Welcome!

Peel Wastewater Treatment Solutions

G.E. Booth Water Resource Recovery Facility
Schedule C Class Environmental Assessment

The Region of Peel is situated on the Treaty Lands and Territory of the Mississaugas of the Credit First Nation as well as the traditional territory of the Anishinabeg, Huron-Wendat, and Haudenosaunee peoples.

Virtual Public Information Event No. 4
On Display from Wednesday, March 15th, 2023

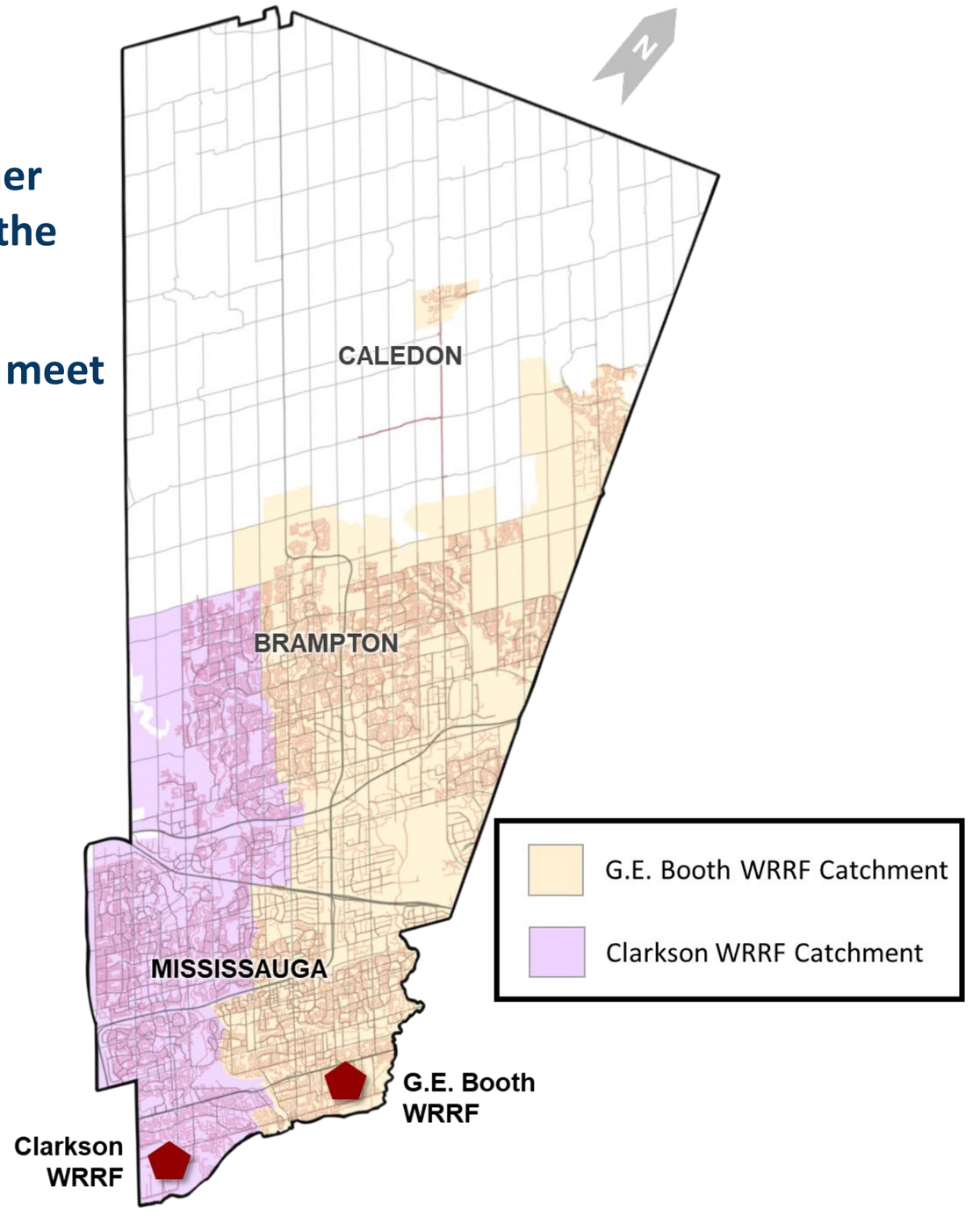
Background Information

- **Wastewater from residential, commercial, institutional, and industrial users in the Region of Peel is collected through a network of sewers and pumping stations and treated at either the G.E. Booth Water Resource Recovery Facility (WRRF) or the Clarkson WRRF.**
- **As population grows in Peel, there is insufficient capacity to meet future wastewater treatment needs at the WRRFs.**

The Region of Peel is

GROWING!

2016	2041	
2.12 Million	**2.94 Million**	**40% increase**
1,428,000 people 695,000 jobs	1,970,000 people 970,000 jobs	+ 542,000 people + 275,000 jobs

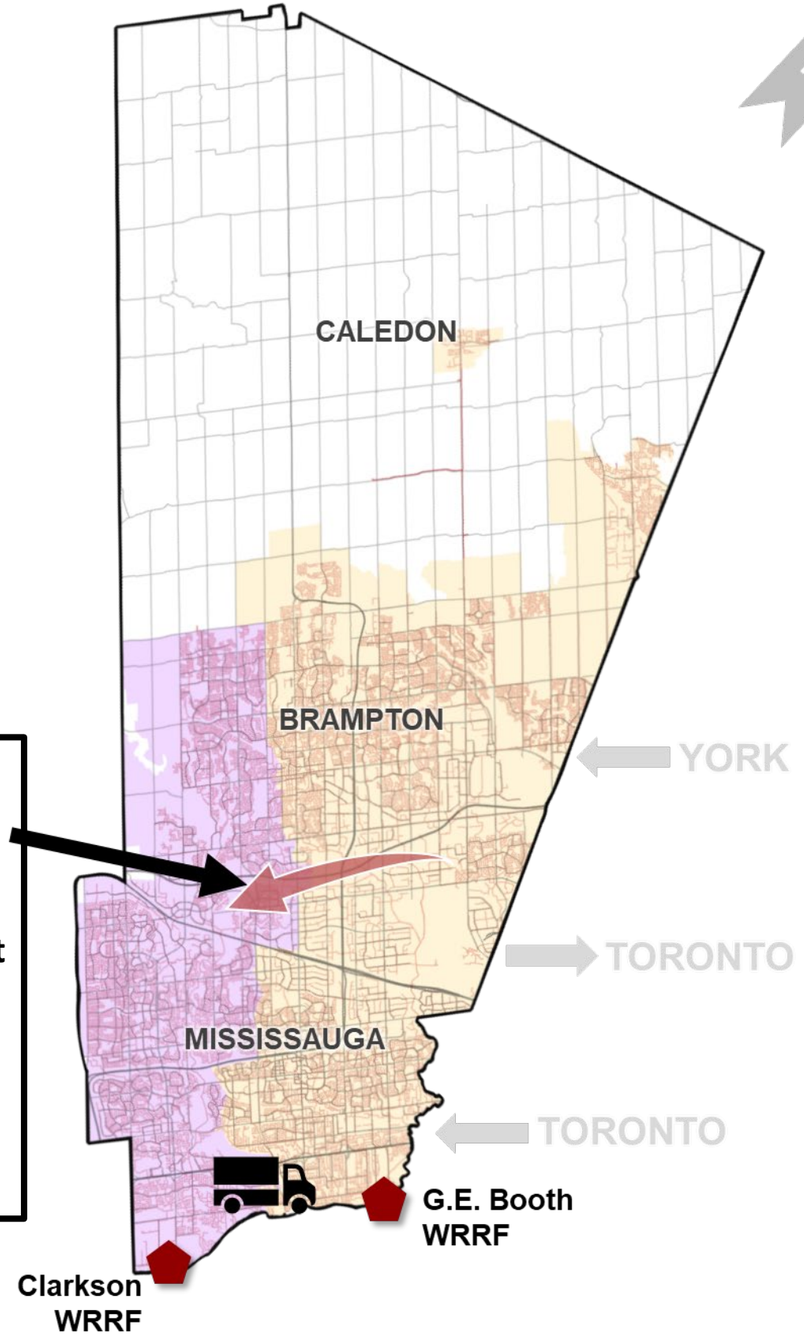


Peel's Wastewater Treatment System

G.E. Booth WRRF (518 MLD)

Clarkson WRRF (350 MLD)

The East-West Diversion is a deep gravity trunk sewer of 2400 mm diameter currently being constructed along Derry Road. It is expected to be completed and operational by 2027. It allows Peel to divert flows from the G.E. Booth WRRF catchment area where there are capacity limitations, to the Clarkson WRRF catchment area which currently has surplus capacity.



Problem / Opportunity Statement

The Region is undertaking two Schedule C Class EAs to develop preferred solutions at the G.E Booth WRRF and the Clarkson WRRF that will:

- Meet future needs associated with population growth, new regulations, climate resiliency, energy efficiency, and wet weather flow management.
- Address community expectations regarding level of service, odour, air/noise, water quality, protection of the environment and aesthetics.
- Provide greater flexibility and reliability in wastewater and biosolids management.

This Public Information Centre focuses on the Schedule C Class EA for the G.E. Booth WRRF.

Goals & Objectives of the Class EAs

	Long-Term Sustainability	• Region-wide wastewater and biosolids management with operational flexibility • Multiple biosolids product marketing opportunities • Resource recovery through beneficial use
	Resiliency	• Manage wet weather flows • Adapt to changing conditions • Built-in redundancy in treatment processes
	Energy Efficiency and Reduce Greenhouse Gas (GHG) Emissions	• Support Peel's GHG Reduction Goals • Energy Reduction and Reuse Opportunities
	Environmental Protection	• Mitigate risks to natural environments • Meet air and effluent quality requirements
	Community Acceptability	• Manage odour and noise • Limit truck traffic • Visually appealing designs and landscaping
	Ease of Operations	• Operator acceptability • Proven processes
	Fiscally Responsible	• Balance life-cycle costs, while protecting the environment and communities

Class EA Process

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Problem or Opportunity	Alternative Solutions	Alternative Design Concepts for Preferred Solution	Environmental Study Report (ESR)	Implementation
Identify Problem and Opportunity	Identify Alternative Solutions to Problem and Opportunity	Identify Alternative Design Concepts (technologies, construction methods, site layouts)	Complete Environmental Study Report (ESR)	Complete Contract Drawings and Tender Documents
Notice of Commencement (July 16, 2020)	Public Information Event No. 1. RE: Problem / Opportunity Statement and Alternative Solutions	Detail Inventory Natural, Social, Economic Environment	Environmental Study Report (ESR) Placed on Public Record	Proceed to Construction and Operation
	Inventory Natural, Social, Economic Environment	Identify Impact of Alternative Designs on Environment, and Mitigating Measures	Notice of Completion to Review Agencies and Public	Monitor for Environmental Provisions and Commitments
	Identify Impact of Alternative Solutions on the Environment, and Mitigating Measures	Evaluate Alternative Designs: Identify Recommended Design Concepts	Opportunity to Request Minister Within 30 Days of Notification to consider a Section 16 Order	
	Evaluate Alternative Solutions: Identify Recommended Solutions	Public Information Event No. 3. RE: Preliminary Preferred Design Concept for Clarkson WRRF (May 11, 2022)		
	Public Information Event No. 2. RE: Preliminary Preferred Solution	Public Information Event No. 4. RE: Preliminary Preferred Design Concept for G.E. Booth WRRF		
	Select Preferred Solution	We are here!		
		Select and Finalize Preferred Design Concept		

PHASES 1 & 2 COMPLETED CONCURRENTLY FOR G.E. BOOTH WRRF AND CLARKSON WRRF

PHASES 3, 4, & 5 COMPLETED SEPARATELY FOR G.E. BOOTH WRRF AND CLARKSON WRRF

PIC No.4 Objectives

Objective: Review Phase 2 solutions and provide an overview of Phase 3 of the Class EA for the G.E. Booth WRRF

Present recommendations and preliminary preferred design concepts for key study components.

