

**Class EA Addendum Report
Municipality of Brighton Wastewater Treatment System Class EA
Addendum**

Appendix A

Previous Studies



MUNICIPALITY OF BRIGHTON

BRIGHTON WASTEWATER TREATMENT SYSTEM

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PHASE 2 REPORT - FINAL

August 2018

Submitted by:



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JLR 27271

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1.0 INTRODUCTION

1.1 Background

The Municipality of Brighton (the Municipality) initiated a Class Environmental Assessment (Class EA) of their wastewater treatment system in August 2016 to address various problems experienced with treatment (e.g. elevated ammonia concentrations in the treated effluent) and also to ensure that increased influent flows from future growth can be effectively accommodated. In order to fully define the problems and identify a preferred solution to address these issues, J.L. Richards & Associates Limited (JLR) was retained by the Municipality to assist in the completion of the Class EA.

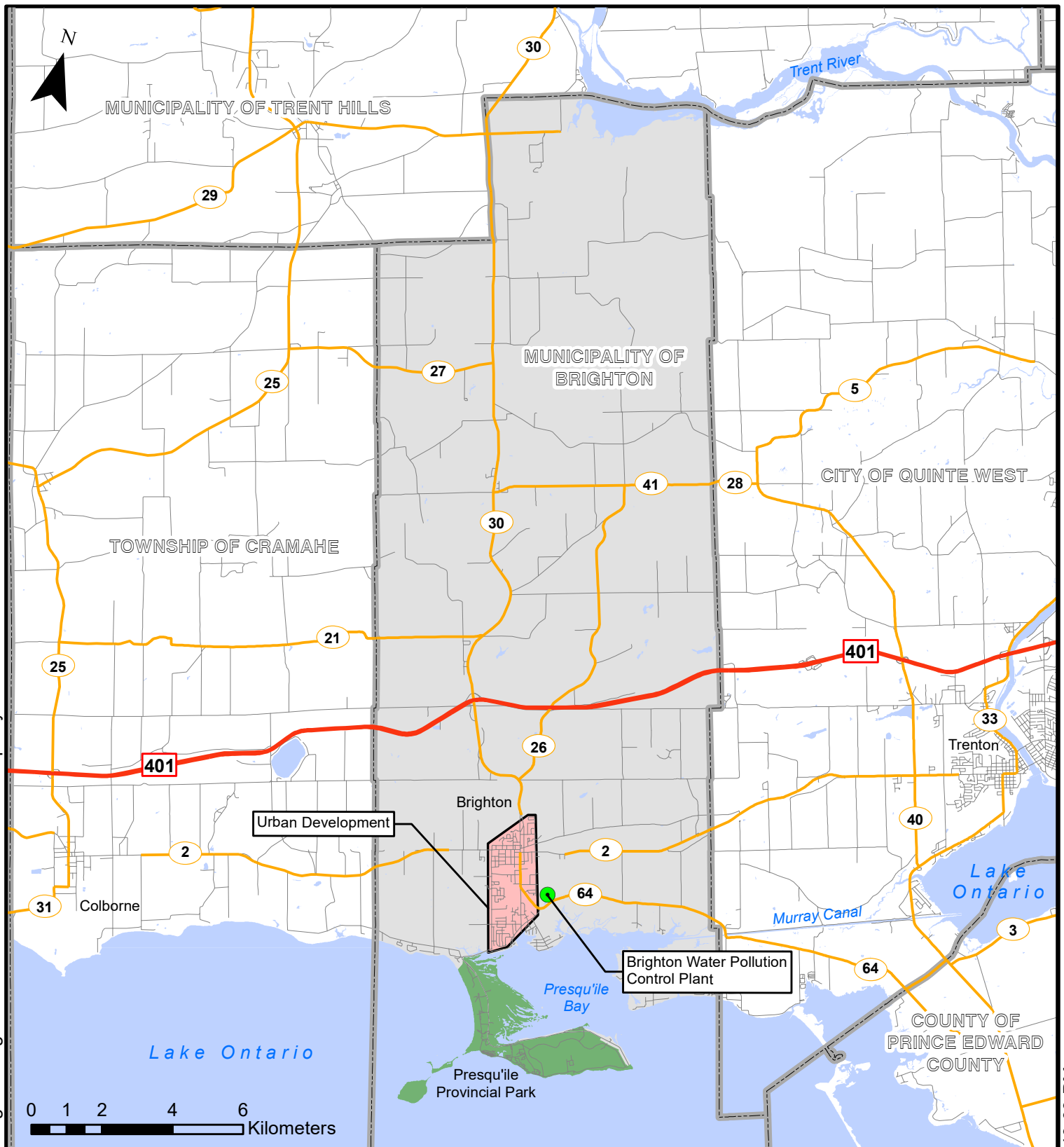
The Municipality includes the former Town and Township of Brighton and is the most eastern Municipality within the County of Northumberland. The Municipality is bounded by the City of Quinte West to the east and the Town of Cramahe to the west, with the shoreline of Lake Ontario to the south. Highway 401 provides the main east-west corridor through the Municipality, which tends to be a regional focus for hamlets in the surrounding areas. Refer to Figure 1-1 for an overview of the Municipality and study location.

The communal sewage system generally consists of the Brighton Wastewater Treatment Lagoon system (currently rated for 4,600 m³/day), the Harbour Street Sewage Pumping Station (SPS) and forcemain, a small sub-area sewage pumping station and forcemain servicing Presqu'île Provincial Park, and several kilometers of gravity collection sewer. Approximately half of the sewage generated in the collection system is directed to the Harbour Street SPS and pumped via a 8.2 km long, 300 mm forcemain to the Lagoon treatment system and the other half flows by gravity to the Lagoon treatment system. Refer to Figure 1-2 for an overview of the Brighton communal sewage system.

As noted above, the Harbour Street SPS receives sewage from approximately half of the existing collection system. The SPS generally consists of a wet well/dry well configuration and is equipped with three dry pit centrifugal type raw sewage pumps (lead/lag/standby operation) complete with inlet and outlet piping, a standby diesel generator, a wet well emergency overflow to Butter Creek, and related instrumentation and controls for the station.

The wastewater treatment system consists of a 0.68 ha single cell aerated lagoon followed by a single cell 5.44 ha waste stabilization pond with baffle partition curtains followed by a 2-cell constructed wetland with a total surface area of 6.2 ha. There is also a chemical storage/feed system used to facilitate continuous phosphorus removal. Chemical is introduced after the aerated lagoon and upstream of the waste stabilization pond. Treated effluent from the waste stabilization pond is discharged continuously to the constructed wetland and from the constructed wetland it continuously discharges to a natural wetland and ultimately to Presqu'île Bay, which is located off the northeast shore of Lake Ontario.

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PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
 MUNICIPALITY OF BRIGHTON, ONTARIO

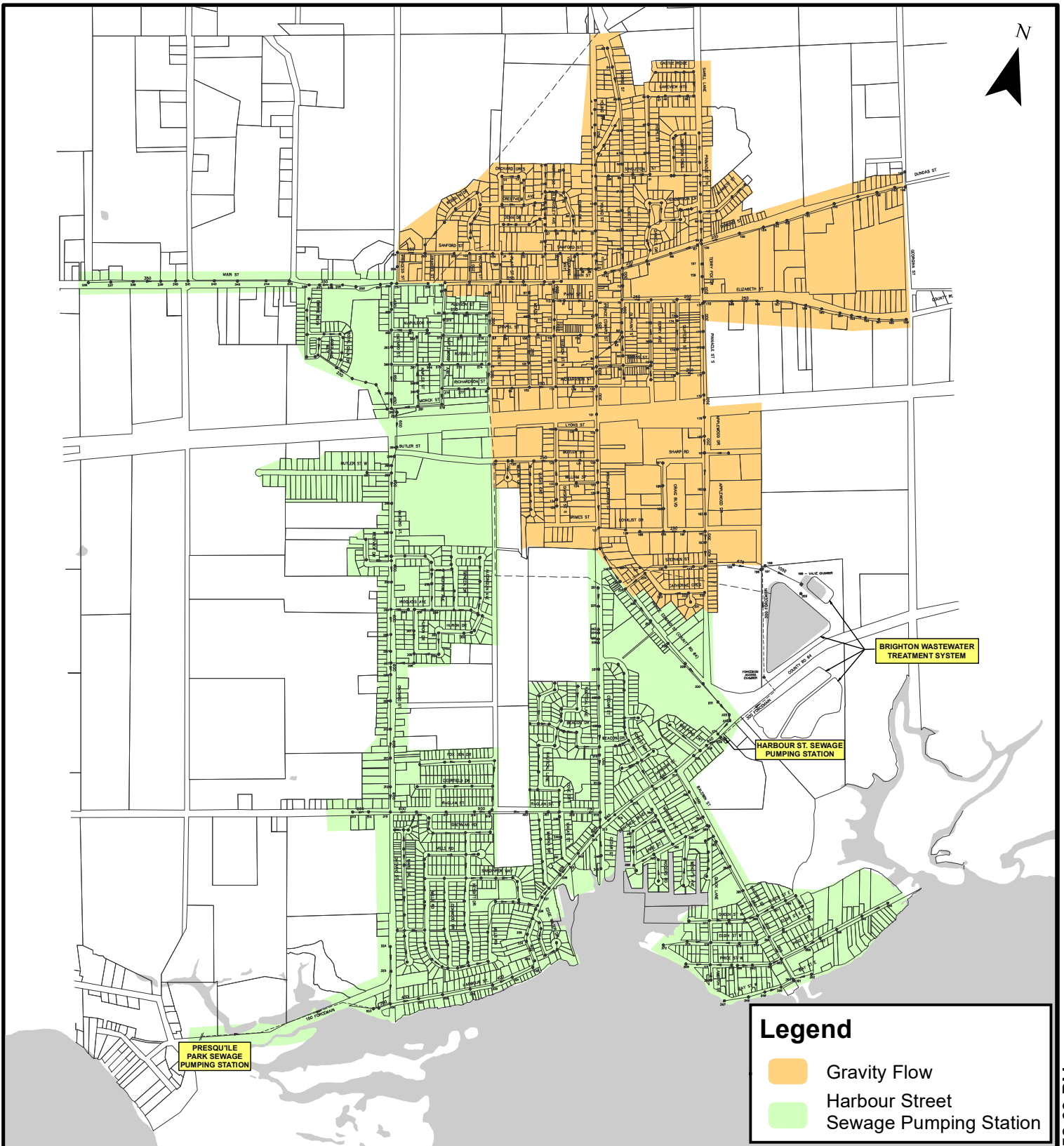
DRAWING: **LOCATION PLAN**

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PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
 MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **SYSTEM MAP (PUMPING STATION(S), FORCEMAIN, LAGOON SITE)**

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1.2 Class Environmental Assessment Process

The Ontario Environmental Assessment Act (the Act) sets out a planning and decision-making process so that potential environmental effects are considered before a project begins. The purpose of the Act is to provide for the protection and conservation of the natural environment (R.S.O. 1990, c.E.18, s.2).

The Municipal Class EA process is followed for common types of projects to streamline the review process while ensuring that the project meets the requirements of the Act. It involves detailed site-specific information gathering and studies, as well as consultation with the public and stakeholder agencies. In 1987 the first Class EA guidance document prepared by the Municipal Engineers Association (MEA) on behalf of Ontario Municipalities was approved under the Act. Updates and amendments were subsequently made in 1993, 2000, 2007, 2011, and 2015.

This Class EA has been initiated as a Schedule 'B' project. Projects categorized as Schedule 'B' undertakings have the potential for significant environmental effects, and are required to follow Phase 1 and Phase 2 specified under the Municipal Class EA. This includes consultation with all parties that may potentially be affected by the project, and the preparation of a Class EA Project File that documents the Class EA process for the project. At the end of Phase 2, the project Schedule is reviewed to determine if the project is complete under a Schedule 'B' Schedule or if the project needs to proceed as a Schedule C undertaking in which case Phases 3 and 4 of the Class EA process are completed.

The Class EA framework defines the process for each type of project (refer to Figure 1-3). For Schedule B projects, the completion of the following Phases of the Class EA process are required:

Phase 1 – Identify the Problem and/or Opportunity

Phase 2 – Identify Alternative Solutions to the Problem and/or Opportunity

The Project File shall be made available for public and agency review at the completion of Phase 2 of the Class EA process for a mandatory 30-day period. If there are no requests to the Ministry of the Environment and Climate Change (MOECC) for a 'Part II Order' within this 30-day review period, then the project may proceed to implementation (Phase 5).



PHASE 1
Identify & Describe the Problem or Opportunity

PHASE 1 COMPLETE
Draft Report and Consultation with Review Agencies and Project Stakeholders undertaken

Schedule 'A', 'B', & 'C' Projects



PHASE 2
Evaluate Alternative Solutions & Establish the Preferred Solution.
Review & Confirm Choice of Schedule.



Schedule 'A' Project

Schedule 'B' Project

Schedule 'C' Project

PHASE 3
Identify Alternative Design, Environmental Effects & Preferred Design.
Review & Confirm Choice of Schedule.



File Project File Report

PHASE 4
Prepare Environmental Study Report (ESR) Documenting Phases 1-3 or Opportunity



PROJECT IS AT THIS STAGE

Environmental Study Report



Opportunity for Part II Order Request (formerly referred to as "Bump-up")

PHASE 5
Complete Drawings & Documents - Proceed to Construction, Operate & Monitor Projects

— Indicates Schedule 'C' mandatory events

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PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **CLASS EA PROCESS**



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1.3 Objectives of the Class EA

The objective of this Class EA is to identify the preferred strategies for wastewater treatment and for the main sewage pumping station and associated forcemain for the Brighton communal sewage system over a 20-year planning period.

The purpose of this Report is to summarize the results of Phase 2 of the Class EA process, including providing a review of the various options that have been considered to address the Problem Statement determined during Phase 1 and to recommend a preferred alternative. This Report also summarizes Phase 1 findings (based on a separate report completed for that Phase) and summarizes agency and public consultation activities;

2.0 SUMMARY OF PHASE 1 FINDINGS

2.1 Key Findings

The following are some of the key Phase 1 findings:

- The raw sewage is relatively “high strength” for a domestic sewage, with monthly samples each year falling in the range of literature values for medium to high strength raw municipal wastewater. Some maximum values are reported to be even higher. This suggests that non-residential contributions to the waste stream (e.g. industrial wastes or other sources) may be significant and may be loading the lagoon at a higher rate than it was originally designed for treating.
- The main concern over the past several years is related to treated effluent quality. In particular, ammonia concentration has exceeded the ECA limits (stabilization pond effluent) and objectives (wetland effluent) on several occasions. Additionally, in four of the six years reviewed, the ECA limits for total phosphorous were not met in the stabilization pond. There are no limits specified in the ECA for E. Coli, but the objective (wetland) was not met in five of the six years reviewed.
- A detailed review of the wastewater treatment system performance indicates that the existing system experiences a number of challenges including: regular organic overloading, potential short circuiting, and limited hydraulic detention time, issues with inefficient aeration, rapid sludge accumulation, and poor ammonia effluent quality throughout the year.
- The wetland portion of the treatment system does not appear to be providing significant treatment with the exception of some marginal decreases in Total Phosphorus.

- Due to the age and condition of the existing infrastructure, it is estimated that approximately \$500,000 in infrastructure rehabilitation and maintenance at the Harbour Street SPS and Lagoon is required over approximately the next 7 years.
- Updated population and flow projections show that the currently approved ECA rated capacity of the existing treatment system is not anticipated to be exceeded in the 20-year planning period for this study.

2.2 Phase 1 Problem and Opportunity Statement

Based on the information developed and analyzed during Phase 1 of this Class EA, the following problem/opportunity statement was developed for the project:

The Brighton communal sewage system generally consists of several kilometers of gravity collection sewers, a main pumping station, a smaller sub-area pumping station and a continuously discharged lagoon based treatment system that includes an aeration cell, a waste stabilization pond, a constructed wetland and a continuous chemical feed system for phosphorus removal. The treatment system is currently licensed under Environmental Compliance Approval (ECA) No. 3081-9XQNZK which stipulates certain operational and performance requirements. The system currently services an estimated population of 6462 and some population growth is projected to occur within the 20 year planning period that will generate additional flows and increase hydraulic loading to the treatment system. The system is currently only operating at approximately 60% to 70% of its ECA rated “hydraulic” capacity.

Based on an evaluation of the available operational historical treated effluent data, it has been determined that the treatment system has regular difficulties in achieving the effluent quality required by ECA No. 3081-9XQNZK, particularly for ammonia and in some cases Total Phosphorus. A review of historical raw sewage quality, hydraulic input and the overall physical configuration of the Lagoon based treatment system, indicates that the relatively high strength raw sewage combined with physical limitations of the treatment system is the primary cause for the treated effluent exceedances. The system, as currently configured, is not capable of treating the organic loadings received from the collection system. Further the constructed wetland portion of the treatment system is not providing any significant treatment with respect to the parameters of concern.

In addition, the Harbour Street SPS and the Lagoon based treatment system were evaluated as part of Phase 1 of the Class EA. Due to the age and condition of the existing infrastructure, within the next 7 years approximately \$500,000 in infrastructure rehabilitation and maintenance is required.

3.0 PHASE 2 PUBLIC AND AGENCY CONSULTATION

3.1 Consultation Summary

The Class EA process requires consultation with parties that may potentially be affected by the project. As part of Phase 2, the consultation plan developed in Phase 1 was followed in order to facilitate communication with the public and various agencies and other interested parties. Refer to Appendix A for the Phase 2 Public Consultation Summary and supporting documentation.

Key components of Phase 2 Stakeholder consultation include:

- Reviewing the Public Consultation Plan (developed in Phase 1)
- Project Team/Committee Meetings
- Responding to Public Stakeholder Comments
- Responding to Review Agency Comments
- Maintaining Project Mailing List and Contacts
- Public Information Centre
- Notice of Completion

Key consultation correspondence from Phase 2 is included in Appendix A. A brief summary of some of the key results of this consultation is presented below:

- Public – Comments were received from members of the public and Councilors. Concerns varied but included comments about the design and operation of the current wastewater treatment system, maintenance and protection of the engineered and natural wetland, the planning horizon of the Class EA, water quality in Presqu'île Bay, the capital on ongoing costs associated with the proposed infrastructure upgrades, and comments on the preliminary preferred alternative.
- MOECC - The MOECC reviewed the Phase 1 and draft Phase 2 Report and other available information on the project and determined that the existing effluent limits may remain in place. The Ministry noted that the Class EA evaluation should consider that some add-on treatment options could provide incidental improvements in overall effluent quality. Improvements in BOD and TSS in addition to ammonia were of particular interest to the MOECC. The MOECC indicated that they do not anticipate giving credit to the effluent quality improvements that the constructed wetland may provide.

4.0 ADDITIONAL CONDITIONS AND CONSTRAINTS

Phase 1 of the Class EA involved problem/opportunity definition, which included identifying all relevant existing conditions and constraints to ensure that feasible alternative solutions could be properly identified and evaluated in consideration of all of the project specific circumstances. Some additional key conditions and constraints were also confirmed early on in Phase 2 and are outlined below.

4.1 Treated Effluent Requirements

The wastewater treatment system is rated for an Average Day Flow (ADF) of 4,600 m³/day. An evaluation of projected growth within the service area was undertaken as part of Phase 1 of this Class EA and based on this evaluation, the 20-year design average day raw sewage flow to the lagoon is anticipated to be less than the current rated capacity and there is no need for an increase to the ECA rated capacity during this time period.

The existing ECA compliance requirements for the treatment system are outlined in Table 4-1. The MOECC was consulted near the end of Phase 1 and early on into Phase 2 of the Class EA. During this consultation, it was confirmed that the current ECA requirements are to remain in effect as part of this undertaking. It was noted by the MOECC that enhanced treatment should focus on addressing the issues associated with ammonia removal and to a lesser extent total phosphorous. The MOECC indicated that during the evaluation of options in Phase 2 and moving forward into preliminary design, consideration should be given to alternatives that can provide some incidental improvements in the treatment of TSS and cBOD₅. Documentation of this correspondence with the MOECC is provided in the Consultation Summary (Appendix A).

Table 4-1 Existing Effluent Compliance Limits – Waste Stabilization Pond

Parameter	Concentration in Effluent	Loading in Effluent	Non-compliance
CBOD ₅	30.0 mg/L	138.0 kg/day	Annual Average
Total Suspended Solids	40.0 mg/L	184.0 kg/day	Annual Average
Ammonia + Ammonium Nitrogen	14.0 mg/L * 17.0 mg/L **	64.4 kg/day * 78.2 kg/day **	Monthly Average
Total Phosphorus	1.0 mg/L	4.6 kg/day	Monthly Average
Notes: * from May 01 to October 30 ** from November 01 to April 30			

4.2 Receiving Water Assessment

Based on the above-noted consultation with the MOECC and given the fact that an increase in the rated capacity is not required for this particular undertaking, a receiving water assessment was deemed not to be required.

5.0 IDENTIFICATION OF WASTEWATER TREATMENT ALTERNATIVES

5.1 Evaluation and Selection Methodology

The main objective of Phase 2 of a Class EA is to identify and evaluate possible alternative solutions to the problem(s) (and/or opportunities) identified in Phase 1. All reasonable potential solutions to the problem(s), including the 'Do Nothing' option, are considered. Class EAs for wastewater projects generally result in the identification and review of a broad range of solutions. It is also important to note that the objective of Phase 2 is to focus on a determining an overall "generalized solution" to the problem and not necessarily all of the intricate details which are typically further explored as part of Phase 3 of a Schedule C Class EA and then further developed during a preliminary and detailed design stage (i.e. included as part of Phase 5 of the Class EA process and referred to as Implementation).

In order to facilitate the evaluation and selection of the preferred solutions during Phase 2, a transparent and logical three part assessment process was established. This process included:

- Initial screening of alternatives;
- Detailed evaluation of screened alternatives; and
- Selection of a preferred alternative.

The first evaluation stage considers the overall feasibility of the potential solutions and identifies those alternatives that fully address the problem statement. This step ensures that unrealistic alternatives are not carried forward to a more detailed evaluation stage.

Based on the initial screening, a detailed assessment of the short list of alternatives is conducted. Evaluation criteria were developed based on a review of the background information, experience on similar assessments and in consultation with Municipal staff. The evaluation was conducted using criterion in the following four major criteria categories:

- Natural Environment and Archeology
- Engineering and Technical Considerations
- Social and Community Well Being
- Financial Impacts

Once the detailed evaluation was completed, a recommended preferred alternative or alternative(s) was identified for presentation to stakeholders and to solicit input prior to finalizing a preferred alternative.

5.2 Initial Screening of Alternatives

Several alternatives are presented in Table 5-1 along with a summary of the review carried out to support a recommendation to either carry the alternative forward for further evaluation or not.

Table 5-1 Description and Preliminary Evaluation of Wastewater Treatment Alternatives

Alternative	Review/Recommendation
Option 1: Do nothing	
1) Do nothing	<p>Review: This option would have a negative effect on the environment as effluent would likely continue to exceed the ECA limits and could also result in fines to the Municipality. This option has not been carried forward as it does not address the problem.</p> <p>Recommendation: Do not carry forward</p>
Option 2: Optimize/Modify Current Lagoon Operations	
2A) Remove sludge from lagoon cells	<p>Review: Sludge removal has proven in the past to not address the identified issues on its own. This alternative should only be considered in combination with other options.</p> <p>Recommendation: Carry forward but only as an option to be considered in <u>combination</u> with other alternatives</p>
2B) Optimize baffle design and upgrade/refurbish existing baffles	<p>Review: Optimizing baffle design in the stabilization pond (Cell No. 2) will not address all the identified problems on its own but it should provide some additional treatment by improving lagoon retention time and reduce overall risks in not meeting ECA requirements. This alternative should be only considered in combination with other options.</p> <p>Recommendation: Carry forward but only as an option to be considered in <u>combination</u> with other alternatives</p>
2C) Modify lagoon operating volume and/or aeration	<p>Review: Previous upgrades to the existing lagoon aeration system have proven not to be effective in addressing the identified problems. A new aeration system is part of some of the other options being carried forward (see below). Adding additional lagoon volume will not address the issues associated with ammonia treatment.</p> <p>Recommendation: Do not carry forward</p>

<p>2D) Optimize alum dosage for phosphorous removal</p>	<p>Review: Optimizing alum dosage will not address all of the identified problems on its own but should help to resolve the issues with periodic phosphorous exceedances from the lagoon.</p> <p>Recommendation: Carry forward but only as an option to be considered in <u>combination</u> with other alternatives</p>
<p>2E) Upgrade/refurbish the constructed wetland</p>	<p>Review: Refurbishing the wetland is not anticipated to address all of the identified issues on its own. Initial conversations with the MOECC suggest that the effluent objects on the wetland are for data collection purposes only. Refurbishing the wetland, however, may provide some additional treatment and reduce overall risks in not meeting ECA requirements.</p> <p>Recommendation: Carry forward but only as an option to be considered in <u>combination</u> with other alternatives</p>
<p>1F) Investigate and divert any identified high strength waste streams away from the lagoon system</p>	<p>Review: As part of the preferred alternative, the Municipality should continue to work with its ICI customers in the community to assess options for reducing high strength sewage discharges to the collection system. Reducing the strength of the influent loading to the lagoon system will assist in mitigating risks of impacts to the existing treatment system (and any new systems) and the resulting treated effluent concentrations.</p> <p>Recommendation: Carry forward but only as an option to be considered in <u>combination</u> with other alternatives</p>
<p>Option 3: Install Specialized Treatment System to Complement the Existing Lagoon System</p>	
<p>3A) Install complete mix activated sludge process upstream of existing lagoons (e.g. Biolac Treatment System)</p>	<p>Review: These options (Option 3) have all been reviewed based on information received from technology providers and all have the potential to meet the current effluent criteria and address the key issues in the problem statement.</p> <p>Recommendation: Carry forward</p>
<p>3B) Upgrade aeration in the existing aeration cell and install submerged aerated bio-film reactors in the existing stabilization pond (e.g. WCS Bio-Shell)</p>	
<p>3C) Upgrade/expand aeration in the existing cells and install an attached growth reactor following the existing stabilization pond (e.g. SAGR)</p>	
<p>3D) Add pre-screening and install a fixed film biological treatment process upstream of the existing lagoons (e.g. SMBR, MBBR)</p>	

<p>3E) Upgrade aeration in the existing aeration cell and install a fixed film biological treatment process downstream of the existing lagoons (e.g. SMBR, MBBR)</p>	
<p>3F) Add pre-screening and install a bioreactor with activated sludge process and membrane technology upstream of the existing lagoons (e.g. MBR)</p>	
<p>Option 4: New Mechanical Treatment Plant</p>	
<p>4) Replace lagoon completely with a new mechanical treatment plant</p>	<p>Review: This option has the proven ability to meet the current effluent criteria and address the key issues in the problem statement; however, the costs are anticipated to be much higher than the other options and significant changes to the site and operations would be required making it unaffordable to the Municipality. Costs are estimated to be \$15M to \$25M with annual operating costs in the \$750,000 range.</p> <p>Recommendation: Do not carry forward</p>

5.3 Detailed Evaluation of Wastewater Treatment Alternatives

5.3.1 Probable Costs - Capital Costs

An Opinion of Probable Construction Costs (OPCC) with a Class ‘D’ (Indicative Estimate) level of accuracy was developed for each of the alternates and includes allowances for design elements that have not fully been developed. The OPCC’s were developed based on past experience on similar projects, professional judgment, and equipment costs provided by suppliers.

Table 5-2 Total Estimated Cost of Treatment Alternatives (2017 \$)

Option	Estimated Capital Cost (2017 \$)
Option 2: Optimize/Modify Current Lagoon Operations 2a. Remove sludge from lagoon cells ¹ . 2b. Upgrade/refurbish existing baffles ² . 2d. Optimize alum dosage (study component only) 2e. Refurbish the constructed wetland 2f. Divert high strength waste streams	\$ 1,000,000 \$ 300,000 \$ 30,000 \$150,000 No on-site cost
Option 3: Install Specialized Treatment System to the Existing Lagoon System 3a. Complete Mix Activated Sludge Process 3b. Submersible Aerated Bio-Film Reactors ³ . 3c. Submerged Attached Growth Reactor ³ . 3d. Fixed Film Biological Process – upstream 3e. Fixed Film Biological Process – downstream ³ . 3f. Activated Sludge with Membrane Technology	\$4.5M \$4.5M \$4.5M \$6.0M \$4.5M \$10.0M
Notes: 1. Estimated cost of full desludging of aeration and stabilization pond. 2. Includes computational fluid dynamics (CFD) modelling to optimize design and new, as well as modified baffles in the stabilization pond. 3. Includes aeration upgrades in existing aeration cell.	

5.3.2 Probable Costs – Lifecycle Costs

Based on the cost of existing operations and information from suppliers and similarly sized facilities, the annual operating costs of each particular treatment alternative have been summarized in Table 5-3. For the purposes of establishing operational costs it has been assumed that the treatment system is operating at its ECA rated capacity. Costs include operations staff and electricity costs for blowers and pumps. Chemical costs associated with the phosphorous removal system and equipment replacement costs have not been included.

Table 5-3 Estimated Annual Operational Costs of Treatment Alternatives (2017 \$)

Option	Estimated Operations Cost (\$/year)
3a. Complete Mix Activated Sludge Process	\$200,000
3b. Submersible Aerated Bio-Film Reactors	\$200,000
3c. Submerged Attached Growth Reactor	\$300,000
3d. Fixed Film Biological Process - upstream	\$200,000
3e. Fixed Film Biological Process - downstream	\$200,000
3f. Activated Sludge with Membrane Technology	Info not provided by supplier

5.3.3 Evaluation Overview

Table 5-4 summarizes the detailed evaluation of the screened alternatives for the treatment system. Each option was assigned an evaluation impact level (refer to Table 5-4) for each evaluation criteria. This method provides an overall assessment of the positive and negative impacts of each alternative. This method was used as it is recognized that there could be more than one option or technology that can address the problem and that additional consideration of these technologies could be undertaken either as part of a Phase 3 (i.e. Schedule C continuation of this Class EA) or as part of a pre-design stage. For the detailed evaluation refer to Appendix B.

Table 5-4 Evaluation Impact Level

Evaluation Impact Level	Indicator
Potential for Positive Impact	+1
No Anticipated Impact	0
Potential for Negative Impact	-1

Appendix C contains conceptual layouts of each of the technologies and how they could be integrated into the existing site.

Table 5-5 Summary Evaluation Matrix

MAJOR CRITERIA	MINOR CRITERIA	OPT 3A COMPLETE MIX ACTIVATED SLUDGE PROCESS	OPT 3B SUBMERSIBLE AERATED BIO- FILM REACTORS	OPT 3C SUBMERGED ATTACHED GROWTH REACTOR	OPT 3D FIXED FILM BIOLOGICAL PROCESS (UPSTREAM)	OPT 3E FIXED FILM BIOLOGICAL PROCESS (DOWNSTREAM)	OPT 3F ACTIVATED SLUDGE WITH MEMBRANE TECHNOLOGY
NATURAL ENVIRONMENT AND ARCHAEOLOGY	Effect on Fish and Aquatic Habitat	+1	+1	+1	+1	+1	+1
	Effect on Wetlands, Woodlands, Wildlife Habitat	0	0	-1	0	0	0
	Effect on Archeological Potential Impacts	0	0	0	0	0	0
ENGINEERING AND TECHNICAL CONSIDERATIONS	Proven Cold Weather Installations	+1	-1	+1	+1	+1	-1
	Ability to Meet Effluent Criteria	+1	0	+1	+1	+1	+1
	Degree of Process Control	+1	-1	-1	+1	+1	+1
	Ease of Operation	-1	+1	+1	0	0	-1
	Capability with existing site	+1	+1	-1	+1	0	+1
	Opportunities for Future Expansion	+1	-1	-1	+1	+1	+1
SOCIAL/COMMUNITY WELL BEING	Impacts During Construction	0	0	-1	0	0	0
	Compatibility with Surrounding Land Use and Visual Impact	0	0	-1	0	0	0
	Noise and Odour Effects during Operation	+1	+1	+1	+1	+1	+1
Maintenance (Short Term and Long Term Requirements)		-1	-1	0	-1	+1	-1
Capital Cost		0	0	0	-1	0	-1
TOTAL		5	0	-1	5	7	2

6.0 PREFERRED SOLUTION

6.1 Description of the Preferred Alternative

Based on the evaluation methodology utilized, it was determined that Option 3 - Install a Specialized Treatment System to Complement the Existing Lagoon System provided the highest overall net benefit to the Municipality. In order to mitigate risk and ensure appropriate treatment redundancy and to take advantage of existing facilities/infrastructure (i.e. the existing lagoon and constructed wetland), this option should be completed in combination with some of the items identified in Option 2 – Optimizing and Modifying Current Lagoon Operations as being part of the overall preferred solutions. This includes a very thorough de-sludging program prior to any new technology implementation, upgrading baffles in the stabilization pond, optimizing alum dosage, refurbishing the constructed wetland, and diverting high waste streams. With regards to the particular specialized treatment system to be selected, the complete mix activated sludge process (3A) and the fixed film biological process (3D or 3E) appear to provide the highest overall benefit to the Municipality based on information available at this time.

The main benefits of each of the preferred solutions in Option 3 are the following:

- Proven full scale Canadian and cold weather installations;
- Ability to meet current effluent criteria, with quality that is better than current ECA limits;
- Controlled process that can be adjusted to achieve consistent effluent quality;
- Easily expandable process with minimal capital cost to increase treatment capacity; and
- Moderate upfront capital costs and ongoing operational costs.

In addition, the fixed film biological process located downstream of the stabilization pond (3E) has several added benefits for consideration by the municipality:

- Comparatively lower capital cost investment
- Potential for reduced necessity to upgrade aeration equipment in Cell 1
- Manufacturer's warrantee on effluent quality (with effluent at ECA compliance measurement point)

6.2 Opinion of Probable Cost for Preferred Solution (including lifecycle upgrades)

An Opinion of Probable Construction Costs (OPCC) with a Class 'D' (Indicative Estimate) level of accuracy was developed for full implementation of all elements of the preferred solution. Allowances for design elements that have not fully been developed are included. The OPCC's were developed based on past experience on similar projects, professional judgment, and equipment costs provided by suppliers.

Table 6-1 Opinion of Probable Cost for Preferred Solution

Component	Estimated Capital Cost (2017 \$) (Option 3E)
Install Specialized Treatment System	\$4,500,000
Remove sludge from lagoon cells	\$1,000,000
Upgrade/refurbish existing baffles	\$ 300,000
Optimize alum dosage (study component only)	\$ 30,000
Refurbish the constructed wetland	\$ 150,000
Complete Lifecycle Upgrades at SPS and Lagoon	\$ 500,000
Sub-Total	\$6,480,000
Engineering and Contingency (30%)	\$ 1,940,000
Grand Total (rounded)	\$ 8,424,000

7.0 CONCLUSIONS AND NEXT STEPS

The Municipality is now in a position to post the Class EA Project File that documents the Class EA process. After the 30-day period for comment closes the Municipality will be in a position to implement the preferred option and proceed directly into preliminary design. The design would be based on the analysis presented within this Schedule B and the conceptual layouts for the preferred alternatives identified in Phase 2 that take the environmental factors into consideration (e.g. potential impacts to the constructed wetland, etc.).

