%	27.80	0.02	100%	8.25	0.68	46.73	1.16
MAR	161,729	180,785	5,832	8,519	77	2.00	97%	104	7.45	93%	11.72	0.72	94%	24.64	0.01	100%	8.21	0.55	35.45	1.30
APR	132,877	147,987	4,933	7,862	119	2.38	98%	212	8.31	96%	14.25	0.83	94%	37.93	0.70	98%	9.74	0.64	45.52	1.95
MAY	97,280	104,465	3,370	4,033	164	1.50	99%	254	3.97	98%	17.86	0.79	96%	44.88	0.17	100%	12.83	0.65	61.28	1.25
JUN	84,102	91,129	3,038	4,214	191	3.70	98%	280	4.03	99%	20.38	0.72	96%	44.82	0.02	100%	13.46	0.63	65.81	0.90
JUL	84,206	89,255	2,879	3,145	129	1.50	99%	204	4.09	98%	21.26	0.84	96%	44.58	0.01	100%	14.27	0.77	68.32	0.89
AUG	83,865	91,239	2,943	3,369	190	1.88	99%	324	4.69	99%	20.77	0.69	97%	58.58	0.01	100%	14.13	0.54	89.17	0.96
SEP	79,561	88,160	2,939	3,560	166	2.90	98%	245	7.30	97%	19.25	0.94	95%	55.58	0.02	100%	14.11	0.71	73.23	1.07
OCT	99,498	107,890	3,480	6,844	188	1.50	99%	238	7.17	97%	18.77	0.89	95%	54.88	0.04	100%	15.25	0.71	76.83	1.17
NOV	91,528	100,352	3,345	3,828	187	2.75	99%	278	5.39	98%	18.71	0.80	96%	40.20	0.08	100%	11.90	0.67	67.95	1.23
DEC	116,447	121,703	3,926	7,304	142	2.30	98%	163	6.19	96%	14.73	0.64	96%	31.54	0.03	100%	9.04	0.55	50.53	1.10
TOTAL	1,274,902	1,382,160																		
AVERAGE			3,780		150	2.15	98%	220	6.02	97%	17.25	0.79	95%	42.04	0.09	100%	11.79	0.64	61.84	1.18
MAXIMUM				10,172																
CRITERIA						25			25			1.00			15					
ANNUAL LOADING Kg/d						8.12			22.75			2.97								
CRITERIA						101			101			4								

Municipality: **TOWNSHIP OF SOUTH STORMONT** | **Year:** 2016

INGLESIDE WWTP | **Receiving Water:** Lake St. Lawrence

DESIGN CAP: 4,045 m^3/d ave. - 10,027 m^3/d peak

Description: SECONDARY TREATMENT / EXTENDED AER/ AEROBIC DIGESTION

MONTH	**NO_2**		**NO_3**		**ALKALINITY**		**CHLORIDES**		**COND.**		**pH**		**TC**	**E.Coli**	**FS**	**Temp.**	**Total Cl^2**
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	INF	EFF	EFF	EFF	EFF	EFF	EFF
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	umhos/cm		pH units		cts/100mL	cts/100mL	cts/100mL	^0C	mg/l
JAN	0.68	0.05	0.28	33.51	847	386	183	208	2048	2046	7.98	8.16	44	5	3	19.1	0.91
FEB	0.71	0.05	1.19	38.75	674	336	175	195	1825	1930	8.04	8.05	12	2	2	17.9	0.93
MAR	0.65	0.39	1.18	28.78	628	320	178	216	1788	1745	8.09	7.29	29	1	2	17.3	0.77
APR	0.29	1.35	0.14	35.35	766	355	274	253	2193	1933	8.11	7.96	242	29	6	19.6	0.71
MAY	0.15	0.29	0.19	43.45	845	328	288	290	2393	2172	8.05	7.64	33	4	2	23.6	0.82
JUN	0.05	0.09	0.12	46.12	905	301	264	293	2360	2263	8.05	7.30	149	3	1	26.9	0.82
JUL	0.83	0.10	0.41	55.18	998	369	268	352	2510	2560	8.03	7.34	186	8	1	29.6	0.69
AUG	0.54	0.53	0.14	48.41	1183	417	223	266	2678	2609	8.14	7.19	338	1	1	30.0	0.61
SEP	1.24	0.09	0.81	61.14	1092	386	284	316	2612	2574	8.10	7.55	54	3	2	29.6	0.68
OCT	0.15	0.15	0.18	58.98	1150	399	358	362	2973	2719	7.96	7.56	43	5	3	26.5	0.77
NOV	0.29	0.36	0.50	48.95	725	356	252	329	2135	2339	8.02	7.39	50	4	2	23.4	1.02
DEC	1.07	0.18	1.72	38.30	731	316	281	314	2303	2264	8.01	7.24	83	6	4	20.8	1.07
TOTAL																	
AVERAGE	0.55	0.30	0.57	44.74	879	356	252	283	2318	2263	8.05	7.56	105	6	2	23.7	0.82
MAXIMUM																	
CRITERIA														200			
ANNUAL LOADING Kg/d																	
CRITERIA																	

Appendix C   Public Consultation Information

First_name	Last_Name	Job_Title	Company	Address	City	Postal_Code	Phone	Email
Municipality								
Jim	Bancroft	Mayor	Township of South Stormont	2 Mille Roches Road	Long Sault	K0C 1P0	613-534-8889	jbancroft@southstormont.ca
Tammy	Hart	Deputy Mayor	Township of South Stormont	2 Mille Roches Road	Long Sault	K0C 1P0	613-534-8889	thart@southstormont.ca
Donna	Primeau	Councillor	Township of South Stormont	2 Mille Roches Road	Long Sault	K0C 1P0	613-534-8889	dprimeau@southstormont.ca
Richard	Waldfroff	Councillor	Township of South Stormont	2 Mille Roches Road	Long Sault	K0C 1P0	613-534-8889	rwaldroff@southstormont.ca
David	Smith	Councillor	Township of South Stormont	2 Mille Roches Road	Long Sault	K0C 1P0	613-534-8889	dsmith@southstormont.ca
Betty	de Haan	CAO	Township of South Stormont	3 Mille Roches Road	Long Sault	K0C 1P1	613-534-8889	betty@southstormont.ca
Peter	Young	Director of Planning	Township of South Stormont	4 Mille Roches Road	Long Sault	K0C 1P2	613-534-8889	peter@southstormont.ca
Ross	Gellately	Director of Public Works	Township of South Stormont	5 Mille Roches Road	Long Sault	K0C 1P3	613-534-8889	ross@southstormont.ca
Operator-in-Charge								
Chris	Eamon	Operations Manager	Caneau Water and Sewage Operations Inc.	15005 Parkway Drive	RR#3 Inglesid	K0C 1M0	613-537-2719	c.eamon@caneau.ca
Political Representation								
Guy	Lauzon	MP		621 Pitt Street	Cornwall	K6J 3R8	613-937-3331	Guy.Lauzon@parl.gc.ca
Jim	McDonell	MPP		120 Second Street West	Cornwall	K6J 1G5	613-933-6513	jim.mcdonellco@pc.ola.org
Provincial Government								
Vicki	Mithell	Environmental Assessment Coordinator	MOECC	1259 Gardiners Road, Unit 1	Kington	K7P 3J6	613-540-6852	vicki.mitchell@ontario.ca
Victor	Castro	Group Leader, Surface Water	MOECC	1259 Gardiners Road, Unit 1	Kington	K7P 3J6	613-540-6862	victor.castro@ontario.ca
James	Mahoney	Manager (Acting)	MOECC	1259 Gardiners Road, Unit 1	Kington	K7P 3J6	613-548-6902	james.mahoney@ontario.ca
Melissa	Forget	Water Inspector	MOECC	113 Amelia Street	Cornwall	K6H 3P1	613-933-0709	melissa.forget@ontario.ca
Mary	Dillon	District Planner (Acting)	MNR	10 Campus Drive, P.O.Box 2002	Kemptville	K0G 1J0	613-258-8470	mary.dillion@ontario.ca
Jonh	O'Neil	Rural Planner	OMAFRA	59 Ministry Road, PO Box 2004	Kemptville	K0G 1J0	613-258-8341	john.o'neil@ontario.ca
Michael	Elms	Manager	Ministry of Municipal Affairs & Housing	Rockwoord House, 8 Estate Lane	Kingston	K7M 9A8	613-545-2132	michael.elms@ontario.ca
Katherine	Kirzati	Heritage Planner	Ministry of Tourism	401 Bay Street	Toronto	M7A 0A7	416-314-7643	katherine.kirzati@ontario.ca
Heather	Levecque	Director (Acting)	Indigenous Relations	9th Floor, 160 Bloor St. East	Toronto	M7A 2E6	416-325-7032	heather.levecque@ontario.ca
Federal Government								
Anjala	Puvananatha	Director	Canadian Environmental Assessment Agency	55 St. Clair Avenue East, Rm 907	Toronto	M4T 1M2	416-953-1575	anjala.puvananathan@ceaa-acee.gc.ca
Anne	Scotton	Regional Director General	Indigenous Affairs and Northern Developmen	25 St. Clair Avenue East, 8th Fl	Toronto	M4T 1M2	416-973-1255	anne.scotton@aadnc-aandc.gc.ca
			Transport Canada - Navigation Protection					nppont-ppnont@tc.gc.ca
			DFO -Fisheries Protection					fisheriesprotection@dfo-mpo.gc.ca
Agencies								
Dr. Paul	Roumeliotis	Medical Officer of Health	Eastern Ontario Health Unit	1000 Pitt Street	Cornwall	K6J 3X1	613-933-1375	proumeliotis@eohu.ca
Lisa	Deslandes	Regulation Officer	RRCA	18045 County Road #2, Box 429	Cornwall	K6H 5T2	613-938-3611	info@rrca.on.ca
Benjamin	de Haan	Director of Transportation and Planning Servic	United Counties of SDG	26 Pitt Street	Cornwall	K6J 3P2	6139321515	bdehaan@sdgcounties.ca
First Nation Groups								
			Algonquin Anishinabeq Nation	81 Kichi Mikan	Kitigan Zibi, C	J9E 3C3	819-449-1225	info@anishinabenation.ca
Aly	Alibhai	Director	Metis Nation of Ontario Region				416-977-9881x	alya@metisnation.org
Peggy	Pyke	Director	Mohawk Council of Akwesasne	PO Box 90	Akwesasne, C	H0M 1A0	613-575-2250	peggy.pyke@akwesasne.ca
Bill (Colonnial Drive)							613-449-1298	

TOWNSHIP OF SOUTH STORMONT

CLASS ENVIRONMENTAL ASSESSMENT

INGLESIDE WASTEWATER TREATMENT PLANT

NOTICE OF STUDY COMMENCEMENT

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont is considering alternative ways in which the wastewater treatment plant can be improved to meet the demands of the existing population as well as the potential growth in a 20-year horizon.