Provide clarity on the Municipal Class Environmental Assessment process and results.

Identify next steps and study commitments.

Receive feedback on the preliminary preferred design concepts.

This is the fourth and final PIC for the G.E. Booth WRRF and Clarkson WRRF studies. PIC #1 (October 2020) and PIC #2 (April 2021) were conducted for Phases 1 & 2, respectively, for both plants. PIC #3 (May 2022) was conducted to outline the Phase 3 recommendations for the Clarkson WRRF.

Phase 3 Key Questions

- What technologies should we use to treat our wastewater (liquid and solids components)?
- Where should our treated biosolids go and be used?
- Do we require additional outfall capacity? How will it be provided?
- How should the wastewater plant site be laid out and look?
- How do we mitigate environmental and social impacts?

Phase 2: Existing Conditions

Wastewater Treatment

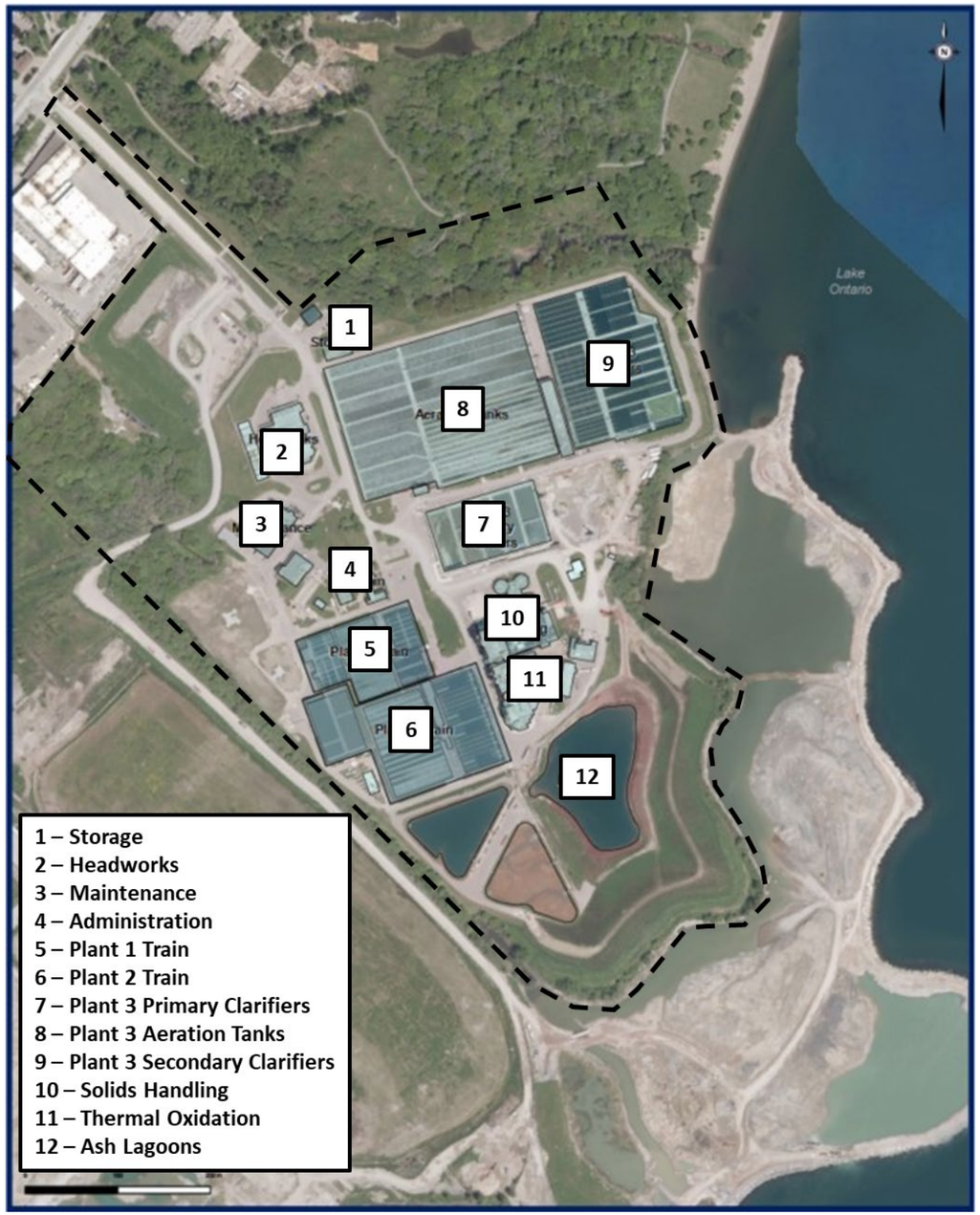
- Plant treats flows using conventional activated sludge (CAS) process with an average rated flow capacity of 518 Megalitres per day (MLD).
- Processes include screening, grit removal, primary clarification, aeration, secondary clarification, and chlorine disinfection and de-chlorination prior to discharge to Lake Ontario through the plant's outfall.
- Ongoing upgrades include the replacement of Plant 1, upgrades to Plant 3 primary clarifiers, and incinerator refurbishment.

Outfall

- Existing outfall is 3.65 metres in diameter and 1,435 metres in length and conveys effluent from Plants 1, 2, & 3 into Lake Ontario.

Biosolids Management

- Primary and waste activated sludge (WAS) is dewatered and incinerated in four fluidized bed incinerators.
- Digested sludge from the Clarkson WRRF is currently trucked to the G.E. Booth WRRF for incineration.
- Ash slurry from the incinerators is pumped to ash lagoons for settling and storage.



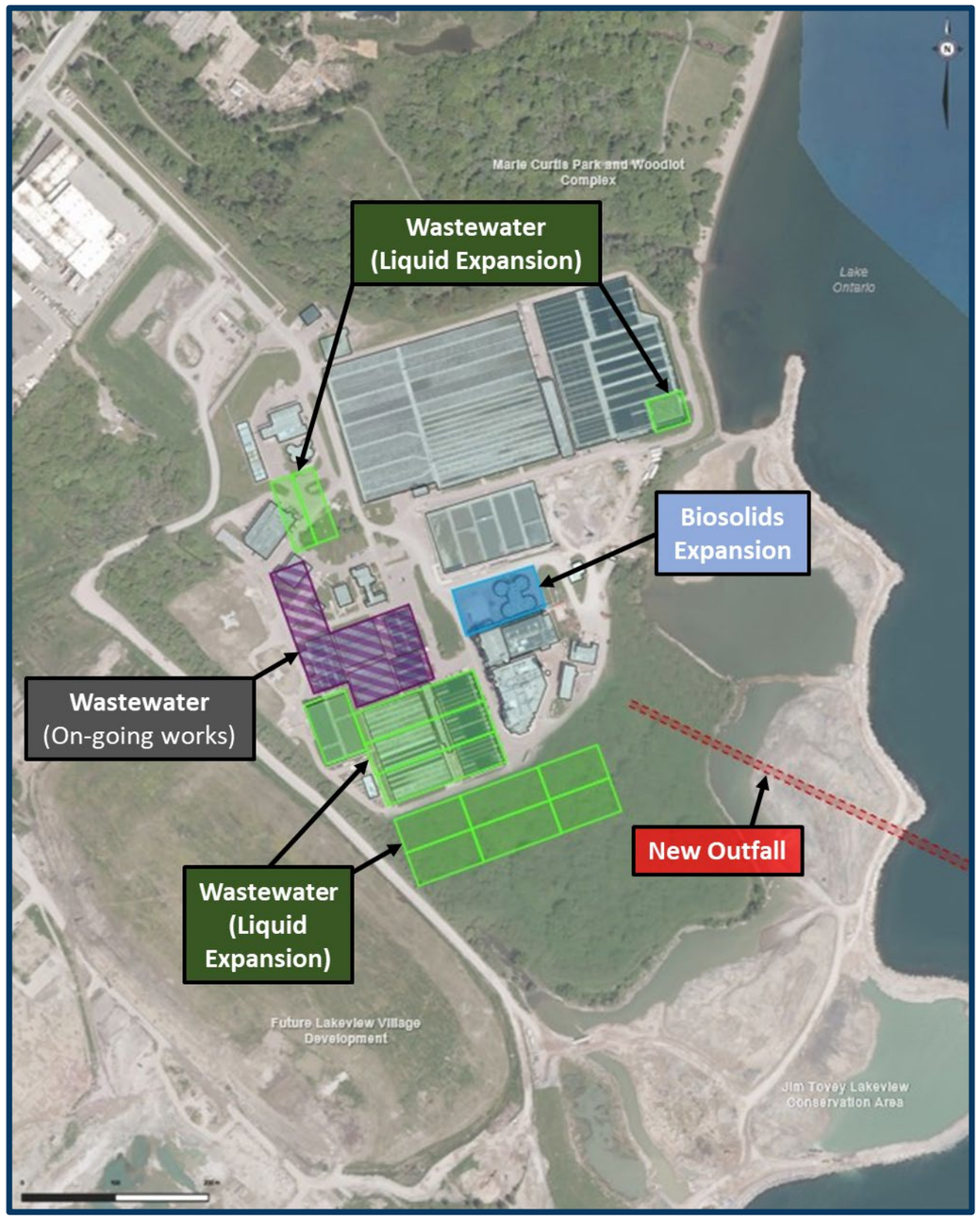
Phase 2: Recommended Solutions

Recommended Strategy to Treat Wastewater

- Divert flows through the East-West Diversion Trunk Sewer
- **Expand the G.E. Booth WRRF from 518 MLD to 550 MLD**
- **New Outfall at the G.E. Booth WRRF**
- Expand the Clarkson WRRF from 350 MLD to 500 MLD

