CITY OF WINDSOR BIOSOLIDS MANAGEMENT STRATEGY - “SCHEDULE C” CLASS EA ENVIRONMENTAL STUDY REPORT

Final

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Prepared for:

City of Windsor

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GENERAL

The City of Windsor owns and operate two municipal wastewater treatment plants, the Lou Romano Water Reclamation Plant (LRWRP) and the Little River Pollution Control Plant (LRPCP). The LRWRP provides secondary level treatment for municipal and industrial wastewater from the central and western portions of the City of Windsor and from the northern area of the Town of LaSalle. The plant has a rated primary treatment capacity of 273,000 m^3/d, and a rated secondary treatment capacity of 218,000 m^3/d. The liquid treatment process at the LRWRP consists of coarse and fine screening, grit removal, primary enhanced clarification, biological aerated filtration (BAF), and UV disinfection. The LRPCP provides secondary level treatment for municipal wastewater and industrial wastewater from the eastern portions of the City of Windsor and from the Town of Tecumseh. The LRPCP has a rated secondary treatment capacity of 73,000 m^3/d. The LRPCP treatment process consists of fine screening, grit removal, primary clarification, activated sludge process, secondary clarification, and UV disinfection.

The LRWRP and LRPCP produce approximately 8,500 and 2,500 dry tonnes of biosolids each year, respectively. The dewatered biosolids, which have a dry solids content of approximately 30%, are heat dried and pelletized at the City-owned Windsor Biosolids Processing Facility (WBPF). The finished pellets are used as a Class A fertilizer and soil conditioner throughout Southwestern Ontario. The servicing contract and upgrade requirements for the WBPF will be revisited by 2029 as the capacity of existing biosolids management facility is unable to accommodate projected wastewater biosolids or community growth.

To address biosolids management needs at the two wastewater treatment plants, the City initiated a study to identify the preferred means of processing biosolids. A primary goal of this study was to prioritize solutions which would move the two wastewater treatment plants towards a ‘net-zero’ energy future and improve upon energy conservation commitments outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. To achieve this goal, the biosolids management strategy will consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions.

This Study Report presents the completed planning and decision-making process from the identification of the opportunity and the evaluation of alternative solutions to the recommendation of the preferred solution. This is a study, which follows the Class Environmental Assessment (Class EA) process of the Municipal Engineers Association (MEA). This study report comprises **Sections 1 to 10** and **Appendices A to C,** inclusive. A brief description of each section follows.

SECTION 1 - INTRODUCTION

This section provides background information regarding the project including applicable regulatory requirements, relevant municipal planning reports, and purpose of the report as well as a description of the Class EA process. This study and the resulting Environmental Study Report (ESR) is being undertaken in accordance with the requirements of the MEA Municipal Class EA.

SECTION 2 – EXISTING WASTEWATER TREATMENT FACILITIES

This section provides a description of energy consumption, GHG emissions, and major process units at the Lou Romano Water Reclamation Plant, the Little River Pollution Control Plant, and Windsor Biosolids Processing Facility.

SECTION 3 – STUDY AREA CONDITIONS

All projects identified through the Municipal Class EA process must be evaluated based on the potential impact to the existing conditions of the study area. This section provides a general description of the existing natural environmental, social, and economic conditions in the study area as a basis for the potential impact analysis.

SECTION 4 – PROBLEM STATEMENT

This section defines the problem statement, project objective, and describes the needs for the management and processing of biosolids.

SECTION 5 - ALTERNATIVE DESIGN SOLUTIONS AND RECOMMENDATIONS

This section involves the identification of various alternative design solutions which best address the identified problem and needs based on the potential impact to the natural, social, and economic environments. The following alternative solutions have been considered and evaluated for managing and processing biosolids while moving the two wastewater treatment plants towards a "net-zero" energy future and significantly reduced GHG emissions:

1. Do Nothing
2. Waste Minimization
3. Incineration
4. Composting
5. Anaerobic Digestion

SECTION 6 – ALTERNATIVE DESIGN CONCEPTS AND RECOMMENDATIONS

This section involves the identification and evaluation of various alternative design concepts which best fulfill the identified design solution. This includes alternative design concepts for the sludge handling, pre-treatment technologies, type of anaerobic digestion, site location, digestate handling, and biogas utilization technologies.

SECTION 7 – PREFERRED DESIGN

This section outlines the preferred design as well as recommendations for project delivery method, and implementation schedule.

SECTION 8 – ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section identifies the environmental impacts of the preferred solution and describes the recommended mitigation measures.

SECTION 9 – PUBLIC CONSULTATION

This section documents agency and public consultations that occurred during Phases 1 through 3 of the process. This section includes documentation of consultation with the public and review agencies. To complete Phase 4 of the Class EA process, this report will be made available for review and comment by the public and review agencies as a part of the consultation process.

SECTION 10 – SUMMARY

This section summarizes conclusions that can be drawn from the completion of this study, and recommendations that are made with respect to this study.

Abbreviations

Anaerobic Digestion	AD
Combined Heat and Power Generation	CHP
Corporate Climate Action Plan	CCAP
Corporate Energy Management Plan	CEMP
Community Energy Plan	CEP
Environmental Compliance Approval	ECA
Environment and Climate Change Canada	ECCC
Energy Conservation and Demand Management Plan	ECDMP
Environmental Master Plan	EMP
Essex Region Conservation Authority	ERCA
Essex-Windsor Solid Waste Authority	EWSWA
Fats, Oils and Grease	FOG
Greenhouse Gas	GHG
High Strength Organic Wastes	HSO
Reciprocating Internal Combustion Engine	IC
Industrial, Commercial, and Institutional	ICI
Little River Pollution Control Plant	LRPCP
Lou Romano Water Reclamation Plant	LRWRP
Lump Sum	LS
Mesophilic Anaerobic Digestion	MAD
Ontario Ministry of Environment Conservation and Parks	MECP
Opinion of Probable Cost	OPC
Provincial Policy Statement	PPS
Primary Sludge	PS
Renewable Natural Gas Pipeline Quality (also referred to in industry as biomethane)	RNG
Renewable Compressed Natural Gas (for vehicle fuel)	R-CNG
Source Separated Organics	SSO
Thermal Hydrolysis Process	THP
Temperature Phased Anaerobic Digestion	TPAD
Total Solids	TS
Total Suspended Solids (total solids - dissolved solids)	TSS
Ultraviolet	UV
Volatile Solids	VS
Volatile Solids Reduction	VSR
Volatile Suspended Solids	VSS
Waste Activated Sludge	WAS
Wastewater Treatment Plant	WWTP
Windsor Biosolids Processing Facility (formerly Prism Berlie)	WBPF

1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 General

The City of Windsor (City) is Canada's southernmost city with a population of 230,000 and an area of 146 km^2. The City is located on the south bank of the Detroit River directly across from Detroit, Michigan. The City owns and operates two municipal wastewater treatment plants, the Lou Romano Water Reclamation Plant (LRWRP) and the Little River Pollution Control Plant (LRPCP).

The LRWRP, formerly the West Windsor Pollution Control Plant, is located at the intersection of Ojibway Parkway and Sandwich Street in the City of Windsor. The LRWRP provides secondary level treatment for municipal and industrial wastewater from the central and western portions of the City of Windsor, the northern area of the Town of LaSalle and a portion of the Town of Tecumseh (Oldcastle). The LRWRP receives wastewater via the (1) Riverfront Interceptor Sewer, which services the core section of the City west of Pillette Road, and (2) Western-Grand Marais Sanitary Trunk Sewer, which services the existing and recently developed areas in South Windsor. The plant provides primary physical-chemical treatment for up to 273,000 m^3/d, which includes capacity for combined storm and sanitary flows. The LRWRP has a rated secondary biological treatment capacity of 218,000 m^3/d which is followed by ultraviolet (UV) disinfection.

The LRPCP is located at 9400 Little River Road in the City of Windsor. The plant serves the portion of the City of Windsor east of Pillette Road and the surrounding municipality of Tecumseh. Major unit operations at the LRPCP consists of fine bar screening, grit removal, primary enhanced clarification, conventional activated sludge with nitrification, UV disinfection, and centrifuge dewatering. The LRPCP has a rated treatment capacity of 73,000 m^3/d.

The LRWRP and LRPCP produce approximately 8,500 and 2,500 dry tonnes of biosolids each year, respectively. The dewatered biosolids, which have a dry solids content of approximately 30%, are heat dried and pelletized at the City-owned Windsor Biosolids Processing Facility (WBPF), formerly known as Prism-Berlie. The WBPF, which is located at 4365 Sandwich Street near the LRWRP is operated on behalf of the City by Synagro Technologies Inc. The finished biosolids pellets are used as a fertilizer and soil conditioner. This fertilizer is classified under Title 40 CFR, Part 503 as Class A biosolids in the USA. In Canada, the fertilizer product was registered under the federal Fertilizer Act as a farm fertilizer with trade name Eco Pearl (formerly Windsor Propell) and is sold throughout Southwestern Ontario. The servicing contract and upgrade requirements for the WBPF will be revisited by 2029 as the capacity of the existing biosolids management facility is unable to accommodate projected wastewater biosolids or community growth.

1.1.2 Biosolids Master Plan Class Environmental Assessment (1997)

Prior to the implementation of the WBPF, sludge produced at the City's two wastewater treatment facilities were transferred to the LRWRP to be disposed of by open air composting with lime stabilization and application on agricultural land. Odours emanating from the open method of stabilization and storage of the resulting biosolids created unacceptable conditions for the residential properties surrounding the LRWRP. The City of Windsor recognized the need to correct this issue and to provide an effective, environmentally friendly biosolids management system to meet the City's long-term needs. Therefore, they carried out a municipal class environmental assessment known and the 'Biosolids Master Plan' in 1996 and 1997.

The selection of a long term biosolids management system was done through a request for proposal (RFP) process. Proposals were invited through a public advertising process and evaluated by a committee formed of community representatives, environmental organizations, City administration, and an engineering consultant. The evaluation considered environmental, technical, and financial aspects of all proposals received. The proposal submitted by Prism-Berlie for a heat drying pelletization plant was recommended as the preferred alternative. The proposed drying system was a Berlie/Swiss Combi rotary drum dryer with a closed loop drying air circuit. This technology was favourable at the time due to its good track record, broad application, and consistency to provide a desirable and marketable final product. An agreement was reached between the City of Windsor and Prism-Berlie on August 11th, 1997, for a 20-year contract for biosolids management services. The proposed facility was constructed and placed into service in 1999. This agreement has since been updated and is now known as the Windsor Biosolids Processing Facility, which is operated and maintained by Synagro Technologies Inc. Synagro is responsible for the transportation and dewatering of wastewater sludge cakes from the two wastewater treatment facilities.

1.1.3 Environment and Energy Management Planning Reports

The City of Windsor has a long-standing commitment to the environment including energy management, climate change mitigation, and long-term adaptation planning. This corporate environmental commitment has been established through the development of numerous environmental plans over the past few decades, including:

1. Corporate Energy Management Plan
2. Environmental Master Plan
3. Community Energy Plan
4. Corporate Climate Action Plan
5. Climate Change Adaptation Plan

The City of Windsor Corporate Energy Management Plan (CEMP) was prepared in compliance with the Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans (O. Reg. 507/18) of the Electricity Act. As per this regulation the CEMP is updated on a five-year basis with the most recent amendment posted in 2019. The CEMP records and evaluates energy consumption and costs for all municipally owned buildings and facilities. Further, the CEMP identifies strategies to reduce energy consumption, benefit the environment, and mitigate costs to the City.

The City of Windsor Environmental Master Plan (EMP) was originally developed in 2006 and was amended in 2012. The EMP acts as a guide for the municipality to address environmental issues with the goals to make the City cleaner, greener, healthier, and more sustainable. The purpose of the EMP is to identify actions the municipality can take over the short and long term to improve the City's environment. The five main goals of the EMP are to (A) Improve Our Air and Water Quality, (B) Create Healthy Communities, (C) Green Windsor, (D) Use Resources Efficiently, and (E) Promote Awareness.

The Community Energy Plan (CEP) is an extension of the EMP and was approved by council in 2017. The plan focuses on improving energy efficiency, effective land use planning, reducing energy consumption, limiting Greenhouse Gas (GHG) emissions, and promoting smart / green energy solutions. The CEP provides recommendations for municipal projects and identifies opportunities to incorporate smart energy solutions in various municipal programs such as the Official Plan, strategic plans, community economic strategies and development priorities.

The Corporate Climate Action Plan (CCAP) is an extension of the CEP and was approved by council in 2017. This plan focuses on reducing energy and GHG emissions from municipal operations and fleets. The CCAP sets emission reduction targets in order to develop a local action plan and provides recommendations for municipal projects.

The Climate Change Adaptation Plan was developed by the City of Windsor in 2020 with the goal to prepare for the climate future by creating a more climate resilient city. The City will continue to minimize climate change risks to the community through the advancement of sustainable policies, infrastructure investment, and public education. Forward thinking and proactive actions will benefit the community health, environment, and economy. The climate change mitigation and planning objectives for the City of Windsor include: (1) Integrate Climate Change Thinking and Response, (2) Protect Public Health and Safety, (3) Reduce Risk to Buildings and Property, (4) Strengthen Infrastructure Resilience, (5) Protect Biodiversity and Enhance Ecosystem Functions, (6) Reduce Community Service Disruptions, and (7) Build Community Resilience.

1.1.4 Integrated Site Energy Master Plan

On January 1st, 2012, the Energy Conservation and Demand Management Plans Regulation (Ontario Regulation 397/11) came into effect under the Green Energy Act (2009). The regulation requires public agencies to report their annual energy consumption and GHG emissions as well as to implement an Energy Conservation and Demand Management Plan (ECDMP) beginning in 2014. These plans are required to be reviewed and updated every 5 years. Requirements from the City of Windsor under the Green Energy Act 2009, O. Reg. 397/11 include:

- Report on Energy Use
- Prepare Energy Plan, which includes:
  - Annual energy consumption reports
  - Planning goals and objectives
  - Past and current energy conservation and demand management (CDM) measures
  - Proposed CDM measures and details on lifespan, capital cost, and potential savings estimates
  - Existing or planned renewable energy (e.g., heat pumps, solar technologies, wind, bioenergy, etc.)

To comply with Regulation 397/11 under Green Energy Act 2009, the City of Windsor completed the Community Energy Plan (CEP) and Climate Change Action Plan (CCAP) in 2017. The CEP looks at all residential heating and cooling activities as well as power industry and businesses; and recommends strategies for a smart energy future. The CEP is complemented by the CCAP Plan that guide the City towards reducing GHG emissions and energy use to help the City prepare for legislative changes and Cap-and-Trade initiatives by senior levels of government. The City of Windsor, with funding assistance from the senior governments, initiated an Integrated Site Energy Master Plan in 2020 to reduce energy consumption and mitigate climate change impacts at the two municipal wastewater treatment plants.

The Integrated Site Energy Master Plan identified and evaluated various alternatives for energy conservation, improved energy efficiency, and on-site renewable energy generation. The plan provided a list of actions that will move the two wastewater treatment plants towards a "net-zero" energy future and significantly reduced GHG emissions associated with both wastewater treatment plants. Throughout the course of the study, four conceptual planning level alternative solutions were reviewed and evaluated in detail to ensure the most cost effective and viable long-term solution was identified. The results of the study identified the following as the recommended solution:

- Process Improvements at the LRWRP and LRPCP
- Energy Recovery from Waste via Anaerobic Digestion and Biogas Utilization
- Implement Sustainable Energy Initiatives and Technologies (including solar energy)

1.1.5 Food and Organic Waste Policy Statement

In recent years, there has been increasing attention paid to managing the organic fraction in waste streams. The environmental benefits of diverting organic materials from landfills include reduced methane emissions (a potent greenhouse gas) and decreased leachate discharges. On April 30th, 2018, the Food and Organic Waste Policy Statement came into effect under the Resource Recovery and Circular Economy Act (2016). The policy provides direction to municipalities, industrial, commercial, and institutional (ICI) establishments, and the waste management sector to increase waste reduction and resource recovery of food and organic waste. The Policy provides support and encouragement for the innovative utilization of waste organics as well as biosolids as resources to help achieve a more sustainable economy. More specifically, clause 6.16 of the Policy states that municipalities are encouraged to plan for the management and beneficial use of biosolids including considering new and enhanced biosolids processing technologies and co-management practices. The Policy also identifies that infrastructure for the processing and utilization of waste organics must be developed in compliance with applicable environmental and land use planning approvals. Clause 6.5 of the Policy identifies that the province and municipalities as well as other planning authorities, (e.g., Conservation Authorities) should co-ordinate and complement approaches to provincial and municipal approvals to facilitate timely decisions for the development of resource recovery systems.

Requirements under the Policy Statement include:

- ➢ The City of Windsor to achieve 70% waste reduction and resource recovery of food and organic waste generated by single-family dwellings in urban settlement areas by 2025;

- The City of Windsor to provide curbside collection of food and organic waste to single-family dwellings in the urban settlement area within the municipality;
- Multi-unit residential buildings to achieve 50% waste reduction and resource recovery of food and organic waste generated at the building by 2025;
- Industrial and commercial facilities to achieve 50% waste reduction and resource recovery of food and organic waste generated in the facility by 2025; and
- Educational institutions and hospitals to achieve 70% waste reduction and resource recovery of food and organic waste generated in the facility by 2025.

The City does not currently have an organic waste collection facility or program in place and must implement one in the near future to meet the requirements of the Food and Organic Waste Policy Statement.

The source separate organic (SSO) waste materials which may potentially be accepted through this program include municipal food and organic waste, ICI food and organic waste, agricultural organic waste, and high strength organic waste (HSW) such as food processing waste, dairy waste, and fats, oils, and grease (FOG). In recent years, municipalities throughout Canada have implemented integrated organics programs. This involves processing both municipal sludge and SSO waste (also called supplementary organic feedstock) within one management facility. The focus in not only processing the wastes, but also maximizing the recovery of their remaining value in the form of electricity, thermal energy, and/or fuel. Benefits of integrated programs include improved nutrient balance, synergistic effects of microorganisms, improved digestion rate, increased load of volatile solids and biodegradable organic matter resulting in increased biogas yield. Based on the benefits of integrated management plans and the requirements outlined in the Food and Organic Waste Policy, co-processing municipal sludge and SSO waste would be considered a favorable long-term solution on a municipal and regional level. Further, there is support from the provincial government for the development of increased organics utilization with emphasis on innovative approaches. It is reasonable to assume that the Province will see the City’s interest in developing a stand-alone, expandable facility to effectively management both biosolids and waste organics to generate renewable energy as innovative.

1.1.6 Purpose of Report

This is an Environmental Study Report (ESR) to address biosolids management needs in the City of Windsor and prioritize solutions that move the two wastewater treatment plants towards a ‘net-zero’ energy future including energy savings and GHG reductions. This Biosolids Management Strategy will explore the opportunities for processing wastewater biosolids for improved energy recovery, biogas production, and energy savings. The ESR will identify the preferred design solution and concepts recommended to manage and process the wastewater biosolids with consideration for potential addition of SSO wastes in the future.

This ESR presents the complete planning and decision-making process for the Biosolids Management Strategy. This includes all stages of the Class EA, from the review of background information and problem identification to the evaluation of alternative solutions and design concepts, finishing with the selection of the preferred alternatives. Throughout this ESR, alternative design solutions and concepts are presented and evaluated leading to the selection of a cost effective and viable long-term solution. The decision-making process is based upon minimizing undesirable natural environmental, social, and economic impact. Where impacts to these factors are unavoidable, proposed measures are presented to mitigate those impacts.

1.2 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

1.2.1 Project Schedules in the Class Environmental Assessment

The Environmental Assessment Act (the Act) was passed in 1975 by the Province of Ontario to provide a mechanism for public participation in public projects. The Act provides a means for the public or interested groups to receive the needed assurances that the environment is being protected from adverse effects on any significant public project. If there are necessary adverse effects on the environment, the public also needs assurances that all essential measures are being taken to minimize these impacts. The proponent is to weigh the impacts of several possible alternative ways to achieve the desired objective and to select the best alternative based on a thorough examination of each.

The Act recognized that certain municipal undertakings occur frequently, are small in scale, have a generally predictable range of effects or have relatively minor environmental significance. To ensure that a degree of standardization in the planning process is followed throughout the province, the Act contemplated the use of the Class EA procedure for projects which require approval under the Act, but which are not considered to be major environmental works.

Municipal staff and consultants can use the Class EA process in planning, design, and construction of projects to ensure that the requirements of the Act are met. The projects shall follow the planning and design process of the Municipal Engineers Association (MEA) Class EA, October 2000, as amended in 2007, 2011 and 2015. As part of the Class EA procedure, the proponent is required to state how the project is to proceed and gain approval under the Act. There are four approval mechanisms available to the proponent under the Class EA:

- **Schedule A and Schedule A+** projects are limited in scale, have minimal adverse environmental affects, and include several normal or emergency municipal maintenance and operational objectives. Projects listed in these schedules are now exempt from the Act**.**
- **Schedule B** projects generally include improvements and minor expansions to existing facilities. In these cases, there is a potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.
- **Schedule C** projects generally include the construction of new facilities and major expansions to existing facilities. These projects proceed through the environmental assessment planning process outlined in the Class EA and require preparation of an Environmental Study Report (ESR) to document the planning process.

Schedule C projects generally include the construction of new facilities and major expansions to existing facilities where there is the potential for adverse environmental impacts, and therefore requires completion of Phases 1, 2, 3, and 4 of the Class EA process. Examples of relevant Schedule C projects are given in

Appendix 1 of the Municipal Class EA document and include establishing a new transfer station or new storage lagoon not located at a sewage treatment plant, incinerator, landfill site, or organic soil conditioning site, for purposes of biosolids management.

This biosolids management project includes activities requiring new facility construction, extension, and enlargement of existing biosolids management facility where such facilities may be located outside of an existing sewage treatment plant site. Therefore, this project is being completed under the Municipal Class EA as a **Schedule C** activity, which is the highest identified schedule. Upon completion of Phase 1, Phase 2, Phase 3, and Phase 4 for Schedule C projects, the Owner may proceed directly to Phase 5 and implement the preferred solution.

1.2.2 Phases in Municipal Class Environmental Assessment Process

Figure 1.1 illustrates the steps followed in the planning and design of projects covered by the Municipal Class EA. The Class EA for municipal projects follows a five-phase planning process that can be summarized as follows:

Phase 1 – Identification of the problem

Phase 2 – Identification of alternative solutions to the problem, consultation with review agencies and the public, selection of the preferred solution, and identification of the project as a Schedule A, A+, B or C activity.

Phase 3 – Identification of alternative design concepts (technical alternatives) for the preferred solution, evaluation of the alternative designs and their impacts on the environment, consultation with review agencies and the public and selection of the preferred design.

Phase 4 – Preparation of an Environmental Study Report (ESR) to document the planning, design, and consultation process for the project. The ESR is placed on the public registry for scrutiny by review agencies and the public.

Phase 5 – Final design, construction, and commissioning of the selected technical alternative. Monitoring of construction for adherence to environmental provisions and commitments.

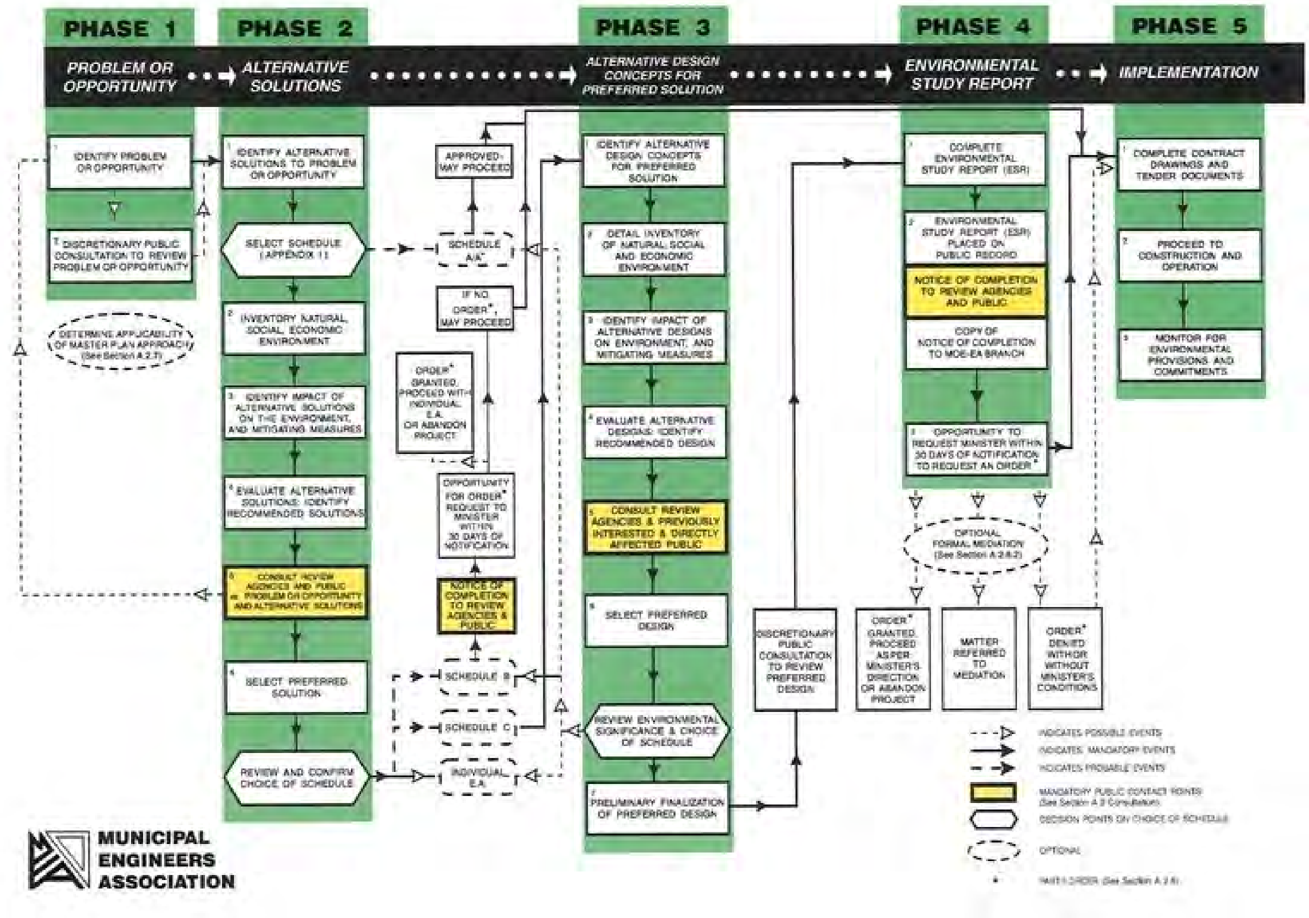

Figure 1.1 Municipal Class EA Planning and Design Process

2.0 EXISTING WASTEWATER TREATMENT FACILITIES

2.1 LOU ROMANO WATER RECLAMATION PLANT

The LRWRP, formerly the West Windsor Pollution Control Plant, is located on a 14.6-hectare site at the intersection of Ojibway Parkway and Sandwich Street in the City of Windsor. The LRWRP provides secondary level treatment for municipal wastewater and industrial wastewater from the central and western portions of the City of Windsor and from the northern area of the Town of LaSalle.

The original plant began its operation in 1970 as a primary treatment plant with a rated capacity of 109,000 m^3/d. The level of treatment was upgraded to "physical chemical" in 1973 to meet provincial phosphorous removal requirements. The plant was expanded in 1980 to a capacity of 159,000 m^3/d, and most recently the expansion to add secondary treatment was completed in 2011. The plant has a rated primary treatment capacity of 273,000 m^3/d, and a rated secondary treatment capacity of 218,000 m^3/d using biological aerated biofilter treatment technology.

The review of historical energy use was initiated by compiling data from drawings, operational records, utility bills, and equipment inventories to develop an understanding of plant energy usage patterns. The LRWRP processes (except for dewatering) operate 24 hours per day, seven days per week. Major unit operations at the LRWRP include the following:

- Coarse Bar Screening
- Raw Wastewater Pumping Station
- Fine Bar Screening
- Grit Removal
- Primary clarifiers
- Primary Effluent Pumping Station
- Biological Aerated Biofilters
- UV disinfection
- Sludge Dewatering by Centrifuges

An aerial photo showing the plant site and the layout of the existing treatment facilities is shown in **Figure 2.1**. Process schematic is shown in **Figure 2.2**. Major unit process data is described in the following sections below. The existing treatment process at the Lou Romano Water Reclamation Plant is described in further detail in the following sections.

Figure 2.1: Aerial Image of the Lou Romano Water Reclamation Plant

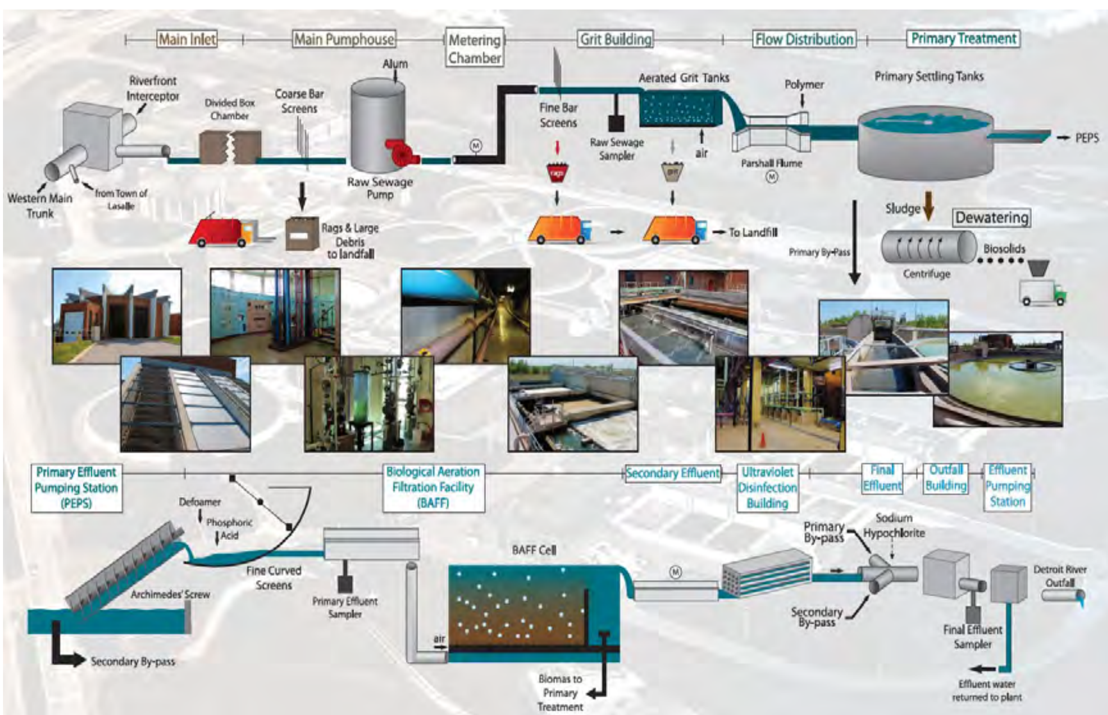

Figure 2.2: Process Schematic of the Lou Romano Water Reclamation Plant

2.1.1 LRWRP Sludge Dewatering

At the LRWRP, sludge is removed from the treatment process train at the primary settling tanks and transferred to the dewatering system. The sludge dewatering system consists of one (1) 75 m^3 sludge holding tank, three (3) centrifuge dewatering units complete with macerators, sludge feed pumps, horizontal/inclined conveyors, sludge storage hoppers/loading facility, and two (2) dry polymer make-up units with two (2) 13.5 m^3 mix tanks and two (2) 54 m^3 age tanks.

Sludge is pumped from the sludge holding tank to dewatering centrifuges. A cationic polymer which promotes dewatering of the sludge solids is introduced to the primary sludge before it enters the centrifuge. The sludge cake produced by the centrifuges is deposited in inclined screw conveyors and transferred to sludge cake storage facilities. The liquid or centrifuge centrate is returned to the plant inlet works through the plant sewer system. Major sludge dewatering process data are summarized in **Table 2.1**.

Table 2.1: LRWRP Sludge Dewatering Facility - Major Unit Process Description

Unit Process	Process Description
Macerators/grinders: No. of Units, Type & Size:	Three (3) - “Muffin Monsters”, each 7.5 kW (10 HP) Drives
Sludge Feed Pumps: No. of Units, Type & Size, and Capacity:	Two (2) Vogelsang Rotary Lobe Positive Displacement Pumps, 18.6 kW (25 HP) each, 1,100 L/min – 3,800 L/min at 17.5 m TDH One (1) Vogelsang Rotary Lobe Positive Displacement Pump, 56kW (75 HP) each, 1,100 L/min – 3,800 L/min at 17.5 m TDH
Sludge Dewatering: No. of Centrifuges, Main/Back Driver Systems, and Centrifuge Capacity:	Three (3) dewatering centrifuges • One (1) Alfa Laval (Sharples) DS906 driven by a Reliance 448 kW (600 HP) main drive motor and 30 kW (40 HP) backdrive motor. Capacity 7 DT/hr. • Two (2) Andritz centrifuge, each driven by a 186 kW (250 HP) and 37 kW (50 HP) backdrive motor. Each 2.7 DT/hr.
Sludge Cake Transport System: No. of Units, type & Size: Capacity - each:	Six (6) screw conveyors • Four (4), 20 HP each • Two (2), 25 HP each 120,000 kg/hr
Sludge Cake Storage Hopper: No. of Units, Type & Size	Four (4) unloading screws, 25 HP each
Polymer Make Up Water System: No. of Units, Type & Size: Capacity - each:	One (1) city water boost pump, 22.4 kW (30 HP) 56 L/min at 64 m TDH
Polymer Batching System: No. of Units, Type & Size:	Two (2) StSt mixing tanks each 13,500 L capacity, each with mixing impeller driven by 1 HP electric motor , Two (2) FRP holding tanks each 54,000 L capacity

Polymer Feed Pumps: No. of Units, Type & Size, and Capacity:	Six (6) polymer feed pumps • Four (4) Robbins and Myers Moyno progressive cavity pumps, 3.7 kw (5 HP), 90 L/min – 252 L/min at 15 m TDH • Two (2) Robbins and Myers Moyno progressive cavity pumps, each 15 kW (20 HP), 120 L/min – 360 L/min at 53 m TDH
Odour Control System No. of Units Type & Size:	 Two (2) One (1) Biorem 3,000cfm biofilter system stage with 3,000cfm humidifier One (1) Biorem 9,000cfm biofilter system stage with 9,000cfm humidifier

2.1.2 LRWRP Design Wastewater Flows

The plant has a rated treatment capacity for an average daily sewage flow of 218,000 m^3/day, and a peak flow capacity of 545,000 m^3/d for primary treatment and 436,000 m^3/day for secondary treatment. The primary treatment included the provision of 108,080 m^3/day primary treatment capacity for wet weather flow treatment. Based on historic operating records at the LRWRP from 2015 to 2019, the average daily sewage flow was 134, 000 m^3/day (approximately 61 % of the rated treatment capacity).

2.1.3 LRWRP Design Wastewater Characteristics and Loading

The raw wastewater influent to the LRWRP is primarily of domestic origin, with the exception of a few industrial and commercial sources. **Table 2.2** presents a summary of the raw wastewater characteristics and loadings for the upgrades of the existing plant in 2008.

Table 2.2: LRWRP Raw Wastewater Characteristics and Loadings

Parameter	**Concentration(1) (mg/L)**		
	Average	**Minimum**	**Maximum**
BOD_5	157	15	495
TSS	218	20	1720
TP	4.3	0.6	19.3
Ammonia	11.7	6.2	16.4
Notes: (1) Average concentration based on 1999 to 2002 inclusive historical average.			

2.1.4 LRWRP Treatment and Compliance Requirements

The treatment plant operates under an Amended Environmental Compliance Approval (ECA) No. 1853-B43PVC issued on September 28, 2018. A copy of the current ECA is contained in **Appendix A**. The current ECA outlines the effluent compliance limits and objectives for the facility, which are summarized in **Table 2.3**.

Table 2.3: Effluent Objectives and Non-Compliance Limits

Parameter	Non-Compliance Limits		Effluent Objectives
	Monthly Average Concentration	Annual Average Loading	Concentration
$cBOD_5$	15 mg/L	3,270 kg/d	10 mg/L
TSS	15 mg/L	3,270 kg/d	10 mg/L
TP	0.5 mg/L	109 kg/d	0.4 mg/L
Unionized Ammonia	0.1 mg/L	-	0.08 mg/L
E. coli (1)	200 organisms/100 mL	-	100 organisms/100 mL
pH	6.5 - 9.5 inclusive	-	6.5 – 9.0 inclusive
Toxicity to Rainbow Trout and Daphnia magna	Non-acutely lethal (no more than 50% mortality)	-	-
Notes: (1) Monthly geometric mean density.			

2.2 LITTLE RIVER POLLUTION CONTROL PLANT

The LRPCP is located at 9400 Little River Road in the City of Windsor. The LRPCP provides secondary level treatment for municipal wastewater and industrial wastewater from the eastern portions of the City of Windsor and from the Municipality of Tecumseh. The original plant began its operation in 1966 as a primary treatment plant with a rated capacity of 18,000 m^3/d. It was upgraded and expanded in 1974 to 36,000 m^3/d providing secondary treatment including phosphorous removal as well as activated sludge process. The plant was expanded in the early 90's to a rated capacity of 73,000 m^3/d.