In accordance with the requirements for Schedule C projects of the Municipal Class Environmental Assessment process, the Township is making preliminary study materials and plans available for public review. On Thursday July 20, 2017, between the hours of 4:00pm and 8:00pm, the public is invited to attend at the South Stormont Support Centre, 34 Memorial Square, Ingleside. The Township's consultants will be available to discuss issues and concerns with the members of the public. Thereafter, input and comment will be accepted by the consultants until August 3rd, 2017.

For further information on the project, or on the planning process being followed, contact EVB Engineering, 208 Pitt Street, Cornwall, ON, K6J 3P6, telephone (613) 935-3775 (x21); attention Mr. Marco Vincelli, P.Eng., Environmental Assessment Lead at marco.vincelli@evbengineering.com.

This Notice issued on July 13, 2017.

Ms. Betty de Haan, CMO, CAO

Township of South Stormont

P.O. Box 84
2 Mille Roches Road
Long Sault, ON K0C 1P0
Phone: 613-534-8889
Fax: 613-534-2280

info@southstormont.ca

TOWNSHIP OF SOUTH STORMONT

CLASS ENVIRONMENTAL ASSESSMENT

INGLESIDE WASTEWATER TREATMENT PLANT

2nd MANDATORY PUBLIC CONTACT

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont has reviewed alternative solutions to ensure the wastewater treatment plant will meet the demands of the existing population as well as the potential growth in a 20-year horizon.

This project is being planned as a **Schedule C** project under the **Municipal Class Environmental Assessment**. For further information on the project, or on the planning process being followed, contact EVB Engineering, 208 Pitt Street, Cornwall, ON, K6J 3P6, telephone (613) 935-3775 (x21); attention Mr. Marco Vincelli, P.Eng., Environmental Assessment Lead at marco.vincelli@evbengineering.com.

Public Consultation Centre
Date: Wednesday October 12, 2017,
Open House: between the hours of 5:00pm and 8:00pm,
Public Meeting: 7:00pm
Location: South Stormont Support Centre, 34 Memorial Square, Ingleside.

Following the public consultation centre, further comments are invited for incorporation into the planning of this project and will be received until November 17, 2017.

Subject to comments received as a result of this Notice, the Township plans to proceed with the completion of the Class EA for this project and an Environmental Study Report will be prepared and placed on the public record for a minimum of 30-day review period.

This Notice issued on September 29, 2017.

Ms. Betty de Haan, CMO, CAO

Township of South Stormont

P.O. Box 84
2 Mille Roches Road
Long Sault, ON K0C 1P0
Phone: 613-534-8889
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TOWNSHIP OF SOUTH STORMONT

CLASS ENVIRONMENTAL ASSESSMENT

INGLESIDE WASTEWATER TREATMENT PLANT

NOTICE OF COMPLETION OF ENVIRONMENTAL STUDY REPORT

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont has reviewed alternative solutions to ensure the wastewater treatment plant will meet the demands of the existing population as well as the potential growth in a 20-year horizon.

This project is being planned as a **Schedule C** project under the **Municipal Class Environmental Assessment**. The Environmental Study Report has been completed and by this Notice is being placed in the public record for review and comment. Subject to comments received as a result of this Notice and the receipt of necessary funding and approvals, the Township intends to proceed with the construction of this project in the near future. The estimated total project cost is $27 million.

The Environmental Study Report is available for review at the Township office located at:

2 Mille Roches Road, Long Sault, ON
Monday to Friday: 8:30am to 4:30pm

For further information on the project, contact EVB Engineering, 208 Pitt Street, Cornwall, ON, K6J 3P6, telephone (613) 935-3775 (x21); attention Mr. Marco Vincelli, P.Eng., Environmental Assessment Lead at marco.vincelli@evbengineering.com. There will be a final Public Consultation Centre to be held on:

Public Consultation Centre

Date:	Tuesday January 9, 2018,
Time:	5:00pm and 8:00pm,
Location:	South Stormont Seniors Support Centre, 34 Memorial Square, Ingleside.

Interested persons should provide written comment to the Township on the project within 30 calendar days from the date of this Notice (DEADLINE: January 15, 2018). Comments should be directed to the Director of Public Works at Town Hall.

A person or party may request that the Minister of the Environment and Climate Change order a change in the project status and require a higher level of assessment under an individual Environmental Assessment process (referred to as a Part II Order). Reasons must be provided for the request. Copies of the Request Form must be sent to the following three parties:

Minister of the Environment
and Climate Change
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, ON M7A 2T5

Minister of the Environment
and Climate Change
Environmental Approvals
Branch
135 St. Clair Avenue W
1st Floor
Toronto, ON M4V 1P5

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

If there is no "request received by January 15, 2018", the Township will proceed to carry out the design and construction as presented in the Environmental Study Report.

Please note that ALL personal information included in a Part II Order submission – such as name, address, telephone number and property location – is collected, maintained and disclosed by the Ministry of the Environment and Climate Change for the purpose of transparency and consultation. The information is collected under the authority of the Environmental Assessment Act or is collected and maintained for the purpose of creating a record that is available to the general public as described in s.37 of the Freedom of Information and Protection of Privacy Act. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential. For more information, please contact the ministry's Freedom of Information and Privacy Coordinator at 416-327-1434.

This Notice issued on December 14, 2017.

Ms. Betty de Haan, CMO, CAO

Township of South Stormont

P.O. Box 84
2 Mille Roches Road
Long Sault, ON K0C 1P0
Phone: 613-534-8889
Fax: 613-534-2280

info@southstormont.ca

TOWNSHIP OF SOUTH STORMONT

CLASS ENVIRONMENTAL ASSESSMENT

INGLESIDE WASTEWATER TREATMENT PLANT

NOTICE OF COMPLETION OF ENVIRONMENTAL STUDY REPORT

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant under stress. Therefore, the Township of South Stormont has reviewed alternative solutions to ensure the wastewater treatment plant will meet the demands of the existing population as well as the potential growth in a 20-year horizon.

This project is being planned as a **Schedule C** project under the **Municipal Class Environmental Assessment**. The Environmental Study Report has been completed and by this Notice is being placed in the public record for review and comment. Subject to comments received as a result of this Notice and the receipt of necessary funding and approvals, the Township intends to proceed with the construction of this project in the near future. The estimated total project cost is $27 million.

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and Climate Change
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Environmental Approvals
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135 St. Clair Avenue W
1st Floor
Toronto, ON M4V 1P5

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

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Please note that ALL personal information included in a Part II Order submission – such as name, address, telephone number and property location – is collected, maintained and disclosed by the Ministry of the Environment and Climate Change for the purpose of transparency and consultation. The information is collected under the authority of the Environmental Assessment Act or is collected and maintained for the purpose of creating a record that is available to the general public as described in s.37 of the Freedom of Information and Protection of Privacy Act. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential. For more information, please contact the ministry's Freedom of Information and Privacy Coordinator at 416-327-1434.

This Notice issued on December 14, 2017.

Ms. Betty de Haan, CMO, CAO

Township of South Stormont

P.O. Box 84
2 Mille Roches Road
Long Sault, ON K0C 1P0
Phone: 613-534-8889
Fax: 613-534-2280

info@southstormont.ca

INGLESIDE WATER POLLUTION CONTROL PLANT ENVIRONMENTAL ASSESSMENT

Public Open House #1

July 20, 2017: 4:00 – 8:00pm
South Stormont Support Centre,
34 Memorial Square, Ingleside

The Environmental Assessment Process

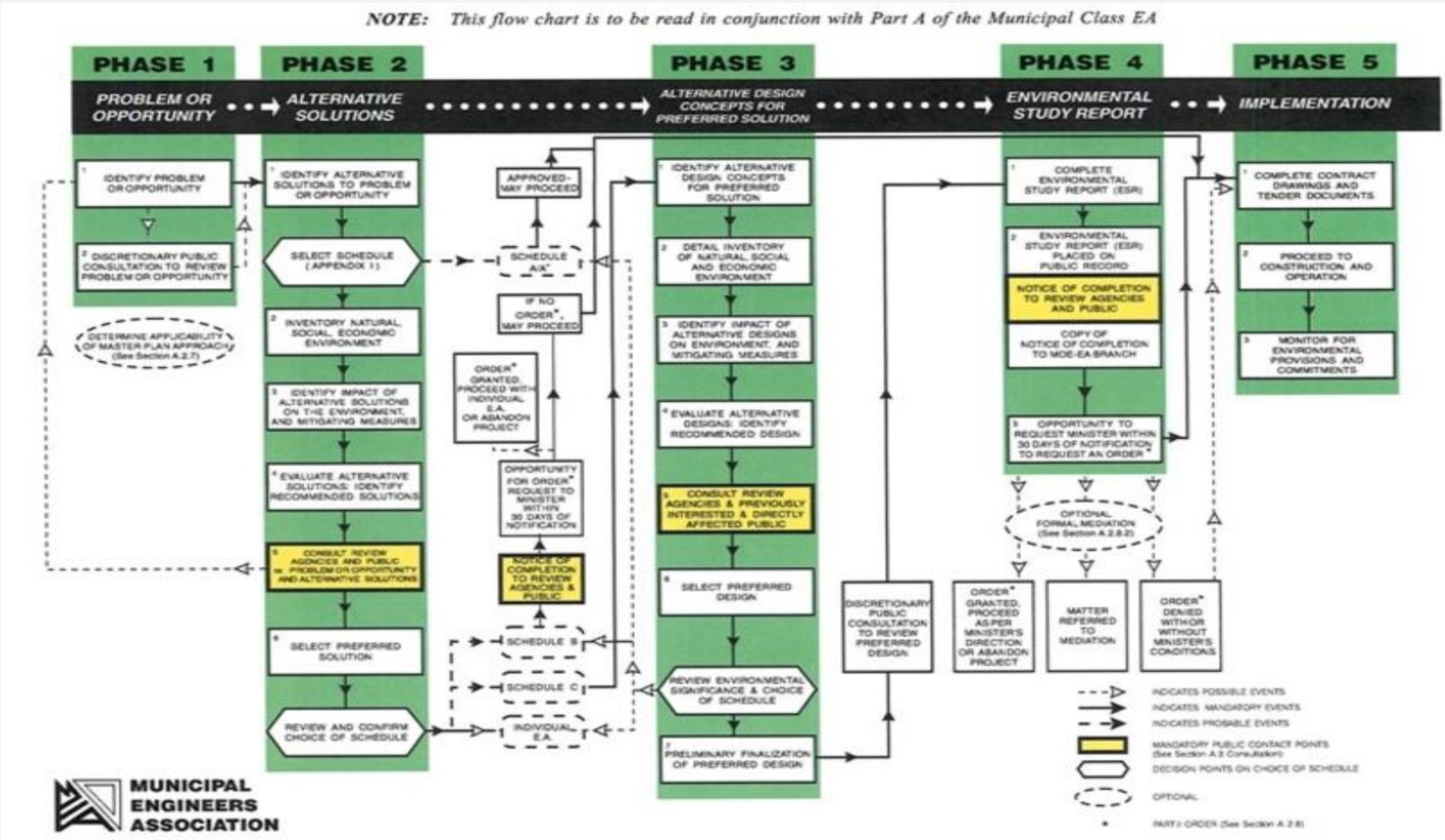
In Ontario, municipal wastewater projects are subject to the provisions of the Municipal Class Environmental Assessment. The Class Environmental Assessment (Class EA) is an approved planning document which describes the process which municipalities must follow to meet the requirements of the Environmental Assessment Act (EAA) of Ontario.