Appendix A
Public Consultation Summary



MUNICIPALITY OF BRIGHTON

BRIGHTON WASTEWATER TREATMENT SYSTEM

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PHASE 2

PUBLIC CONSULTATION SUMMARY

August 2018

Submitted by:



203-863 Princess Street

Kingston, ON Canada

K7L 5N4

JLR 27271

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APPENDICES

Appendix A – Notice of Study Commencement

Appendix B – Public Correspondence

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Appendix E – Public Information Centre Materials (Notice, Boards, and Comment Sheet)

1.0 OVERVIEW

The Municipality of Brighton (the Municipality) initiated a Class Environmental Assessment (Class EA) of their wastewater treatment system in August 2016 to address various problems experienced with treatment at their treatment lagoon (e.g. elevated ammonia concentrations in the treated effluent) and also to ensure that increased influent flows from future growth can be effectively accommodated. In order to fully define the problems and identify a preferred solution to address these issues, J.L. Richards & Associates Limited (JLR) was retained by the Municipality to assist in the completion of the Class EA.

Public consultation activities have been undertaken to ensure that the public and other stakeholders would have numerous opportunities to be involved in and to provide comments throughout the Class EA. This Consultation Summary will be updated on an ongoing basis throughout the Class EA.

2.0 NOTICE OF STUDY COMMENCEMENT

In accordance with Phase 1 of this Class EA, a Notice of Study Commencement (provided in Appendix A) was prepared by the consulting team. The Notice was issued in English and also included a survey for stakeholders to return by mail or email.

The Notice of Study Commencement was:

1. Placed on the Municipality's website home page from October 14, 2016 to date.
2. In the Brighton Independent newspaper on December 8, 2016 and December 15, 2016.
3. Mailed to the mandatory review agencies on October 27, 2016.

3.0 STAKEHOLDER COMMENTS

3.1 Public Stakeholders

Written correspondence from the public and project team responses is summarized in Appendix B. In addition, approximately 20 members of the public requested to join the project mailing list. These names were added to the stakeholder list.

3.2 Review Agencies

A project mailing list was developed identifying review agency stakeholders. Refer to Appendix C for a copy of the project agency mailing list and written correspondence from the review agencies. Table 3.1 provides a summary of agency comments received to date regarding this Class EA. In addition to written correspondence, meetings were held with the Ministry of Environment and Climate Change, these are documented in Section 6.0.

Table 3.1 Summary of Agency Stakeholder Comments

Stakeholder	Comment	Action
Lower Trent Region Conservation Authority (LTC)	November 23, 2016 - The LTC expressed interest in being included on the mailings for this project as portions of the treatment system are in an area regulated by the LTC.	Added to the mailing list.
Ministry of Environment and Climate Change (MOECC)	<p>November 30, 2016 - The MOECC provided comments on the Class EA Process, MOECC Technical Review, and consultation with Aboriginal Communities.</p> <p>March 28, 2017 – The MOECC reviewed the Phase 1 Report and other available information on the project and determined that the existing effluent limits can remain in place. The Ministry noted that the Class EA evaluation should consider that some add-on treatment options could provide incidental improvements in overall effluent quality. Improvements in BOD and TSS in addition to ammonia were of particular interest in to the MOECC.</p> <p>The MOECC indicated that they do not anticipate giving credit to the effluent quality improvements that the constructed wetland may provide.</p> <p>July 13, 2017 – The MOECC reviewed the Phase 2 Report (dated April 10, 2017) the MOECC indicated that they are prepared to accept the proposal that as no physical expansion of the sewage works is proposed, the existing effluent compliance limits, objectives and loadings be maintained in the amended ECA and that the compliance point or the Brighton sewage system be imposed upstream of the constructed wetland. Overall, the MOECC indicated that they are satisfied with the proposed effluent criteria for the upgrades to the Brighton sewage system.</p>	<p>A pre-consultation meeting with the MOECC was scheduled.</p> <p>Incidental improvements in overall effluent quality were considered in the evaluation alternatives.</p> <p>The proposed effluent criteria have been incorporated into the final Phase 2 Report.</p>
Ministry of Natural Resources and Forestry (MNR)	December 13, 2016 – The MNR provided general information on the databases available. It was also noted that any expansions of the existing infrastructure should not be placed within the Provincially Significant Wetland (adjacent to the engineered wetland). A site assessment was also recommended to identify the presence of any Species at Risk and/or their habitat.	The placement of new infrastructure was considered as part of the evaluation and consideration will be given to completing a site assessment in subsequent phases of the proposed work.

3.3 Aboriginal Communities

Based on the Crown's preliminary assessment seven Aboriginal communities were identified as potentially affected. Refer to Appendix D for a copy of the Aboriginal communities' mailing list and written correspondence received. Table 3.2 provides a summary of Aboriginal comments received to date regarding this Class EA.

Table 3.2 Summary of Aboriginal Community Stakeholder Comments

Stakeholder	Comment	Action
Mississaugas of Scubob Island	August 2, 2017 – The Mississaugas of Scugog Island expressed concern for the fishing and wetland related species and environments.	The evaluation considered the potential impact of each alternative on several natural environment criteria including: fish and aquatic habitat; wetlands, woodlands, wildlife habitat; and archeological potential impacts. Study updates will be sent to the representative.

4.0 PROJECT MEETINGS

4.1 Project Committee Team Meetings

To facilitate the consultation process the Project Management Team, including JLR team members and City staff, have met at regular intervals during the Class EA. Table 4.1 provides a summary of the meetings.

Table 4.1 Summary of Project Team Meetings

Meeting/Date	Comments
Progress Meeting No. 1 September 28, 2016	Meetings held to discuss Phase 1 activities to date, including review and collection of background information.
Progress Meeting No. 2 Friday May 3, 2017	Review draft Phase 1 and Phase 2 reports, including discussion of the MOECC feedback, evaluation methodology, and selection of the preferred alternative.

4.2 MOECC Meetings

To facilitate the consultation process the Project Management Team, including JLR team members and City staff, met at regular intervals during the Class EA with representatives from the MOECC. Table 4.2 provides a summary of the meetings.

Table 4.2 Summary of MOECC Consultation Meetings

Meeting/Date	Comments
MOECC Meeting No. 1 December 20, 2016	Meeting held to provide MOECC with project background information and obtain preliminary feedback from the MOECC on the project.
MOECC Meeting No. 2 January 31, 2018	Meeting to provide the MOECC with a project update, discuss the Class EA status, and solicit input into next steps.
MOECC Meeting No. 3 July 16, 2018	Meeting to review the Council decisions to move forward with completion of Schedule B Class EA for the Brighton WPCP based on the preferred design alternative and discuss the detailed plans and timelines for the project.

4.3 Presentations to Council

To facilitate the consultation process the JLR team members presented to Council at regular intervals during the Class EA. Table 4.3 provides a summary of the meetings.

Table 4.3 Summary of JLR Presentations to Council

Meeting/Date	Comments
Special Council Meeting May 29, 2017	Presentation from Steve Saxton, JLR regarding the Brighton Wastewater Treatment System Schedule B Class Environmental Assessment. Meeting was held in conjunction with the Public Information Centre.
Council Meeting July 17, 2017	Follow-up from Steve Saxton, JLR regarding the Brighton Wastewater Treatment System Schedule B Class EA.
Council Meeting December 11, 2017	That Council received delegation from Steve Saxton, JLR in response to a Motion passed December 4, 2017 to resume the Schedule 'B' Class EA and investigate the construction of a mechanical, conventional activated sludge plant.
Council Meeting June 4, 2018	Steve Saxton, JLR attended in response Council direction regarding next steps at the Brighton Wastewater Treatment System. A motion was passed that JLR provide a report to Council describing various ammonia treatment technologies and associated costs.
Special Council Meeting June 25, 2018	Steve Saxton, P.Eng., JLR provided a report regarding Resolution 2018-443 directing J.L. Richards to describe different technologies and associated costs that will address the ammonia issue at the Brighton Lagoon. Technologies discussed included: the complete mix activated sludge process, submersible aerated bio-film reactors, submerged attached growth reactor, fixed film biological process (MBBR), activated sludge with membrane, secondary clarifier with activated sludge recirculation. Resolution No. 2018-520 was passed that Council select MBBR supplemental treatment and complete the Schedule 'B' Class EA. Further to that, Resolution 2018-521 was passed that Council provide funding for a Schedule 'C' Class EA for future planning. To conclude Resolution No. 2018-522 was passed that Council direct staff through GSS Engineering to develop an RFP for the preliminary detailed design of an MBBR system.

5.0 PUBLIC INFORMATION CENTRE

The Phase 2 Public Information Centre (PIC) for the Class EA took place on Monday, May 29, 2017 at the Brighton Community Centre from 6:00 pm to 8:00 pm. The Notice was sent to the project mailing list and posted on the Municipality's website. Representatives from the project team and staff from the Municipality were available to answer questions during the PIC. The PIC was attended by some Councillors and approximately 20 members of the public. Comments received from the public at the PIC are summarized in Appendix B. Refer to Appendix E for a copy of the Notice, display boards and comment sheet.

Appendix A

Notice of Study Commencement

Notice of Study Commencement



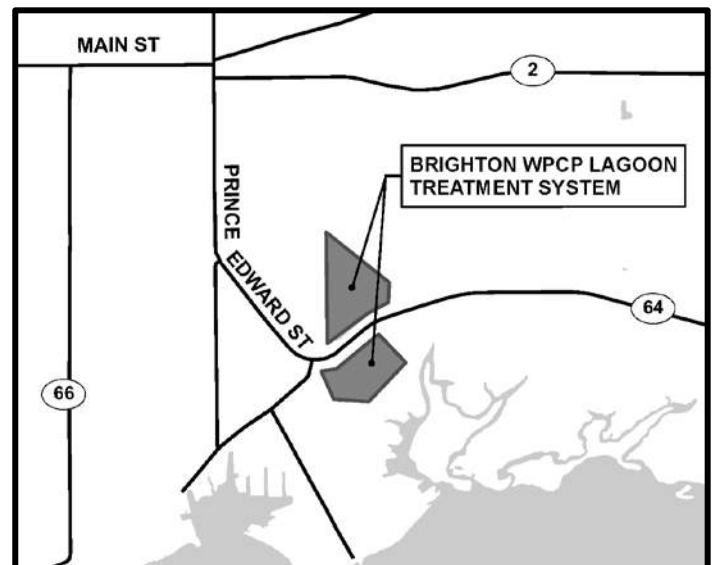
Municipality of Brighton Brighton Wastewater Treatment System Schedule B Class Environmental Assessment

The Municipality of Brighton has initiated a Class Environmental Assessment (Class EA) to determine the most suitable process for wastewater treatment in Brighton over the next 20 years.

How Will This Affect Me?

The study will assess current and future requirements of the Brighton wastewater treatment system, including the lagoon, main sewage pumping station, and forcemain and make recommendations for the wastewater treatment system.

Public and agency consultation is a key element of the process. Based on your input, alternative strategies will be evaluated to identify optimal community, environmental and economic opportunities.



How Do I Get More Information?

A Public Information Centre (PIC) will be conducted in early 2017 prior to finalizing the preferred solution. In the meantime, the study team is reviewing background data and determining alternative solutions. You are also invited to contact a member of the study team at anytime with questions or to provide input into the study.

Updates will be provided throughout the study on the Municipality website, and if you have any questions regarding the study, please visit our website at www.brighton.ca or contact one of the people listed below.



**TO FIND OUT
MORE VISIT**
www.brighton.ca

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This study is being conducted according to the requirements of a Schedule B project under the Municipal Class Environmental Assessment process (October 2000, as amended in 2015).

This Notice issued October 14, 2016

Appendix B

Public Correspondence

Brighton Wastewater Treatment System Municipal Class EA
Record of Public Feedback
(Comments received to June 27, 2017)

Comment 1 – [REDACTED] – Resident – Received October 25 & 27, 2016

The Aecom report states in section 3, ammonia control options, the retention time has to be increased from the present to 48 and 54 days of retention in order to meet the ammonia limits, in order to do this the top water has to be raised 0.9 m.

Q) Is this sound advice, can this be done, and will it help?

Response: It is not uncommon for facultative lagoons to have difficulties in treating for ammonia. An expanded lagoon volume could improve some aspects of the treated effluent quality but would not be effective in additional ammonia removal which has been identified as a key concern for this project. There are, however, several available specialized treatment technology lagoon “add-ons” that could be implemented on site which are designed to specifically target ammonia removal and are best suited to be located downstream of the lagoon after it has removed significant contaminants. Many of these specialized processes also provide additional treatment for other parameters which will be a benefit in providing additional redundancy to the lagoon system.

In the Aecom report it clearly states in section 3 that in order to maintain this retention time for a daily average flow rate for the future (4600 m³/day) the berm would have to be raised 0.6 m.

Q) Is this sound advice, can this be done, and will it help?

Response: The existing wastewater stabilization pond can be considered a valuable asset at its current capacity. An expanded lagoon volume, by raising the berm could improve some aspects of the treated effluent quality but would not be effective in additional ammonia removal which has been identified as a key concern for this project. One related recommendation from the current EA work is to undertake Computational Fluid Dynamic (CFD) modeling of the lagoon system to determine if enhancing the overall baffling will significantly improve retention time. The decision to improve baffling or not will be made based on the CFD modeling and also in consideration of all factors including the specific type of specialized add on treatment.

Q) What is the max daily flow rate with a retention time of 48 and 54 day can our system handle with outraising the berm?

Response: The site is limited by its current Environmental Compliance Approval which limits flow to 4600m³/day.

In the Aecom report it is clear in section 2 with a retention time of 48 and 54 day that we have a reserve capacity equivalent to 2127 persons a day if we extended the height of the berm 0.6 m.

Q) Is this correct?

Response: As shown in the Draft Phase 1 Report, an updated uncommitted reserve capacity calculation indicates that 967 units (above the 345 units already committed) can be accommodated by the current Lagoon ECA hydraulic capacity. . At 2.2 persons per unit, this equates to 2886 persons. However, effective ammonia removal is a key consideration of this Class EA and it has been determined that the existing lagoon as currently configured requires an

additional treatment process to consistently and reliably achieve ammonia effluent requirements now and in the future.

Q) Presqu'ile Park has about 120,000 overnight guests ever year for 5 months that the park is open. We can't divide this number over a 12 month period because our system has to take that flow of sewage when it occurs. About 400 persons in new development to be conservative, 50 new commercial lots, and our first Tim Horton's. Is our system sized for the population it serves by the size of our population (not by flow)?

Response: We acknowledge that the Park draws a large number of visitors that do contribute flow to the Brighton wastewater treatment facility. The MOECC has a published procedure in order to identify available capacity at water and wastewater facilities. It is based on historical flow and Presqu'ile Park is included in these historical values. Based on the MOECC Procedure D-5-1 (Uncommitted Reserve Capacity Calculation) and reported approved development information, the Municipality has MOECC approved hydraulic capacity within the current configuration for growth over the next 20 years. This is based on the understanding that the wastewater treatment system effluent quality remains acceptable and in accordance with the current ECA. Installation of specialized treatment systems, as described in the Class EA reporting, will be used to improve effluent quality and ensure all compliance requirements are met. It should be noted that flow from commercial/industrial growth can vary depending on the nature of the activity on those lots and wastewater volume and quality impacts from significant commercial/industrial development needs to be considered should that type of development be contemplated.

Q) Would adding raw water to the system at the plant help with the dilution of the raw sewage, and would this be helpful with ammonia control?

Response: The amount of raw water required would be enormous and not practical. It is also generally recognized that "dilution is not the solution to pollution". There are, however, several available specialized treatment technology lagoon "add-ons" that could be implemented on site which are designed to specifically target ammonia removal and are best suited to be located downstream after it has removed significant contaminants.

Q) The smell of sewage is a problem, can a treatment system be installed to prevent the odor?

Response: Ongoing maintenance, including routine desludging of the lagoon and constructed wetland renewal, is expected to improve odours. The Municipality is not aware of a persistent odour issue, however, we will note your comment for future reference.

Q) Can the discharge of the constructed wetland be redirected to discharge to the east side away from the north west wind and away from the shore line of Gosport?

Response: The constructed wetland outfall (discharge location) is on the south side of the constructed wetland due to the hydraulic grade of the process (water flowing from high point to low point). From here, water flows into the natural wetland area. All flow from the natural wetland area then passes the east point of Gosport near the Presqu'ile Yacht Club.

Q) The constructed wetland is not part of our system or C of A why is this, the final discharge from our treatment system is from the wetland?

Response: The constructed wetland is recognized within the facility's Environmental Compliance Approval. However, MOECC does not anticipate giving credit to the effluent quality improvements that the constructed wetland provides. It is acknowledged that the wetland may offer varying levels of additional treatment for some parameters (e.g. Total Phosphorus), but it also may have little or detrimental treatment for other parameters.

Q) Wildlife is a problem in the constructed wetland, would it help if we had a more aggressive wildlife removal program?

Response: The Class EA focus is to determine improvements to the facility effluent. Your comment is noted for future reference by the Municipality. They may choose to control wildlife that is shown to cause damage to the wetland (e.g. burrowing animals) in the future .

Q) Why are we allowing the public to walk around this site, with no safety or staff on site?

Response: The Class EA focus is to determine improvements to the facility effluent. Your comment is noted for future reference by the Municipality. The municipality has chosen to allow limited access to the site. Public access to the site is reviewed on a regular basis.

Comment 2 – Roger McMurray – Municipal Councillor – Received April 27, 2017

After reading the report, I have two concerns. The first relates to the date the system was established. The report states "the 1970s" I believe that the 1960s would be more accurate. I have contacted staff who were present and hopefully more accurate info is available as to christening date. The second point is more critical to this EA and accurate numbers are essential to establish true loading of the plant. Section 4 table, page 3 states, "Presquile Park has about 120,000 overnight guests every year for 5 months that the park is open" I am including an Ontario Parks printout of parks in the southeast zone which includes Presqu'ile which list the 2010 visitor number at 212,614 and Day-use visitors as 79,341. I have stat sheets for 2008 and 2009 which show respectively 191,804 and 201,983 visitors which show the 120,000 visitors listed in the EA to be very low in comparison and would introduce an error in loading calculations. I recommend that the Consultant contact Ontario Parks and get a more accurate visitor statistics to better reflect actual spring/summer/fall loading of the lagoon. I am including a copy of the 2010 SOUTHEAST ZONE statistics which includes Presqu'ile Park on digital page 46 (actual page 43). For your info/action as required. Best regards.

Response: Thank you for the information on the date that the facility was first established. We have updated the Phase 1 report to reflect that the lagoon was established between the 1960s to early 1970s.

Thank you also for highlighting the number of annual visitors to Presqu'ile Park. We acknowledge that the Park draws a large number of visitors that do contribute flow to the

Brighton wastewater treatment facility. The MOECC has a published procedure in order to identify available capacity at water and wastewater facilities. It is based on historical flow and Presqu'île Park is included in these historical values. Based on the MOECC Procedure D-5-1 (Uncommitted Reserve Capacity Calculation) and reported approved development information, the Municipality has capacity within the current configuration for growth over the next 20 years. This is based on the understanding that the wastewater treatment system effluent quality remains acceptable. Installation of specialized treatment systems, as described in the Class EA reporting, will improve effluent water quality. It should be noted that flow from commercial/industrial growth can vary depending on the nature of the activity on those lots and wastewater volume and quality impacts from significant commercial/industrial development needs to be considered should that type of development be contemplated.

Comment 3 – Anonymous Resident – Comment Sheet Response from PIC Meeting – Received May 29, 2017

[Comment Sheet Question 3 – The recommended preferred solution is shown in the poster. Do you have any comments or questions on the recommended solution?] **“Like the small footprint. Concerned about high operating costs. If the wetland is ineffective – why retain?”**

Response: The constructed wetland has shown to provide improvements for some chemical parameters and nutrients such as total phosphorus. It also provides other social and environmental benefits to the community (e.g. bird watching). Also, one of the components of the overall recommended solution is to refurbish/clean the constructed wetland with the goal of improving its treatment performance effectiveness. Reportedly it has not been cleaned out since it was originally constructed.

[Comment Sheet Question 5 – Do you have any additional comments?] **“Regrettable that the Mayor and Council not present to receive comments.”**

Response: Thank you for the comment. Please also note that all comments received will be included in the final project file and in a dedicated Appendix to the Phase 2 report and available for review by the Municipality, including Council.

Comment 4 – ██████████ – Resident – Received May 30, 2017

Item 1: I thought the explanations given at the May 29 meeting were quite clear

Response: Thank you for the comment.

Item 2:

- The current system does need upgrading based on ammonia and phosphorous removal problems.
- There could be a need to rebuild the whole system based on poor settling pond performance and rapid rate of sludge build up.
- I also question how it can be said that the system is only being used at 60% of capacity yet does not meet MOE effluent requirements and sludge build up appears to be excessive.
- I also favour a 20 year planning window used by the consultant as opposed to the 50 year window batted about at the meeting. One can't predict population growth or technology changes 50 years into the future.

Response: The recommended preferred solution includes a thorough cleaning of the lagoon. Although it has been reported that some sludge has been removed in the past, the thoroughness of that previous sludge removal is in question. The existing sewage treatment system is in some respects, performing well by providing a significant level of treatment for key wastewater parameters. For example, CBOD5 removal is reported to be in the 90% range on average, TSS removal is in the 85% range on average and total phosphorus removal is in the 85% range on average. However, it does require assistance to provide treatment for ammonia as ammonia removal is only reported to be in the 40% range. It is not uncommon for facultative lagoons to have difficulties in treating for ammonia. Planning sewage treatment improvements on a 20 year interval is industry standard practice. Constructing a system today to accommodate a flow that may or may not occur in 50 years would be economically unwise. In addition, treatment components such as mechanical equipment, instrumentation and controls, electrical, etc. typically have a service life in the 20 year range. Depending on the option ultimately implemented, planning provisions can be made for future capacity expansion (e.g. if flows increase faster than expected or if the preferred technology option is still relevant and can be upgraded/renewed after the 20 year time period has elapsed).

Item 3:

- It is clear to me that the current treatment system does not work and that some sort of special treatment is required.
- We need a proven system that will meet MOE effluent limits all year around regardless of temperature extremes.
- The information presented at the meeting was, in my mind, insufficient to say that the stated preferred system is the best system.
- It makes sense to put any biological treatment after the settling pond to minimize shock loading that could harm the bacteria. Such a system must be sized properly to handle the outflow.

Response: Thank you for the comments. The goal of a Schedule B Class EA is to identify the problem and the opportunity along with the major constraints and then identify a preferred solution through a consultative process. It is not intended to necessarily define all of the details and nuances of the preferred solution which can be further reviewed as part of a Schedule C Class EA (if the Municipality so chooses to follow that course) or as part of a preliminary design phase and detailed design phase. The solution presented for this Class EA has been purposely presented in a somewhat "general" nature to allow for further optimization during subsequent work and to achieve an optimum (i.e. "best") solution.

Item 4: At the meeting there seemed to be confusion as to what role council would play in this decision. Whatever the next steps that will be taken they should be made clear to the public.

Response: Thank you for the comment. Council has recognized this Class EA as a strategic priority and have budgeted for and recommended that this Class EA be undertaken. A Class EA is intended to be an open and transparent process that needs to account for many project specific factors throughout its course. The “expected” outcomes of a Class EA are sometimes preconceived ahead of time; however, the “final” outcome can sometimes be different than expected since environmental and other factors that come to light during the study can have an impact on the recommended preferred solution. Council generally has a role in endorsing the recommended preferred solution in the Class EA before it moves to the implementation phase.

Item 5: I am concerned that the current study is too focused on adding onto the current treatment system. For example the proposals all used the current settling pond because that is what exists. Perhaps more land could be bought and the pond enlarged and reengineered, thereby increasing retention times and sewage uniformity. This would make whatever the next treatment step more effective.

Response: The recommended preferred solution includes utilizing the existing wastewater stabilization pond since this readily available and valuable asset is, in some respects, performing well by providing a significant level of treatment for many key wastewater parameters. For example, CBOD5 removal is reported to be in the 90% range on average, TSS removal is in the 85% range on average and total phosphorus removal is in the 85% range on average. However, it does require assistance to provide treatment for ammonia as ammonia removal is only reported to be in the 40% range. It is not uncommon for facultative lagoons to have difficulties in treating for ammonia. An expanded lagoon volume could improve some aspects of the treated effluent quality but would not be effective in additional ammonia removal which has been identified as a key concern for this project. There are, however, a number of available specialized treatment technology lagoon “add-ons” that could be implemented on site which are designed to specifically target ammonia removal and are best suited after the lagoon treatment component of the system has removed significant contaminants (as noted above). Many of these processes also provide additional treatment for other parameters as well which will be a benefit in providing additional redundancy to the lagoon system.

Comment 5 – Tom Willison –Commodore Presqu’ile Yacht Club – Received May 30, 2017

Speaking on behalf of the Presqu’ile Yacht Club

- We are very interested in water quality since the membership is focused on using the bay for our activities. In addition we are directly located near the outlet of the current treatment wetlands and so our water front is directly affected by the effluent. Excessive nutrients, bacteria, and suspended solids causes problems that impede our boating activities and cause

undo expense in dredging and aquatic weed control. It is imperative that the new treatment system produce effluent that meets or is better than the MOE requirements.

- We also request that any system chosen will be able to, without question, handle sewage from boat holding tanks. Every other community with docking facilities has waste treatment facilities that can handle this type of sewage and Brighton should too. Not being able to use the sewer system for boat holding tank sewage could lead to unhealthy sewage handling and possible improper disposal.

Response: Thank you for your comments. One of the intents of the recommended preferred solution is to substantially improve the quality of effluent discharged to the environment by the current system as well as the consistency of this quality. The Municipality may elect to resume accepting wastewater from the Presqu'ile Yacht Club when they are satisfied that the wastewater treatment process can accommodate these additional flows without risking non-compliance of the overall treatment system.

Comment 6 – [REDACTED] – Resident – Received June 5, 2017

I attended the information session and reviewed the presentation. I am concerned that the recommended solution of \$6.5 million expenditure to upgrade the present system and water polishing ponds is inadequate and wasteful. The lagoon system in place has failed. To simply try a new method of resuscitation as planned is a gamble that may result in improvement but it will still leave the town with an inadequate system. Brighton is growing quickly. As new subdivisions are added and more retirement-aged Torontonians flee the city, demand for new services will far outstrip the projected volumes. The industrial park is capable of accommodating a number of new industries. However, any sizeable operation will overwhelm the working sewage plant envisioned here. The twenty year threshold given as the operational range may well be overcome in ten years! I believe that the population growth algorithm applied to Brighton is way off base.

I believe that Brighton will require a new mechanized treatment plant within 10 years. Indeed, it needs it now. \$6.5 million spent fixing the present system is wasteful. Better to apply \$6.5 million towards a \$25 million plant and seek Federal and Provincial funds to assist. The new Federal municipal infrastructure programs and infrastructure bank may well provide funds. Long term debt at government backed low rates should be acceptable to Brighton taxpayers. The provincial environment officials will be demanding that we get on with it. Let's get on with a proper solution and not another band-aid.

Response: Population projections that have been completed for the Class EA use data from the Municipality's own growth documents as well as including committed/reserved capacity for subdivisions and other developments that have yet to be constructed or are in the process of being constructed. It has been determined that an appropriately upgraded facility would be capable of handling the flow projections within a 20 year planning horizon and possibly beyond.

The recommended preferred solution includes utilizing the existing wastewater stabilization pond since this readily available and valuable asset is in some respects, performing well by

providing a significant level of treatment for many key wastewater parameters. For example, CBOD5 removal is reported to be in the 90% range on average, TSS removal is in the 85% range on average and total phosphorus removal is in the 85% range on average. However, it does require assistance to provide treatment for ammonia as ammonia removal is only reported to be in the 40% range. In this respect the lagoon system has not “failed” as it is not uncommon for facultative lagoons to have difficulties in treating for ammonia and require an appropriate upgrade just like many other sewage treatment systems require at some point. Treatment for ammonias can be accomplished through specialized treatment technologies which are often scalable. There are hundreds of lagoon treatment systems throughout Ontario and Canada that have been operating successfully for many decades. Ammonia has become more of a concern to regulators in recent years and many municipalities that own and operate lagoons are doing similar successful treatment “add-ons” so what is being proposed as the recommended preferred solution should not in any way be considered to be a “band-aid”. Should wastewater treatment improvements become necessary again in the future, the Municipality will be able to assess what is the most appropriate option (from a physical, cultural, fiscal, environmental perspective) at that time. It should also be noted that while a mechanical treatment plant is another option that will address the ammonia problem and was considered as part of the evaluation of solutions, it was determined that this would not only entail a significant “capital” cost but would also entail a significant increase to ongoing annual “operational” costs for which funding programs are not applicable. Projects that are not financially viable are at risk of never being implemented in which case the current problem would persist.

Comment 7 – Roger McMurray – Municipal Councillor – Received June 6, 2017

1. RFP 2015-10 Section 3, Task 1 - Review all Existing Information

Bullet 1 of para 1. Above states: **“Meet with Municipal Council, staff and others to identify available background information.”** Is it SOP to wait until the first public meeting to meet Council? Particularly after meeting with staff, collecting and reviewing reports, dwgs, ops and maint data. Collecting and reviewing gov’t docs, OP and inspecting existing facilities?

Response: Typically, Councils are aware of the project and receive periodic updates on the progress of the project by staff. Council members are invited to public meetings as well. If Council as a group wishes to discuss the project with the consultant, attendance at meetings of Council can be arranged by staff. Public meetings run through a Class Environmental Assessment process and cannot take place at a meeting of Council. Two key reports (Phase 1 and Phase 2) were also made available to the Municipality in “draft” form well prior to the public meeting in order to apprise staff and Council of progress. There is little point in formally meeting with Council until some tangible results of the Class EA are developed which in this case was during Phase 2 of the Class EA. In some respects it is beneficial for the Consultant to work partially through a Class EA in order to scientifically evaluate the problems and solutions in a transparent and unbiased manner.

Note: Paras 12.- 16 Inclusive, Below, refer to information from both the RFP 2015-10 and the J.L Richards Phase II report.

Under item 1.3 – General Description of Preliminary Upgrade Alternatives for the Wastewater Treatment System. RFP 22015-10 states at Item 1.3, paragraph 4: “To upgrade and/or expand the wastewater treatment system, all reasonable alternatives are to be considered which could include upgrading the existing lagoon system or construction of a new mechanical plant, likely at the existing site.” .Why was the construction of a small mechanical plant given short shrift in the EA. They work and they last a long time.

Response: This Class EA process involved reviewing a long list of alternatives (including a Mechanical Treatment Plant option) and then narrowing this list down to undertake a more thorough review of the short list of alternatives. Once the required treated effluent quality requirements were determined in consultation with the Provincial regulators (i.e. the MOECC), the mechanical treatment plant alternative did not make the short list of alternatives primarily because the capital and operating costs involved are anticipated to be much higher than other viable options and significant changes to the site and operations would be required, likely making it unaffordable to the Municipality. Capital costs are estimated at \$15M to \$25M with annual operating costs in the \$750K range. Given that the existing lagoon facility is generally performing well with respect to CBOD5 (90% removal efficiency on average), TSS (85% removal efficiency on average) and Total Phosphorus (85% removal efficiency on average) it should be considered a readily available and valuable asset and not a “throw away”. However, it is recognized that the existing lagoon does require assistance to provide improved treatment for ammonia which has been one of the focuses of this Class EA and a key factor in the development of a proposed solution. There is a risk in specifying a project that is unaffordable to a municipality in that it is possible that it will never be implemented in which case the problem will persist. A balance of factors was used in the determination of a recommended preferred solution.

1. Benthic Feedback. GSS Engineering some time ago complained to me informally of high ammonia readings where they should not have been. Processing ammonia has been a problem since at least 2008. I am aware that anaerobically digesting sludge can release ammonia into the water column. In your opinion does our sewage treatment lagoon, specifically the facultative lagoon exhibit symptoms of **benthic feedback**. How can this condition be positively identified? Can it be eliminated by sludge removal? To what degree must sludge be removed? I have read where this condition can lead to **the effluent** concentration testing higher than **the influent** for ammonia concentration and could account for the plant’s apparent inability to process ammonia. ENVIROSIM testing proved that the plant was capable of processing existing influent streams.

Response: It is suspected that one of the causes of elevated ammonia concentrations in the lagoon effluent, compared to what would normally be expected, is the influence of sludge (potentially through a benthic feedback action) particularly since ammonia removal is also poor in the warmer months when it is typically easier to treat. We understand that desludging activities have been completed in the past but there are questions in regards to the thoroughness of those cleaning activities. It is suspected that existing sludge may be part of the problem although regardless of this issue, lagoons typically are not extremely effective on their

own at ammonia removal throughout an entire year of operation. One of the recommendations of the Class EA is to complete a thorough desludging of the lagoon which is part of the normal operation and maintenance of any lagoon over the course of its life anyway (i.e. is should not be viewed as a capital cost for the project but rather a maintenance activity that may have been deferred for too long). In our opinion, effective removal of sludge would be a first step that could be undertaken in order to remove impacts from the sludge on the ammonia concentrations in the treated effluent.

2. Sludge Removal. Excess sludge buildup could be blamed for many of the plant's shortcomings for a number of years, however approx. 20,000 M3 were removed in 2012/2013 with no short or long term improvement in ammonia processing. If sludge accumulation is a problem already it is painfully obvious that a lagoon system is not the best approach for processing ammonia. Will the system you recommend deal with the heavy sludge accumulation problem? The size of the lagoon has not changed since the late 1950s/early 1960s despite a population growth from 2500 in 1959/60 until today's population of 6462 plus Presqu'île Park. Should the municipality have a regular schedule for sludge removal rather than an ad hoc process?

Response: Effective lagoon desludging involves accurately measuring the existing sludge volume and water content by mapping the sludge contours throughout the lagoon. A desludging contract is then centred on the effective removal of solids (instead of water) as solids content is continuously measured throughout the removal process. An experienced contractor is paid only on removal of solids. At the end of the contract, the sludge contours are again mapped to determine the overall effectiveness of the desludging operations. It is our understanding that earlier desludging activities were not based on solids removal and therefore much of the original sludge may still remain in place. Buildup of sludge in lagoons varies from case to case. Some municipalities go many years (even decades) without having to desludge any significant volume. A good practice is to undertake a mapping exercise on regular intervals (such as every 2-5 years after the most recent desludging activity). At that time, the Municipality can assess the pros and cons of whether there is significant volume of sludge that is affecting the quality of effluent as well as a significant enough volume in order to make a contract feasible through economies of scale.

3. Screening. During 2015 Council tried to meet the requirements of a MOECC Order and passed motions which were provided to MOECC by GSS Engineering who was contracted by the Municipality act as the municipal signing authority and liaise with the MOECC. A Motion was passed by Council to provide screening to prevent fouling of the aerators. Screening was never purchased for whatever reason. Do your alternate and preferred options include the provision of screening for raw sewage?

Response: Several specialized treatment technologies have been identified in the Phase 2 Report and are available for consideration by the Municipality. Some of these technologies would benefit from upstream screening of the raw sewage. Others are not necessarily affected as much (or at all) since the technology is preferentially located downstream of the lagoon allowing sufficient settlement of these materials in the lagoons. In short, screening is dependent on the technology selected and should not necessarily be implemented if not needed as it entails

significant capital cost and also requires additional operation and maintenance costs to ensure its effectiveness.

4. **Bio-Cord.** During 2015 Council tried to meet the requirements of a MOECC Order and passed motions which were provided to MOECC by GSS Engineering who was contracted by the Municipality to act as the municipal signing authority and liaise with the MOECC. A Motion was passed by Council to provide a, "BIO-CORD system which would provide a foundation for nitrifying bacteria to grow as at present there is nowhere for the bacteria to attach. A Council resolution was passed to acquire one, however, it did not happen. If you select a lagoon based system does it include a bio-cord system or equivalent?