- Major unit operations at the LRPCP include the following:
- Fine Bar Screening
- Raw Wastewater Pumping Station
- Grit Removal
- Primary clarifiers
- Aeration Tanks (activated sludge process)
- Final Clarifiers (activated sludge process)
- UV disinfection
- Sludge Dewatering by Centrifuges

An aerial photo showing the plant site and the layout of the existing treatment facilities is shown in **Figure 2.3**. Process schematic is shown in **Figure 2.4**. Major unit process data are described in the following sections. The existing treatment process at the Little River Pollution Control Plant is described in further detail in the following sections.

Figure 2.3: Aerial Image of the Little River Pollution Control Plant

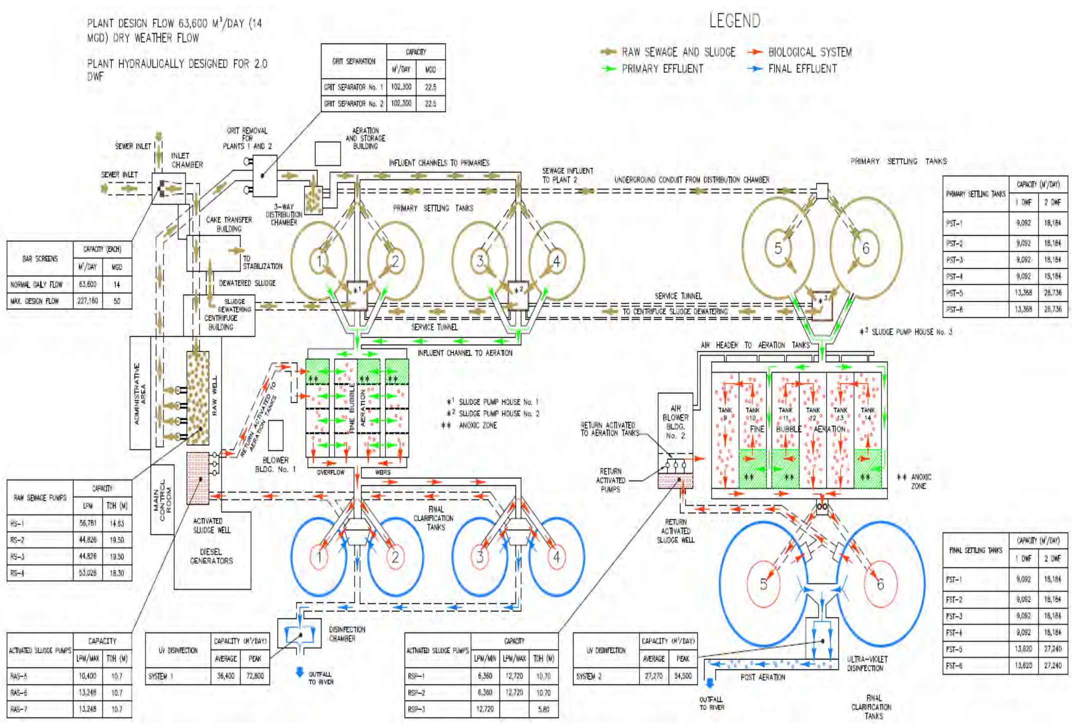

Figure 2.4: Process Schematic of Little River Pollution Control Plant

2.2.1 LRPCP Sludge Dewatering

Primary settling tank sludge is withdrawn from the storage compartment and pumped to sludge dewatering facilities for further treatment. Settled solids are pumped from the sludge compartment of the primary clarifiers to the sludge dewatering facilities. The primary sludge pumps discharge through three underground pipe headers through macerators to a sludge holding tank located in the dewatering building. Prior to discharging into the holding tank the sludge is passed thru two (2) inline macerators to shred stringy and fibrous materials that would adversely affect the operation of the centrifuges. Sludge is pumped from the holding tank to the dewatering centrifuges. Polymer, a sludge conditioning chemical is added to the sludge to aid in bulking of the sludge solids in the centrifuges. The polymer system consists of one polymer makeup water system which provides mixing and dilution water to two polymer solution preparation and feed systems.

Dewatered sludge, or sludge cake, discharges from the centrifuges and is transferred by sludge cake pump and transport systems to the truck loading facility for eventual transport to Windsor Biosolids Pelletizing Facility (WBPF). Liquid removed from the sludge (centrate) is returned to the treatment process by a gravity sewer which discharges into the plant inlet chamber. Major sludge dewatering system data are summarized in **Table 2.4**.

Table 2.4: LRPCP Sludge Dewatering Facility - Major Unit Process Description

Unit Process	Process Description
Macerators: No. of Units: Type & Size:	 Two (2) Robbins and Myers Moyno "Pipeliner" Series 301, 5 HP each
Sludge Feed Pumps: No. of Units: Type & Size: Capacity - each:	 Three (3) Robbins and Myers Moyno progressive cavity pumps, 14.9 kW (20 HP) each 90 L/min – 1,120 L/min at 28.2 m TDH
Sludge Cake Transport System: No. of Units: Type & Size: Capacity - each:	 Three (3) Each consists of Schwing Model SD350 twin auger cake pump screw feeder with screw feed chute with 22 kW (30 HP) hydraulic unit 25 L/min – 167 L/min
Sludge Dewatering: No. of Centrifuges: Centrifuge Driver Systems: Centrifuge Capacity - each:	 Three (3) dewatering centrifuges, each Vee-belt driven by a 225 kW (300 HP), 1800 RPM main drive motor and 75 kW (100 HP) AC backdrive. 25.2 to 34.2 m^3/hr of primary sludge with a solids concentration of 1.5% to 4.5% dry solids
Polymer Make Up Water System: No. of Units, Type & Size: Capacity - each:	 Two (2) centrifugal pumps, 11.19 kW (15 HP) 795 L/min at 44.8 m TDH
Polymer Batching System: No. of Units, Type & Size:	 Two (2) mixing/holding tanks each 3028 L capacity, each with mixing impeller driven by 2 HP electric motor
Polymer Feed Pumps:	

No. of Units, Type & Size: Capacity - each:	Three (3) Netzch Canada - single stage positive displacement 4 L/min – 60 L/min at 50 psi
Odour Control System No. of Units Type & Size:	Two (2) One (1) single stage wet scrubber system with mix tanks and chemical storage tank One (1) 2-stage wet scrubber system with mix tanks and chemical storage tank

2.2.2 LRPCP Design Wastewater Flows

The most recent upgrades of the existing LRPCP were completed in 2008. The plant has a rated treatment capacity for an average daily sewage flow of 72,800 m^3/day. The peak flow capacity of the plant is approximately 143,600 m^3/d.

2.2.3 LRPCP Design Wastewater Characteristics and Loading

The raw wastewater influent to the LRPCP is primarily of domestic origin, with the exception of a few industrial and commercial sources. **Table 2.5** presents a summary of the raw wastewater characteristics.

Table 2.5: LRPCP Raw Wastewater Characteristics

Parameter	Concentration[1] (mg/L)		
	Average	Minimum	Maximum
BOD_5	139	54	273
TSS	158	78	376
TP	4.1	1.8	8.1
Ammonia	18.1	4.6	31.1
Notes: (1) Average concentration based on 1999 to 2002 inclusive historical average.			

2.2.4 LRPCP Treatment and Compliance Requirements

The effluent compliance limits and objectives for the facility are summarized in **Table 2.6**. The treatment plant operates under an Amended Environmental Compliance Approval (ECA) No. 4681-BT3L39 issued on January 29, 2021. A copy of the current ECA is contained in **Appendix A.**

Table 2.6: Effluent Objectives and Non-Compliance Limits

Parameter	Non-compliance Limits	Effluent Objectives
cBOD5	25 mg/L	Not specified
TSS	25 mg/L	Not specified
TP	1.5 mg/L	Not specified
Total Ammonia	8 mg/L	Not specified
E. coli (1) (2)	1000 organisms/100 mL	Not specified
pH	6.5 - 9.0 inclusive	6.5 – 9.0 inclusive
Dissolved Oxygen	-	4 mg/L

Notes:
(1) Represent monthly geometric mean density.
(2) Not applicable during freezing period when stream temperatures are below 5 ºC, which includes the period from November 1 through April 30.

2.3 WINDSOR BIOSOLIDS PROCESSING FACILITY

2.3.1 Overview

Prior to the implementation of the Windsor Biosolids Processing Facility (WBPF), sludge produced at the City's two wastewater treatment facilities were transferred to the LRWRP to be disposed of by open air composting with lime stabilization and application on agricultural land. Odours emanating from the open method of stabilization and storage of the resulting biosolids created unacceptable conditions for the residential properties surrounding the LRWRP. The City of Windsor recognized the need to correct this issue and to provide an effective, environmentally friendly biosolids management system to meet the City's long-term needs. Therefore, they carried out a municipal class environmental assessment known and the 'Biosolids Master Plan' in 1996 and 1997.

The selection of a long term biosolids management system was done through a request for proposal (RFP) process. Proposals were invited through a public advertising process and evaluated by a committee formed of community representatives, environmental organizations, City administration, and an engineering consultant. The evaluation considered environmental, technical, and financial aspects of all proposals received. The proposal submitted by Prism-Berlie for a heat drying pelletization plant was recommended as the preferred alternative. The proposed drying system was a Berlie/Swiss Combi rotary drum dryer with a closed loop drying air circuit. This technology was favourable at the time due to its good track record, broad application, and consistency to provide a desirable and marketable end product. An agreement was reached between the City of Windsor and Prism-Berlie on August 11th, 1997, for a 20-year contract for biosolids management services. The proposed facility was constructed and placed into service in 1999.

WBPF was constructed under a Public-Private partnership between American Water (formerly Prism-Berlie) and the City of Windsor. The biosolids processing facility was built, financed, owned, and operated by American Water from 1999 to 2019 under a 20-year contract. The facility was repaired in 2002 following an explosion that caused damage to the facility. The facility operator is responsible for transporting dewatered sludge from LRPCP and LRWRP to WBPF and selling the fertilizer pellets to end-users. The ownership of WBPF was transferred to the City in 2019. The City has since contracted Synagro to operate the facility under a new 10-year contract expiring 2029.

The WBPF, formerly known as 'Prism Berlie', is located at 4365 Sandwich Street in the City of Windsor. The facility uses thermal drying to process dewatered sludge from the two City of Windsor wastewater treatment plants (WWTP) into biosolids fertilizer pellets. An aerial photo showing the plant site is shown on **Figure 2.5**.

Figure 2.5: Site Plan of the Windsor Biosolids Processing Facility (formerly Prism Berlie)

2.3.2 Existing Biosolids Management Process

An overview of the existing biosolids management strategy for the two City owned wastewater treatment facilities is shown in **Figure 2.6**. At the LRWRP and LRPCP sludge is removed from the treatment process and dewatered on-site by centrifuge. Following the centrifuge process, the dewatered sludge cake has a dry solids content of approximately 25 to 30 %. Dewatered sludge cake from both of the wastewater treatment facilities is then transferred to the WBPF by tractor trailer for further processing.

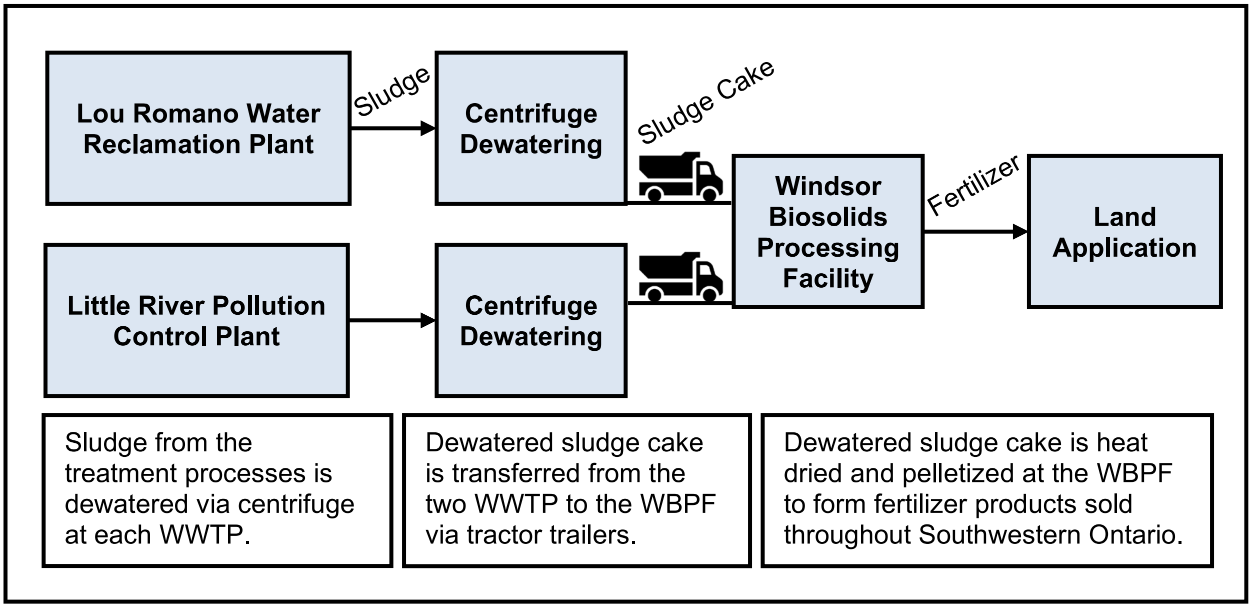

Figure 2.6: Process Schematic of the Windsor Biosolids Management Process

At the WBPF the dewatered sludge from the two wastewater treatment facilities is heat dried and pelletized to remove moisture, stabilize the sludge, and produce fertilizer which is sold by the WBPF operator (Synagro). The process flow diagram at the WBPF is shown in **Figure 2.7**.

The dewatered sludge cake is transported from each wastewater treatment plant to the WBPF using tractor trailers. The dewatered sludge cake is unloaded from the tractor trailers into a receiving bin at the WBPF, which is equipped with an adsorption odor control system. Piston pumps are utilized to transfer the sludge cake from this receiving area to a sludge holding tank located in the drying area. From the sludge holding tank, twin transfer screws move the sludge into a mixer where the dewatered sludge is mixed with dried recycled product to form a homogenous feed material. This homogenized mixture allows for improved management and conveyance of materials through the rotary dryer system.

The WBPF is a heat drying pelletization plant, which uses a rotary drum dryer to thermally dry dewatered sludge. The homogenized feed materials are conveyed into the rotary drum dryer and heated to 400 – 450 ºC to stabilize and remove moisture. The rotary drum dryer has a typical retention time of 20 minutes and has an evaporation capacity of 6,000 kg water/hr. This residence time allows the sludge to dry, pasteurizes it, and eliminates pathogens, while maintaining the nutrient and organic benefits in the final product. The dried product from the dryer is separated from the air/vapour stream by cyclone technology. From here the dried biosolids are conveyed by bucket elevator to the screening area. Off screenings are recycled to the mixer and reincorporated into the homogenized mixture prior to the rotary drum dryer. The screened dried fertilizer product is conveyed pneumatically into silos where the fertilizer is stored prior to being shipped to customers.

The fertilizer is classified under Title 40 CFR, Part 503 as Class A biosolids in the USA. In Canada, the fertilizer product was registered under the federal *Fertilizer Act* as a farm fertilizer under the trade name Windsor Propell. The fertilizer is now marketed under the trade name Eco Pearl.

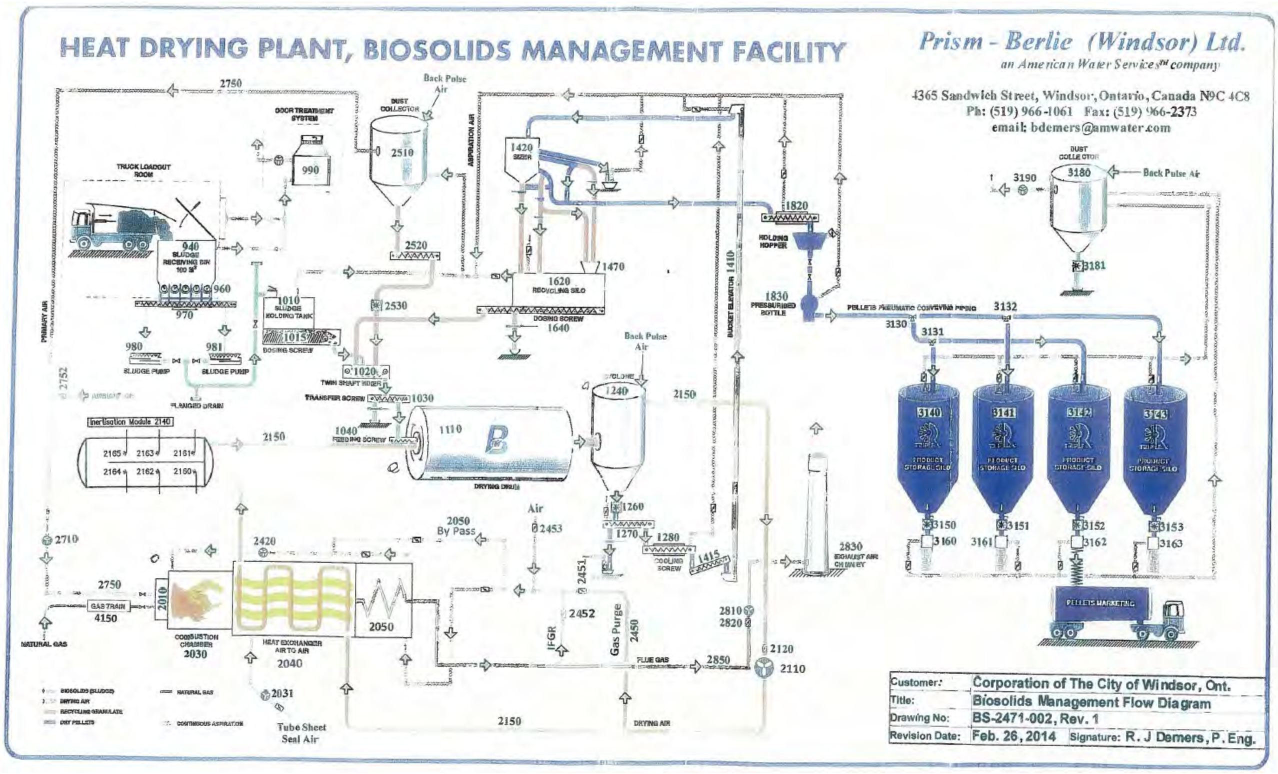

Figure 2.7: Process Schematic of the Windsor Biosolids Processing Facility

2.3.3 Existing Biosolids Treatment Capacity

In 2021, the WBPF processed approximately 40,000 wet tonnes of sludge from the LRWRP and LRPCP into approximately 12,000 dry tonnes of EcoPearl fertilizer product. For a third consecutive year, all of the biosolids produced at the two WWTPs were converted into fertilizer and no biosolids (sludge or fertilizer) was sent to landfill. **Table 2.7** summarizes the approximate amount of dewatered sludge processed at the WBPF in 2021.

Table 2.7: Operating Conditions at the WBPF (2021)

Month	LRWRP (wet tonnes)	LRPCP (wet tonnes)	Total (wet tonnes)	Landfilled (wet tonnes)	Processed (dry tonnes)
January	2,099	771	2,870	0	986
February	1,828	761	2,589	0	734
March	2,561	942	3,503	0	1,076
April	2,496	844	3,340	0	974
May	2,666	833	3,499	0	987
June	2,837	835	3,673	0	1,065
July	2,662	693	3,355	0	1,132
August	2,662	737	3,399	0	948
September	2,503	726	3,229	0	950
October	2,403	731	3,135	0	876
November	2,683	790	3,473	0	940
December	2,814	814	3,628	0	1,078
Total	30,203	9,479	39,692	0	11,748

The treatment process at the existing WBPF is controlled and limited by the capacity of the rotary drum dryer system. The rotary drum dryer at the WBPF has a typical retention time of 20 minutes and an evaporation capacity of 6,000 kg water/hr. Depending on the moisture content of the incoming wet dewatered sludge cake the maximum capacity of the WBPF is 7,500 to 8,300 kg sludge/hr in operation. The typical operating schedule for the WBPF is 24 hours per day from Monday to Friday and maintenance of the plant is completed on Saturday and Sunday. Based on this the WBPF can process approximately 47,000 to 52,000 tonnes of wet dewatered sludge per year. This capacity is sufficient for the current sludge loading in the City of Windsor but would not be able to meet future biosolids management needs as shown in **Figure 2.8**.

2.3.4 Biosolids Storage and General Requirements

The WBPF has two storage facilities on-site for the appropriate storage of (i) wet dewatered sludge cakes and (ii) final fertilizer material. As outlined in **Section 2.3.2**, the wet dewatered sludge cake from the two wastewater treatment facilities is transferred to the WBPF. These sludge cake are unloaded from the tractor trailers into a receiving bin at the WBPF. The receiving bin is equipped with an adsorption odor control system to reduce odour emissions to the surrounding community. Piston pumps are then utilized to transfer the sludge cake from this receiving area to a sludge holding tank located in the drying area. Following the treatment process, the final product, which is a stabile pelletized biosolids material is stored on-site in one of four storage silos.

The Ontario Design Guidelines for Sewage Works outlines the general requirements for sludge storage and disposal. Dewatered sludge with solids content less than 35 % may be stored on-site for a maximum of 7 days, whereas dewatered sludge with solids content greater than or equal to 35 percent may be stored on-site for up to 90 days. Dried sludge with a solids content greater than or equal to 50 percent may be stored on-site without limitation prior to disposal or land application. In Ontario, biosolids may be used as a soil conditioner for agricultural, horticultural, or reclamation purposes as an alternative to sludge disposal through landfilling. Biosolids contain nutrients such as nitrogen, phosphorus, zinc, magnesium, and copper as well as organic matter that are beneficial to agricultural plant growth. When applied in accordance the Nutrient Management Act biosolids can improve soil fertility, reduce the application of commercial fertilizers, add organic matter, enhance soil structure, and improve moisture retention.

2.4 SLUDGE CHARACTERISTICS, QUANTITIES, AND PROJECTIONS

2.4.1.1 Sludge Characteristics

In order to characterize the sludge characteristics samples were collected at the two wastewater treatment facilities for internal and external analysis. The external sludge sample analysis was conducted by a certified laboratory (AGAT Laboratories). Samples were collected twice weekly for the analysis of total solids and volatile solids and monthly for the analysis of pH, Total Kjeldahl Nitrogen, Ammonia, Total Phosphorus, Extractable Phosphorous, Orthophosphorous, Oil & Grease (% of Total Sludges), Conductivity, Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Nitrate, Potassium, Selenium, Silver, Sodium, Strontium, Thalium, Tin, Titanium, Uranium, Vanadium, and Zinc. A summary of the key parameters for the sludge characterization in the year 2021 is shown in **Table 2.8**. The sample results show that the sludge at the two wastewater treatment plants is typical of municipal sludge. Further, the sample results show that heavy metals, ammonia, sulfides, and other inhibitors of biological decomposition are not a concern.

Table 2.8: Primary Sludge Characteristics (2021)

Parameter	LRWRP			LRPCP		
	10th Percentile	Average	90th Percentile	10th Percentile	Average	90th Percentile
pH	5.49	5.67	5.8	5.5	5.6	5.7
Total Solids (%)	4.0	5.1	6.2	2.7	3.5	4.3
Volatile Solids/ Total Solids Fraction (%)	60.7	69.7	75.5	77.0	80.2	84.3
Total Kjeldahl Nitrogen (mg / kg)	31,770	40,614	49,733	25,976	43,687	57,456
Total Phosphorus (mg / kg)	15,100	49,131	199,900	15,517	17,210	21,370

2.4.1.2 Sludge Cake Production and Operating Conditions at the LRWRP and LRPCP

At the LRWRP, sludge is removed from the treatment process at the primary clarifiers. At this point the primary sludge has a solids content in the range of 4 to 7 %, with an average of approximately 5.5 %. Based on the historical operating conditions, there appears to be a consistent seasonal effect whereby the solids concentration is higher in the winter period and lower in the summer period. The ratio of volatile solids (VS) to total solids (TS) in the primary sludge varies from 60 to 80 %, with an average concentration of 68%. Dewatered sludge cake from the Alfa-Laval Centrifuge (Machine 1) has a solids content of approximately 24 to 28 %, with an average of 26%. Dewatered sludge cake from the Andritz Centrifuges (Machine 2 and 3) has a solids content of approximately 28 to 34 %, with an average of 32%.

The historical operating conditions at the LRWRP Dewatering Facility for the years 2018 to 2021 are summarized in **Table 2.9.** The average dewatered sludge cake production at the LRWRP is 8,500 dry tonnes per year or approximately 31,000 wet tonnes per year with a solids content of 27 %.

Table 2.9: Operating Conditions at the LRWRP Dewatering Facility (2018-2021)

Parameter	Units	Max Month	Average Month	Min Month
Plant Flow	MLD	220	133	100
Primary Sludge [Solids]	% TS	7.0	5.5	4.0
Primary Sludge [VS]/[TS]	%	80	68	60
Primary Sludge Feed (including non-dewatering days)				
Total (machine 1+2+3)	dry tonnes/d	35	28	22
Dewatered Cake Production (including non-dewatering days)				
Wet Total (machine 1+2+3)	wet tonnes/d		84	
Dry Total (machine 1+2+3)	dry tonnes/d	30	23	18
Dewatering Time (including non-dewatering days)				
Total (machine 1+2+3)	hrs runtime/d		10.4	
Machine #1	hrs runtime/d		3.5	
Machine #2	hrs runtime/d		4.5	
Machine #3	hrs runtime/d		2.5	
Dewatered Solids Concentrations				
Machine #1	% dry solids	28	26	25
Machine #2	% dry solids	33	32	28
Machine #3	% dry solids	33	32	28
Polymer Concentration	%	0.3	0.2	0.15
Polymer Usage	kg poly/dry t	8-10	4-8	3-4

At the LRPCP, sludge is removed from the treatment process at the primary clarifiers. At this point the primary sludge has a solids content in the range of 1.5 to 8 %, with an average of approximately 3.6 %. Based on the historical operating conditions, there appears to be a consistent seasonal effect whereby the solids concentration is higher in the winter period and lower in the summer period, which may be due to fermentation. The ratio of VS to TS in the primary sludge varies from 66 to 88 %, with an average concentration of 81 %. Dewatered sludge cake after centrifuging has a solids content of approximately 21 to 33 %, with an average of 27%.

The historical operating conditions at the LRPCP Dewatering Facility for the years 2018 to 2021 are summarized in **Table 2.10.** The average dewatered sludge cake production at the LRWRP is 2,500 dry tonnes per year or 9,500 wet tonnes per year with a solids content of approximately 27 %.

Table 2.10: Operating Conditions at the LRPCP Dewatering Facility (2018-2021)

Parameter	Units	Max Month	Average Month	Min Month
Plant Flow	MLD	60	45	31
Primary Sludge [Solids]	% TS	8.0	3.6	1.5
Primary Sludge [VS]/[TS]	%	88	81	66
Primary Sludge Feed (including non-dewatering days)				
Total	dry tonnes/d		9.8	
Dewatered Cake Production (including non-dewatering days)				
Wet Total	wet tonnes/d		25.6	
Dry Total	dry tonnes/d		6.8	
Dewatering Time (including non-dewatering days)				
Total	hrs runtime/d		6.0	
Machine #1	hrs runtime/d		2.2	
Machine #2	hrs runtime/d		1.8	
Machine #3	hrs runtime/d		2.1	
Dewatered Solids Concentrations				
Total	% dry solids	33	27	21
Polymer Concentration	%	0.60	0.46	0.26
Polymer Usage	kg poly/dry t	14.0	8.2	5.0

The mass of wet dewatered sludge cake measured from the LRWRP and LRPCP from 2018 to 2021 are summarized in **Table 2.11**. The table further shows that LRWRP and LRPCP generate an average of 31,000 wet tonnes/yr and 9,500 wet tonnes/yr, respectively, for a combined total of 40,500 wet tonnes/yr.

Table 2.11: Measured Mass of Dewatered Sludge Cake (2018-2021)

Year	Mass of Wet Dewatered Sludge Cake at approximately 27 % Solids (wet tonnes / yr)		
	LRWRP	**LRPCP**	**Combined**
2018	32,700	8,600	41,300
2019	32,400	9,700	42,100
2020	28,800	9,700	38,500
2021	28,600	9,400	38,000
Average	**31,000**	**9,500**	**40,500**

2.4.1.3 Biosolids Projections

The historical operating data for the average daily sewage flow and the average mass of wet dewatered sludge cake at the LRWRP for period between 2018 and 2021 is shown in **Table 2.12**. In addition, the rated capacity of the LRWRP and the corresponding mass of wet dewatered sludge cake is shown in the table.

The LRWRP services the central and western portion of the City of Windsor as well as the nearby Town of Lasalle. A majority of the land within this region of the City of Windsor are fully developed and are not anticipated to be changed or redeveloped above the existing rated capacity of the sanitary collection system and LRWRP. In the Town of Lasalle there are a variety of areas which have not been developed or are in the process of being redeveloped. However, development within these regions is not anticipated to exceed the original design capacity of the sanitary collection system and LRWRP. Overall, the average daily sewage flow and therefore the mass of wet dewatered sludge cake at the LRWRP is anticipated to increase in the future but not exceed the rated capacity of the LRWRP in the next 20 years.

Table 2.12: Historical Operating Conditions and Rated Capacity at the LRWRP

Parameter	Historical Operating Records (2018 – 2021)	Rated Capacity
Average Daily Flow	131 MLD	218 MLD
Wet Mass of Dewatered Sludge Cake (at approximately 27.4% solids)	31,000 wet tonnes / yr	60,000 wet tonnes / yr
Dry Mass of Dewatered Sludge Cake	8,500 dry tonnes / yr	16,000 tonnes / yr

The historical operating data for the average daily sewage flow and the average mass of wet dewatered sludge cake at the LRPCP for period between 2018 and 2021 is shown in **Table 2.12.** In addition, the current rated capacity of the LRPCP and the corresponding mass of wet dewatered sludge cake is shown in **Table 2.12**.

The LRPCP services the eastern portion of the City of Windsor as well as the nearby Municipality of Tecumseh. These regions are anticipated to undergo intensive growth including residential developments as well as major institutional (Windsor Regional Hospital) and industrial developments (Stellantis/LG Electric Battery Plant and feeder plants). Therefore, the LRPCP is expected to undergo expansions to meet future wastewater servicing needs. The Windsor – Tecumseh Wastewater Servicing Agreement (2004) and the Tecumseh Water and Wastewater Master Plan (2018) outlines that the LRPCP may undergo four expansions in the future. At the time when these studies were carried out the first expansion was anticipated to be completed in 2031 with the subsequent expansion occurring in 2037; however, recent industrial commitments and residential pressures may expediate the expansion of the LRPCP. The final rated capacity of the LRPCP after all expansions are completed, as outlined in the Wastewater Servicing Agreement, is 145 MLD which corresponds to approximately 40,000 wet tonnes / yr of wet dewatered sludge cake or 10,500 dry tonnes / yr.

Table 2.13: Historical Operating Conditions and Rated Capacity at the LRPCP

Parameter	Historical Operating Records (2018 – 2021)	Rated Capacity	Anticipated Rated Capacity (Final Expansion)
Average Daily Flow	45 MLD	73 MLD	145 MLD
Wet Mass of Dewatered Sludge Cake (at approximately 26.6% solids)	9,500 wet tonnes / yr	20,000 wet tonnes / yr	40,000 wet tonnes / yr
Dry Mass of Dewatered Sludge Cake	2,500 dry tonnes / yr	5,250 dry tonnes / yr	10,500 dry tonnes / yr

The projections for future sludge production at the two wastewater treatment plants are summarized in

Table 2.14. These projections are generally based on the rated design capacities of the wastewater treatment plants with the following assumptions:

- The 20-year design basis for the management of sludge from the LRWRP is based on the current rated capacity of the plant.
- The 20-year design basis for the management of sludge from the LRPCP is based on the current rated capacity of the plant multiplied by a factor of 1.5. This factor was introduced to provide accommodation for major developments that are anticipated to occur in the service area over the next 20 years.
- The ultimate design basis for the management of sludge from the LRWRP is based on the current rated capacity of the plant multiplied by a factor of 1.5. This factor was introduced to provide accommodation for future servicing needs and may be re-evaluated based on development pressures and realized sludge production values.
- The ultimate design basis for the management of sludge from the LRPCP is based on the anticipated rated capacity of the plant after the completion of all expansions outlined in the

Wastewater Servicing Agreement. This value may be re-evaluated in the future based on development pressures and realized sludge production values.

This Biosolids Management Master Plan including the evaluation of alternative design solutions, evaluation of alternative design concepts, and recommendations for preferred overall design will be based on the projections summarized in

Table 2.14. The preferred design will be based on the 20-year sludge projection (24,000 dry tonnes / yr) with consideration for future expansion or phasing to the ultimate sludge projection (34,500 dry tonnes / yr).

Table 2.14: Sludge Projections and Design Basis for Biosolids Management

Sludge Projections		Wet Mass* (tonnes / yr)	Dry Mass (tonnes / yr)
Historic Average 2018 - 2021	LRWRP	31,000	8,500
	LRPCP	9,500	2,500
	Total	**40,500**	**11,000**
20-Year Design	LRWRP	60,000	16,000
	LRPCP	30,000	8,000
	Total	**90,000**	**24,000**
Ultimate Design	LRWRP	90,000	24,000
	LRPCP	40,000	10,500
	Total	**130,000**	**34,500**
Note: *Wet Mass at 26-27% Solids			

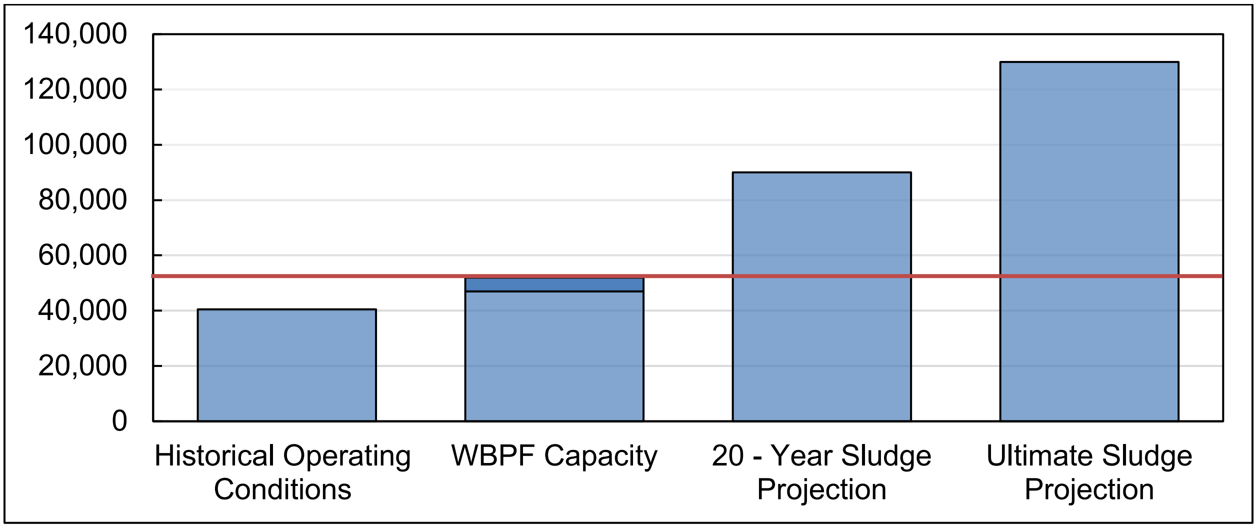

Figure 2.8: Historical Operating Conditions, WBPF Capacity, and Biosolids Projections

2.5 ENERGY CONSUMPTION AT THE WINDSOR WASTEWATER TREATMENT FACILITIES

2.5.1 Lou Romano Water Reclamation Plant

2.5.1.1 Historical Electricity Consumption and Treated Wastewater Flows

Historical electricity use from 2014 to 2018 is summarized in **Table 2.15**. The table shows that LRWRP consumes 16,800 MWh of electricity costing $2.1 million dollars on average annually.

Table 2.15: Historical Electricity Use at the LRWRP (2014-2018)

Year	Utility Electricity Bill Cost ($/yr)	Utility Electricity Consumed (kWh/yr)	Local Utilities Average Unit Cost ($/kWh)	Actual Annual Unit Cost for the facility ($/kWh)
2014	$2,082,617	17,562,931	0.118	0.120
2015	$2,272,270	16,918,046	0.134	0.135
2016	$2,401,254	16,012,165	0.148	0.153
2017	$2,016,343	16,458,437	0.120	0.127
2018	$1,604,845	16,962,231	0.092	0.100
Average	**$2,100,000**	**16,780,000**	**0.122**	**0.127**

Figure 2.9 presents monthly raw sewage flows and electricity use between the years 2014 and 2018. The figure shows that the monthly electricity consumption ranges between 1,090,186 kWh/month and 1,808,379 kWh/month, with an average of 1,398,563 kWh/month. As illustrated in **Figure 2.9**, the monthly average daily flow ranges between 93 MLD and 187 MLD with an average of 133 MLD. In general, the electricity consumed tends to follow the volume of treated wastewater at the plant.