The Class EA planning process was developed to ensure that the potential social, economic and natural environmental effects are considered in planning municipal projects.

The Class EA process requires:

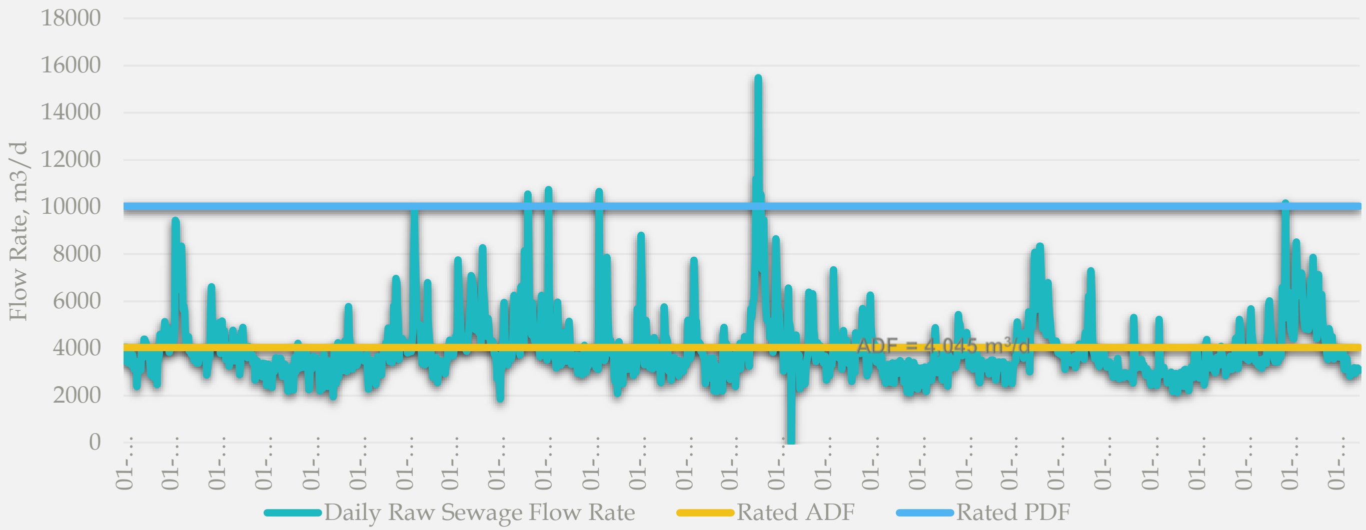
- Consultation with the general public and agencies potentially affected by the proposed project;
- Consideration of a reasonable range of alternatives; and
- Documentation of the planning process.

The Environmental Assessment Process



Problem Definition

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Water Pollution Control Plant (WPCP) under stress. Therefore, the Township of South Stormont is considering alternative ways to ensure wastewater treatment services are provided to meet the Village's needs for the next twenty years.



Proposed Design Flows

Flow Component	Average Daily Flow (m^3/d)	Peak Daily Flow (m^3/d)
Existing	4,045	10,027
Residential Growth[1]	473	1,418
ICI Growth	1,900	2,833
DESIGN BASIS	6,500	14,500

1 Represents 15 new homes every year for 20 years. (Growth Rate of 2.0%)

Alternative Solutions

The following alternatives are considered:

1. Do Nothing;
2. Optimize the Existing WPCP; and
3. Expand Existing WWTP on Existing Site.

We will develop these alternative solutions and present a full description of the solutions and an evaluation of the solutions at a second public meeting.

The evaluation will take into consideration impacts on the natural environment (effluent quality, groundwater, aquatic and terrestrial life, etc.), social environment (cultural, aesthetic, impact to adjacent land, etc.) and economic environment (cost).

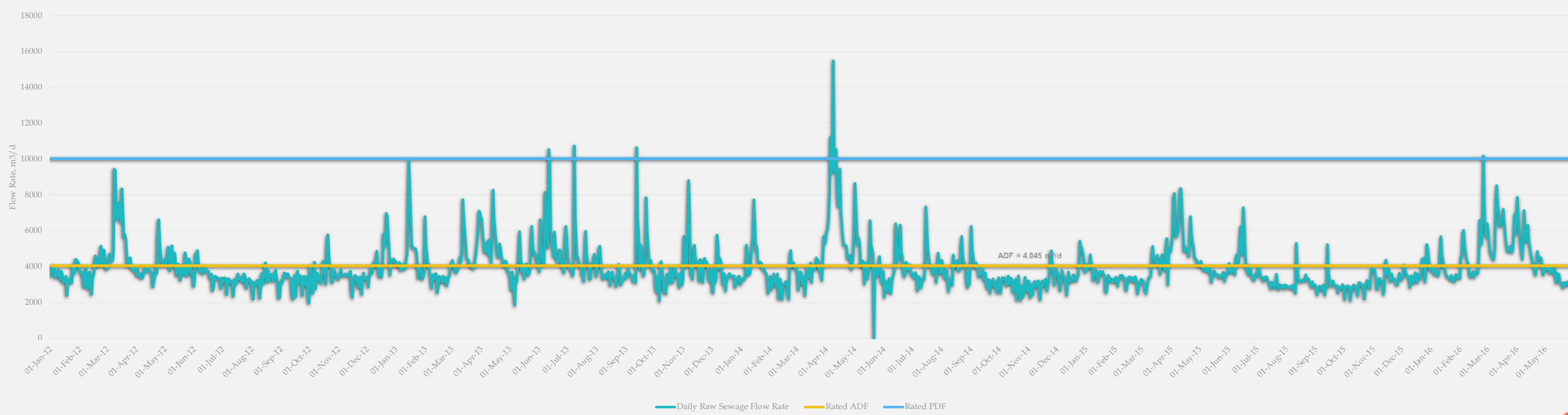
Ingleside Wastewater Treatment Plant

Environmental Assessment

Public Meeting
October 12, 2017

Problem Definition

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant (WWTP) under stress. Therefore, the Township of South Stormont has retained EVB Engineering to help prepare an environmental assessment to plan for wastewater treatment services which will meet the Village's needs for the next twenty years.



Environmental Assessment Process

In Ontario, municipal wastewater projects are subject to the provisions of the Municipal Class Environmental Assessment. The Class Environmental Assessment (Class EA) is an approved planning document which describes the process which municipalities must follow to meet the requirements of the Environmental Assessment Act (EAA) of Ontario.

The Class EA process requires:

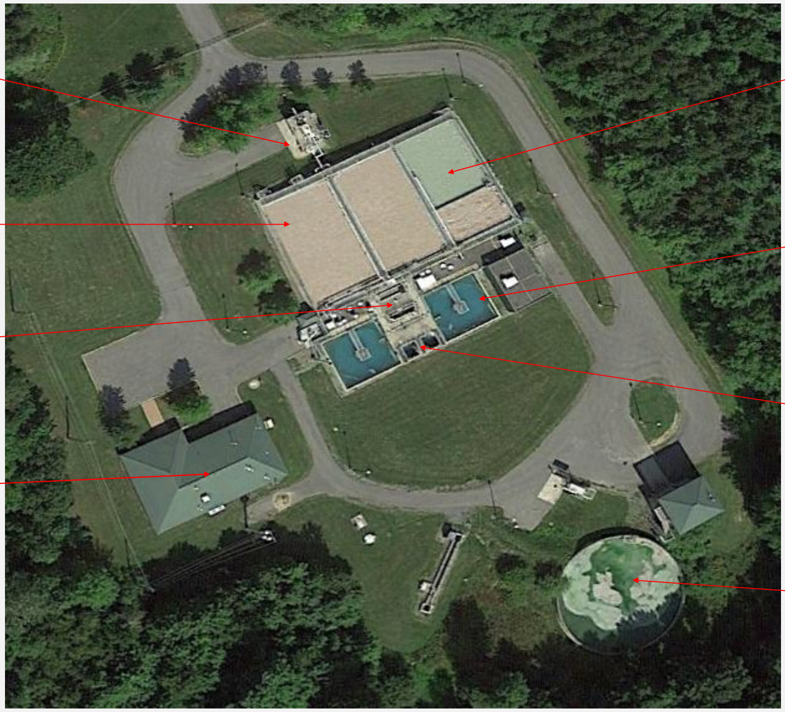
- Consultation with the general public and agencies potentially affected by the proposed project;
- Consideration of a reasonable range of alternatives; and
- Documentation of the planning process.