Response: Several of the technologies presented in the Phase 2 report are based on a similar philosophy of providing a media for the attached growth of nitrifying organisms. The nitrification process is a key to removal of ammonia.

5. **Chemical Sludge Removal.** Has your company considered a chemical based method of sludge removal other than physical removal by dredging?

Response: No we have not considered a chemical based method of sludge removal as part of this Class EA. In our experience, physical removal of sludge is the most effective way of ensuring that sludge has been removed from the facility. Chemical based methods that offer to either solubilize the sludge and transport out of the facility over a period of time or consolidate it in a thicker mat of sludge do not have the immediate impact that physical sludge removal does.

6. In 2012, Council approved the proposal for consulting services for the Brighton WWTP upgrade and odour study submitted by AECOM. The AECOM report stated that 6 Aerators are ultimately required. June 2012 – Oct 2012 Bio-solids removal as per AECOM proposal. In Jul 2012 AECOM proposed a tender for floating aerators with estimated cost for purchase that was more than two and one half times the estimated cost in their proposal dated Sept 2011. For comparison staff reviewed cost and ammonia removal efficiencies of other aeration technologies. A technology was discovered (BIO-DOMES) with proven ammonia removal capabilities in wastewater treatment systems that are similar to Brighton's system. Following removal of bio-solids the municipality will engage a contractor conduct a pilot study for an aeration system. The pilot study will require a temporary amendment of the ECA with an application to be submitted early in 2013. The bio-dome pilot project was ultimately unsuccessful. The municipality purchased and installed two used aerators. Will the preferred solution address the aeration issue?

Response: Several specialized treatment technologies are available for consideration by the Municipality and are presented in the Phase 2 report. Some of these technologies would benefit from optimizing aeration of the raw sewage. Others are not necessarily affected as much. In addition, aeration design is site specific and requires careful consideration of the depth and dimensions of the aerated cell compared with the size of the aeration equipment. As has been demonstrated at the Brighton facility, installing aeration equipment of incompatible size/type does not provide beneficial results and can, in fact, worsen the situation. A detailed assessment of the system requirements and design is required as part of the final selection of the technology.

It is also possible that upfront aeration could ultimately be eliminated. In either case, the size and operating parameters of the technology will be optimized for the site.

7. What is the annual operational bill for the proposed new system? More staff required?

Response: The Phase 2 report has conservatively suggested that approximate annual operating costs of \$200K can be expected. An additional 0.5 to 1.0 FTE (full time equivalent) of additional staff may be expected, the cost of which is included in the annual operating cost mentioned above. In comparison to a mechanical treatment plant, annual operating costs of approximately \$750,000 may be expected including the addition of several FTE staff and the requirement of staff to undergo additional training and hold additional levels of licensing.

8. What will the capital costs (up-front and continuing) for the MBBR system? Is purchase of proprietary material required?

Response: The MBBR system is one of several technologies available to the Municipality. This technology does use a floating media. Several suppliers of this particular technology are in the marketplace, each with their own type of proprietary media and system configuration. Replacement of media is very infrequent with some suppliers indicating that many facilities have never had to replace media but purchase of more media would be available if needed in the future (note that additional media can also be added in the future to improve treatment further). Up-front capital cost for the technology is estimated to be approximately \$4M including on-site capital works. Annual operating costs of \$200K are forecasted for the treatment system. In addition, in the future MBBRs can be added upstream of the existing lagoon to improve other parameters and potentially defer the need to add more lagoon volume (this has been done successfully in several installations in Quebec).

9. What is the MTBF for the proposed new system? What is the MTTR for the system? Can the system be taken off line and isolated for maintenance/repair?

Response: All parts of sewage treatment facilities require ongoing preventative maintenance. Generally more passive equipment with less moving parts requires less maintenance. Several of the specialized treatment technologies have passive equipment and should be expected to have less maintenance, less time between maintenance activities and less downtime during maintenance. Installations can be designed with parallel systems to ensure one side can be taken off line while maintenance or repairs are being made. An additional benefit of the flow buffering capacity of lagoons is to create short term capacity in the lagoon by temporarily lowering the lagoon cell slightly and stopping flow to downstream processes. This example could allow for short term interruptions of flow and allow maintenance on technologies that are placed downstream of the lagoon.

10. The municipality expends significant resources on sludge removal due to it being regularly identified and the primary culprit for ammonia exceedances. In What area (of overall plant) will savings (if any) be

realized with inclusion of an MBBR system and more importantly, how much will the inclusion of a MBBR impact overall operational costs?

Response: Refer to the answer for question 7 above regarding approximate anticipated operation and maintenance costs of the specialized treatment technologies available to the Municipality. The MBBR system will not treat sludge and sludge buildup will continue in the lagoon. The MBBR system would be used to improve treated effluent quality and in particular effluent ammonia levels. The savings are realized by continuing to use the lagoon facility as a significant asset for the treatment of CBOD5, TSS, TP and a portion of the ammonia and avoiding the need to construct and operate a mechanical treatment plant as well as avoiding impacts to the environment caused by poor effluent quality that could result in fines from the regulator.

11. Will the proposed MBBR system process the entire flow of the WWTP or will it process a defined percentage and then add this treated effluent to the primary stream to lower its overall strength to a point where it complies with the ECR? How much will the nitrifying media cost for the proposed MBBR annually?

Response: Each of the specialized treatment technologies available, including the MBBR system, is intended to accommodate the entire flow sent through the system. As described in the answer to Question 8 above, media replacement is infrequent and an annual cost for media replacement is not anticipated.

12. In the “Summary of Problem/Opportunity Statement” bullet five states, “It has been determined that the current Environmental Compliance Approval (ECA) rated hydraulic capacity does not need to increase for the next 20 years.

13. I thought that this (the 20 year time horizon) was an inordinately short time for such a large, complex and costly Environmental assessment considering that the collection system and lagoon were installed in the late 1950s and early 1960s and have remained virtually unchanged until the present (approximately 57 years) Twenty years is a relatively short period of time compared to the length of time the system has been in existence. Question, Who or what organization determined this 20 year number?

Response: Twenty years is a common planning time frame for sewage treatment facility projects since accurately forecasting population growth (translated into flow) is not precise and/or always dependable. Technologies and regulations can also change over time and predicting this 50 years into the future is unreliable. The longer the planning period (e.g. 50 years) the less accurate the predicted population (and resulting flows) becomes. In addition, sewage treatment equipment such as mechanical equipment, instrumentation and controls and electrical systems tend to have a service life of 20 years and therefore the solutions are often limited to this type of time frame. It is not to say that the systems cannot be refurbished or replaced in the future to extend the systems life but designing for a system that is 25, 30 or 50 years is not prudent in this case. Interestingly, lagoons can be an exception to this as they tend to be relatively passive type systems constructed of earthworks which can last significantly longer provided they are properly maintained which includes periodic removal of sludge. In fact, Municipalities such as Brighton

are often seen by other municipalities as fortunate to have a low-cost communal sewage treatment process. Annual operating and maintenance costs of lagoons are relatively low compared to mechanical treatment plants.

14. Concerned about the short time frame (20 years) being considered, I consulted the Municipality of Brighton Request for Proposal (RFP) 2015-10. I note at page 14, item 1.3 which states, In part “prior to starting Phase 2 of the EA, produce a Summary Growth Evaluation Document that would project estimates of the projected serviced population sewer flows for a i) 20 year period and ii) a 50 year planning period.”

Response: Recommending a sewage treatment facility that can accommodate a projected flow 50 years into the future is not common for the reasons outlined previously (population growth projection uncertainty, service life of typical components, the potential for more economical advanced technologies in the future and not overdesigning and overpaying for future flows that may not come to fruition). The economies of sizing a facility for a 50 year flow is generally thought of as an untimely investment in infrastructure since the facility would largely sit underutilized for much of its lifetime while deterioration is ongoing and much of it (if not all) would need replacement well before the 50 year time period elapsed.

A 20 year projection was developed prior to the start of Phase 2 and presented in the Phase 1 Report for this project. For sake of interest, we have extrapolated that calculation and have determined that the 50 year serviced population projection is 9,867 and the 50 year flow is 4,970 m³/day. It is recommended, however, that these figures not be used as any basis for determination of a preferred solution within the context of this Class EA and that they simply be noted for interest sake.

15. Additionally, RFP 2015-10 Page 14, bullet 4 states in part: “That once the above Growth Evaluation Document is prepared and accepted by the Municipality of Brighton, that the evaluation of alternatives would be completed in accordance to population and sewage flow increases projected by the document.” To my knowledge, this document remains outstanding and has not been seen by Council.

Response: The Growth Evaluation Document is presented in Appendix C to the Phase 1 Report. As previously indicated, there is little point in updating this document to include the 50 year projections if they are not going to be utilized in any meaningful way.

GROWTH IN POPULATION

16. Page 14, section 1.3 of the RFP 2015-10 states, “Preliminary growth data reviewed for Brighton and the County of Northumberland suggests that growth rates will be approximately 1% per year over a 20 year planning period. If a 1960 population of 2500 is assumed, the increase is in the neighbourhood of 155 percent and incrementing the 2500 number at 1 percent per year comes nowhere close to the 6462 population being presently used.

Population projections that have been completed for the Class EA use data from the municipality's own growth documents as well as including committed/reserved capacity for subdivisions and other developments that have yet to be constructed or are in the process of being constructed. It has been determined that an appropriately upgraded facility would be capable of handling the flow projections within a 20 year planning horizon and possibly beyond.

17. The sheet titled: "Phase 1 Problem and Opportunity Statement of the J.L. Richards report states in part: "that the system is currently operating at approximately 60 to 70 percent of its ECA rated "hydraulic" capacity. Question. What does the word, "currently" include? That is to say, how many months/years of flow data were included to arrive at these percentages? I can remember flows being in excess of 80 percent (See R.V. Anderson Report. How are fixed percentages to be seen as credible when infiltration is so variable?

Response: Five years of data have been used to perform the MOECC Procedure D-5-1 "Uncommitted Reserve Capacity" calculation (please refer to the Phase 1 report). The average of these years indicates approximately 60-70% of ECA rated capacity. Reduced flow in the last two years can be, at least, partially attributed to ongoing efforts to reduce inflow and infiltration. These activities could result in slightly decreasing flows (per capita) as time progresses.

18. In the J.L. Richards Opinion of Probable Costs for the Recommended Preferred Solution: \$6,500,000 (including engineering and contingency, excluding HST) one can assume that due to the many manufacturers of MBBRs that this potential acquisition by the Municipality of Brighton will be sent out for competitive bid as per the Municipal purchasing by-law. Who will prepare the RFP for the MBBR and send it out to interested bidders?

Response: That is correct. There are several suppliers of the MBBR technology as well as several others suppliers of the other specialized treatment technologies identified in the Phase 2 Report. It is anticipated that the designer retained by the Municipality as part of the implementation phase would prepare documents to facilitate competitive bidding by suppliers and contractors. It should be noted that further preliminary and detail design exercises are required prior to implementation.

After reading "future tasks" which appear to relate to preliminary and detailed design and project implementation my thoughts were that J.L. Richards assumes that by completing an EA that they won a contract for engineering and installing a new facility if Council should agree. Am I hallucinating? I was under the impression that the Municipality hired J.L. Richards to do an Environmental Assessment.

Response: You are correct. J.L. Richards & Associates Limited was only retained to undertake the Class EA. There is no assumption on anyone's part that J.L. Richards & Associates Limited would be automatically be involved in subsequent design tasks. The reference to "future tasks" was simply to provide the Municipality with some guidance as to the next steps that are typically taken towards implementation and were in fact requested to be included by staff.

CONCLUSION

I am disappointed that this EA has focused on the ammonia problem particularly when the proposed cost for solving this one problem is so high. I consider MBBR to be just bio-domes on steroids. The pilot project using bio-domes failed and no one is really sure why. How long will the MBBR last? Will it suffer the same fate as the bio-domes? I can see the Municipality shelling out another 6.5 million in a few years to go off on another tangent. In your description of the recommended preferred solution (J.L. Richards) para 3 list other upgrades which are not really upgrades but maintenance actions. 1. The lagoon has been de-slugged in 2012/2013 to no avail. 2. A contract for \$189,000 for baffles replacement was awarded to Fitzgibbon Construction in 2013. 3. Flocculent was changed from alum to ferric chloride. Why? 4. Refurbish the constructed wetland. Why? It may or may not be part of the system depending on who you ask and according to the J.L. Richards report it is not working. 5. In my humble opinion, High strength wastewater is a red herring. All influent streams were tested by EnviroSim and no problems were highlighted. Rather than chasing rainbows and fixing a single problem area, the Municipality should be investing in tried and true technology that will last a lifetime as is the case in our neighbouring municipalities such as Picton, Cobourg, Colbourne, and Quinte West – The Conventional Activated Sludge (CAS) Plant. Yes, CAS plants are expensive but they work.

Response: Many of the above comments have been responded to in previous responses. Please also reference the Phase 1 and Phase 2 technical reports for a full understanding of the work completed as part of this Class EA including a concise identification of the existing problems with the lagoon which to a large extent revolve around effluent ammonia – not an uncommon situation for similar types of systems and partly due to enhanced scrutiny by regulators. The MBBR process is a system that has been installed on previous lagoons and is working successfully in full scale applications – as is some of the other processes presented in the Phase 2 report. The science of an attached growth media to promote nitrification (and hence ammonia removal) is proven in many different applications including some mechanical treatment plants. MBBR is in fact considered a mechanical treatment system.

Comment 8 – Roger McMurray – Municipal Councillor – Received June 6, 2017

J.L. Richards makes the statement in their Phase one report in the problem and opportunity statement on page 28 that, “the overall physical configuration of the lagoon-based treatment system indicates that the relatively high strength sewage combined with the physical limitations of the treatment system is the primary cause for the treated effluent exceedances. **The system, as currently configured, is not capable of treating the organic loadings received from the collection system.** Further, the Constructed Wetland portion of the treatment system is not providing any significant treatment with respect to the parameters of concern.

Concerns about the efficacy of the sewage lagoon are not new. In July 2011 AECOM consultants were retained to complete an independent review of the operation of the Brighton WPCP. They conclude that the lagoon volume would have to be significantly increased to achieve nitrification even with additional aeration. They indicated a total hydraulic retention time of 48 days would be required versus the current

detention time of 31 days at existing flows and only 23 days at the rated capacity flow of 4600 m³/day. It is not a ringing endorsement of our lagoon-based sewage treatment system when two unrelated engineering firms have reservation on its efficacy. It begs the question: why is the Municipality reluctant to consider tried and true solutions? **The only thing our wastewater system seems to process effectively are consulting firms.**

Projects such as wastewater plants are both costly and risky and it is Council's role to consider funding. In 2009 CH2MHill proposed a hybrid plant using an MBR at a cost of 6.4 million. In 2011 AECOM provided a number of options in its ammonia removal study including SAGR, Gravel Bed, Bio-Reef, U Tech Volute System and a mechanical Plant at a cost of 17 million. AECOM suggested raising the Bern by .6 Meters. Brighton staff were concerned. The purchase of three aerators was considered and dropped and in 2012 the bio-dome trial was initiated as a replacement for aeration. The bio-dome trial ultimately failed and as it was only a trial, cost to the municipality were minimal. Had it been a full scale installation of bio-domes that failed financial loss would have been extreme. AECOM recommended the installation of three and possibly 6 aerators, however none were installed. Baffles were replaced in 2013 by Fitzgibbon Construction. There was no movement by AECOM on the Ammonia issue in 2013. RV Anderson was hired by the CAO in 2014 and their proposal was not endorsed by Council who subsequently submitted an RFP which resulted in the hiring of GSS Engineering Consultants. This firm managed to provide 2 used aerators from Norwood and did their best to bring the lagoon into compliance. GSS Engineering was subsequently hired to draft an RFP for this EA and here we are.

Considering the bad experiences with the Bio-domes with their suspended nitrifying bacteria and the lack of success by GSS Engineering with their Aqua-n magic potion, **I and reluctant to endorse J.L. Richard's preferred solution using Moving Bed Bio-film Reactors (MBBR) with their film based nitrifying bacteria at a cost to the Municipality of 6.5 million dollars.** The money could be better used to initiate purchase of a mechanical plant. As money seems to be the biggest impediment to fixing this problem, perhaps the purchase of a mechanical plant could be considered over a ten year window in manageable phases starting with screening, sludge handling, etc. The firm of J.L. Richards won the bid to perform an EA for the Municipality. Briefly the following are my concerns in that regard.

1. Did not meet with Council as per RFP 2015, Section 3, Task 1.
2. Who or what organization specified a 20 year planning period?
3. Did not provide a 50 year planning period as required by RFP 2015-10. Page 14 Item 1.3
4. Did not provide Growth Evaluation document as required by RFP 2015-10, page 14, bullet 4.
5. The firm of J.L. Richards seems to have assumed that they were awarded a design/build contract along with winning the bid for the EA. Is my assumption valid or not?
6. A Conventional Activated sludge Plant was not given and serious consideration even though it appears to be the gold standard.

Response: The lagoon has been doing a relatively good job at CBOD₅, TSS and Total Phosphorus (TP) removal but requires "assistance" in the removal of ammonia which has been a focus of this Class EA. While the constructed wetland has shown limited effectiveness it does in fact show some indications of nutrient removal (particularly TP). The overall recommended preferred solution includes cleaning the constructed wetland which has reportedly not been done since it was originally constructed. It is envisioned that this will improve overall treatment for this component. The recommended preferred solution also recommends conducting a Computational Fluid Dynamic (CFD) assessment of the existing lagoon including the baffling to more definitively determine the hydraulic residence time and then determine if adding additional baffling could

improve the residence time in the lagoon. Some additional costs for more baffling have been included in the estimated cost for the recommended preferred solution.

Phasing in a mechanical treatment plant over a ten year period in order to address the actual problem (i.e. ammonia removal improvement) is not possible (e.g. adding screening will not impact ammonia removal). Essentially the entire mechanical treatment plant would need to be constructed to address the ammonia issue as ammonia removal would be through secondary treatment which requires all components of a plant to be in place.

In response to specific questions 1 to 6 please note the following:

- 1. JLR met with Municipal staff as part of a project kickoff meeting and site visit and had previously met with two members of Council prior to the project award and discussed project scope. Based on these consultations it was not felt it was required to have a formal meeting with Council as it would not provide any additional required information at that time.*
- 2. The Municipality's RFP references a 20 year planning period which was also proposed as part of the JLR work plan.*
- 3. Acknowledged. A 20 year planning period (which was more the focus noted in the RFP) is more appropriate for this type of project and is standard for a Class EA of this type. This was used as the basis for problem identification and solution evaluation. The 50 year population projection is 9,867 with a resulting average day flow of 50 year flow is 4,970 m³/day.*
- 4. Please refer to Appendix C of Phase 1 report for Technical Memorandum: Growth Evaluation Document*
- 5. Your assumption is not valid. It is unclear why this would be assumed by anyone. JLR does not have a contract for anything beyond completion of the Class EA.*
- 6. A mechanical treatment plant was given consideration as an option during Phase 2. The mechanical treatment plant option would be significantly more in capital and ongoing annual operating cost and would entail significantly more energy to operate versus the lagoon based system which relies partly on natural treatment processes. In addition there are other options available that are viable and less costly for addressing the ammonia treatment issue.*

Comment 9 – Roger McMurray – Municipal Councillor – Received June 6, 2017

MBBR/IFAS

Hi Steve,

I understand that Lakeview WWTP in Peel Region initiated a study in 2005/2006 to assess the relative merits of a Conventional Activated Sludge plant and an MBBR by running both system in parallel. Apparently the pilot is still running, however, Lakeview WWTP does not plan to permanently implement Integrated Fixed Film Activated Sludge (IFAS) for secondary treatment. I understand that a decision was made that conventional treatment is the preferred treatment method at Lakeview. I have two papers

authored by William Fernandes, Manager of Capital Works for the Region of Peel. Reasons for Mr. Fernandes choosing conventional treatment versus IFAS include:

- The plant (Peel Lakeview) is a very large one. We have 14 aeration tanks for 448 ML per day;
- Concern about how to keep the media in the tank at all times;
- How to transfer media from one tank to the next;
- Our tanks are very long and we would have to put many screens and increase head loss in plant 5;
- Concern over foaming

In going through general information available on the Internet I note that a number of MBBRs/IFAS operations have suffered hydraulic failures after media causing screen failure and media loss due to blocked screens. I also have a concern over the ongoing cost of media which I assume is not generic. The municipality would be locked in to a single supplier of increasing costly proprietary media.

*

QUESTION: What were the primary reasons for choosing the MBBR over conventional treatment considering the multitude of other concerns associated with the Brighton WWTP, i.e. lack of screening, rapid sludge accumulation, etc.?

Response: Comparison of Brighton to Peel (Lakeview) is not possible since the facilities are extremely different. Peel (Lakeview) is a mechanical treatment plant that requires screening as such. It is also "orders of magnitude" larger than Brighton. Without intimate knowledge of the retrofit considered at that facility, it also appears that a retrofit of IFAS was not ideal due to existing tankage geometry and flow routing through the facility. Brighton's facility would be built specifically for the treatment technology that is selected. It should also be noted that although it has been noted that the MBBR technology appears to be an attractive option for the Brighton system based on site specific factors, other technologies can still be considered as an "add-on" to the existing lagoon system.

QUESTION: How many MBBRs are presently in operation at Ontario Municipal WWTPs under an MOECC C of A? How many (if any) are operating in conjunction with sewage lagoons?

Response: We do not have these numbers and would need to undertake some additional research to obtain this information.

Comment 10 – Anonymous Resident – Comment Sheet Response from PIC Meeting – Received June 9, 2017 by Municipality, Received June 14 by JLR

[Comment Sheet Question 1 – This study is following the requirement of the Municipal Class Environmental Assessment process for a Schedule B project. Do you have any questions, comments, or concerns about the decision-making and public consultation process that are being followed to-date?] **“How do we know that the constructed wetland is not providing significant additional treatment (as stated in Summary of Problem)?”**

Response: Laboratory testing of effluent water quality done both before and after the constructed wetland has been completed for many years and has indicated as such (information is presented in the Class EA Phase 1 report). It is noted that cleaning of the wetland is recommended as part of the overall recommended solution with the intent of improving its performance.

[Comments Sheet Question 2 – The need to upgrade the Brighton Wastewater Treatment System is based on the current condition and future servicing requirements within the Municipality. Do you have any questions, comments, or concerns about the need to upgrade the wastewater treatment system?] **“Services are estimated to be serving 6,462 people and upgrades are intended to add 20 years to current system.’ Brighton grew 8.4% since 2011 (2016 Census) Have we done projections for the next 20 years?”**

Response: Population projections have been completed for the next 20 years at rates published by the Municipality’s own growth documents (refer to the Phase 1 report).

[Comment Sheet Question 3 – The recommended preferred solution is shown in the poster. Do you have any comments or questions on the recommended solution?] **“(1) What would the capacity be once upgraded? (2) Do we have space for expansion in the future when needed?”**

Response: The current licensed ‘rated capacity’ would be unchanged from present as there is additional capacity presently available in the facility’s licence in order to accommodate the projected growth (this was also noted in the Municipality’s RFP). Depending on the final technology selected it is anticipated that there would be space for expansion if and when needed in the future.

[Comment Sheet Question 4 – There are several final steps to be undertaken to finalize the Environmental Assessment. Do you have any comments or questions regarding how this study will be completed?] **“(1) Will the discretionary public meeting be held? (3 mandatory, 2 discretionary) (2) What happens to public input?”**

Response: The points of contact for consultation in this project were identified as (1) Project commencement (mandatory), (2) MOE consultation (agency – discretionary), (3) Notice of Public Meeting and Public Meeting (Mandatory), (4) Notice of Project Completion (Mandatory – yet to be completed). Public input becomes part of the public record and will be documented in the Class EA reports (specifically Appendix A of the Phase 2 Report) and in the project file.

Comment 11 – [REDACTED] - Resident – Comment Sheet Response from PIC Meeting – Received June 9, 2017 by Municipality, Received June 14 by JLR

[Comment Sheet Question 1 – This study is following the requirement of the Municipal Class Environmental Assessment process for a Schedule B project. Do you have any questions, comments, or

concerns about the decision-making and public consultation process that are being followed to-date?] **"I believe the correct procedure is being followed in this regard."**

Response: Thank you for the feedback.

[Comments Sheet Question 2 – The need to upgrade the Brighton Wastewater Treatment System is based on the current condition and future servicing requirements within the Municipality. Do you have any questions, comments, or concerns about the need to upgrade the wastewater treatment system?] **"Upgrades to the current system are definitely required."**

Response: Thank you for the feedback.

[Comment Sheet Question 3 – The recommended preferred solution is shown in the poster. Do you have any comments or questions on the recommended solution?] **"I thought that the 'preferred solution' was the very minimum that needs to be done but was rather surprised to see that this will cost \$6,500,000!"**

Response: Note that the \$6.5M includes substantial existing operation and maintenance costs that are not related to construction of the actual specialized treatment technology itself.

[Comment Sheet Question 4 – There are several final steps to be undertaken to finalize the Environmental Assessment. Do you have any comments or questions regarding how this study will be completed?] **"I do not know what these steps are."**

Response: Upon receipt of all stakeholder feedback it will be summarized and integrated into the Class EA reporting. The recommendations will be revisited to determine whether changes to the original evaluation and recommended preferred alternative are necessary. Once reporting is finalized, a 'Notice of Completion' will be issued to notify interested public, stakeholders and agencies of this milestone and provide a further 30 days to comment. Should concerns remain, the Municipality can address them or they can be referred to the Minister of Environment through a process called a "Part II Order" request. Should no concerns remain; the municipality can proceed with implementation beginning with preliminary and detail design tasks, procurement and amendments to the ECA as appropriate, and finally construction and commissioning.

[Comment Sheet Question 5 – Do you have any additional comments?] **"After reading the J.L. Richards report on-line, I thought that the Town should have a larger aeration pond, but at the Open House Mr. Saxton said that in reality what is required is a larger stabilization lagoon. I was surprised to read that the previous recommendations made over the past few years have not been acted upon. I realize that the Town is in a bit of a bind re: enlarging the settlement pond owing to the fact that no additional land is available except for the engineered wetland. In spite of complaints from the bird watchers, I believe this is where an additional settling pond should be located. This is necessary in order to protect Lake Ontario. Because this is handwritten, I hope that you will take the time to read my comments.
Thank you.**

Response: What may have been relayed is that the hydraulic retention time in the Brighton lagoon is lower in comparison to other similar facilities in eastern Ontario. Part of the overall

solution is to improve retention time with improving the baffling of the existing lagoon. With a longer retention time, treatment of wastewater may be enhanced. Increasing the size of the retention pond by converting the constructed wetland is not advisable since other social and environmental factors influence this decision. In addition, the larger retention time will not be the only necessity in order to meet effluent criteria limits. In other words, the need to introduce a specialized treatment technology is still required since increasing retention time alone will not be enough to enhance effluent water quality with respect to effluent ammonia

Comment 12 – [REDACTED] - Resident – Telephone Call – Date unrecorded by JLR

Resident indicated that Brighton should look into use of ozonators with a fine bubble diffuser to deal with ammonia issues.

Response: Thank you for the suggestion. The addition of a treatment technology should have multiple treatment aspects to it. This could allow for improvement of ammonia levels as well as other parameters in the effluent. Further work into the potential of ozone as a part of the addition of an overall treatment train could be completed during detail design stages.

Appendix C

Agency Mailing List and
Correspondence

Date Created: August 8, 2016
 Last Modified: August 23, 2016
 JLR File No. 27271

Brighton Lagoon
 Notice of Commencement Agency and Organization Mailing List - MASTER

Jurisdiction	Agency	Address 1	Address 2	Salutation
Aboriginal	Ontario Ministry of Aboriginal Affairs	4th floor, 160 Bloor Street East	Toronto ON M7A 2E6	To Whom It May Concern
Aboriginal	Metis Consultation Unit – Metis Nation of Ontario Head Office	500 Old St. Patrick Street, Unit D	Ottawa ON, K1N 9G4	To Whom It May Concern
Aboriginal	Metis Nation of Ontario – Land, Resources & Consultation	355 Cranston Cres	Midland ON L4R 4K6	To Whom It May Concern
Federal	Environment Canada	P.O. Box 5050 867 Lakeshore Road	Burlington ON L7R 4A6	Mr. Dobos
Federal	Fisheries and Oceans Canada – Communication Branch	200 Kent Street, 13 th Floor, Station 13E228	Ottawa ON K1A 0E6	To Whom It May Concern
Federal	Health Canada	200 Eglantine Driveway, Tunney's Pasture	Ottawa ON K1A 0K9	To Whom It May Concern
Provincial	Ministry of the Environment and Climate Change (MOECC) – Peterborough District MOECC Office	300 Water Street Robinson Place	Peterborough ON K9J 8M5	Mr. Muloin
Provincial	Ministry of Natural Resources and Forestry (MNRF) - Southern Regional Office	4th Floor South Tower, 300 Water Street	Peterborough ON K9J 3C7	To Whom It May Concern
Provincial	Ministry of Natural Resources and Forestry (MNRF) - Peterborough District Office	1st Floor South Tower, 300 Water Street	Peterborough, ON K9J 3C7	To Whom It May Concern
Provincial	Ministry of Agriculture and Food & Rural Affairs	R R #3, 95 Dundas Street	Brighton, ON K0K 1H0	Mr. Valaitis
Provincial	Ministry of Culture, Tourism & Recreation	5 th Floor, 180 Dundas Street	Toronto ON M7A 2R9	To Whom It May Concern
Provincial	Ministry of Transportation	1201 Wilson Ave., 7 th Floor, Atrium Tower	Downsview ON M3M 1J8	Mr. DeVos
Provincial	Ministry of Municipal Affairs & Housing – Planners, Community P & D	777 Bay St., 13 th Floor	Toronto ON M5G 2E5	Ms. Gonzalez
Provincial	Infrastructure Ontario	1 Dundas St. West, Suite 2000	Toronto ON M5G 2L5	To Whom It May Concern
Regional	Brighton Health Unit	35 Alice St.	Brighton, ON K0K 1H0	Dr. Noseworthy
Regional	Hydro One Networks Inc	12 th Floor, North Tower, 483 Bay Street	Toronto ON M5G 2P5	To Whom It May Concern
Regional	Enbridge Consumers Gas	500 Consumers Road	North York ON M2J 1P8	To Whom It May Concern
Regional	Bell Canada	Floor 5, Blue, 100 Borough Drive	Toronto ON M1P 4W2	Mr. Lachapelle
Regional	Lower Trent Conservation Authority	714 Murray Street, R.R. 1	Trenton, Ontario, K8V 5P4	Ms. Noyes
Provincial	Ministry of the Environment and Climate Change (MOECC) – Peterborough District MOECC Office	300 Water Street Robinson Place	Peterborough ON K9J 8M5	Ms. Light
Provincial	Ministry of the Environment and Climate Change (MOECC) – Eastern Region - Kingston MOECC Office	PO Box 22032	Kingston, ON K7M 8S5	Ms. Mitchell

Jane Wilson

From: Steve Saxton
Sent: November 23, 2016 3:24 PM
To: Janet Noyes
Cc: Bill Watson; Jane Wilson
Subject: RE: Schedule B Class EA Brighton WWTP

Hi Janet,
Thanks for letting us know. We'll be sure to include you in the communications and will seek LTC comments as the project progresses.
Kind regards,
Steve

Steve Saxton, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
203 - 863 Princess Street, Kingston, ON K7L 5N4
Tel: 613-544-1424 Fax: 613-544-5679



**J.L. Richards
& Associates Limited**
ENGINEERS • ARCHITECTS • PLANNERS



From: Janet Noyes [<mailto:janet.noyes@ltc.on.ca>]
Sent: November 22, 2016 3:15 PM
To: Steve Saxton
Cc: Bill Watson
Subject: Schedule B Class EA Brighton WWTP

Hello Steve;

Lower Trent Region Conservation Authority (LTC) received the Notice of Commencement for the above noted Class EA project in Brighton.

Since portions of the WWTP are located within the Presqu'ile Bay Marsh Provincially Significant Wetland and along the Lake Ontario shoreline, and therefore within an area regulated by LTC, we are interested in being including on the communications mailings for this project.

We look forward to reviewing the submissions and providing comments to aid in the protection of this coastal wetland and the Lake Ontario shoreline.

Regards,

Janet Noyes

Janet Noyes, P.Eng.

Manager, Development Services & Water Resources

Lower Trent Conservation

Phone: 613-394-3915 x 211

Fax: 613-394-5226

714 Murray Street

R.R. #1 Trenton, ON

K8V 5P4

Buying or building near wetlands or waterways? Check out these new [online services](#) – ***Property Inquiry Service*** and ***Map Viewer*** will help you get information about environmental features & required permits!

Check out our website at: www.ltc.on.ca

By email only

November 30, 2016

Municipality of Brighton

Attention: Bill Watson, P. Eng., Chief Administrative Officer
bwatson@brighton.ca

Dear Mr. Watson:

Re: Brighton Wastewater Treatment System, Municipality of Brighton

Thank you for providing the Notice of Study Commencement issued October 14, 2016. The notice indicates that the project is being planned as a schedule B activity in accordance with the Municipal Class Environmental Assessment (Class EA).

Class EA Process

I have also received a copy of an October 24, 2016 letter sent to Viktoria Light, Drinking Water Inspector at MOECC, from Keith Lee, Wastewater Supervisor at the Brighton Water Pollution Control Plant (WPCP) which states that "The municipality has also retained J.L. Richards to complete a Class EA process for the wastewater treatment system. This Class EA will evaluate alternatives to upgrade, and potentially expand, the treatment system for short term and long term servicing conditions". If the municipality proceeds with a Class EA project to expand the system, depending on the specifics of the expansion, the project may need to be elevated to a schedule C project rather than a schedule B project. For example, if the existing rated capacity of a WPCP will be increased by expansion of a sewage treatment plant or lagoons, or by adding sewage storage tanks, the project would be classified as schedule C.

As the MOECC Regional EA Coordinator for this project, I will be responsible for circulating project notices and information to other MOECC reviewers and coordinating the MOECC response during the Class EA process. I am a mandatory contact for all Notices issued for the project. I would prefer to receive copies of notices by email, if possible. In addition, I request copies of other relevant information such as information updates, technical studies, interim reports and technical memoranda, and two copies of the Project Report when it is available.

Please send notices and copies of reports and information packages to the attention of:

Vicki Mitchell, Environmental Assessment Coordinator
Ministry of the Environment and Climate Change
1259 Gardiners Road
P.O. Box 22032
Kingston, Ontario
K7M 8S5

vicki.mitchell@ontario.ca

We normally recommend that intermediate reports or Technical Memoranda, be prepared and circulated for comment before the final Project Report is prepared. This is not a requirement of the Municipal Class Environmental Assessment (Class EA) process; however, it can ensure that consultation with review agencies is carried out in an effective way and that technical comments are received from agencies before the report is finalized.

Supporting technical information, such as proposed effluent criteria, should be submitted at an early stage of the Class EA process, so that this Ministry has an opportunity to confirm our acceptance of the proposal before the report is finalized.

MOECC Technical Review

This Ministry's interest in the project includes problems identified during MOECC inspections of the existing facilities; impacts to the receiving water body due to increase in the discharge of sewage treatment plant effluent; impacts to groundwater and surface water due to construction (i.e. dewatering of trenches during installation of sewers or tanks, control of erosion and sedimentation, construction and/or dredging at outfall location); information on the existing sewage collection system, extent of inflow and infiltration to sewage collection system and any remedial measures under consideration; noise and odour impacts to nearby residents from new infrastructure such as pumping stations; and information on water and sewage service areas.