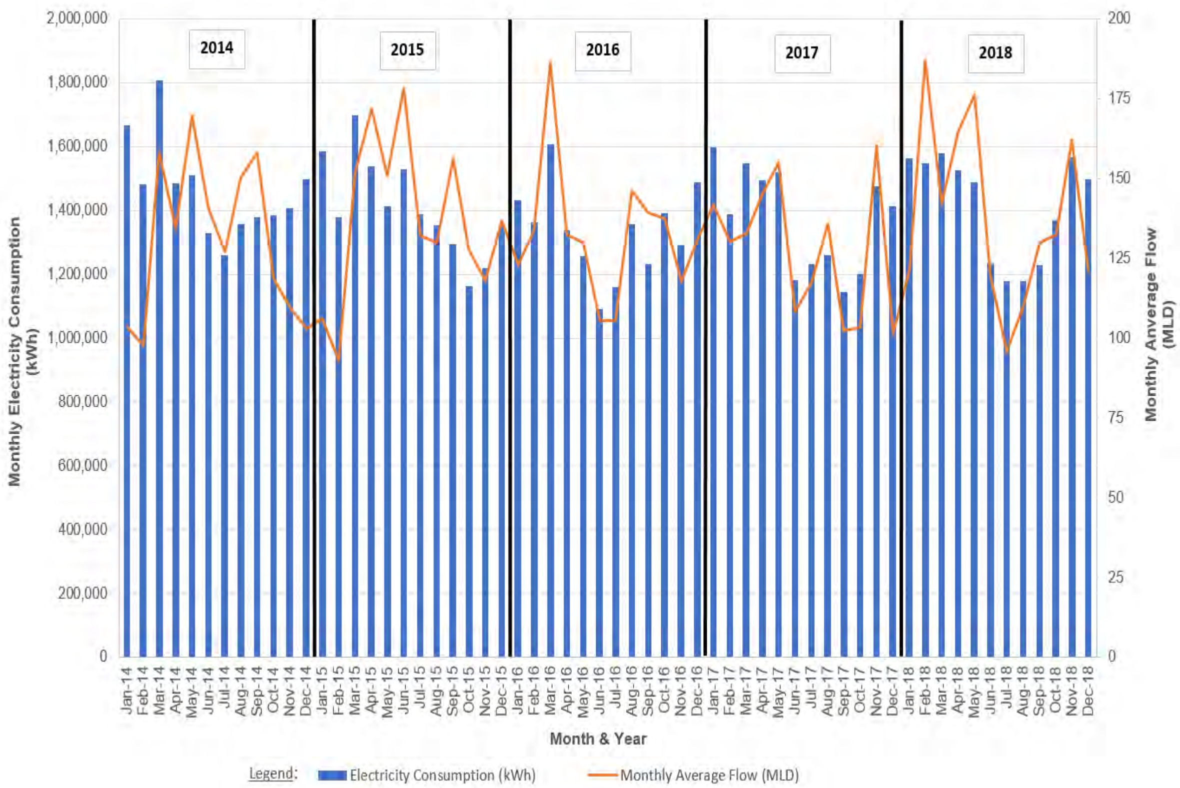

Figure 2.9: Monthly Electricity Use and Treated Flow at the LRWRP (2014-2018)

2.5.1.2 Historical Natural Gas and Diesel Fuel Consumption

Historical natural gas use from 2014 to 2018 is summarized in **Table 2.16**. Gas consumption at the LRWRP was monitored by utility billing invoices. The LRWRP consumes an average of 271,000 m^3/yr of natural gas costing $70,000 dollars on average annually. Natural gas consumption in winter months (Jan-April, Oct-Dec) is approximately 95% of the annual gas consumption, which can be attributed to heating the plant.

Table 2.16: Historical Natural Gas Use at the LRWRP (2014-2018)

Year	Annual Gas Consumption (m^3/yr)	Gas Consumption in Winter Months (Jan-April, Oct-Dec) (m^3/yr)	Percentage of Gas Consumption in Winter Months (%)	Utility Natural Gas Cost ($/yr)
2014	316,801	304,608	96%	72,712
2015	264,584	251,862	95%	61,915

2016	215,680	205,604	95%	51,865
2017	Not available	Not available	Not available	Not available
2018	287,566	266,228	93%	84,148
Average	**271,158**	**257,076**	**95%**	**$67,660**

The total diesel fuel purchased at LRWRP was 126,345 L in 2018. This diesel fuel was utilized by onsite generators for backup power generation. The 2018 utility electricity consumed was 16,962,231 kWh. The total power generated by the backup power system was 472,613 kWh, which is approximately 3% of the 2018 total electricity consumed at the plant.

2.5.2 Little River Pollution Control Plant

2.5.2.1 Historical Electricity Consumption and Treated Wastewater Flows

Historical electricity use from 2014 to 2018 is summarized in **Table 2.17**. The table shows that LRPCP consumes 5,765 MWh of electricity costing $0.7 million dollars on average annually.

Table 2.17: Historical Electricity Use at the LRPCP (2014-2018)

Year	Utility Electricity Bill Cost ($/yr)	Utility Electricity Consumed (kWh/yr)	Average Annual Unit Cost ($/kWh)
2014	$710,777	5,939,577	0.120
2015	$761,807	5,614,873	0.136
2016	$848,486	5,673,061	0.150
2017	$691,353	5,784,386	0.120
2018	$584,299	5,813,896	0.101
Average	**$719,000**	**5,765,000**	**0.125**

Figure 2.10 presents monthly raw sewage flows and electricity use between the years 2014 and 2018. The figure shows that the monthly electricity consumption is in the range between 427,326 kWh per month and 553,904 kWh per month with an average of 479,444 kWh/month. As illustrated in **Figure 2.10**, the monthly average daily flow ranges between 31 MLD and 56 MLD with an average of 43 MLD. In general, the electricity consumed is proportional to the volume of treated wastewater at the plant.

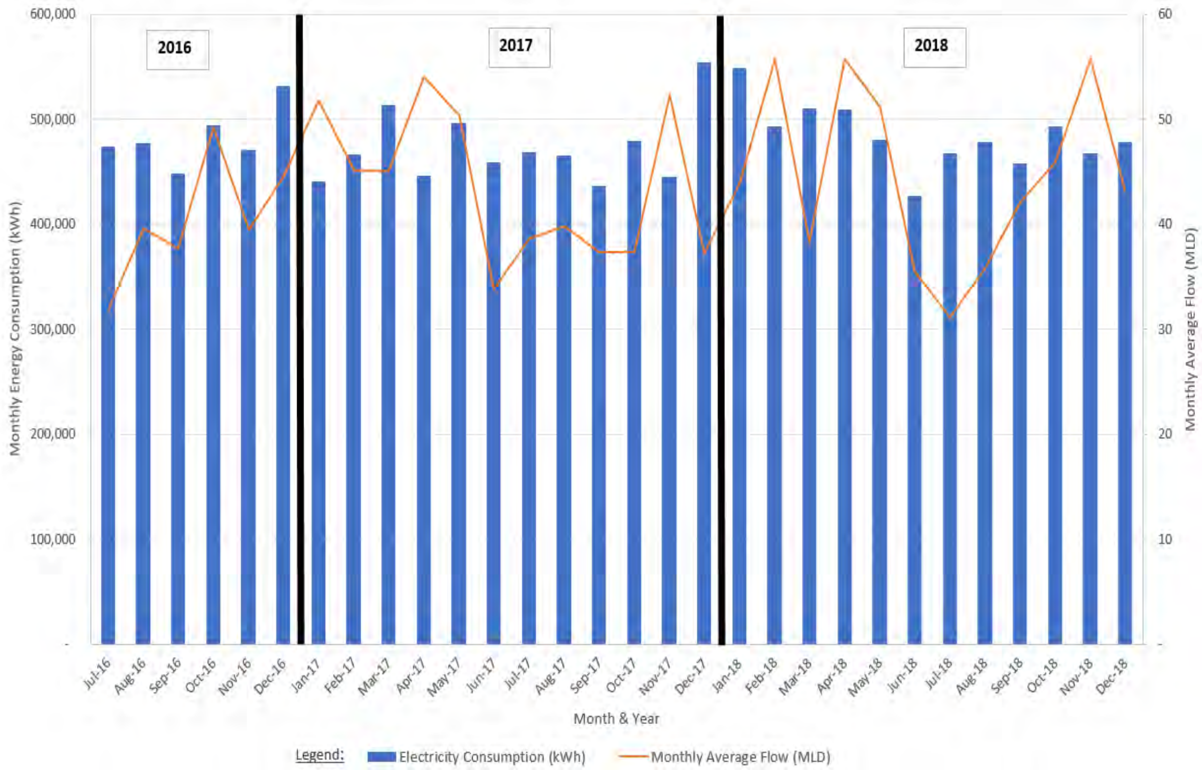

Figure 2.10: Monthly Electricity Use and Treated Flow at the LRPCP (Jul 2016- 2018)

2.5.2.2 Historical Natural Gas and Diesel Fuel Consumption

Historical gas use from 2014 to 2018 is summarized in **Table 2.18**. Gas consumption at the LRPCP was monitored by utility billing invoices. The LRPCP consumes an average of 93,000 m^3/yr of natural gas costing $20,000 dollars on average annually. Natural gas consumption in winter months (Jan-April, Oct-Dec) is above 95% of annual gas consumption because most of the gas load utilized is for building heating.

Table 2.18: Historical Natural Gas Use at the LRPCP (2014-2018)

Year	Annual Gas Consumption (m3/yr)	Gas Consumption in Winter Months (Jan-April, Oct-Dec) (m3/yr)	Percentage of Gas Consumption in Winter Months (%)	Utility Natural Gas Cost ($/yr)
2014	117,311	112,846	96%	28,980.87
2015	72,350	71,294	99%	18,201.72
2016	79,119	75,036	95%	15,276.38
2017	80,489	77,453	96%	21,951.66
2018	119,008	115,693	97%	29,114.99
Average	**93,655**	**90,464**	**97%**	**$22,705.12**

The total diesel purchased at LRPCP was 38,353 L in 2018. This diesel fuel was utilized by onsite generators for backup power generation. The 2018 utility electricity consumed was 5,813,896 kWh. The total power generated by the backup power system was 92,086 kWh, which is approximately 2% of the 2018 total electricity consumed at the plant.

2.5.3 Windsor Biosolids Processing Facility

2.5.3.1 Historical Electricity Consumption

Historical electricity use from 2014 to 2018 is summarized in **Table 2.19**. The table shows that WBPF consumes approximately 2,094 MWh of electricity costing $290,000 dollars each year.

Table 2.19: Historical Electricity Use at WBPF (2014-2018)

Year	Utility Electricity Bill Cost ($/yr)	Utility Electricity Consumed (kWh/yr)	Average Annual Unit Cost ($/kWh)
2014	$246,306	2,035,220	$0.121
2015	$283,285	2,077,060	$0.136
2016	$321,136	2,144,303	$0.150
2017	$313,590	2,124,341	$0.148
2018	$295,600	2,090,622	$0.141
Average	**$292,000**	**2,094,000**	**$0.139**

2.5.3.2 Historical Natural Gas Consumption

Historical gas use from 2014 to 2018 is summarized in **Table 2.20**. The table shows that WBPF consumes 2,600 MCM of natural gas costing $590,000 dollars on average annually. The majority (99%) of the gas consumption at the WBPF was used in the thermal drying process. The remaining natural gas was consumed for building and hot water heating (1%).

Table 2.20: Historical Natural Gas Use at WBPF (2014-2018)

Year	Annual Total Gas Consumption (m^3/yr)	Annual Process Gas Consumption (m^3/yr)	Percentage of Process Gas Consumption (%)	Utility Natural Gas Cost ($/yr)	Average Annual Unit Cost ($/$m^3$)
2014	2,531,576	2,500,415	99%	$672,065	0.265
2015	2,642,644	2,622,578	99%	$533,253	0.202
2016	2,523,830	2,503,541	99%	$453,910	0.180
2017	2,703,482	2,686,728	99%	$697,637	0.258
2018	2,720,396	2,693,487	99%	$614,100	0.225
Average	**2,588,400**	**2,601,300**	**99%**	**$594,200**	**0.210**

2.6 GREENHOUSE GAS EMISSIONS AT THE WINDSOR WASTEWATER TREATMENT FACILITIES

Estimating GHG emissions is an important step in identifying sources (emitters) and sinks that can reduce GHG emissions, so that with intervention GHG concentrations in the future may be at a level that prevents anthropogenic interference and destruction of the earth's atmosphere. To be consistent with GHG accounting standards worldwide, GHG emissions are inventoried into three (3) separate categories or scopes in accordance with industry standard GHG reporting protocols (IPCC 2006). Scope 1 includes all direct GHG emissions (with the exception of biogenic CO_2). Scope 2 includes indirect GHG emissions associated with the consumption of purchased electricity. Scope 3 includes all other indirect emissions not covered in Scope 2, such as emissions resulting from the manufacture of purchased materials or waste disposal occurring outside of an entities jurisdiction.

While organizations worldwide have worked to develop methods to estimate process related GHG emissions from WWTPs, there are no widely accepted standardized guidelines to estimate emissions. The protocols used to compute the historical greenhouse gas emissions at the Windsor Wastewater Treatment Facilities is outlined in the City of Windsor Integrated Site Energy Master Plan. These protocols are the most widely accepted in the municipal wastewater treatment industry in Ontario. They were selected so that process emissions computed from LRWRP and LRPCP use the same emission sources and consistent methodology that are being accounted for by all other WWTPs in Ontario. GHG emissions for the subject analysis were computed for the calendar year 2018. The scope of the analysis started at the headworks of the WWTPs and ended once screenings and grit were hauled to landfill, and the sludge was processed into fertilizer pellets or hauled to landfill.

2.6.1 Lou Romano Water Reclamation Plant and WBPF

The proportion of GHG emissions emitted from each source from LRWRP and WBPF is shown in **Table 2.21**. The total quantity of GHG emitted from the facility is 7,012 tonnes CO_2e in 2018. WWTP's in Ontario that report GHG emissions in the most recent year of reporting reported between 0.1 – 0.3 tonnes CO_2e / ML (for plants with similar treatment process as LRWRP). The LRWRP had a GHG intensity of 0.14 tonnes CO_2e / ML in 2018.

Table 2.21: GHG Emissions from the LRWRP and WBPF (Annually)

IPCC Scope	Description	Fuel Source / Description	GHG Emissions (tonnes CO_2e)
1 (direct emissions from WWTP operation)	Process emissions	Process specific	1,077
	Fuel Oil Burning Equipment LRWRP WBPF Total	Natural Gas	546 + 4,049 4,595
	Vehicles in Fleet	Gasoline	8
	Backup Generator Power	Diesel	354

2 (indirect emissions from purchased electricity)	Electricity LRWRP WBPF Total	Biofuel or Natural Gas	526 + 51 577
3 (indirect emissions from other purchased materials)	Chemicals	Production & Transportation	402
Total GHG Emissions (excluding Biogenic)			**7,010**

Figure 2.11 shows the proportion of GHG's emitted from each source at the LRWRP. The figure shows that the majority (62%) of GHG's were emitted from combusting natural gas. The majority of the natural gas emissions were from the thermal drying process at WBPF (88%). The remainder of natural gas is primarily used for building and hot water heating. GHG's emitted from purchased electricity (8%), and process emissions (25%) were the other two most signficant sources. It should be noted that in other areas of the world the primary source of GHG emissions from wastewater treatment plants is usually from purchased electricity. However, since Ontario decommissioned its last Coal Fired Power Plant prior to 2014, GHG emissions from purchased electricity have signficantly reduced due to lower emissions factors from electricity generating methods that emitt less GHGs. As a result, electricity has a low emission factor per unit energy consumed in Ontario. Typically, electricity has an emission factor of 9g CO_2e/MJ which is much lower than the the next cleanest fossil fuel natural gas which is 49g CO_2e/MJ energy consumed.

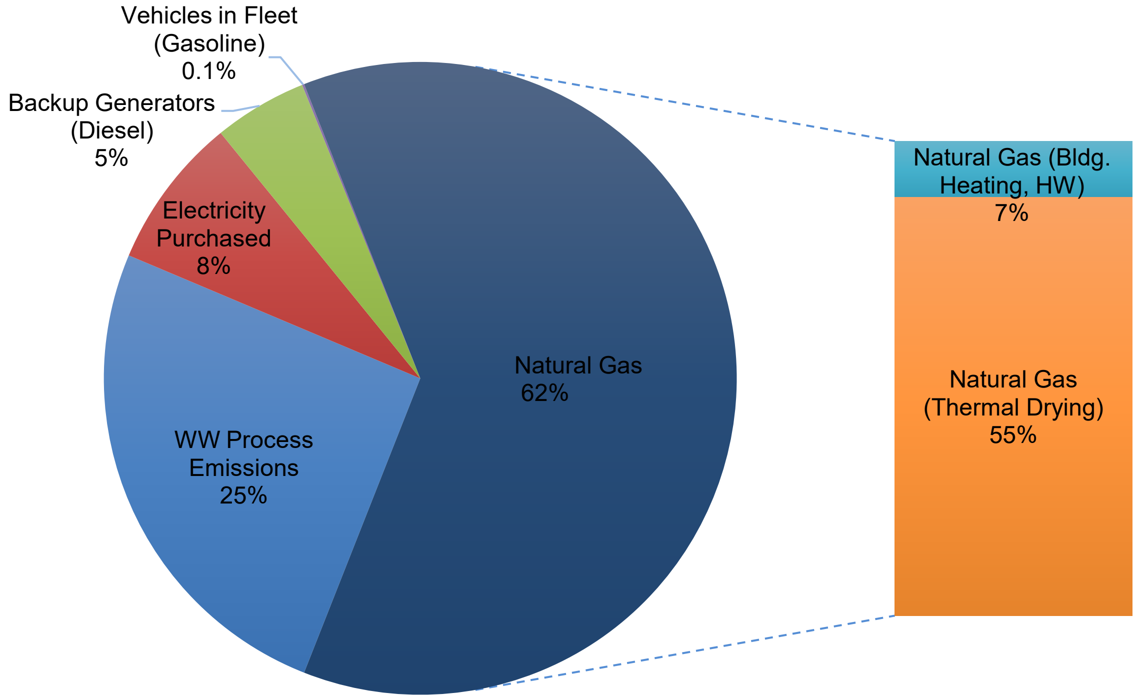

Figure 2.11: Proportion of GHG's Emitted at LRWRP and WBPF Based on Source

Note: (HW = Hot Water)

2.6.2 Little River Pollution Control Plant and WBPF

The proportion of GHG emissions emitted from each source from the LRPCP and WBPF facility is shown in **Table 2.22**. The total quantity of GHG emitted from LRPCP and WBPF is 2,219 tonnes CO_2e in 2018. WWTP's in Ontario that report GHG emissions in the most recent year of reporting reported between 0.1 – 0.3 tonnes CO_2e / ML (for plants with similar treatment process as LRPCP). The LRPC had a GHG intensity of 0.13 tonnes CO_2e / ML in 2018, which is within the range of plants with similar process treatment trains in Ontario.

Table 2.22: GHG Emissions from the LRPCP and WBPF (Annually)

IPCC Scope	Description	Fuel Source / Description	GHG Emissions (tonnes CO_2e)
1 (direct emissions from WWTP operation)	Process emissions	Process specific	458
	Fuel Oil Burning Equipment LRPCP WBPF Total	Natural Gas	223 + 1,117 1,343
	Vehicles in Fleet	Gasoline	5
	Backup Generator Power	Diesel	108
2 (indirect emissions from purchased electricity)	Electricity LRPCP WBPF Total	Biofuel or Natural Gas	180 + 14 194
3 (indirect emissions from other purchased materials)	Chemicals	Production & Transportation	111
Total GHG Emissions (excluding Biogenic)			**2,220**

Figure 2.12 shows the proportion of GHG's emitted from each source at the LRWRP. The figure shows that the majority (60%) of GHG's were emitted from combusting natural gas. The majority of the natural gas emissions were from the thermal drying process at WBPF (83%). The remainder of natural gas is primarily used for building heating. GHG's emitted from purchased electricity (9%), and process emissions (26%) were the other two most signficant sources.

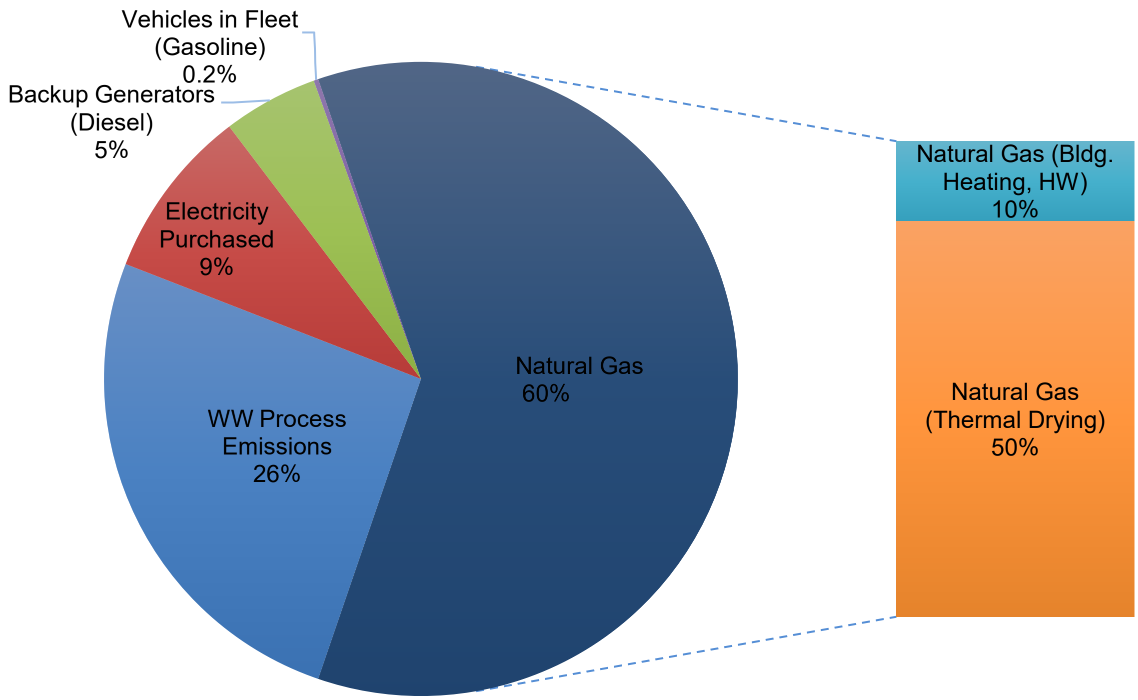

Figure 2.12: Proportion of GHG's emitted at LRPCP and WBPF Based on Source

Note: (HW = Hot Water)

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3.0 STUDY AREA CONDITIONS

The following sections provide an overview of background information and a description of existing conditions within the study area as a basis for comparison. Alternative design solutions and concepts must be evaluated based on their potential impact to existing natural, cultural, social, and economic environments.

3.1 GENERAL DESCRIPTION OF THE STUDY AREA

The City of Windsor is located in Southwestern Ontario on the south shore of the Detroit River and Lake St. Clair directly across from the City of Detroit, Michigan. The population of Windsor is approximately 230,000 with a total land area of approximately 145.3 square kilometers (12,063 hectares). Settlement in the Windsor area dates back to the 1700's with a population of 200 being reported in 1836 and 2,500 in 1892. Development generally started along the riverfront and progressed southerly away from the river as the population increased. More recently, the Canadian Census Program shows the population of the City increased from 217,188 in 2016 to 229,660 in 2021. The Windsor Census Metropolitan Area (which includes the Towns of Amherstburg, LaSalle, Lakeshore, and Tecumseh) is the 14th largest metropolitan area in Canada.

The riverfront area of the City extends from Lake St. Clair approximately 22.5 km downstream to the west limit of the City. The long-term average discharge of the Detroit River is 5,200 m^3/s with mid-channel surface currents of 1 to 1.2 m/s at the Ambassador Bridge. Flow travel time along the riverfront study area from Lake St. Clair to the western City limit is approximately 8 to 9 hours. There are numerous existing uses of the Detroit River as described in the "Detroit River Remedial Action Plan, Stage 1" dated 1991.

- The river supports over sixty species of resident and migratory fish with an associated strong sport fishery.
- The river provides habitat for many resident and migratory birds.
- The river is heavily used for commercial navigation as part of the Great Lakes-St. Lawrence Seaway system with Detroit being the busiest port on the Great Lakes.
- The river is used as a source of cooling water supply for several industries.
- There are five municipal drinking water intakes in the river including the City of Windsor intake in the study area and the Town of Amherstburg intake in the lower reaches of the river near Lake Erie.
- The river serves as a receiving water for municipal and industrial discharges.
- The Detroit River is an important recreational resource used for activities such as swimming, water skiing, jet skiing, scuba diving, fishing, boating, waterfowl viewing and waterfowl hunting.

- The two bathing beaches on the Canadian shore are located upstream of the study area (Sand Point Beach and Stop 26).
- There are extensive park areas in the City of Windsor bordering on the river.

3.2 LAND USE PLANNING AND POLICY

The Provincial Policy Statement (PPS) is a consolidated statement of the government’s policies on land use planning. The PPS was issued in 2020 under the *Planning Act* and as such all decisions affecting planning matters shall be consistent with the Provincial Policy Statement. The PPS has policies across five themes: increasing housing supply and mix, protecting the environment and public safety, reducing barriers and costs, supporting rural, northern, and Indigenous communities, and supporting certainty and economic growth. The PPS is a key consideration for identifying land-use planning objectives and evaluating alternative design concepts in Phase 2 and 3 of the Class EA process.

In combination with Municipal Official Plans, the PPS outlines a framework for comprehensive planning that allows Ontario to sustain strong communities, a clean and healthy environment, and economic growth. The key approach for implementing the PPS is through Municipal Official Plans which identify provincial interests and present appropriate land use designations and policies for the local community. It is important that Municipal Official Plans are kept up to date with the PPS to protect provincial interests and ensure that development takes place in suitable areas. This proposed project is consistent with the City of Windsor’s Official Plan.

3.3 NATURAL ENVIRONMENT

3.3.1 Climate

The climate in Essex County is classified as modified humid continental, which has hot and humid summers with mild winters and adequate precipitation. In comparison with the other areas in the Province, Essex County's southerly latitude and proximity to the lower Great Lakes provides for warmer summer and winter temperatures with a longer growing season. Because the area is also on one of the major continental storm tracks, it experiences wide variations in day-to-day weather including severe summer thunderstorms. The normal minimum and maximum temperatures are –9 ^{0}C and +28 ^{0}C respectively and the mean daily temperature is above 6 ^{0}C, which tends to increase temperatures in surface waters.

3.3.2 Geology and Physiography

The City of Windsor is located in the physiographic region of Southwestern Ontario known as the St. Clair Clay Plains. As the name suggests the area is covered with extensive clay plains. The topography of the area is extremely flat with elevations ranging from 175 to 204 meters above sea level.

Most of the bedrock under the region is sedimentary limestone of the Devonian age which has a high calcium and magnesium content. The bedrock in the majority of Essex County is covered by glacial drift with a thickness ranging from 3 m to 45 m from west to east. The parent soil material is a heavy ground moraine and lacustrine deposition containing a considerable amount of limestone, appreciable amounts of shale and some igneous rock.

3.3.3 Soils and Subsurface Conditions

Soils within the County of Essex were formed from heavy ground moraine, which has been altered by glacial lake wave action and lacustrine deposition. The majority of the area is part of a smooth clay plain and the predominant soil types are Perth and Brookston clays and their associated clay loams. Developed from dolomitic limestone intermixed with shale, the imperfectly drained member is the Perth clays, and the poorly drained member is the Brookston clays. The clay deposits found in the majority of the Windsor area consist of a stiff silty clay to clayey silt deposited without significant stratification and possessing a distinctively till-like structure with a small fraction of sand and gravel sized particles distributed randomly throughout. In the west end of Windsor, this till-like deposit is overlain by a lacustrine deposit of soft to firm, layered silty clay. This deposit was laid down in the glacial lakes in front of the ice sheet during their retreat in the post glacial period, when the level of Lake Erie was considerably higher than it is at present. These layered strata, of varying thicknesses and strengths, are known to exist up to 30 meters in total depth.

3.3.4 Natural Vegetation

The City lies completely within the Niagara section of the Deciduous Forest Region of Ontario. Favourable soil and climatic conditions have allowed for the extension of many species of Carolinian and prairie flora which makes the region unique in Canada.

The study area (sites near the LRWRP and WBPF) consist mainly of industrial properties. Stantec completed a site investigation, to document existing natural heritage conditions in the study area. Surveys included Ecological Land Classification (ELC) of vegetation communities, a Species at Risk (SAR) habitat assessment of terrestrial features, and a fish habitat assessment. The natural heritage features that were identified through the background review were confirmed during the field surveying. The natural heritage impact assessment report is included in **Appendix C**.

Potential impacts associated with the proposed construction of the biosolids management faciltiy include soil compaction, siltation, and spills of deleterious substances, noise disturbance, and encounters with wildlife. The impacts are considered short term, localized to the construction area during construction activities, and will be mitigated through the application of appropriate construction techniques and mitigation measures.

3.3.5 Terrestrial Life

The land uses in the study area support a limited number of small animals such as squirrels and rabbits that have adapted to human activity. Installation of the biosolids management facility will not result in an impact on vegetation communities. No permanent impact to breeding birds, reptiles and other wildlife is expected as a result of the installation of the biosolids management facility provided appropriate mitigation measures are followed.

3.4 CULTURAL HERITAGE ENVIRONMENT

Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage landscapes.

3.4.1 Archeological Resources

Windsor is an area rich in cultural heritage resources and diversified cultural traditions. Many of the areas along the Detroit River retain cultural and historical significance. **Figure 7.2** (below) shows a map, taken from the City's Archeological Master Plan (2005), identifying areas with archeological potential, which typically require archeological assessments. The map identifies the lands surrounding the LRWRP and WBPF as an area retaining archeological potential.

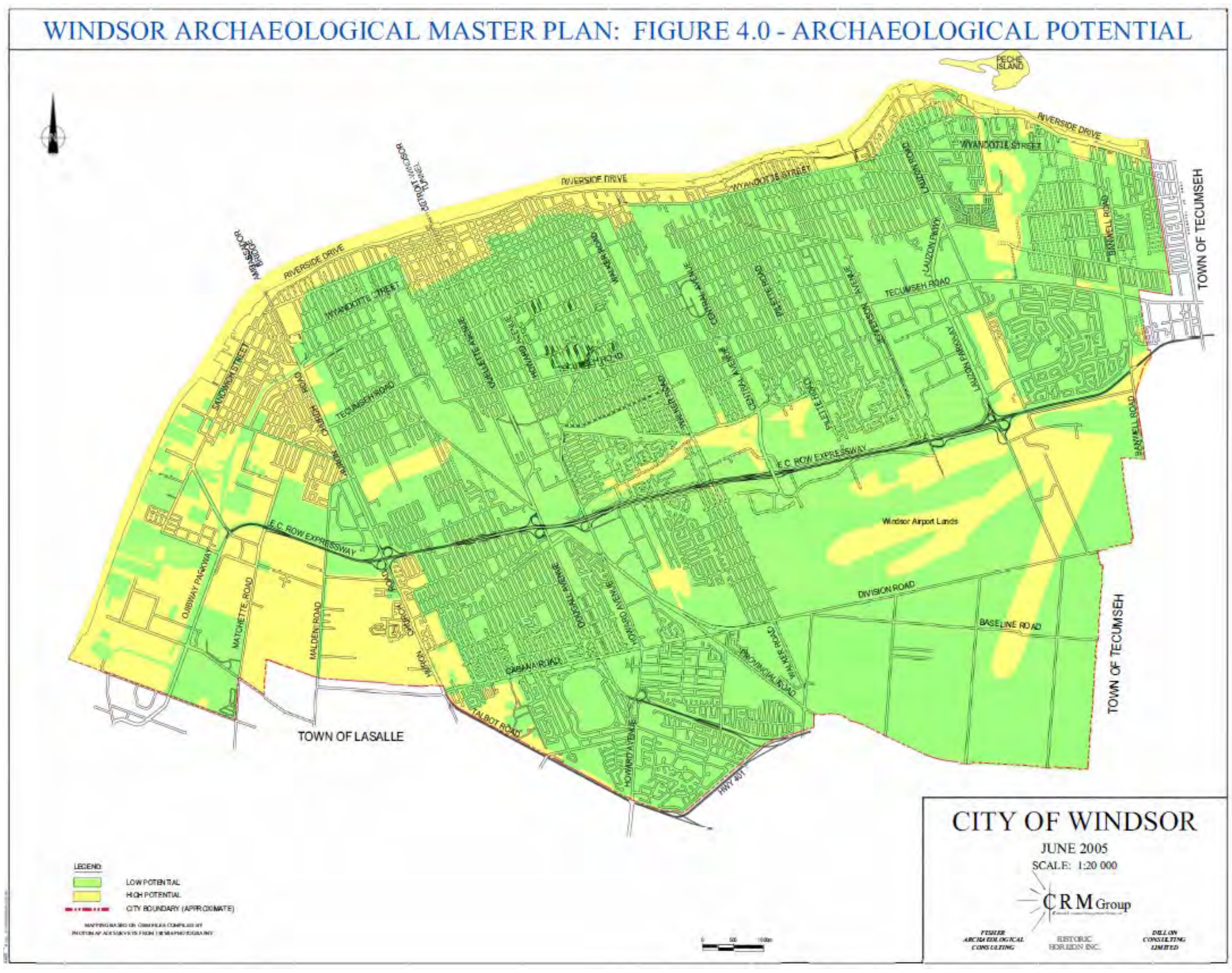


Figure 7.1: Archaeological Potential in the City of Windsor Area

A Stage 1 Archaeological Assessment (AA) was undertaken by Stantec Consulting Ltd. (Stantec) of the LRWRP and WBPF lands (under Project Information Form [PIF] number P422-0031-2023). A Stage 1 AA provides information about a study area's geography, history, previous AAs, and includes a property inspection by a licensed archaeologist to assist in the evaluation of a study area's archaeological potential. Its purpose is to identify areas of archaeological potential and recommend further AA as necessary (i.e., Stage 2). A property inspection was completed by Stantec archaeologists on March 17, 2023. For the LRWRP lands, the study area was identified as being subject to previous and extensive land disturbance and it is anticipated that no further archaeological work will be recommended. The WBPF lands were identified as being subject to previous AA in 2006 and 2007 as part of the Detroit River International Crossing project. No archaeological resources were identified during the 2006 and 2007 AAs and no further archaeological work was recommended for the WBPF lands (ASI 2010).

In summary, no further AA is anticipated to be recommended for the LRWRP or WBPF lands. The Stage 1 AA Report is included in **Appendix C**.

3.4.2 Built Heritage Resources and Cultural Heritage Landscapes

The screening checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes, developed by the MTCS (now Ministry of Citizenship and Multiculturalism (MCM)), was completed as part of the project file. The heritage resources around the proposed work area (site next to WBPF) were identified based on the Windsor Municipal Heritage Register provided by the City of Windsor. The City of Windsor's Planning and Building Services Department was also consulted to determine the location and details of Built Heritage and Cultural Heritage Landscapes. The completed checklist is included in **Appendix C**. The study area was determined to have low potential for built heritage resources and cultural heritage landscapes. Therefore, no technical cultural heritage studies have been undertaken as part of this Class EA.

4.0 PROBLEM STATEMENT

The City of Windsor owns and operates two wastewater treatment facilities, the LRWRP and the LRPCP, which produce approximately 8,500 and 2,500 dry tonnes of biosolids each year, respectively. The dewatered biosolids, which have a dry solids content of approximately 30%, are heat dried and pelletized at the City-owned Windsor Biosolids Processing Facility (WBPF). The finished pellets are used as a Class A fertilizer and soil amendment throughout Southwestern Ontario. The servicing contract and upgrade requirements for the WBPF will be revisited by 2029 as the capacity of existing biosolids management facility is unable to accommodate projected wastewater biosolids or community growth. Based on the biosolids projections for the two WWTPs, the proposed solution should have the capacity to treat upwards of 24,000 dry tonnes of biosolids each year (20 – year projection) and 34,500 dry tonnes of biosolids each year (ultimate projection).

To address current and future biosolids management needs at the two wastewater treatment plants, the City initiated this study to identify the preferred means of processing wastewater sludge into biosolids. A primary goal of this study was to prioritize solutions which would move the two wastewater treatment plants towards a 'net-zero' energy future and improve upon energy conservation commitments outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. To achieve this goal, the biosolids management strategy will consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions.

The objective of this Class EA study is to investigate and report alternative methods for addressing biosolids management needs in the City of Windsor. This study will explore the opportunities for processing wastewater biosolids for improved energy recovery, biogas production, and energy savings. Further, the study will identify the preferred design solution and concepts recommended to manage and process the wastewater biosolids with consideration for potential addition of SSO wastes in the future. The SSO waste materials which may potentially be accepted at this facility include municipal food and organic waste, ICI food and organic waste, agricultural organic waste, and high strength organic waste such as food processing waste, dairy waste, and fats, oils, and grease.