Design Basis

- Planning for 2% residential growth, which represents 15 new homes per year for 20 years.
- Planning to provide wastewater servicing in the Business Park for up to 20 m^3/ha/d.
- Planning to expand Kraft-Heinz's capacity in the plant to 2,500 m^3/d (Scenario #1) or 3,000 m^3/d (Scenario #2).

Design Average Daily Flow	Current	Scenario #1	Scenario #2
	4,054 m^3/d	5,800 m^3/d	6,300 m^3/d

Ingleside WWTP



Alternative Solutions

The Environmental Assessment process requires that all reasonable alternatives be considered during the evaluation. This typically includes:

1. Do Nothing
2. Optimize Existing Plant
3. Expand Existing Plant
    - 3.1 Conventional Activated Sludge
    - 3.2 Extended Aeration
    - 3.3 Membrane Bioreactor
4. Build New Plant on New Site

Alternative Solutions

Alternative Solution 1 – "Do Nothing"

- Typically, this alternative maintains the "status quo" presenting the operations staff with the task of operating the existing plant to the best of its ability.
- As the plant is nearing its rated capacity, growth restrictions will need to be implemented.
- This alternative does not provide a comprehensive solution.

Alternative Solutions

Alternative Solution 2 – Optimization of the Existing WPCP

- This alternative reviews the possibility of optimizing the existing WPCP to enable a higher flow through the existing system.
- The Needs Assessment Report, completed in 2016, identifies that the hydraulics through the existing plant is creating the restraint from re-rating the facility.
- This alternative does not provide a comprehensive solution.

Alternative Solutions

Alternative Solution 3 – Expansion on the Existing Site

- This alternative reviews the possibility of expanding the existing WPCP utilizing one (1) of the following technologies:
  - Extended Aeration
  - Conventional Activated Sludge
  - Membrane Bioreactor
- This alternative will incorporate as much of the existing infrastructure as possible to minimize capital cost.

Alternative Solutions

Alternative Solution 4 – Construction of a New WWTP on a New Site

- This alternative reviews the possibility of building a new WWTP utilizing one (1) of the following technologies:
  - Extended Aeration
  - Conventional Activated Sludge
  - Membrane Bioreactor
- This alternative would require all new infrastructure and the identification of a new property

Evaluation of the Alternative Solutions

	"Do Nothing"	Optimize Plant	Expand on Existing Site	Build on New Site
ADVANTAGES	•Status Quo •No additional cost		•Maximizes reuse of existing WWTP components •Reuse existing Raw Sewage Pumping Station and forcemain •Land is available on existing site •Address problems that were identified	•Address problems that were identified
DISADVANTAGES	•Limits Growth •Infrastructure will continue to degrade •Does not help with reduction to operating costs	•Plant is hydraulically stressed and cannot be optimized	•Cost associated with the expansion	•New forcemain required •Need to find land available for plant. •New outfall to River
COST			$23M - $29M	$32M - $36M
			RECOMMENDED	

Next Steps

- Further Development of the various technologies such that an evaluation can be completed
- Final Public Information Centre (Early December 2017)
- Preparation of supporting information which can be used to assist with any future funding applications

EVB ENGINEERING

Ingleside Water Pollution Control Plant

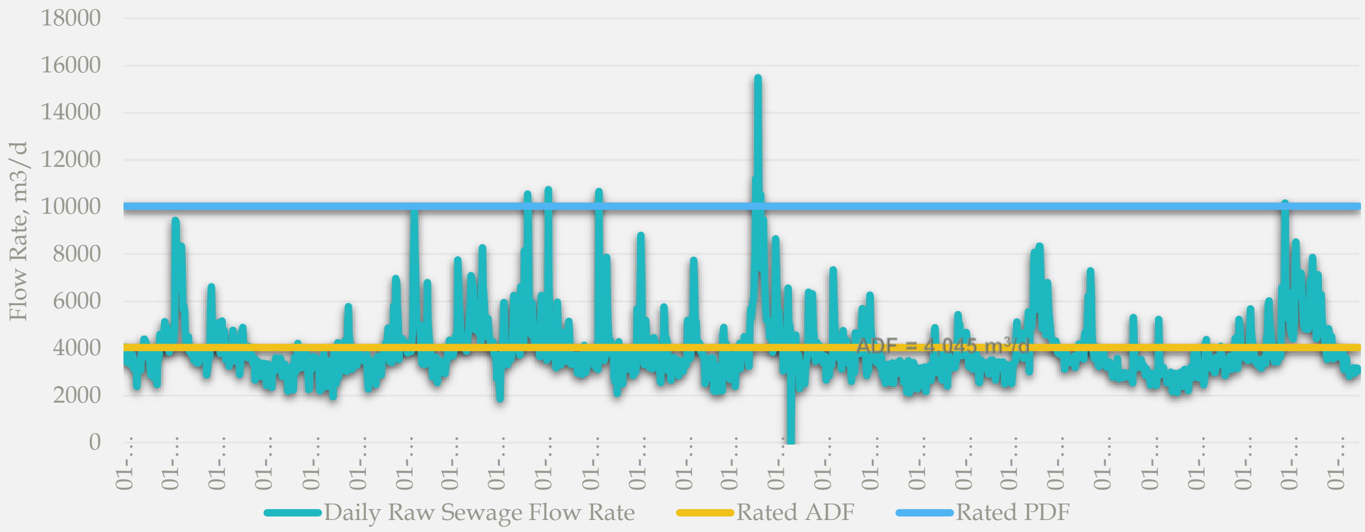
Environmental Assessment

Public Meeting #3

January 9, 2018

Ingleside WWTP Environmental Assessment – Problem Definition

Population growth and an aging infrastructure in the Village of Ingleside has placed the Ingleside's Wastewater Treatment Plant (WWTP) under stress. Therefore, the Township of South Stormont has retained EVB Engineering to help prepare an environmental assessment to plan for wastewater treatment services which will meet the Village's needs for the next twenty years.



Proposed Design Flow Basis for Expansion of the Ingleside WWTP

Component	ADF	BOD	TSS	TP	TKN
	m^3/d	mg/L			
Growth Scenario #1					
Existing	4,054	177	274	17.2	63.2
Residential Growth	473	190	210	7.0	25
Kraft-Heinz	439	250	328	26.0	95
Industrial Park	800	190	210	7.0	25
Septage	15	5,000	3,500	200.0	750
DESIGN BASES #1	5,800	197	272	16.0	58.8
Growth Scenario #2					
Existing	4,054	177	274	17.2	63.2
Residential Growth	473	190	210	7	25
Kraft-Heinz	939	250	328	26	95
Industrial Park	800	190	210	7	25
Septage	15	5,000	3,500	200	750
DESIGN BASES #2	6,300	202	277	17	62

Alternative Solutions

The Environmental Assessment process requires that all reasonable alternatives should be considered during the evaluation. This typically includes:

1. Do Nothing
2. Optimize Existing Plant
3. Expand Existing Plant
4. Build New Plant on New Site

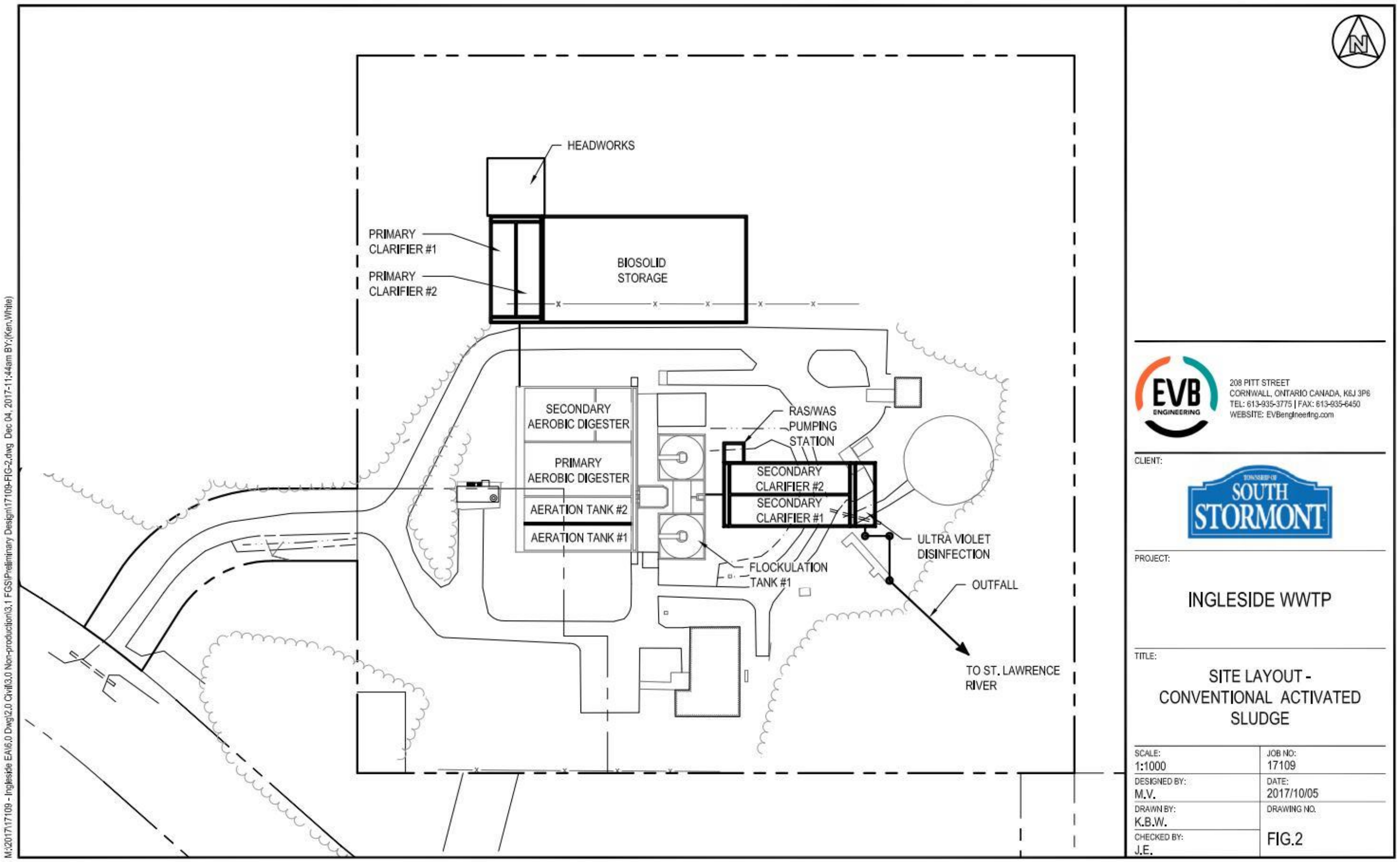
Evaluation of the Alternative Solutions

"Do Nothing"	Optimize Plant	Expand on Existing Site	Built on New Site
• Status Quo • No additional cost		• Maximizes reuse of existing WWTP components • Reuse existing Raw Sewage Pumping Station and forcemain • Land is available on existing site • Address problems that were identified	• Address problems that were identified
• Limits Growth • Infrastructure will continue to degrade	• Plant is hydraulically stressed and cannot be optimized	• Cost associated with the expansion	• New forcemain required • Need to find land available for plant. • New outfall to River
		RECOMMENDED	