Recommended Strategy to Manage Biosolids

- Provide biosolids treatment at the Clarkson WRRF and market product for beneficial land use. This will result in phasing out the trucking of sludge from the Clarkson WRRF to the G.E. Booth WRRF.
- **Assess alternatives for treatment and management of solids at the G.E. Booth WRRF, taking into consideration the incinerators' remaining service life and the investment Peel has made in the technology.**



Phase 3: Evaluation Approach

STEP 1
Develop Long List of Technologies

STEP 2
Screen Long List of Technologies

'Must-Have' Screening Criteria:
- Maturity of Technology
- Proven Application at Large WRRFs
- Compatibility with Existing and Future Processes
- Compatible with Region's Energy Management and GHG Reduction Goals

STEP 3
Develop Combination of Short-Listed Technologies into Design Concepts

STEP 4
Evaluate Design Concepts

EA Evaluation Categories:
- Natural Environment (25%)
- Social / Cultural Environment (25%)
- Technical Considerations (25%)
- Economic Considerations (25%)

STEP 5
Evaluate Feasible Alternatives per Region's Key Objectives

Region's Key Objectives:
- Long-term Sustainability
- Resiliency
- Environmental Protection
- Community Acceptability
- Ease of Operations
- Energy Efficiency
- Fiscally Responsible

STEP 6
Recommend Preferred Design Concept

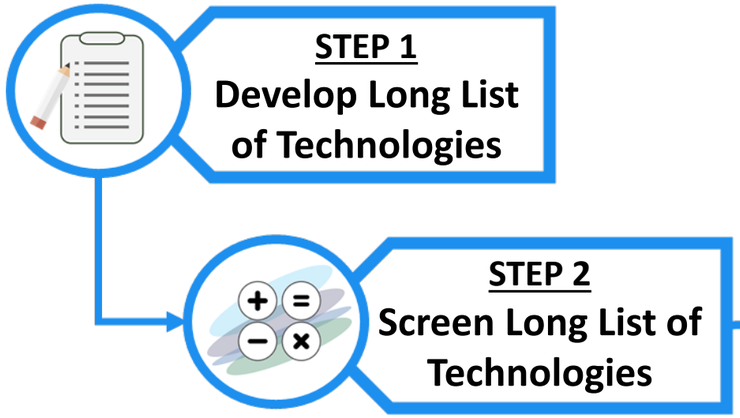
OUTFALL

STEP 1
Identify Alternative Shaft Locations and Outfall Alignmentsx

STEP 2
Evaluate Alternatives

STEP 3
Recommend Preferred Alternative

Wastewater Treatment – Long List Alternatives & Screening



'Must-Have' Screening Criteria:

- Maturity of Technology
- Proven Application at Large WRRFs
- Compatibility with Existing and Future Processes
- Compatible with Region's Energy Management and GHG Reduction Goals

No.	Technology Alternative	Maturity of Technology	Proven Application at Large WRRFs	Compatibility with Existing and Future Processes	Compatible with Region's Energy Management and GHG Reduction Goals	SHORT-LISTED FOR EVALUATION
1	Conventional Activated Sludge (CAS)	Positive/No Impact	Positive/No Impact	Positive/No Impact	Moderate Impact	Yes
2	CAS with Chemically Enhanced Primary Treatment (CEPT)	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Yes
3	CAS with Wet Weather Flow (WWF) Treatment	Positive/No Impact	Moderate Impact	Positive/No Impact	Moderate Impact	Yes
4	Ballasted Activated Sludge (BAS)	Moderate Impact	High Impact	Positive/No Impact	Moderate Impact	No
5	Biological Nutrient Removal (BNR)	Moderate Impact	Moderate Impact	High Impact	Positive/No Impact	No
6	Membrane Bioreactor	Positive/No Impact	Moderate Impact	Positive/No Impact	High Impact	No
7	Membrane Aerated Biofilm Reactor	Moderate Impact	High Impact	Positive/No Impact	Positive/No Impact	No
8	Integrated Fixed-Film Activated Sludge / Moving Bed Bioreactor	Moderate Impact	High Impact	High Impact	High Impact	No
9	Sequencing Batch Reactor	Positive/No Impact	Moderate Impact	High Impact	High Impact	No
10	Aerobic Granular Sludge	Moderate Impact	Moderate Impact	High Impact	Moderate Impact	No
11	Biological Aerated Filter	Positive/No Impact	Positive/No Impact	High Impact	High Impact	No

Wastewater Disinfection – Long List Alternatives & Screening

STEP 1
Develop Long List of Technologies

STEP 2
Screen Long List of Technologies

'Must-Have' Screening Criteria:

- Maturity of Technology
- Proven Application at Large WRRFs
- Compatibility with Existing and Future Processes
- Compatible with Region's Energy Management and GHG Reduction Goals

No.	Technology Alternative	Maturity of Technology	Proven Application at Large WRRFs	Compatibility with Existing and Future Processes	Compatible with Region's Energy Management and GHG Reduction Goals	SHORT-LISTED FOR EVALUATION
1	Chlorination/ dechlorination	Positive/No Impact	Positive/No Impact	Positive/No Impact	Moderate Impact	Yes
2	UV Disinfection	Positive/No Impact	Positive/No Impact	Moderate Impact	Moderate Impact	Yes
3	Ozonation	Positive/No Impact	Moderate Impact	Moderate Impact	High Impact	No
4	Peracetic Acid	Moderate Impact	Moderate Impact	High Impact	Moderate Impact	No

Description of Alternative Wastewater Design Concepts

STEP 3
Develop Combination of Short-Listed Technologies into Design Concepts

Wastewater Treatment

Alternative	Description
Conventional Activated Sludge (CAS) Process	This alternative involves expanding the G.E. Booth WRRF with new CAS process trains which are consistent with the existing facility and would follow the same operating philosophy. There are opportunities to retrofit CAS tankage in the future to accommodate other newer technologies to optimize aeration and energy efficiency.
CAS Process with Chemically Enhanced Primary Treatment (CEPT)	This alternative involves expanding the G.E. Booth WRRF with new CAS process trains optimized with CEPT. The addition of metal salts and polymer upstream of the primary clarifiers would aid with solids settling, reducing the organic and solids load to the secondary treatment process. This would reduce the size of the aeration tanks and would reduce the energy consumption required for aeration.
CAS Process Optimized with Wet Weather Flow (WWF) Management	This alternative involves implementing WWF management to reduce peak flows to the G.E. Booth WRRF. This could involve either a parallel, high-rate treatment facility at the plant or implementing Real Time Control (RTC) in the collection system. The G.E. Booth WRRF would be expanded with new CAS process trains. This alternative would allow for the construction of smaller CAS tanks.

Wastewater Disinfection

Alternative	Description
Chlorination/ dechlorination	This technology involves expanding the disinfection facilities at the G.E. Booth WRRF using chlorination and dechlorination. This might involve construction of a new chlorine contact tank or integration with the proposed new outfall.
Ultraviolet (UV) Disinfection	This technology involves construction of a new UV disinfection facility including in-channel UV disinfection systems and power equipment.

Wastewater Treatment and Disinfection: Design Concept Evaluation

STEP 4
Evaluate Design Concepts

EA Evaluation Categories:
- Natural Environment (25%)
- Social / Cultural Environment (25%)
- Technical Considerations (25%)
- Economic Considerations (25%)

Minimal difference in the overall scoring of the design concepts, therefore a second evaluation was conducted based on the Key Objectives of the Region.

Wastewater Treatment Design Concepts

Design Concepts		Natural Environment (25%)	Social – Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Conventional Activated Sludge (CAS)		17.1	17.0	18.4	15.8	68.4
CAS with Chemically Enhanced Primary Treatment (CEPT)		16.7	16.8	18.6	14.2	66.3
CAS with WWF Treatment	CAS with High-Rate Clarification	18.3	18.0	19.8	15.0	71.1
	CAS Optimized using Real Time Control (RTC)	18.3	18.0	19.8	17.5	73.6

Wastewater Disinfection Design Concepts

Design Concepts	Natural Environment (25%)	Social – Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Chlorination / Dechlorination	17.9	20.7	20.9	15.8	75.3
Ultraviolet (UV) Disinfection	18.3	21.4	20.5	16.7	76.9

Wastewater Treatment and Disinfection: Evaluation of Feasible Design Concepts

Region of Peel
working with you

STEP 5
Evaluate Feasible Alternatives per Region's Key Objectives

Region's Key Objectives:

- Long-term Sustainability
- Resiliency
- Environmental Protection
- Community Acceptability
- Ease of Operations
- Energy Efficiency
- Fiscally Responsible

Wastewater Treatment Design Concepts

Design Concepts	Long-term Sustainability	Resiliency	Environmental Protection	Community Acceptability	Ease of Operations	Energy Efficiency	Fiscally Responsible	Preferred Alternative
Conventional Activated Sludge (CAS)	✓							
CAS with Chemically Enhanced Primary Treatment (CEPT)	✓					✓		
CAS with High-Rate Clarification	✓	✓	✓	✓	✓			
CAS Optimized using Real Time Control (RTC)	✓	✓	✓	✓	✓		✓	✓

Wastewater Disinfection Design Concepts

Design Concepts	Long-term Sustainability	Resiliency	Environmental Protection	Community Acceptability	Ease of Operations	Energy Efficiency	Fiscally Responsible	Preferred Alternative
Chlorination / Dechlorination		✓			✓	✓	✓	
Ultraviolet (UV) Disinfection	✓	✓	✓	✓	✓		✓	✓

Outfall - Existing Conditions

An outfall conveys treated effluent from a WRRF and discharges it into a body of water. Components of the outfall system are:

On-shore shaft

- The outfall shaft is located on the east side of the plant.
- Effluent conduits convey flow from Plants 1, 2, & 3 to the effluent channels of the outfall shaft.