5.0 ALTERNATIVE DESIGN SOLUTIONS AND RECOMMENDATIONS

This section presents an overview of the work undertaken for Phase 2 of the Class EA process. Phase 2 involves the identification and evaluation of various design solutions with the objective of determining which alternative best addresses the problem statement. In Ontario, the Municipal Engineers Association defines the Municipal Class EA process and outlines that this phase should include the development of a reasonable range of alternatives. This includes a 'Do Nothing' option as a basis for comparison.

5.1 INTRODUCTION

In this section of the report, alternative design solutions will be identified and evaluated leading to the selection of the recommended design. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Do Nothing
Alternative No. 2: Process Improvements at the Existing WBPF
Alternative No. 3: Incineration
Alternative No. 4: Compost
Alternative No. 5: Anaerobic Digestion and Biogas Utilization

The five alternative solutions were evaluated based on a variety of social, natural environmental, economic, and technical criteria. These evaluation criteria were developed based on biosolids management needs at the two wastewater treatment plants, applicable municipal plans / commitments, design principles, and past industrial experience. The evaluation criteria are as follows:

Technical Criteria:

- Ability to meet biosolids management needs
- Constructability, implementation timeline, and reliability
- Flexibility to meet future needs or climate change predictions
- Ease of operation and maintenance

Social Criteria:

- Impact to archaeological sites or areas of archaeological potential
- Impact to known or potential built heritage resources and cultural heritage landscapes
- Noise, vibration, odour, or air pollution emissions
- Permanent changes or impacts to society including acceptability to the public

- Development policies and agreements

Environmental Criteria:

- Impacts to natural environment including air, climate, vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, surface drainage and groundwater, and soil / geology.
- Regulatory compliances and applicable development / planning policies
- Conservation and optimization of resources including energy recovery, reduction of energy consumption, reductions in GHG emissions, nutrients recovery (where applicable)

Economic Criteria:

- Capital, operational, and maintenance (lifecycle) costs
- Energy savings
- Potential for federal and provincial grant programs

5.2 ALTERNATIVE NO. 1: DO NOTHING

5.2.1 Overview

The "Do Nothing" option sets a benchmark for the evaluation and is a required component of the Municipal Class EA process. This option assumes that nothing is done to address the stated problem and the existing WBPF would continue to be used for biosolids management needs in the City of Windsor. Although this may be an acceptable short-term solution for the remainder of the servicing contract, this is not considered a viable long-term solution (6+ years).

5.2.2 Screening Result

The WBPF is approaching the end of its current servicing contract and would require upgrades to have capacity for future biosolids processing needs. If nothing is done to plan for these future needs, the WBPF will not be able to accommodate the biosolids produced at the City of Windsor's two WWTPs. Further, if nothing is done, there would be no improvements to energy efficiency, energy consumption, GHG emissions, or other energy conservation commitments outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. For these reasons, Alternative No. 1 – Do Nothing was not considered a viable alternative for the long-term Biosolids Management Strategy and was not carried forward for detailed evaluation.

5.3 ALTERNATIVE NO. 2: PROCESS IMPROVEMENTS AT THE EXISTING WINDSOR BIOSOLIDS PROCESSING FACILITY

5.3.1 Overview

Under this strategy, sludge cake from the LRPCP and LRWRP would continue to be processed at the Windsor Biosolids Processing Facility using the existing biosolids management process outlined in **Section 2.3.2**. To meet future sludge handling requirements, the WBPF would need to be capable of processing 90,000 tonnes of wet dewatered sludge per year (20-year design capacity) with consideration for future expansion or phasing to 130,000 tonnes of wet dewatered sludge per year (ultimate design capacity).

The biosolids treatment capacity at the existing WBPF is primarily limited by the operational schedule and evaporation capacity of the rotary drum dryer. The existing rotary drum dryer has an average retention time of 20 minutes and an evaporation capacity of 6,000 kg water/hr. The processing rate is dependent on the moisture content of incoming wet dewatered sludge cake and is typically in the range of 180 to 200 tonnes of sludge per operating day. It is standard for the WBPF to operate 24 hours per day from Monday to Friday with maintenance occurring on Saturday and Sunday. Based on the current sludge production, operational schedule, and evaporation capacity the WBPF processes approximately 47,000 to 52,000 tonnes of wet dewatered sludge each year.

5.3.2 Evaluation

Technical Feasibility

To provide flexibility and meet future needs the capacity of the existing plant would need to significantly increase (nearly three times the current processing volume). Assuming ideal operating conditions and longer operating times (increasing operation to 24 hours per day for 6 days per week), the WPBF would only be capable of processing 62,400 tonnes of wet dewatered sludge each year. This means that the required increase in capacity at the WBPF would not be achievable through operational changes and would only be accomplished through considerable process improvements and expansion of the existing WBPF. Although the thermal drying technology is proven and reliable for the current servicing needs, the WBPF is nearing the end of its design service life and there are considerable process improvements that would be required to maintain operations. The operation and maintenance costs for the drying process at the WBPF are high due to the need to buy large quantities of natural gas and, in turn, burning the natural gas releases excessive amounts of greenhouse gases to the atmosphere. There are a variety of new and proven technologies which could be employed for this application and for these reasons upgrading and expanding the existing WPBF would not be seen as the most technically suitable long-term solution.

Social Impacts

A Stage 1 AA was completed for the lands next to the WBPF and determined, the expansion of the WBPF is not anticipated to have significant impacts on archaeological sites or areas of archaeological potential. The MCM Checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage

Landscapes, was completed and the proposed work area was determined to have low potential for built heritage resources and cultural heritage landscapes.

The neighbourhood surrounding the existing WBPF is zoned as an industrial district with business parks and heavy industrial complexes. There are no residential properties within the immediate or general vicinity of the WBPF; therefore, permanent changes or impacts to the society are anticipated to be minimal.

Natural Environmental Impacts

The expansion of the WPBF is anticipated to have minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. Potential impacts associated with the expansion would include soil compaction, spills of deleterious substances, noise disturbance, and encounters with wildlife. However, these impacts are considered short term and are localized to the construction area during construction activities. The land uses in the area surrounding the WBPF support a limited number of terrestrial species and vegetation. No permanent impact to breeding birds, reptiles, or other wildlife is expected as a result of the construction provided appropriate mitigation measures and construction techniques are followed.

Further to the considerations from construction activities, it is important to consider the natural environmental impacts in terms of the (i) local development and planning policies and (ii) ability to reduce energy consumption and GHG emissions. Upgrading and expanding the existing WBPF is inconsistent with the City of Windsor Community Energy Plan which focuses on improving energy efficiency, effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. This alternative does not promote the use of green energy solutions for the efficient reuse of wastewater residuals, nor does it allow for a sustainable long-term solution. Although the process upgrades would improve the energy efficiency of the WBPF and reduce the overall energy consumption, the thermal drying process is energy intensive and does not provide the opportunity for significant energy savings or reduction in GHG emissions.

Economic Impacts

The required improvements and cost of land for potential expansion would come at a significant capital cost to the City of Windsor. Further to this capital cost investment, the thermal drying process employed at the WBPF would have higher operation and maintenance costs when compared to other technologies. Historical operation of the WPBF includes thorough equipment replacement, which results from considerable equipment wear and tear and increases the overall cost for maintenance and operations.

5.3.3 Screening Result

The WBPF is approaching the end of its current servicing contract and would require significant process upgrades and expansion to meet future biosolids processing needs. In consideration of the technical, social, natural environmental, and economic factors discussed above, Alternative No. 2 – Process Improvements at the Existing WBPF is not considered a viable alternative for the long-term Biosolids Management Strategy. Although upgrading and expanding the WBPF is not considered a viable long-term solution, this facility has potential to (i) be reutilized for material storage, (ii) provide interim solution, (iii) provide engineering redundancy, or (iv) be reutilized in combination with alternative technologies.

5.4 ALTERNATIVE NO. 3: INCINERATION

5.4.1 Overview

Under this strategy, the biosolids produced in the City's two WWTPs would be dewatered by centrifuge onsite and then transferred to a centralized incineration facility. At the incineration facility the sludge would be combusted, and remaining ash material would be trucked to landfill. The simple process schematic for an incineration facility is shown in **Figure 5.1**.

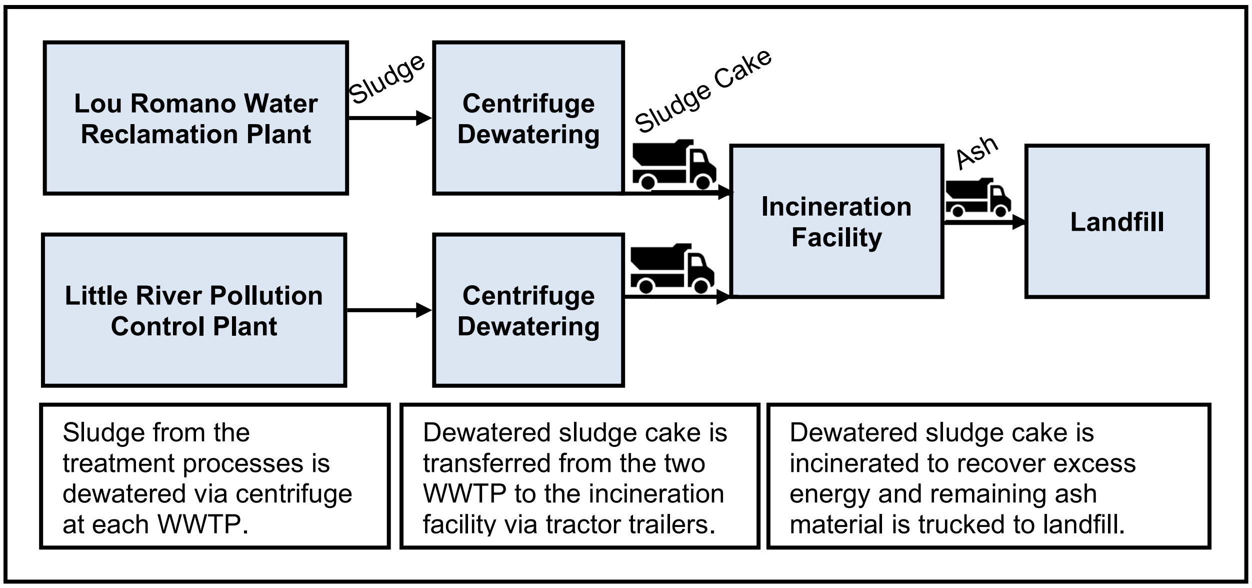


Figure 5.1: Process Schematic for the Incineration Facility

Incineration is a type of thermal treatment technology which may be used to treat residential, commercial, industrial, or institutional wastes. Incineration facilities operating in Canada include waste-to-energy facilities, municipal wastewater sludge incinerators, hazardous waste incinerators, and biomedical incinerators. The industry standard and most commonly applied technology for incineration of municipal sludge are fluidized bed incinerators with comprehensive air pollution control measures. At these facilities, wastewater sludge is burned in a combustion chamber to recover excess energy in the form of heat and/or electricity. Fluidized bed incinerators employ a fluidized bed of granular material at a minimum temperature of 850°C to transfer heat directly to the sludge. Energy from the incineration occurring in the combustion chamber is converted into steam and further into electricity by use of a turbine generator. The electricity recovered from this process can be used to power the incineration facility or sold to the provincial electrical grid. With the exception of the initial start-up period, the process does not require the input of additional heat or energy. Incineration facilities have the capability to reduce the volume of solid waste by up to 90%.

Following combustion, propellers remove the remaining materials from the chamber where they are further separated for material reuse. The granular bed material is separated via sieves and returned to the combustion chamber and metals are removed via magnets to be recycled. The remaining material, ash, is collected, stored, and reutilized or landfilled offsite. There is potential for a portion of the ash material to be beneficially reused to offset raw inputs in cement manufacturing, gypsum material production or other similar industrial applications as available in the region. The incineration facility would provide short-term storage of ash and that which is not reused would be periodically trucked to landfill.

5.4.2 Evaluation

Technical Feasibility

The incineration facility would be designed to have the capability to meet current and future biosolids management needs. Fluidized bed incinerators are a proven and reliable incineration technology for the processing of municipal wastewater sludge. Ideally, the incineration facility would be in operation prior to the end of the existing WBPF servicing contract expiration in 2029. However, the increased complexity for the design, construction, and testing/operation of the facility due to restrictive permitting requirements discussed below may delay the overall implementation timeline. In this scenario, the existing WBPF would be utilized until the incineration facility is in operation and then decommissioned as there is no opportunity for beneficial reuse in combination with the incineration facility.

Social Impacts

The exact location of the proposed facility could not be determined at this stage; however, it is expected that the site would be selected such that the facility is located in an area zoned for heavy industrial complexes. The construction of an incineration facility is not anticipated to have significant impacts to archaeological sites or areas of archaeological potential, built heritage resources, or cultural heritage landscapes given the site for the facility is appropriately selected and assessed for such resources.

Noise, vibration, odour, and air pollution emissions from the incineration facility are anticipated to be minimal as the facility would be designed in accordance with stringent emission requirements and regulations of the Ontario Ministry of Environment Conservation and Parks (MECP). These regulations ensure the facility is designed accordingly and appropriate mitigation measures are in place to minimize emissions to any surrounding properties. More specifically, Guideline A-7: Air Pollution Control, Design and Operation Guidelines for Municipal Waste Treatment applies to incinerator systems designed and operated within Ontario under O. Reg. 419/05 of the *Environmental Protection Act*. This guideline controls the installation of air pollution systems; sets air emission limits for particulate matter, acid gases, heavy metals, and polychlorinated dioxins and furans; and establishes requirements for the control, monitoring, and performance testing of incineration systems. Modern incinerators employ air pollution control measures which can remove approximately 99% of pollutants emitted from the incineration process. Although these stringent regulations and monitoring programs would be in place for the facility it is anticipated that the incineration of sewage sludge would not be favorable amongst Windsor residents.

Natural Environmental Impacts

The construction of this incineration facility is anticipated to have minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. The site for the incineration facility would be selected such that no permanent impact to breeding birds, reptiles, or other wildlife is expected as a result of construction provided appropriate mitigation measures and construction techniques are followed.

Further to the considerations from construction activities, incineration facilities are becoming increasingly less common in Ontario and throughout Canada due to stringent environmental regulations, mitigation controls, and monitoring programs. The rigorous environmental permitting requirements and need for comprehensive air pollution controls make incineration less favorable in comparison to land disposal alternatives. Socio-environmental considerations including concerns for anthropogenic climate change and global warming have also led to the decrease in the use of incineration facilities. Further, the use of an incineration facility is inconsistent with the City of Windsor Community Energy Plan which focuses on improving energy efficiency, effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. This alternative does not promote the use of green energy solutions and results in a large quantity of ash material being disposed of in landfills. Although this facility would recover excess energy in the form of electricity, the incineration process would not result in a significant reduction of GHG emissions in comparison to the existing process at the WBPF.

Economic Impacts

The cost of land and construction for the incineration facility would come at a significant capital cost to the City of Windsor. Further to this capital cost investment, the facility would have considerable operation and maintenance costs associated with the incineration, air pollution control, and ash disposal.

5.4.3 Screening Result

The implementation of an incineration facility would provide flexibility to meet current and future biosolids management needs within the City of Windsor. However, from a social, natural environmental, and economic perspective this would not be considered a preferable solution. Negative socio-environmental factors which would limit the use of incineration include rigorous environmental permitting requirements; strict air pollution control and monitoring requirements; GHG emissions and anthropogenic climate change concerns; and the ultimate disposal / landfilling of ash materials. Negative economic impacts include a significant capital cost for implementation, operation, and maintenance of the incineration facility. In consideration of these factors, Alternative No. 3 – Incineration is not considered a viable alternative for the long-term Biosolids Management Strategy.

5.5 ALTERNATIVE NO. 4: COMPOST

5.5.1 Overview

Under this strategy, the biosolids produced in the City's two WWTPs would be dewatered by centrifuge onsite and then transferred to a centralized composting facility. The composting facility would utilize aerated static pile processing and be fully enclosed with comprehensive odour control systems. At the composting facility the sludge would be processed, stored onsite, and then sold as a fertilizer product for land application throughout Southwestern Ontario. The simple process schematic for the composting facility is shown in **Figure 5.2**.

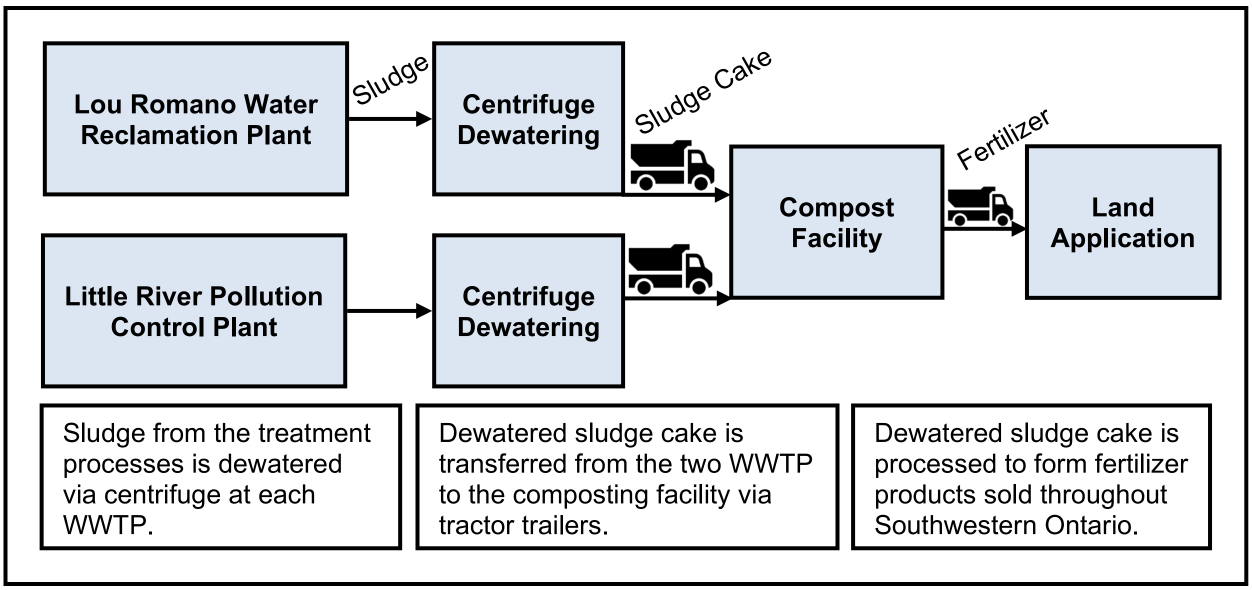


Figure 5.2: Process Schematic for the Compost Facility

Composting is a solids stabilization process which biologically decomposes organic material and destroys pathogens from the solids stream. This process results in a stabilized compost product that can be used as mulch, soil conditioner, or a soil amendment depending on the incoming material. Composting may be used to process a variety of wastes including yard waste, food, paper, municipal solid waste, and sewage sludge. The industry standard for composting municipal sludge is enclosed negatively aerated static pile composting which is a well proven and successful technology used throughout Canada. This technology is beneficial as the final product is a Class A fertilizer which can be effectively stored during winter months and sold for revenue.

At these facilities dewatered sludge is mixed with a bulking agent such as wood chips, municipal solid waste, or SSO waste prior to composting. This mixed composting material is formed into freestanding piles on top of perforated piping or stored in three-walled bunkers that are lined with perforated piping. These piping systems are connected to a blower that push (positive aeration) or pull (negative aeration) air through the pile and control the decomposition process. The use of negative aeration is advantageous as biofilters can be installed in the blower assembly to treat the process air, remove particulate, and eliminate odours prior to venting. The perforated aeration pipes are covered with a layer of wood chips to facilitate air distribution, absorb moisture, and ensure uniform aeration. In addition, a layer of wood chips or recycled compost is used to cover the pile for insulation and improved odour control.

The main parameters that must be controlled to ensure optimum conditions for material decomposition are the oxygen concentration, temperature, and moisture content. The oxygen concentration in the compost pile must be controlled to maintain aerobic decomposition and effectively eliminate odours. The temperature and moisture content in the compost pile must be maintained to provide effective composting, ensure destruction of pathogens, and monitor progression of the decomposition. These parameters should be monitored and can be controlled by increasing or decreasing the aeration rate through the compost pile.

The active composting period is typically 3 to 4 weeks and is followed by a curing period of approximately 4 to 12 weeks. Following the active composting period, material is removed from their existing piles and reformed into curing piles, typically located outdoors. The curing period is essential to further dry, stabilize, and deodorize the material prior to screening and final storage.

There are five (5) major considerations for the design and implementation of a composting facility: (1) tipping / receiving area, (2) active composting area, (3) curing area, (4) product storage, and (5) odour control systems. The tipping and receiving area would be an enclosed building that provides initial storage and pre-processing (if applicable) of wastewater sludge and bulking materials. It is essential that the doors to the building remain closed as much as possible and the building is sized appropriately based on the type of trucks/trailers used for material collection. The receiving building will have frequent air exchanges and a slight negative pressure to reduce odour issues at the facility. If SSO waste is to be processed at this facility, pre-processing with a shredder or other technology would be required and would be located in the receiving area. The active composting area would be an enclosed building that can provide adequate capacity for four weeks of active negative aeration within three-walled bunkers. The curing area would be outdoors and provide adequate capacity for twelve weeks of curing. Following the curing process, the material would be screened and stored onsite until it is sold. The product storage area would provide allowance for storage during the winter months (October to April).

The odour control system at the facility would likely include a biofilter in combination with the negative aeration blowers. The use of a biofilter is common in composting facilities because they are an effective and budget-friendly means of achieving odour control, and the equipment and materials to maintain them are readily available at compost facilities. Biofilters consist of moist organic material curated to adsorb and biologically degrade odorous compounds including ammonia and various volatile organic compounds.

5.5.2 Evaluation

Technical Feasibility

The composting facility would be designed to have the capability to meet current and future biosolids management needs. Negative aerated static pile composting is a proven and reliable technology for the processing of municipal wastewater sludge. Ideally the composting facility would be in operation prior to the end of the existing WBPF servicing contract expiration in 2029. The design, construction, and testing/operation of the facility may be completed within the desired implementation timeline. In this scenario, the existing WBPF would be utilized until the composting facility is in operation and then decommissioned as there is minimal opportunity for beneficial reuse in combination with the composting facility.

The composting facility would be composed of one main building, one curing storage yard, one final product storage yard, and one odour management facility. The composting facility would be sized to accommodate the 20-year sludge projection (24,000 dry tonnes / yr) with consideration for future expansion or phasing to the ultimate sludge projection (34,500 dry tonnes / yr). The site for the composting facility would be selected based on the size requirements for the ultimate sludge projection scenario. The main building will include the receiving area, initial storage, and the active composting area with an initial area of approximately 20,000 m^2 and consideration for expansion to 40,000 m^2. The curing area and storage yard will have an initial area of approximately 20,000 m^2 and consideration for expansion to 40,000 m^2. The odour management facility will have an area of approximately 5,000 m^2 and consideration for expansion to 10,000 m^2. The total size requirements for the site under ultimate design is approximately 130,000 m^2 (13 hectares) with an allowance for interior roadways and clearances (+25%) and mandatory separation along site perimeter (+15 %). This is a large land area requirement for the given project and approximately 8 times larger than that required for an anerobic digestion facility. Due to the size and separation requirements, it is anticipated that the composting facility would be located outside of the City limits. The selected site would need to be zoned or re-zoned for heavy industrial complexes.

Social Impacts

The exact location of the proposed facility could not be determined at this stage; however, it is expected that the site would be selected such that the facility is located in an area zoned for heavy industrial complexes. The construction of a composting facility is not anticipated to have significant impacts to archaeological sites or areas of archaeological potential, built heritage resources, or cultural heritage landscapes given the site for the facility is appropriately selected and assessed for such resources. Although this site would be located outside of the City limits and away from residential properties, additional considerations would be required to ensure the prevention and control of off-site impacts. This will include mitigation and/or control of noise and vibration; air pollutants; odour; leachate; and vermin / vectors.

- Noise and vibration emissions from the composting facility are anticipated to be minimal as the facility would be designed in accordance with stringent emission requirements and regulations of the Ontario Ministry of Environment Conservation and Parks (MECP). These regulations ensure the facility is designed accordingly and appropriate mitigation measures are in place to minimize emissions to any surrounding properties.
- Air pollution studies have shown that bioaerosols (particularly the fungus Aspergillus fumigatus) are commonly present indoor and outdoor at composting facilities. The concentration of these bioaerosols is variable with higher concentrations occurring in the spring and summer. Literature indicates that the off-site concentration of these bioaerosols is typically below the level believed to cause health effects. Moreover, health risk can be reduced through the careful siting of the

composting facility and operational control measures. All components of the composting operation should be located away from sensitive receptors such as residential dwellings, institutional facilities, and other outdoor public areas. The separation distance at each site varies based on geographic conditions (topography, vegetation, elevation, prevailing wind speed, and direction) and the standard distance for facility approval is between 250 and 1000 metres.

- Ontario Regulation 419/05, Air Pollution – Local Air Quality of the *Environmental Protection Act*, establishes contaminant-specific concentration limits for some odorous contaminants. As a part of the environmental compliance approval process, composting facilities will be required to develop an Odour Prevention and Control Plan. Further compliance with O.Reg. 419/05 includes an Odour Impact Assessment and Emission Summary and Dispersion Modelling (ESDM) Report. These assessments involve a summary of total air emissions for individual contaminants from a property which are converted to off-property concentrations using mathematical air dispersion models. Follow-up assessments will also be required to reflect actual operating conditions.
- Water that has come into contact with waste materials at the composting facility, known as leachate, may possess characteristics and contain compounds that can degrade the quality of surface and groundwater if discharged without treatment. Composting facilities can generate significant amounts of leachate. The *Ontario Water Resources Act*, regulates discharges to surface and groundwater, including stormwater and leachate from composting facilities, to ensure that water resources are protected. As a part of the approval process for the composting facilities, studies of the physical, geological, hydrological, and hydrogeological conditions on the site must be conducted. These studies should depict the anticipated quality and quantities of leachate or run-off on site and identify appropriate management options. If leachate is directly discharged to a receiving water body, directly to the ground, or into the subsurface, approval under section 53 of this Act is required.
- Compost material and raw waste at the facility may attract a variety of vermin and vectors including insects, rodents, birds, and other wildlife. If established these vermin and vectors can be difficult to remove and may pose a public health problem. Measures that can be used to control vermin and vectors at a site include prompt processing of organic wastes; maintaining aerobic compost conditions; controlling odour emissions; ensuring regular mixing of curing materials to discourage nesting; and using pest control and traps as necessary.

Although these stringent regulations and monitoring programs ensure that the off-site impacts of the composting process are mitigated it is anticipated that the composting of sewage sludge would not be favorable amongst local residents.

Natural Environmental Impacts

The construction of this composting facility is anticipated to have minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. The site for the composting facility would be selected such that no permanent impact to breeding birds, reptiles, or other wildlife is expected as a result of construction. In addition, appropriate mitigation measures and construction techniques are to be followed for the composting facility.

Further to the considerations from construction activities, the use of a composting facility is inconsistent with the City of Windsor Community Energy Plan which focuses on effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. The implementation of this composting facility would require the acquisition of a large plot of land away from residential and other sensitive receptors. The required amount of land is not readily available within the City limits and would severely alter of hinder long-term land use plans outlined in the Official Plan. Based on this the facility would have to be located outside of the City limits and would need to be incorporated into land use plans for the County of Essex. In terms of reducing energy consumption and limiting GHG emissions, the aeration and curing processes used at the composting facility would be better than the thermal drying process used at the existing WBPF. However, the composting facility would likely be located in the County which significantly increases the energy consumption and GHG emissions associated with transporting the wastewater sludge from the WWTP's to the processing facility. Further, this alternative does not promote the use of green energy solutions, nor does it provide an opportunity for energy recover from wastewater sludge in the form of heat or electricity. Energy recovery from wastewater sludge can be used to significantly reduce or offset electricity consumption, improve the process sustainability, and move wastewater treatment plants towards net-zero energy. Many municipalities throughout North America are implementing alternative technologies which include energy recovering processes as an opportunity for environmental, social, and economic benefits.

Economic Impacts

The opinion of probable cost for a composting facility is summarized in **Table 5.1**. The following is a summary of the key assumptions applied for the OPC assessments presented in this section of the report:

- The Probable Costs are presented in 2023 dollars.
- The capital cost is estimated from equipment cost plus 50% installation cost. Equipment costs are based on vendor supplied price quotations and historical pricing of similar equipment.
- The level of accuracy in projecting costs at this stage of development of a project is typically plus or minus 30% or greater and can be refined as the project develops to a level of plus or minus 10% just prior to tendering. However, the level of accuracy cannot be guaranteed, and the actual final cost of the project will only be determined through the tendering and construction process.
- The preliminary cost analysis does not include an estimate for property acquisition because it is tied to the current real estate market and may vary depending on location. Therefore, it is not possible to produce an accurate estimate of these costs at this stage of the project.

Table 5.1: Opinion of Probable Capital Cost for Composting Facility

Item	Description	Quantity	Unit	Unit Cost ($/Unit)	Cost
1	Property / Land Acquisition	13	ha	Unknown	Not Included
2	Tipping / Compost Building	20,000	m^2	2,500	$ 50,000,000

Item	Description	Quantity	Unit	Unit Cost ($/Unit)	Cost
3	Aeration Equipment	1	LS	10,000,000	$ 10,000,000
4	Air Pollution Control (Biofilter)	5,000	m^2	2,500	$ 12,500,000
5	Process Mechanical, Electrical, Instrumentation and Control	1	LS	5,500,000	$ 5,500,000
6	Mobile Equipment (Front End Loaders, Screen, Compost Turner, Dump Truck)	1	LS	2,000,000	$ 2,000,000
Subtotal					**$80,000,000**
Contingency Allowance (30%)					$ 24,000,000
Engineering Allowance (15%)					$ 12,000,000
Total Capital Cost					**$ 116,000,000**

There are no known government rebate programs available for the implementation of a composting facility for the purpose of processing wastewater sludge. There are government rebate programs available to help municipalities implement waste diversion programs and adopt technologies that generate clean affordable energy. Therefore, the total anticipated capital cost for the implementation of a composting facility is approximately $ 116,000,000 plus the cost for property / land acquisition.

The annual budget for operation and maintenance of the composting facility is summarized in **Table 5.2**. The operation and maintenance costs for the facility include operator and administrative staff labour, trucking, general equipment operation and maintenance, electricity consumption, biofilter media replacement, mechanical equipment maintenance, and laboratory analysis. Since the proposed composting facility is located away from the existing WWTP's there is no opportunity to share operating staff between the facilities.

The aeration blowers and odour control equipment at the composting facility will be operated 24 hours per day 7 days per week to ensure appropriate aeration and odour management. The biofilter media in the odour control system is required to be refreshed annually which would include replacing one third of the media each year. General mechanical maintenance and part replacement will be expected annually for the mobile trucking equipment and on-site mobile equipment.

The O&M cost for the composting facility would be offset with revenue from the sale of the final fertilizer product. The potential annual revenue from selling compost is approximately $1,850,000. This is based on the anticipated compost production of 370,000 m^3 (20-year sludge projection) sold at a unit price of $5.00 per m^3.

Table 5.2: Opinion of Probable Cost for Annual O&M of Composting Facility

Item	Description	Quantity	Unit	Unit Cost ($/Unit)	Cost
1	Labour	27,000	hrs	40	• $ 1,080,000

Item	Description	Quantity	Unit	Unit Cost ($/Unit)	Cost
2	General Equipment O&M	24,000	dry tonnes	120	• $ 2,880,000
3	Biofilter Media Replacement	1	LS	100,000	• $ 100,000
4	Fertilizer Revenue	370,000	m^3	5	+ $ 1,850,000
Total					• $2,210,000

The operation and maintenance cost for a composting facility to service the City of Windsor with consideration for fertilizer revenue is approximately $ 2,210,000 / year.

5.5.3 Screening Result

The implementation of a composting facility would provide flexibility to meet current and future biosolids management needs within the City of Windsor. In consideration of the factors discussed in **Section 5.5.2**, Alternative No. 4 – Composting was carried forward for further evaluation in **Section 5.7**.

5.6 ALTERNATIVE NO. 5: ANAEROBIC DIGESTION AND BIOGAS UTILIZATION

5.6.1 Overview

Under this strategy, it is assumed the biosolids produced in the City's two WWTPs would be processed at a centralized anaerobic digestion facility. Sludge from the LRPCP would be dewatered by centrifuge on-site and then trucked as sludge cake to the anaerobic digestion facility. This sludge cake from the LRPCP would be mixed with liquid waste sludge from the LRWRP and then fed to the anaerobic digestion facility. At the anaerobic digestion facility sludge would be processed (digested), dewatered via centrifuge, stored, and then sold as a fertilizer product for land application throughout Southwestern Ontario. There are opportunities to reduce the biosolids volume, improve the performance of the digesters, and increase biogas production through various pretreatment technologies. Further, there are opportunities to reduce the volume of digestate through further treatment and drying at the existing WBPF. For the evaluation of alternative design solutions, it will be assumed that the anaerobic digestion facility will follow the simple process schematic shown in **Figure 5.3.** Pretreatment technologies, anaerobic digestion technologies, and post processing options will be further reviewed in the evaluation of alternative design concepts.

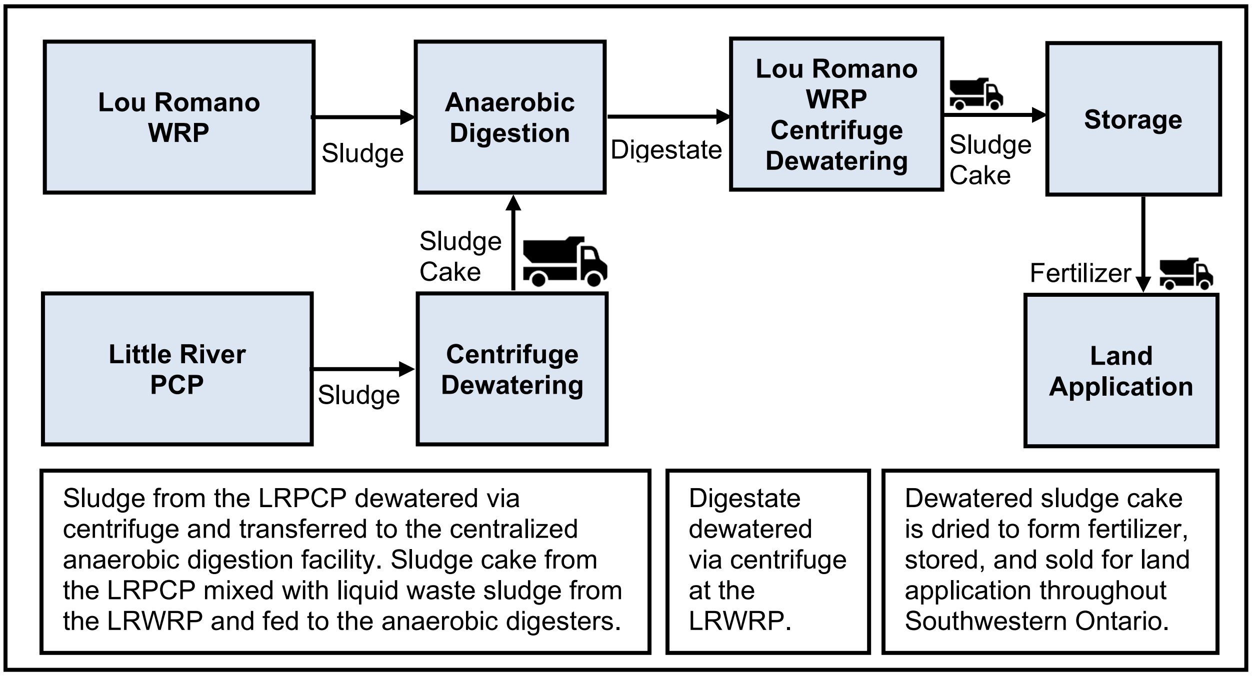


Figure 5.3: Process Schematic for the Anaerobic Digestion Facility

Anaerobic digestion is a solids stabilization process which utilizes microorganisms to decompose organic materials while simultaneously reducing odours and pathogens from the solids stream. This process significantly decreases the volume of biosolids material. The most common digester type for this application is mesophilic anaerobic digesters (MADs) and alternative technologies include thermophilic anaerobic digesters, temperature-phased anaerobic digestion, acid/gas phased digestion, and egg-shaped anaerobic digesters. It is assumed at this stage of the Class EA that MADs will be utilized for the facility, the appropriate anaerobic digester size and type for this facility may be further assessed during the design concept evaluation (**Section 6.0**).

Anaerobic digestion is a biological process which includes four stages: (i) hydrolysis, (ii) acidogenesis, (iii) acetogenesis, and (iv) methanogenesis. In the first stage, hydrolysis, complex organic matter is hydrolyzed to simpler soluble organic compounds. In the subsequent step, acidogenesis, these soluble organic compounds are then fermented to volatile fatty acids (VFAs). In the next step, acetogenesis, VFAs are converted to acetic acid, carbon dioxide, and hydrogen. In the last step, methanogenesis, methanogens convert acetic acid, carbon dioxide, and hydrogen to biogas consisting mainly of methane, carbon dioxide, and some impurities. In this biological process, hydrolysis is considered the rate limiting step.