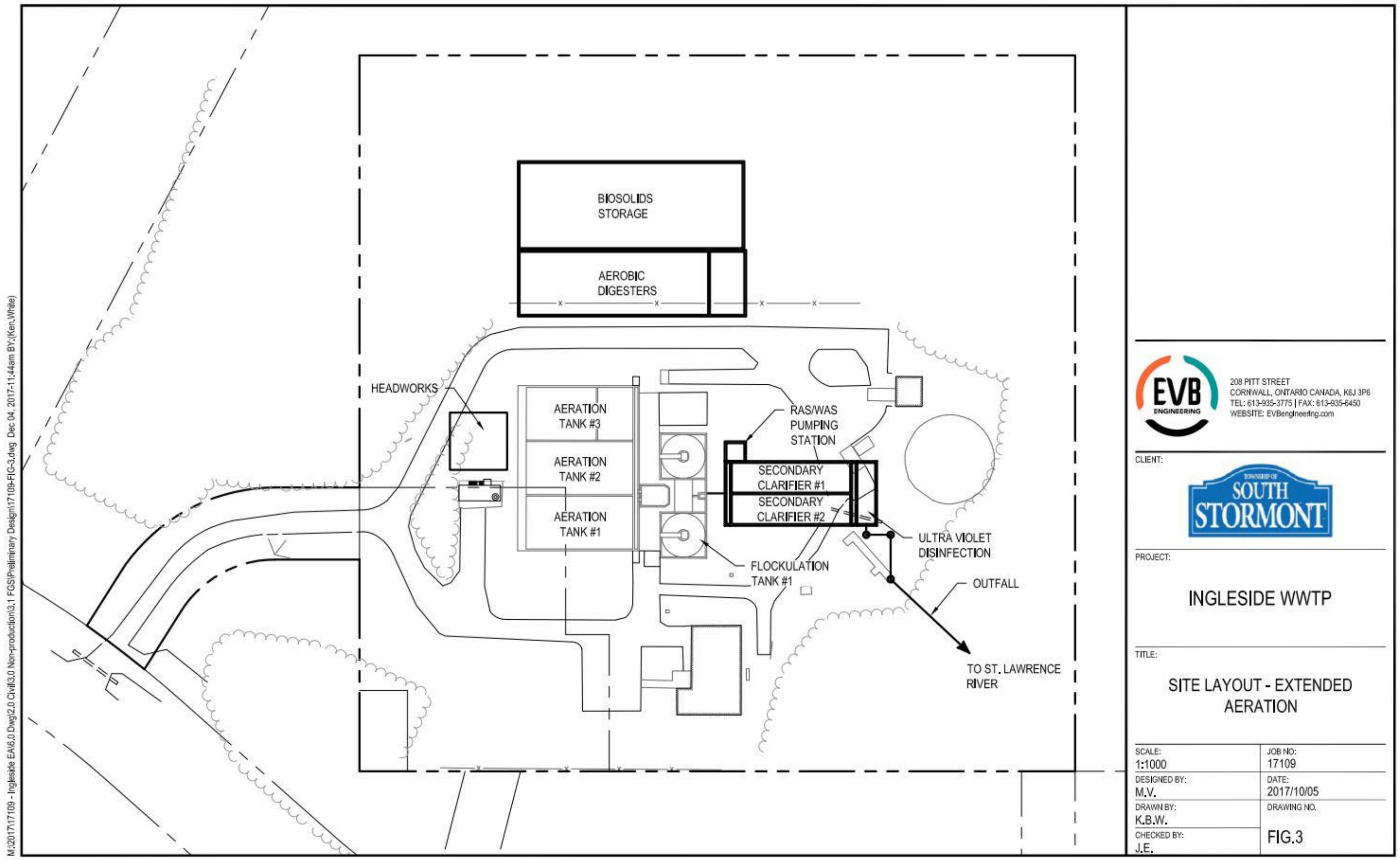
Evaluation of the Alternative Designs

- The expansion of the Ingleside Wastewater Treatment Plant can be based on many different technologies. The three best suited for integration on the existing site are:
  - Conventional Activated Sludge
  - Extended Aeration
  - Membrane Bioreactor

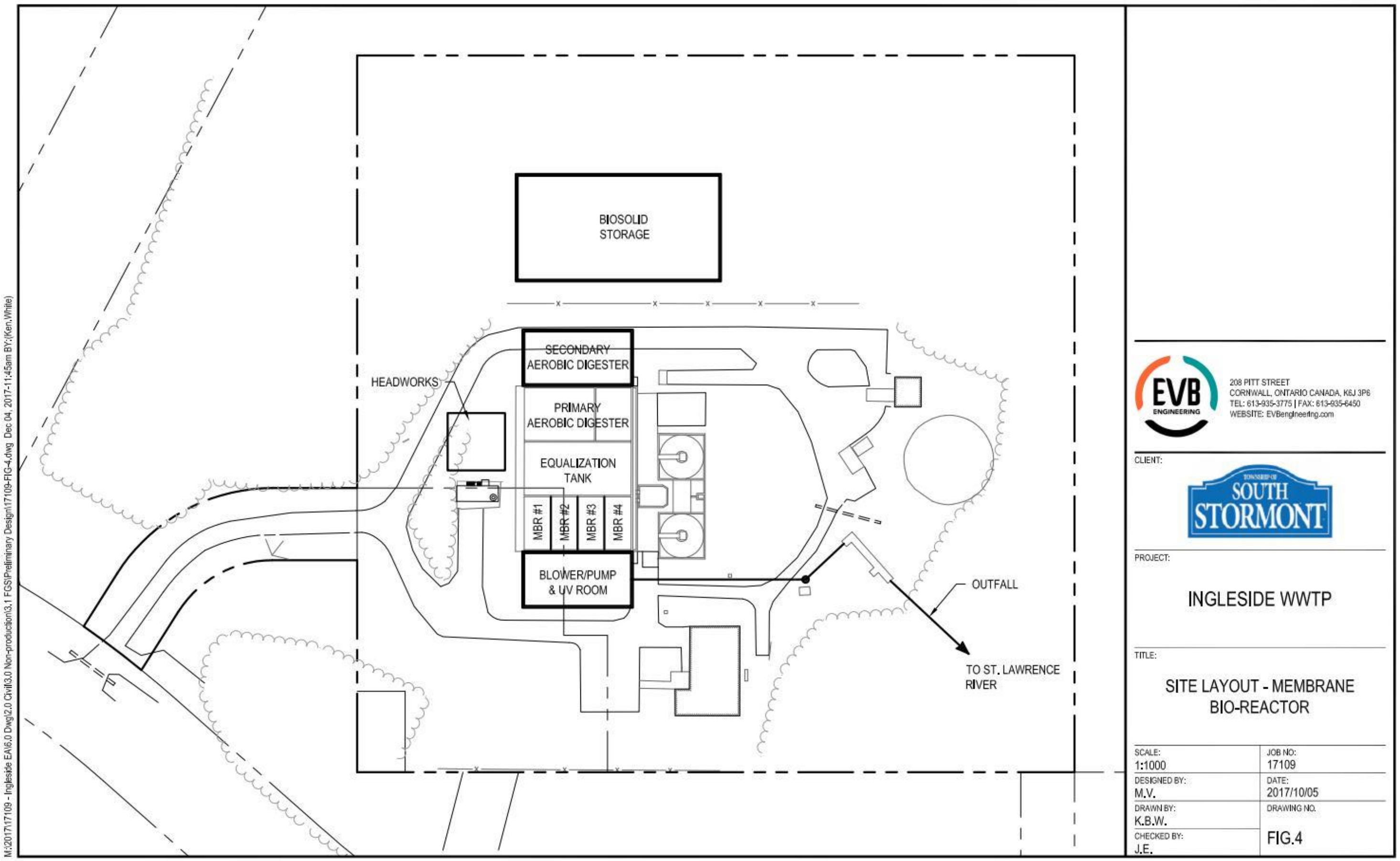
Conventional Activated Sludge



Extended Aeration



Membrane Bioreactor



Preliminary Project Cost Estimate

Cost Component	Conventional Activated Sludge	Extended Aeration	Membrane Bioreactor
Headworks	$4,442,000	$4,442,000	$4,442,000
Primary Clarifiers	$2,839,000-$2,978,000		
Aeration Tank Upgrades	$342,000	$516,000	$5250,000 - $5,750,000
Flocculation Tank	$363,000	$363,000	
Secondary Clarifiers	$3,685,000 - $3,872,000	$3,685,000 - $3,872,000	
UV Disinfection	$946,000 - $996,000	$946,000 - $996,000	$946,000 - $996,000
WAS Thickening	$1,282,000		$1,282,000
Aerobic Digestion	$336,000	$4,608,000	$336,000
Biosolids Storage	$3,454,000	$4,646,000	$3,454,000
Contingency (30%)	$5,307,000 - $5,420,000	$5,762,000 - $5,833,000	$4,713,000 - $4,878,000
Engineering (15%)	$3,449,000 - $3,523,000	$3,745,000 - $3,791,000	$3063,000 - $3,171,000
TOTAL PROJECT COST	**$26,445,000 - $27,008,000**	**$28,713,000 - $29,067,000**	**$23,486,000 - $24,309,000**