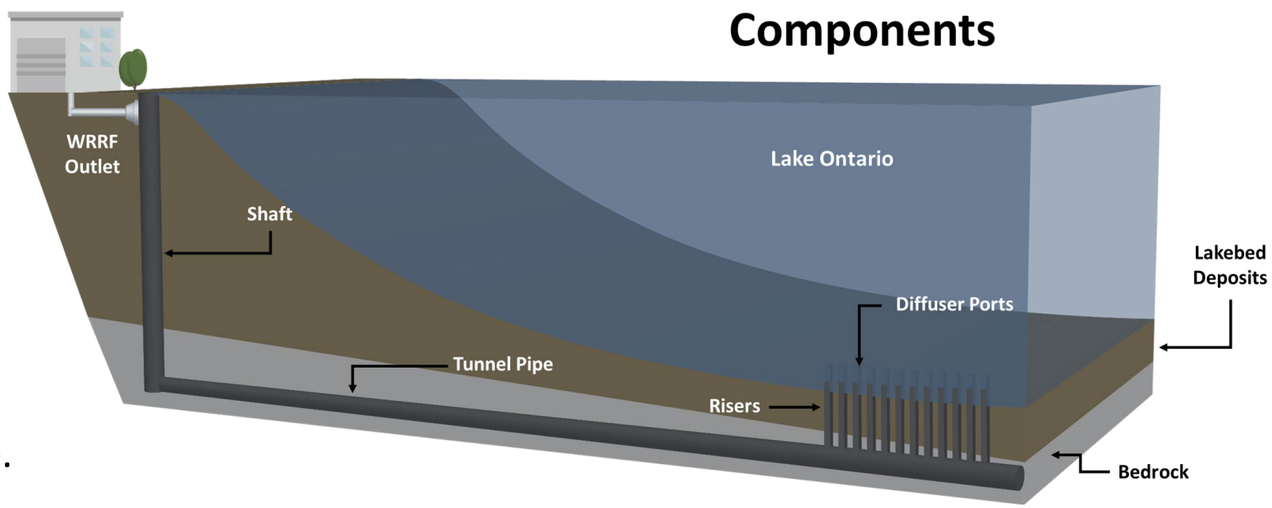
Off-shore tunneled pipe

- The existing outfall pipe is 3.65 metres in diameter and 1,435-metres in length.

Risers and diffusers

- There are 35 diffusers in the last 212 metres of the outfall pipe.

Outfall Components



A new outfall is required at the G.E. Booth WRRF for the following reasons:

- The rated peak flow capacity of outfall is 1,523 MLD, however it can only convey 1,200 MLD before flooding the secondary clarifier weirs.
- The existing outfall and diffuser system does not extend far enough into Lake Ontario to generate the dilutions required to meet Provincial Water Quality Objectives (PWQOs).
- There is insufficient peak flow capacity to meet future needs to the year 2041 and beyond.

Outfall – Evaluation of Outfall Shaft Locations

Evaluation of potential locations was based on:

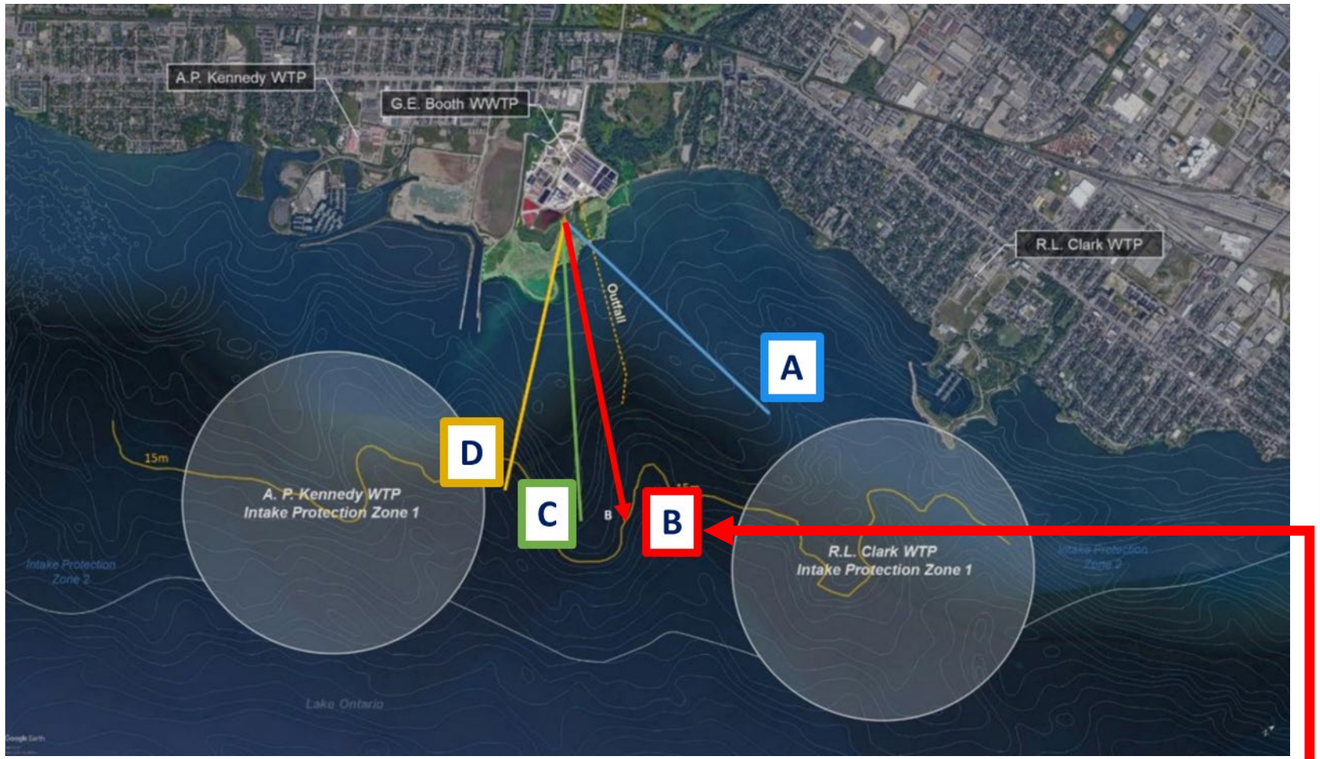
- Site spatial requirements
- Proximity to existing connections (effluent conduits)
- Ease of connection to District Energy Centre (DEC)
  - The DEC will use treated effluent to heat and cool future buildings in the Lakeview Development Area
- Avoiding the Jim Tovey Lakeview Conservation Area (JTLCA)

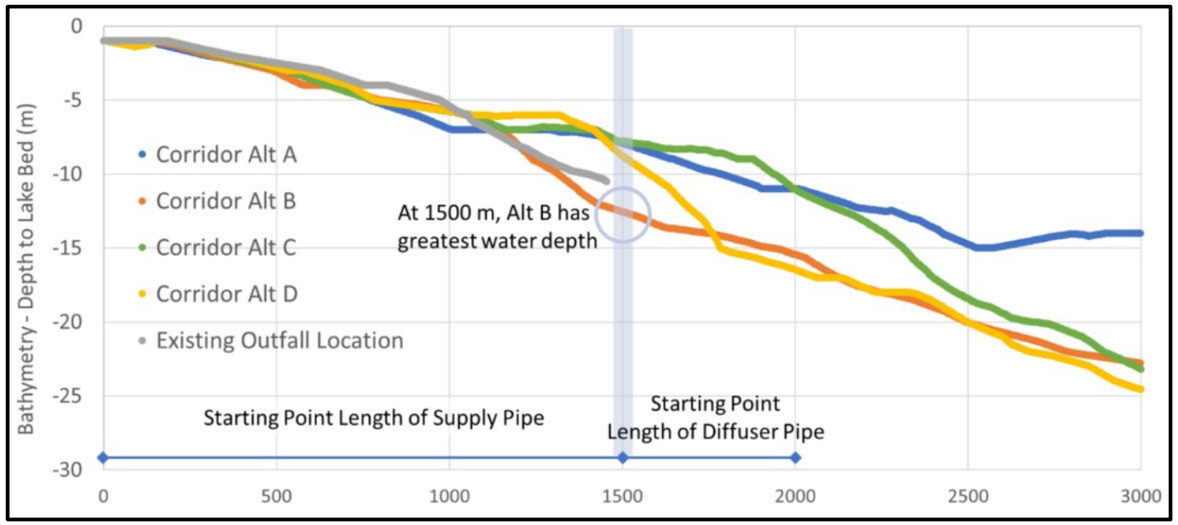
Alternative 1 was determined to be the preferred shaft location based on:

- ✓ Optimized construction sequencing with DEC
- ✓ Opportunities for capital cost savings and lowest overall cost
- ✓ Shortest construction duration

Alternative Shaft Locations	Natural Environment (25%)	Social – Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Alternative 1 (East of existing disinfection building)	17.5	18.3	18.3	15.0	69.1
Alternative 2 (Southeast of existing ash storage pond)	17.5	18.3	13.3	10.0	59.1
Alternative 3 (Adjacent to existing outfall shaft near Plant 3)	10.0	16.7	8.3	5.0	40.0

Outfall – Evaluation of Pipe Alignment Alternatives





Alternative Alignments	Natural Environment (25%)	Social – Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Alignment A	20.0	14.2	12.5	12.5	59.2
Alignment B	20.0	18.3	18.3	15.0	71.6
Alignment C	20.0	18.3	16.7	12.5	67.5
Alignment D	20.0	15.0	18.3	12.5	65.8

Evaluation was based on:

- Lake bathymetry (topography)
- Minimizing impacts to the natural environment, Intake Protection Zones (IPZs), and shoreline users
- Diffuser effectiveness (currents)
- Capital cost and schedule

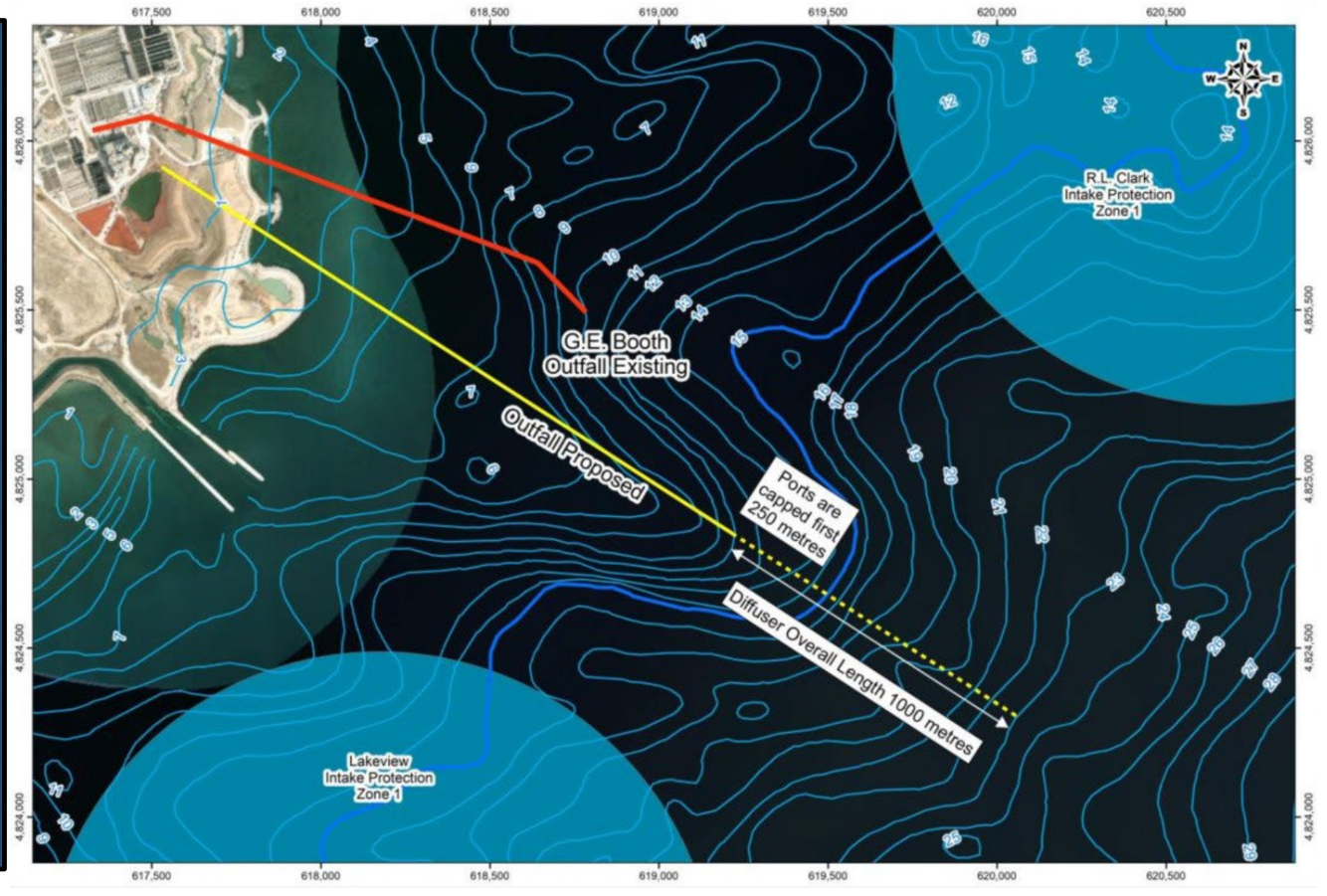
Alignment B was selected as the preferred alignment based on:

- ✓ Central location between IPZs for A.P. Kennedy Water Treatment Plant (WTP) and R.L. Clark WTP
- ✓ Favourable current direction and bathymetry (greater water depth achieved closer to shore, thereby improving effluent mixing)

Outfall – Preferred Design Concept

The Preferred Design Concept for the Outfall includes the following:

- Outfall shaft to be located on east side of property
  - Optimal location for connection to Plants 1, 2, & 3
- Outfall pipe alignment to be generally parallel to existing outfall
  - 2,000 metre length supply pipe (without diffusers), 1,000 metre length diffuser pipe, 3,000 metres total length
  - Includes 67 staged 500mm diameter diffusers at 15 metre intervals
- Peak flow capacity of 2,850 MLD
  - Sufficient capacity to service ultimate growth in G.E. Booth WRRF catchment area and potential flow increases from climate change
- Existing 1,435 metre length outfall to be maintained for redundancy purposes



Wastewater Treatment, Disinfection, & Outfall: Preferred Design Concepts

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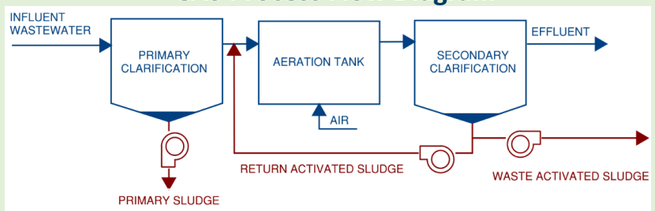
STEP 6
Recommend Preferred Design Concept

Recommended Wastewater Treatment Design Concept: Expansion of CAS, optimized with RTC

- CAS expansion areas identified on concept plan
- Real Time Control (RTC) implemented in collection system, thereby eliminating need for expanded headworks.

CAS Process Flow Diagram

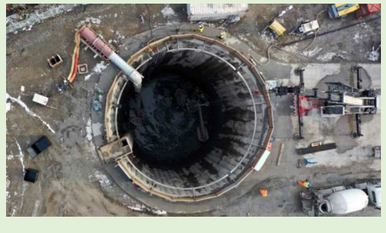


Recommended Wastewater Disinfection Design Concept: New Ultraviolet (UV) Disinfection system

- UV Disinfection has significantly lower operating costs than chlorination/dechlorination, lower risk to Lake Ontario water quality, and higher community acceptability
- Aligns with the Region's goals of reducing Operation & Maintenance (O&M) costs and chemical use

Recommended Outfall Design Concept: New Outfall

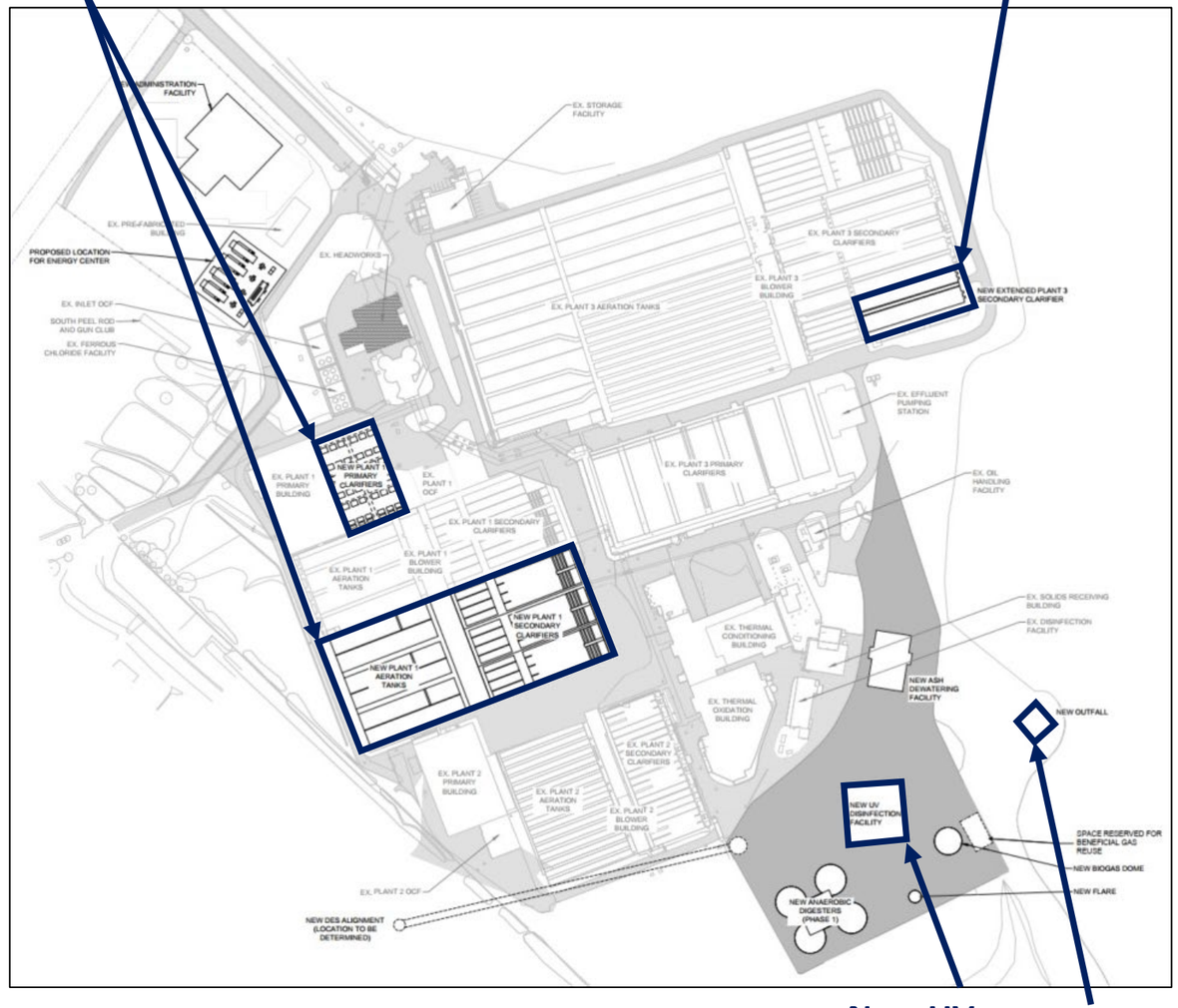
- New 3,000 metre length outfall will be constructed parallel to the existing 1,435 metre outfall into Lake Ontario
- New outfall's capacity of 2,850 MLD will be a substantial increase to the existing outfall capacity of 1,523 MLD.



Build-out of Plant 1

- Two new primary clarifier tanks
- Three new aeration tanks
- Three new secondary clarifier tanks

Expanded Plant 3 Secondary Clarifier No. 11



New UV Disinfection Facility

New Outfall

Biosolids Management – Long List Alternatives & Screening

STEP 1
Develop Long List of Technologies

STEP 2
Screen Long List of Technologies

'Must-Have' Screening Criteria:

- Maturity of Technology
- Proven Application at Large WRRFs
- Compatibility with Existing and Future Processes
- Compatible with Region's Energy Management and GHG Reduction Goals

No.	Technology Alternative	Maturity of Technology	Proven Application at Large WRRFs	Compatibility with Existing and Future Processes	Compatible with Region's Energy Management and GHG Reduction Goals	SHORT-LISTED FOR EVALUATION
1	**Anaerobic Digestion**					
1a	Conventional Mesophilic Anaerobic Digestion	Mature Technology	Yes	Yes	Yes	Yes
1b	Temperature-Phased Anaerobic Digestion (TPAD)	Uncommon	Yes	Complex operation	Yes	No
1c	Acid/Gas Phased Anaerobic Digestion	Limited number of installations	Yes	Complex operation	Yes	No
2	**Anaerobic Digestion + Hydrolysis Pretreatment**					
2a	Thermal Hydrolysis Pre-treatment (THP)	Maturing technology becoming popular	Yes	Yes	Yes	Yes
2b	Thermo / Alkaline Hydrolysis Pre-treatment	Limited number of installations	Limited	Yes	Yes	No
3	**Aerobic Digestion**					
3a	Conventional Aerobic Digestion	Mature Technology	No	No	No	No
3b	Autothermal Thermophilic Aerobic Digestion (ATAD)	Maturing Technology Second Generation	No	No	No	No
4	**Drying**					
4a	Direct Thermal Dryer (Drum Dryer, Belt Dryer)	Mature Technology	Yes	Yes	Yes	Yes
4b	Indirect Thermal Dryer (Paddle Dryer, Disc Dryer)	Mature Technology	Limited	Yes	No	No
4c	Solar Dryer	Newer, successful technology becoming popular	Limited	Yes	No	No

Biosolids Management – Long List Alternatives & Screening

STEP 1
Develop Long List of Technologies

STEP 2
Screen Long List of Technologies

'Must-Have' Screening Criteria:

- Maturity of Technology
- Proven Application at Large WRRFs
- Compatibility with Existing and Future Processes
- Compatible with Region's Energy Management and GHG Reduction Goals