Impacts to surface water due to increased volumes or concentrations of sewage effluent should be evaluated as soon in the Municipal Class EA process as possible. A site-specific receiving water assessment may need to be conducted to determine the effluent requirements based on the waste assimilative capacity of the receiver. The site-specific effluent requirements derived from the receiving water assessment must be compared to provincial guidelines for effluent discharge (MOECC procedure F-5-1: *Determination of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Waters*), and the most stringent criteria will apply. Receiving water assessments, including background water quality and flow data, must be provided to MOECC by the proponent during the Class EA process.

The Class EA study should consider the need for an adequate buffer area between the sewage treatment facility and residences, and should identify the separation distances between the facility and nearest residences. Adequate buffer area should be acquired for new facilities or enlargements of existing facilities. The study should discuss the potential for odour or noise impacts, and propose appropriate mitigation measures. Please refer to this Ministry's Guideline *D-2 Compatibility between Sewage Treatment and Sensitive Land Use*.

Proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be addressed (requirements under the Clean Water Act). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the report on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (please consult with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in

the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. Even if the project activities in a vulnerable area are deemed to not to be a drinking water risk, there may be other policies that apply, so consultation with the local CA/SPA is important.

Consultation with First Nation and Métis Communities

Your proposed project may have the potential to affect Aboriginal communities who hold or claim Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. The Crown has a legal duty to consult First Nation and Métis communities when it has knowledge of established or credibly asserted Aboriginal or treaty rights, and contemplates decisions or actions that may adversely affect them.

Although the Crown remains responsible for ensuring the adequacy of Aboriginal consultation, it may delegate procedural aspects of the consultation process to project proponents. The MOECC relies on Aboriginal consultation conducted by proponents as part of its assessment of the Crown's obligations and directs proponents during the prescribed process.

Where the Crown's duty to consult is triggered in relation to your proposed project, **the MOECC is delegating the procedural aspects of rights-based consultation to you through this letter.**

Based on information you have provided to date and the Crown's preliminary assessment you are required to consult with the following Aboriginal communities who have been identified as potentially affected by your proposed project:

- Mohawks of the Bay of Quinte
- Curve Lake First Nation
- Alderville First Nation
- Hiawatha First Nation
- Mississaugas of Scugog First Nation
- Metis Nation of Ontario
- Huron-Wendat (if archaeological assessments will be undertaken)

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link:

<https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process>

Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments

You must contact the Director of Environmental Approvals Branch under the following circumstances subsequent to initial discussions with the communities identified by MOECC:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation has reached an impasse; or,
- A Part II Order request or elevation request is expected

The MOECC will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

Should you or any members of your project team have any questions regarding the material above, please contact me at (613) 540-6852.

Yours sincerely,



V. Mitchell
Environmental Assessment Coordinator
Eastern Region
VM/dv

Ec: J.L. Richards and Associates, Steve Saxton, P. Eng., ssaxton@jlrichards.ca

Viktoria Light, MOECC
Victor Castro, MOECC

January 18, 2017
JLR File: 27271

VIA: Email

Vicki Mitchell, Environmental Assessment Coordinator
Ministry of the Environment and Climate Change
P.O. Box 22032
Kingston, Ontario
K7M 8S5

Dear Ms. Mitchell:

**Re: Brighton Wastewater Treatment System MCEA, Municipality of Brighton
Approach to Phase 2 of the MCEA Process**

Thank you for your interest in this project. In response to your letter dated November 30, 2016 and subsequent discussion in our pre-consultation meeting held December 20, 2016 we offer the following clarifications and study updates.

Class EA Process

As indicated in the Notice of Commencement (issued October 14, 2016) this project is being planned as a Schedule B activity in accordance with the Municipal Class Environmental Assessment (Class EA). This decision is supported by Phase 1 work investigating property constraints and anticipated growth in the study area.

The lagoon is located on Lot 33 and 34, Concession B, in the Municipality. The existing lagoon cells and wetland take up a good portion of the available property. However, due to the amount of underutilized property and opportunities to re-purpose existing treatment and storage areas, additional property is not anticipated for the preferred solution. We note that, although a title search was not conducted as part of this Class EA, it is understood that the adjacent property is privately held. As such, MOECC Guideline D-2 separation distances between wastewater treatment plants and sensitive land uses (i.e. residences) will be considered in Phase 2 of the Class EA.

An evaluation of growth in the service area was also undertaken as part of Phase 1 of this Class EA. A Technical Memorandum was developed (refer to Appendix C in the Phase 1 Report) which used an existing service population of 6,462 and growth projections for the Municipality to develop residential population projections for the 20- year design populations. Projected average daily per capita wastewater flows from growth are anticipated be approximately 500 L/c/day, in keeping with current flows. Based on these assumptions, 20-year design average day flow is anticipated to be less than the current rated capacity.

As a result of this review it is not anticipated that additional land will be required and it was determined that a capacity expansion will not be needed within the 20 year Class EA planning period. At this time, we wish to confirm that the Class EA is proceeding as a Schedule B undertaking. However, as per the Class EA process the schedule will be confirmed again at the end of Phase 2.

As per the MOECC's letter, all correspondence regarding the Class EA will be directed to Vicki Mitchell, the MOECC Regional EA Coordinator for the project, for circulation to the appropriate MOECC reviewers. Intermediate reports or Technical Memoranda, will be circulated to the MOECC in advance of preparing the Project File. In particular supporting technical information will be submitted at an early stage of the Class EA process.

MOECC Technical Review

From the MOECC's letter and discussions at the pre-consultation meeting on December 20, 2016 we understand that impacts to surface water due to increased volumes or concentrations of sewage effluent should be evaluated as soon as possible in the Municipal Class EA process. The rated capacity and effluent criteria of the plant are not anticipated to change as a result of the outcome of this Class EA. Therefore, at this time a site-specific receiving water assessment is not planned. The need for a receiving water assessment, however, will be confirmed again in subsequent stages of the Class EA process. We note that a conference call will be scheduled with Victor Castro, Surface Water technical Support (MOECC Kingston) to discuss the project further.

As noted previously, the buffer requirements in the Ministry's Guideline D-2 Compatibility between Sewage Treatment and Sensitive Land Use will be considered for all new facilities or enlargements of existing facilities considered in Phase 2 of the Class EA.

We acknowledge that as part of undertaking the Municipal Class EA, proponents must identify early in the process whether the project is occurring within a source water protection vulnerable area. This assessment will be undertaken and documented in the Project File report. Source Water Protection is not likely to apply for this project and further consultation regarding source water impacts with the Conservation Authority/Source Protection Authority is not anticipated.

Consultation with First Nation and Metis Communities

Aboriginal communities identified in the MOECC's letter dated November 30, 2016 will be consulted as outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". The Director of Environmental Approvals branch will be contacted under the circumstances notes subsequent to initial discussion with the communities identified by the MOECC.

If there are any questions regarding the above, please contact the undersigned.

J.L. RICHARDS & ASSOCIATES LIMITED



Steve Saxton, P.Eng.
Civil Engineer

SS:jw

CC: Viktoria Light MOECC Peterborough (SDWB)
Victor Castro, MOECC Kingston (SW Tech Support)
Adedoyin Adenowo, MOECC Toronto (Approvals Branch)
Bill Watson CAO, Municipality of Brighton
Jane Wilson, J.L. Richards & Associates

MEMORANDUM



**J.L. Richards
& Associates Limited**
203-863 Princess Street
Kingston, ON Canada
K7L 5N4
Tel: 613 544 1424
Fax: 613 544 5679

To: Vicki Mitchell, Environmental Assessment Coordinator
Ministry of the Environment and Climate Change
P.O. Box 22032
Kingston, Ontario

Date: January 30, 2017

Job No.: 27271

CC: Bill Watson, P.Eng., CAO - Town of Brighton

From: Steve Saxton, P.Eng.

RE: Brighton Wastewater Treatment System MCEA
Effluent Criteria Rational

In response to your letter dated November 30, 2016 and subsequent discussion in our pre-consultation meeting held December 20, 2016 this memorandum is being provided to detail the current effluent objectives and criteria for the Brighton Wastewater Treatment System and the rationale for maintaining these criteria in subsequent phases of the Class EA process. We are seeking concurrence from the MOECC on this rationale before getting to far into Phase 2 of the Class EA process.

Existing Environmental Compliance Approval Requirements (ECA No. 3081-9XQNZK)

The wastewater treatment system is rated for an Average Day Flow (ADF) of 4,600 m³/day. The objective and compliance requirements for the treatment system are outlined in Table 1 and Table 2 below. Effluent “objectives” are set for the wetland; however, the effluent compliance limits are imposed on the waste stabilization pond (Lagoon No. 2).

Table 1 Effluent Objectives - Constructed Wetland (ECA No. 3081-9XQNZK)

Parameter	Concentration in Effluent
CBOD5	15.0 mg/L
Total Suspended Solids	15.0 mg/L
Ammonia + Ammonium Nitrogen	10.0 mg/L * May 01 to October 30 15.0 mg/L ** November 01 to April 30
Total Phosphorus	0.8 mg/L
<i>E.coli</i>	200 organisms per 100 mL
pH	6.0 - 9.5

Table 2 Effluent Compliance Limits – Waste Stabilization Pond (ECA No. 3081-9XQNZK)

Parameter	Concentration in Effluent	Loading in Effluent	Non-compliance
CBOD5	30.0 mg/L	138.0 kg/day	<ul style="list-style-type: none"> Annual Average Concentration exceeds concentration Annual Average Loading exceeds concentration specified during any 12 consecutive calendar months
Total Suspended Solids	40.0 mg/L	184.0 kg/day	<ul style="list-style-type: none"> Annual Average Concentration exceeds concentration Annual Average Loading exceeds concentration specified during any 12 consecutive calendar months
Ammonia + Ammonium Nitrogen	14.0 mg/L * 17.0 mg/L **	64.4 kg/day * 78.2 kg/day **	<ul style="list-style-type: none"> Monthly Average Concentration exceeds concentration Monthly Average Loading exceeds concentration
Total Phosphorus	1.0 mg/L	4.6 kg/day	<ul style="list-style-type: none"> Monthly Average Loading exceeds concentration during any 12 consecutive calendar months

Notes	* from May 01 to October 30 ** from November 01 to April 30
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Proposed Rationale for Maintaining Current Criteria as part of this Class EA

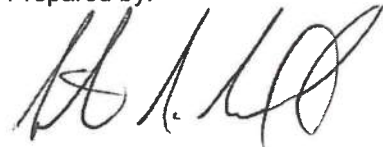
An evaluation of growth in the service area was undertaken as part of Phase 1 of this Class EA. A Technical Memorandum was developed (refer to Appendix C in the Phase 1 Report) which used an existing service population of 6,462 and growth projections for the Municipality to develop residential population projections for the 20- year design populations. Projected average daily per capita wastewater flows from growth are anticipated to be approximately 500 L/c/day, in keeping with current flows. Based on this information, the 20-year design average day flow is anticipated to be less than the current rated capacity and there will be no need for any increase to the ECA rated capacity.

From the MOECC's letter and discussions at the pre-consultation meeting on December 20, 2016, we understand that impacts to surface water due to increased volumes or concentrations of sewage effluent should be evaluated as soon as possible in the Municipal Class EA process. As noted previously, no changes to the treatment system's rated capacity are being proposed. The process modifications being investigated will be intended to improve effluent quality to ensure current ECA requirements are met (i.e. the intent of this Class EA is to solve a current treatment problem with the existing system and not expand the system).

In our meeting you indicated that the MOECC originally considered that the effluent quality requirements for the constructed wetland portion of the system were established in order to obtain performance data and that these were never intended to be compliance criterion. We understand that consideration may be given to removing these requirements.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Steve Saxton, P.Eng.
Senior Project Engineer

Reviewed by:



Brian Hein, P.Eng.
Chief Environmental Engineer

Jane Wilson

From: Steve Saxton
Sent: March 1, 2017 4:04 PM
To: Castro, Victor (MOECC)
Cc: Brian Hein; Jane Wilson
Subject: Brighton WWTP Effluent

Hi Victor,
Thanks for the chat today. It was good to continue our conversation from a few weeks ago and go through the items in a little more detail.

To summarize what we discussed, we will proceed with the understanding that the existing limits will remain in place for the current parameter list. The primary objective of the Class EA exercise will continue to be to recommend implementation of systems will improve effluent ammonia levels to meet the current limits. In addition, a secondary objective will be to recommend improvements to phosphorus treatment from the waste stabilization pond in order to consistently meet the imposed limits.

From the Ministry's perspective, there is a recognition that the overall current effluent criteria limits at the site are dated and not in line with current Provincial and Federal levels for secondary treatment, particularly for BOD and TSS. There is also recognition that the facility is not currently meeting these current levels for BOD and TSS on an monthly average basis. (However, the site does meet them on an annual average basis.) Should those criteria limits be imposed (on a monthly average basis), the municipality would be facing additional challenges on top of the persistent documented ammonia issues they currently have. This is something they are not anticipating.

With that being said, the Ministry would expect to see improvements in effluent quality of these parameters since it is anticipated that introduction of most add-on treatment options will produce spin-off improvements to the overall effluent quality. As such, the evaluation of alternatives within the Class EA should consider that certain options may provide additional treatment of parameters other than ammonia.

Improvements to effluent quality with respect to BOD and TSS will help the municipality when faced with the potential for meeting more stringent effluent criteria for these parameters at some point in the future. Overall, water quality in Presquile Bay is an important factor and overall improvement to effluent quality will help this.

With respect to the constructed wetland, the Ministry does not anticipate giving credit to the effluent quality improvements that the constructed wetland may provide. It is acknowledged that the wetland may offer varying levels of additional treatment for some parameters, but it is not something that the Ministry is looking to formally recognize at this time.

Please let me know if I have anything incorrect in my understanding above. You mentioned that you'd likely be able to provide a brief piece of correspondence through Vicki confirming the above items over the next couple of weeks.

Thanks again,
Steve

Steve Saxton, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
203 - 863 Princess Street, Kingston, ON K7L 5N4
Tel: 613-544-1424 Fax: 613-544-5679



**J.L. Richards
& Associates Limited**
ENGINEERS • ARCHITECTS • PLANNERS



Jane Wilson

From: Steve Saxton
Sent: March 28, 2017 9:41 AM
To: Castro, Victor (MOECC); Mitchell, Vicki (MOECC)
Cc: Brian Hein; Jane Wilson
Subject: RE: Brighton WWTP Effluent

Thanks Victor.

Steve Saxton, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
203 - 863 Princess Street, Kingston, ON K7L 5N4
Tel: 613-544-1424 Fax: 613-544-5679



**J.L. Richards
& Associates Limited**
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From: Castro, Victor (MOECC) [<mailto:Victor.Castro@ontario.ca>]
Sent: March 28, 2017 9:33 AM
To: Steve Saxton; Mitchell, Vicki (MOECC)
Subject: RE: Brighton WWTP Effluent

Hi Steve,

The letter you are looking for is on the short list. Your email of March 1, 2017 summarizes our discussion and reflects my position. I will provide you a more formal response shortly.

Victor

From: Steve Saxton [<mailto:ssaxton@jlrichards.ca>]
Sent: March 21, 2017 5:10 PM
To: Mitchell, Vicki (MOECC)
Cc: Castro, Victor (MOECC)
Subject: RE: Brighton WWTP Effluent

Hi Vicki,
Just shooting an email over to see about timing for the correspondence previously discussed with yourself and Victor.
Thanks,
Steve

Steve Saxton, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
203 - 863 Princess Street, Kingston, ON K7L 5N4

From: Steve Saxton
Sent: March 6, 2017 3:39 PM
To: 'Mitchell, Vicki (MOECC)'
Cc: Castro, Victor (MOECC)
Subject: FW: Brighton WWTP Effluent

Hi Vicki,
Apologies, I should have copied you on this email (below) back to Victor. I just realized now.
The Town is wondering if they can share the Phase 1 report with their council or other interested individuals. In addition to a confirmation letter coming from Victor, would you mind giving us a quick heads up whether there was anything in MOECC opinion to prevent that report from being shared at this time?
Thanks for the assistance.
Steve

From: Steve Saxton
Sent: March 1, 2017 4:04 PM
To: Castro, Victor (MOECC)
Cc: Brian Hein; Jane Wilson
Subject: Brighton WWTP Effluent

Hi Victor,
Thanks for the chat today. It was good to continue our conversation from a few weeks ago and go through the items in a little more detail.

To summarize what we discussed, we will proceed with the understanding that the existing limits will remain in place for the current parameter list. The primary objective of the Class EA exercise will continue to be to recommend implementation of systems will improve effluent ammonia levels to meet the current limits. In addition, a secondary objective will be to recommend improvements to phosphorus treatment from the waste stabilization pond in order to consistently meet the imposed limits.

From the Ministry's perspective, there is a recognition that the overall current effluent criteria limits at the site are dated and not in line with current Provincial and Federal levels for secondary treatment, particularly for BOD and TSS. There is also recognition that the facility is not currently meeting these current levels for BOD and TSS on an monthly average basis. (However, the site does meet them on an annual average basis.) Should those criteria limits be imposed (on a monthly average basis), the municipality would be facing additional challenges on top of the persistent documented ammonia issues they currently have. This is something they are not anticipating.

With that being said, the Ministry would expect to see improvements in effluent quality of these parameters since it is anticipated that introduction of most add-on treatment options will produce spin-off improvements to the overall effluent quality. As such, the evaluation of alternatives within the Class EA should consider that certain options may provide additional treatment of parameters other than ammonia.

Improvements to effluent quality with respect to BOD and TSS will help the municipality when faced with the potential for meeting more stringent effluent criteria for these parameters at some point in the future. Overall, water quality in Presquile Bay is an important factor and overall improvement to effluent quality will help this.

With respect to the constructed wetland, the Ministry does not anticipate giving credit to the effluent quality improvements that the constructed wetland may provide. It is acknowledged that the wetland may offer varying levels of additional treatment for some parameters, but it is not something that the Ministry is looking to formally recognize at this time.

Please let me know if I have anything incorrect in my understanding above. You mentioned that you'd likely be able to provide a brief piece of correspondence through Vicki confirming the above items over the next couple of weeks.

Thanks again,

Steve

MEMORANDUM

July 13, 2017

TO: V. Mitchell
Environmental Assessment Coordinator
Technical Support Section
Eastern Region

FROM: V. Castro
Surface Water Scientist
Technical Support Section
Eastern Region

RE: Municipality of Brighton
Brighton Wastewater Treatment System
Municipal Class Environmental Assessment
Phase 2 Report (Draft)

I have reviewed the report titled "*Municipality of Brighton, Brighton Wastewater Treatment System, Municipal Class Environmental Assessment, Phase 2 Report (Draft)*" dated April 10, 2017 prepared by J.L. Richards & Associates Limited and offer the following comments for your consideration.

The Municipality of Brighton sewage system consists of a 0.68 ha single cell aerated lagoon, a single cell 5.44 ha waste stabilization pond with baffle partition curtains, and a two cell constructed wetland with a total surface area of 6.2 ha. A chemical storage/feed system doses the influent continuously after the aeration lagoon and prior to the waste stabilization pond for phosphorus removal. The sewage works operates under Environmental Compliance Approval (ECA) No. 3081-9XQNZK issued July 7, 2015 and has a design rated capacity of 4,600 m³/day. Treated effluent is discharged continuously to the constructed wetland which in turn discharges to a natural wetland system located in Presqu'île Bay.

Presqu'île Bay is a small and relatively sheltered coastal embayment located west of the Bay of Quinte on the north shore of Lake Ontario. Located along the west and southern shoreline, Presqu'île Peninsula offers some protection from the open waters of Lake Ontario. This peninsula forms Presqu'île Provincial Park. The Town of Brighton lies along the north shore of Presqu'île Bay.

At its most northeastern point, Presqu'île Bay connects to the western portion of the Bay of Quinte through the Murray Canal. Presqu'île Bay connects to the open waters of Lake Ontario through a narrow channel at its most south eastern point. Several streams flow into Presqu'île Bay. The two main streams are Smithfield Creek and Butler Creek (also known as Proctor's Creek).

Within the immediate vicinity of Presqu'île Bay, land use consists of a mixture of rural, agricultural, and urban lands. The urban area is largely restricted to the north central portion of the bay, extending north to the town centre. The eastern extent of the bay is a mixture of shoreline residential properties, rural, and agricultural lands. The western and southern extent of

the bay is dominated by open parklands (Presqu'île Provincial Park) along with shoreline residential properties. The outlying areas surrounding Presqu'île Bay consist of a mixture of agricultural and rural lands.

Discharge from the Brighton sewage works makes up less than 1% of the water found in Presqu'île Bay, except for the northwest inlet where the sewage discharge enters the bay. In this inlet, sewage discharges account for approximately 5 to 10% of the volume. Presqu'île Bay also experiences large exchange flows with Lake Ontario and the Murray Canal leading to short resident times for water (Nettleton, 2015).

Daily sewage flows from 2011 to 2016 have averaged 71% of the approved design rated capacity (4,600 m³/day). Twenty year growth projections for the Town of Brighton suggest that the existing design rated capacity of the sewage works is sufficient to handle future flows.

Phase 1 of the Class EA identified that raw sewage is relatively high strength even with high per capita flow rates. Possible sources of high strength sewage and flows include industrial and other non-residential contributors. The main concern with the sewage system over the last several years has been related to effluent quality and non-compliance with ammonia-N limits and occasionally total phosphorus. This has been attributed to high organic loadings and physical limitations of the current treatment system.

Since the main objective of the Class EA is to provide a preferred solution to address deficiencies with nitrification, the consultant is proposing that the existing effluent compliance limits, objectives and loadings be maintained in the amended ECA. I am prepared to accept these effluent criteria since no physical expansion of the sewage works is proposed. As part of the Phase I review and presubmission consultation meetings, I have indicated to the consultant that the municipality should give consideration in their Class EA evaluation to selecting a technology that can provide incidental improvements in the overall effluent quality, as more stringent effluent criteria will likely be imposed in the future. This approach will provide the municipality with flexibility when they do propose further upgrades and expansion.

The preferred solution is to install a specialized treatment system to complement the existing sewage lagoon system in combination with optimizing/modifying current lagoon operations (ie. desludging program, upgrading baffles, optimize alum dosing, refurbish constructed wetland). In addition, the municipality will investigate and divert high strength waste streams entering the collection system. In terms of the specialized treatment system, the preferred option is a fixed film biological process located downstream of the stabilization pond (e.g. SBR, MBBR).

The proposed compliance limits, design objectives and loadings are as follows:

Parameter	Design Objective (mg/L)	Effluent Limit (mg/L)	Effluent Loading (kg/day)
CBOD ₅	15	30	138
Total Suspended Solids	15	40	184
Total Phosphorus	0.8	1.0	4.6
Total Ammonia-N - Summer (May 1 to Oct. 31)	10	14	64.4
- Winter (Nov. 1 to April 30)	15	17	78.2
<i>E. coli</i>	200 counts/100 ml	n/a	n/a

The limits and loadings noted in the above table for TAN and TP are based on monthly averages, with the exception of *E. coli* which should be calculated as a monthly geometric mean.

The limits and loadings noted in the above table for CBOD₅ and TSS are based on annual averages as per the current ECA.

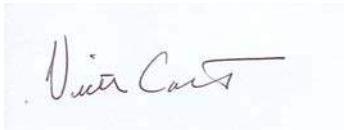
Historically, the compliance point for the Brighton sewage system has been imposed upstream of the constructed wetland. This compliance point should be maintained in the new design.

The existing ECA also has a set of effluent objectives for the constructed wetland; however, historical sampling has shown that the wetland portion of sewage system does not provide significant treatment for most of the parameters of concern. The continued use of the constructed wetland in its role as a natural polishing system is supported by this office; however, the design objectives in the ECA should be applied to the actual treatment system (discharge from fixed biological treatment process), and not on the discharge from the constructed wetland.

It would be prudent to maintain some form of monitoring program for the constructed wetland effluent but this is more for information purposes, data continuity and due diligence.

In summary, I am satisfied with the proposed effluent criteria for the upgrades to the Brighton sewage system.

If you have any questions regarding these comments please contact me at (613) 540-6862.



Victor Castro B.Sc. M.Pl.
VC/dv

ec: G. Faaren
V. Light
J. Fuller

c: File SW NO BR 03 07 (Town of Brighton Sewage System)

Jane Wilson

From: Steve Saxton
Sent: December 7, 2016 11:55 AM
To: Jane Wilson
Subject: FW: Study Commencement - Municipality of Brighton - Wastewater Treatment System

FYI.

Steve Saxton, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
203 - 863 Princess Street, Kingston, ON K7L 5N4
Tel: 613-544-1424 Fax: 613-544-5679



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From: Steve Saxton
Sent: December 7, 2016 11:55 AM
To: 'Tolles, Cheryl (MTO)'
Cc: Bill Watson (BWatson@brighton.ca); DeVos, Kevin (MTO)
Subject: RE: Study Commencement - Municipality of Brighton - Wastewater Treatment System

Hi Cheryl,
Thank you for the reply. We confirm MTO non-involvement as a stakeholder and appreciate the contact information you provided.
Regards,
Steve

From: Tolles, Cheryl (MTO) [<mailto:Cheryl.Tolles@ontario.ca>]
Sent: December 7, 2016 11:48 AM
To: Steve Saxton
Cc: Bill Watson (BWatson@brighton.ca); DeVos, Kevin (MTO)
Subject: Study Commencement - Municipality of Brighton - Wastewater Treatment System

Dec 7, 2016

Steve, I am in receipt of the notification of Study Commencement sent to Kevin DeVos at the MTO Downsview complex for the proposed wastewater treatment project in Brighton. The Municipality of Brighton falls under the jurisdiction of MTO Eastern Region and Kevin forwarded the correspondence directly to me for response.

Thank you for providing an opportunity to review and provide any comments. In this instance, the only provincial highway in the Municipality of Brighton is Highway 401 and this project is not within the MTO

Highway 401 permit control area. MTO does not require any further correspondence or notification on this project and no MTO approvals or permits are required.

For any further projects you may have in Eastern Ontario, please direct them to the Corridor Management Section at the MTO Kingston address noted below. MTO Eastern Region consists of everything east of the Durham/Northumberland boundary to the Quebec border and north into the County of Haliburton, including the Municipality of Highlands East in Haliburton, and north on Highway 17 to the Nipissing Boundary.

Again, thank for your informing MTO of your project.

Cheryl Tolles

Ministry of Transportation

Corridor Management Planner

Highway Corridor Management Section

1355 John Counter Blvd.

Kingston, ON K7L 5A3

Cheryl.Tolles@ontario.ca

613-545-4744

Toll Free: 1-800-267-0295



December 9, 2016

Response to EA Notice

Thank you for providing Infrastructure Ontario (IO) with a copy of your Environmental Assessment Notice. From the information you have provided, it is unclear if you are proposing to use lands under the control of the Ministry of Infrastructure (MOI lands) to support your proposed project.

Prior to MOI consenting to the use of MOI lands, the applicable environmental assessment, duty to consult Aboriginal peoples (if triggered) and heritage obligations will need to be met. In order for MOI to allow you access to MOI lands and to carry out proposed activities, MOI must ensure that provincial requirements and due diligence obligations are satisfied. These requirements are in addition to any such obligations you as the proponent of the project may have.

You as the proponent of the project will be required to work with Infrastructure Ontario (IO) to fulfill MOI's obligations which may include considering the use of any MOI lands as part of your individual environmental assessment. All costs associated with meeting MOI's obligations will be the responsibility of the proponent. Please note that time should be allocated in your project timelines for MOI to ensure that its obligations have been met and to secure any required internal government approvals required to allow for the use of the MOI lands for your proposed project.

In order for MOI and IO to assist you to meet your required project timelines, please recognize that early, direct contact with IO is imperative. The due diligence required prior to the use of MOI lands for your proposed project, may include but may not be limited to the following:

- Procedural aspects of the Provincial Crown's Aboriginal Duty to Consult obligations – see *Instruction Note 1*
- Requirements of the MOI Public Work Class Environmental Assessment – see *Instruction Note 2*
- Requirements of the Ministry of Tourism Culture and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists– see *Instruction Note 3*
- Requirements of the MTCS Standards and Guidelines for the Conservation of Provincial Heritage Properties Consultant Archaeologists – see *Instruction Note 4*

Representatives from IO are available to discuss your proposed project, the potential need for MOI lands and the corresponding provincial requirements and due diligence obligations.

Please review the attached instruction notes which provide greater detail on the due diligence obligations associated with the use of MOI lands for your proposed project. We are providing this information to allow you as the proponent to allocate adequate time and funding into your project schedule and budgets. If your project requires you to study MOI lands, then an agreement is required and all studies undertaken on MOI lands will be considered confidential until approval is received. IO will require electronic copies of all required studies on MOI lands that you undertake.

We strongly encourage you to work with IO as early as possible in your process to identify if any MOI lands would be required for your proposed project. Please note that on title MOI control may

be identified under the name of MOI or one of its predecessor ministries or agencies which may include but is not limited to variations of the following: Her Majesty the Queen/King, Hydro One, MBS, MEI, MEDEI, MGS, MOI, OLC, ORC, PIR or Ministry of Public Works¹.

Please provide Rita Kelly with a confirmation in writing of any MOI lands that you propose to use for your proposed project and why the lands are required along with a copy of a title search for the MOI lands.

For more information concerning the identification of MOI lands in your study area or the process for acquiring access to or an interest in MOI lands, please contact:

Rita Kelly
Project Manager
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON
M5G 2L5
Tel: (416) 212-4934
Email: rita.kelly@infrastructureontario.ca

An application package and requirements checklist is attached for your reference. Please note that transfer of an interest in MOI lands to a proponent can take up to one year and there is no certainty that approval will be obtained.

For more information concerning the MOI Public Work Class Environmental Assessment process and due diligence requirements, please contact:

Lisa Myslicki
Environmental Specialist
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON
M5G 2L5
Tel: (416) 557-3116
Email: lisa.myslicki@infrastructureontario.ca

¹ MBS - Management Board Secretariat; MEI - Ministry of Energy and Infrastructure; MEDEI – Ministry of Economic Development, Employment and Infrastructure; MGS - Ministry of Government Services; MOI - Ministry of Infrastructure; OLC - Ontario Lands Corporation; ORC - Ontario Realty Corporation; PIR - Ministry of Public Infrastructure Renewal

If MOI lands are not to be impacted by the proposed project, please provide a confirmation in writing to Infrastructure Ontario.

Thank you for the opportunity to provide initial comments on your proposed project.

Sincerely,

Patrick Grace
Director
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON, M5G 2L5

INSTRUCTION NOTE 1

Provincial Crown's Aboriginal Duty to Consult obligations

The Crown has a constitutional Duty to Consult (DTC) in certain circumstances and Aboriginal consultation may be required prior to MOI granting access to MOI lands or undertaking other activities. The requirement for Aboriginal consultation may be triggered given Aboriginal or treaty rights, established consultation or notification protocols, government policy and/or program decisions, archaeological potential or results, and/or cultural heritage consultation obligations. The requirement for Aboriginal consultation will be assessed by MOI.

Prior to the use of MOI lands, MOI must first meet any duty to consult obligations that may be triggered by the proposed use of MOI lands. It is incumbent on you to consult with IO as early in the process as possible once you have confirmed that MOI lands would be involved.

MOI will evaluate the potential impact of your proposed project on Aboriginal and treaty rights. MOI may assess that the Crown's Duty to Consult (DTC) requires consultation of Aboriginal communities. Proponents should discuss with IO whether MOI will require consultation to occur and if so, which communities should be consulted.

Where MOI determines that Aboriginal consultation is required, MOI will formally ask you to consult or continue to consult with Aboriginal peoples at the direction of MOI.

On behalf of MOI you will also be required to:

1. Maintain a record and document all notices and engagement activities, including telephone calls and/or meetings;
2. Provide the Ministry updates on these activities as requested; and
3. Notify the Ministry of any issues raised by Aboriginal communities.

If consultation has already occurred, IO strongly encourages you to provide complete Aboriginal consultation documentation to IO as soon as possible. This documentation should include all notices and engagement activities, including telephone calls and/or meetings.

Any duty to consult obligations must be met prior to publically releasing the Notice of Completion for the assessment undertaken under the MOI PW Class EA.

INSTRUCTION NOTE 2

Requirements of the MOI Public Work Class Environmental Assessment

MOI has an approved Class EA (the Ministry of Infrastructure Public Work Class Environmental Assessment (Public Work Class EA) to assesses undertakings that affect MOI lands including disposing of an interest in land or site development. Details on the Public Work Class EA can be found at:

<http://www.infrastructureontario.ca/Templates/Buildings.aspx?id=2147490336&langtype=1033>

You may be required to work with IO to complete an environmental assessment under the Public Work Class EA for the undertakings related to MOI lands. IO will work with you to ensure that all of the MOI undertakings or activities related to the use of MOI lands are identified, that the appropriate Category of undertaking is used and a monitoring and report back mechanism is established to ensure that MOI's obligations are met.

The completion of another environmental assessment process that assesses the undertakings related to MOI lands may satisfy MOI's obligations under the Public Work Class EA. You will be required to work with IO to determine the most appropriate approach to meeting the Public Work Class EA obligations for undertakings related to MOI lands on a case by case basis.

Where it is decided that the assessment of undertakings related to MOI lands can be assessed as part of the environmental assessment being undertaken by the proponent then it is likely that the following provisions will be required:

- that the environmental assessment documents set out that one process will be relied on by both the proponent and MOI to evaluate their respective undertakings and meet their respective obligations to assess the potential impacts of their undertakings;
- that the proponent's description of the undertaking to be assessed include all of the MOI undertakings related to the use or access to MOI lands (see Glossary of Terms);
- the associated EA Category from the Public Works Class EA be identified and met by the environmental assessment (see Figure 22. Category Listing Matrix and/or Tale 2.1 EA Category Identification Table);
- that the proponent's environmental assessment indicate that MOI would be relying on the proponent's assessment to satisfy MOI's obligations under the *Environment Assessment Act*;
- establish a monitoring and report back mechanism to ensure that any obligations of MOI resulting from the assessment will be met; and

An environmental assessment consultation plan be developed to ensure that all stakeholders required to be consulted regarding the undertakings on the MOI lands are consulted

Other Due Diligence Requirements

There may also be other additional due diligence requirements for the use of MOI lands in the proposed project. These may include:

- Phase One Environmental Site Assessment and follow up
- Stage 1 Archaeological Assessment and follow up

- Survey
- Title Search
- Species at Risk Survey(s)
- Appraisal

INSTRUCTION NOTE 3 – ARCHAEOLOGY - (see also *Instruction Note on Duty to Consult*)

Archaeological sites are recognized and protected under the *Ontario Heritage Act*. Carrying out archaeological fieldwork is a licensed, regulated activity under the 2011 Ministry of Culture Standards and Guidelines for Consulting Archaeologists. Please visit.....

Archaeological due diligence is required for any proposed project on MOI land that could cause significant below ground disturbance such as, new building construction, installation/modification of site services, and installation/maintenance of new pipelines or transmission lines.

You, as the proponent, must engage IO prior to undertaking any archaeological work on MOI lands.

IO has two in-house licensed archaeologists who should be consulted early in the preparatory stages of a proposed project when geographic and site locations are being considered so that the potential for archaeological resources including historic and Aboriginal material (ion Aboriginal villages and burials sites) can be assessed.

To support both the Public Work Class EA and MOI's duty to consult analysis, archaeological assessments are required to determine if there are any significant findings that may be of cultural value or interest to Aboriginal people (e.g., archaeological or burial sites).

Archaeological work can begin before the assessment under the Public Works Class EA begins but the Class EA cannot be completed until the duty to consult that may be triggered regarding archaeological resources are fulfilled.