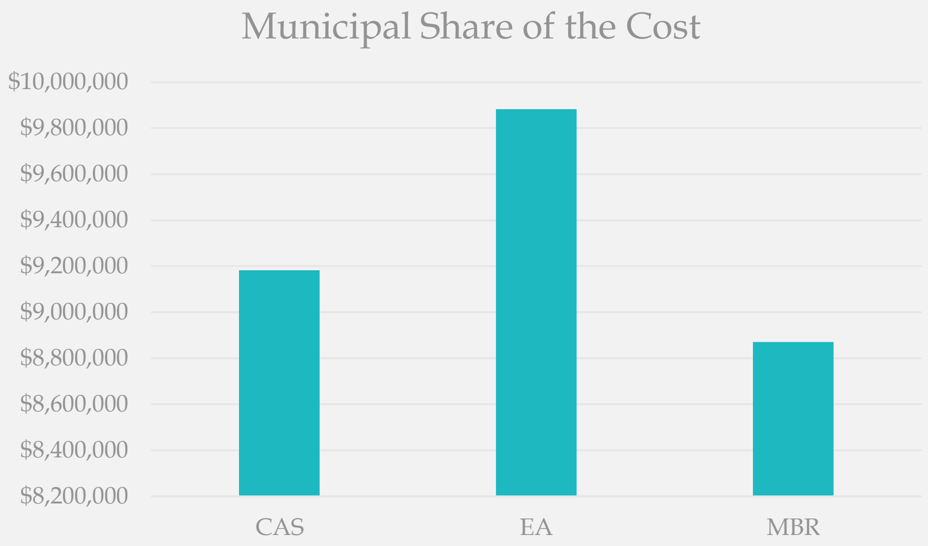
Life Cycle Cost

- This is the most important part of the financial analysis which helps determine the most cost effective solution for the Township.
- The evaluation considers the upfront construction cost as well as the annual operating cost for the next 20 years
- The following assumptions will be used:
  - The Township proceeds with Growth Option #2.
  - The Township will receive 66% funding for the capital cost of the project.
  - The inflation rate is 2.2% and bank interest rate of 5%.

Life Cycle Cost

- Capital Cost Component

Cost Component	Conventional Activated Sludge	Extended Aeration	Membrane Bioreactor
Total Project Cost	$27,008,000	$29,067,000	$26,091,000
Infrastructure Funding	$17,825,280	$19,184,220	$17,220,060
Municipal Share of the Cost	$9,182,720	$9,882,780	$8,870,940



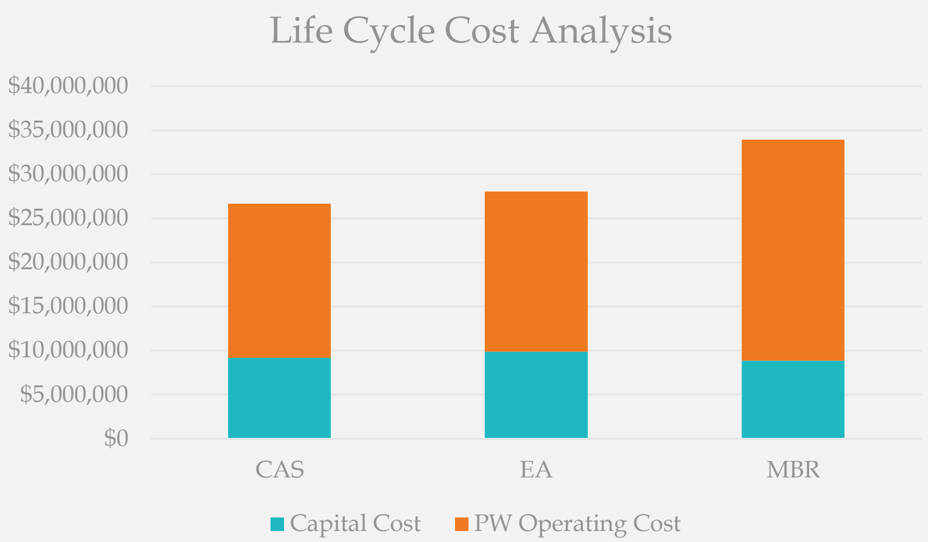
Life Cycle Cost

- Annual Operating Cost Component

Description	Existing	CAS	EA	MBR
Administration	$34,900	$34,900	$34,900	$34,900
Utilities	$273,520	$274,167	$316,839	$643,965
Telephone	$5,800	$5,800	$5,800	$5,800
Chemicals	$260,000	$236,000	$236,000	$284,480
Professional Fees	$12,000	$12,000	$12,000	$12,000
Repairs[1]	$75,000	$82,085	$79,785	$137,285
Sludge Disposal	$85,000	$82,100	$85,000	$93,500
Sampling	$30,000	$30,000	$30,000	$30,000
Equipment	$1,000	$1,000	$1,000	$1,000
Building/Grounds	$50,000	$50,000	$50,000	$50,000
Infrastructure Rep/Main	$30,000	$30,000	$30,000	$30,000
Contracts	$238,600	$238,600	$238,600	$238,600
Share of Costs	$11,000	$11,000	$11,000	$11,000
Insurance	$29,330	$29,330	$29,330	$29,330
ANNUAL TOTAL	**$1,136,150**	**$1,115,632**	**$1,160,253**	**$1,601,860**
1 - Accounts for membrane replacement every 10 years				

Life Cycle Cost

Cost Component	Conventional Activated Sludge	Extended Aeration	Membrane Bioreactor
Municipal Share of the Cost	$9,182,720	$9,882,780	$8,870,940
Annual Operating	$1,115,632	$1,160,253	$1,601,860
20 Years Present Worth	$17,470,196	$18,168,949	$25,084,271
Total Present Worth	$26,652,916	$28,051,729	$33,955,211



Recommendation

- The Preferred Design uses conventional activated sludge, UV and aerobic digestion.
- Recommend carrying both growth scenarios forward and continue discussions with Kraft-Heinz on their requirements for the design period.
- Post the Environmental Study Report with the above recommendations.
- Public Information Center scheduled for January 9th, 2018 at the South Stormont Support Centre, 34 Memorial Square, Ingleside.
- Prepare project information to start lobbying higher levels of government to provide funding for the project.

Appendix D Summary of Ingleside WWTP Needs Study

Table 4.3 – Hydraulic Assessment of the Ingleside WWTP

Unit Operation	Governing Parameter	Hydraulic Capacity (m³/d)
Headworks Channel	Channel Width/Freeboard	<10,027
Screen	Effective Open Area and Cleaning Frequency	
Vortex Grit Unit	Headloss through Vortex impacting upstream channel conditions, discharge piping	<10,027
Aeration Tank	Outlet Sluice Gate Weir, which impacts the partition walls within the Aeration tank	Non-ideal
Flocculation Tank	Less than 200mm of freeboard in Floc tank at current peak flow, less than 300mm freeboard at peak flow conditions in Outlet channel	>10,027
Secondary Clarifiers	Inlet piping has significant friction headloss during peak flow, Surface Overflow Rate	
Effluent Chamber	Outlet conditions	>10,027
Effluent Channel	Freeboard	Matches Flume Capacity
Parshall Flume	Throat width	16,000
Outfall Forcemain	TBD	TBD
In River Pipe/Diffusers	TBD	TBD

Table 4.4 – Aeration Tank Assessment

Parameter	Measured Value	MOE Guideline	M&E Recommended Range	Status of Existing Design
Hydraulic Retention Time	24 Hr at ADF	15 Hr Min.	20 - 30	Meets Guideline
Organic Loading Rate (kg BOD_5/m^3.d)	0.185	0.17 – 0.24	0.1 – 0.3	Low end of Guideline
F/M_v (d^{-1})	0.08	0.05 – 0.10	0.04 – 0.10	Meets Guideline
Return Sludge Rate (% of ADF)	64	50 – 200	50 – 150	Low end of Guidelines
Solids Retention Time (SRT, Days)	11.1	> 15	20 – 40	Not Met
MLSS Concentration (mg/L)	4,400	3,000 – 5,000	2,000 – 5,000	High End of Range

Table 4.5 – Secondary Clarifier Assessment

Parameter	Calculated Values	Design/Typical Value/MOE Guidelines
Average Daily Flow (ADF, m^3/day)	4,045	ECA Rated Capacity
Peak Daily Flow (PDF, m^3/day)	10,027	
Total Surface Area (m^2)	211.4	
Side Water Depth (m)	4.4	3.6 – 4.6
Launder Hydraulic Loading Rate (m^3/m.d) at PDF	108	375 m^3/m.d at PDF

Parameter	Calculated Values	Design/Typical Value/MOE Guidelines
Surface Overflow Rate (SOR $m^3/m^2.d$) at PDF	47.4	40 m^3/m^2.d at PDF
Solids Loading Rate at PDF (kg TSS/m^2.d)	262.7	170 kg/m^2.d

Table 4.6 – Disinfection Assessment

Parameter	Current Operating Conditions	MOE Guidelines
Average Daily Flow (ADF, m^3/day)	4,045	
Design Peak Flow (PDF, m^3/day)	10,027	
Volume of Effluent Tank (m^3) **ADF** **PDF**	 68.7 78.6	
Contact Time (min) **ADF** **PDF**	 24.5 11.3	 30 15
Average Chlorine Dose (mg/L)	14.15	2 - 9

Table 4.7 – Process Assessment of Aerobic Digesters

Parameter	Current Operating Conditions	Guideline Values
Average Daily Flow (ADF, m^3/day)	4,045	N/A
Aerobic Digester Volume (m^3) **Primary Digester** **Secondary Digester**	 1,334 667	 2/3 Volume in First Stage 1/3 Volume in Second Stage
Total Aerobic Digestion SRT **Aeration Tank SRT** **Primary Digester** **Secondary Digester** **Total SRT**	 11.1 days 19.9 days 20.6 days **51.6 days**	45 Days Minimum
Volatile Solids Loading (kg VS/m^3•d)	0.62	1.6 based on the primary digester

Table 4.8 – Process Assessment of Biosolids Storage

Parameter	Calculated Values	Design/Typical Value/MOE Guidelines
Storage Tank Volume	1,630	N/A
Total Solids Flow Rate to Storage (m^3/d)	28.5	
Days of Storage	57.2[1]	180 days recommended, depending on management strategy