No.	Technology Alternative	Maturity of Technology	Proven Application at Large WRRFs	Compatibility with Existing and Future Processes	Compatibility with Region's Energy Management and GHG Reduction Goals	SHORT-LISTED FOR EVALUATION
5	**Chemical Stabilization**					
5a	Alkaline Stabilization	Mature Technology	Yes	No; insufficient space on-site	No	No
5b	Alkaline Stabilization with Supplemental Heat or Acid	Mature Technology	Yes	Yes; off-site only	Yes	**Yes**
5c	Alkaline Stabilization with Supplemental Heat and High-Speed Mixing	Maturing technology	Yes	Yes; off-site only	Yes	**Yes**
6	**Composting**					
6a	Composting (Open Technologies Aerated Static Pile and Windrow Composting)	Mature Technology	Yes	No	No	No
7	**Thermal Conversion**					
7a	Incineration	Mature Technology	Yes	Yes	Yes	**Yes**
7b	Gasification	No	No	Yes	No	No
7c	Pyrolysis	No	No	Yes	No	No
7d	Wet Oxidation	No	No	Yes	No	No
7e	Hydrothermal Liquification	No	No	Yes	No	No

Description of Alternative Biosolids Management Design Concepts

STEP 3
Develop Combination of Short-Listed Technologies into Design Concepts

Alternatives[1]	Description
Alternative 1: Optimize and Expand Incineration	• Increase the firm capacity of incineration from 210 dry ton per day to 280 dry ton per day by installing two new incinerators units. • Replace the existing four incinerators at the end of their service life.
Alternative 2: Optimize Incineration and Transport Additional Solids Off-site to the Clarkson WRRF for Management	• Optimize the existing incinerators to increase their operational capacity. • Any excessive solids incineration capacity would be transported off-site as liquid sludge to the Clarkson WRRF for further treatment and disposal. • Replace the existing four incinerators at the end of their service life.
Alternative 3: Thermal Hydrolysis Process (THP) followed by Anaerobic Digestion prior to Incineration	• Construct a new THP and anaerobic digestion facility. • Divert a portion of solids for thermal hydrolysis followed by anerobic digestion. The biogas generated during anaerobic digestion will be collected and used for the THP operation, along with power generation by a combined heat and power (CHP) facility. • Replace the existing four incinerators at the end of their service life.
Alternative 4: Optimize Incineration and Third-Party Management of Additional Solids (e.g., using advanced alkaline stabilization)	• Optimize the existing incinerators to increase their operational capacity. • Third-party biosolids management firms will be contracted to transport and manage the solids exceeding the incineration system's capacity. The third-party firms may apply additional treatment such an advanced alkaline stabilization. • Replace the existing four incinerators at the end of their service life.
Alternative 5: Anaerobic Digestion, Dewatering, and Direct Thermal Drying	• Optimize and operate the existing incinerators to the end of their service life. • Prior to 2041, decommission the existing incinerators and replace them with eight new digesters to stabilize the solids and a direct thermal drying facility. The biogas generated during digestion would be collected and used for dryer operation and power generation by a CHP facility.
Alternative 6: Anaerobic Digestion Prior to Incineration	• Construct four anaerobic digesters to stabilize the solids and support the existing incinerator units to approximately 2041. The biogas generated during digestion would be collected and used for beneficial uses (power generator or other). • Prior to 2041, re-assess biosolids management options and select an option that best meets the goals of Peel and the surrounding community (e.g., thermal drying, continued incineration, third-party management).

Note 1: All alternatives include decommissioning of the Ash Lagoons and Storage Pond and construction of an Ash Dewatering Facility.

Biosolids Management - Design Concept Evaluation

STEP 4
Evaluate Design Concepts

EA Evaluation Categories:

- Natural Environment (25%)
- Social / Cultural Environment (25%)
- Technical Considerations (25%)
- Economic Considerations (25%)

Design Concepts	Natural Environment (25%)	Social - Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Optimize and Expand Incineration	17.0	19.0	17.5	10.0	63.5
Optimize Incineration and Transport Additional Solids Off-site to the Clarkson WRRF for Management	16.5	17.3	17.3	15.0	66.1
Thermal Hydrolysis Process (THP) Followed by Anaerobic Digestion Prior to Incineration	18.0	19.0	17.5	10.8	65.3
Optimize Incineration and Third-Party Management of Additional Solids (e.g., using advanced alkaline stabilization)	16.5	17.3	17.3	15.0	66.1
Anaerobic Digestion, Dewatering, and Direct Thermal Drying	20.0	19.0	18.4	10.0	67.4
Anaerobic Digestion Prior to Incineration	18.5	19.5	19.3	12.5	69.8

Wastewater Treatment and Disinfection: Evaluation of Feasible Design Concepts

Region of Peel
working with you

STEP 5
Evaluate Feasible Alternatives per Region's Key Objectives

Region's Key Objectives:
- Long-term Sustainability
- Resiliency
- Environmental Protection
- Community Acceptability
- Ease of Operations
- Energy Efficiency
- Fiscally Responsible

Design Concepts	Long-term Sustainability	Resiliency	Environmental Protection	Community Acceptability	Ease of Operations	Energy Efficiency	Fiscally Responsible	Preferred Alternative
Optimize and Expand Incineration			✓		✓			
Optimize Incineration and Transport Additional Solids Off-site to the Clarkson WRRF for Management					✓			
Thermal Hydrolysis Process (THP) Followed by Anaerobic Digestion Prior to Incineration		✓	✓			✓		
Optimize Incineration and Third-Party Management of Additional Solids (e.g., using advanced alkaline stabilization)					✓			
Anaerobic Digestion, Dewatering, and Direct Thermal Drying	✓	✓	✓	✓				
Anaerobic Digestion Prior to Incineration	✓	✓	✓	✓	✓	✓	✓	✓

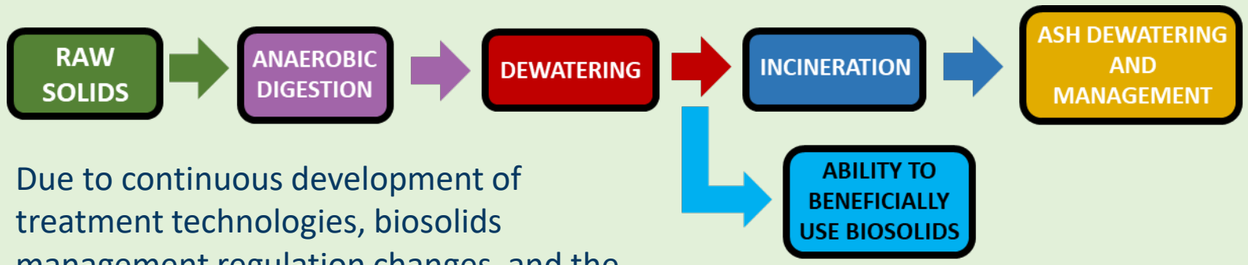
Biosolids Management – Preferred Design Concept

STEP 6
Recommend Preferred Design Concept

Recommended Biosolids Management Design Concept

Anaerobic Digestion Prior to Incineration

Process Flow Diagram



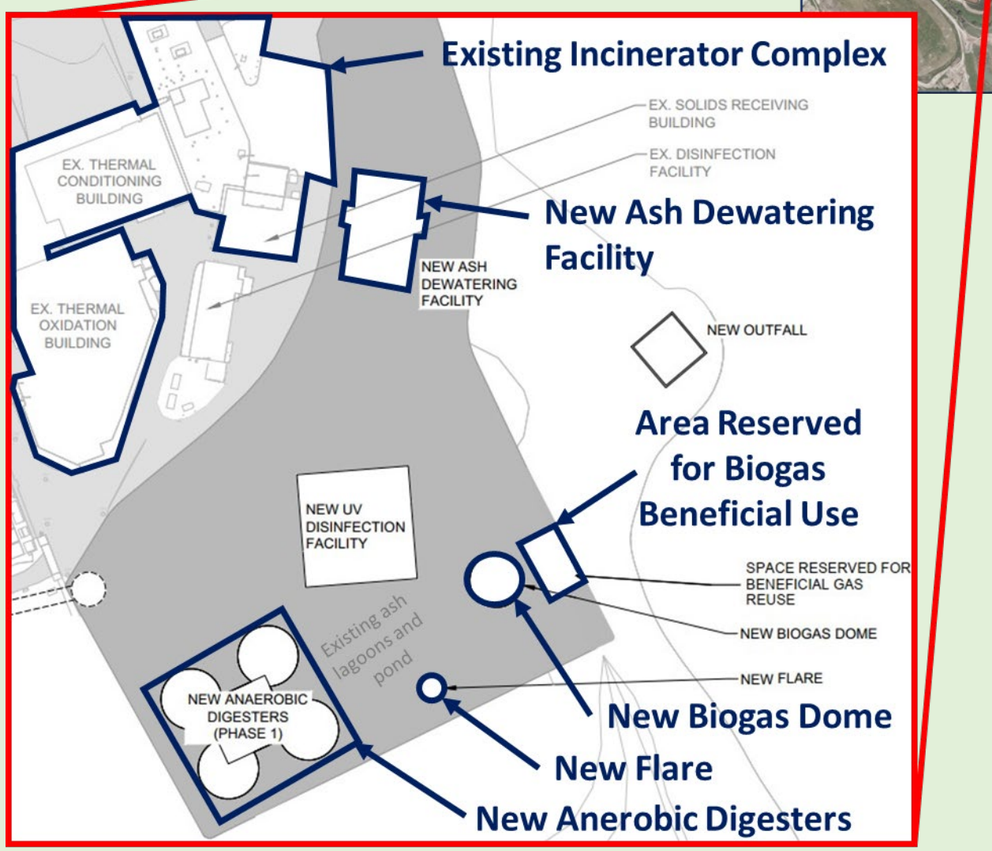
Due to continuous development of treatment technologies, biosolids management regulation changes, and the remaining service life of the existing thermal oxidation (incinerator) facility, it is recommended to:

- ✓ Continue with incineration to the end of the existing incinerators' service life
- ✓ Provide anaerobic digestion to reduce biosolids incineration requirements
- ✓ Re-assess biosolids management options in the future to select technology that best meets the needs of Peel and the surrounding community

This strategy best aligns with the Region's goals of increased energy recovery, improved resiliency, and increased construction flexibility.

Conceptual Site Layout

- Existing ash lagoons and pond to be decommissioned; and space restored. Ash dewatering facility will be constructed to replace function.
- Four (4) new anaerobic digesters, new biogas dome, and new flare to be constructed in re-claimed pond area.
- Area allocated for beneficial use of biogas.