Enhancing hydrolysis through pretreatment of sludge can improve the performance of MADs and increase biogas production. Typically, pretreatment technologies require an additional input of energy, chemicals, and/or capital cost. The main objective of pretreatment of sludge is to break down biomass cell walls, disintegrate large complex organic compounds, and render the inner organic matter more bioavailable. As a result, pretreatment will accelerate sludge hydrolysis and improve the performance of subsequent anaerobic digestion. Pretreatment options will be further explored in the evaluation of alternative design concepts (**Section 6.0**) and may include: biological pretreatment (enzymatic hydrolysis, temperature-phased anaerobic digestion, microbial electrolysis cell); thermal pretreatment (thermal hydrolysis process (THP)); mechanical pretreatment (ultrasonication, microwave irradiation, electrokinetic disintegration, high-pressure homogenization); electrical (focused pulse); chemical (acidic or alkali pretreatment, ozonation, Fenton oxidation, Fe(ii)-activated persulfate oxidation); or any combination of the above methods.

The gas produced from the anaerobic digesters is a form of renewable energy resource commonly referred to as 'biogas' which can be used as a source for the production of heat, electricity, and/or fuel. Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities. A quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions is presented in **Section 5.8**.

The quantity and quality of the biogas production at a facility is directly related to the quantity and quality of feedstock materials (sludge characteristics) as well as the operating conditions of the digester. The volatile solids loading may be used to characterize digester performance and estimate volume of biogas production. Biogas is collected in the digester headspace prior to biogas pretreatment and use in a biogas-to-energy technology. The digester headspace is typically maintained below 3 kPA and if the biogas demand is exceeded, excess biogas is flared to regulate pressure. Alternative biogas-to-energy technologies or biogas utilization strategies include: (1) generation of heat for the thermal drying process at the WBPF; (2) on-site generation of heat via a boiler; (3) on-site co-generation of combined heat and power (CHP) via reciprocating engines; (4) upgrade to renewable compressed natural gas (R-CNG) and utilize as an alternative fuel in fleet vehicles; and (5) upgrade to renewable natural gas (RNG) and inject to natural gas pipeline. An overview of the anaerobic digestion process and alternative biogas utilization strategies are shown in **Figure 5.4.**

In recent years, many municipalities have implemented integrated organics management programs that involve processing both municipal wastewater sludge and organic wastes (also called supplementary organic feedstock) within one management facility. The organic waste materials which may potentially be accepted at this facility include municipal food and organic waste, ICI food and organic waste, agricultural organic waste, and high strength organic waste (HSW) such as food processing waste, dairy waste, and fats, oils, and grease (FOG). The focus is not only processing the waste materials within the municipality but maximizing the recovery of their remaining value in the form of electricity, thermal energy, and/or fuel to achieve net-zero energy within wastewater treatment plants. The utilization of supplementary organic feedstock materials such as municipal source separated organics may be further assessed during the design concept evaluation (**Section 6.0**).

The anaerobic digestion process results in the production of biosolids in the form of digestate. The digestate would be dewatered and stored on-site or off-site prior to agricultural land application. The size of this storage would need to be adequate for storage during the winter months. Alternatively, pretreatment technologies or post-treatment at the existing WBPF may be utilized to reduce the volume of and upgrade the quality of the biosolids. Retaining the WBPF is beneficial as there is a proven market for pelletized fertilizer as compared to bulk sludge fertilizer and the storage space required is significantly lower.

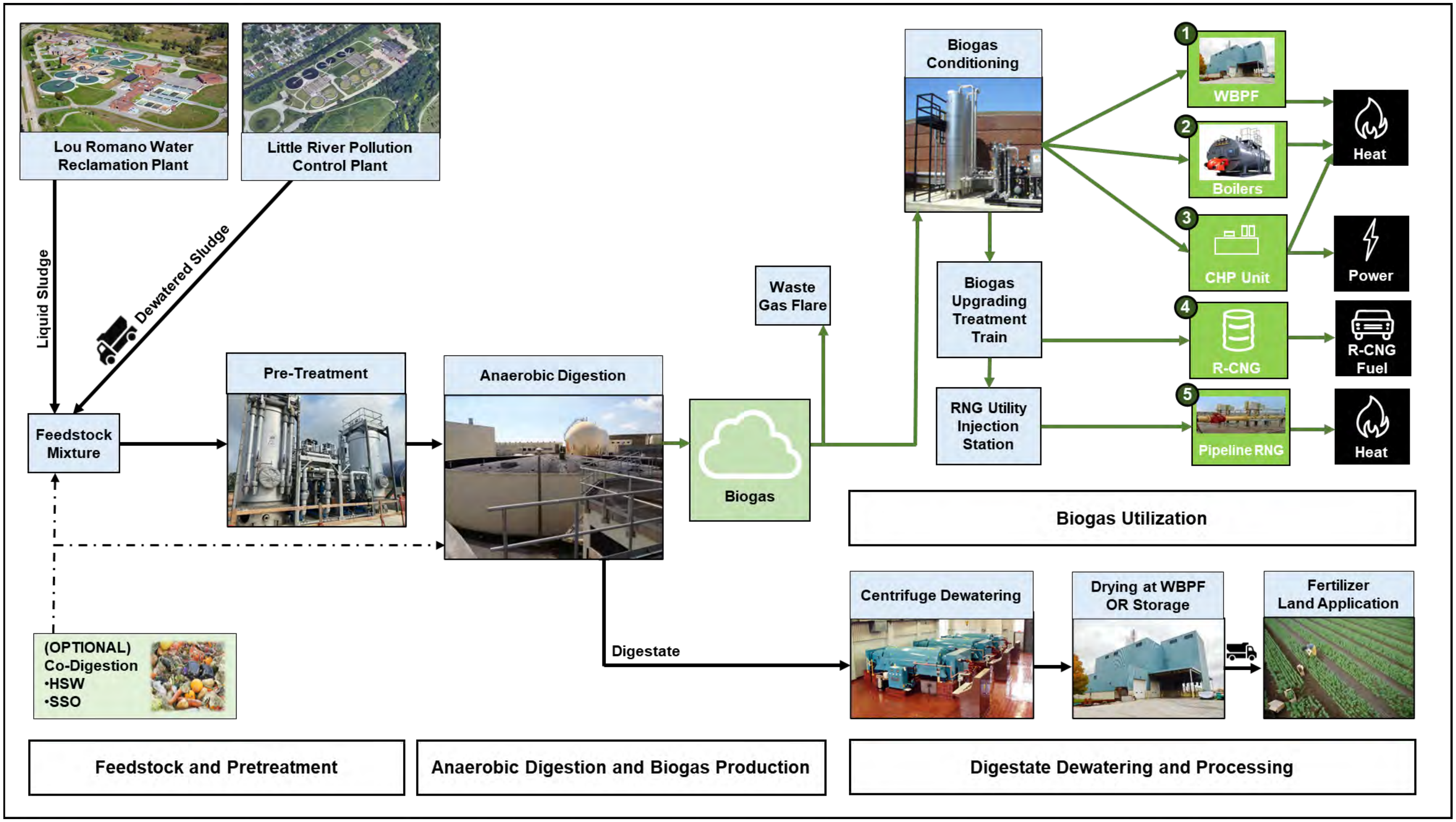


Figure 5.4: Overview of Anaerobic Digestion and Biogas Utilization Alternatives

5.6.2 Evaluation

Technical Feasibility

The anaerobic digestion facility would be designed to have the capability to meet current and future biosolids management needs. Anaerobic digestion is a proven and reliable technology for the processing of municipal wastewater sludge. Ideally, the facility would be in operation prior to the end of the existing WBPF servicing contract expiration in 2029. The design, construction, and testing/operation of the facility may be completed within the desired implementation timeline. In this scenario, the existing WBPF may be utilized after the anaerobic digestion facility is in operation as there is an opportunity for beneficial reuse to provide redundancy or operational flexibility.

The anaerobic digestion facility would be composed of one (1) sludge receiving / temporary storage area, two (2) pretreatment units (one current; one future; if applicable), fourteen (14) digesters (seven current; seven future), one (1) biogas management facility (including biogas conditioning unit), and digestate processing / storage facility. The facility would be sized to accommodate the 20-year sludge projection (24,000 dry tonnes / yr) with consideration for future expansion or phasing to the ultimate sludge projection (34,500 dry tonnes / yr). The site for the anaerobic digestion facility would be selected based on the size requirements for the ultimate sludge projection scenario.

The sludge receiving and temporary storage area would be located near the entrance to the site and require an area of approximately 500 m^2. The pretreatment units will require an area of approximately 100 m^2 (each). The digesters will have an initial area of approximately 3,000 m^2 with consideration for expansion to 6,000 m^2. The biogas management facility will require an area of approximately 600 m^2. The digestate processing and storage facility would require an area of approximately 800 m^2. The total size requirements for the site under ultimate design is approximately 16,000 m^2 (1.6 hectares) with an allowance for interior roadways and clearances (+50%) and mandatory separation along site perimeter (+25 %). Due to the small size and separation requirements, it is anticipated that the facility would be located at the LRWRP or WBPF.

Social Impacts

It is expected that the anaerobic digestion facility would be located at the existing LRWRP or WBPF which are zoned for heavy industrial complexes. A Stage 1 AA was completed for both of these lands and determined, the facility is not anticipated to have significant impacts on archaeological sites or areas of archaeological potential. There are no (i) registered built or cultural heritage resources or (ii) residential properties in the immediate vicinity of the LRWRP or WBPF. The MCM Checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes, was completed and the proposed work area was determined to have low potential for built heritage resources and cultural heritage landscapes.

It is anticipated that all of the processes employed at the proposed anaerobic digestion facility (receiving building, pretreatment unit, anaerobic digesters, biogas utilization unit, and dewatering facility) would be covered or enclosed with air pollution control devices. Therefore, noise, vibration, odour, and air pollution emitted from this facility are anticipated to be minimal and/or similar to that from the existing wastewater treatment plant and industrial facilities in the area. Based on this and the lack of residential dwellings, recreational facilities, or public outdoor spaces in the area the permanent changes or impacts to the society are anticipated to be minimal.

Further during the implementation phase of this project, throughout detailed design and after the preferred size, layout, and technical specifications for the facility are determined an ESDM Report should be prepared in accordance with Ontario Regulation 419/05. The ESDM Report will outline the potential impact of the proposed facility on local air quality as well as mitigation measures to be followed during the design, construction, and operation of the proposed facility.

Natural Environmental Impacts

The construction of this anaerobic digestion facility is anticipated to have minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. The site for the facility would be selected such that no permanent impact to breeding birds, reptiles, or other wildlife is expected as a result of construction. In addition, appropriate mitigation measures and construction techniques are to be followed for the facility.

Further to the considerations from construction activities, the use of an anaerobic digestion facility is consistent with the City of Windsor Community Energy Plan which focuses on effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. The implementation of this biosolids management facility would not require the acquisition of land and would effectively reuse lands located at the WBPF or LRWRP.

In terms of reducing energy consumption and limiting GHG emissions, the biogas produced from the anaerobic digesters is a form of renewable energy which can be used as a source for the production of heat, electricity, and/or fuel. Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities. A quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions is presented in **Section 5.8**. Further, this alternative promotes the use of green energy solutions and provides an opportunity for energy recovery from wastewater sludge in the form of heat or electricity. Energy recovery from wastewater sludge can be used to significantly reduce or offset electricity consumption, improve the process sustainability, and move wastewater treatment plants towards net-zero energy. Many municipalities throughout North America are implementing waste-to-energy technologies which include energy recovering processes as an opportunity for environmental, social, and economic benefits.

Economic Impacts

The opinion of probable cost for an anaerobic digestion facility is summarized in **Table 5.3**. The following is a summary of the key assumptions applied for the OPC assessments presented in this section of the report:

- The Probable Costs are presented in 2023 dollars.
- The capital cost is estimated from equipment cost plus 50% installation cost. Equipment costs are based on vendor supplied price quotations and historical pricing of similar equipment.

- The level of accuracy in projecting costs at this stage of development of a project is typically plus or minus 30% or greater and can be refined as the project develops to a level of plus or minus 10% just prior to tendering. However, the level of accuracy cannot be guaranteed, and the actual final cost of the project will only be determined through the tendering and construction process.
- The Opinion of Probable Cost does not include any cost for land acquisition as it is assumed the facility would be located on property which is currently owned by the City of Windsor.

Table 5.3: Opinion of Probable Capital Cost for Anaerobic Digestion Facility

Item	Description	Quantity	Unit	Unit Cost ($/Unit)	Cost
1	Pretreatment Unit	1	Unit	16,000,000	$ 16,000,000
2	Anaerobic Digesters	1	LS	70,000,000	$ 70,000,000
3	Biogas Utilization Facility	1	LS	18,000,000	$ 18,000,000
Subtotal					**$ 104,000,000**
Contingency Allowance (30%)					$ 31,200,000
Engineering Allowance (15%)					$ 15,600,000
Total Capital Cost					**$ 150,800,000**

There are several government rebate programs available which help to facilitate municipalities implementing waste diversion programs and adopting technologies that generate clean affordable energy. Funding programs that may be applicable to this anaerobic digestion facility include the Government of Canada Low Carbon Economy Fund and the Green Municipal Fund with high potential for other programs to open in the future. Therefore, the total anticipated capital cost for the implementation of an anaerobic digestion facility is approximately $ 151,000,000 minus the value of potential government rebates.

The annual budget for operation and maintenance of the anaerobic digestion facility is summarized in **Table 5.2**. The operation and maintenance costs for the facility include operator staff labour, equipment operation, electricity consumption, general equipment maintenance, and laboratory analysis. Administrative staff, maintenance technicians, and a portion of the operating staff may be shared with the existing staff at the WBPF and/or LRWRP.

The O&M cost for the anaerobic digestion facility would be offset with revenue from the sale of the final fertilizer product. The potential annual revenue from selling fertilizer is approximately $1,400,000 based on the anticipated fertilizer production of 280,000 m^3 (20-year sludge projection) sold at a unit price of $5.00 per m^3. In addition, there is potential for the O&M cost to be further offset with cost savings from heat and/or electricity produced from the anaerobic digestion process. The potential annual cost savings from energy savings is approximately $2,000,000 based on the anticipated net electricity production of 16,400,000 kWh (20-year sludge projection) at a unit price of $ 0.12 /kWh.

Table 5.4: Opinion of Probable Cost for Annual O&M of Anaerobic Digestion Facility

Item	Description	Quantity	Unit	Unit Cost ($)	Cost
1	Labour	10,000	hrs	40	• $ 400,000
2	General Equipment O&M	24,000	dry tonnes	40	• $ 1,000,000
3	Fertilizer Revenue	280,000	m^3	5	+ $ 1,400,000
4	Electricity Savings / Revenue	16,400,000	kWh	0.12	+ $ 2,000,000
Total					+ $ 2,000,000

With consideration for fertilizer revenue and electricity savings an anaerobic digestion facility to service the City of Windsor would generate a profit of approximately $2,000,000 / year.

5.6.3 Screening Result

The implementation of an anaerobic digestion facility would provide flexibility to meet current and future biosolids management needs within the City of Windsor. In consideration of the factors discussed in **Section 5.6.2**, Alternative No. 5 – Anaerobic Digestion and Biogas Utilization was carried forward for further evaluation in **Section 5.7**.

5.7 EVALUATION OF ALTERNATIVE SOLUTIONS

In order to objectively compare Alternative No. 4 and 5, an evaluation matrix with a colour rating scale system was utilized. For each of the evaluation criteria the alternatives were assessed and awarded a rating in the colour range of red, yellow, green, or dark green with red being the least desirable and dark green being the most desirable. The description of the colour rating is presented in **Table 5.5**. A summary of the overall scoring is presented in **Table 5.6**.

Table 5.5: Description of Colour Rating for Evaluation Criteria

Colour	Scale	Description
	Poor	Unsuitable or not fit for the desired application; negative impacts; disadvantageous; and/or undesirable given the project timeline, budget, scope, and standards.
	Fair	Acceptable for the desired application; minimal negative impacts; adequate given the project timeline, budget, scope, and standards.
	Good	Suitable or good for the desired application; negligible impacts; and/or agreeable given the project timeline, budget, scope, and standards.
	Very Good	Favourable; positive impacts; advantageous; excellent given the project timeline, budget, scope, and standards.

Table 5.6: Evaluation of Alternative Solutions

Evaluation Criteria	Alternative No. 4: Composting	Alternative No. 5: Anaerobic Digestion
Technical Criteria: • Ability to meet biosolids management needs • Constructability, implementation timeline, and reliability • Flexibility to meet future needs or climate change predictions • Ease of operation and maintenance	Good • Strong ability to meet current biosolids management needs with the ability to process wastewater biosolids in a less energy intensive way for improved energy savings. • Moderately complex construction. • Large land area requirements - the total size requirements for the site under ultimate design is approximately 130,000 m^2 (13 hectares). • It is anticipated that the composting facility would be located outside of the City limits. • The design, construction, and testing/operation of the facility may be completed within the desired implementation timeline. • Proven and reliable biosolids management practice with the ability to produce a marketable final product (Class A fertilizer product). • Flexible to meet future biosolids management needs through the expansion of or addition to active composting building, outdoor curing and product storage area, and odour control systems. • Higher operational requirements - increased labour requirements for moving biosolids / composting materials though the four stages of the composting process. • High maintenance requirements due to the use and upkeep of (i) mechanical components to mix/churn the compost material, (ii) aeration blowers and piping to aerate the compost material, (iii) mechanical / trucking equipment to move compost material, and (iv) biofilter material replacement (annual).	Very Good • Strong ability to meet current biosolids management needs with the ability to process wastewater biosolids in a less energy intensive way for improved energy recovery, biogas production, and energy savings. • Moderately complex construction. • Smaller land area requirements - the total size requirements for the site under ultimate design is approximately 16,000 m^2 (1.6 hectares). • It is anticipated that the anaerobic digestion facility would be located at the LRWRP or WBPF. • The design, construction, and testing/operation of the facility may be completed within the desired implementation timeline. • Proven and reliable biosolids management practice with the ability to produce a marketable final product (Class B / Class A fertilizer product). • Flexible to meet future biosolids management needs through the addition of pretreatment units or additional digestion units. • Lower operational requirements - highly automated operation procedures with minimal labour requirements for moving solid materials. • Low-moderate maintenance requirements.
Social Criteria:		

Evaluation Criteria	Alternative No. 4: Composting	Alternative No. 5: Anaerobic Digestion
• Impact to archaeological sites of areas of archaeological potential • Impacts to known of potential built heritage resources and cultural heritage landscapes • Noise, vibration, odour, or air pollution emissions • Permanent changes or impacts to society including acceptability to the public • Development policies and agreements	Fair • Anticipated to have no significant impact to archaeological sites or areas of archaeological potential given the site for the facility is appropriately selected and assessed for such resources. • Anticipated to have no significant impact to built heritage resources or cultural heritage landscapes given the site for the facility is appropriately selected and assessed for such resources. • Site to be zoned or rezoned heavy industrial complexes. If rezoning is required, this will have a greater impact to society and existing land use planning. • Although this site would be located outside of the City limits and away from residential properties, additional considerations would be required to ensure the prevention and control of off-site impacts. This will include mitigation and/or control of noise and vibration; air pollutants; odour; leachate; and vermin / vectors. Composting facility has a higher potential for these issues due to the outdoor curing and storage yards. • Inconsistent with the City of Windsor Community Energy Plan which focuses on effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. • Greater permanent changes or impacts to the society are anticipated	Very Good • Anticipated to have no significant impact to archaeological sites or areas of archaeological potential (based on Stage 1 AA findings). • Anticipated to have no significant impact to built heritage resources or cultural heritage landscapes (based on screening checklist). • Zoned for heavy industrial complexes. • The noise, vibration, odour, and air pollution emitted from this facility are anticipated to be negligible and/or less than the baseline emissions from the existing wastewater treatment plant and industrial facilities in the area. • Consistent with the City of Windsor Community Energy Plan which focuses on effective land use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. • Permanent changes or impacts to the society are anticipated to be minimal.
Environmental Criteria: • Impacts to natural environment including air, climate, vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas,	Fair • Minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. • Inconsistent with the City of Windsor Community Energy Plan which focuses on effective land use	Very Good • Minimal impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and/or soil. • Consistent with the City of Windsor Community Energy Plan which focuses on effective land

Evaluation Criteria	Alternative No. 4: Composting	Alternative No. 5: Anaerobic Digestion
surface drainage and groundwater, and soil / geology. • Regulatory compliances and applicable development / planning policies • Conservation and optimization of resources including energy recovery, reduction of energy consumption, reductions in GHG emissions, nutrients recovery (where applicable)	planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. • Moderate reduction in energy consumption and GHG emissions - composting would be more energy efficient that the thermal drying process used at the existing WBPF. However, the composting facility would likely be located in the County which increases the energy consumption and GHG emissions associated with transporting the wastewater sludge. • Does not promote the use of green energy solutions, nor does it provide an opportunity for energy recover from wastewater sludge in the form of heat or electricity.	use planning, reducing energy consumption, limiting GHG emissions, and promoting smart / green energy solutions. • High reduction in energy consumption and GHG emissions - biogas produced from the anaerobic digesters is a form of renewable energy which can be used as a source to produce heat, electricity, and/or fuel. • Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities.
Economic Criteria: • Capital, operational, and maintenance (lifecycle) costs • Energy savings	Fair • No known government rebate programs available for the implementation of a composting facility for the purpose of processing wastewater sludge. • High capital cost investment - the total anticipated capital cost for the implementation of a composting facility is approximately $ 116,000,000 plus the cost for property / land acquisition. • The operation and maintenance *cost* for a composting facility with consideration for fertilizer revenue is approximately $ 2,210,000 / year.	Good • Several government rebate programs available which help to facilitate municipalities adopting technologies that generate clean affordable energy. Funding programs that may be applicable include the Government of Canada Low Carbon Economy Fund and the Green Municipal Fund with high potential for other programs to open in the future. • High capital cost investment - the total anticipated capital cost for the implementation of an anaerobic digestion facility is approximately $ 151,000,000 minus the value of potential government rebates. • With consideration for fertilizer revenue and electricity savings an anaerobic digestion facility would generate a *profit* of approximately $2,000,000 / year.
Evaluation Results	**Fair**	**Very Good**

5.8 RECOMMENDED SOLUTION

5.8.1 Overview

The above sections present a thorough review and evaluation of alternative design solutions for the management of the City of Windsor biosolids from the LRWRP and LRPCP. This study identified, evaluated, and reported on five (5) alternative design solutions:

Alternative No. 1: Do Nothing
Alternative No. 2: Process Improvements at the Existing WBPF
Alternative No. 3: Incineration
Alternative No. 4: Compost
Alternative No. 5: Anaerobic Digestion and Biogas Utilization

As a part of this Municipal Class EA, these five alternative solutions were evaluated based on a variety of social, natural environmental, economic, and technical criteria. **Section 5.0** summarizes the evaluation criteria, screening of alternatives, detailed evaluation, and outcomes of the analysis. The most preferred alternative and therefore the recommended solution was determined to be Alternative No. 5 – Anaerobic Digestion and Biogas Utilization. Under this strategy, the biosolids produced in the City's two WWTPs would be processed at a centralized anaerobic digestion facility. At the anaerobic digestion facility sludge would be processed (digested), dewatered via centrifuge, stored, and then sold as a fertilizer product for land application throughout Southwestern Ontario. The biogas produced from the anaerobic digesters is a form of renewable energy which can be used as a source to produce heat, electricity, and/or fuel. Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities. A quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions is shown in the sections below.

5.8.2 Biogas Potential

In recent years, many municipalities have implemented integrated organics management. This involves processing both municipal waste sludge and organic wastes (also called supplementary organic feedstock) within one biosolids management facility. The focus in not only processing the wastes, but also maximizing the recovery of their remaining value in the form of electricity, thermal energy, and/or fuel to achieve net-zero energy within wastewater treatment plants.

Supplementary organic feedstock materials which may be processed at the proposed anaerobic digestion facility include household Source Separated Organic (SSO) waste. SSO's includes food and organic wastes which may be collected through curbside collection programs throughout the City of Windsor or Essex County. In Canada, organic waste can make up to 40% of the total solid waste; however, the mass of SSO accepted at the proposed anaerobic digestion facility is highly dependent on public participation. Therefore, it is considered conservative for this study to evaluate co-digestion assuming 20% of the total solid waste is separated and recovered for potential re-use. The average annual mass of solid waste collected in the City of Windsor from 2012 to 2020, was approximately 51,500 wet tonnes / yr. Therefore, an estimated 10,300 wet tonnes of SSO could be accepted at the proposed facility each year. Additional supplementary feedstock materials that could be utilized at the co-digestion facility include HSW such as commercial or industrial food processing waste, dairy waste, and FOG waste. Co-digesting HSW wastes with sludge is an attractive option because it can significantly increase the biogas/energy yield and create a revenue stream from tipping fees. In the City of Windsor, it is estimated that the HSW and FOG collection station would accept an average of 22.7 m3/day which corresponds to two truckloads of 11.4 m3/day (two truckloads of 3,000 US gallon/day).

Table 5.7 shows the feedstock quantity, volatile solids (VS) loading, and biogas production for each feedstock material based on the historic sludge loading at the LRWRP and LRPCP. The biogas production from digesting sludge from the two wastewater treatment plants is estimated to be 2,050 m^3 biogas/day and 6,950 m^3 biogas/day for LRPCP and LRWRP, respectively. Co-digestion could potentially increase the total biogas production by approximately 50% with 1,350 m^3 biogas/day from digesting liquid HSW and 3,600 m^3 biogas/day from digesting SSO. The total biogas production from anaerobic digestion based on the historic sludge loading is 14,000 m^3 biogas/day.

Table 5.7: Loading and Biogas Production from Anaerobic Digestion (Current – Historic Sludge Load)

Feedstock	Feedstock Quantity	VS Loading (kg/day)	Biogas Production (m^3 biogas/day)
LRPCP Sludge (1)	9,200 wet tonnes /yr	5,100	2,050
LRWRP Sludge (1)	31,200 wet tonnes/yr	17,300	6,950
HSW (2)	22.7 m^3/day	1,000	1,400
SSO (3)	10,300 wet tonnes/yr	4,800	3,600
Total	-	28,200	14,000

(1) Biogas Production Rate = 0.8m^3 biogas/kg VSR; VS/TS = 0.75; VSR = 50%; 27% solids
(2) Biogas Production Rate = 1.5m^3 biogas/kg VSR; VS/TS = 0.95; VSR = 90%; 5% solids
(3) Biogas Production Rate = 1.0m^3 biogas/kg VSR; VS/TS = 0.85; VSR = 75%; 20% solids

Table 5.8 shows the feedstock quantity, volatile solids (VS) loading, and biogas production for each feedstock material based on the anticipated 20-year sludge projection. The biogas production from digesting sludge from the two wastewater treatment plants is estimated to be 6,700 m^3 biogas/day and 13,300 m^3 biogas/day for LRPCP and LRWRP, respectively. The total biogas production from anaerobic digestion based on the projected sludge loading is 25,000 m^3 biogas/day.

Table 5.8: Loading and Biogas Production from Anaerobic Digestion (20-Year Sludge Projection)

Feedstock	Feedstock Quantity	VS Loading (kg/day)	Biogas Production (m^3 biogas/day)
LRPCP Sludge [(1)]	30,000 wet tonnes /yr	16,700	6,700
LRWRP Sludge [(1)]	60,000 wet tonnes/yr	33,300	13,300
HSW [(2)]	22.7 m^3/day	1,000	1,400
SSO [(3)]	10,300 wet tonnes/yr	4,800	3,600
Total	-	55,800	25,000

[(1)] Biogas Production Rate = 0.8m^3 biogas/kg VSR; VS/TS = 0.75; VSR = 50%; 27% solids
[(2)] Biogas Production Rate = 1.5m^3 biogas/kg VSR; VS/TS = 0.95; VSR = 90%; 5% solids
[(3)] Biogas Production Rate = 1.0m^3 biogas/kg VSR; VS/TS = 0.85; VSR = 75%; 20% solids

5.8.3 Energy Savings Potential

Table 5.9 shows the energy balance for the LRWRP and LRPCP with the projected energy production from anaerobic digestion and biogas utilization in the form of combined heat and power. The energy consumption presented incorporates the historic energy consumption at the LRWRP and LRPCP and projected energy consumption required for sludge thickening, anaerobic digestion, and digestate dewatering. The energy produced from anaerobic digestion of sludge would amount to 40% of the energy required to operate LRWRP and LRPCP. Co-digestion with HSW and SSO could potentially produce an additional energy that amounts to 62% of the total energy required to operate both plants.

Table 5.9: Energy Balance of the LRWRP and LRPCP with Energy Production from Anaerobic Digestion (Current – Historic Sludge Loading)

Feedstock	Energy Consumption (-)		Net Energy Production (+) Anaerobic Digestion and CHP	
	Electricity (MWh/yr)	Total Energy (eMWh/yr)	Electricity (MWh/yr)	Total Energy (eMWh/yr)
LRPCP Sludge	6,000	9,500	1,700	3,600
LRWRP Sludge	17,800	28,000	5,700	12,300
HSW		300	1,100	2,400
SSO	300	1,900	3,000	6,400
Total	24,100	39,700	11,500	24,700

5.8.4 Potential Reduction in GHG Emissions

Table 5.10 shows the effect that anaerobic digestion and biogas utilization in the form of CHP had on GHG emissions for LRWRP and LRPCP. Anaerobic digestion of sludge reduced GHG emissions by 1,400 tonnes CO_{2e}/year and 400 tonnes CO_{2e}/year at the LRWRP and LRPCP, respectively. Co-digestion with HSW and SSO could potentially reduce GHG emissions further to 5,900 tonnes CO_{2e} /year, which corresponds to approximately 35 % reduction in GHG emissions.

Table 5.10: Energy Balance of the LRWRP and LRPCP with Energy Production from Anaerobic Digestion (Current – Historic Sludge Loading)

Feedstock	Existing Conditions (tonne CO_2e/yr)	Anaerobic Digestion with CHP (tonne CO_2e/yr)	
	GHG Emissions (A)	GHG Emissions (B)	GHG Reductions (A – B)
LRPCP Sludge	2,200	1,800	(400)
LRWRP Sludge	7,000	5,600	(1,400)
HSW	-	(200)	(200)
SSO	-	(1,300)	(1300)
Total	9,200	5,900	(3,300)

6.0 ALTERNATIVE DESIGN CONCEPTS AND RECOMMENDATIONS

6.1 INTRODUCTION

This section presents an overview of the work undertaken for Phase 3 of the Class EA process. Phase 3 involves the identification of alternative design concepts (technical alternatives) for the preferred solution, and evaluation of various design concepts with the objective of determining which alternative best addresses the preferred solution. As such, the following sections describe alternative anaerobic digestion and biogas utilization technologies that might be considered for achieving net zero and significantly reducing GHG emissions with wastewater treatment.

In this section of the report, alternative design concepts for an anaerobic digestion facility will be identified and evaluated leading to the selection of the recommended design. The following sections will outline and evaluate design concept alternatives within the following categories:

1. **Sludge Handling**
   - Trucking LRPCP Sludge Cake
   - Pumping LRPCP Liquid Sludge
2. **Sludge Pretreatment**
   - Biological
   - Thermal
   - Mechanical / Electrical
   - Chemical
3. **Type of Anaerobic Digestion**
   - Mesophilic Anaerobic Digesters
   - Thermophilic Anaerobic Digesters
   - Temperature Phased Anaerobic Digesters
   - Acid / Gas Phased Anaerobic Digesters
4. **Site Selection**
   - LRWRP
   - WBPF
5. **Digestate Handling**
   - WBPF
   - Storage and Land Application
6. **Biogas Utilization**
   - Heat (via boiler)
   - Combined Heat and Power
   - Renewable Compressed Natural Gas
   - Renewable Natural Gas

The alternative design concepts were evaluated based on a variety of social, natural environmental, economic, and technical criteria. These evaluation criteria were developed based on biosolids management needs at the two wastewater treatment plants, applicable municipal plans / commitments, design principles, and past industrial experience. The evaluation criteria are as follows:

Technical Criteria:

- Ability to meet biosolids management needs
- Constructability, implementation timeline, and reliability
- Flexibility to meet future needs or climate change predictions
- Ease of operation and maintenance

Social Criteria:

- Impact to archaeological sites or areas of archaeological potential
- Impact to known or potential built heritage resources and cultural heritage landscapes
- Noise, vibration, odour, or air pollution emissions
- Permanent changes or impacts to society including acceptability to the public
- Development policies and agreements

Environmental Criteria:

- Impacts to natural environment including air, climate, vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, surface drainage and groundwater, and soil / geology.
- Regulatory compliances and applicable development / planning policies
- Conservation and optimization of resources including energy recovery, reduction of energy consumption, reductions in GHG emissions, nutrients recovery (where applicable)

Economic Criteria:

- Capital, operational, and maintenance (lifecycle) costs
- Energy savings
- Potential for federal and provincial grant programs

6.2 SLUDGE HANDLING

In this section of the report, alternative design concepts for the handling of sludge from the LRWRP and LRPCP will be identified and evaluated leading to the selection of the recommended design. Currently, sludge at the LRWRP and LRPCP is removed from the treatment process and dewatered on-site by centrifuge. Following the centrifuge process, the dewatered sludge cake has a dry solids content in the range of 25 to 30 % (typically 27 %). Dewatered sludge cake from both of the wastewater treatment facilities is then transferred to the WBPF by tractor trailer for further processing.

With the implementation of an anaerobic digestion facility alternative methods must be assessed to determine the preferred sludge handling and transportation method. Sludge from the LRWRP and LRPCP will need to be transported to the proposed anaerobic digestion facility using one of two methods: (i) sludge dewatering via centrifuge with transferring via tractor trailer or (ii) pumping of dilute liquid sludge. The method used for sludge handling will influence the sludge feedstock characteristics and solids content which directly impacts the ability to meet technical requirements for anaerobic digestion. The anaerobic digestion facility will be located close to the LRWRP; therefore, it is anticipated that the sludge will be handled using the second method, pumping dilute liquid sludge. Employing this method for the LRWRP sludge will not require a significant capital cost investment and will have minimal social and natural environmental impacts. Whereas the anaerobic digestion facility will be located far from the LRPCP; therefore, it is necessary to evaluate each sludge handling method to determine the preferred strategy. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Trucking LRPCP Sludge Cake and Pumping LRWRP Liquid Sludge

Alternative No. 2: Pumping LRPCP Liquid Sludge and Pumping LRWRP Liquid Sludge

6.2.1 Alternative No. 1 – Trucking LRPCP Sludge Cake

Under this strategy the liquid sludge from the LRPCP would be centrifuged onsite to a dry solids content of approximately 27 %. Next, the dewatered sludge cake would be trucked via tractor trailer to a sludge holding tank at the anaerobic digestion facility. The liquid sludge from LRWRP would be removed from the treatment process with a solids content of approximately 5 % and pumped to the nearby anaerobic digestion facility sludge holding tank. The liquid sludge from the LRWRP would be mixed with sludge cake from LRPRP in the sludge holding tank, diluted/thickened (as necessary), input to the pretreatment process (if applicable), and then fed to anaerobic digestion. The simple process schematic for this alternative is shown in **Figure 6.1**.

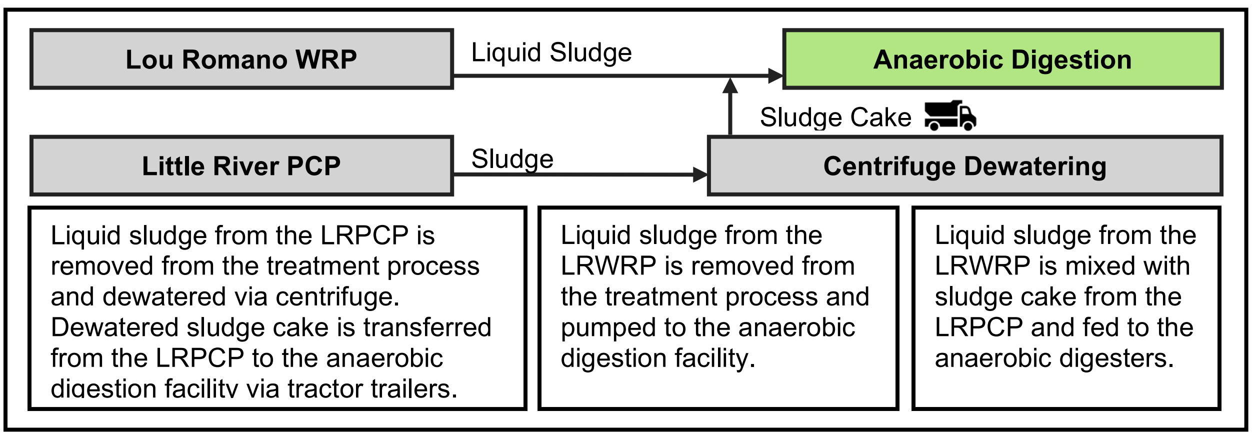


Figure 6.1: Process Schematic for Trucking LRPCP Sludge Cake

Benefits of this sludge handling method include a higher level of control over the solids concentration and loading to the anaerobic digesters. With this method the mixing of liquid sludge from LRWRP and dewatered sludge from LRPCP may be controlled to provide a suitable solids content for anaerobic digestion. If a sludge pretreatment technology is employed prior to anaerobic digestion, sludge thickening may be required. In comparison to the other sludge handling alternative, the solids content in the mixed sludge is significantly higher and closer to the desired value for pretreatment. This is beneficial at it will require less energy and/or resources to be input for the sludge thickening process.