Appendix E Mitigative Measures

Table H: Potential Effects Caused by Proposed Works and Mitigative Measures

Potential Effect	Not Probable	Probable	Effect	Mitigative Measure	Net Effect
Agriculture					
• removal of productive farmland	X				
• disruption of tile and surface drainage	X				
• effects on crops, trees, & vegetation	X				
• effect on climate that specialty crops may depend on	X				
• effect on property loss (physical)	X				
• effect on agricultural areas	X				
Residential/Commercial/Industrial					
• effects on safety		X	+		Effluent quality will be equal or better
• effects of temporary disruption during construction (i.e. dust, noise, vibration)		X	-	Dust control measures to be implemented during construction of project; blasting and rock removal to be conducted using approved methods of reducing noise and vibrations	Minimized and mitigated to acceptable levels
• effects of property loss (physical)	X				
• effects of social stress (i.e. loss of home)	X				
Terrestrial Vegetation and Wildlife					
• effect of mortality/stress of vegetation by construction equipment • effect on wildlife habitat and breeding activity		X	-	Construction of the alternative facilities will occur on new or existing sites which may result in impacts on vegetated areas.	Minimized loss of trees and shrubs

Potential Effect	Not Probable	Probable	Effect	Mitigative Measure	Net Effect
• changes in vegetation composition as a result of environmental changes • effect of removal or disturbance of significant woody and herbaceous vegetation and/or rare and endangered flora and/or fauna • possible effects of roadway contaminants on vegetation	X X X			Erosion and sediment control measures to be implemented during construction stage	
Heritage Resources • disruption and/or destruction of sites, structures, or cultural heritage landscape	X			Stage 1 Archeological Study was conducted on existing site	
Outdoor Recreation • effects on environmental conditions in a recreation area • temporary disruption due to construction • effects on operations • effects on quality of user experience	 X X X	X	+	The Ministry of Natural Resources, Department of Fisheries and Oceans will provide direction as to the best construction practices to minimize undue stress on the aquatic system.	No in-water work is expected at this time.
Aesthetics • effects on removal of vegetation • changing of compatibility with surroundings	X X				

Potential Effect	Not Probable	Probable	Effect	Mitigative Measure	Net Effect
• adjacent residents exposed to new view		X	-	New building will have an existing tree screen minimizing the impact	Minimize change in aesthetics in area
Community Effects					
• change in tax base	X				Cost can be minimized but not eliminated. Growth component to be recovered through development fees.
• change in sewer rates		X	-	Owner seeking provincial/federal funding for the project and additional financing of unfunded portion to reduce the impact on current users.	
• change to impost rates		X	-	Rates will be applied to existing users; however, the capital rates may be amortized over longer periods to minimize the financial burden.	
• effects on quality of life		X	+		
Noise					
• effects of change in noise levels due to operation of facility		X	+		Enclosed building will reduce the noise produced by the facility.
Surface Water					
• diversion of watercourse	X				
• effects on floodplain	X				
• contamination of surface water		X	+	Treatment of sewage will be equal or better	
• sedimentation of surface water		X	+		
• increased runoff	X				
• effects on downstream users		X	+		

EVB Engineering

Appendix F Figures

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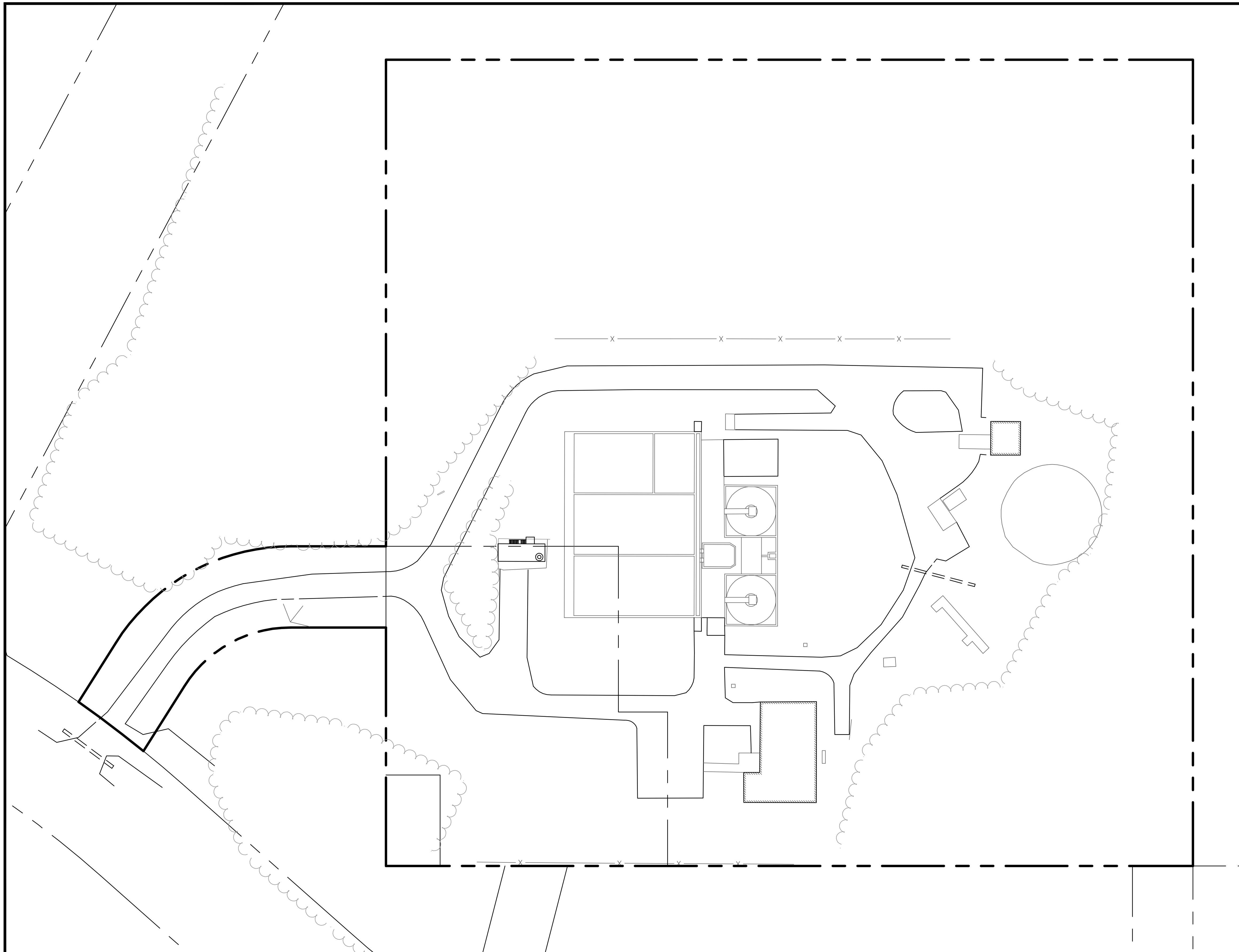


EVB ENGINEERING
208 PITT STREET
CORNWALL, ONTARIO CANADA, K6J 3P6
TEL: 613-935-3775 | FAX: 613-935-6450
WEBSITE: EVBengineering.com

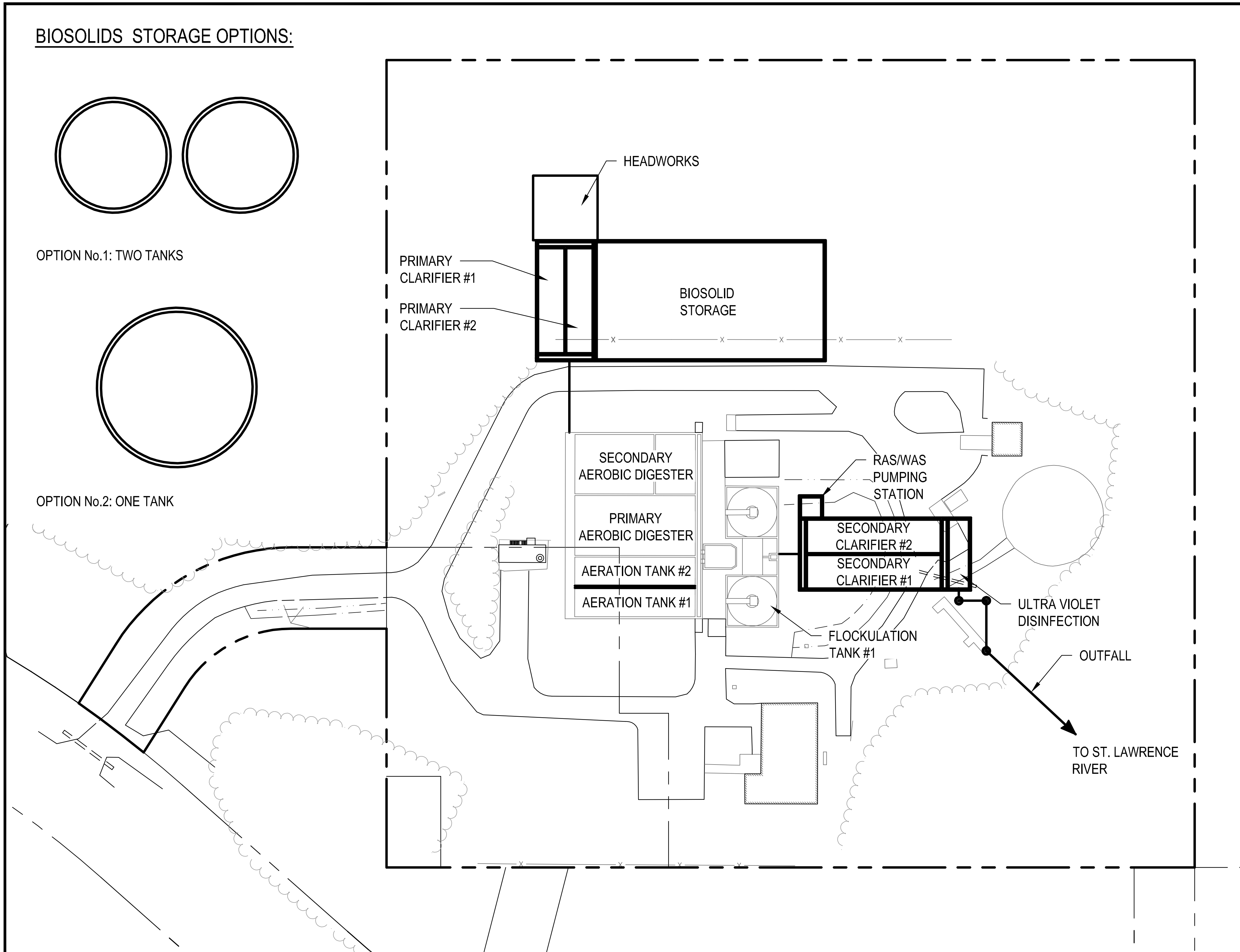
CLIENT: TOWNSHIP OF SOUTH STORMONT

PROJECT: INGLESIDE WWTP

TITLE: EXISTING SITE LAYOUT

SCALE: 1:1000	JOB NO: 17109
DESIGNED BY: M.V.	DATE: 2017/10/05
DRAWN BY: K.B.W.	DRAWING NO.
CHECKED BY: J.E.	FIG.1

M:\2017\17109 - Ingleside EA\6.0 Dwg\2.0 Civil\3.0 Non-production\3.1 FGS\Preliminary Design\17109-FIG-2.dwg Dec 04, 2017-11:44am BY:(Ken.White)