G.E. Booth WRRF: Current Site Layout

Region of Peel
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G.E. Booth WRRF: Overall Design Concept

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G.E. Booth WRRF: Overall Design Concept

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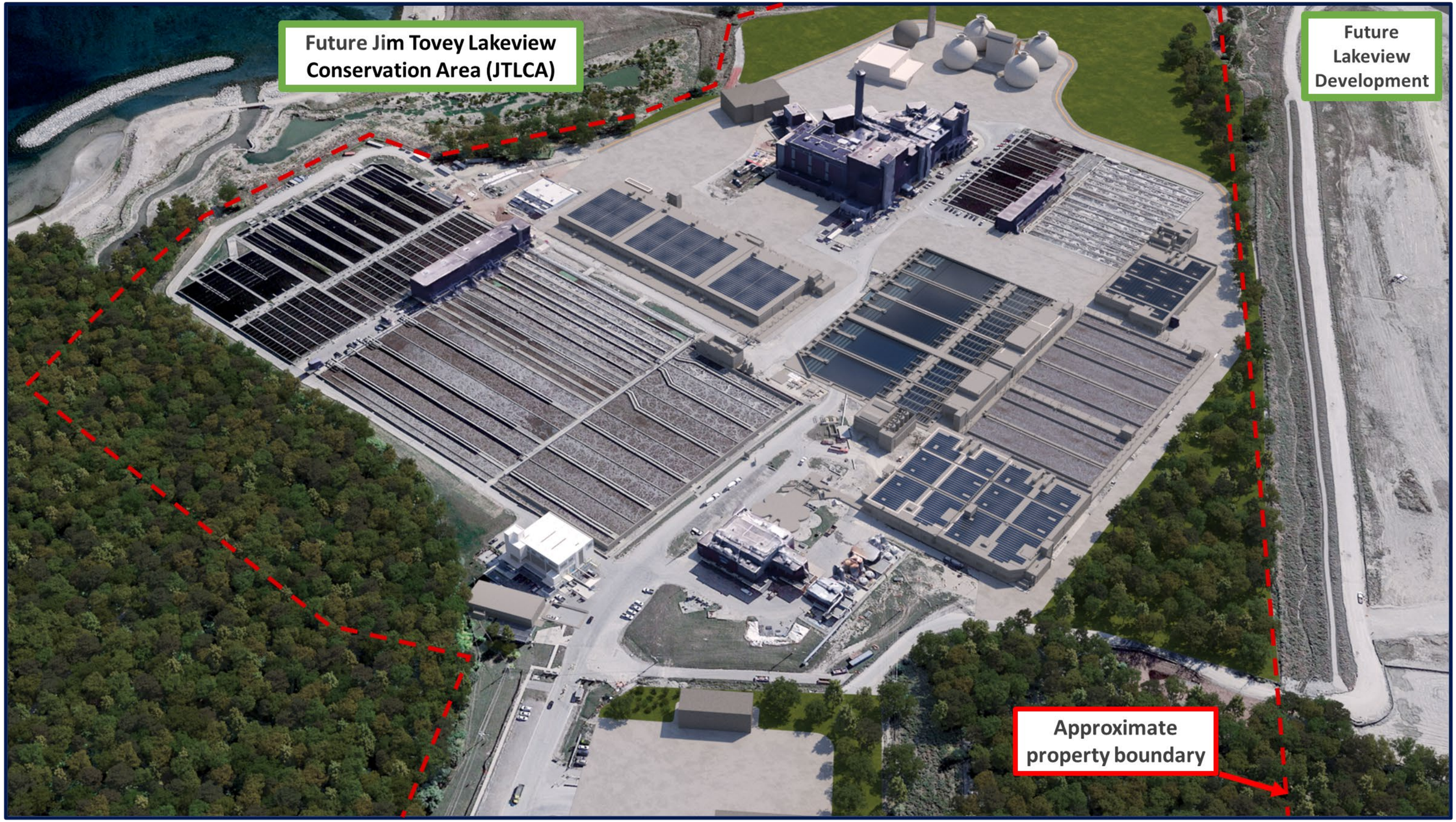
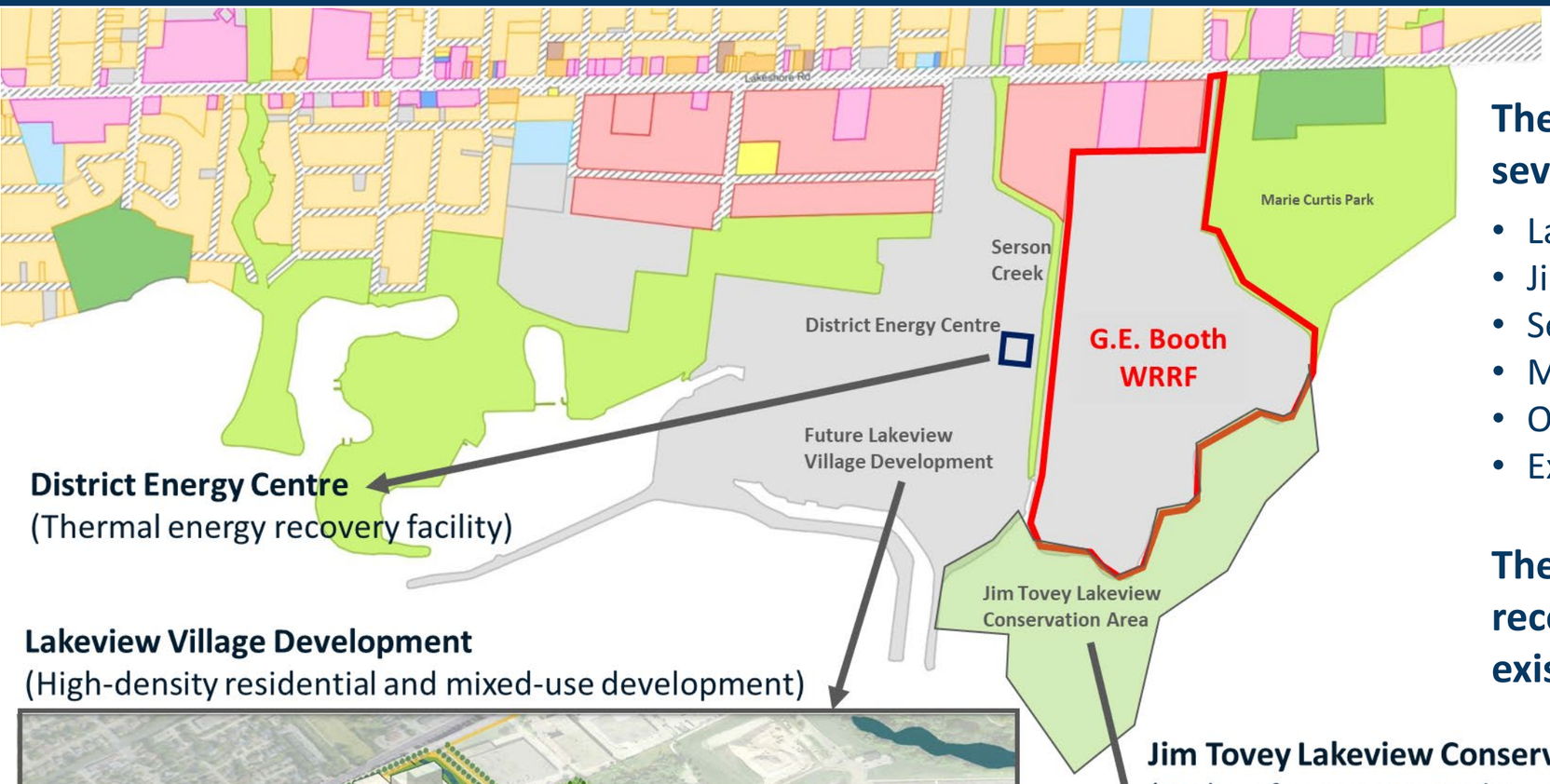
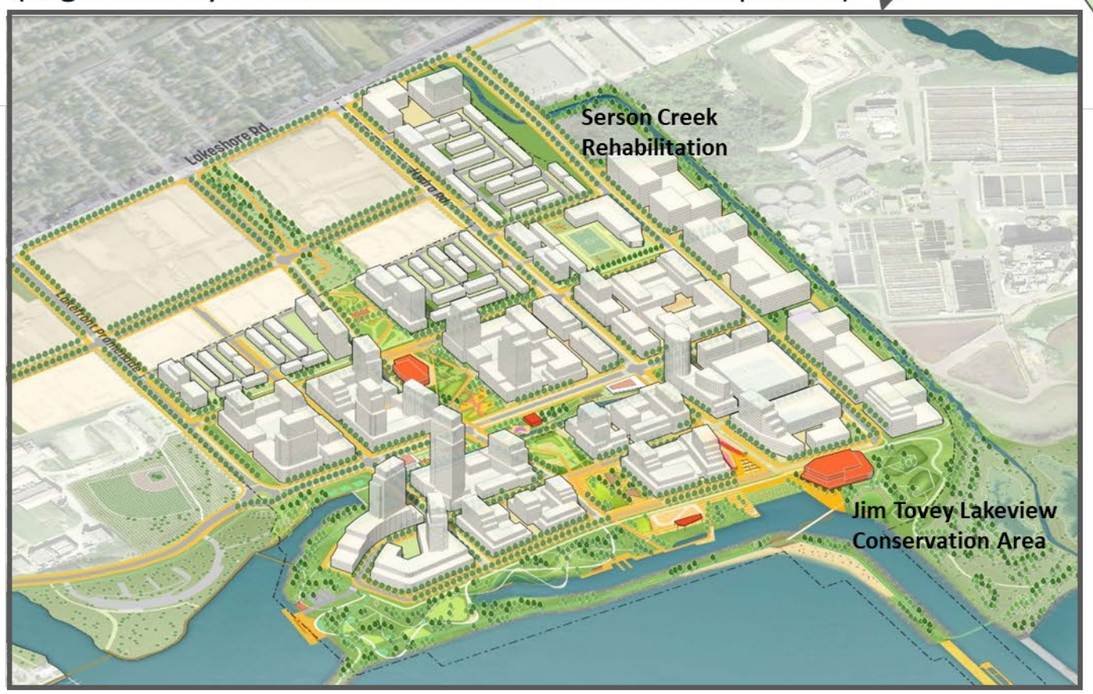