In addition, the number of tractor trailer loads may be easily scaled up or down based on the sludge production at the LRPCP. This will provide flexibility to meet current and future sludge handling needs without the requirement for addition funding. This transfer method is consistent with the current sludge handling protocol at the LRPCP which will allow the City of Windsor to follow existing practices and protocols. Since the City of Windsor operating staff is familiar with this method there will be simple and continuous operation of sludge transfer from the LRPCP. For this sludge handling strategy, there are some level of social and environmental impacts due to the transportation and emissions from transferring the sludge by tractor trailer across the City. However, these impacts are equivalent to the existing sludge handling strategy and are not anticipated to increase due to the implementation of the anaerobic digestion facility. The energy recovered from the sludge at the anaerobic digestion facility in the form of biogas would offset the transportation emissions associated with transferring this sludge.

6.2.2 Alternative No. 2 – Pumping LRPCP Liquid Sludge

Under this strategy the liquid sludge from the LRPCP would be removed from treatment process and diluted (as necessary) to a solids content of approximately 2 %. Next, this liquid sludge would be pumped via a new pipeline to a sludge holding tank at the anaerobic digestion facility. The liquid sludge from LRWRP would be removed from the treatment process with a solids content of approximately 5 % and pumped to the nearby anaerobic digestion facility sludge holding tank. The liquid sludge from the LRWRP and LRPCP would be mixed, thickened (as necessary), input to the pretreatment process (if applicable), and then fed to anaerobic digestion at approximately 4 % dry solids. The simple process schematic for this alternative is shown in **Figure 6.2**.

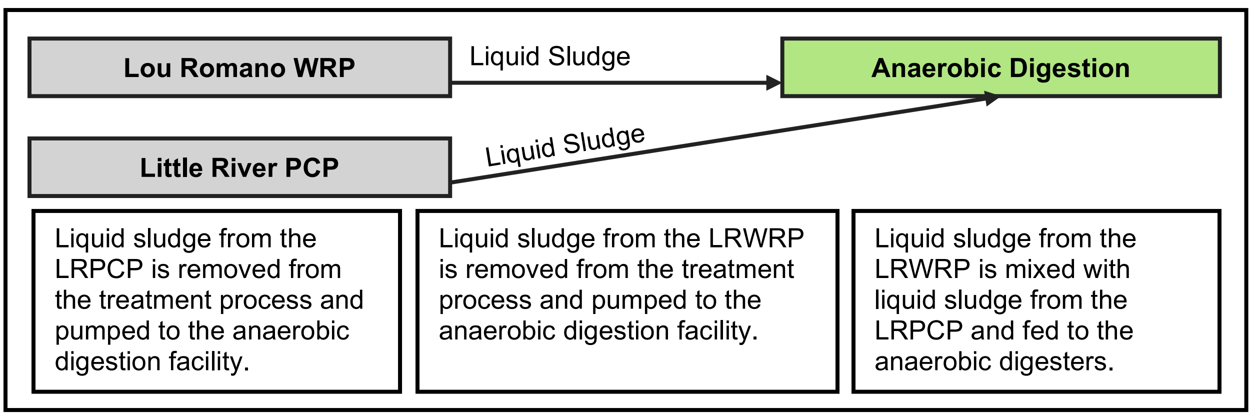


Figure 6.2: Process Schematic for Piping LRPCP Liquid Sludge

Benefits of this sludge handling method include eliminating the need to operate the dewatering facility at the LRPCP and the partial automation of sludge transfer from the LRPCP to the anaerobic digestion facility. The operation of the dewatering centrifuges at a wastewater treatment facility account for a portion of the overall energy usage and operation and maintenance requirements. With this strategy the dewatering facility at LRPCP may be decommissioned which would lower the overall operations and maintenance requirements for the facility.

Drawbacks of this sludge handling method include a lower level of control over the solids concentration and loading to the anaerobic digesters. With this method there is less control over the mixing of liquid sludge from LRWRP and dilute liquid sludge from LRPCP and some processing may be required to provide a suitable solids content for anaerobic digestion. If a sludge pretreatment technology is employed prior to anaerobic digestion, sludge thickening will be required. In comparison to the other sludge handling alternative, the solids content in the mixed sludge is significantly lower and more energy and/or resources will be required for the sludge thickening process.

The implementation of this solids management strategy would require approximately 20 km of forcemain piping across the City of Windsor as well as multiple pumping stations. This would come at a significant capital cost investment from the City of Windsor. This piping system would have complex construction, operations, and maintenance requirements with the need for multiple property acquisitions and regulatory approvals. This construction would have major social and environmental impacts along the route of the piping system and is not likely to be favourable to the community as a whole. This alternative would have significantly higher potential for impact to archaeological sites or areas of archaeological potential as well as impacts to known or potential built heritage resources and cultural heritage landscapes.

In addition, there is limited ability to scale this process up or down based on the sludge production at the LRPCP. In order to meet future needs the pipeline which connects the two facilities may need to be upgraded or twinned. This will have a significant social-environmental impact and require additional capital cost investments which limits flexibility to meet current and future sludge handling needs. This transfer method is different from the current sludge handling protocols at the LRPCP which will require some retraining and updates to the existing practices and protocols. Since the City of Windsor operating staff is familiar with the current method there may be some disruptions to the operation of sludge transfer from the LRPCP.

6.2.3 Evaluation of Sludge Handling Alternatives

The evaluation of the alternative sludge handling concepts is shown in **Table 6.1**.

Table 6.1: Evaluation of Alternative Sludge Handling Concepts

Evaluation Criteria	Alternative No. 1 – Trucking LRPCP Sludge Cake	Alternative No. 2 – Pumping LRPCP Liquid Sludge
Technical Suitability	Very Good • More suitable solids content for anaerobic digestion or sludge pretreatment technologies • High level of control over solids concentration fed to anaerobic digestion • Flexible to meet future needs • No construction • Simple O&M	Poor • Sludge thickening would be required to reach suitable solids content for anaerobic digestion or pretreatment • Lower level of control over solids concentration fed to anaerobic digestion • Less flexible to meet future needs • Complex construction • Moderately complex O&M
Social & Natural Environment	Good	Fair

Evaluation Criteria	Alternative No. 1 – Trucking LRPCP Sludge Cake	Alternative No. 2 – Pumping LRPCP Liquid Sludge
	• Emissions from transportation across the City (equivalent to existing management strategy) • Lower potential for impact to archaeological sites or areas of archaeological potential • Lower potential for impact to known or potential built heritage resources and cultural heritage landscapes	• High social and environmental impact from installation of approximately 20 km of forcemain piping and multiple pumping stations • Higher potential for impact to archaeological sites or areas of archaeological potential • Higher potential for impact to known or potential built heritage resources and cultural heritage landscapes
Economic	Good • No capital cost • Moderate O&M	Fair • High capital cost • Low-moderate O&M cost
Overall	Good	Fair

Based on this analysis, trucking LRPCP sludge cake and pumping LRWRP liquid sludge to the anaerobic digestion facility appears to be preferred. Benefits of this alternative include the increased control over the solid's concentration fed to the pretreatment unit or anaerobic digesters, lower capital cost, and flexibility to meet future needs. Further, this alternative would avoid the negative social, economic, and natural environmental impacts of installing a long forcemain from the LRPCP to the LRWRP which would likely require multiple pumping stations across the City of Windsor. The option to pipe sludge from the LRPRP to the anaerobic digestion facility should be reconsidered during future LRPCP expansion studies or when major upgrades of the LRPCP centrifuges are anticipated.

6.3 SLUDGE PRETREATMENT

In the biological process of anaerobic digestion, hydrolysis is considered the rate limiting step. During hydrolysis, complex organic matter reacts in the presence of water to form simpler soluble organic compounds. Enhancing hydrolysis through pretreatment of sludge can improve the performance of anaerobic digestion and increase biogas production. Pretreatment technologies commonly require an additional input of energy, chemicals, and/or capital cost. The main objective of pretreatment of sludge is to break down biomass cell walls, disintegrate large complex organic compounds, and render the inner organic matter more bioavailable. As a result, pretreatment will accelerate sludge hydrolysis and improve the performance of subsequent anaerobic digestion including increasing volatile solids reduction (VSR) and improving biogas production. Pretreatment options may include: biological pretreatment (enzymatic hydrolysis, temperature-phased anaerobic digestion, microbial electrolysis cell); thermal pretreatment (thermal hydrolysis process (THP)); mechanical pretreatment (ultrasonication, microwave irradiation, electrokinetic disintegration, high-pressure homogenization); electrical (focused pulse); chemical (acidic or alkali pretreatment, ozonation, Fenton oxidation, Fe(ii)-activated persulfate oxidation); or any combination of the above methods.

In this section of the report, alternative design concepts for the pretreatment of sludge will be identified and evaluated leading to the selection of the recommended design. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Biological Pretreatment

Alternative No. 2: Thermal Pretreatment

Alternative No. 3: Mechanical / Electrical Pretreatment

Alternative No. 4: Chemical Pretreatment

6.3.1 Alternative No. 1: Biological Pretreatment

Biological pretreatment methods employ microorganisms to breakdown the biomass rendering it more bioavailable for anaerobic digestion thus improving biogas production. Microorganisms utilized for this pretreatment method include fungal or bacterial strains, microbial consortia, or enzymes. Biological pretreatment methods include enzymatic hydrolysis and microbial electrolysis cells. The chosen application varies depending on the chemical composition of the substrate material, structural/facility requirements, and economic factors; however, enzymatic hydrolysis is more common for the treatment of wastewater sludge. Enzymatic hydrolysis typically involves the construction of up to six (6) enzymatic hydrolysis tanks in series upstream of the anaerobic digesters. The goal is to shift the reactor kinetics away from complete mixed reaction to a plug flow condition in which temperature, enzyme type, and concentration can be controlled to improve VSR and digestion capacity as well as reduce the production of inhibitory substances and sterilizes waste eliminating pathogens. Advantages of biological pretreatments in comparison to other pretreatment methods are the low energy and chemical requirements within a compact footprint for improved biogas potential and thus energy savings. However, there are limited full scale applications for the pretreatment of wastewater sludge with conflicting findings in scientific papers related to full-scale biological pretreatment.

6.3.2 Alternative No. 2: Thermal Pretreatment

Thermal pretreatment methods employ heat and pressure to breakdown biomass rendering it more bioavailable for anaerobic digestion. The main thermal pretreatment method used for wastewater sludge is Thermal Hydrolysis Process (THP) which is a pre-digestion conditioning process which treats solids in a batch reaction at elevated temperature and pressure. THP consists of three main phases:

- (Phase 1) Preheating
- (Phase 2) Heating and Batch Reaction
- (Phase 3) Depressurizing

The preheating phase occurs in the pulper where pre-thickened sludge at a solid's concentration of approximately 14 to 16 % is heated using steam recycled from the flash tanks. The heating and batch reaction phase occurs in the reactor where the feedstock is heated to 165 °C at a high pressure of approximately 8 to 9 bar gauge. From the reactor, hydrolyzed sludge at a solid’s concentration of approximately 10 % is transferred to the flash tank. The depressurizing phase occurs in the flash tank where it is rapidly depressurized and diluted further to approximately 8% to 12% total solids. Following this stage, the pretreated sludge temperature is reduced to approximately 40°C before it is fed to the digesters.

This process enhances digestion rate resulting in shorter retention time, smaller digesters’ footprint, more biogas production, sludge disinfection, enhanced dewaterability, and Class A biosolids production. This technology is a proven and reliable with full-scale applications in operation throughout North America. The main provider of THP systems for pretreatment of wastewater sludge is Cambi.

6.3.3 Alternative No. 3: Mechanical / Electrical Pretreatment

Mechanical and electrical pretreatment work to break apart sludge flocs and denature complex biological molecules making biomass more bioavailable for anaerobic digestion. Mechanical and electrical pretreatment methods include:

- Ultrasonification –involves the irradiation of feedstock material with ultrasonic waves (>20 kHz) resulting in agitation of rigid sludge flocs and cellular walls. Ultrasound waves generate microbubbles that violently collapse within a few microseconds after reaching a critical size, inducing cavitation. The sudden and violent collapse leads to extreme temperatures (~5000 °K) and pressure (~500 bars) initiating powerful hydro-mechanical shear forces and highly reactive radicals. Both the hydro-mechanical shear forces and the oxidizing effect of the radicals contribute to the break-up of sludge flocs and the liberation of intercellular material. This disruption to feedstock material alters the biomass making it more bioavailable for anaerobic digestion. Ultrasonication is a well-established mechanical technology for sludge disintegration in Europe.
- Microwave Irradiation – involves the application of short oscillation frequency microwaves (typically close to 900 MHz or 2,450 MHz) to feedstock material resulting in damage to sludge cells making it more bioavailable for anaerobic digestion. Microwave irradiations may be applied in one of two processes: (1) thermal or (2) athermal. The thermal effect process occurs through the mechanism of heat generation by the effect of polarization. Thermal effect that is generated through its the rotation of dipoles under oscillating electromagnetic fields, which heats the intracellular liquor to boiling point and brings out the break-up of bacterial cell. Athermal effect is not correlated with temperature changes. Athermal effect is induced by changing the dipole orientation of polar molecules, giving rise to the possible breakage of hydrogen bonds, and unfolding and denaturing of complex biological molecules, which kills microorganisms at lower temperatures.
- Electrokinetic Disintegration – also known as pulsed electric field involves applying high-voltage electric fields to the feedstock material to induce a sudden disruption of rigid sludge flocs and cellular walls. This disruption to feedstock material alters the biomass making it more bioavailable for anaerobic digestion.
- High-Pressure Homogenization – relies on abrupt pressure gradient, high turbulence, cavitation as well as strong shearing forces, which are aroused under strong depressurization of highly compressed sludge suspensions (up to 900 bar). During this process, sludge flocs break and cell

membrane ruptures releasing the intracellular substances and making the feedstock more bioavailable for anaerobic digestion.

The chosen application varies depending on the chemical composition of the substrate material, structural/facility requirements, and economic factors. These processes may be used to enhance the digestion rate allowing for higher VSR loading rate, increased digestion capacity, biogas production, and Class A biosolids production. However, there are limited full-scale installations in North America and typically these technologies require higher energy demands, increased replacement costs, and more complex operation and maintenance.

6.3.4 Alternative No. 4: Chemical Pretreatment

Chemical pretreatment methods employ strong reagents to deform biomass cell wall rendering it more bioavailable for anaerobic digestion and thus improving the biogas production. The main reagents employed for this application include acid or alkali pretreatment as well as oxidants (including ozonation, Fenton oxidation, and Fe (II)-activated persulfate oxidation). Chemical pretreatment methods include:

- Acidic and Alkali Pretreatment – involves the use of concentrated and diluted acids and/or bases to break the chemical structure of feedstock materials. The most commonly used acids include hydrochloric acid (HCl), sulfuric acid (H_2SO_4), phosphoric acid (H_3PO_4), and nitric acid (HNO_3). The most commonly used bases include sodium hydroxide (NaOH), potassium hydroxide (KOH), calcium hydroxide ($Ca(OH)_2$), magnesium hydroxide ($Mg(OH)_2$), calcium oxide (CaO), and ammonia (NH_3). The application of acid or base avoids the need for use of high temperatures and thus can be operated at ambient or moderate temperatures. The effectiveness of acidic or alkali pretreatment may vary with the types and characteristics of feed sludge because of their distinct affinity to organic components. Besides, this method may induce the formation of toxic by-products that negatively impact the anaerobic digestion process. Other drawbacks include great toxicity, strong corrosivity, necessity of treated sludge neutralization, and increased mineral content of digested sludge.

- Ozonation – involves the infusion of ozone (O_3) into the feedstock material to effectively disintegrate biomass cell wall and enhance sludge digestion. The efficiency of the ozonation process is closely related to characteristics of sludge; mass transfer rate; and slow kinetic rates of ozonation reaction with sludge. In addition, sludge ozonation is an energy-intensive process. High energy input is required for ozone production, transfer to sludge, and energy consumption to produce liquid oxygen. Microbubble ozonation can be applied to accelerate the formation of hydroxyl radicals and speed up sludge solubilization, thus reducing the impact of high capital requirements.

- Fenton Oxidation - involves reactions of hydrogen peroxide (H_2O_2) with catalyst iron ions (Fe^{2+}) to produce highly active hydroxyl radicals (•OH). Hydroxyl radicals have a higher oxidation potential and are particularly effective for the disintegration of sludge resulting in the release of both intracellular materials and bound water. The effectiveness of this process depends on several variables including reagents concentrations, Fe_{2+}/H_2O_2 ratio, reaction time, initial pH, and temperature. A major drawback for Fenton oxidation process is the low pH requirements (< 4.0) to prevent Fe^{3+} precipitation and the subsequent neutralization step required before digestion.

- Fe (II)-Activated Persulfate Oxidation - is an emerging sludge pretreatment technology to condition and enhance waste sludge dewatering. Persulfate ($S_2O_8^{2-}$) can be activated by heat, UV light, or transition metals to generate sulfate free radicals (SO_4^{-}•) which are extremely strong oxidants. This method is effective in disintegrating sludge cell wall resulting in the release of intracellular materials and subsequent enhancement of digestion and dewaterability. Compared to hydroxyl radicals, sulfate radicals own higher oxidation potentials at a wider pH range (3.0 – 8.5) and are more selective for oxidation at acidic conditions. Therefore, it can be more cost-effective than using hydroxyl radicals.

The chosen application varies depending on the chemical composition of the substrate material, structural/facility requirements, and economic factors. These processes may be used to enhance the digestion rate allowing for higher VSR, increased digestion capacity, biogas production, and Class A biosolids production. However, there are limited full-scale installations in North America and typically these technologies require higher energy demands, high capital costs, high chemical cost, and more complex operation and maintenance related to neutralization requirements.

6.3.5 Evaluation of Sludge Pretreatment Alternatives

The evaluation of the alternative pretreatment concepts is shown in **Table 6.2**.

Table 6.2: Evaluation of Alternative Pretreatment Concepts

Evaluation Criteria	Alternative No. 1: Biological Pretreatment	Alternative No. 2: Thermal Pretreatment	Alternative No. 3: Mechanical / Electrical Pretreatment	Alternative No. 4: Chemical Pretreatment
Technical Suitability	Poor • Limited full-scale applications • Moderately robust and resilient • Complex O&M • Class A Fertilizer	Very Good • Proven and reliable full-scale applications • Highly robust and resilient • Complex O&M • Reduces biosolids volume for improved anaerobic digester capacity • Class A Fertilizer	Fair • Limited full-scale applications • Highly robust and resilient • Complex O&M • Class A Fertilizer	Fair • Limited full-scale applications • Highly robust and resilient • Complex O&M • Class A Fertilizer
Social & Natural Environment	Very Good • Small footprint • No chemical use	Very Good • Small footprint • No chemical use	Very Good • Small footprint • No chemical use	Fair • Moderate footprint • Chemical use
Economic	Good • High capital cost • High O&M cost • Improved biogas production and energy savings	Good • High capital cost • High O&M Cost • Improved biogas production and energy savings	Fair • High capital cost • High O&M costs • Higher energy cost • Improved biogas production and energy savings	Fair • High capital cost • High O& M costs • Chemical cost • Improved biogas production and energy savings
Overall	Good	Very Good	Good	Fair

Based on this analysis, thermal pretreatment using THP appears to be preferred. Benefits of this alternative include its ability to accelerate sludge hydrolysis and improve the performance of subsequent anaerobic digestion. This process enhances digestion rate resulting in shorter retention time, smaller digesters' footprint, more biogas production, sludge disinfection, enhanced dewaterability, and Class A biosolids production. This technology is a proven and reliable with full-scale applications in operation throughout North America. These applications have been proven to be highly robust and resilient in comparison to alternative pretreatment technologies.

Implementation of a pretreatment unit for the anaerobic digestion site may be limited by the available budget for this project. If there are budgetary restrictions, it would be recommended to implement the anaerobic digestion facility without pretreatment as an interim solution. When budgetary funding becomes available or during the detailed design process it is recommended that pretreatment options be further explored. Implementation of pretreatment technologies may also be considered when major upgrades of the WBPF are required or when capacity expansion of the anaerobic digestion facility is required.

6.4 TYPE OF ANAEROBIC DIGESTION

In this section of the report, alternative design concepts for the type of anaerobic digesters to be used at the facility will be identified and evaluated leading to the selection of the recommended design. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Mesophilic Anaerobic Digesters

Alternative No. 2: Thermophilic Anaerobic Digesters

Alternative No. 3: Temperature Phased Anaerobic Digesters

Alternative No. 4: Acid / Gas Phased Anaerobic Digesters

6.4.1 Alternative No. 1: Mesophilic Anaerobic Digesters

Mesophilic Anaerobic Digesters (MAD) employ mesophilic microorganisms that live and thrive in moderate temperature ranges between 30 °C and 38 °C. MADs are usually operated at a consistent temperature of 37 °C in order to avoid reduction in microbial activity (below 35 °C) and production of inhibitory compounds (above 40 °C). MADs are generally more stable and reliable than thermophilic anaerobic digesters because there is a wider diversity of microbial organisms that grow in the mesophilic temperature range. In addition, mesophilic organisms are generally more robust and adaptable to changes in operating conditions such as temperature shifts or feedstock variations. MADs are a proven and reliable technology which make up a majority, more than 90%, of anaerobic digestion processes employed at WWTPs. This process is fully enclosed which mitigate potential noise and odour concerns. Digestate produced from MAD may be classified as a Class B quality biosolids when the tie and temperature criteria specified by the regulating body are satisfied. This biosolids quality would be increased to Class A if pretreatment via THP was included.

6.4.2 Alternative No. 2: Thermophilic Anaerobic Digesters

Thermophilic Anaerobic Digesters (TAD) employ thermophilic microorganisms that live and thrive in moderate temperature ranges between 50 °C to 57 °C. TADs are usually operated at a consistent temperature of 57 °C. In the anaerobic digestion process, temperature of operation is a key driver in the activity of microbial organisms that influences the overall rate of anaerobic digestion. At higher temperatures hydrolysis, the breakdown of complex organic molecules occurs at an improved rate which can theoretically increase the biogas yield. TAD offers advantages over MAD as operating at higher temperatures accelerates and increases the VSR and allows for higher loading rates or decreased retention times in the digesters. In addition, the higher temperatures utilized in TAD allows for improved pathogen reduction. Digestate produced from TAD may be classified as a Class A quality biosolids when the tie and temperature criteria specified by the regulating body are satisfied. Digestate material produced from TADs are typically more odourous than that from MAD.

Although TAD are generally more efficient for the production of biogas, most anaerobic digestion facilities are operated at mesophilic digestion temperatures. There are limited full-scale municipal applications in North America. Drawbacks of TADs include higher maintenance and operations costs associated with maintaining the digesters at higher operating temperatures. In addition, TADs have a lower process stability that make them less reliable in comparison to MADs. The operating temperature and influent substrate characteristics are important parameters to be monitored and controlled for efficient operation and stability of TADs. Variations in these parameters, particularly the temperature, significantly impact anaerobic digestion because there is a lower diversity of microbial organisms that grow in the thermophilic temperature range. Further, the formation of inhibitory compounds is more likely in the thermophilic temperature range. These inhibitors can slow down or interrupt the anaerobic digestion process resulting in decreased biogas yield.

6.4.3 Alternative No. 3: Temperature Phased Anaerobic Digesters

Temperature Phased Anaerobic Digestion (TPAD) incorporates both thermophilic and mesophilic reactors connected in series. This technology combines the advantages of thermophilic digestion with the advantages of mesophilic digestion to improve the overall performance of the anaerobic digestion facility. TPAD employs digesters in series where the first stage, consisting of first stage digester, operated at thermophilic temperatures and the second stage, consisting of multiple digesters, is operated at mesophilic temperatures. In stage one, the thermophilic digesters improve VSR, increases biogas production, and increases pathogen destruction rates. In stage two, the mesophilic digesters improve the process stability and destroy odourous compounds produced during the thermophilic stage. Digestate produced from TPAD may be classified as a Class A quality biosolids when the tie and temperature criteria specified by the regulating body are satisfied.

TPAD are not nearly as common as MADs. Further, there are limited full-scale applications of this technology in North America. Thermal pretreatment technologies such as THP provides similar advantages to TPAD and is increasingly more common worldwide.

6.4.4 Alternative No. 4: Acid / Gas Phased Anaerobic Digesters

Acid / Gas Phased Anaerobic Digesters involves the physical separation of the acid-forming steps (hydrolysis and fermentation) and gas-forming steps (acetogenesis and methanogenesis) of the anaerobic digestion process. These two stages are conducted in separate digestion tanks and operated at ideal conditions for the corresponding biological process. In theory, this would allow for improved control of operating conditions during each stage of the anaerobic digestion process and optimization of biogas production.

In the first stage, the primary digester is heated to optimize performance of hydrolytic and acidogenic microorganisms. These digesters are maintained at a pH of 6 or less for a short retention period that is conducive to the production of VFAs. In the second stage, the secondary digesters are self-heated due to the exothermic (heat-producing) nature of the methanogenesis process. These digesters are maintained at a neutral pH for a longer retention period that is conducive to the methanogenesis process and maximizes biogas production. Although this process offers many advantages in theory, there are limited full-scale applications with conflicting findings in scientific papers related to acid / gas phased anaerobic digesters.

6.4.5 Evaluation of Type of Anaerobic Digestion Alternatives

The evaluation of the alternative types of anaerobic digestion is shown in **Table 6.3**.

Table 6.3: Evaluation of Alternative Anaerobic Digestion Concepts

Evaluation Criteria	Alternative No. 1: Mesophilic Anaerobic Digesters	Alternative No. 2: Thermophilic Anaerobic Digesters	Alternative No. 3: Temperature Phased Anaerobic Digesters	Alternative No. 4: Acid / Gas Phased Anaerobic Digesters
Technical Suitability	Very Good • Proven and reliable • Class B biosolids (without pretreatment) • High stability • Less complex O&M • High biogas potential	Poor • Limited municipal applications • Potential for Class A biosolids (without pretreatment) • Lower stability • Complex O&M • High biogas potential	Fair • Limited full-scale applications • Potential for Class A biosolids (without pretreatment) • Moderate stability • More complex O&M • High biogas potential	Poor • Limited full-scale applications with poor process reliability • Potential for Class A biosolids (without pretreatment) • Moderate stability • More complex O&M • High biogas potential
Social & Natural Environment	Very Good • Moderate footprint • Less odour potential in digestate material	Good • Small footprint • Higher odour potential in digestate material	Very Good • Moderate footprint • Less odour potential in digestate material	Very Good • Moderate footprint • Less odour potential in digestate material
Economic	Very Good • Moderate O&M cost • Moderate capital cost	Fair • Higher O&M cost • Higher capital cost • Higher energy requirements	Fair • Higher O&M cost • Higher capital cost • Higher energy requirements	Fair • Higher O&M cost • Higher capital cost
Overall	Very Good	Fair	Good	Fair

Based on this analysis, Mesophilic Anaerobic Digesters (MAD) appears to be preferred. MAD is a highly proven and reliable technology which makes up vast majority, approximately 90 %, of anaerobic digestion processes employed for the digestion of wastewater sludge from municipal WWTPs. Benefits of this alternative include that it is a proven and reliable technology with high process stability and less complex operations and maintenance requirements. Further, this alternative has a moderate footprint and capital cost requirement when compared to the alternatives with less odour potential in the digestate material.

6.5 SITE SELECTION

In this section of the report, alternative locations for the facility will be identified and evaluated leading to the selection of the recommended design. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Lou Romano Water Reclamation Plant

Alternative No. 2: Windsor Biosolids Processing Facility

The preliminary layouts shown in the Figures below are for display purposes only. The requirements for the various components of the anaerobic digestion facility as well as their exact location and layout are to be determined during the detailed design phase.

6.5.1 Alternative No. 1: Lou Romano Water Reclamation Plant

Under this strategy the anaerobic digestion facility would be located at the LRWRP site to the northeast of the existing dewatering facility as shown in **Figure 6.3**. This land is currently owned by the City of Windsor; therefore, no land acquisition would be required. At this site the anaerobic digestion facility would be composed of the receiving area, pretreatment, anaerobic digesters, and a biogas processing area. The remaining solids from the anaerobic digesters, digestate, would be transferred to the existing dewatering facility at the LRWRP; therefore, a new dewatering facility is not included in the preliminary site layout. Benefits of this location include that the facility would be close to the existing sludge holding tank and dewatering facility allowing for beneficial reuse and easy transfer of sludge and digestate. However, there is limited space at this location and there is potential for increased construction complexity due to underground utilities.

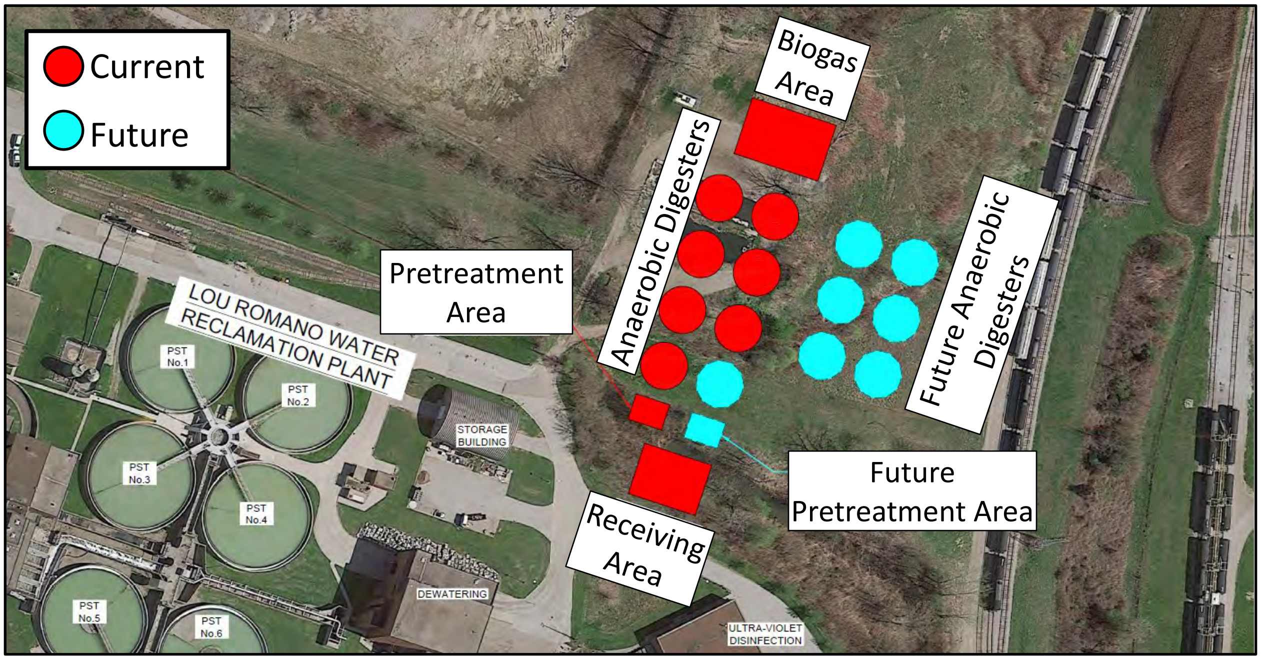


Figure 6.3: Potential Site Layout at the Lou Romano Water Reclamation Plant

6.5.2 Alternative No. 2: Windsor Biosolids Processing Facility

Under this strategy the anaerobic digestion facility would be located at the WBPF site to the southeast of the existing facility as shown in **Figure 6.3**. This land is currently owned by the City of Windsor; therefore, no land acquisition would be required. At this site the anaerobic digestion facility would be composed of the receiving area, pretreatment (if applicable), anaerobic digesters, biogas processing area, and dewatering facility. The remaining solids from the anaerobic digesters would be transferred to a new dewatering facility Transferring the digestate to the LRWRP for dewatering and then transferring the dewatered digestate back to the WBPF for storage is not seen as a cost-effective solution. Benefits of this location include that the site has adequate space for current and future processing needs with no construction concerns regarding underground utilities.

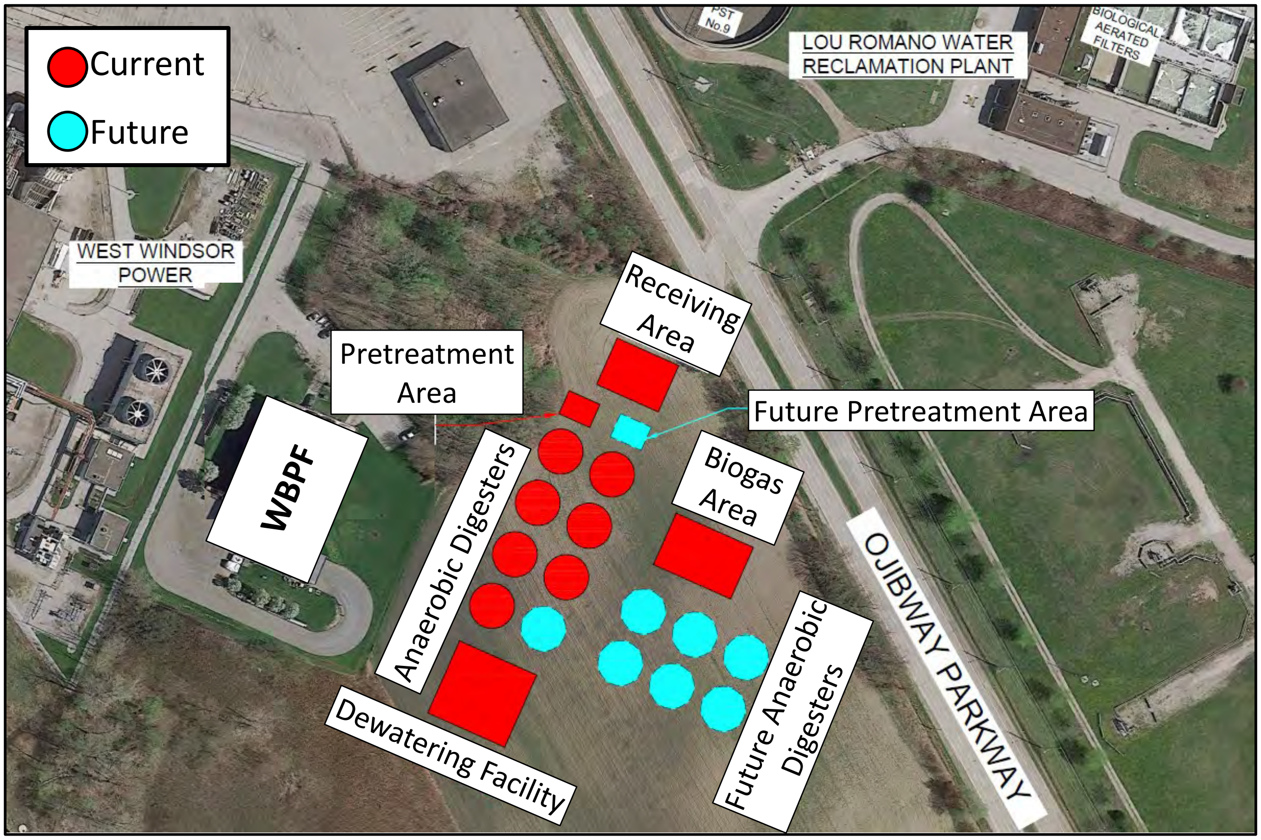


Figure 6.4: Potential Site Layout at the Windsor Biosolids Processing Facility

6.5.3 Evaluation of Site Alternatives

The evaluation of the alternative site location concepts is shown in **Table 6.4**Table 6.1**.**

Table 6.4: Evaluation of Alternative Site Location Concepts

Evaluation Criteria	Alternative No. 1: Lou Romano Water Reclamation Plant	Alternative No. 2: Windsor Biosolids Processing Facility
Technical Suitability	Poor • Limited space • Additional space for digestate storage would be required with option to be located at the WBPF site • Close to the existing sludge holding tank and dewatering facility allowing for beneficial reuse and easy transfer of sludge and digestate	Good • Adequate space • Adequate space for digestate storage • Farther from the existing sludge holding tank and dewatering facility

Evaluation Criteria	Alternative No. 1: Lou Romano Water Reclamation Plant	Alternative No. 2: Windsor Biosolids Processing Facility
	• Increased construction complexity and site restrictions due to underground utilities	
Social & Natural Environment	Very Good • Land zoned for heavy industrial use • Far from residential areas • Anticipated to have no significant impact to archaeological sites or areas of archaeological potential (based on Stage 1 AA findings). • Anticipated to have no significant impact to built heritage resources or cultural heritage landscapes (based on screening checklist).	Very Good • Land zoned for heavy industrial use • Far from residential areas • Anticipated to have no significant impact to archaeological sites or areas of archaeological potential (based on Stage 1 AA findings). • Anticipated to have no significant impact to built heritage resources or cultural heritage landscapes (based on screening checklist).
Economic	Very Good • Similar capital cost • Similar O&M cost	Very Good • Similar capital cost • Similar O&M cost
Overall	Good	Very Good

Based on this analysis, the Windsor Biosolids Processing Facility Site appears to be preferred. Benefits of this alternative include that there is adequate space for the anaerobic digestion facility and digestate storage to service current and future biosolids processing needs. Although the LRWRP site provides the opportunity to reutilize the existing sludge holding tank and dewatering facility there are limitations to the site use due to underground utilities.