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CORNWALL, ONTARIO CANADA, K6J 3P6
TEL: 613-935-3775 | FAX: 613-935-6450
WEBSITE: EVBengineering.com

CLIENT: TOWNSHIP OF SOUTH STORMONT

PROJECT: INGLESIDE WWTP

TITLE: SITE LAYOUT - CONVENTIONAL ACTIVATED SLUDGE

SCALE: 1:1000	JOB NO: 17109
DESIGNED BY: M.V.	DATE: 2017/10/05
DRAWN BY: K.B.W.	DRAWING NO.
CHECKED BY: J.E.	FIG.2

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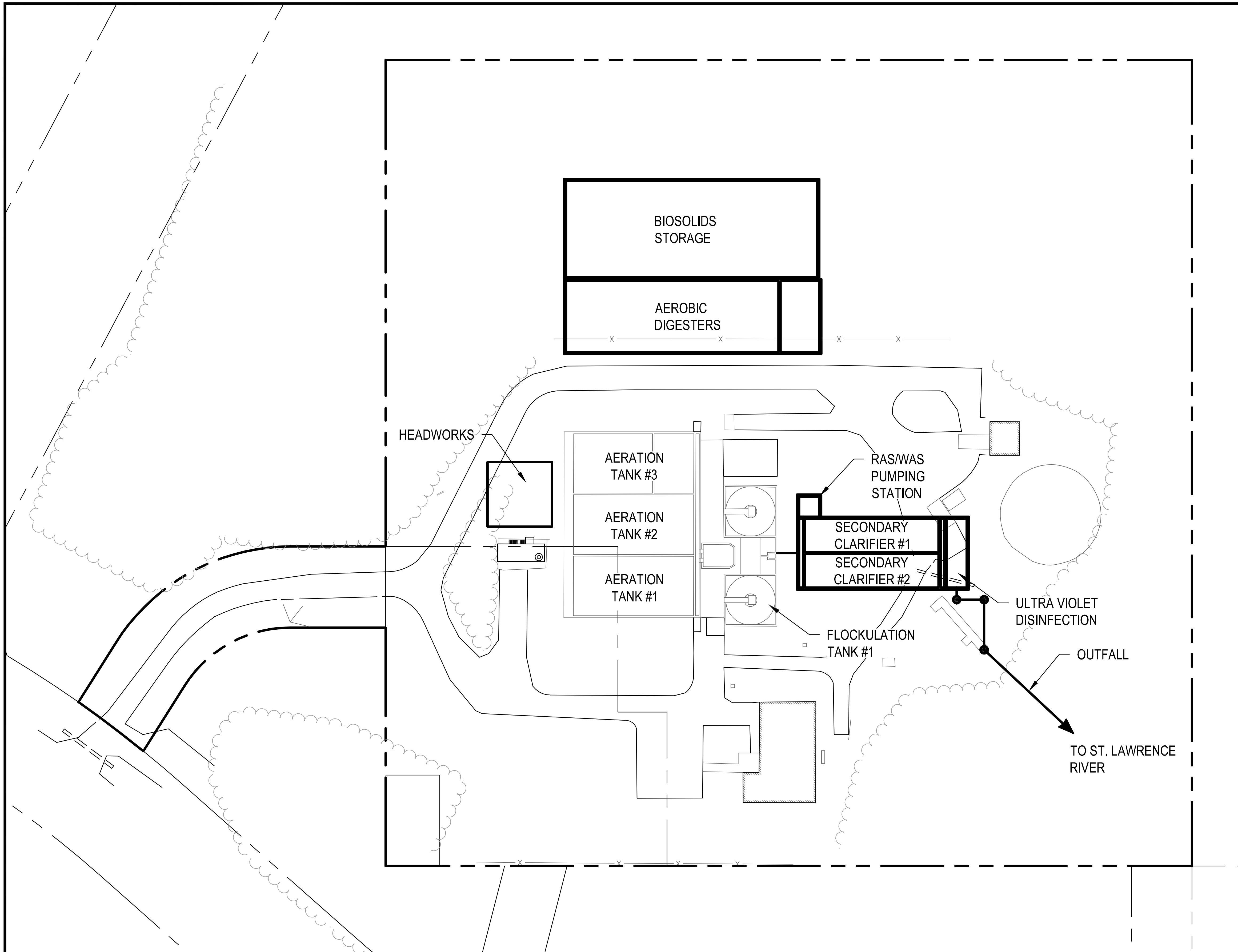

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WEBSITE: EVBengineering.com

CLIENT:

TOWNSHIP OF SOUTH STORMONT

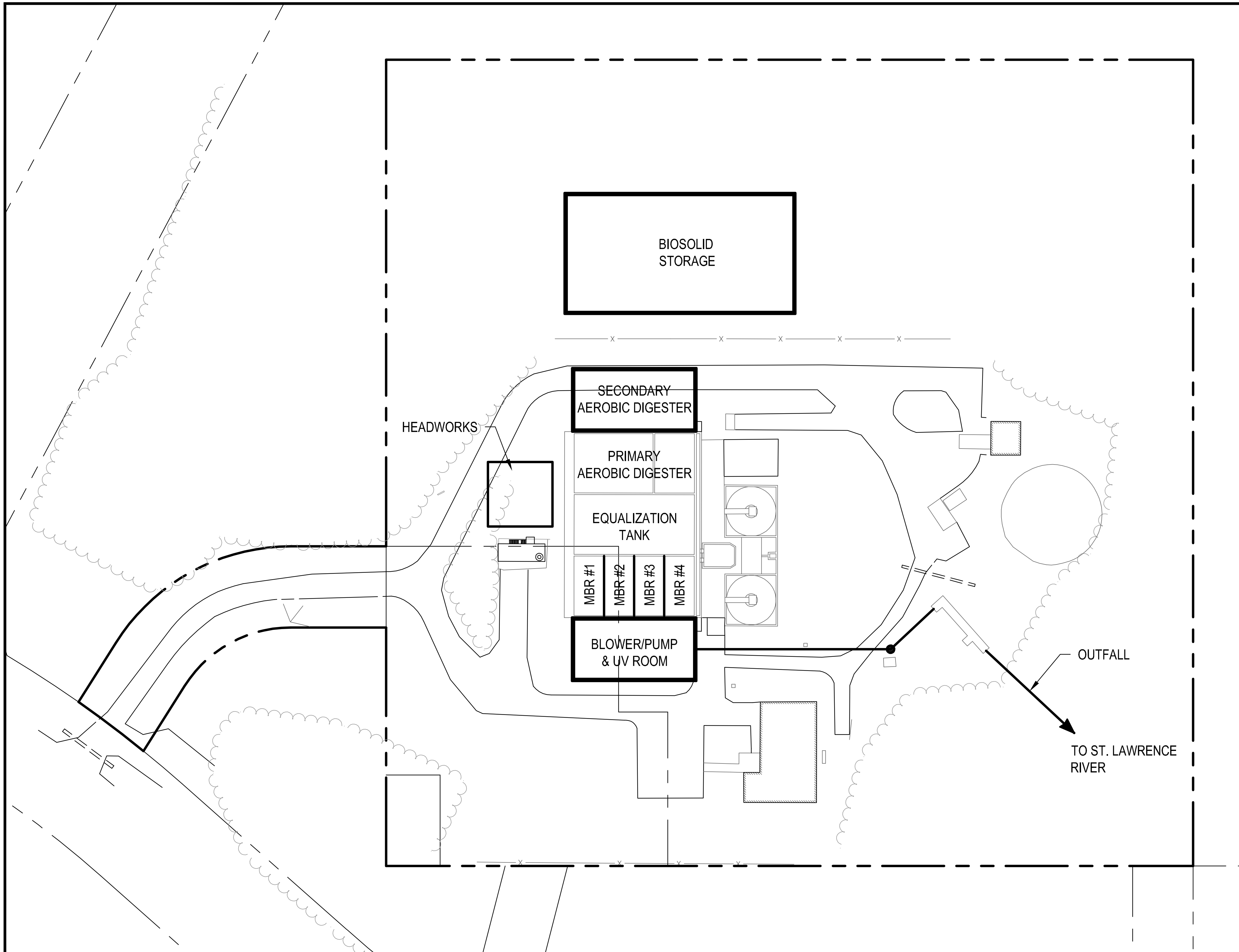
PROJECT:

INGLESIDE WWTP

TITLE:

SITE LAYOUT - EXTENDED AERATION

SCALE: 1:1000	JOB NO: 17109
DESIGNED BY: M.V.	DATE: 2017/10/05
DRAWN BY: K.B.W.	DRAWING NO.
CHECKED BY: J.E.	FIG.3



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CLIENT:

TOWNSHIP OF SOUTH STORMONT

PROJECT:

INGLESIDE WWTP

TITLE:

SITE LAYOUT - MEMBRANE BIO-REACTOR

SCALE: 1:1000	JOB NO: 17109
DESIGNED BY: M.V.	DATE: 2017/10/05
DRAWN BY: K.B.W.	DRAWING NO.
CHECKED BY: J.E.	FIG.4