Impacts and Mitigation: Overview of Adjacent Land Uses

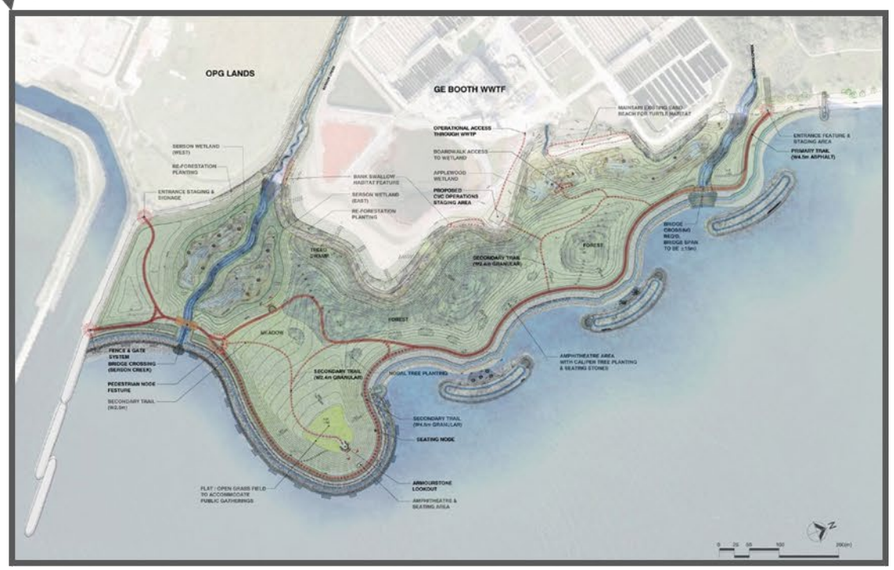


District Energy Centre
(Thermal energy recovery facility)

Lakeview Village Development
(High-density residential and mixed-use development)



Jim Tovey Lakeview Conservation Area
(26-ha of reconstructed meadow, forest & wetland)

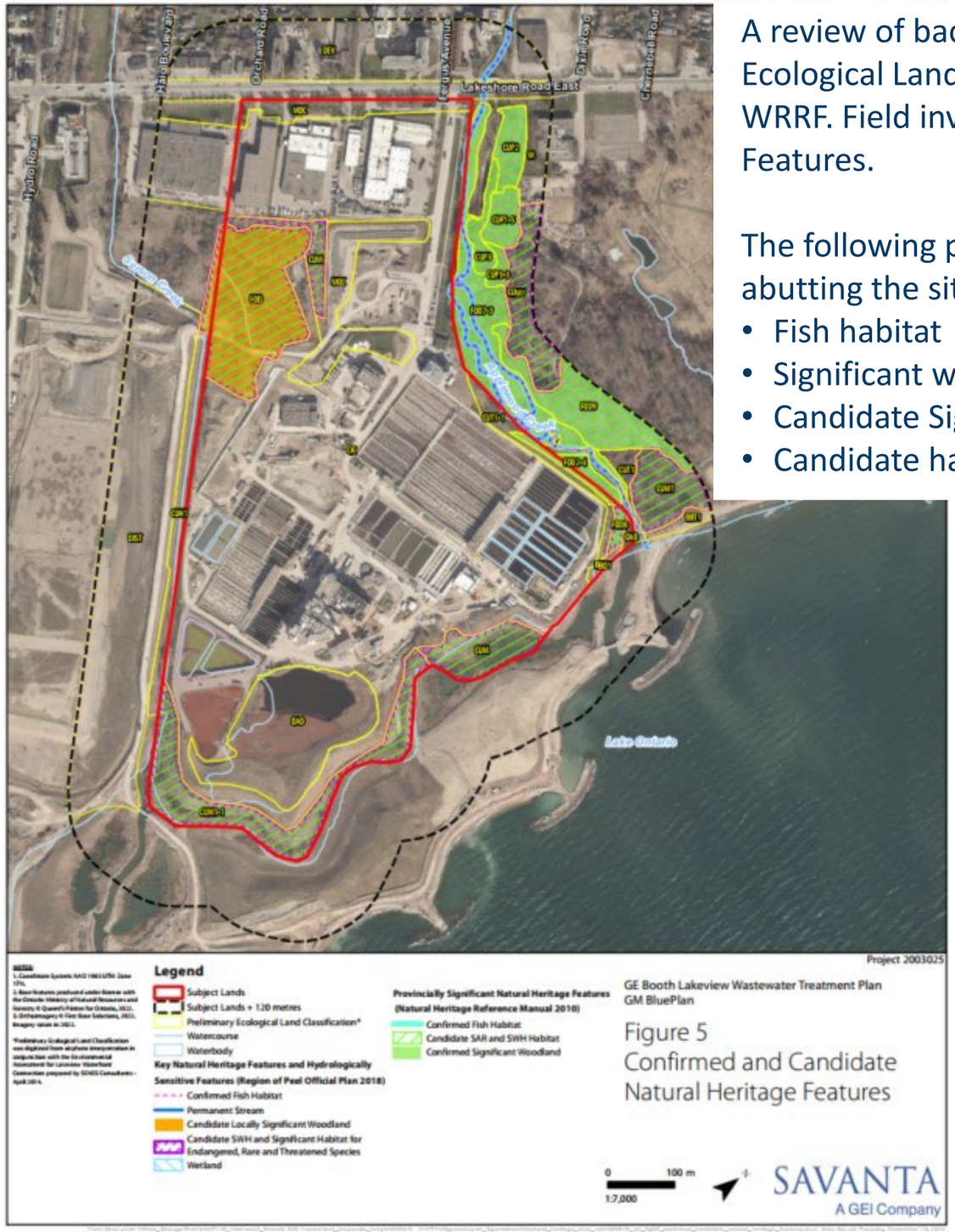


The G.E. Booth WRRF is located adjacent to several existing and future sensitive uses:

- Lakeview Village development
- Jim Tovey Lakeview Conservation Area (JTLCA)
- Serson Creek rehabilitation
- Marie Curtis Park
- On-site environmental areas
- Existing adjacent industrial and residential properties

The G.E. Booth WRRF EA provides recommendations that will mitigate impacts to existing features and future land uses.

Impacts and Mitigation: Natural Environment



A review of background information was conducted to confirm the preliminary Ecological Land Classification (ELC) mapping within and adjacent to the G.E. Booth WRRF. Field investigations were completed to confirm the Candidate Natural Heritage Features.

The following provincially significant natural heritage features were identified on and abutting the site:

- Fish habitat
- Significant woodland
- Candidate Significant Wildlife Habitat (SWH), and;
- Candidate habitat for endangered and threatened species

The **Preferred Design Concept** was developed to avoid natural heritage features to the extent possible. However, there may be some isolated tree removals and encroachment on portions of the Candidate Significant Wildlife Habitat on the northwest side of the site.

The Region is working with the Conservation Authorities to develop appropriate measures to mitigate impacts to natural heritage features, which will include:

- Construction timing windows
- Stormwater management plans
- Restoration

Impacts and Mitigation: Social and Cultural

Potential Impact	Mitigation
Noise	Noise controls will be implemented through the conceptual design of the plant expansion to mitigate any noise impacts exceeding applicable guidelines.
Odour	The Region has been proactively working with the City of Mississauga to develop an enhanced odour management strategy at the G.E. Booth WRRF. The odour management strategy includes: • Replacing old Plant 1 and enclosing the new Plant 1 primary clarifiers with flat covers, a building, and an odour control facility. • Covering the existing Plant 2 & Plant 3 primary clarifiers with flat covers, a building, and odour control facilities. • Increasing the stack height of the odour control facility at the existing headworks facility. • Adding a polishing stage of odour control to the existing headworks odour control facility. • Continued odour modelling and community outreach. Through implementation of these control measures, odours from the existing G.E. Booth WRRF will be reduced.
Visual	• Decommissioning the lagoons. • Constructing naturalized barriers between the plant and surrounding areas, including the Lakeview development area, the Jim Tovey Lakeview Conservation Area, and Marie Curtis Park.
Archaeology	• Stage 1 Archaeological & Marine Archaeological Assessment identifies that the site is disturbed with little remaining potential for archaeological resources. • If additional areas are disturbed, a Stage 2 Archaeological Assessment will be completed during conceptual design.
Traffic	Due to the biosolids from the Clarkson WRRF not being trucked to G.E. Booth WRRF, there is an overall reduction in truck traffic for the site.

Summary of Net Effects

The Preferred Expansion Project will:

- Mitigate impacts to natural heritage features
- Protect Lake Ontario water quality and shoreline users
- Enhance the site aesthetics through the removal of ash lagoons, site restoration, and maximizing buffer areas
- Reduce odours from existing conditions
- Optimize the use of existing plant infrastructure while providing flexibility to meet future conditions
- Provide opportunities for energy recovery and GHG emissions reductions at the G.E. Booth WRRF

The expansion project will also be designed to support the District Energy Centre (DEC) planned on the Lakeview Development site

- The DEC is a thermal energy centre which pumps treated effluent from the G.E. Booth WRRF through heat exchangers to provide heating and cooling to buildings in the Lakeview Development.

Further details on the preferred expansion project at the G.E. Booth WRRF, including refinements to measures to mitigate impacts will be developed through the detailed design stage.

Project Timeline

Public Information Centre 2

Value Engineering (VE) Session

Receiving Water Assessment

Public Information Centre 4

File ESR for Public Review

2021												2022												2023								
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept

Phase 2: Alternative Solutions	Phase 3: Alternative Design Concepts for Preferred Solution	Phase 4: Environmental Study Report (ESR)

Phase 2 Tasks (Completed)

- Prepare natural, hydrogeological, social, cultural, archaeological & economic inventory
- Identify potential impacts and how to address them
- Supporting technical analysis and studies
- Identify key factors and considerations
- Determine detailed criteria for overall strategy
- Identify alternative solutions
- **Public Information Centre No. 2**

Phase 3 Tasks (Ongoing)

- Validate preferred solution
- Identify design concept alternatives
- Prepare detailed inventory
- Identify impacts and how to address them
- Select preliminary preferred conceptual design and technologies
- **Public Information Centre No. 4 (March 15th, 2023)**
- Two-week Question Submission Period (**March 16th to 30th, 2023)**
- Response to Questions (**April 13th, 2023**)

Phase 3 Studies (Ongoing)

- Air, Odour, & Noise Modelling

We are here!

Phase 4 Tasks (Future)

- Confirm preferred design concepts and technologies
- Finalize Environmental Study Report
- Notice of study completion
- Finalize conceptual design
- File study report
- Public review period

Thank you for participating. Please Stay Engaged!

We want to hear from you!

- **Visit our website:** www.peelregion.ca/GEBooth
- **Provide PIC No. 4 feedback** on the website from March 16th to 30th, 2023
- **Sign-up to receive study notifications** on the website, including notice of study completion when the final report is available for public review.

For any Class EA questions, please contact the Project Manager:

Cindy Kambeitz, PMP, PMI-RMP
905-791-7800, ext. 5040
GEBoothEA@peelregion.ca

Next Steps:

Today: PIC No. 4 (present conceptual design elements for the expansion of the G.E. Booth WRRF)

April/May 2023: Validate design concepts and finalize all study reporting for public review

June 2023: Issue Notice of Completion and initiate 30-day public review for the Environmental Study Report

Post EA: Design and Construction of WRRF