Depending upon the number or significance of resources found, the duty to consult may be triggered during any of the 4 phases of archaeological work (see below) or anytime during project construction.

The discovery of Aboriginal resources can impact on activities, including project and site plans, timelines and all costs. As the proponent, you are expected to ensure that you project timelines include adequate time and resources to address MOI due diligence obligations, including internal government approvals. All costs associated with meeting MOI's archaeological obligations will be the responsibility of the proponent.

For Archaeological Assessments (Stages 1 through 4), proponents must adhere to the four stage archaeological fieldwork process prescribed by the Ontario Ministry of Tourism, Culture and Sport (MTCS) as per the 2011 Standards and Guidelines for Consultant Archeologists. Not all noted Stages will be necessary for all work. Respondents must follow industry procedures and practices as per the MTCS Standards and Guidelines for Consultant Archeologists 2011 for each Stage of archaeological assessment, all reporting criteria and formatting, and any other license requirements and/or obligations.

- Stage 1 Background Study - Evaluation of Archaeological Potential
 - Archival research and non-intrusive site visit
- Stage 2 Property Assessment

- In-field systematic pedestrian survey or test pitting and reporting
-
- Stage 3 Site-specific Assessment
 - Limited excavation to determine site significance and size
 - Field works and reporting
- Stage 4 Site mitigation
 - Through either avoidance/protection or excavation Field work 4 to 8 weeks
 - Develop summary report
 - MTCS review – expedited review of summary report 6 weeks
 - Final report
 - Time to develop and implement mitigation measures – negotiation, legal protections, avoidance

IO Contact Information and direction to IO website....

INSTRUCTION NOTE 4 – HERITAGE REQUIREMENTS

Built Heritage/Cultural Landscapes

Built heritage/cultural landscapes (cultural heritage) are recognized and protected under the Ontario Heritage Act, the regulations to that Act and the 2010 Ministry of Culture Standards and Guidelines for Conservation of Provincial Heritage Properties (S&Gs) Criteria for determining cultural heritage value or interest are set out in O. Reg. 9/06 and 10/06. The S&Gs set out a process for identifying properties of cultural heritage value, and the standards for protection, maintenance, use and disposal of these properties. Please visit.....

Cultural heritage due diligence will be required for any proposed project on MOI land with the potential to impact cultural heritage resources, such as new building construction, installation/modification of site services, landscape modifications and installation/maintenance of new pipelines, transmission lines.

To support MOI's heritage and MOI PW Class EA obligations, proponents will be required to undertake cultural heritage assessments for all projects that require MOI lands. This will help to determine if the MOI lands are of cultural value or interest to the Province and the level of heritage significance. Where a property has heritage value, proponents may be required to develop appropriate conservation measures/plans and heritage management plans.

You, as the proponent, are strongly encouraged engage IO heritage staff as early in your project planning process as possible and in advance of beginning any cultural heritage assessment work. IO staff will be able to provide advice on the S&Gs and will provide any available heritage information for the MOI lands.

Proponents must also follow industry procedures and practices for all components of cultural heritage assessment work, all reporting criteria and formatting, and any other requirements and/or obligations. IO heritage staff can help identify any required reports.

Should MOI lands be identified under the S&Gs as a Provincial Heritage Property (local significance) or a Provincial Heritage Property of Provincial Significance, IO must be engaged to determine next steps.

Please note that if a Provincial Heritage Property of Provincial Significance is to be impacted, it is likely that consent from the Minister, Ontario Minister, Tourism, Culture and Sport (MTCS) will be required prior to access being granted to MOI lands. Minister's consent requires a detailed application and approvals should land dispositions or building demolitions be applied for as part of the proposed project.

As the proponent, you are expected to ensure that your project timelines include adequate time and resources to address MOI's heritage due diligence obligations, including internal government approvals. All costs associated with meeting MOI's heritage obligations are the responsibility of the proponent.

Staff contacts.....

January 18, 2017
JLR File: 27271

VIA: Email

Lisa Myslicki, Environmental Specialist
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON M5G 2L5
Tel: (416) 557-3116
Email: lisa.myslicki@infrastructureontario.ca

Dear Ms. Myslicki:

Re: Brighton Wastewater Treatment System MCEA, Municipality of Brighton

Thank you for your interest in this project. In response to your letter dated December 9, 2016 we wish to confirm that no lands under the control of the Ministry of Infrastructure (MOI lands) are anticipated to be required or affected by the proposed project. If MOI lands are found to be impacted, IO will be contacted and the due diligence required prior to the use of MOI lands for the propose project, will be completed.

If there are any questions regarding the above, please contact the undersigned.

J.L. RICHARDS & ASSOCIATES LIMITED



Steve Saxton, P.Eng.
Civil Engineer

SS:jw

CC: Bill Watson, CAO, Municipality of Brighton
Jane Wilson, J.L. Richards & Associates

Jane Wilson

From: Steve Saxton
Sent: December 13, 2016 12:38 PM
To: Spang, Elizabeth (MNRF)
Cc: bwatson@brighton.ca; Jane Wilson
Subject: RE: Brighton Wastewater Treatment System Class EA; MNRF file 16-MURR-NOR-EAE-2352

Ms. Spang,

Thank you for providing feedback to the Notice as well as providing additional site specific information for our review and consideration. We also appreciate the offer to consult with you if we have any questions.

Kind regards,
Steve

From: Spang, Elizabeth (MNRF) [mailto:Elizabeth.Spang@ontario.ca]
Sent: December 13, 2016 11:47 AM
To: Steve Saxton
Cc: bwatson@brighton.ca
Subject: Brighton Wastewater Treatment System Class EA; MNRF file 16-MURR-NOR-EAE-2352

Dear Mr. Saxton:

MNRF Peterborough District has received your Commencement Notice for the Brighton Wastewater Treatment System Class Environmental Assessment. We can provide you with the information below to inform your project.

General: MNRF Data and Information

We would like to inform you that MNRF's natural heritage and natural resources data and information (including wetlands, ANSIs) for the study area can be obtained through the Land Information Ontario Warehouse (LIOW) through the Ministry's Land Information Ontario (LIO) website at: <https://www.ontario.ca/environment-and-energy/land-information-ontario>.

You may also view natural heritage information online (e.g. Provincially Significant Wetlands, ANSIs, Woodlands, NHIC 1 km screening squares) using Natural Heritage Make a Map at: <https://www.ontario.ca/environment-and-energy/make-natural-heritage-area-map>.

You can also obtain Species at Risk occurrence information on our Natural Heritage Information Centre website: <https://www.ontario.ca/environment-and-energy/get-natural-heritage-information>. In addition, the official Species at Risk in Ontario (SARO) List can be obtained at: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080230_e.htm

We recommend that you use the above-noted sources of information during the review of your project proposal.

Wetlands

The project area, including the southern portion of the sewage lagoons, is located within the Presqu'île Bay Marsh Provincially Significant Wetland (PSW). I have attached a summary report for the wetland evaluation. The Presqu'île Bay Marsh PSW is extremely unique and diverse and is considered a significant colonial waterbird nesting area, including colonial waterbirds that are listed as species at risk (see SAR section below). The wetland is also a provincially significant staging area as well as a regionally significant moulting area. The wetland is greater than 1000 hectares in size, making it one of the larger coastal wetlands.

MNRF recommends that further expansions of the existing infrastructure (if required) not be placed within the PSW and that alternatives for wastewater treatment options outside of the PSW be considered. Where possible, water quality and discharge to the PSW and associated watercourses should be improved. The EA should consider impacts and mitigation measures to protect the significant coastal wetland features and functions for each alternative.

Fisheries

The project area contains watercourses. The creek in the northern section that crosses both Lot 33 and 34 (north and east sides of the sewage lagoons) is a coldwater stream. Our office does not have data to indicate whether trout or salmon species are present. Fish species on file include: banded killifish, blackchin shiner, brook stickleback, creek chub, fathead minnow, northern redbelly dace, white sucker, yellow perch. If impacts to the cold water stream are possible, additional fisheries assessments are required to determine if the stream is being used for any trout or salmon species before a timing window can be determined. Our office can be contacted for further advice on in-water work timing windows once additional fisheries assessments are done. Please note that a Scientific Collector's Permit is required for fish sampling – see section below.

The stream located solely in within the lower half of Lot 34 (Proctor's Creek) is also a coldwater stream which supports both brook trout and rainbow trout and is fully within the PSW. Fish species on file include: brook trout, common shiner, creek chub, eastern blacknose dace, longnose dace, mottled sculpin, northern redbelly dace, rainbow trout, white sucker.

We also recommend contacting Lower Trent Conservation Authority for information on potential approvals for work within watercourses.

Significant Wildlife Habitat

Presqu'île Bay Marsh PSW is known to contain Black Tern nesting colonies, colonial waterbird nesting area, including colonial waterbirds that are listed as species at risk, and waterfowl staging areas.

The site may also contain other significant wildlife habitat which typically must be identified during site-specific investigations. Significant wildlife habitat may include features such as: seasonal concentration areas for wildlife species (e.g. snake hibernaculum), rare vegetation communities (e.g. tallgrass prairie), specialized habitats of wildlife (e.g. turtle nesting and over-wintering areas), habitats of species of conservation concern (e.g. Special Concern species as identified on the Species at Risk in Ontario list) and animal movement corridors (e.g. amphibian movement corridors). We recommend that you contact the local planning authority to determine whether any Significant Wildlife Habitat has been identified in this area. In addition, when no information is available, we refer you to the Significant Wildlife Habitat Technical Guide and the recently approved Ecoregion 6E Criterion Schedule for the identification of Significant Wildlife Habitat (January 2015). The Ecoregion Criterion Schedules and newly approved Significant Wildlife Habitat Mitigation Support Tool (MiST) can be downloaded here: <https://www.ontario.ca/search/natural-heritage-planning-resources-municipal-planning>. MNRF considers these documents to be the best available information to identify significant wildlife habitat.

Species at Risk/ Endangered Species Act

A review of our best available information indicates that there are observations and/or occurrences of American Eel (Endangered), Bank Swallow (Threatened), Barn Swallow (Threatened), Butternut (Endangered), Eastern Pondmussel (Endangered), King Rail (Endangered), Least Bittern (Threatened), Northern Map Turtle (Special Concern), Snapping Turtle (Special Concern), Wood Thrush (Special Concern), and Pale-bellied Frost Lichen (Endangered-historical) in the immediate area of the site. Also, there are observations and/or occurrences of American Ginseng (Endangered), Bald Eagle (Special Concern), Black Tern (Special Concern), Blanding's Turtle (Threatened), Bobolink (Threatened), Eastern Meadowlark (Threatened), Eastern Musk Turtle (Special Concern), Eastern Wood-Pewee (Special Concern), Loggerhead Shrike (Endangered), Monarch Butterfly (Special Concern), Piping Plover (Endangered), Red Knot rufa subspecies (Endangered), Yellow Rail (Special Concern) in the general area (5 km) of the proposed activities. Although no other

threatened or endangered species or their habitat have been documented in the area of the proposed project, these features may be present and this list should not be considered complete.

Species listed as endangered or threatened on the Species at Risk in Ontario (SARO) list are protected under the Endangered Species Act, 2007 (ESA). Section 9(1) of the ESA prohibits a person from killing, harming, harassing, capturing or taking a member of a species listed as endangered, threatened or extirpated on the SARO list. Section 10(1) of the ESA prohibits the damage or destruction of habitat of a species listed as endangered or threatened on the SARO list.

Since comprehensive mapping for most Species at Risk is not available, a site assessment is recommended to identify the presence of any Species at Risk and/or their habitat on the subject lands, as a decision should not be made in the absence of such information. The focus of the site assessment can include a review of the information about observations and/or occurrences provided by MNR above along with other information sources such as species distributions and habitat requirements as well as field visits using MNR approved protocols during the appropriate seasons by a qualified professional. **Suggested studies/surveys include, but are not limited to, Breeding Bird survey, Marsh Bird Survey, Whip-Poor-Will survey (protocol attached), Turtle Basking Survey, and Amphibian survey. Further surveys may be warranted dependent on habitat types observed during ELC mapping/vegetation surveys.** Due to the species that are potentially present at this site, the following recommendations should help prevent adverse impacts:

Birds

Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs and/or young. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 1 (or as soon as it has been determined that the young have left the nest). Please note that the breeding bird season in the subject area extends from April 15 to July 31.

Specific Barn Swallow Information: Barn Swallow nests may be present under bridges and/or culverts. Therefore, the underside of these structures should be assessed for Barn Swallow nests before proceeding. If no nests are present, a contravention of the ESA is unlikely. However, if nests are present, construction should not begin until after August 15 of any year. If nests will be impacted during the nesting season or if the structure will no longer be suitable for nesting post-construction, ESA requirements will apply to the activity. A regulatory provision is available that allows eligible activities that impact to Barn Swallow to register and follow all the rules in regulation in place of applying for a permit under the ESA. See this website for more information on regulatory requirements for Barn Swallow:

<https://www.ontario.ca/page/alter-structure-habitat-barn-swallow>.

Turtles and Snakes

Workers must be vigilant and check work areas for the presence of turtles. If turtles or snakes are encountered, whenever possible, work should be temporarily suspended until the animal is out of harm's way. Workers should report any turtle observations (including photographs and coordinates) to the Peterborough District Office immediately at (705) 755-2001. Please note that the turtle nesting season in the subject area extends from May 15 to Aug 15. Therefore, activities which may cause adverse impacts to a species or habitat (e.g. use of heavy equipment) should commence after Aug 15.

Butternut:

If a Butternut tree(s) is identified and is to be removed, trimmed or is in close proximity to the application of herbicides, a Butternut Health Assessment should be conducted by an individual trained and certified by MNR as a Butternut Health Assessor (BHA) under the Butternut Health Assessment in Ontario protocol. All Butternut Health Assessments must be submitted to the MNR District office for a 30 day review period before proceeding. Depending on the results of the assessment, you may have different options for how to proceed. Please see the following online factsheet (<http://www.ontario.ca/environment-and-energy/butternut-trees-your-property>) for more information. Please note that the ideal time of year to properly identify Butternut (and to distinguish between Butternut and Butternut Hybrids) is between the leaf on and leaf off period (approximately June to August). Workers should report any Butternut observations (including photographs and coordinates) to the Peterborough District office immediately upon discovery.

For those Butternut that are not proposed for removal, a minimum protective buffer of a 25 metre radius from the stem of each Butternut is required to prevent root disturbance. A larger area up to 50 m may also be considered protected habitat for the tree. In this buffer area, activities that would remove or significantly compact the roots and soil, and cause direct harm to the Butternut are not permitted. Activities that would damage or destroy habitat e.g. by impacting the tree's ability to disperse seeds are also not permitted. Removal of other vegetation and careful logging practices within this radius are permitted.

As of July 1, 2013, there are new regulatory provisions provided under the ESA. This regulatory provision allows eligible activities, such as work undertaken to repair, modify, demolish, replace or general maintenance of a structure or the removal of buildings and/or excavation of land, vegetation removal, etc. that is considered to be species at risk habitat to proceed without a permit, provided the proponent register with the Ministry of Natural Resources and Forestry and then follow the specific rules in regulation under the ESA. These rules include, but are not limited to, preparing a mitigation plan and implementing steps to minimize the adverse effects of the activity on the species identified. Information on the new ESA regulatory provision that come into effect on July 1, 2013 can be found at <http://www.ontario.ca/environment-and-energy/natural-resources-approvals>.

The amended ESA regulation (O.Reg 242/08) can be found at http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm.

If an impact to a Species at Risk or its habitat cannot be avoided, a person(s) should contact MNRF to discuss options, including applying for an authorization under the ESA. In situations where an activity is not registered with or authorized by the MNRF, a person(s) must comply with the ESA by modifying proposed activities to avoid impacts to Species at Risk and habitat protected under the ESA.

It is highly recommended that landowners and on-site workers familiarize themselves with information found at the following links:

MNRF Species at Risk website: www.ontario.ca/speciesatrisk

During on-site activities, should any species at risk or their habitat be potentially impacted, MNRF should be contacted immediately and operations should be modified to avoid any negative impacts to species at risk or their habitat until further discussions with MNRF can occur regarding opportunities for mitigation. If any species at risk are found, the Peterborough District MNRF office should be contacted at 705-755-2001. If possible, pictures of the species at risk and coordinates for the location where it was observed should be provided to MNRF.

Public Lands Act

Except for federal canals and harbours, the beds of most lakes and streams are public land in Ontario. Please note that you may require a Work Permit under the Public Lands Act if you are proposing any work in water or near shore areas below the spring high water mark. If you have any questions about the Public Lands Act, please contact the Lands and Waters Technical Specialist at 705-755-3134.

Lakes and Rivers Improvement Act

Approval may be required under the Lakes and Rivers Improvement Act (LRIA) if you are planning to construct, alter, repair or decommission a dam. If you have any questions regarding the LRIA, please contact the Lands and Waters Technical Specialist at 705-755-3134.

Fish and Wildlife Conservation Act

Please note that you may require a Scientific Collector's Permit from our office if you will be doing any fish or wildlife sampling, collection, salvage, or relocation within Peterborough District. For more information about Scientific Collector's Permits, please contact Julie Formsma, Fish and Wildlife Technical Specialist at 705-755-3296.

Other Approvals

It is the responsibility of the proponent to acquire all other information and necessary approvals from any other municipal, provincial or federal authority under other legislation. We recommend that you contact your local

Conservation Authority, Department of Fisheries and Oceans, Parks Canada, Ministry of the Environment and Climate Change, Ministry of Tourism, Culture and Sport, etc.

Don't hesitate to contact me if you have any questions. Please reference the file number in the subject line for any future correspondence.

Best regards,

Liz Spang, M.Pl

District Planner
Peterborough District
Ontario Ministry of Natural Resources and Forestry
300 Water Street, 1st Floor South
Peterborough, ON K9J 8M5
Tel: (705) 755-3360
Fax: (705) 755-3125
Email: Elizabeth.Spang@ontario.ca

Help stop the invasion! Do you know *your* action plan? Ontario.ca/invasionON

Peterborough District MNR

Wetland Summary Report

Report Generated:
December-13-16



Wetland Name: **Presqu'ile Bay Marsh**
 Wetland Code: PB-NOR-LT-039 Significance: PSW
 LIO (OGF) ID: 1251551360 Historical Record? (No longer in LIO).

OWES Edition: Third Edition Scoring System: Southern
 Upper Tier Municipalities: County of Northumberland

Last Field Evaluation 2006-Mar
 Last Desktop Update:

Lower Tier Municipalities: Municipality of Brighton

EcoDistrict: Multi
 Wetland Size (ha): 1114.5
 Catchment Area (ha):

Conservation Authority: Lower Trent Conservation

MNR Area Team: Peterborough

Evaluation Notes:

A Provincially significant, Coastal wetland, composed of three wetland types (3% fen, 20% swamp and 80% marsh) (Snider, 2006);

Biological Component:	191
Social Component	221
Hydrological Component:	30
Special Features Component:	250
Total Score:	692
Significance:	PSW

Evaluation Authors: B. Snider

Snider's Ecological Services

Dominant Vegetation Forms (%)		
h	11	ts 3
c		ls re 20
dh		gc ff
dc		m f 2
ds		ne 7 su 55
unvegetated		

Soils (%)	
clay/loam	
silt/marl	
limestone	
sand	90
humic/mesic	10
fibric	
granite	

Site Type (%)	
Isolated	3
Palustrine	10
Riverine	
Riverine (at rivermouth)	
Lacustrine (at rivermouth)	
Lacustrine (enclosed bay)	4
Lacustrine (exposed to lake)	83

Vegetation Communities:

Snider, 2006:

One Form

W2: su coontail, Eurasian milfoil, wild celery, northern water milfoil, large leaf pondweeds, narrow-leaved potamogeton, chara;

M3: re common cattail;

S14: ts slender willow, balsam poplar, speckled alder, white birch, silver maple;

Two Forms

W4: su Canada waterweed, Richardson's pondweed, northern water milfoil; f European frogbit, fragrant white water lily;

F1: ne twigrush; gc marsh fern, silverweed, false dragonhead, royal fern;

M1: ne wild rice; f fragrant white water lily;

M2: re common cattail; gc jewelweed;

M6: re common cattail; ff lesser duckweed;

M9: ne reed canary grass; gc white boneset, purple loosestrife;

M10: ne softstem bulrush; su chara

M12: re common cattail, ne softstem bulrush;

S5: h silver maple, red ash, white birch; ts Salix sp, silver maple;

S7: h red ash; ne grasses

Three Forms

W3: f fragrant white water lily, European frogbit; ff Wolfia; su wild celery, coontail, bracted water milfoil, Potamogeton sp.;

W5: ne wild rice; f fragrant white water lily; su wild celery, coontail;

M4: re common cattail; f European frogbit; gc small bedstraw;

M7: re common cattail; gc purple loosestrife, small bedstraw, jewelweed, water horsetail; ne Canada bluejoint;

M8: ne Canada bluejoint twigrush, canary reed grass, sedge; m mosses; gc purple loosestrife, sensitive fern;

M11: re common cattail; m mosses; gc small bedstraw, bulb-bearing water hemlock;

S3: h red ash, white birch, silver maple; gc sensitive fern; ls reed oiser dogwood;

S6: ts slender willow, red oiser dogwood; ne Canada bluejoint; ls narrow-leaved meadowsweet;

S9: h balsam poplar, white birch, red ash, black cherry; ts reed oiser dogwood, common buckthorn, black cherry, annyberry; gc sensitive fern, jewelweed;

Wetland Name: Presqu'ile Bay Marsh

Significance: PSW

Wetland ID: PB-NOR-LT-039

LIO ID 1251551360

S12: c white cedar; h crack willow, Manitoba maple; gc ostrich fern, jewelweed;

S16: ls slender willow; gc horsetail; ne canary reedgrass, twigrush;

S21: ts speckled alder, red oiser dogwood, narrow-leaved meadowsweet; ne sedges, grasses;

Four Forms

W1: f fragrant white water lily, European frogbit; su water milfoil, Canada waterweed, Potamogeton sp.; ne wild rice; re common cattail;

S1: h red ash, white birch, white elm; ts speckled alder; narrow-leaved meadowsweet; gc purple loosestrife, sensitive fern;

S8: h red ash, white birch; ts speckled alder, Canada elderberry, winterberry, narrow-leaved meadowsweet; gc sensitive fern; ne Canada bluejoint;

S10: h crack willow; ts Manitoba maple, common buckthorn, choke cherry; gc jewelweed, wild cucumber; m mosses;

S15: ts red oiser dogwood; gc sensitive fern; ne grasses, sedges; m mosses;

S17: ts slender willow; ne reed canary grass; h eastern cottonwood; gc horsetail;

S19: ff greater duckweed, wolfia; ls water willow; re common cattail; ne Canada bluejoint;

S20: h silver maple, black ash, white birch, balsam poplar; ts speckled alder; gc sensitive fern, jewelweed; ne grasses, lakebank sedge;

Five Forms

S2: ts red maple, white birch, white elm; ls narrow leaved meadowsweet; gc purple loosestrife, white boneset; ne rice cut grass, woolgrass, sedges; dh white elm;

S11: ts slender willow; re common cattail; gc purple loosestrife, nodding beggar's tick, small bedstraw, bulb bearing water hemlock; ne Canada bluejoint, Carex sp; m mosses;

S13: c white cedar; dh white elm; gc ostrich fern, bulbet fern; h red ash, Manitoba maple, crack willow; ts Manitoba maple, apple, nannyberry;

S18: h red ash; ts red ash, black cherry; gc sensitive fern, marsh fern, false nettle, horsetail, nodding beggar's tick; ne ; m mosses

Six Forms

S4: h red ash, silver maple; ts speckled alder, Canada elderberry; ls narrow-leaved meadowsweet; jc jewelweed, sensitive fern; ne grasses; m mosses;

Social Component SummaryWild Rice Present? Source:Comm. Fish Present? Source: 2006**Furbearers**

muskrat, beaver, raccoon, mink, fox;

Recreational Activity Intensity

Hunting

Nature Enjoyment
/ Ecosystem Study

Fishing

Proximity to Settlement

to

Threats to Communities:

Moderate disturbance; localized water pollution (Snider, 2006);

Biodiversity Summary:**Breeding Habitat for Endangered
or Threatened Species:**

Snider, 2006: King Rail, Least Bittern;

Prov. Sig. Animals:Snider, 2006: Black-crowned night heron, Monarch
butterfly, Caspian tern, Black tern, Great black-
bearded gull;**Prov. Sig. Plants:****Regionally Sig. Species:**

Snider, 2006: Great lobellia;

Locally Significant Species:

Special Features**Colonial Waterbird Notes:****Winter Cover for Wildlife****Details:**

Waterfowl Staging

Waterfowl Moulting

Waterfowl Breeding

Migratory Stopover

Fish Habitat

Details:**Land Uses:** Recreational Activities (Snider, 2006):
Hunting- high, Nature Appreciation or Study- high, Fishing- moderate;**Ecological Values:**Nesting of Colonial Waterbirds- black terns, black-crowned night
herons, caspian terns (Snider, 2006);
Winter cover for Wildlife- significant in site district (Snider, 2006);
Waterfowl Staging and/or Moulting- staging provincially significant,
moulting regionally significant (Snider, 2006);
Waterfowl Breeding- habitat suitable (Snider, 2006);
Migratory Passerine, Shorebird or Raptor Stopover Area- significant
in site region (Snider, 2006);
Fish Habitat is present within the wetland (Snider, 2006);
Extra Information- purple loosestrife present (Snider, 2006);
Species of Special Significance- feeding area for osprey (Snider,
2006);**Other Values:****Ownership Information:**22% of wetland in public or private ownership, held under contract or in trust for wetland protection;
56% of wetland area in public ownership, not as above;
22% of wetland area in private ownership, not as above (Snider, 2006);

Wetland Name: Presqu'ile Bay Marsh**Significance:** PSW**Wetland ID:** PB-NOR-LT-039**LIO ID** 1251551360

Offsite Information:

Diversity of Surrounding Habitat (Snider, 2006):

row crops, pasture, abandoned agricultural land, deciduous forest, mixed forest (at least 25% conifer and 75% deciduous or vice versa), open lake or deep river, fence rows with cover or shelterbelts;

Hydrologically connected by surface water to other wetlands or open water within 1.5 km (Snider, 2006);

January 18, 2017
JLR File: 27271

VIA: Email

Elizabeth Spang, District Planner, Peterborough District
Ontario Ministry of Natural Resources and Forestry
300 Water Street, 1st Floor South
Peterborough, ON K9J 8M5
Tel: (705) 755-3360
Email: Elizabeth.Spang@ontario.ca

Dear Ms. Spang:

**Re: MNRF file 16-MURR-NOR-EAE-2353
Brighton Wastewater Treatment System MCEA, Municipality of Brighton**

Thank you for your interest in this project. In response to your email dated December 16, 2016 we offer the following clarifications and study updates.

General: MNRF Data and Information

The information sources indicated in your email have been obtained and will be used during the review of alternatives generated as part of this Class EA process.

Wetlands

The lagoon is located on Lot 33 and 34, Concession B, in the Municipality. The existing lagoon cells and engineered wetland utilize a good portion of the available property. However, due to the amount of underutilized property and opportunities to re-purpose existing treatment and storage areas, additional property is not anticipated for the preferred solution. In keeping with the MNRF recommendation, if further expansions of the existing infrastructure are required they would be placed outside of the Provincially Significant Wetland (PSW).

We note that, where possible, the MNRF requests that water quality and discharge to the PSW and associated watercourses should be improved. The overall intent of the project is to address a current effluent quality problem and no changes are proposed to current ECA treated effluent requirements. The intent of the project is to identify a preferred alternative that will allow the system to meet "current" requirements and improve current effluent quality. As the requirements in the existing ECA are not changing we do not anticipate any further consultation with the MNRF will be required on this matter. However, this will be re-assessed in Phase 2 of the Class EA.

Fisheries/Significant Wildlife Habitat/Species at Risk

As noted above, additional property is not anticipated for the preferred solution. At this time no further Fisheries/Habitat/Species at Risk studies/ assessment are anticipated as part of this Class EA.

Public Lands Act/ Lakes and Rivers Improvement Act/ Fish and Wildlife Conservation Act/Other Approvals

If any proposed work is impacted by the Act's listed above or other approvals are required, the authority having jurisdiction will be notified.

If there are any questions regarding the above, please contact the undersigned.

J.L. RICHARDS & ASSOCIATES LIMITED

A handwritten signature in blue ink, appearing to read 'S. Saxton', is written over a faint, larger blue signature.

Steve Saxton, P.Eng.
Civil Engineer

SS:jw

CC: Bill Watson, CAO, Municipality of Brighton
Jane Wilson, J.L. Richards & Associates

Appendix D

Aboriginal Communities Mailing List
and Correspondence

Russell Ott
Consultation Intake Clerk
Metis Nation of Ontario
75 Sherbourne Street, Suite 311
Toronto, ON M5A 2P9
russello@metisnation.org

Mr. James R. Marsden, Chief
Mississaugas of Alderville First Nation
P.O. Box 4
Roseneath, ON K0K 2X0
jbmarsden@alderville.ca

Mr. R. Donald Maracle, Chief
Mohawks of the Bay of Quinte
24 Meadow Drive
Tyendinaga Mohawk Territory, ON K0K 1X0
rdonm@mbq-tmt.org

Hiawatha First Nation
Chief Laurie Carr
123 Paudash Street
Hiawatha, Ontario
K9J 0E6
chiefcarr@hiawathafn.ca

Chief Phyllis Williams
Government Services Building
Curve Lake First Nation
22 Winookeedaa Road
Curve Lake, Ontario K0L1R0

Chief Kelly LaRocca
Mississaugas of Scugog Island First Nation
Administration Building
22521 Island Road
Port Perry, ON
L9L 1B6



Municipality of Brighton
Schedule 'B' Municipal Class Environmental Assessment
Brighton Wastewater Treatment System

COMMENT FORM

Name (please print):

DAVE MOWAT

Date:

May 2/17

I represent a(n):
(please select the most applicable)

Resident

Agency

Public Interest Group

Other Stakeholder

(please specify)

Do you wish to receive updates in regards to this project?

YES

NO

(please specify)

Contact Name

DAVE MOWAT

Agency (if applicable)

MISSISSAUGAS OF SCUGOG ISLAND

Address (number, street, and apt. no.)

22521 Island Rd

(City, Province, Postal Code)

Port Perry ON

Phone

905-985-3337

E-mail

dmowate@scugogfirstnation.com

Please indicate any issue(s) that need to be explored/investigated as part of this Class EA:

Please provide any additional comments about this Class EA:

We always maintain a concern for the fishery and wetland relevant species. We don't have in-house capacity to fully analyse any engineering/scientific data but the end result of this type of usage for us is contained expectation that the environment and fishery etc be made safe.



TO FIND OUT
MORE VISIT
www.brighton.ca

Steve Saxton, P.Eng.
Civil Engineer
J.L. Richards & Associates Limited
203-863 Princess Street
Kingston, ON K7L 5N4
Email: ssaxton@jrichards.ca
Phone: 613-544-1424

Bill Watson, P.Eng.
Chief Administrative Officer
Municipality of Brighton
35 Alice Street, P.O. Box 189
Brighton, ON K0K 1H0
Email: bwatson@brighton.ca
Phone: 613-475-0670



Click here to submit form by E-mail

Note: Comments and information regarding this Study are being collected to assist the Ministry in meeting the requirements of the EA Act. This material will be maintained on file for use during the Study and may be included in project documentation. With the exception of personal information, all comments will become part of the public record

Appendix E

Public Information Centre Materials

Notice of Public Open House



Municipality of Brighton Brighton Wastewater Treatment System Schedule B Class Environmental Assessment

The Municipality of Brighton has initiated a Class Environmental Assessment (Class EA) to determine the most suitable process for wastewater treatment in Brighton over the next 20 years.

How Will This Affect Me?

The Class EA study is evaluating various alternatives in order to address historical problems experienced with wastewater treatment (predominantly elevated ammonia concentrations) and also to ensure that increased flows from future growth can be effectively accommodated.

We Want To Hear From You!

Public consultation is a key component to this Study. The proposed consultation plan provides for a single Public Open House to review the future wastewater treatment alternative that are being considered as part of this project. This Public Information Centre will identify existing system constraints and potential alternative solutions.

The 'preferred alternative' currently being considered envisions installing a specialized treatment system to complement the existing lagoon system and optimizing current lagoon operations.

The Open House (or Public Information Centre) is scheduled as follows:

Date: Monday, May 29, 2017
Time: Open House from 6:00 – 8:00 p.m.
Location: Brighton Community Centre (King Edward Park Arena)
Address: 75 Elizabeth Street, Brighton, ON

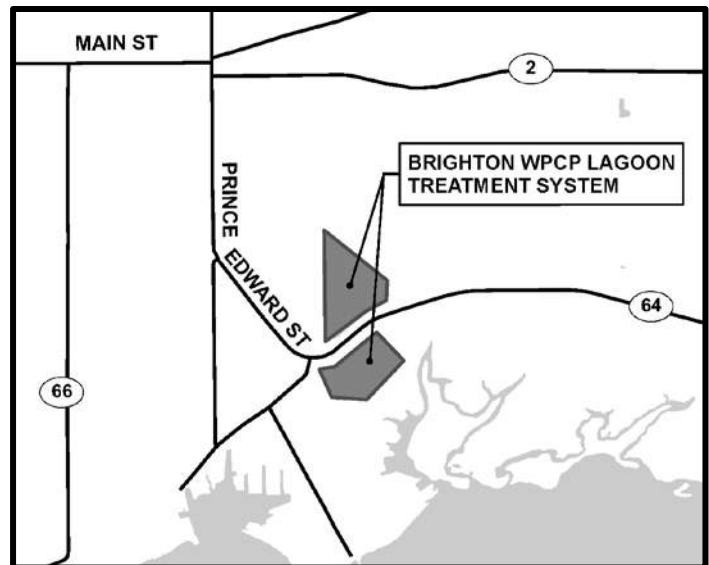
All those interested in the project are urged to attend. Project information will also be available to the public at the municipal office and on the Municipality's website, <http://www.brighton.ca/>. If you have any questions regarding the study please contact one of the people listed below. We welcome your feedback.



**TO FIND OUT
MORE VISIT
www.brighton.ca**

Steve Saxton, P.Eng.
Civil Engineer
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203 – 863 Princess Street
Kingston, ON K7L 5N4
ssaxton@jlrichards.ca
Phone: 613-544-1424

Bill Watson, P.Eng.
Chief Administrative Officer
Municipality of Brighton
35 Alice Street, PO Box 189
Brighton, ON K0K 1H0
bwatson@brighton.ca
Phone: 613-475-0670



This study is being conducted according to the requirements of a Schedule B project under the Municipal Class Environmental Assessment process (October 2000, as amended in 2015).

This Notice issued May 8, 2017

PUBLIC INFORMATION CENTRE

May 29, 2017

MUNICIPALITY OF BRIGHTON

**Brighton Wastewater Treatment System
Schedule 'B' Municipal Class
Environmental Assessment**

Welcome! Please Sign In.