6.6 DIGESTATE HANDLING

In this section of the report, alternative design concepts for the handling of digestate from the anaerobic digestion facility will be identified and evaluated leading to the selection of the recommended design. With the implementation of an anaerobic digestion facility alternative methods must be assessed to determine the preferred digestate handling, transportation, solids disposal, and liquid treatment method.

The following sections will outline and evaluate alternatives for the management of digestate:

Alternative No. 1: Windsor Biosolids Processing Facility

Alternative No. 2: Storage and Land Application

The liquid fraction of digestate, also known as supernatant, has a high concentration of nitrogen which must be treated prior to ultimate disposal. Typically, this supernatant is separated from the digestate by centrifuge and then can be transferred to the headworks of a WWTP for treatment. In some cases, the high nitrogen content of the supernatant may strain the plants secondary treatment process and sidestream treatment must be considered before it is directed to the headworks. Alternatives which may be used for this sidestream treatment include (i) physiochemical options i.e., air stripping, membrane contactor, ion exchange, breakpoint chlorination, or precipitation, and (i) biological options i.e., full nitrification (with or without denitrification, partial nitrification (with or without denitrification), or deammonification. Advanced oxidation processes such as ozonation, hydrogen peroxide, and/or UV light are not considered viable methods for sidestream treatment. Based on the anticipated concentration of nitrogen in the supernatant and the average daily flow at the LRWRP sidestream treatment is not recommended at this time and should be further evaluated during the detailed design process.

6.6.1 Alternative No. 1: Windsor Biosolids Processing Facility

Under this strategy, the remaining material from the anaerobic digesters would be dewatered via centrifuge and then transferred to the existing WBPF to be further processed. At the WBPF, the digestate would be heat dried and pelletized to remove moisture, stabilize the sludge, and produce a Class A fertilizer product. The fertilizer may be stored at the existing WBPF and then sold throughout Southwestern Ontario. The simple process schematic for this alternative is shown in

Figure 6.5.

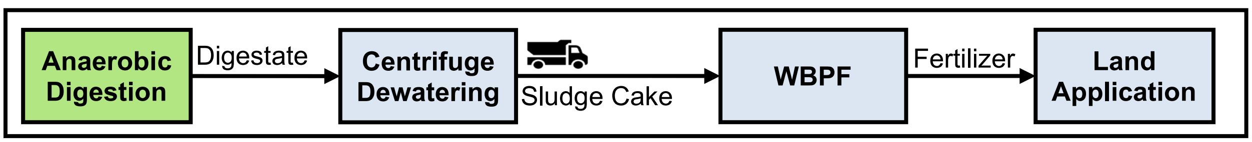


Figure 6.5: Process Schematic for Digestate Handling at the WBPF

Benefits of this digestate handling strategy include the ability to produce a Class A fertilizer product without the need for sludge pretreatment. This strategy can be implemented within a small footprint and at low to no capital cost. The capital cost of this option may increase if optional improvements are implemented at the WBPF to improve the energy efficiency of the drying process. In addition, the WBPF will continue to produce revenue from the sale of the fertilizer product. Retaining the pelletizing process at the WBPF is beneficial as there is a proven market for pelletized fertilizer as compared to bulk sludge fertilizer and the storage space required is significantly lower. The pelletized fertilizer product contains very little moisture, is easy to handle and transport and requires much less storage space than dewatered sludge.

Currently, there are higher energy requirements and costs for the processing of digestate at the WBPF due to the need to buy large quantities of natural gas for the heat drying process. In turn, burning the natural gas releases excessive amounts of GHGs to the atmosphere. If biogas from the anaerobic digestion process was used to heat/power the drying process at the WBPF this would greatly offset the energy requirements, reduce the operating costs, and minimize GHG emissions.

Drawbacks of this digestate handling strategy include that it has more complex operation and maintenance requirements. Significant upgrades, such as the replacement of the rotary drum dryer, may be required in the future to improve the energy efficiency of the drying process. The WBPF was built in 1999 (approximately 24-years old) and is operated by Synagro under a service contract expiring in 2029.

Generally speaking, the WBPF has been well maintained throughout its service life and may remain operational for some additional time after the expiration of the servicing contract. The processes utilized at the WBPF are aging and are maintenance intensive; therefore, this facility may be taken out of service in the long-term. The WBPF can continue to be used for the remainder of its useful life and the decommissioning of this facility should be reconsidered as process failures occur or significant upgrades are required.

6.6.2 Alternative No. 2: Storage and Land Application

Under this strategy the remaining material from the anaerobic digesters would be dewatered via centrifuge and then stored prior to land application. If pretreatment is not employed at the anaerobic digestion facility the dried material would be classified as a Class B fertilizer which may be land applied or stored at the anaerobic digestion facility when land application is not possible. Storage of Class B material may be required when land application is not possible such as during the winter months, inclement weather, unsuitable soil conditions, and/or other adverse conditions. Class B fertilizer materials may be temporarily stored for less than one week at the application site prior to land application. If pretreatment is employed at the anaerobic digestion facility the dried material would be classified as a Class A fertilizer which may be land applied or stored at the anaerobic digestion facility or at the application site prior to land application. The fertilizer may be stored on-site (Class B) or off-site (Class A) and sold throughout Southwestern Ontario. The simple process schematic for this alternative is shown in

Figure 6.6**.**

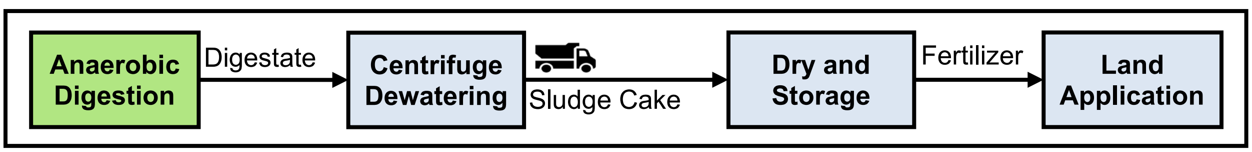


Figure 6.6: Process Schematic for Digestate Storage and Land Application

Benefits of this strategy include that it is a viable long-term solution for digestate handling requirements. This process has minimal construction requirements and may be implemented within a moderate footprint. In addition, this strategy would have simple operation and maintenance requirements with low energy input demands. The sales of fertilizer product will produce revenue for the City of Windsor.

Drawbacks of this digestate handling strategy include that sludge pretreatment is required to produce a Class A fertilizer. Without pretreatment the fertilizer would be classified as Class B which is not as marketable as Class A fertilizers. Developing a market for the dewatered sludge product may face some difficulty due to the more complex and costly systems for handling, transportation, and application of the product. Due to the requirement for a pretreatment unit, this strategy would require a larger capital cost investment.

6.6.3 Evaluation of Digestate Handling Alternatives – Solids Disposal

The evaluation of the alternative digestate handling concepts is shown in **Table 6.5**.

Table 6.5: Evaluation of Alternative Solids Disposal Concepts

Evaluation Criteria	Alternative No. 1: Windsor Biosolids Processing Facility	Alternative No. 2: Storage and Land Application
Technical Suitability	Good • Production of Class A fertilizer product • Highly marketable fertilizer product with proven sales record • More complex O&M • Short to medium-term solution • Upgrades may be required to improve the energy efficiency of the WBPF	Very Good • Production of Class B fertilizer product • Potential for Class A fertilizer with sludge pretreatment • Less marketable fertilizer product • Simple O&M • Long-term solution • Minimal construction requirements
Social & Natural Environment	Fair • Higher energy requirements • Small footprint	Very Good • Low energy requirements • Moderate to small footprint
Economic	Good • Low capital cost (some upgrades may be required to if the City would like to improve energy efficiency) • Moderate O&M cost • Revenue from fertilizer	Good • Moderate capital cost (pretreatment unit required to produce Class A fertilizer) • Low O&M cost • Revenue from fertilizer
Overall	Good	Very Good

Storage and land application of the digestate material appears to be the most preferred because it is a viable long-term solution with simple operation and maintenance requirements, low energy demand, and minimal construction requirements. Implementation of a pretreatment unit (which is necessary for the storage and land application of digestate) may be limited by the available budget for this project. If there are budgetary restrictions, it would be recommended to continue to use the WBPF as an interim solution. The long-term solution for the management of digestate material should be further explored during the detailed design period or as additional funding becomes available.

6.7 BIOGAS ULTILIZATION

In this section of the report, alternative design concepts for biogas-to-energy technologies or biogas utilization strategies will be identified and evaluated leading to the selection of the recommended design. The gas produced from the anaerobic digesters is a form of renewable energy resource commonly referred to as 'biogas' which can be used as a source for the production of heat, electricity, and/or fuel. Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities. A quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions is presented in **Section 5.8**.

The quantity and quality of the biogas production at a facility is directly related to the quantity and quality of feedstock materials (sludge characteristics) as well as the operating conditions of the digester. The volatile solids loading may be used to characterize digester performance and estimate volume of biogas production. Biogas is collected in the digester headspace prior to biogas pretreatment and use in a biogas-to-energy technology. The digester headspace is typically maintained below 3 kPA and if the biogas demand is exceeded, excess biogas is flared to regulate pressure. Alternative biogas-to-energy technologies or biogas utilization strategies include: (1) on-site generation of heat via a boiler; (2) on-site co-generation of combined heat and power via reciprocating engines; (3) upgrade to renewable compressed natural gas and utilize as an alternative fuel in fleet vehicles; and (4) upgrade to renewable natural gas and inject to natural gas pipeline. An overview of the anaerobic digestion process and alternative biogas utilization strategies are shown in Figure 4.4.

With the implementation of an anaerobic digestion facility, alternative methods must be assessed to determine the preferred method for processing, conditioning, and utilizing biogas efficiently. The following sections will outline and evaluate the following alternative solutions:

Alternative No. 1: Heat (via boiler)

Alternative No. 2: Combined Heat and Power

Alternative No. 3: Renewable Compressed Natural Gas

Alternative No. 4: Renewable Natural Gas

6.7.1 Alternative No. 1: Heat (via boiler)

Biogas produced by the anaerobic digesters can be utilized with little to no processing by being burned on-site to power boilers. Under this strategy, conditioned biogas from the anaerobic digesters may be used for direct combustion via a boiler to produce heat. This heat may be used to maintain the operation of the anaerobic digesters at approximately 37 °C and excess gas may be used to supply heat to buildings at the WBPF and LRWRP during the colder months. If the heating requirements for the facility are significantly less than the heat produced from the anaerobic digestion, excess biogas must be flared to maintain operating conditions. This would result in poor biogas utilization and negates the environmental and economic benefits of implementing the anaerobic digesters. The biogas yield for this facility is anticipated to exceed the heating requirements at the anaerobic digestion facility and LRWRP; therefore, this would not be a favourable option.

Benefits of utilizing biogas in boilers include that it is a simple, proven, and reliable technology with minimal operations and maintenance requirements. Further, this alternative may be supplied within a small footprint at a low capital cost. Boilers would provide an opportunity for energy savings during the winter months (when heating demand is higher) and offset the GHG emissions by displacing grid power during this time.

However, a major drawback of this technology is the poor biogas utilization which counteracts the benefits listed above.

6.7.2 Alternative No. 2: Combined Heat and Power

Combined Heat and Power (CHP), also known as cogeneration, is a process for the concurrent production of electrical energy and thermal energy (heating and/or cooling) from a single fuel source. Heat is produced as a by-product of electricity generation from the combustion of the selected fuel source, in this case biogas. In the power conversion process, it is typical for the thermal energy (heat) produced to be equal to or greater than the electrical power generated. The recovery and beneficial use of thermal energy via CHP is what makes this process highly energy efficient. CHP has been successfully implemented in many wastewater treatment plants with anaerobic digestion and biogas utilization. Under this strategy, conditioned biogas from the anaerobic digesters may be used for direct combustion via reciprocating engines or turbines to produce heat and electricity. This heat may be used to maintain the operation of the anaerobic digesters at approximately 37 °C, heat the drying process at the WBPF, and supply heat to buildings at the WBPF and LRWRP during the colder months. In addition, the electricity produced in this process may be used to support anaerobic digestion and other processes at the WBPF or LRWRP.

Benefits of CHP are that it is a proven and reliable technology which has widescale applications in North America. This system has less complex operation and maintenance requirements when compared to the renewable natural gas alternatives. CHP can be implemented at the anaerobic digestion facility within a small to moderate footprint and at a moderate capital cost. The main benefit of CHP is that it produces more useful energy (in the form of electricity) than if biogas was used solely for heat demands for anaerobic digestion, WBPF, and LRWRP processes. This improves biogas utilization and enhances the heat and power reliability of the facility. CHP can provide energy and cost savings by displacing electricity or fuels purchased for the LRWRP and WBPF. This displacement of purchased energy reduces the carbon footprint of the City of Windsor corporation and reduces the emissions of GHGs and other air pollutants.

6.7.3 Alternative No. 3: Renewable Compressed Natural Gas

Biogas which has been conditioned and upgraded to remove carbon dioxide, water vapor, and other trace gases such that it meets natural gas quality and compressed is known as Renewable Compressed Natural Gas (R-CNG). R-CNG can be utilized for fleet vehicles as a renewable alternative to traditional fossil fuels in heavy or light duty vehicles. This process is beneficial when the cost of petroleum-based fuels is significantly more than that for R-CNG. To further improve the economics of this strategy, R-CNG is best suited for use in fleet vehicles that return to a single location of refueling. This will allow for the construction and maintenance of a single R-CNG fueling station. Under this strategy, biogas from the anaerobic digesters would undergo conditioning and upgrading to RNG. Next this RNG would be compressed, stored, and dispensed for use as an alternative fuel source for City of Windsor fleet vehicles.

The implementation of R-CNG will include consideration for compression requirements; onsite storage; construction of a central dispensing station; purchasing or upgrading fleet vehicles with engines design for R-CNG; and maintenance garage. Additional considerations for the construction and operation of a dispensing station include safety considerations for onsite storage of a compressed explosive gas (tank sizing, weatherizing, etc.); operating staff and security; increased truck traffic to and from the dispensing facility; and permitting, zoning, bylaws, regulations, certifications, etc.

Benefits of R-CNG include that it is a proven and reliable technology with full-scale applications in Ontario (Hamilton, Ontario). This strategy can be implemented within a moderate footprint at the anaerobic digestion facility. R-CNG allows for improved biogas utilization and enhances the fuel reliability for the City of Windsor. R-CNG can provide energy and cost savings by displacing fuels purchased by the City. This displacement of traditional fossil fuels also reduces the carbon footprint of the City of Windsor corporation and reduces the emissions of GHGs and other air pollutants.

Drawbacks of R-CNG include that it has more complex operation and maintenance requirements when compared with boilers or CHP. In addition, this alternative would require a higher capital cost investment due to the need to construct a biogas conditioning and upgrading station as well as the cost for the R-CNG storage / fueling station and the upgrading or purchasing of C-RNG compatible fleet vehicles. The biogas conditioning and upgrading unit as well as the fueling station would require specialized operating and maintenance staff.

6.7.4 Alternative No. 4: Renewable Natural Gas

Biogas which has been conditioned and upgraded to remove carbon dioxide, water vapor, and other trace gases such that it meets natural gas quality is known as Renewable Natural Gas (RNG). RNG, also referred to as biomethane, can be injected into existing natural gas grids and used as a renewable alternative to conventional natural gas. Under this strategy, biogas from the anaerobic digesters would undergo conditioning and upgrading to RNG and would be injected to the nearest natural gas pipeline. In Ontario, 100% of RNG production is sold to the pipeline and then repurchased at a discounted price to heat and/or power the treatment processes at the LRWRP, WBPF, and anaerobic digestion facility. Utility providers across Canada have been showing increasing interest in RNG and have set goals to include a five percent blend of RNG in natural gas grids by the year 2025 and ten percent by 2030.

The implementation of RNG will include consideration for onsite storage; connection and distance to natural gas grid; and construction of an injection station. Additional considerations for the construction and operation of an injection station include safety considerations for onsite storage of an explosive gas (tank sizing, weatherizing, etc.); operating staff and security; and permitting, zoning, bylaws, regulations, certifications, etc.

Benefits of RNG include that it is a proven and reliable technology with full-scale applications in Ontario (Hamilton, Ontario). This strategy can be implemented within a moderate footprint at the anaerobic digestion facility. RNG allows for improved biogas utilization and enhances the heat and power reliability of the anaerobic digestion facility, LRWRP, and WBPF. RNG can provide energy and cost savings by displacing electricity and fuels purchased for the LRWRP and WBPF. This displacement of purchased energy reduces the carbon footprint of the City of Windsor corporation and reduces the emissions of GHGs and other air pollutants.

Drawbacks of RNG include that it has more complex operation and maintenance requirements when compared with boilers or CHP. In addition, this alternative would require a higher capital cost investment due to the need to construct a biogas conditioning and upgrading station as well as the cost for the RNG storage and injection station. The biogas conditioning and upgrading unit as well as the injection station would require specialized operating and maintenance staff.

6.7.5 Evaluation of Biogas Utilization Alternatives

The evaluation of the alternative biogas utilization concepts is shown in **Table 6.6.**

Table 6.6: Evaluation of Alternative Biogas Utilization Concepts

Evaluation Criteria	Alternative No. 1: Heat (via boiler)	Alternative No. 2: Combined Heat and Power	Alternative No. 3: Renewable Compressed Natural Gas	Alternative No. 4: Renewable Natural Gas
Technical Suitability	Fair • Proven and reliable • Less complex O&M • Poor biogas utilization if heat requirements are significantly less than heat production	Very Good • Proven and reliable • Less complex O&M • Improved biogas utilization	Fair • Proven and reliable • Complex O&M • Improved biogas utilization • Requires specialized staff • Requires construction and O&M of biogas upgrading unit and R-CNG fueling station	Fair • Proven and reliable • Complex O&M • Improved biogas utilization • Requires specialized staff • Requires construction and O&M of biogas upgrading unit and RNG injection station
Social & Natural Environment	Good • Small footprint • Enhances heating reliability • Less reduction in emissions of GHG and other air pollutants due to poor biogas utilization	Very Good • Moderate footprint • Enhances heating and power reliability • Reduces emissions of GHG and other air pollutants by displacing grid power	Good • Moderate footprint • Enhances fuel reliability • Reduces emissions of GHG and other air pollutants by displacing fossil fuel • Complex permitting requirements	Good • Moderate footprint • Enhances power reliability Reduces emissions of GHG and other air pollutants by displacing grid power • Complex permitting requirements
Economic	Good • Low capital cost • Low O&M cost • Low energy cost savings	Good • Moderate capital cost • Moderate O&M cost • Energy cost savings	Poor • High capital cost • Moderate O&M cost • Fuel cost savings	Poor • High capital cost • Moderate O&M cost • High energy cost savings
Overall	Good	Very Good	Fair	Fair

Combined heat and power appear to be the most preferred because it is a proven and reliable technology with potential for improved biogas utilization, energy savings, and reduction in GHG emissions. CHP can be implemented at the anaerobic digestion facility within a small to moderate footprint and at a moderate capital cost.

Alternative No. 3 and 4, are considered viable options for the biogas utilization; however, the capital cost requirements for implementing these solutions were considered a major limiting factor. Should Governmental Funding Programs or Industrial Partnerships (for example, Enbrige Gas Inc.) become available to offset the capital cost requirements these solutions may be considered as favourably as combined heat and power.

7.0 PREFERRED DESIGN

7.1 OVERVIEW OF PREFERRED DESIGN

The recommended design concepts that form the overall recommended design are summarized in **Table 7.1. Section 6.0** identified, evaluated, and reported on: (1) Sludge Handling Strategies, (2) Sludge Pretreatment Technologies, (3) Type of Anaerobic Digestion, (4) Site Selection, (5) Digestate Handling Strategies, and (6) Biogas Utilization Technologies. The recommended design meets the sludge handling requirements determined in **Section 2.4** of this ESR. The anaerobic digestion facility will be design with an initial capacity of 24,000 tDS/yr and potential for future expansion to 35,000 tDS/yr. The current biosolids loads is 11,000 tDS/yr; therefore, the proposed facility will have interim capacity for the co-digestion with supplementary feedstocks.

Table 7.1: Overview of Preferred Design Concepts

No.	Design Concept	Recommendation
1	**Sludge Handling**	**Trucking LRPCP Sludge Cake** Benefits Include: • More suitable solids content with the increased control over the solid's concentration fed to the pretreatment unit or anaerobic digesters; • Improved flexibility to meet current and future solids handling needs; • No construction requirements and no capital cost investment; and • Avoids negative social, economic, and natural environmental impacts of installing a long forcemain from the LRPCP to the LRWRP.
2	**Sludge Pretreatment**	**Thermal Sludge Pretreatment** Benefits Include: • Accelerated sludge hydrolysis and improved performance of subsequent anaerobic digestion; • Enhanced digestion rate resulting in shorter retention time, smaller digesters' footprint, more biogas production, sludge disinfection, enhanced dewaterability, and Class A biosolids production; • Proven and reliable technology with full-scale applications in operation throughout North America; and • Highly robust and resilient treatment technology. If there are budgetary restrictions, it would be recommended to implement the anaerobic digestion facility without pretreatment as an interim solution.
3	**Type of Anaerobic Digestion**	**Mesophilic Anaerobic Digesters** Benefits Include: • Highly proven and reliable technology which makes up vast majority, approximately 90 %, of anaerobic digestion processes employed for the digestion of wastewater sludge from municipal WWTPs; • High process stability with less complex operations and maintenance requirements; • Moderate process footprint requirements; • Lower capital and O&M cost in comparison to the alternatives; and

		• More socially favourable with less odour potential in the digestate material.
4	**Site Selection**	**WBPF Site** Benefits Include: • Adequate space for current and future processing needs; • Land zoned for heavy industrial use and located far from residential areas; and • No construction concerns regarding underground utilities.
5	**Digestate Handling**	**Solids Disposal - Storage and Land Application** Benefits Include: • Viable long-term solution for digestate handling requirements; • Minimal construction requirements which may be implemented within a moderate footprint; • Simple operation and maintenance requirements; and • Low energy input requirements. If there are budgetary restrictions, it would be recommended to continue to use the WBPF as an interim solution until sludge pretreatment can be implemented. The long-term solution for the management of digestate material should be further explored during the detailed design period or as additional funding becomes available.
6	**Biogas Utilization**	**Combined Heat and Power** Benefits Include: • Proven and reliable technology; • Less complex operation and maintenance requirements (in comparison to RNG and R-CNG); • Simple construction within a small to moderate footprint; • Moderate capital cost; • Improved biogas utilization that enhances heat and power reliability of the facility; and • Displaced electricity and/or fuel purchased for the LRWRP and WBPF leading to energy savings, cost savings, and reduction of GHG emissions.

The simple process schematic for the preferred design is shown in **Figure 7.1**. The proposed biosolids management strategy would operate with the following sludge handling protocol. Liquid sludge from the LRPCP would be centrifuged onsite and then trucked via tractor trailer to a sludge holding tank at the anaerobic digestion facility. Whereas the liquid sludge from LRWRP would be removed from the treatment process and directly pumped to the nearby anaerobic digestion facility. The liquid sludge from the LRWRP would be mixed with sludge cake from LRPRP in the sludge holding tank, diluted/thickened (as necessary), input to the pretreatment process, and then fed to anaerobic digestion. Under this strategy the anaerobic digestion facility would be located in the lot next to the existing WBPF.

The sludge pretreatment method selected for the anaerobic digestion facility is thermal pretreatment via the thermal hydrolysis process. After the preheating, heating and batch reaction, and depressurizing phases of THP, pretreated sludge will be fed to the mesophilic anaerobic digesters. From the anaerobic digestion process the (i) residual solids, digestate, must be processed for final disposal and (ii) biogas must be processed for utilization. Implementation of a pretreatment unit for the anaerobic digestion site may be limited by the available budget for this project. If there are budgetary restrictions, it would be recommended to implement the anaerobic digestion facility without pretreatment as an interim solution. When budgetary funding becomes available or during the detailed design process it is recommended that pretreatment options be further explored.

In terms of the digestate handling, in the short to medium-term, material would be dewatered at a new dewatering facility at the anaerobic digestion site (via centrifuge) and then transferred to the existing WBPF to be further processed. No sidestream treatment is required for the liquid fraction of digestate material, supernatant. As such this liquid fraction may be directed to the headworks of the LRWRP for treatment. At the WBPF the digestate would be heat dried and pelletized to remove moisture, stabilize the sludge, and produce a Class A fertilizer product. The fertilizer may be stored at the existing WBPF and then sold throughout Southwestern Ontario. In the long term, pretreatment of sludge would be employed to upgrade the biosolids classification from Class B to Class A. With this strategy digestate would be dewatered and the resulting fertilizer may be (i) immediately land applied, (ii) stored at the anaerobic digestion facility, or (iii) stored at the application site prior to land application. The long-term solution for the management of digestate material should be further explored during the detailed design period or as additional funding becomes available.

Conditioned biogas from the anaerobic digesters may be used for direct combustion via reciprocating engines or turbines to produce heat and electricity. This heat may be used to maintain the operation of the anaerobic digesters at approximately 37 °C, heat the WBPF rotary drum dryer, and supply heat to buildings at the WBPF and LRWRP during the colder months. In addition, the electricity produced in via this process may be used to support anaerobic digestion and other processes at the LRWRP.

Based on the MECP Guideline D-2 'Compatibility between Sewage Treatment and Sensitive Land Use' and the capacity of the LRWRP (greater than 25,000 m^3/d) a separation distance greater than 150 meters may be required from sensitive land uses. Sensitive land uses may be generally defined as a building, amenity area, or outdoor space where routine or normal activities occurring at reasonably expected times would experience 1 or more 'adverse effect(s)' from contaminant discharges generated by a nearby 'facility'. This includes:

- Residences or facilities where people sleep (e.g., single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.).
- Institutions (e.g., schools, churches, community centers, day care centers).
- Certain outdoor recreational uses deemed by a level of government to be sensitive (e.g., trailer park, picnic area, etc.).
- Certain agricultural operations (e.g., cattle raising, mink farming, cash crops and orchards).
- Bird/wildlife habitats or sanctuaries.

The nearest sensitive land use receptor to the proposed facility is greater than 800 meters away. Therefore, the facility will be located at an adequate separation distance. The high-level conceptual layout for the facility and a 150 meter buffer zone is shown in **Figure 7.2**.

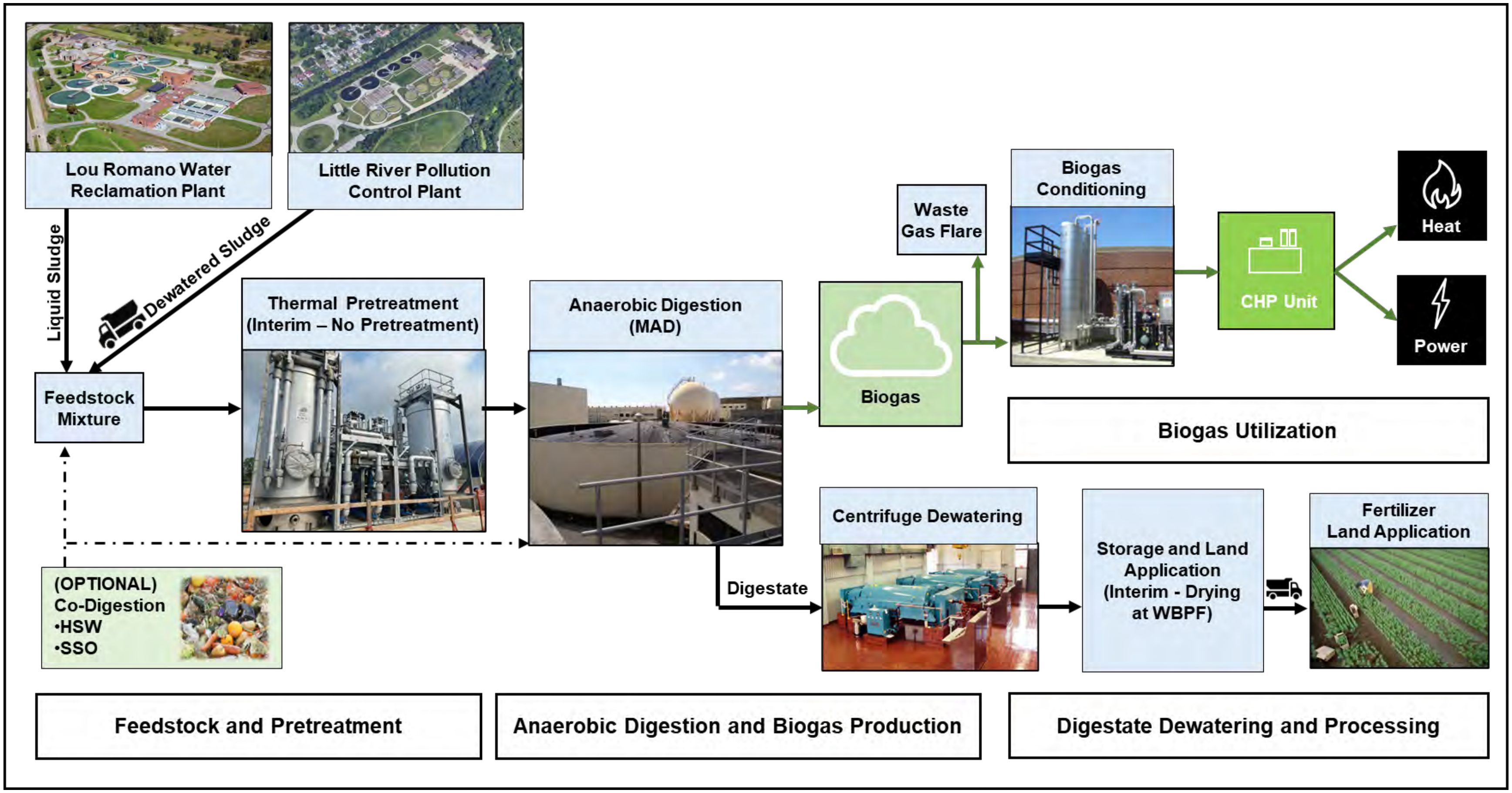


Figure 7.1: Process Schematic for the Preferred Design

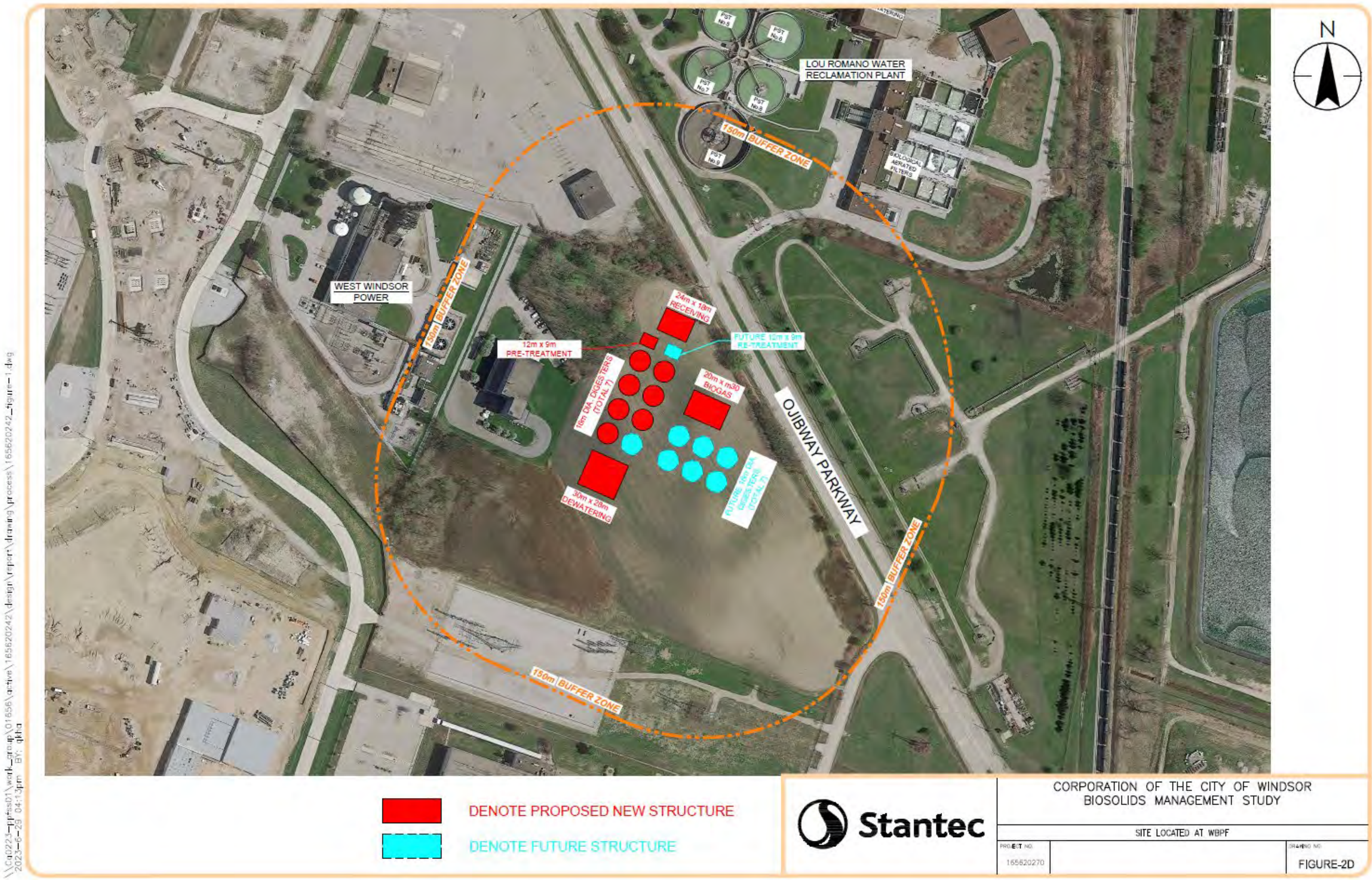


Figure 7.2: Conceptual Layout for the Preferred Design with Buffer Zone

7.2 CO-DIGESTION OF BIOSOLIDS AND SSO

In recent years, many municipalities have implemented integrated organics management. This involves processing both municipal waste sludge and organic wastes within one biosolids management facility. The focus in not only processing the wastes, but also maximizing the recovery of their remaining value in the form of electricity, thermal energy, and/or fuel. Based on the evaluation presented in **Section 5.8**, significant energy savings and GHG reductions can be achieved through anaerobic co-digestion of wastewater biosolids and supplementary organic feedstock materials (i.e., SSO waste). The co-digestion process would move the LRWRP and LRPCP towards a net-zero energy future, provide energy savings to the City of Windsor, and reduce GHG emissions. It is strongly encouraged for the City of Windsor to accept municipal and ICI supplementary feedstock materials at this facility.

The proposed anaerobic digestion facility would be designed to have the capability to meet current and future biosolids management needs. The anaerobic digestion facility will be design with an initial capacity of 24,000 tDS/yr and potential for future expansion to 35,000 tDS/yr. The current biosolids load (historic average) is 11,000 tDS/yr; therefore, the proposed facility will have interim capacity for co-digestion with supplementary feedstocks. Pretreatment of supplementary materials will be required prior to being fed to the anaerobic digesters and is not included in the layout or opinion of probable cost for the anaerobic digestion facility. Prior to detailed design of the anaerobic digestion facility, the inclusion of supplementary feedstock materials should be confirmed.

7.3 PROJECT DELIVERY METHOD

Standard project delivery methods which may be utilized for the implementation of the anaerobic digestion facility are outlined in **Table 7.2**.

Table 7.2: Common Project Delivery Methods

Project Delivery Method	Description
Design-Bid-Build	Traditional project delivery method that involves a design team and a general contractor working directly for the owner under separate contracts. • Advantages of this method include that it is common/familiar to most construction professionals, owners retain a high level of control over design, and often result in lower project cost (due to competitive nature of bidding). • Disadvantages include that the contractor is not involved in the design process often resulting in discrepancies, change orders, and disagreements between parties.
Design-Build	Project delivery method that employs a single firm to handle the design and construction aspects of a project for the owner under a single contract. • Advantages of this method include that the process may be more efficient due to collaboration between the design and construction teams. • Disadvantages include that it is less familiar to most construction professionals as well as potential conflicts of interest between parties. Namely the contractor who would like to minimize cost and the owner who would like a high-quality solution.

Public-Private Partnership	Project delivery method that involves a private company and a government entity to collaborate on a project. • Advantages of this method include private-sector expertise in the desired construction as well as potential for outside funding. • Disadvantages include that projects may be delayed or impacted by changes in priorities of the funding source.
Integrated Project Delivery	Project delivery metho that involves multiple stakeholders performing work under a single predetermined contract. Risk and responsibility are divided equally amongst the stakeholders. • Advantages of this method include improved collaboration amongst all stakeholders and sharing of risk amongst all parties. • Disadvantages include that this is a relatively new method which may not be familiar to construction and design professionals. In addition, selection of a qualified designer and contractor is essential to project success.

Generally speaking, Design-Bid-Build is considered the traditional or standard method for project delivery. For the implementation of the proposed anaerobic digestion facility, additional project delivery methods may be considered by the City of Windsor. Alternative project delivery methods may be considered more desirable if there is an opportunity for external funding.