PROJECT LOCATION AND OVERVIEW

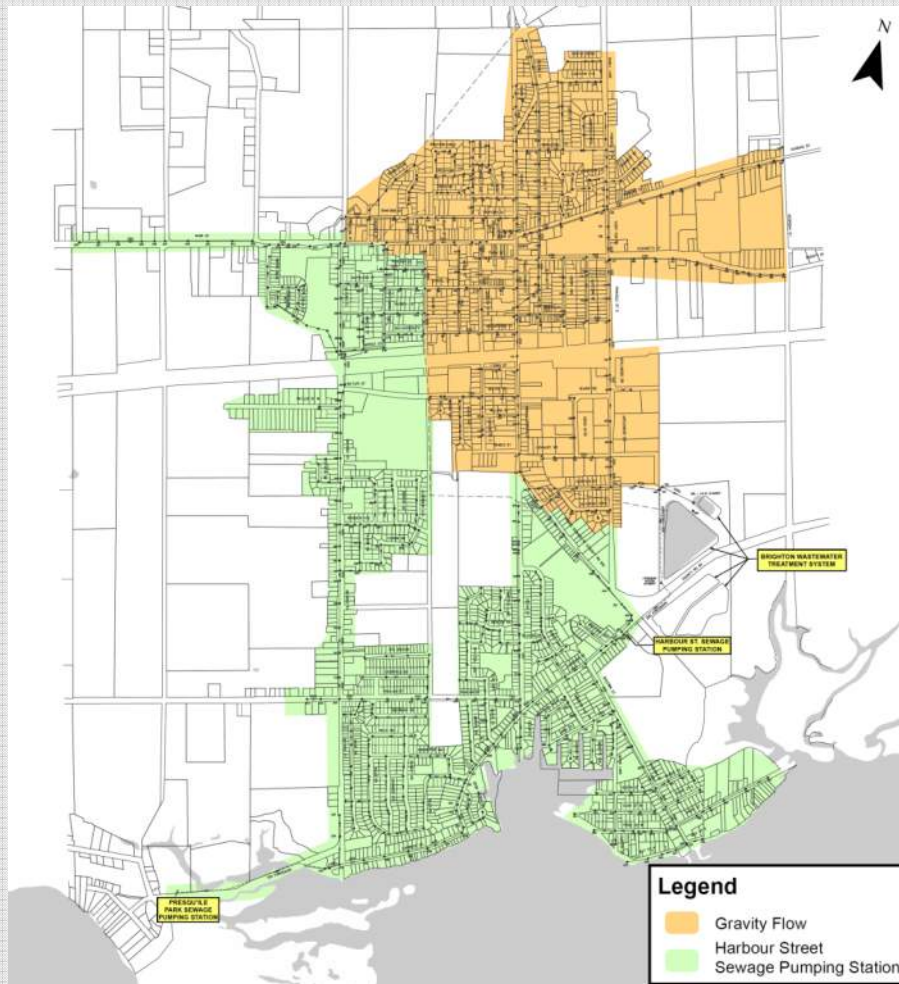


Figure 1 – Brighton Wastewater Collection System

- Several kilometres of gravity collection sewers
- Pumping Stations:
 - One main pumping station on Harbour Street
 - One small pumping station at Presqu'île Park
- Approximately half of the sewage generated is directed to the Harbour Street Sewage Pumping Station and pumped via forcemain to the lagoon and the other half flows by gravity directly to the lagoon

BRIGHTON LAGOON TREATMENT SYSTEM



Figure 2 – Brighton Lagoon Treatment System Site Plan

- A wastewater treatment system consisting of:
 - A pre-aeration lagoon cell (0.68 ha)
 - A single facultative stabilization lagoon cell (5.44 ha)
 - A constructed wetland (6.2 ha)
 - A chemical storage/feed system

- Brighton Lagoon Treatment System is:
 - A continuously operated system that discharges year-round
 - Currently rated for 4,600 m³/d average day flow
 - A Class 1 treatment facility operating under the MOECC ECA No. 3081-9XQNZK
 - Historically operating at about 60 - 70% of its rated average day flow capacity

PURPOSE OF THIS STUDY

- To evaluate the Brighton Wastewater System and to identify what is required for it to perform effectively and in accordance with regulations over a 20 year planning period.

SUMMARY OF PROBLEM / OPPORTUNITY STATEMENT

- Difficulties have been experienced in meeting effluent quality compliance criterion and objectives, particularly for ammonia and phosphorus
- The existing wastewater treatment system “struggles” with performance sometimes as a result of:
 - Relatively high organic loading (e.g. Ammonia)
 - Potential hydraulic short circuiting in the lagoon
 - Limited retention time in the lagoon
 - Sludge accumulation
 - Lack of a dedicated nitrification process for ammonia removal
- The Constructed Wetland is not providing significant additional treatment
- Aging infrastructure at the Harbour Street Sewage Pumping Station and the lagoon requires upgrades to maintain the appropriate level of service.
- It has been determined that the current Environmental Compliance Approval (ECA) rated hydraulic capacity does not need to increase for the next 20-year planning horizon.



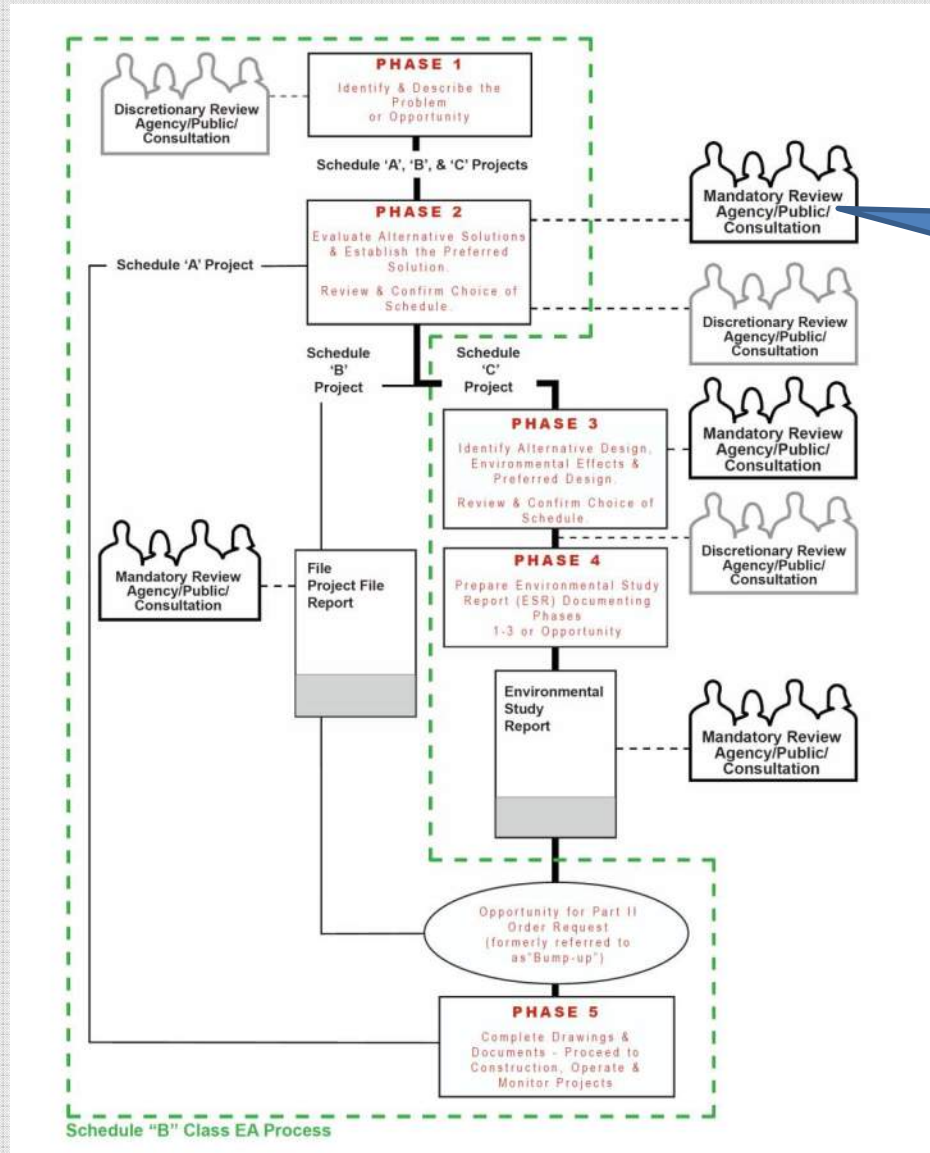
PHASE 1 PROBLEM AND OPPORTUNITY STATEMENT

“The Brighton communal sewage system generally consists of several kilometers of gravity collection sewers, a main pumping station, a smaller sub-area pumping station and a continuously discharged lagoon based treatment system that includes an aeration cell, a waste stabilization pond, a constructed wetland and a continuous chemical feed system for phosphorus removal. The treatment system is currently licensed under Environmental Compliance Approval (ECA) No. 3081-9XQNZK which stipulates certain operational and performance requirements. The system currently services an estimated population of 6,462 and some population growth is projected to occur within the 20-year planning period that will generate additional flows and increase hydraulic loading to the treatment system. The system is currently only operating at approximately 60% to 70% of its ECA rated “hydraulic” capacity.

Based on an evaluation of the available operational historical treated effluent data, it has been determined that the treatment system has regular difficulties in achieving the effluent quality required by ECA No. 3081-9XQNZK, particularly for ammonia and in some cases Total Phosphorus. A review of historical raw sewage quality, hydraulic input and the overall physical configuration of the Lagoon based treatment system, indicates that the relatively high strength raw sewage combined with physical limitations of the treatment system is the primary cause for the treated effluent exceedances. The system, as currently configured, is not capable of treating the organic loadings received from the collection system. Further the constructed wetland portion of the treatment system is not providing any significant treatment with respect to the parameters of concern.

In addition, the Harbour Street SPS and the Lagoon based treatment system were evaluated as part of Phase 1 of the Class EA. Due to the age and condition of the existing infrastructure, within the next 7 years approximately \$500,000 in infrastructure rehabilitation and maintenance is required.”

OVERVIEW OF THE SCHEDULE B CLASS EA PROCESS



We are here

THE MUNICIPAL CLASS EA PROCESS

- What is a Municipal Class Environmental Assessment ?



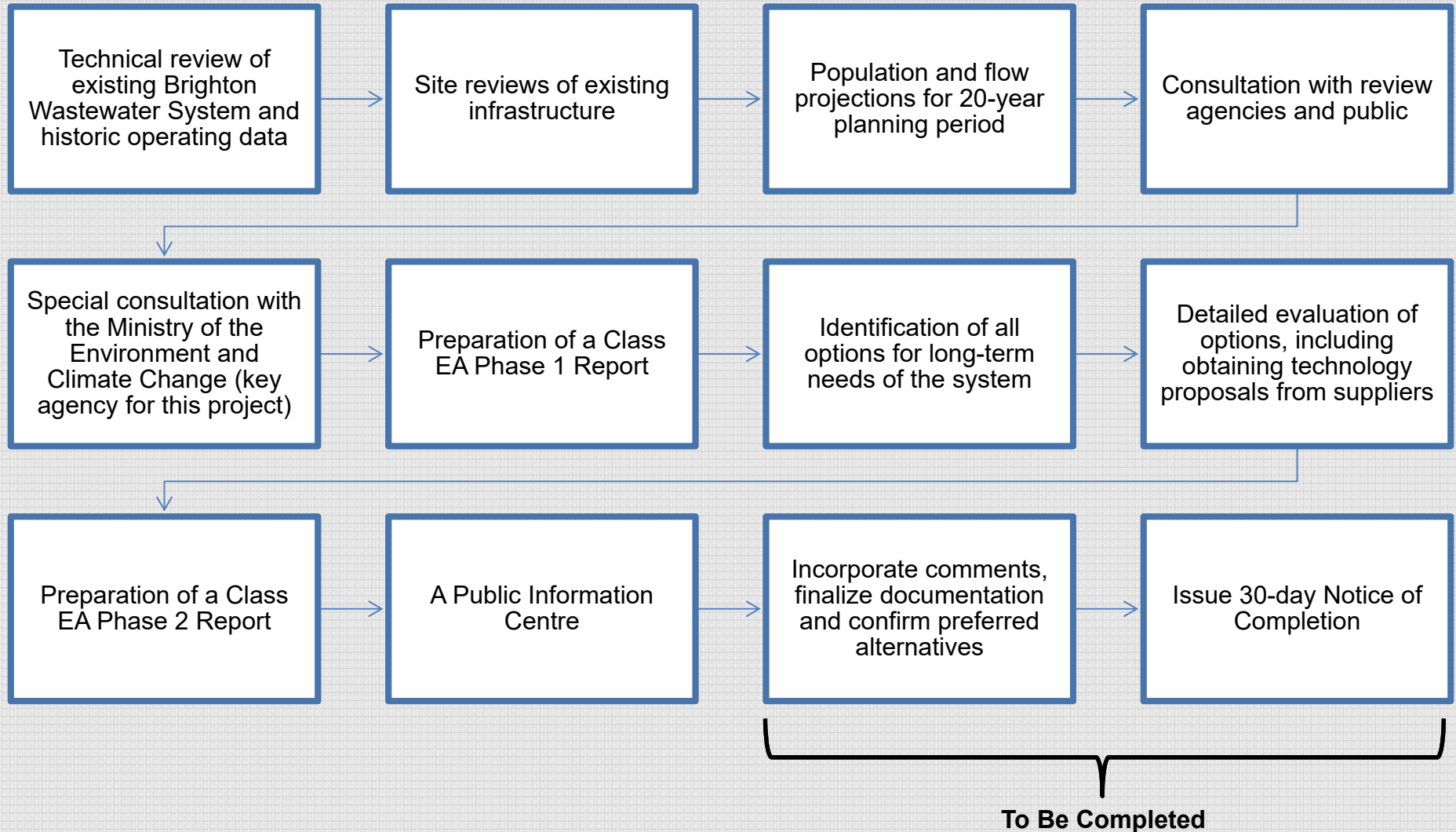
- A **self-assessment** process by which municipal infrastructure projects will be planned in accordance with the Environmental Assessment Act
- The Class EA provides for:
 - the identification of problems or opportunities;
 - the **identification, evaluation and selection** of a preferred means of addressing the problems or opportunities, giving due regard to the need to **protect the environment and minimize environmental effects**; and
 - doing the foregoing with the **involvement of affected stakeholders** in the decision-making process

THE MUNICIPAL CLASS EA PROCESS

- Municipal Projects can involve:
 - Road Projects
 - Transit Projects
 - Water Projects
 - **Wastewater Projects**

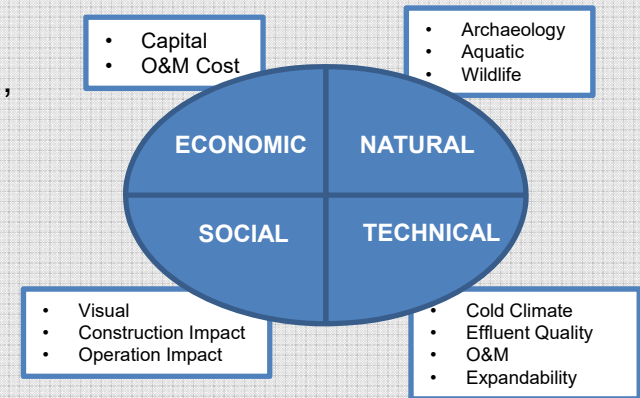
- Projects have various levels of complexity:
 - **Schedule A** projects are limited in scale and are pre-approved.
 - They have minimal adverse effects and often involve normal and maintenance activities
 - **Schedule A+** projects are pre-approved with public notification.
 - **Schedule B** projects have the potential for some adverse impacts.
 - There is mandatory contact with public and review agencies to ensure they are aware of the project and that their concerns are addressed.
 - **Schedule C** projects have the potential for significant adverse impacts.
 - There is mandatory full screening process including filing of an Environmental Study Report (ESR)
 - Generally for construction of new facilities and major expansions (ie. New Mechanical Sewage Treatment Plant)

SUMMARY OF WORK COMPLETED AS PART OF THIS CLASS EA



IDENTIFICATION OF ALTERNATIVE SOLUTIONS

- All options were evaluated against their impact to the natural, social, technical and economic environment.
- The impact for each criterion relative to each potential solution was assessed and evaluated.
- Key consideration was given to whether the option addresses the existing problem and conditions.



OPTION	DESCRIPTION	EVALUATION
1	Do Nothing	<ul style="list-style-type: none"> • Effluent continues to exceed compliance limits • Negative effect on the environment • Existing problem not addressed
2	Optimize and Modify Current Lagoon Operation <ul style="list-style-type: none"> a. Remove sludge from lagoons ✓ b. Optimize and upgrade existing baffles ✓ c. Modify lagoon operating volume and aeration ✘ d. Optimize alum dosage for phosphorus removal ✓ e. Upgrade and refurbish the constructed wetland ✓ f. Investigate and divert high strength wastewater stream from lagoon ✓ 	<ul style="list-style-type: none"> • Various optimization and modification measures identified not sufficient to address the existing effluent quality issues • These measures should be carried forward in addition to the preferred solution for improved performance
3	Install Specialized Treatment System to Complement Existing Lagoon System	<ul style="list-style-type: none"> • Meets effluent design and compliance limits • Addresses existing conditions and constrains • Modest capital, operation and maintenance costs
4	New Mechanical Treatment Plant	<ul style="list-style-type: none"> • Improved treatment performance • High capital, operation and maintenance costs

*** RECOMMENDED
PREFERRED
SOLUTION
(WITH
MODIFICATIONS TO
EXISTING LAGOONS)**











DESCRIPTION OF THE RECOMMENDED PREFERRED SOLUTION

1. Installation of a specialized treatment system, either upstream or downstream of the lagoon, to complement the treatment performance of the existing facility and to target ammonia removal
2. Lifecycle upgrades at Harbour Street Pumping Station and Lagoon
3. Various other upgrades to the existing facility, including:
 - De-sludge the existing lagoon
 - Enhance baffling in the stabilization lagoon
 - Optimize chemical dosage
 - Refurbish the constructed wetland
 - Further investigate reasons for high strength wastewater

Opinion of Probable Costs for the Recommended Preferred Solution:
\$6,500,000 (including engineering and contingency, excluding HST)

EXAMPLES OF AVAILABLE SPECIALIZED TREATMENT TECHNOLOGIES

<p>Option A: Complete Mix Activated Sludge Process</p>	<p>Option B: Submersible Aerated Bio-film Reactor</p>	<p>Option C: Submerged Attached Growth Reactor</p>
		
<ul style="list-style-type: none"> ▪ Install within the existing aerated lagoon ▪ Suspended growth environment for biomass ▪ Aeration and mixing provided by blowers and diffusers ▪ Proven technology in cold climate ▪ Reliable performance with no new tankage or building 	<ul style="list-style-type: none"> • Install the new system within the stabilization lagoon • Attached growth environment for biomass • Very limited installation in cold climate • Expensive capital investment 	<ul style="list-style-type: none"> • Install new tankage downstream of the wetland • New tankage to house attached growth reactors • Upgrade aeration system in aerated and stabilization lagoons • Proven technology in cold climate • High quality effluent
<p>Option D: Fixed Film Biological Process (Upstream)</p>	<p>Option E: Fixed Film Biological Process (Downstream)</p>	<p>Option F: Activated Sludge with Membrane Technology</p>
		
<ul style="list-style-type: none"> • New treatment tanks in part of aerated lagoon • Existing lagoons acts as clarifiers to polish effluent • Proven technology in cold climate 	<ul style="list-style-type: none"> • New treatment tank downstream of the stabilization lagoon • Proven technology in cold climate 	<ul style="list-style-type: none"> • A combination of activated sludge process and membrane technology • New treatment tank within aerated lagoon • Provides highest level of treatment • Most expensive capital investment

EXAMPLE CONCEPT – OPTION E



Figure 3 – Future Brighton Lagoon Treatment System Conceptual Layout

Fixed Film Biological Process (MBBR) Downstream of Lagoons

- Targets ammonia removal in the lagoon effluent to meet compliance requirements
- Small footprint
- Very limited operation and maintenance requirements
- Easily expandable in the future (if required)
- Proven technology in cold climate
- Least intrusive to existing site layout



NEXT STEPS

CURRENT
TASKS



FUTURE
TASKS

- Obtain and evaluate public, stakeholders and agency comments and confirm the preferred solution
 - Issue Schedule 'B' Class EA Project 30-day Notice of Completion and advise public and stakeholders
 - Following the 30-day public review period, finalize Class EA documents
-
- Proceed to preliminary and detailed design and project implementation
 - Estimated schedule to implement the recommended solution:
 - Design Phase: 8 to 12 months
 - Construction Phase: 12 to 18 months

THANK YOU!
Your Comments are Important to Us

**YOUR COMMENTS WILL BE CONSIDERED
IN THE FINAL ASSESSMENT AND
EVALUATION OF THE PREFERRED
SOLUTION**



Ongoing information about this project can be found at www.brighton.ca



**Brighton Wastewater Treatment System
Schedule B Class Environmental Assessment
Public Information Centre**

Comment Sheet

Municipality of Brighton is interested in receiving the community's comments, questions, and concerns regarding the proposed improvements for the Brighton Wastewater Treatment System. Please take a few minutes to fill out this brief comment sheet. All comments will be carefully considered while completing the Class Environmental Assessment study.







1. This study is following the requirements of the Municipal Class Environmental Assessment process for a Schedule B project. *Do you have any questions, comments, or concerns about the decision-making and public consultation process that are being followed to-date?*

2. The need to upgrade the Brighton Wastewater Treatment System is based on the current condition and future servicing requirements within the Municipality. *Do you have any questions, comments, or concerns about the need to upgrade the wastewater treatment system?*

3. The recommended preferred solution is shown in the poster. Do you have any comments or questions on the recommended solution?

(Over to the back)

Appendix B
Detailed Treatment Technology Evaluation

MAJOR CRITERIA	MINOR CRITERIA	OPT 3A COMPLETE MIX ACTIVATED SLUDGE PROCESS	OPT 3B SUBMERSIBLE AERATED BIO- FILM REACTORS	OPT 3C SUBMERGED ATTACHED GROWTH REACTOR	OPT 3D FIXED FILM BIOLOGICAL PROCESS (UPSTREAM)	OPT 3E FIXED FILM BIOLOGICAL PROCESS (DOWNSTREAM)	OPT 3F ACTIVATED SLUDGE WITH MEMBRANE TECHNOLOGY
							
NATURAL ENVIRONMENT AND ARCHAEOLOGY	Effect on Fish and Aquatic Habitat	POSITIVE: Quality of effluent discharged to surface water will improve.	POSITIVE: Quality of effluent discharged to surface water will improve.	POSITIVE: Quality of effluent discharged to surface water will improve.	POSITIVE: Quality of effluent discharged to surface water will improve.	POSITIVE: Quality of effluent discharged to surface water will improve.	POSITIVE: Quality of effluent discharged to surface water will improve.
	Effect on Wetlands, Woodlands, Wildlife Habitat	NO IMPACT: No construction will occur in the engineered or natural wetland.	NO IMPACT: No construction will occur in the engineered or natural wetland.	NEGATIVE: New treatment cells will reduce the engineered wetland area by approximately 50%.	NO IMPACT: No construction will occur in the engineered or natural wetland.	NO IMPACT: Minimal footprint of new treatment cell could be placed outside of the constructed wetland.	NO IMPACT: No construction will occur in the engineered or natural wetland.
	Effect on Archeological Potential Impacts	NO IMPACT: No archeological potential has been identified on site.	NO IMPACT: No archeological potential has been identified on site.	NO IMPACT: No archeological potential has been identified on site.	NO IMPACT: No archeological potential has been identified on site.	NO IMPACT: No archeological potential has been identified on site.	NO IMPACT: No archeological potential has been identified on site.
ENGINEERING AND TECHNICAL CONSIDERATIONS	Proven Cold Weather Installations	POSITIVE: Numerous Canadian/ and cold weather installations, however, process subject to extreme environmental conditions.	NEGATIVE: No full scale Canadian installations and limited number of cold weather installations generally.	POSITIVE: Numerous Canadian/ and cold weather installations, however, subject to extreme environmental conditions.	POSITIVE: Numerous Canadian/ and cold weather installations, however, subject to extreme environmental conditions.	POSITIVE: Numerous Canadian/ and cold weather installations, however, subject to extreme environmental conditions.	NEGATIVE: Limited number of cold weather installations, influent temperature must be above 9 deg. C.
	Ability to Meet Effluent Criteria	POSITIVE: High quality effluent will be produced that is better than the ECA limits for all parameters. Ammonia will be in the range of <5 mg/L.	NO IMPACT: The effluent quality will meet the ECA limits.	POSITIVE: High quality effluent will be produced that is better than the ECA limits for all parameters. Ammonia will be in the range of <5 mg/L.	POSITIVE: Good quality effluent will be produced that is better than the ECA limits for all parameters. Ammonia will be in the 5 – 15 mg/L range.	POSITIVE: Good quality effluent will be produced that is better than the ECA limits for all parameters. Ammonia will be in the 5 – 15 mg/L range.	POSITIVE: High quality effluent will be produced that is better than the ECA limits for all parameters. Ammonia will be in the range of <5 mg/L.
	Degree of Process Control & Availability of Performance Guarantee	POSITIVE: There are a number of process variables that can be controlled. The existing lagoon is not required for treatment; however, it would be used for sludge storage/stabilization.	NEGATIVE: The submersible aerated bio-film reactors have a higher degree of control than a lagoon alone, however, process control is limited and the system may be slow to respond.	NEGATIVE: Submerged attached growth reactors have a higher degree of control than a lagoon alone, however, process control is limited and the system may be slow to respond.	POSITIVE: There are a number of factors that can be controlled in the fixed film biological process; however, the lagoon is still required for treatment.	POSITIVE: There are a number of factors that can be controlled in the fixed film biological process; however, the lagoon is still required for treatment.	POSITIVE: There are a number of process variables that can be controlled in this process. The existing lagoon is not required for treatment.
	Ease of Operation	NEGATIVE: Automated process that may require more regular operator input.	POSITIVE: Limited operator input is required once established.	POSITIVE: Limited operator input is required once established.	NO IMPACT: Automated process that may require periodic operator input.	NO IMPACT: Automated process that may require periodic operator input.	NEGATIVE: A technically advanced process that may require full/part time operator input. Membranes require regular cleaning.
	Capability with existing site (i.e. HGL, electrical servicing, etc)	POSITIVE: No new tankage or buildings are required; flow except for RAS would be by gravity. Site electrical servicing would need upgrading.	POSITIVE: No new tankage or buildings required, flow would continue to be by gravity. Site electrical servicing would need upgrading.	NEGATIVE: New cells are required. Pumping may be required depending on the location of reactor cells. Site electrical servicing would need upgrading.	POSITIVE: No new tankage or buildings are required; flow would continue to be by gravity. Site electrical servicing would need upgrading.	NO IMPACT: New downstream tankage and a blower building would have a minimal footprint. Site electrical servicing may not need upgrading.	POSITIVE: No new tankage or buildings are required; flow except for RAS would be by gravity. Site electrical servicing would need upgrading.

Appendix C
Conceptual Layouts

File Location: K:\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3A.mxd



Note: Wastewater Treatment System property limits are approximate only. Not a legal survey.

PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **COMPLETE MIX ACTIVATED SLUDGE**

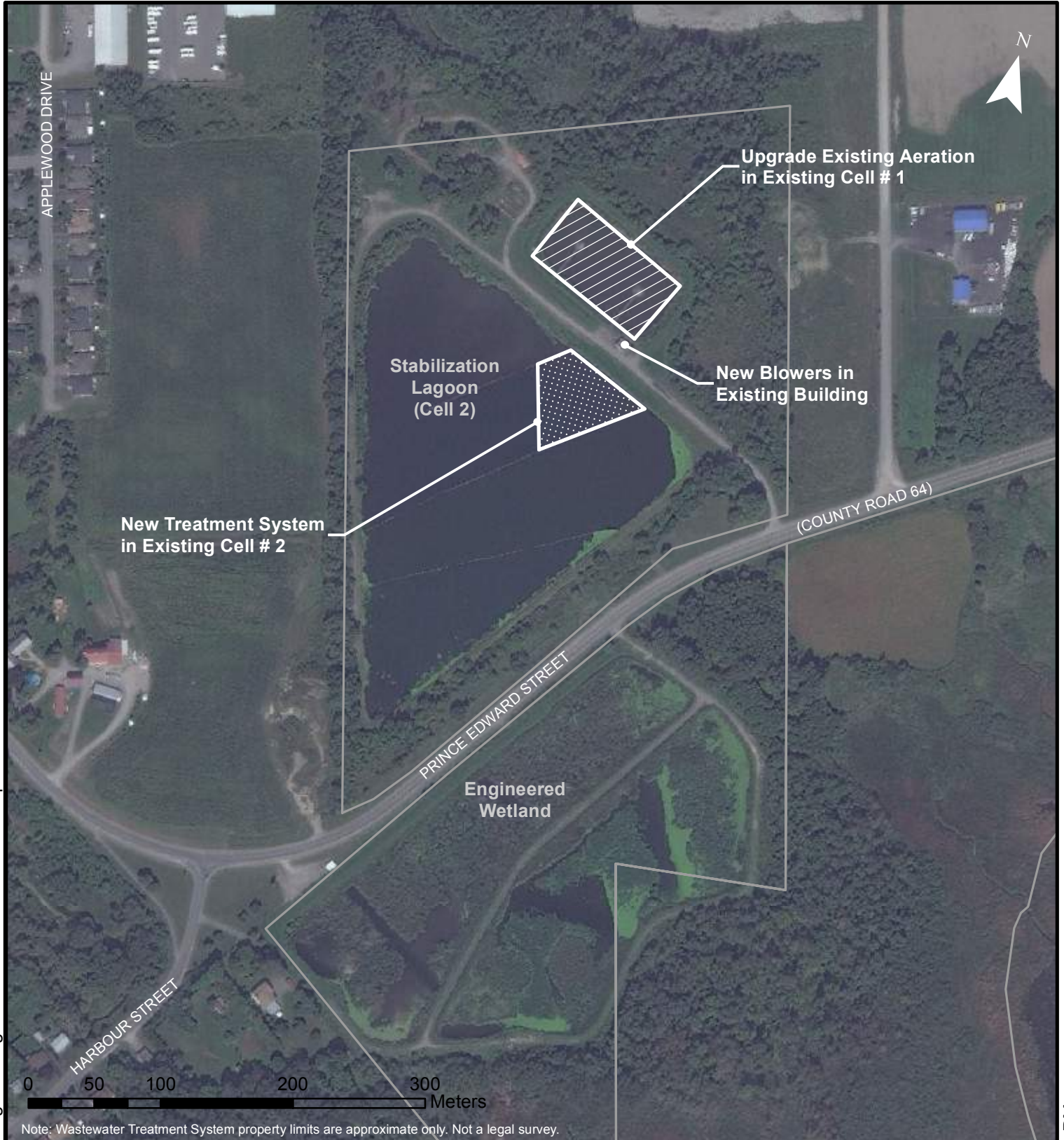
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DESIGN:	JW
DRAWN:	KTK
CHECKED:	SS

JLR NO:	27271
DRAWING NO.:	OPTION 3A

Plot Date: April 11, 2017 3:15:12 PM

File Location: K:\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3B.mxd



Note: Wastewater Treatment System property limits are approximate only. Not a legal survey.

PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **SUBMERSIBLE AERATED BIO-FILM REACTORS**

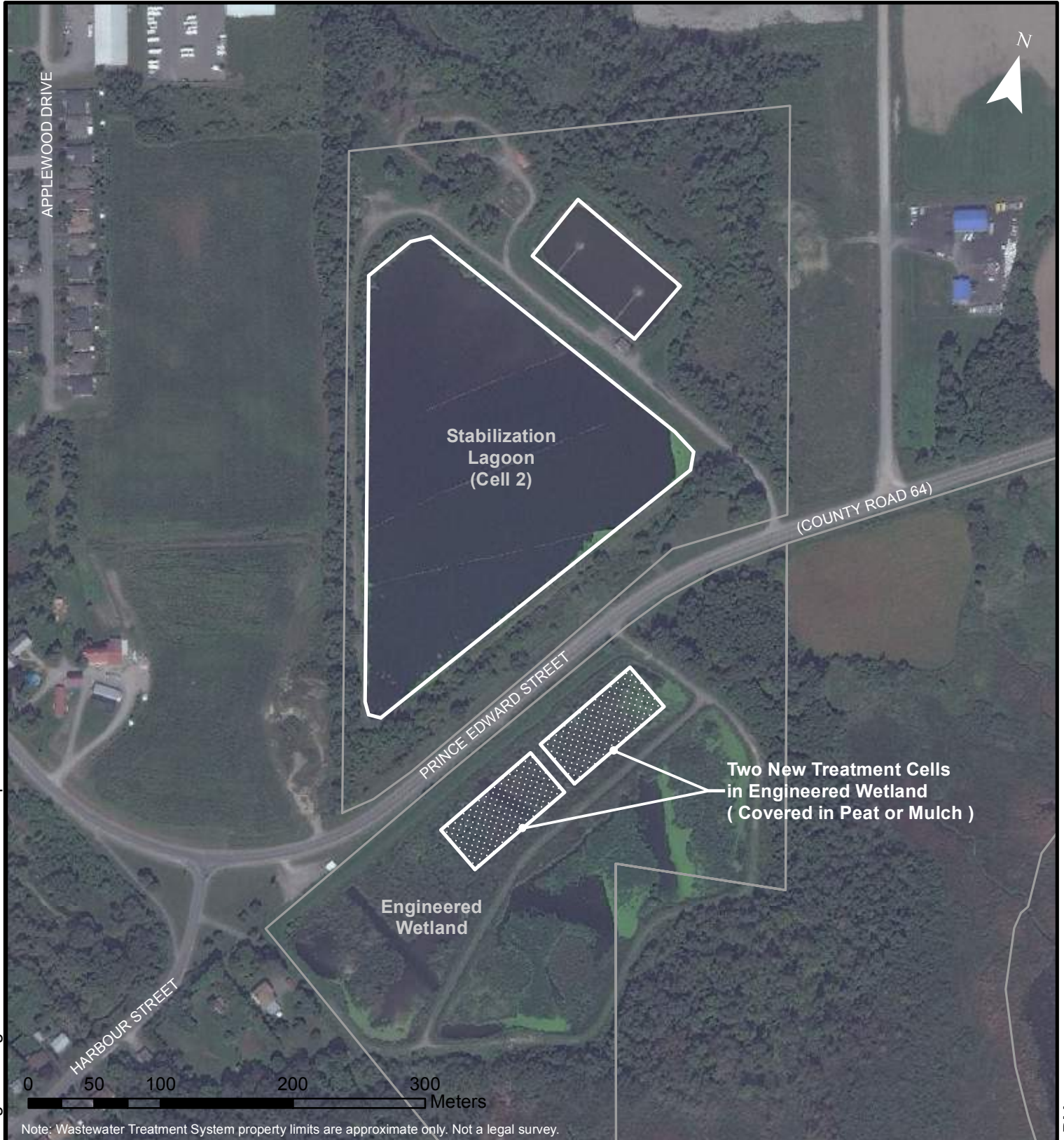
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DESIGN:	JW
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CHECKED:	SS

JLR NO:	27271
DRAWING NO.:	OPTION 3B

Plot Date: April 10, 2017 2:01:48 PM

File Location: K:\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3C.mxd



PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **SUBMERGED ATTACHED GROWTH REACTOR**

J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS
www.jlrichards.ca

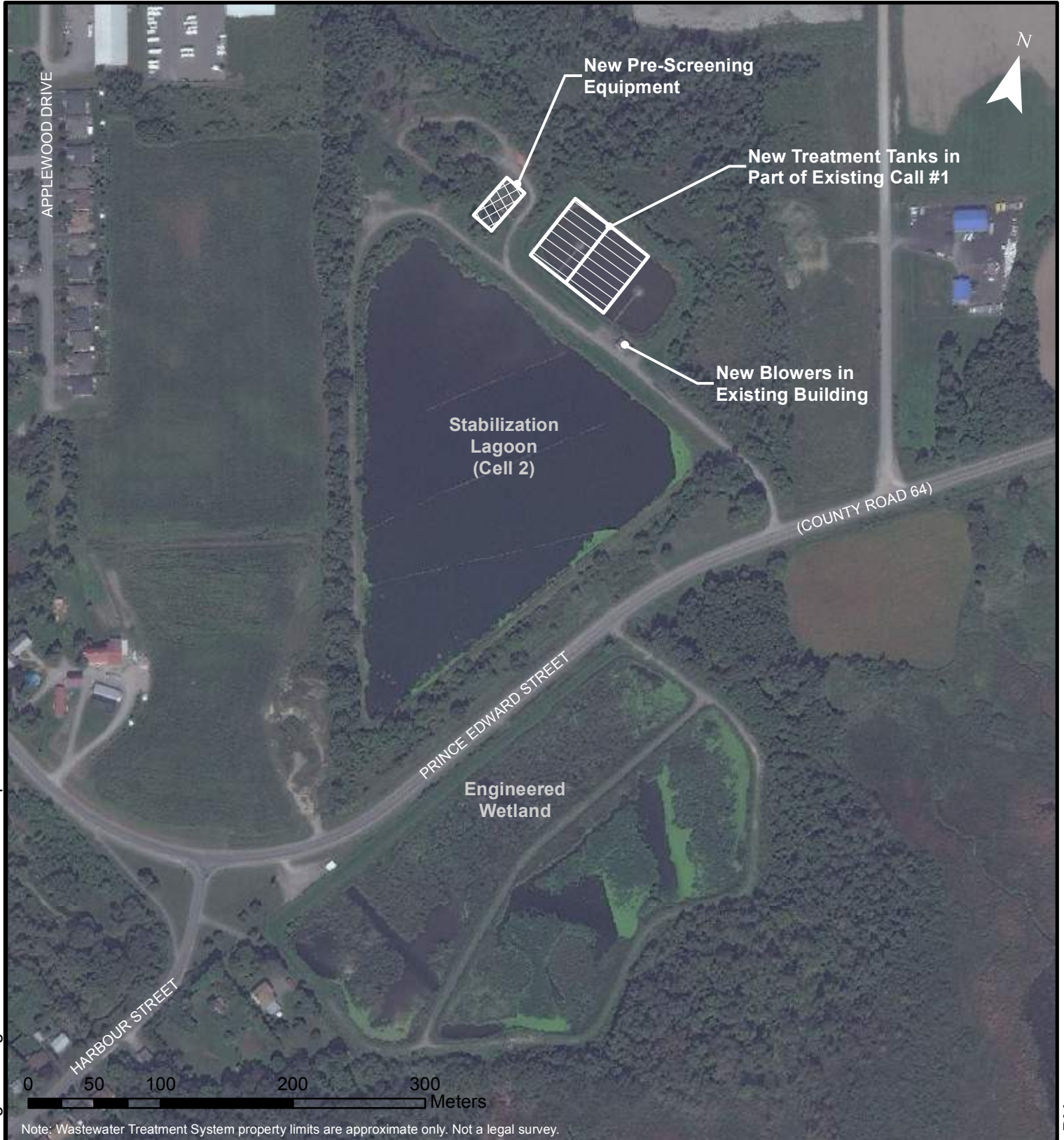
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JLR NO: 27271
DRAWING NO.:
OPTION 3C

Plot Date: April 11, 2017 4:05:24 PM

File Location: K:\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3D.mxd



PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **FIXED FILM BIOLOGICAL PROCESS (UPSTREAM)**

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JLR NO:	27271
DRAWING NO.:	OPTION 3D

Plot Date: April 10, 2017 3:32:20 PM

File Location: K:\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3E.mxd



PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **FIXED FILM BIOLOGICAL PROCESS (DOWNSTREAM)**



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JLR NO:	27271
DRAWING NO.:	OPTION 3E

Plot Date: April 11, 2017 3:29:17 PM

File Location: \\kgdc01\Projects\27000\27271 - Brighton Lagoon\JLR DWG\Plan\27271 Option 3F.mxd



PROJECT: **BRIGHTON WASTEWATER TREATMENT SYSTEM CLASS EA**
MUNICIPALITY OF BRIGHTON, ONTARIO

DRAWING: **ACTIVATED SLUDGE WITH MEMBRANE**



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DESIGN:	JW
DRAWN:	KTK
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JLR NO:	27271
DRAWING NO.:	OPTION 3F

Plot Date: April 10, 2017 3:29:04 PM



June 15, 2021

Project # 15-017

Preston Parkinson
Municipality of Brighton
35 Alice Street, P.O. Box 189
Brighton, ON K0K 1H0

**Re: Brighton WWTP
Aeration System Upgrades with Option to Expand Capacity**

Dear Mr. Parkinson:

As required by MECP, an upgrade to the Brighton WWTP is required to improve treatment of ammonia. An aeration upgrade would also support additional growth in Brighton.

Our original submission of April 13, 2021 provided an outline of the Triplepoint proposal to upgrade aeration in the aerated cell component of the WWTP. This proposal would provide significantly more oxygen as well as full solids mixing in the aerated cell. The proposal includes the following:

- 1) Remove the existing catwalks, original mechanical mixers and the floating aerators in the aerated cell. The total existing horsepower of the existing mechanical and floating aerators is only 110 horsepower.
- 2) Installation of the new Triplepoint, shore based blowers (on the west side of the cell) would provide the air supply to the new, submerged aeration units. The aeration units would be distributed over the entire floor area of the aerated cell. Operating horsepower of the new blowers would be 300 hp.
- 3) Potential new secondary clarifier located at the south end of the aerated cell. The clarifier would separate the biological solids from the cell effluent flow and return the concentrated solids back to the inlet (north) end of the aerated cell.

This proposal does not require screening or grit removal of the raw sewage as the aeration units on the bottom of the aerated cell have no moving parts. As you are aware, we have received a preliminary sizing and design proposal from Triplepoint Environmental who specialize in sewage lagoon aeration projects including cold climate installations. Triplepoint is represented in Ontario by ACG Envirocan, who are a recognized supplier of wastewater treatment equipment in Ontario.

The Triplepoint proposal is included in **Appendix A**. Key features are summarized as follows:

- i) Three, 150 hp blowers (2 operating and 1 standby). These blowers would be housed within acoustically treated, weatherproof enclosures. The blowers would be VFD controlled to provide operator flexibility. Total air flow with two blowers running at 100% speed would be approximately 5,050 cubic feet per minute (cfm) and provide approximately 3,900 kg of dissolved oxygen per day to the aerated cell.
- ii) The air flow would be delivered evenly to 100 aeration units located on the bottom of the cell. Air flow per aeration unit would therefore be approximately 50.5 cfm per unit. Triplepoint has advised that each unit is designed to run efficiently over an airflow range of 25 to 75 cfm per aeration unit.
- iii) The blower sizing has been oversized to provide sufficient mixing of the cell to maintain biological solids in suspension, compared to oxygen supply requirements (i.e. mixing dominates).
- iv) At the current rated capacity of the WWTP (4,600 m³/day), the raw sewage BOD load is estimated to be 900 kg/day and the raw sewage TKN load is estimated to be 275 kg/day.
- v) The theoretical oxygen requirement for full removal of BOD and TKN is 1,350 kg/day for BOD removal and 1,270 kg/day for TKN removal. These values are based on 1.5 kg of oxygen per kg of BOD and 4.6 kg of oxygen per kg of TKN. Total oxygen required is therefore approximately 2,620 kg/day for the current, rated capacity of 4,600 m³/day.
- vi) As above, the air flow of 5,050 cfm provides a daily oxygen supply of 3,900 kg/day, or approximately 50% more oxygen than theoretically required for the current design flow of 4,600 m³/day.

As you are aware, we have recently discussed possible, major residential developments in Brighton. Preliminary calculations of uncommitted, remaining treatment capacity would indicate that it is likely that a rated increase in sewage treatment capacity will be required at some point for Brighton.

Exactly when such an increase in rated capacity is required is difficult to predict. However, it would be reasonable to review the Triplepoint proposal to ensure that such an aeration upgrade (including provision of the secondary clarifier) is suitably sized for an increase in rated capacity.

While preliminary, we suggest the future, rated capacity of the WWTP be estimated as 6,000 m³/day. This provides a 30% increase over the current rated capacity of 4,600 m³/day. We note that current, average sewage flows are approximately 3,000 to 3,300 m³/day. This 30% capacity increase (providing an additional 1,400 m³/day treatment capacity) would allow connection of at least another 1,000 residential units.

Table 1 below provides a side by side comparison of the Triplepoint aeration system for the current capacity (4,600 m³/day) and the possible, future rated capacity (6,000 m³/day).

TABLE 1

**Summary of Flow and Oxygen Demand
Current Rated Capacity and Potential, Future Rated Capacity**

Operating Parameter	Current Capacity	Future Capacity
Design Flow Rate	4,600 m ³ /day	6,000 m ³ /day
Aeration Cell Volume	± 14,300 m ³	± 14,300 m ³ /day
Air Flow Proposed (Triplepoint)	5,050 cfm	5,050 cfm
Oxygen Provided	3,900 kg/d	3,900 kg/d
BOD Load (at 195 mg/l)	± 900 kg/d	± 1,200 kg/d
BOD Oxygen demand (at 1.5 times BOD load)	± 1,350 kg/d	± 1,800 kg/d
TKN load (at 60 mg/l)	± 275 kg/d	± 360 kg/d
TKN Oxygen demand (at 4.6 times TKN load)	± 1,270 kg/d	± 1,660 kg/d
Total Oxygen demand	± 2,620 kg/d	±3,460 kg/d

As per **Table 1**, the Triplepoint aeration system appears to provide sufficient oxygen to satisfy the future BOD and TKN oxygen demands associated with a rated capacity of 6,000 m³/day. As per **Table 1**, the estimated, future oxygen demand is 3,460 kg/day. This compares with the Triplepoint oxygen supply estimate of 3,900 kg/day.

The surplus supply of oxygen is not surprising given total air flow from the blowers has been sized to provide a complete mix of solids in the aeration cell. This design approach therefore provides surplus oxygen supply for the current rated capacity and for the proposed, increased rated capacity of 6,000 m³/day.

We also provide a preliminary drawing set which details existing conditions, the proposed Triplepoint aeration system installation in the aerated cell, and installation of a secondary clarifier at the south end of the aerated cell.

The clarifier itself does not provide treatment of ammonia or any other pollutant. Rather, the sole function of the clarifier is to separate the biological solids from the effluent of the aerated cell and return these solids to the inlet of the aeration tankage. Maintaining high solids concentrations in the aeration cell is key to achieving ammonia removal.

In mechanical sewage plants, the secondary clarifiers also provide an important function to protect the quality of the secondary effluent. In those cases, the secondary clarifiers are designed to remove solids even at the maximum, peak flow rate. In the case of the Brighton WWTP, protection of secondary effluent quality is not nearly as critical as any biological solids (or other solids) escaping the secondary clarifier will settle out in the large, downstream stabilization lagoon.

The secondary clarifier is one option for removing the solids from the aerated cell. The other method would be to run the aerated cell similar to a Sequencing Batch Reactor system (SBR), which is now a commonly used activated sludge process that achieves aeration followed by quiescent settling, solids removal and decanting of secondary effluent all in a single tank. With the SBR approach, the decanting would be accomplished in Brighton manually (pulling stop logs from the outlet point of the aerated cell) or by way of an automatic decanter operating by PLC control. In either case, the blowers would first need to be turned off to allow the solids to settle before decanting occurs.

Particularly with the secondary clarifier option, rerouting of Arena Creek to the east and to the south east is required. With either option, however, relocation of the Arena Creek channel further east from the east side of the aerated cell is recommended to protect the east berm of the aerated cell from erosion during flood flows.

The secondary clarifier option also requires new inflow and effluent piping, sludge return pumping and piping, relocation of flow measurement facilities and a new location for addition of ferric chloride coagulant.

Process Objectives

The estimated oxygen requirement for effective treatment of BOD and ammonia in the aerated cell has been provided above in Table 1 for both the current rated capacity of 4,600 m³/day and the proposed, potential rated capacity of 6,000 m³/day.

Mixing of the aerated cell contents is considered more critical and dictates the size of the blowers. The volume of the aerated cell (included submerged side slope volumes) is approximately 14,300 m³ at a normal water depth of 3 m. Total surface area of the cell is approximately 6,910 m² but the surface area of the cell overtop of the flat bottom area of the cell is approximately 3,600 m².

Total blower energy (two blowers running at 100% speed) is 300 hp (225 kW). Mixing energy is therefore 15.7 W per m³ based on an aeration cell volume of 14,300 m³ which essentially matches MECP design standards for even mixing of biological solids (MECP design parameters are 16 to 25 W per m³ for mixing of biological solids).

The Triplepoint aeration unit design is a hybrid diffuser providing part coarse bubble and part fine bubble aeration.

The Triple Point air flow rate of 5,050 cfm (2,400 litres per second) represents an air flow rate of 0.17 l/s per m³, which is less than the recommended coarse bubble mixing recommendation of 0.33 l/s per m³ (as per MECP). However, based on an air flow of 2,400 l/s, the surface air flow rate for fine bubble mixing is 0.34 l/s per m² for the total area of the cell but is 0.66 l/s per m² for the smaller, flat bottom

surface area. The latter aeration rate (0.66 l/s per m² of flat bottom area) exceeds the MECP design recommendation of 0.61 l/s per m² for fine bubble aeration mixing.

Overall, therefore, full mixing of MLSS should be accomplished. Oxygen delivery exceeds oxygen demand requirements by a significant margin indicating that daily oxygen requirements could be provided in say 16 hours of aeration per day, for the current design capacity of 4,600 m³/day, allowing say 8 hours or settle and decant time per day if the overall system is operated as an SBR process.

However, for a future capacity of 6,000 m³/day, there would be less time available for decanting and the secondary clarifier is assumed required if the WWTP was rerated to 6,000 m³/day.

Rated Capacity Increase

If rerating the WWTP to 6,000 m³/day, the following would need to be considered:

- i) A Schedule C Class EA would have to be completed
- ii) As part of the Class EA process, MECP would very likely require more stringent effluent requirements for the increased capacity.
- iii) The current effluent compliance values for BOD, Suspended Solids and Total Phosphorus are 30 mg/l, 40 mg/l and 1.0 mg/l, respectively. The values for BOD and Suspended Solids would likely be reduced to approximately 20 mg/l. The compliance limit for phosphorus might remain at 1.0 mg/l or be lowered slightly (i.e. 30%) such that total phosphorus loadings to Presquile Bay stayed the same as currently permitted.
- iv) For ammonia, the current compliance limits are 14 mg/l for the summer and 17 mg/l. These would likely be significantly reduced. Likely, future ammonia limits would be approximately 2 mg/l for the summer and 4 mg/l for the winter.
- v) Overall, the proposed aeration system upgrade and secondary clarifier should achieve the new, estimated compliance limits for an increased design flow of 6,000 m³/day.

Potential Clarifier

MECP design guidelines recommend maximum overflow rates of 40 m/day for secondary clarifiers for extended aeration plants providing nitrification. This rate is usually based on the worst case peak flow rate. In the case of Brighton however, it is our opinion that the clarifier can be downsized as:

- i) Solids wasting in the Brighton system may be accomplished by discharge of the aeration cell mixed liquor to the downstream stabilization lagoon and;
- ii) Protection of water quality downstream of the clarifier is not critical as the stabilization lagoon is downstream of the clarifier.

At most, peak flows in the Brighton WWTP have been measured under extreme events as approximately 18,000 m³ per day with flows rarely exceeding 10,000 m³ per day. For discussion, it is recommended the clarifier be sized for twice the potential, future rated capacity of the WWTP or 12,000 m³/day (6,000 m³/day x 2). Based on this design flow rate (12,000 m³/day), the required area would be 300 m², or equal to a clarifier with a diameter of approximately 20 m (66' \varnothing).

Sludge Management

All biological treatment systems continuously produce sludge. As such, surplus sludge management is required. In sewage lagoons, it is quite common for surplus sludge to build up on the bottom of the lagoons over time. One method to deal with such accumulated sludge in lagoon systems is to periodically dredge or remove sludge from the lagoon bottom with application of the sludge on approved farmland.

However, accumulated sludge can release ammonia back to the flow stream as it degrades. Such ammonia feedback from bottom sludges appears to occur periodically in the Brighton lagoon system.

As such, alternatives for proactive sludge management should be considered for Brighton. If the clarifier was provided, the following options would be available for active sludge management:

- i) Discharge surplus sludge to the facultative lagoon from the sludge return line but recognize that very regular lagoon removal of sludge from the north end of the lagoon would be required. Sludge removal would be required at least once per year.
- ii) Regular (i.e. weekly) discharge of surplus sludge from the sludge return line to the sludge drying beds at the north end of the aerated cell. The underdrains from the sludge drying beds drain to the inlet of the aerated cell such that any ammonia in the underdrains is retreated in the aerated cell. Covering of the sludge drying cells may be necessary for winter operation.
- iii) Periodic (i.e. monthly) discharge of surplus sludge from the sludge return line to new sludge dewatering facilities (i.e. geotubes) located near the edge of the aerated cell. Proper location of the geotubes would be required to ensure drainage from the tubes flows back into the aerated cell for retreatment.

Preliminary System Drawing

Drawing 15017-03 provides an overall layout of the proposed new blowers, air delivery lines and the 100 submerged aeration units. As well, the secondary clarifier is shown as well as new feed and effluent piping from the clarifier, the sludge return line to the inlet of the aeration cell, the new coagulant dosing point and a new flow measurement facility.

Budget Pricing

- Supply of Triple Point ACG Air Diffuser package, three blowers and associated air lines - \$850,000
- Additional Cost for Radial Blowers versus conventional PD type blowers and other system upgrades \$200,000
- Install blowers and aeration equipment including VFD's - \$400,000

- Upgrade 600 V, 3 phase power supply - \$200,000

Subtotal - \$1,650,000 plus 30 % contingencies and engineering = \$2,150,000 plus net HST. Note that the cost of relocation of Arena Creek is not included.

If Secondary Clarifier system also included:

- Construct new 20 m ø secondary, concrete clarifier including scraper mechanisms etc. - \$1,500,000
- New clarifier inflow and effluent piping, sludge pumping system and sludge return line, new coagulant feed, new Parshall flume, manholes, etc. - \$800,000

Subtotal Cost of Secondary Clarifier Upgrade = \$2,300,000 plus 30% contingencies and engineering = \$3,000,000 plus net HST. Note that cost of relocation of Arena Creek is not included.

Total preliminary cost estimate of the aeration upgrade and the secondary clarifier is therefore approximately \$5,150,000 plus net HST. The cost of relocation of Arena Creek is not included.

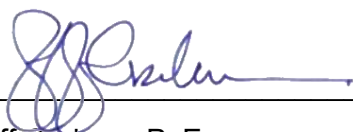
Conclusion

If the proposed upgrade concept was considered further, we recommend the following:

- i) That this proposal be peer reviewed by an engineering firm fully experienced in advanced sewage plant process design to confirm that year round ammonia removal (nitrification) would be provided in the aeration cell. Such peer review to consider ammonia feedback from any sludge stored in the downstream facultative lagoon.
- ii) That Brighton apply to MOECC for an ECA that approved firstly the aeration upgrade and secondly the clarifier upgrade. The objective would be to seek approval to install only the aeration system now but to install the secondary clarifier once an approval to increase the rated capacity to 6,000 m³/day was achieved through the Class EA process.
- iii) While the WWTP operates under the current rated capacity of 4,600 m³/day, operate the aerated cell as an SBR (no clarifier) to retain solids within the aerated cell. If the SBR decanting mode does not prove successful in maintaining elevated solids levels in the aerated cell, complete installation of the secondary clarifier as Phase 2 of the overall upgrade project in advance of rerating the system to 6,000 m³/day.

Sincerely,

GSS Engineering Consultants Ltd.



Jeff Graham, P. Eng.
Designated Consulting Engineer

JTG/nc

APPENDIX A

Triple Point Aeration Proposal

The contents of this Appendix was removed as it contained proprietary information from equipment suppliers. This information can be provided upon request with permission from the Suppliers.



January 19, 2022

RVA 216011

35 Alice Street,
Brighton, Ontario K0K 1H0

Attention: Ms. Amy Russel, Environmental Services Manager, Municipality of Brighton, ON

Dear Ms. Russell:

Re: Technical Review of the Brighton WWTP Upgrade

Please find the enclosed Final Report for the referenced project.

Please contact the undersigned if you have any questions.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

Harpreet Rai, Ph.D., P.Eng.
Project Manager



Encls.

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Brighton WPCP Proposed Upgrade

Technical Review
Final

Municipality of Brighton

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RVA 216011

January 19, 2022

Brighton WPCP Proposed Upgrade Technical Review

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1.0 INTRODUCTION

The existing Brighton Wastewater Pollution Control Plant (WPCP) is a lagoon-based system. The WPCP is located at 100 County Road 64. Wastewater collected from the serviced area of the Municipality passes through four treatment components at the WPCP, in the order listed below:

- 1- A 0.68-hectare flow through Aerated Cell (Lagoon #1) with two stationary mixers with power ratings of 7.5 kW and 11.2 kW in the North section: and three floating aerators in the south section with power ratings of 18.6 kW, 18.6 kW and 11.2 kW.
- 2- A chemical mixing chamber where ferric chloride is added.
- 3- A 5.44-hectare facultative Waste Stabilization Pond (Lagoon #2) equipped with three floating baffles to improve flow distribution.
- 4- A two-celled Constructed Wetland having a total surface area of 6.2 hectares.

The influent passes through the flow-through aerated lagoon, followed by a facultative stabilization lagoon and a constructed wet land to polish the aerated lagoon effluent. The effluent from the constructed wetland is discharged continuously into a provincially significant natural wetland that borders Presqu'île Bay, which is located off the northeast shore of Lake Ontario. The WPCP is currently operating at 72% of its rated capacity of 4,600 m³/d. The effluent from the waste stabilization pond has been exceeding the seasonal compliance limits for Total Ammonia Nitrogen (TAN) limits stated in the Plant Environmental Compliance Approval (ECA).

1.1 Project Background

In December 2018, JL Richards Consulting Engineers (JL) completed a Schedule B Class EA to review alternatives to upgrade the Brighton WPCP to lower levels of total ammonia nitrogen (TAN) in the treated effluent to ensure compliance with the Brighton ECA. The Class EA report identified six general alternatives that JL identified as potential, feasible alternatives. One of these (Option 3E) was a fixed film, biological process at the downstream end of the lagoon system. This process (the MBBR) was selected as the recommended preferred solution and was the basis for the MBBR project that was tendered in the fall of 2020.

However, the quoted prices of “Brighton WPCP-MBBR Addition” Tender were much higher than the originally estimated budget by JL and the Municipality is now reviewing another feasible alternative.

In June 2021, GSS Engineering, acting as owner's engineer in the Class EA process, reviewed a proposal submitted by Triplepoint™ to upgrade aeration in the aerated cell component of Brighton WPCP. GSS found the Triplepoint's proposed aeration system appears to provide sufficient oxygen to satisfy the future BOD and TKN oxygen demands associated with both the current and anticipated future rated capacities of 4,600 m³/d and of 6,000 m³/d respectively. GSS suggested to build a new secondary clarifier to separate the biological solids from the cell effluent flow and return the concentrated solids back to the inlet of the aerated cell. GSS also suggested that the system does not require screening or grit removal for the raw sewage as the aeration units have no moving parts. However, the proposed upgrade includes a screen downstream of the aerated cell to protect the moving equipment in the secondary clarifier.

Further to that the Municipality retained R.V. Anderson Associates Limited (RVA) to conduct a technical review of the proposed upgrade of the Brighton WPCP to address the ongoing issue of non-compliance with the plant's effluent ammonia limits. The objective of this Technical Review is to review the conceptual design of the proposed upgrade regarding the validity of the concepts used in preliminary design, process sizing, and the technical viability of the concept to meet the treatment objectives, as presented in the memo entitled – Brighton WPCP Aeration System Upgrades with Option to Expand Capacity, Dated June 15, 2021– by GSS Engineering Consultants Limited.

It should be noted that the review is limited to the conceptual viability of the proposed upgrade and does not include a review of the process mechanical design and/or installation details of the proposed upgrades and/or equipment. For instance, design information pertaining to the installation of blowers, electrical and control systems, piping design, and all associated installation details have not been reviewed.

2.0 EXISTING TREATMENT PROCESS

The existing WPCP is a lagoon-based system with an aerated lagoon followed by a larger waste-stabilization facultative lagoon for sludge storage and polishing of the aerated lagoon effluent. The raw sewage enters the aerated cell on the northwest end and the mixed liquor comprising treated effluent and bacterial biomass exits on the southeast corner. The mixed liquor from aerated cell enters the facultative lagoon at its northwest corner. The aerated lagoon has a total volume of 14,300 m³ and has five (5) mechanical aerators (2x18.6 kW, 2x11.5 kW and one 7.5 kW). The volume of the aerated lagoon corresponds to a Hydraulic Retention Time (HRT) of 4.3 d at current average flow of 3,317 m³/d and 3.1 d at design flow of 4,600 m³/d. Since it is a flow-through aerated lagoon with no recycle of the active sludge back to the lagoon, the Solids Retention Time (SRT) in the aerated cell equals the HRT.

The mixed liquor from the aerated lagoon enters the polishing lagoon at its Northwest corner and flows through four (4) compartments in the polishing lagoon created by using partitioning curtains, with an objective to prevent hydraulic short circuiting and maximizing effective use of the lagoon volume. Prior to the mixed liquor entry in the polishing lagoon, ferric chloride is added to the mixed liquor to remove phosphorus. The precipitated phosphorus along with the biomass in the mixed liquor settles in the polishing lagoon, and the treated effluent from aerated lagoon gets additional treatment via natural physical and biological activity in the polishing lagoon. The effluent from this lagoon flows into a constructed wetland located east of the lagoon. The design intent of the constructed wetland was to provide further polishing of the effluent via removal of organics and nutrients contained in the polishing lagoon effluent. While it does provide some degree of polishing to the lagoon effluent, the treatment provided is non consistent and therefore can not be relied upon to meet effluent objectives. The constructed wetland effluent flow finally discharges into a natural wetland that borders Presqu'île Bay of Lake Ontario. Figure 2.1 shows the process schematic of the WPCP.

The rated capacity of the WPCP is 4,600 m³/d, with discharge compliance limits for cBOD₅, TSS, TAN and TP, of 30 mg/L, 40 mg/L, 14/17 mg/L (summer/winter) and 1.0 mg/L respectively, and the corresponding objectives of 15 mg/L, 15 mg/L, 10/15 mg/L (summer/winter), and 0.8 mg/L respectively. Also, it is important to note that the compliance limits and objectives are applicable on the stabilization lagoon effluent and not the constructed wetland per the current ECA (# 6166-AJGTGW, dated: March 20, 2017) given the unreliability of the latter to provide consistent treatment.

The WPCP has never had any exceedance issues with cBOD₅, TSS and TP. However, there have been recurring events of TAN exceedance over the past several years. In

addition, frequent exceedances of TSS objectives and E-Coli limits/objectives have been observed over the last four (4) years.

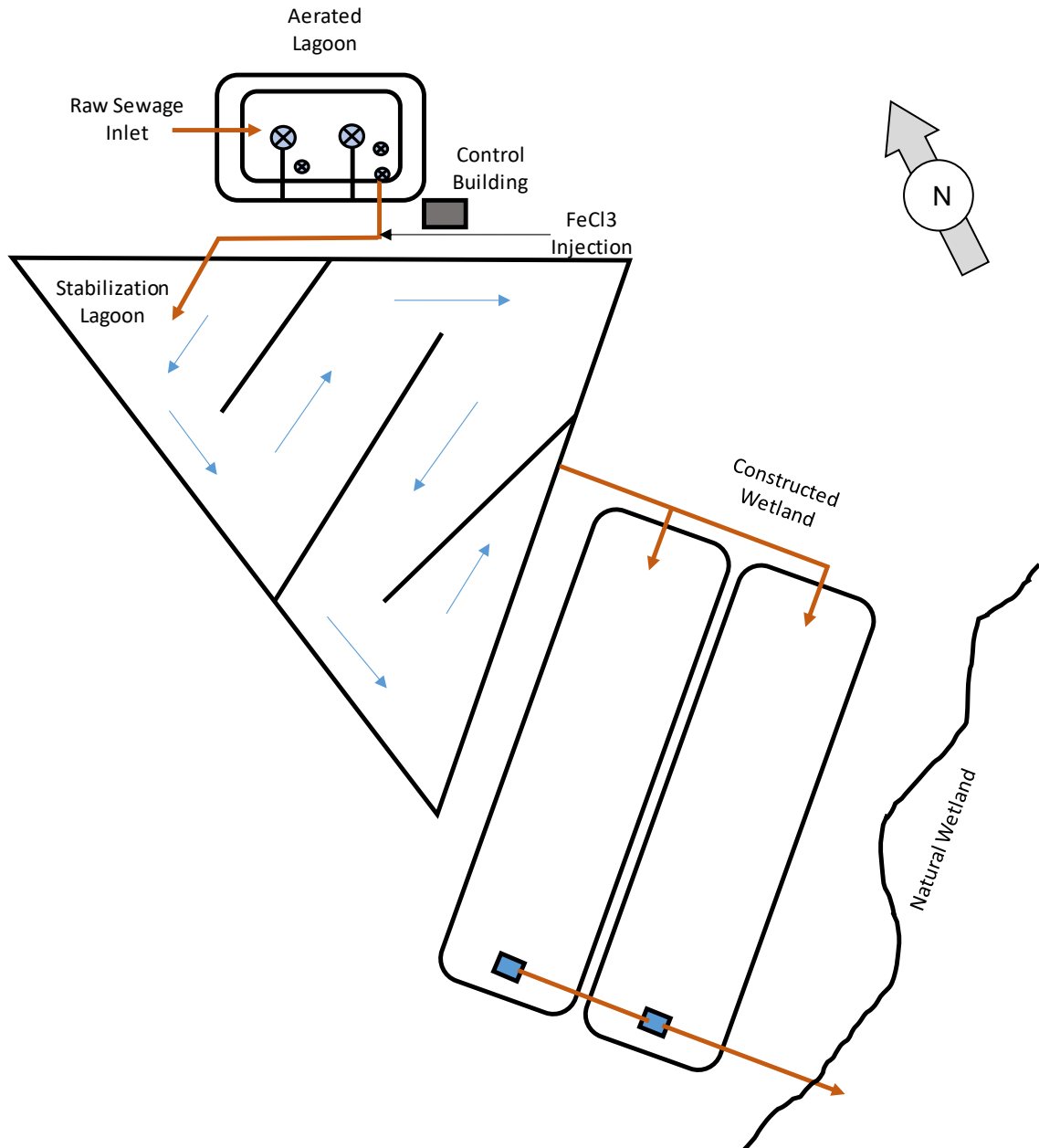


Figure 2.1 – Process Schematic of the Existing WPCP

3.0 WPCP INFLUENT FLOW AND CHARACTERISTICS

3.1 Influent Flowrates and Characteristics

Table 3.1 and 3.2 illustrate the historic average monthly flowrates and characteristics. The historic flow data indicates average day flow (ADF) value of 3,317 m³/d which is 72% of the current rated capacity of the plant. The absolute and 99.5 percentile peak day flows (PDF) values over the reported historic period are 14,009 m³/d and 9,960 m³/d, translating into PDF peaking factor of values of 3.93 and 2.89 respectively. With less than 1% frequency of the peaking factor exceeding 2.89, this value flows represents a realistic peaking factor for the plant. It is also important to note that high flows typically occur from late winter to spring (January to May) as the high flows coupled with low temperatures during these months has a major bearing on nitrification in the aerated cell. See Figure 3.1 for historic monthly average flow trends based on the flow measurements of the aerated cell effluent. The average and maximum month influent characteristics represent a low to medium strength sewage for cBOD₅ and TSS, medium to strong sewage for TP and TKN. See Table 3.2 for details.

Table 3.1 – Brighton WPCP Historic Influent Flow Data

Month	Influent Flow (m ³ /d)				Average
	2018	2019	2020	2021	
Jan	3583	3534	5175	2952	
Feb	4910	3260	3873	2137	
Mar	3794	4314	5943	2951	
Apr	6724	6016	4512	2855	
May	4043	7112	4777	2254	
Jun	3270	5487	1501	1489	
Jul	2285	3812	1146	2242	
Aug	1921	3178	1295	1993	
Sep	2079	2592	1433	2640	
Oct	2219	3083	2222	3052	
Nov	3500	3526	2124	-	
Dec	3627	3677	2939	-	
Average	3,480	4,137	3,071	2,421	3,317
Max Day	13,087	10,614	14,009	11,313	
Max Month	6,724	7,112	5,943	3,052	

Table 3.2 – Brighton WPCP Influent Characteristics

Year	cBOD ₅		TSS		TP		TKN	
	Annual average	Max month	Annual average	Max month	Annual average	Max month	Annual average	Max month
2018	113	175	185	239	5.2	7.5	45	65
2019	121	167	179	319	5.5	7.0	47	58
2020	97	169	189	359	5.1	8.6	45	76
2021	120	160	207	289	6.5	8.3	58	71
Average	113	168	190	301	5.6	7.8	49	68

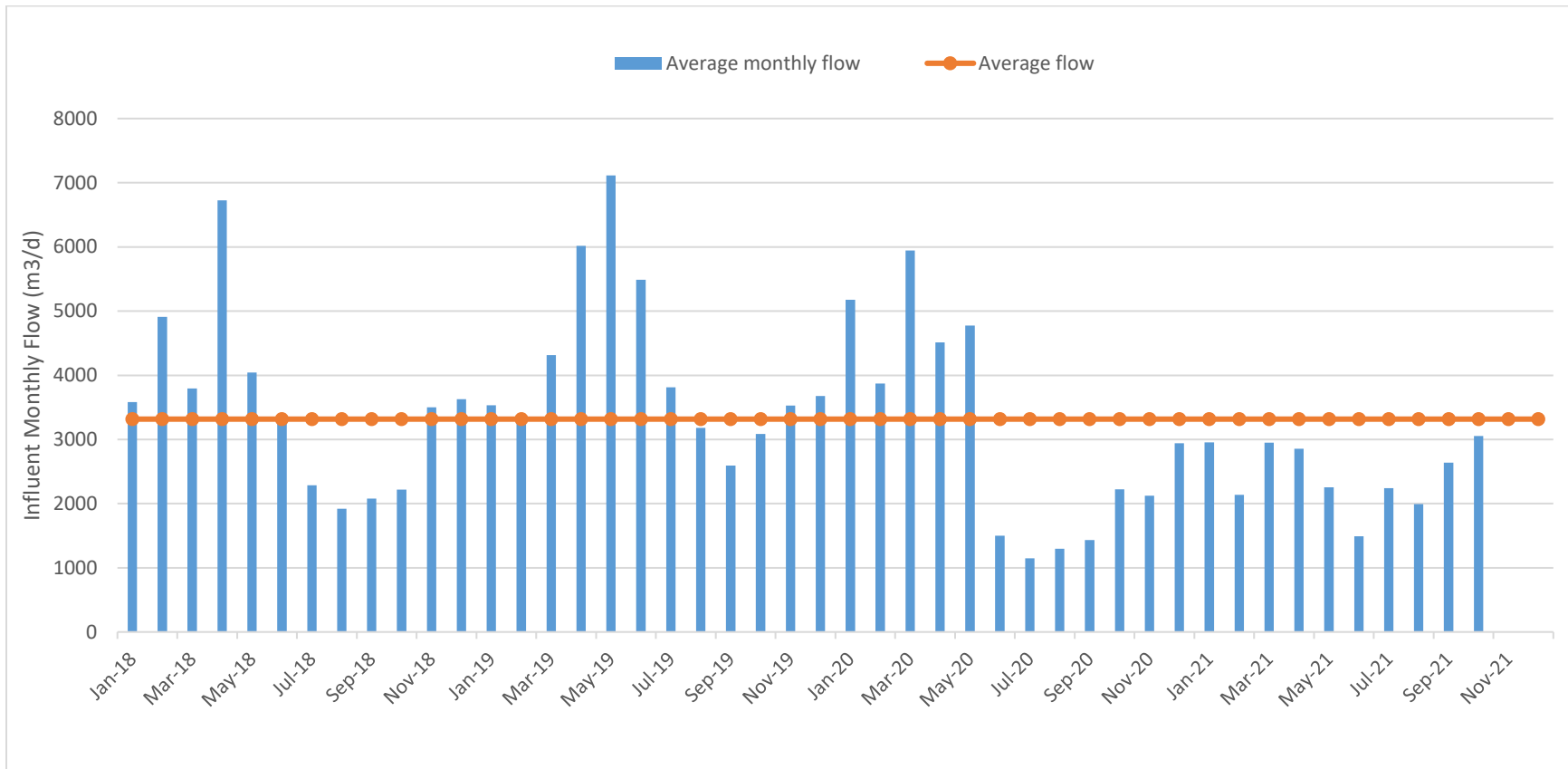


Figure 3.1 – Brighton WPCP Historic Influent Flows

4.0 WPCP HISTORIC PERFORMANCE AND ISSUES

4.1 Aerated Cell and Stabilization Pond Effluent Characteristics

Tables 4.1 and 4.2 summarize the historic effluent characteristics of the aerated cell and the stabilization pond.

Table 4.1 – Aerated Cell Effluent Characteristics

Item	Unit	2018	2019	2020	2021	Average
cBOD ₅	mg/L	28	24	24	25	25
TSS	mg/L	120	113	253	194	170
TP	mg/L	3.2	2.4	5.0	4.5	3.8
TAN	mg/L	14.0	10.2	9.5	14.4	12.1

Table 4.2 – Stabilization Lagoon Effluent Characteristics

Item	Unit	2018	2019	2020	2021	Average
cBOD ₅	mg/L	2.8	3.7	2.6	3.7	3.2
TSS	mg/L	7.2	7.8	7.8	9.1	8.0
TP	mg/L	0.2	0.2	0.2	0.3	0.2
TAN	mg/L	15.1	11.7	12.5	18.0	14.3

4.2 General Observations on WWTP Performance

Figure 4.1 illustrates the monthly average cBOD₅ and TSS values in the stabilization lagoon effluent with comparison to the ECA objectives and limits. As indicated, there were no exceedances of cBOD₅ and TSS limits, while there are occasional minor exceedances of the monthly average TSS objective of 15 mg/L.

The high effluent cBOD₅ and TP in the aerated cell effluent are primarily contributed by the high TSS in the aeration cell effluent, which means a major fraction of these parameters is in particulate form in the aerated cell effluent. As such the treatment provided by the stabilization lagoon is primarily the removal of particulate fractions via settling.

The average values of total ammonia nitrogen (TAN) in the stabilization pond are 10-30% higher than those in the aerated cell effluent. This means that not only is there little or no TAN removal in the stabilization pond, but some TAN gets added to the aerated cell effluent loads leading to worsening of effluent quality for this parameter. See Figure 4.2 for details.

Figure 4.4 illustrates the monthly *E. Coli* values of the stabilization lagoon and constructed wetland effluents. The ECA stipulated that the Geometric Mean Density of *E. Coli* in the constructed wetland effluent should not exceed 200 organisms per 100 millimeters for any calendar month. However, Figure 4.2 indicates that the stabilization lagoon effluent has roughly exceeded the *E. Coli* objective in all cold weather months (Nov throughout May). Further, while the constructed wetland effluent shows some reduction in *E. Coli* in most cases, there are numerous instances when the *E. Coli* in wetland effluent exceeded than in the stabilization effluent, which is a further confirmation of the unreliability and inconsistency in the treatment provided by the same.

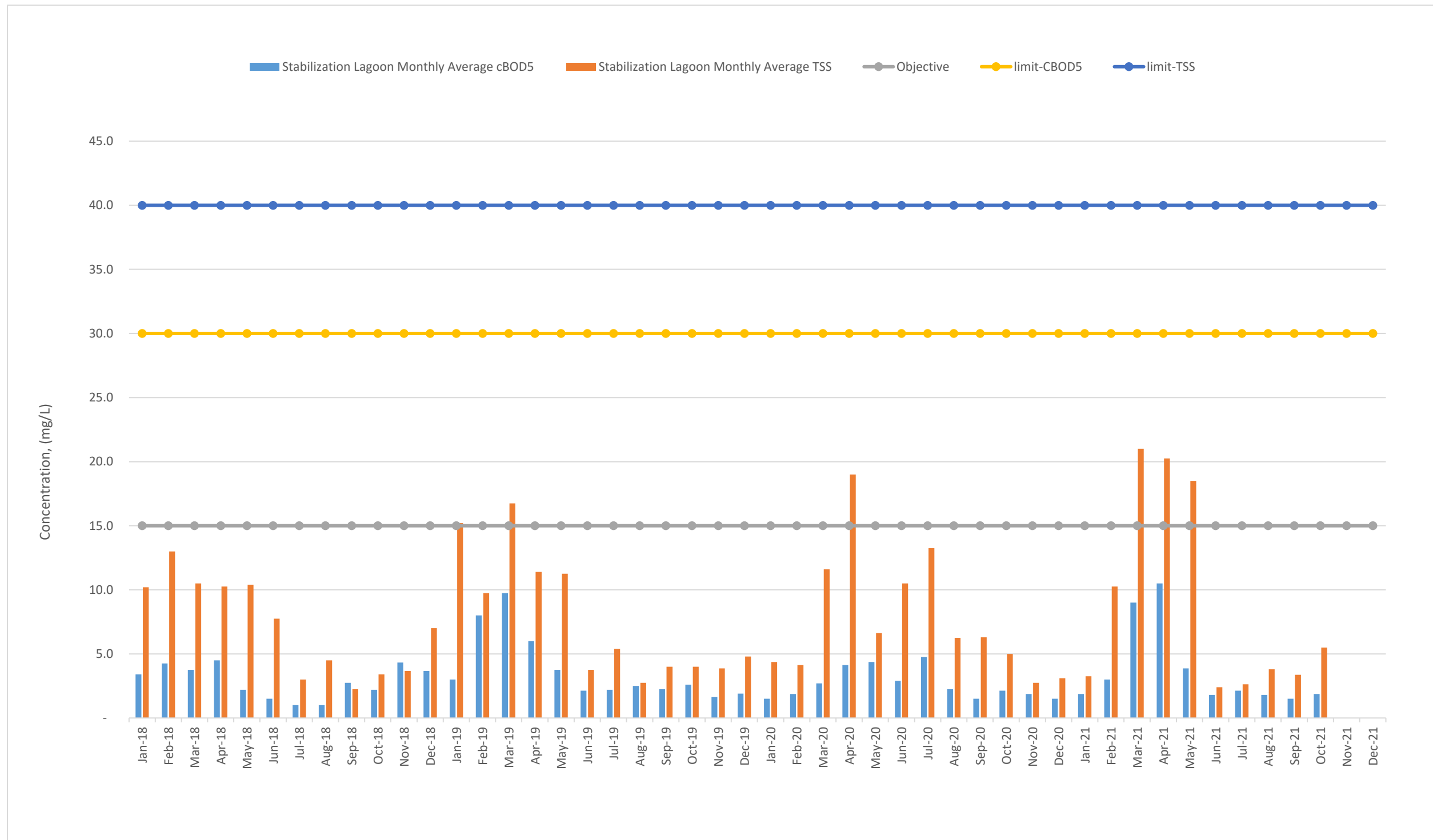


Figure 4.1 – Stabilization Lagoon Effluent cBOD₅ and TSS Trends

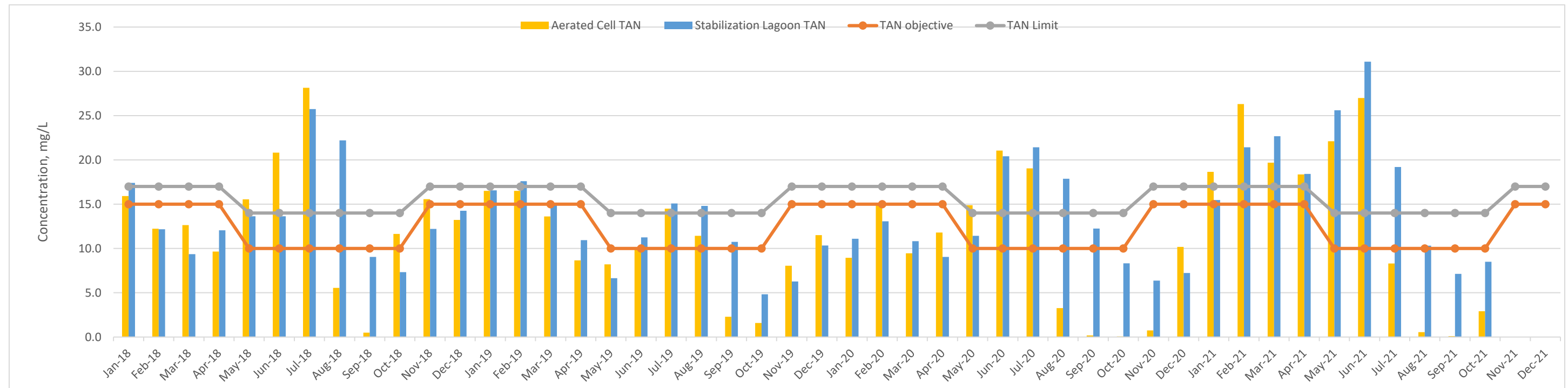


Figure 4.2 – Aerated Cell and Stabilization Lagoon Effluent TAN Trends

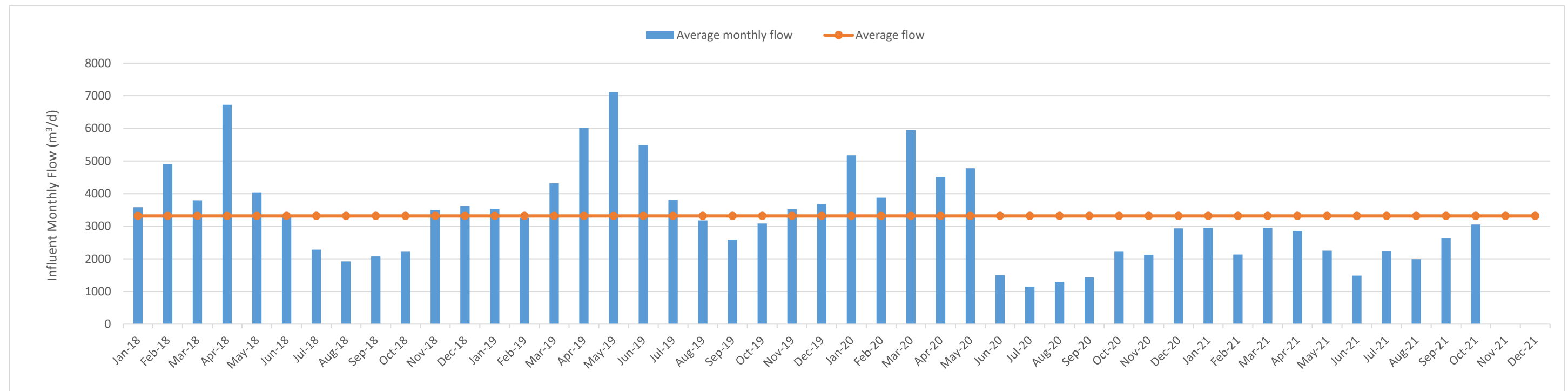


Figure 4.3 – Monthly Average Influent Flow Trends

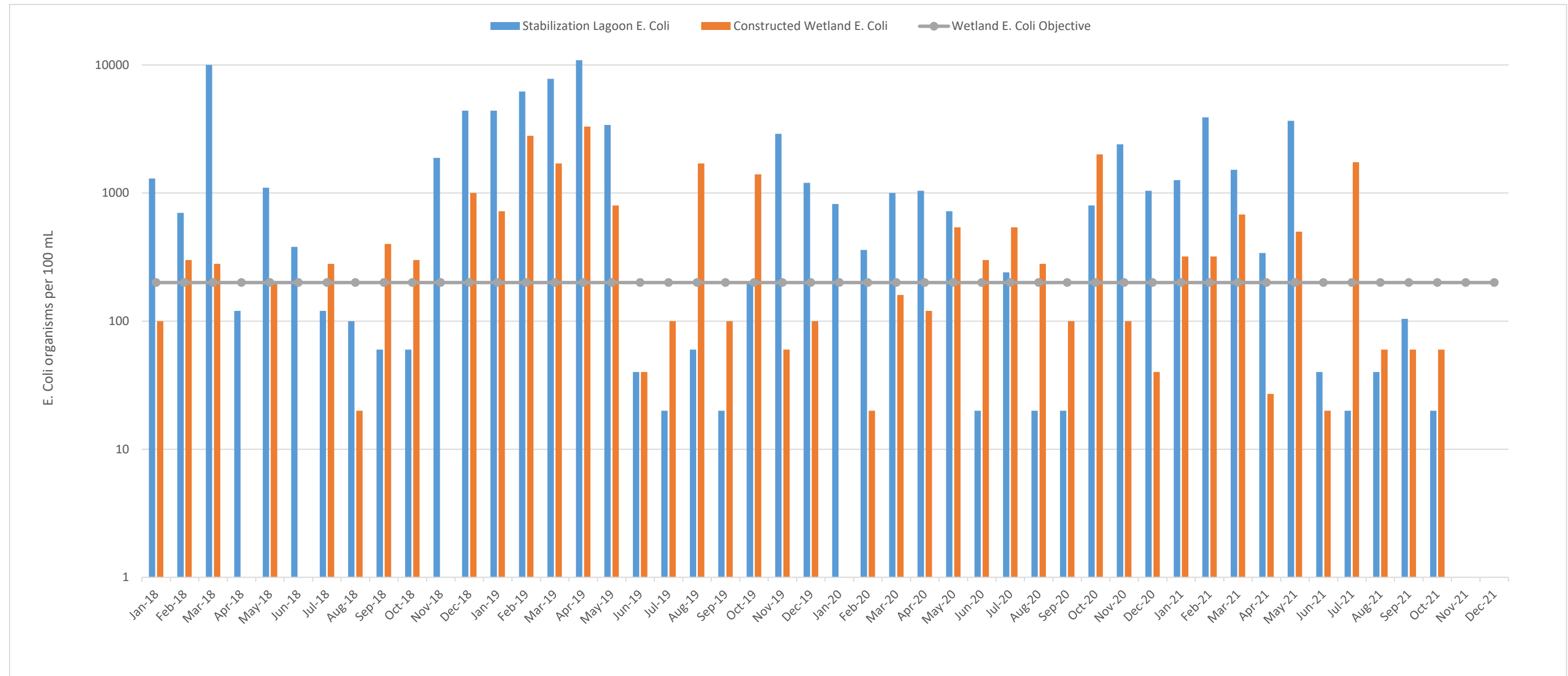


Figure 4.4 – Stabilization Lagoon and Constructed Wetland E. Coli Trends

4.3 TAN Removal in the Aerated Cell

Given below are the key observations on TAN removal in the aerated cell.

- Figure 4.3 illustrates the historic monthly average TAN of both aerated cell and stabilization lagoon effluent verses the ECA objectives and limits. As indicated, there are frequent exceedances of TAN objectives and/or limits in the aerated cell and stabilization lagoon effluents most of the year with the exception of some months in fall.
- Effluent ammonia trends indicate limited nitrification in the aerated cell with ammonia levels mostly ranging between 10-20 mg/L for most months except for the period between August to October when it falls to 5 mg/L or below indicating significant nitrification activity.
- Nitrification limitation in winter months is likely due to combined effect of low temperatures and high flows due to wet weather. The flows during these months average around 4,500 m³/d, decreasing the SRT of the aerated cell to 3.2 d from an already low annual average of approximately 4.3 days. This coupled with the low temperature range (2-10°C) in the cell during these months' limits nitrification.
- The high effluent TAN values during winter and spring are typically followed by further spikes in the months of June and July before a decrease to 5 mg/L or below from August to September and extending as far as November in some years.
- The high TAN values in the month of June and July are likely due to increase in temperature in the aerated cell, and enhanced activity in the bottom zone bringing any settled solids into the upper mixed and biologically active layers. The settlement of mixed liquor and influent solids during the other months indicates mixing limitation of currently installed mechanical aerators in the aerated cell. Breakdown of these sludge solids leads to release of ammonia causing the TAN spikes during these months.
- The above period is followed by the typically dry period from August to September when the flows average between 1,500 -2,500 m³/d giving an SRT range of 6-9 days at average temperature of 20°C. These operating conditions enhance the nitrification activity leading to removal of the solubilized TAN in the preceding months and marked reduction in the TAN concentration in the aerated cell effluent during this period.

4.4 TAN Removal in the Stabilization Lagoon

The effluent TAN values from the stabilization lagoon are mostly equal or slightly lower than the aerated cell effluent during most months except for dry and warm period from August to September (some years extending up to November). This indicates little to no TAN removal in the stabilization lagoon. This means either no nitrification activity in the stabilization lagoon or nullification of any TAN removal by TAN release from the sludge deposits during most months. In August and September however, the TAN release from the sludge deposits decisively exceeds any TAN removal in the stabilization lagoon leading to the high TAN values in the lagoon effluent causing exceedances despite near full nitrification achieved in the aerated cell. These high TAN values produced by the stabilization lagoon are indicative of significant sludge deposits in the lagoon.

5.0 PROPOSED UPGRADE ASSESSMENT

5.1 Upgrade Design Concept

On June 15, 2021, GSS provided an outline of the Triplepoint proposal to upgrade aeration in the aerated cell component of the WPCP and convert it into a fully oxygenated and mixed activated sludge basin (ASB). In addition, the ASB will be equipped with active SRT control via solid separation either by operating it in sequential batch reactor (SBR) mode or provision of a secondary clarifier with a return activated sludge (RAS) facility.

The proposal includes the following:

- 1- Removal of the existing catwalks, original mechanical mixers, and the floating aerators in the aerated cell.
- 2- Installation of the new Triplepoint shore based three 150 hp air blowers (2 duty /1 standby) along with the submerged aeration units. These blowers would be housed within acoustic weatherproof enclosures. The Triplepoint design indicates that the blowers are to be VFD controlled and the total air flow with two blowers running at 100% speed would be approximately 8,883 m³/h (5.050 cfm) and provide approximately 3,900 kg of dissolved oxygen per day to the aerated cell.
- 3- Construction of new secondary clarifier to separate the biological solids from the cell effluent flow and return the concentrated solids back to the aerated cell. The proposed clarifier diameter is 20 m, which translates into a HRTs of 6.6 h at the rated capacity flow of 4,600 m³/d.

GSS also suggested that screening aerated cell effluent upstream of the secondary clarifier to protect the moving parts in the latter. Screening and/or grit removal from raw sewage was deemed unnecessary based on a rationale that the aeration cell would not have any moving parts.

As a supplement to the proposed upgrade to the liquid train, GSS also suggested the following alternatives for proactive sludge management:

- Discharge surplus sludge to the stabilization lagoon from the sludge return line and allow for annual sludge removal from the lagoon.
- Regular discharge of waste sludge from the sludge return line to the sludge drying beds at the north end of the aerated cell, drainage from the bed recycled back to the inlet of the aerated cell and covering of the sludge drying cells for winter operation.

- Periodic discharge of waste sludge from the sludge return line to geotubes located near the edge of the aerated cell and directing the drained liquid back into the aerated cell.

5.2 WPCP Operation Assessment with Proposed Upgrade

BioWin software was used to model the current plant rated capacity (4,600 m³/day) and the proposed future upgraded rate capacity of (6,000 m³/day). One of the basis assumptions in the modelling is that the lagoons have been emptied of sludge, to avoid the impacts seen in the existing which leads to TAN exceedances. In both models, influent characteristics higher than the average historical influent characteristics were used to present tougher operation conditions. Given the significant difference in operation of the upgraded and current systems, particularly the varying SRT and mechanic aeration in the existing system, a calibrated model of the existing system was not prepared to predict the performance of the upgraded system. As such, models of the upgraded system for the current and future rated capacities were prepared using the default values of BioWin operating parameters to achieve this goal. Both models were set for 20 days SRT (minimum 15 days per the MECF guideline), for efficient nitrification and partial sludge stabilization. Table 5.1 illustrates the influent characteristics used in both models.

Note that while the influent BOD₅ values used in the model are higher than the observed maximum month value, the TKN value is lower than the observed maximum month value. See Tables 3.2 and 5.1 for comparison of the BOD₅ and TKN values. The excess BOD₅ value used in the model compensates for the lower TKN value. As such the values given in Table 5.1 were used as such in the models. Further the TP value in Table 5.1, despite being lower than the recorded values was used as such as this has no bearing on the air demand and nitrification ability of the system. The higher TP value observed in the field can be addressed by increasing the dose of ferric chloride.

For both rated capacities, the alternative of Complete Mix Activated Sludge was modeled using BioWin by converting the aerated cell into a completely mixed activated sludge cell with the addition of the proposed 20 m diameter Secondary Clarifier. Table 5.2 illustrates the treatment facilities dimensions.

The operating parameters of the complete-mix activated sludge models at both rated capacities of 4,600 and 6,000 m³/day at summer and winter are summarized in the in Table 5.3.

Table 5.1 – Influent Characteristics Used in BioWin Modeling

Operating Parameter	Unit	Current Capacity		Future Capacity	
		Summer	Winter	Summer	Winter
Rated Capacity	m ³ /day	4,600		6,000	
Influent Temp	°C	20	10	20	10
Influent BOD ₅	mg/L	200	200	200	200
Influent TSS	mg/L	250	250	250	250
Influent TKN	mg/L	60	60	60	60
Influent TP	mg/L	3.3	3.3	3.3	3.3

Table 5.2 – Aerated Cell and Secondary Clarifier Dimensions

Unit Process	Unit	Value
Aerated Cell		
Volume	m ³	14,300
Depth	m ³	2.7
Secondary Clarifier		
Diameter	m	20
Depth	m	4.0
Volume	m ³	1,256
HRT at current capacity	h	6.5

Table 5.3 – Operation Summary for Current and Future Capacity

Parameter	Unit	Current Capacity		Future Capacity		Remarks/ guideline
		Summer	Winter	Summer	Winter	
Average Day Flow (ADF)	m ³ /d	4,600		6,000		
Peak Day Flow (PDF) ¹	m ³ /d	13,294		17,340		
Peak Hourly Flow (PHF) ²	m ³ /d	17,813		23,236		
Influent Temp	°C	20	10	20	10	
MLSS	mg/L	1021	1065	1316	1374	
HRT	h	75	75	57	57	> 15
SRT	d	20	20	20	20	> 15

Parameter	Unit	Current Capacity		Future Capacity		Remarks/ guideline
		Summer	Winter	Summer	Winter	
Mixing Air Demand, Coarse Bubble	m ³ /h	16,988	16,988	16,988	16,988	0.33 L/ (m ³ .s)
Mixing Air Demand, Fine Bubble	m ³ /h	11,631	11,631	11,631	11,631	0.61 L/ (m ² .s)
Biological Air Demand	m ³ /h	4,775	4,597	6,442	6,202	
Average mixing Demand ³	m ³ /h	14,309	14,309	14,309	14,309	
Overall air demand ⁴	m ³ /h	14,309	14,309	14,309	14,309	
Aeration capacity of proposed system	m ³ /h	8,883	8,883	8,883	8,883	
Sec Clarifier SOR at PHF	m ³ /m ² -d	57	57	74	74	< 37
Sec Clarifier SLR at PDF	kg/m ² -d	74	74	74	74	< 170
Effluent cBOD ₅	mg/L	2.5	2.8	2.9	3.3	
Effluent TSS	mg/L	8.8	8.9	11.8	11.8	
Effluent TAN	mg/L	0.08	0.16	0.08	0.16	
Wasted Sludge	m ³ /day	235	236	229	229	
Wasted Sludge Conc	%	0.30%	0.30%	0.40%	0.40%	

1. Based on historic PDF factor of 2.89
2. Based on WEF guidelines for PDF and PHF peaking factor
3. Average of the coarse-bubble and fine-bubble mixing demands
4. Higher of the mixing and biological air demands.

Given below are the key observations on the predicted performance of the upgraded WPCP.

- The complete-mix activated sludge lagoon provides very long hydraulic retention time (HRT), 75 and 57 hour for the plant rated capacities of 4,600 and 6,000 m³/day, respectively, which are much higher than the minimum 15 h requirement for extended aeration systems per the MECP guidelines.
- The proposed secondary clarifier with 20 m diameter has surface overflow rates (SOR) of 57 and 74 m³/m²-d at the design peak hourly flows under the current and future capacity respectively. These SOR values are significantly higher than the MECP guideline of maximum 37 m³/m²-d, which indicates a high probability of effluent TSS spikes in the secondary effluent to the stabilization pond during peak flows. On the other hand, the solids loading rates (SLR) range of 22-39 kg/m²-d at peak day flows for the current and future capacity is significantly lower than the MECP guideline of

maximum of 170 kg/m²-d. As such, the low SLR and the solids removal in the stabilization lagoon are significant mitigating factors for the high SOR for the secondary clarifier.

- The biological air demands for summer season are 4,775 and 6,442 m³/h, respectively for rated capacities 4,600 and 6,000 m³/d respectively. The required aeration capacity for complete mixing of the lagoon is calculated for both coarse and fine bubble diffusers aeration. The mixing aeration demands with coarse bubble and fine bubble aeration demands are estimated at 16,988 m³/h and 11,631 m³/h respectively based on the MECP guideline. As the aeration system in the proposed upgrade provides both coarse-bubble and fine-bubble aeration, the overall estimated demand, taken as the average of the above two value, equals 14,309 m³/h, which is significantly higher than the aeration capacity of 8,883 m³/h of the proposed aeration system. As such while the proposed system has adequate capacity for biological demand for both capacities, it does not meet the requirements for mixing based on MECP guidelines. This will mean that the aerated cell will not be “completely mixed” and that the incomplete mixing will lead to settlement of solids in the unmixed zones.
- The predicted wasted sludge flowrate at the plant rated capacity of 4,600 m³/d after converting the aerated cell into complete-mix activated sludge lagoon is 235 m³/d at 0.3% solids concentration. The waste sludge will be further stabilized and expected to be naturally thickened (typically of 8-10% solids concentration) in the polishing lagoon the wasted sludge will be.
- Given the existing sludge accumulation and the associated ammonia release issues with the same, the proposed approach of waste sludge storage in the lagoon would nullify the upgrade benefits to a large extent unless the accumulated sludge is removed and disposed off periodically.

Note that the approach for intermittent aeration to operate the aerated cell in the SBR mode is not considered practically viable without the automated controls, equipment to operate it as an SBR, and modifications to the aeration cell. Further, the tank geometry and depth would not only make the SBR equipment retrofit a challenge, but also pose significant operational challenges as an SBR system. As such, this option for design upgrade is not recommended and therefore not given any further consideration.

5.3 Operation Cost Implications

The aeration blowers in the proposed upgrade have rated power of 300 HP or 225 kW, which is approximately 225 kW higher than the combined power of 59.6 kW of the existing four mechanical aerators. Considering current average power cost of approximately \$0.12/kW-h, this translates into approximately \$160K of additional

energy cost per annum, which is significant. Further, the increased power demand at the plant should be compared with the existing power supply to identify upgrades required if any to the power supply, and the cost implications of these upgrades considered in the overall cost analysis.

6.0 CONCLUSIONS SUMMARY AND SUGGESTED IMPROVEMENTS

6.1 Existing WWTP

- The TAN exceedances in the existing WWTP are caused by operational limitations in both the aerated cell as well as the stabilization lagoon. The aerated cell being a flow through system operates at low average SRT of 3 days which is insufficient for nitrification in during wet weather and/or winter months.
- The existing aeration system provides limited mixing in the aerated cell thereby allowing some settlement of the solids in the mixed liquor. Over time, these settled solids undergo anoxic degradation as the cell temperature increases in the months of May and June, resulting in release of ammonia, leading to elevated TAN concentrations in aerated cell effluent during these months (as shown in the results). This period is followed by the typically warmer and dryer condition in the period from August to September (sometimes extending further into Fall) when the high temperatures and high SRTs (induced by low flows) enhance the nitrification activity leading to removal of the solubilized TAN in the preceding months and marked reduction in the TAN concentration in the aerated cell effluent during this period.
- There is very little to no TAN removal in the stabilization lagoon. This means either no nitrification activity in the stabilization lagoon or nullification of any TAN removal by TAN release from the sludge deposits during most months. In August and September however, the TAN release from the sludge deposits decisively exceeds any TAN removal in the stabilization lagoon leading to the high TAN values in the lagoon effluent causing exceedances despite near full nitrification achieved in the aerated cell. These high TAN values produced by the stabilization lagoon are indicative of significant sludge deposits in the lagoon.

6.2 Proposed Upgrade

The proposed upgrade concept recognizes most of the limitations in the existing system and is designed to address the same. Provision of a completely mixed aeration system with full oxygenation capacity and mixing, together with the addition of proper secondary clarification with capability of returning sludge would be able to mitigate the current effluent TAN exceedances. However, there are the following limitations in the proposed upgrades that would need to be addressed further to achieve the desired improvements:

- Given the existing sludge accumulation and the associated ammonia release issues with the same, the proposed approach of waste sludge storage in the stabilization lagoon would likely nullify the benefit of the proposed upgrade (particularly for the warm months) to a large extent unless the existing accumulated sludge is removed

and disposed off, and this practice is adopted as a scheduled maintenance activity on a periodic basis. However, it should be noted that this activity can incur significant operational cost. As such other options of sludge management suggested in the GSS proposal including – geotube dewatering and storage, or dewatering via the existing sludge drying beds – should be considered against lagoon storage with regard to capital and operational costs and other operational considerations including ease of operation, maintenance and odour potential.

- The proposed upgrade does not include removal of accumulated solids from the aerated cell and the stabilization lagoon, a factor, that is potentially critical to achieving the desired outcome with the upgrades. As such, this step needs to be included as a pre-requisite to implementation of the proposed upgrades.
- Provision of a screen between the aerated cell and the secondary clarifier, while protecting the latter, will not be protective of the aerated cell as the rags could be a significant operational risk for aeration diffusers. In addition, the absence of grit removal from raw sewage would lead to grit accumulation in the aerated cell which would not only lower the effective treatment volume over time but also be an additional fouling risk for the fine bubble aeration system. As such screening and grit removal facilities upstream of the aerated cell must be an essential component of the upgrade for a robust and complete upgrade solution.
- The method of installation of diffusers and the ability to inspect and clean, repair or relace diffusers should be considered carefully. In addition, installation methods and support provisions for air piping need to properly designed.
- The aeration system capacity of 8,585 m³/hr in the proposed upgrade, while adequate for the biological demands for the current and future capacities of 4,600 m³/d and 6,000 m³/d, is limited for mixing based on the MECF guidelines. The design aeration capacity of the proposed upgrade seems adequate to provide mixing at the flat bottom of the lagoon, but not the entire cell. This could cause accumulation of the sludge on the sloped sides of the cell, which in the longer run would create anerobic condition and high-concentration ammonia bleed-outs in the summer and fall months as experienced with the current system.
- The proposed secondary clarifier with 20 m diameter is hydraulically limited for the design peak hourly flows for both current and future capacity, as the peak SOR values of 57 m³/m²-d and 74 m³/m²-d significantly exceed the MECF guideline of maximum 37 m³/m²-d. While the low peak SLR values at the current and future capacity could mitigate the hydraulic limitation to some extent, there is still the danger of solids loss to the effluent. Also, while the availability of the stabilization lagoon provides a buffer to capture potential high effluent TSS from the secondary clarifier,

the consultant should select a design SOR value that protect the process from solids washout, and that can be defended to the ministry during ECA amendment of the WWTP.

- It is also noted that the MECP guidelines are normally conservative and there are references in the WEF guidelines of lower unit rates for mixing with fine-bubble systems. In addition, the mixing demand calculation in this assessment report was based on the average cross-sectional area of the aerated cell as opposed to the bottom area used by the supplier. As such there may be mitigating conditions for the identified aeration limitation. Should that be the case the proponent should be asked for a guarantee to meet both mixing and oxygenation requirements and ensure that the design of the aeration system should either satisfy the MECP reviewer's requirements and support the ECA amendment or is upsized to meet the MECP guidelines.
- The approach for intermittent aeration to operate the aerated cell in the SBR mode is not considered practically viable without automated controls, proper equipment to operate it as an SBR, and modifications to the aeration cell, and therefore not recommended for this upgrade.
- The Consulting Engineer should ask Triplepoint™, the mode of securing/anchoring the air-feed pipe and diffuser assemblies to prevent their movement and damage. Also, the bearing capacity of the aerated cell bottom should be considered for the latter's ability to support the diffuser assembly bases, which appear to be made of steel and therefore carrying concentrated weights.
- The proposed upgrade has the potential to set-up the WPCP for future re-rating to a capacity of 6,000 m³/d. The existing aerated cell and the proposed aeration system in the current upgrade are large enough to accommodate a rated capacity of 6,000 m³/d and therefore would not require upsizing for the higher capacity. The headworks facility (screening and grit removal), the secondary clarifier and the sludge management facility will however have to be sized for 6,000 m³/d in the current upgrades to set-up the WPCP for re-rating in future. It should be noted that while upsizing these unit processes in the current upgrade will add a marginal cost to the upgrades for 4,600 m³/d capacity, it will be significantly more cost-effective compared to a future expansion to 6,000 m³/d. The MECP should be pre-consulted for their buy-in for this approach particularly with regard to the anticipated effluent criteria for the rated capacity of 6,000 m³/d.

Based on the above discussion and suggestions, Table 6.1 gives a summary of the key processes and considerations for a robust solution for the WWTP upgrade.

Table 6.1 – Proposed Upgrade Summary and Additional Considerations

Unit Process	Upgrade	Consideration
Headworks	New Headworks facility with screening (6 mm or less) and grit removal system	Recommended to be provided upstream of the aerated cell.
Aerated cell	Installation of fine-bubble aeration system	The air supplied by the proposed aeration system should be confirmed with the supplier for its ability to provide full mixing of the aerated cell.
	Removal and disposal of the accumulated sludge	The accumulated sludge in the aerated cell needs to be removed and properly disposed as a part of this upgrade, and this cost should be included in the upgrade cost estimate.
Secondary Clarifier	A new secondary clarifier with sludge recycling facility	Upsizing the proposed clarifier diameter should be considered to bring it closer to MECF guidelines.
Stabilization pond	Removal and disposal of the accumulated sludge	The accumulated sludge in the stabilization pond needs to be removed and properly disposed as a part of this upgrade, and this cost should be included in the upgrade cost estimate.
Sludge management	Provision/implementation of a sludge management facility/plan	Waste sludge storage in the stabilization lagoon, geotube dewatering/storage, or dewatering via sludge drying beds should be evaluated with regard to capital and operational costs, O&M requirements and odours, and the best option implemented as a part of this upgrade. The capital cost of any sludge management facility/plan cost should be included in the upgrade cost estimate and/or life-cycle cost analysis.