7.4 IMPLEMENTATION SCHEDULE

The WBPF was built in 1999 (approximately 24-years old) and is operated by Synagro under a service contract expiring in 2029. Generally speaking, the WBPF has be well maintained throughout its service life and may remain operational for some additional time after the expiration of the servicing contract. The processes utilized at the WBPF are aging, require high energy and resource input, and are maintenance intensive; therefore, this facility will be taken out of service in the long-term. The WBPF can continue to be used for the remainder of its useful life and the decommissioning of this facility should be reconsidered as process failures occur or as significant upgrades become required.

Ideally, the proposed anaerobic digestion facility would be in operation prior to the expiration of the existing WBPF servicing contract (2029). In order to meet this deadline, it is recommended to proceed directly with the implementation of the anaerobic digestion facility. The design, construction, and testing/operation of the facility may be completed within the desired implementation timeline.

7.5 OPINION OF PROBABLE COST

This section discusses an opinion of probable cost for the recommended design solution. The opinion of probable cost is an estimate of the future contract price for the engineering and construction work, which is not yet fully defined and may be subject to changes in scope, design, and market conditions.

7.5.1 Level of Accuracy

Opinions of probable cost are commonly provided throughout various stages of a project lifecycle and there are a number of classifications for these estimates that identify the level of accuracy. These classifications can vary based on the industry, but all are based on the fact that the level of accuracy is directly proportional to the level of detail available at each stage of the project.

The level of accuracy for the opinion of probable cost increases as the project moves from the planning stage to the preliminary design and final design. A wide range of accuracy is expected at the planning stage of a project because a number of details remain unknown. As the project moves closer to completion and final design, the estimate would become more accurate due to the increased level of detail and the reduced number of unknowns.

Table 7.3 includes a summary of typical estimate classifications used throughout a project's development including a description of the project stage and range of accuracy. The opinions of probable cost in this study are estimated at the study stage (Class 2) and the corresponding level of accuracy could range from –15% to +30% from the opinion presented in the report.

Table 7.3: Classification of Cost Estimates

Class	Description	Level of Accuracy	Stage of Project Lifecycle
1	Conceptual Estimate	+50% to -30%	Screening of alternatives.
2	Study Estimate	+30% to -15%	Planning and/or environmental assessment report.
3	Preliminary Estimate	+25% to -10%	Preliminary design report.
4	Detailed Estimate	+15% to -5%	Final design report and specifications.
5	Tender Estimate	+10% to -3%	Estimate received from the contractor in response to the Tender.

7.5.2 Opinion of Probable Cost for Preferred Solution

A capital budget estimate (in 2023 dollars) is summarized in **Table 7.4**. In addition to the level of accuracy discussed, the opinion of probable cost was prepared taking into consideration the following factors.

- All estimates are 2023 Canadian dollars based on an Engineering News Record (ENR) Construction Cost Index of 1200.
- It is assumed that the Contractor will have unrestricted access to the site and will complete the work during normal working hours from 7:00 am to 6:00 pm Monday to Friday. There is no allowance for premium time included. Labour costs are based on union labour rates for the Windsor area. Bulk material and equipment rental costs used are typical for the Windsor area.
- An allowance is included for mobilization and demobilization and the Contractor's overhead and profit.
- Equipment costs are based on vendor supplied price quotations and historical pricing of similar equipment.
- The estimate does not include the cost of application or permit fees. No allowance is included for interim financing costs or legal costs. No allowance is included for escalation beyond the date of this report.
- Allowances for engineering and contingency allowances (approximately 30% and 15%, respectively) are included in the estimate.

- It is not known whether contaminated soil conditions or presence of archaeological resources may be encountered in the areas proposed for the facilities. The potential impact cannot reasonably be determined at this point and no allowance is included in the estimate.
- Does not include any cost for pretreatment of supplementary feedstock materials (if they are chosen to be accepted at this facility).

Table 7.4: Opinion of Probable Capital Cost for Preferred Solution

Item	Description	Probable Cost
1	Anaerobic Digestion Facility	$ 70,000,000
2	Biogas Utilization Unit	$ 18,000,000
SUBTOTAL		**$ 88,000,000**
Contingency Allowance (30%)		$ 26,400,000
Engineering Allowance (15%)		$ 13,200,000
TOTAL CAPITAL COST (excluding taxes)		**$ 127,600,000**
HST (13%)		$ 16,600,000
TOTAL ANTICIPATED CAPITAL COST (including taxes)		**$ 144,200,000**
Note: **If capital funding is available thermal pretreatment via THP is recommended. The opinion of probable cost for this pretreatment unit is approximately $16,000,000 (which does not include contingency allowance, engineering allowance, or HST).**		

8.0 ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

8.1 OVERVIEW

Table 8.1 provides a summary of potential environmental impacts and proposed mitigating measures for the preferred design. In general, the construction and operation of the recommended design will have a limited effect on the environment. The implementation of the pumping station will be the most disruptive phase of the project due to construction activities. **Table 6.1** identifies potential environmental impacts during construction and corresponding mitigation methods. It is anticipated that the recommended work will not have a significant effect on the natural environment such as wildlife, vegetation, or the habitat characteristics of any particular species.

With respect to other socio-economic impacts, it is anticipated that the preferred alternative will not have any serious lasting impact on existing land uses, cultural activities, heritage resources or any other community program. During the construction phase of this project, it is anticipated that all site locations would result in some level of temporary disruption to the community and nearby residents. The impacts on these impacts will be mitigated through standard construction procedures and mitigation measures outlined below.

Table 8.1 Environmental Effects and Mitigating Measures

OPERATION	EFFECT	MITIGATING MEASURES
Cutting, digging, or trimming ground covers, shrubs, and trees	Reduced terrestrial wildlife habitat quality (i.e., diversity, area, function) and increased fragmentation of habitat.	➢ This is not a concern as there is no significant existing terrestrial wildlife habitat in the proposed area of construction
	Loss of unique or otherwise valued vegetation features	➢ There are no known unique vegetation features in the area that may be disturbed by construction activities. ➢ Where possible, existing vegetation features will be restored to a preconstruction condition.
Trenching / tunnelling for sludge pumping; Excavation and construction for anaerobic digestion facility	Soil erosion and sediment transport to adjacent water bodies causing sedimentation and turbidity of adjacent water bodies and drainage ditches	➢ Use of erosion control measures (i.e., sediment traps, silt fences, etc.) ➢ Collect contaminated runoff ➢ Restore vegetation growth quickly ➢ Stage construction activities to minimize potential of adverse impacts
	Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris.	➢ Apply wet weather restrictions to construction activity. ➢ Comply with any local regulations, policies and guidelines that stipulate a minimum acceptable buffer width (the allowable distance from a water body). Maximum buffer widths are desirable. ➢ If possible, direct surface drainage away from working areas and areas of exposed soils. To the maximum extent possible, promote overland sheet flow to well vegetated areas. ➢ Install and maintain silt curtains, sedimentation ponds, check dams, cofferdams or drainage swales, and silt fences around soil storage sites and elsewhere, as required.

OPERATION	EFFECT	MITIGATING MEASURES
	Loss of vegetation and topsoil and mixing topsoil and subsoil	➢ Restore site by replacing topsoil and reinstate vegetation to prevent erosion
	Removal and/or disturbance of trees and ground flora	➢ Avoid treed areas where possible ➢ Employ tree protection measures ➢ Replace trees and provide site landscaping
	Temporary disruption and inconvenience during construction to adjacent properties, buildings, and inhabitants	➢ Notify public agencies and neighbouring owners of construction activities ➢ Prepare program for reporting and resolving problems ➢ Ensure access is provided for emergency vehicles and personnel ➢ Apply noise and vibration control measures ➢ Apply dust control measures ➢ Control emissions from construction equipment and vehicles ➢ Use silencers to reduce noise ➢ Require compliance with municipal noise by-laws
	Possible need to remove contaminated excavated material.	➢ Sample material. ➢ Handle and dispose of contaminated material in an acceptable manner
	Decreased ambient air quality due to dust and other particulate matter.	➢ Avoid site preparation or construction during windy and prolonged dry periods. ➢ Cover and contain fine particulate materials during transportation to and from the site. ➢ Instruct workers and equipment operators on dust control methods. ➢ Spray water to minimize dust off paved areas or exposed soils. ➢ Stabilize high traffic areas with a clean gravel surface layer or other suitable cover material. ➢ Cover or otherwise stabilize construction materials, debris and excavated soils against wind erosion.
	Disturbance to microscopic organisms in the soil.	➢ Limit the size of stockpiles to avoid anaerobic conditions. ➢ Protect stockpiled soils from exposure to and sterilization by solar radiation (or stockpile in an uncovered shaded area).
	Reduced soil capability through compaction and rutting and mixing of topsoil and layers below.	➢ Avoid working during wet conditions and/or confine operation to paved or gravel surfaces. ➢ Whenever possible, strip and store topsoil separately from the layers below and return to excavation in sequence.
	Industrial disruption of field/facility access.	➢ All driveways, roadways and field access will be restored to pre-construction condition ➢ Staging of construction and advance notice to property owners prior to disruption of construction to minimize inconvenience
	Disruption of tile and surface drainage systems.	➢ Provide for temporary drainage systems until final restoration is accomplished. ➢ Avoid disturbing drainage systems during critical periods. ➢ All existing culverts, tiles, and drainage systems to be restored to pre-construction conditions following construction.

OPERATION	EFFECT	MITIGATING MEASURES
	Reduced water quality of nearby surface waters having value as wildlife habitat.	➢ Use sediment control techniques for stockpiled materials to minimize degradation of water quality.
	Modifications or removal of aquatic habitat.	➢ Stage construction to minimize potential for adverse impacts.
	Residential impacts.	➢ Construction noise and dust impacts will be controlled through noise by-laws and dust control measures in contract specification. ➢ Inconvenience due to temporary loss of property access will be minimized through proper communication and advance notice of disruption. ➢ Pedestrian safety will be maintained through excavation barricades and construction fencing
	Traffic disruption.	➢ Construction activities will attempt to maintain a minimum of one lane of open traffic at all times with necessary detour signage and flag persons. ➢ If complete closure is required, emergency services will be advised in advance and access will be restored at the end of each working day.
	Recreation.	➢ Maintain access to recreational sites during construction. ➢ Locate water and wastewater infrastructure components to minimize impact.

OPERATION	EFFECT	MITIGATING MEASURES
	Archaeological Resources.	➢ A Stage 1 AA was undertaken by Stantec Consulting Ltd. (Stantec) of the WBPF lands (under Project Information Form [PIF] number P422-0031-2023). A property inspection was completed by Stantec archaeologists on March 17, 2023. The WBPF lands were identified as being subject to previous AA in 2006 and 2007 as part of the Detroit River International Crossing project. No archaeological resources were identified during the 2006 and 2007 AAs and no further archaeological work was recommended for the WBPF lands (ASI 2010). Based on this Stage 1 AA, no further AA is recommended. The Stage 1 AA Report is included in **Appendix C**. ➢ Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*. ➢ The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.
	Built Heritage Resources and Cultural Heritage Landscapes	➢ The MCM's "Screening for Impacts to Build Heritage and Cultural Heritage Landscapes" checklist was reviewed. The study area was determined to have low potential for built heritage resources and cultural heritage landscapes.
Use of construction equipment	Contamination of surface waters, drains and public roadways from spills, leaks or equipment refuelling.	➢ Use containment facilities ➢ Inspect equipment regularly for fuel and oil leaks ➢ Clean equipment before it travels off site
	Decreased air quality due to vehicular emissions causing increased concentrations of chemical pollutants.	➢ Minimize operation and idling of vehicles and gas-powered equipment, particularly during local smog advisories. ➢ Use well-maintained equipment and machinery within operating specifications.
	Disruption to wildlife migration and movement patterns, breeding, nesting, or hibernation.	➢ There are no known areas containing sensitive vegetation and wildlife. ➢ There are no known areas where migratory birds are breeding.

OPERATION	EFFECT	MITIGATING MEASURES
	Introduction of non-native vegetation, including opportunistic species.	➢ Clean heavy machinery and equipment prior to transporting to new location.
	Loss of unique or otherwise valued vegetation features	➢ Avoid or minimize trampling vegetation with equipment. ➢ Minimize physical damage to vegetation by avoiding pushouts and avoiding the placement of splash onto living vegetation.
	Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris.	➢ Operate heavy machinery on the shore above the normal water level. ➢ Where possible, conduct activities in the dry, above the actual water level and above any expected rises in water level that may occur during a rainfall or snowmelt event.
	Reduced water quality due to inputs of contaminants from surface runoff during construction and operation.	➢ Refuel equipment off slopes and well away from water bodies. ➢ Securely contain and store all oils, lubricants, fuels, and chemicals. If necessary, use impermeable pads or berms.

8.2 NATURAL ENVIRONMENT IMPACTS AND MITIGATING MEASURES

8.2.1 Standard Mitigation Measures

The following standard mitigation measures/best practices are provided to reduce potential impacts to natural heritage features during construction:

- Delineate the Project footprint with tree protection fencing prior to construction to reduce impacts to adjacent natural features.
- Wash, refuel and/or service equipment a minimum of 30 m from surface waters to reduce the risk of deleterious substances from entering surface waters. Check machinery regularly for fluid leaks.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment / spread of invasive species.
- To reduce the potential for spread of insect pests such as the Emerald Ash Borer, trees cut should be disposed of on site (either through spreading of wood chips or trees cut and sawed into logs).
- Develop a Spill Management Plan and have it on site for implementation in the event of an accidental spill. Keep an emergency spill kit on site.
- Stabilize and re-vegetate areas of disturbed/exposed soil, as soon as practicably possible with native seed mixes and woody vegetation.

- Maintain erosion and sediment control measures until the restoration measures have been assessed and determined to be secure and stable.

8.2.2 Wildlife Protection

The installation of silt fencing around the work area will reduce the likelihood of reptiles entering the work area. In addition, a visual search of the construction area (including machinery) is recommended each day to locate and avoid reptiles, amphibians, and other wildlife. If wildlife is encountered, they will be given reasonable time to flee the area on their own. If a wildlife species must be moved, a person knowledgeable in handling techniques may relocate it to a location that is both safe and suitable.

The following mitigation measures are recommended to avoid impacts to wildlife during Project construction:

- A visual search of the work area will be conducted before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles, and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.
- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.
- Any sediment and erosion control measures, such as fencing or blanket, utilized on the site during construction will avoid products with plastic mesh due to risk of entanglement of snakes or other wildlife.
- Eastern Foxsnake are considered arboreal (climbers) and as such, exclusionary fencing is recommended to be 200 cm in height above ground (MNRF 2016). Specifications for reptile exclusion fencing should follow Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (MNR 2013) and Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario (MNRF 2016). A terrestrial ecologist should be consulted during exclusionary fencing design.
- Any observations of species at risk or species of conservation concern should be reported to MECP and MNRF within 48 hours. Species at risk should not be handled, harassed, or moved in any way, unless they are in immediate danger.
- If wildlife handling and relocation (e.g., amphibians, reptiles) is anticipated during construction such as vegetation clearing or during in-water work, the Contractor must obtain a Wildlife Scientific Collectors Authorization from the MNRF prior to the commencement of work.

8.2.3 Terrestrial Habitat

The proposed work area may contain natural features that may support habitat of endangered species and threatened species. As per Section 2.1.7 of the Provincial Policy Statement (PPS 2020) – "Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements." All issues related to the provincial *Endangered Species Act* and its regulations shall be addressed prior to the construction of the proposed work. If the proponent believes that their proposed activities are going to have an impact on Species at Risk or are uncertain about the impacts, they should contact SAROntario@ontario.ca to undergo a formal review under the Endangered Species Act (ESA). It is the responsibility of the proponent to ensure that Species at Risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site.

A field investigation was carried out to document existing conditions at the proposed work site. The field investigation consisted of vegetation and wildlife habitat assessments. The number, location, and species of bird nests found in trees or vegetated areas that may be affected by the proposed work were documented in the Natural Heritage Impact Assessment Report which is available in **Appendix C**.

8.2.4 Protection of Migratory Birds

The *Migratory Birds Convention Act*, 1995 (MBCA) provides legal protection of migratory birds and their active nests in Canada. The loss of migratory bird nests, eggs and/or nestlings due to tree cutting or other vegetation clearing can be avoided by limiting clearing of vegetation to outside of the general nesting period for migratory birds in this region (C2) as identified by Environment and Climate Change Canada (ECCC) (i.e., between April 1 and August 31). If work must be performed within this window, a survey for active nests or breeding activity should be conducted by a qualified biologist before work commences and additional mitigation measures (e.g., implementation of avoidance distances during construction) implemented, if required.

8.2.5 Protection of Fish and Fish Habitat

Implementation of the following measures will protect fish and fish habitat during construction if in-water work is required:

- Reduce the duration of in-water work to the extent possible.
- Conduct in-water work during periods of low flow to allow work in water to be isolated from flows.
- Schedule in-water work to occur during the applicable in-water work timing window. Based on the fish species known to occur in McKee Creek, in-water work can occur from July 16 to March 14 (no in-water work from March 15 to July 15) (MNR 2013b).
- If in-water work is required, develop, and implement a project-specific fish relocation plan to relocate fish from within an in-water work area. The Contractor must obtain a Licence to Collect Fish for Scientific Purposes from the MNRF prior to the commencement of in-water work.

- Screen water intake pipes to prevent entrainment or impingement of fish following the measures as outlined in DFO's Interim Code of Practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020b).
- Where applicable, manage and treat dewatering discharge to reduce the risk of erosion and/or release of sediment-laden or contaminated water to surface waters.

8.2.6 Erosion and Sediment Control

An erosion and sediment control (ESC) plan should be developed and employed during construction to reduce the risk of erosion and the entry of sediment into surface water and other natural features. Mitigation included in the plan should include the following measures:

- Implement project-specific temporary ESC measures per prior to starting work (e.g. silt fence and/or sediment logs).
- Keep additional ESC materials available on site to provide a contingency supply in the event of an emergency.
- Monitor and maintain erosion and sediment controls, as required. Controls are to be removed only after the soils of the construction area have stabilized and vegetation cover has reestablished.
- Stabilize materials requiring stockpiling (fill, topsoil, etc.) and keep a safe distance (> 30 m) from watercourses.

8.2.7 Excess Soil Materials and Waste

In 2019, the MECP introduced O. Reg. 406/19 entitled 'On-site and Excess Soil Management' under the Environmental Protection Act. All excess soil materials and waste generated during the construction process must be disposed of in accordance with O. Reg. 406/19.

8.2.8 Source Water Protection

For the protection of local municipal drinking water sources, the Essex Region Source Protection Plan (SPP), which has been established under the Clean Water Act, 2006 (Ontario Regulation 287/07), came into effect on October 1, 2015.

The Clean Water Act (2006) refers to four types of Vulnerable Areas, which include:

- Intake Protection Zones
- Wellhead Protection Areas
- Highly Vulnerable Aquifers
- Significant Groundwater Recharge Areas

The types of Vulnerable Areas are addressed further below in relation to this project location.

8.2.8.1 Intake Protection Zones (IPZs)

There is one municipal Water Treatment Plant (WTP) downstream of the proposed anaerobic digestion facility, the Amherstburg Water Treatment Plant. The Amherstburg WTP has an intake in the Detroit River (refer to Map 10 of the Essex Region SPP). Intake Protection Zones are areas of land and water, where run-off from streams or drainage systems, in conjunction with currents in lakes and rivers, could directly impact the source water at the municipal drinking water intakes.

An Intake Protection Zone can be described as a defined area surrounding a surface water body intake. The size and shape of each zone in an IPZ represents either a set distance around the intake pipe, or the length of time it would take water and contaminants to reach the intake:

- IPZ-1 is the area closest to the intake pipe and is a set distance which extends one kilometre upstream and 120 meters onto the shore.
- IPZ-2 includes the on and offshore areas where flowing water and any pollution would reach the intake pipe within two hours.
- IPZ-3 is an area where contaminants could reach the intake pipe during and after a large storm.

The proposed facility is located within the Intake Protection Zone 3 (IPZ-3) of the Amherstburg WTP. As such it is subject to one (1) policy of the Amherstburg IPZ-3:

> *The above grade handling and storage of liquid fuels (containing benzene) in quantities of 3,000,000 L or greater is identified as a Significant Drinking Water Threat (SDWT) in the Amherstburg IPZ-3.*

The anaerobic digestion facility will not require nor result in the handling or storage of large volumes of liquid fuel and therefore is not considered a SDWT.

In addition, the LRPCP, is located in the IPZ-2 for the A.H. Weeks (Windsor) Water Treatment Plant (refer to Map 8 of the Essex Region SPP). The application and storage of hauled sewage is considered a SDWT in this zone and further is prohibited in Windsor IPZ-1 and IPZ-2. No sewage will be applied, transported, or stored as a part of this work.

ERCA is the designated Risk Management Official/Inspector providing Risk Management Services for the ERSPA. Proposed work within this area may require approval by the Essex Region Risk Management Official (RMO) to ensure that threats to potential drinking water are mitigated. The RMO has provided preliminary comments for this project and should continue to be consulted as the project progresses regarding Source Water Protection and the applicable source protection plan policies that may apply to the site.

8.2.8.2 Wellhead Protection Areas

Wellhead Protection Areas are not applicable in the Essex Region, as none of the municipal drinking water systems are supplied by groundwater.

8.2.8.3 Highly Vulnerable Aquifers (HVAs)

Highly Vulnerable Aquifers (HVAs) are defined as aquifers on which external sources have or are likely to have a significant adverse impact and include the land above the aquifer. In the Essex Region Source Protection Area (ERSPA) these HVAs are generally located in the sandy soil areas in the southern part of the region, including most of Pelee Island (refer to Map 4 of the Essex Region Source Protection Plan). The proposed site for this project does not fall within a HVA with high vulnerability (6.0). There are no associated Significant Drinking Water Threats (SDWTs) or policies within this area because the municipal water treatment plant does not use groundwater as its supply.

8.2.8.4 Significant Groundwater Recharge Areas (SGRAs)

Significant Groundwater Recharge Areas (SGRAs) are defined as per Regulation 287/07 as areas within which it is desirable to regulate or monitor drinking water threats that may affect the recharge of an aquifer. Groundwater recharge occurs where rain or snowmelt percolates into the ground and flows to an aquifer. The greatest recharge usually occurs in areas which have loose or permeable soil such as sand or gravel that allows the water to seep easily into the aquifer.

Most of the SGRAs in the ERSPA are in the southern Essex Region in sandy soil areas, such as Harrow, Leamington, Kingsville, and limited parts of the Turkey Creek and Pelee Island subwatersheds (refer to Map 5 of the Essex Region Source Protection Plan). The proposed site for this project does not fall within a SGRA with medium or high vulnerability (4.0 to 6.0). There are no associated Significant Drinking Water Threats (SDWTs) or policies with this area because the municipal water treatment plant does not use groundwater as its supply.

8.2.8.5 Overall Vulnerability Assessment Summary

Table 8.2 provides a summary of threats to vulnerable areas and the subsequent actions to be taken, relating to this project.

Table 8.2: Summary of Threats to Vulnerable Areas

Vulnerable Area	Threat Potential	Action Taken
Intake Protection Zone	Low	None
Wellhead Protection Areas	Not applicable	None
Highly Vulnerable Aquifer	Not applicable	None
Significant Ground Water Recharge Areas	Not applicable	None

Based on the assessment provided above, no further action is recommended to be taken; however, additional action may be taken to address low and moderate threats at the discretion of the Source Protection Committee.

8.3 SOCIO-ECONOMIC IMPACTS AND MITIGATING MEASURES

8.3.1 Archaeological Resources

During the implementation phase of this project, should previously undocumented archaeological resources be discovered, there may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act. If any further archaeological field investigation is required, as identified above, the City will engage with all indigenous communities that have been engaged with to date and will facilitate the participation in archaeological field work (if applicable) via a Fieldwork Participation Agreement.

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

8.3.2 Community

8.3.2.1 Disruption of Traffic

Construction of the proposed facility will result in temporary detours or lane restrictions that will disrupt traffic in the area. All emergency services will be notified of detours prior to commencement of construction. Mitigating measures are to provide and maintain detours, provide for safe alternate routes, and select alternate routes to minimize inconvenience.

8.3.2.2 Inconvenience During Construction

Construction activities will create noise and traffic from construction vehicles resulting in temporary inconvenience to area residents and businesses. The best available construction techniques shall be applied to the construction of the proposed tunnel sewer to mitigate noise and vibration. The noise and vibration limits set for the project will ensure that the community, all buildings, including those with heritage features, are protected. Monitoring during construction will ensure that noise and vibration are kept below the established limit.

8.3.2.3 Proximity to Existing Dwellings

Since the anaerobic digestion facility will include fully enclosed digesters units it does not represent a significant source of odour or noise.

8.3.2.4 Proximity to Arterial Roadway

It is not expected that there will be any significant traffic disruptions during the construction of the proposed work. The EC Row Expressway and Highway 401 are the two major roadways, which provide interconnection and access to Windsor communities and neighboring areas. These roads are located significantly far away from the proposed construction; therefore, it is not expected that there will be any significant traffic disruptions during construction.

8.4 PERMITTING CONSIDERATIONS

8.4.1 Site Plan Approval of the Facility and Associated Civil Work

It will be likely that Site Plan Approval of the facility and the associated works, such as access/egress to and from the facility as well as water, sanitary, and storm water servicing. The preparation of the required plans, drawings, and report will comply with the City's specifications and would be completed together with the above-described environmental compliance work.

Finally, some land use planning work may be required if development of the preferred property for the proposed facility would require Amendment to the City's Official Plan and/or Zoning By-law and provisions.

8.4.2 Essex Regional Conservation Authority

The proposed facility is not located in the Essex Region Conservation Authority (ERCA) regulated area of the Detroit River and McKee Drain and as such may not be subject to the policies of O. Reg. 158/06 under the Conservation Authorities Act. Any excavations, construction of structures, drain crossings, or the placement and grading of fill, undertaken within the regulated area would require permits from ERCA under this regulation (Development, Interference with Wetlands and Alteration to Shorelines and Watercourse Regulations - Section 28 of the Conservation Authorities Act).

The site is partially within the Event Based Area for Source Water Protection and may be subject to Source Water Protection regulations per Section 36 of the *Clean Water Act*. This project may require approval by the Essex Region Risk Management Official (RMO) to ensure that appropriate actions are taken to mitigate any potential drinking water threats.

8.4.3 Ministry of the Environment, Conservation and Parks

The Endangered Species Act, 2007 may identify species at risk as having potential to occur within the study area, however, there is a low likelihood of occurrence because there are no recent records, and the area is heavily disturbed. Avoidance of the migratory bird nesting season (April 1 - August 31) is recommended. If this is not possible, then bird nesting surveys must be completed in advance of construction. With the implementation of this mitigation, no authorizations are needed under the ESA. It is the responsibility of the proponent to ensure that Species at Risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site.

Consultation with MECP once design details and staging plans are available to confirm mitigation measures and determine authorization and mitigation requirements, if any, for provincially regulated species at risk. Consultation with MECP is recommended prior to construction.

The MECP indicated through consultation activities that an Air Environmental Compliance Approval application will be required for the proposed works. In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding Air ECA requirements.

Depending on the area of the new construction as well as municipal requirements a stormwater strategy may be required, which in turn will require an Environmental Compliance Approval application to the ministry. In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding potential ECA requirements. Should a stormwater management strategy and/or ECA application be required, the proponent will obtain an ECA prior to starting the construction of the proposed pumping station.

Facilities that use biogas to produce electricity onsite may be required to obtain a Renewable Energy Approval (REA) per Ontario Regulation 359/09, from the ministry, depending on the fuel mixture and other factors. Proponents proposing to generate electricity using biogas and other organics are encouraged to have a pre-submission meeting with MECP to discuss whether REA or other permissions may apply. Pre-submission meeting requests can be submitted in writing to enviropermissions@ontario.ca. In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding potential REA requirements. Should a REA application be required, the proponent will obtain an REA prior to starting the construction of the proposed work.

8.4.4 City of Windsor – Building Permit

The proposed pumping station is located within the City of Windsor and as such would require a building permit prior to construction. Building permits ensure that construction within our municipality meet the standards set out in the Ontario Building Code. In addition, this permitting process ensures all zoning requirements, fire and structural safety standards, and other building standards are met.

8.5 RECOMMENDED ASSESSMENTS / SURVEYS

8.5.1 Natural Heritage Impact Assessment – Future Survey Recommendations

The following studies are proposed during the detailed design phase to determine if SAR and SOCC are present in the defined study area:

- Birds: Breeding bird surveys – Two surveys during the breeding season, from May to July
- Snakes: Artificial cover object survey and visual encounter surveys – Ten surveys from April to July, as per the MNRF Survey Protocol for Ontario's Species at Risk Snakes (OMNRF 2016)
- Bats: Acoustic bat surveys utilizing automatic recording units (ARU) – Two-week ARU survey in June
- Plants: Botanical survey – One survey in July

8.5.2 Air Quality Impact Assessment

At this stage of the project (high-level planning), it is not possible to determine the exact mitigation measures that will be required as a part of these works. During the detailed design phase and after the preferred size, layout, and technical specifications for the facility are determined an Emission Summary and Dispersion Modelling (ESDM) Report should be prepared in accordance with Ontario Regulation 419/05, Air Pollution – Local Air Quality. The ESDM Report should outline the potential impact of the proposed facility on local air quality and outline mitigation measures to be followed during the design, construction, and operation of the proposed facility. If source separate organics are to be processed at the new facility the ESDM Report will include this in the assessment. Further, the proponent will commit to developing an Odour Management and Mitigation Plan during detailed design and prior to the implementation of the works.

The ESDM Report will identify and assess project specific mitigation measures, emission controls, and odour best management practices (BMPs) that will prevent offsite odour and air impacts from the proposed anaerobic digestion facility. Although it is not possible to outline the exact mitigation measures, controls, and management practices at this time, the ESDM should develop an effective and efficient management of odours through the following four stages:

1. Planning
    - Assess facility processes and site operations to identify potential sources of odour, frequency of odour emissions, and manner of discharge.
    - Detail odour avoidance, control, and mitigation strategies specific to the facility and site operations based on material and waste handling, production systems, ancillary services, preventative maintenance, and general site operations.
2. Doing
    - Identify best management practices to be implemented.
    - Develop an Odour Management and Mitigation Plan.
    - Establish odour complaint response protocols.
    - Implement administrative controls such as staff training, development of Standard Operating Procedures (SOPs), preventative maintenance schedules and recordkeeping.
3. Checking
    - Odour monitoring and inspection protocols.
    - Recordkeeping.
4. Acting
    - Periodic review of the effectiveness of the BMPs and update of the Odour Management and Mitigation Plan a regularly scheduled basis, or when changes are made at the facility.

The MECP indicated through consultation activities that an Air Environmental Compliance Approval application will be required for the proposed works. In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding Air ECA requirements.

The following is a discussion of the local air quality in the region of the proposed work. The area surrounding the preferred site is primarily zoned for Heavy Industrial Land Use and some Light Industrial / Business Park Land Use. This includes the Lou Romano Water Reclamation Plant, Brighton Beach Power (natural gas fired combined cycle fossil fuel power station), Windsor Salt, BP Canada – Windsor Storage Facility, and Nemak Engineering Centre. A number of these facilities utilize processes which have potential to impact local air quality and as a mitigative measure the City of Windsor has restricted land use in the area via zoning by-laws. The implementation of an anaerobic digestion facility is fitting to the zoning by-laws and current land use in the region.

Sensitive receptors are defined as a building, 'amenity area', or outdoor space where routine or normal activities occurring at reasonably expected times would experience 1 or more 'adverse effect(s)' from contaminant discharges generated by a nearby 'facility'. The 'sensitive land use' may be a part of the natural or built environment. Depending upon the particular 'facility' involved, a sensitive land use and associated activities may include one or a combination of:

- Residences or facilities where people sleep (e.g., single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.). These uses are considered to be sensitive 24 hours/day.
- A permanent structure for non-facility related use, particularly of an institutional nature (e.g., schools, churches, community centers, day care centers).
- Certain outdoor recreational uses deemed by a municipality or other level of government to be sensitive (e.g., trailer park, picnic area, etc.).
- Certain agricultural operations (e.g., cattle raising, mink farming, cash crops and orchards).
- Bird/wildlife habitats or sanctuaries.

Based on Ontario Guideline D-2 ‘Compatibility between Sewage Treatment and Sensitive Land Use’, sensitive land uses should not be placed adjacent to treatment facilities, where practical. When new facilities (or enlargements to existing facilities) are proposed, an adequate buffer area should be acquired as part of the project. Where acquisition of a buffer is not possible, future sensitive uses on adjacent lands should be discouraged through appropriate official plan and zoning constraints, or ownership by a responsible public authority.

In terms of existing nearby sensitive receptors, the buffer zone between the proposed expansion and nearest sensitive receptors is greater than 800-meters. In terms of future nearby sensitive receptors, all lands within an 800-meter distance of the facility are zoned for Light and/or Heavy Industrial land use which restricts any development for sensitive land uses. Due to the zoning constraints and existing land use in the area the project is not anticipated to have significant air quality impacts on sensitive receptors.

Should odour complaints be received regarding the proposed facility, a 'Complaint Response Protocol' will be followed to address the concerns. Developing an established method of responding to odour complaints allows for issues to be addressed quickly and professionally. Further, documenting questions and responses can assist in identifying potential issues and corrective actions to control, reduce or mitigate the perceived impact. This 'Complaint Response Protocol' should be developed during the detailed design period and consider the findings of the ESDM Report. Basic steps of the 'Complaint Response Protocol' may include:

- Develop a 'Odour Complaint Form' which records the complainant's contact information and description of the odour (magnitude, location, source, substance/process);
- Record weather conditions at the time of the complaint;
- Record the facility and operational activities at the time of the odour to determine whether it corresponded to a specific activity or to a potential abnormal event such as a process upset;
- Conduct a site walkthrough to see if odours are still present and what is causing them;
- Where possible and appropriate, initiate response procedures to mitigate odours;
- Ensure completion of the Odour Complaint Form and retain on site as a means to track and deal with repeat complaints; and,
- Notify the MECP if required by the Terms and Conditions of the facility's ECA or where Section 34 of O. Reg. 1/17 applies.

9.0 CONSULTATION

The Municipal Class Environmental Assessment process provides a minimum of three points of contact, for a Schedule C undertaking, where members of the public and review agencies have the opportunity to review the project findings and submit comments for consideration in development of the project. The following sections summarize the approach that has been taken with respect to consultation during this project. For this Class EA, consultation will include:

- Publication of all mandatory notices and circulation to review agencies, interested stakeholders, Indigenous communities, and the general public.
- A detailed communications and consultation strategy will be outlined as a key component of the study-initiation and organization process.
- Communications would utilize a Project Site developed on the City of Windsor’s website which would encourage input and interaction as the studies proceed.
- All the communications and consultation activities including the input and comments received would be documented in a comprehensive Consultation Plan.

9.1 PUBLIC PARTICIPATION

A notice of commencement advising of the initiation of this Class EA undertaking and inviting input was originally published in the January 15, 2022, edition of the Windsor Star and on the City of Windsor’s Webpage. A copy of the notice and the Windsor Star advertisement is contained in **Appendix B**.

In addition to this discretionary point of contact, there are three points for mandatory public contact during the Class EA process, namely:

- Phase 2: Public Consultation and Information Centre #1
- Phase 3: Public Consultation and Information Centre #2
- Phase 4: Notice of Completion

A public Open House was held on June 29, 2022, to provide information regarding this undertaking and to invite input and comment from interested persons. The open house notice was published in the June 18, 2022, edition of the Windsor Star and on the City of Windsor Webpage. A copy of the notice and the Windsor Star advertisement is contained in **Appendix B** along with a copy of the handout materials that were provided to attendees.

A second public Open House was held on January 31, 2023, to review progress made since the first open house. Information on alternative concepts for the preferred design selected in the Class EA process was available for review. The open house notice was published in the January 21, 2023, edition of the Windsor Star and on the City of Windsor Webpage. A copy of the notice and the Windsor Star advertisement is contained in **Appendix B** along with a copy of the handout materials that were provided to attendees.

9.2 REVIEW AGENCIES

The Class EA process provides an opportunity for involvement in the project by various branches of the MECP as well as other provincial and federal ministries or outside agencies. The list of Review Agencies varies depending upon the scope of the project, its location, and the potential environmental impacts.

An email advising of the initiation of this project and including the notice of project commencement was sent to review agencies on January 14, 2022. A copy of the email and the list of review agencies included are contained in **Appendix B**.

Information on alternative design solutions for the proposed Biosolids Management Strategy as part of Phase 2 of the Class EA process were distributed to review agencies and mandatory contacts in an email on June 17, 2022. This email package included a copy of the notice of the first public information centre. A copy of each email and the distribution list is included in **Appendix B**.

Information on alternative design concepts for the proposed Biosolids Management Strategy as part of Phase 3 of the Class EA process were distributed to review agencies and mandatory contacts in an email on January 20, 2023. This email package included a copy of the notice of the first public information centre. A copy of each email and the distribution list is included in **Appendix B**.

Copies of this Draft ESR Report are being distributed to review agencies and mandatory contacts by email in March 2023.

9.3 RESPONSE FROM PUBLIC AND REVIEW AGENCIES

9.3.1 Notice of Project Initiation

The notice of initiation of the project did not generate any public response. The following responses (copies included in **Appendix B**) were received from review agencies and mandatory contacts.

- Ministry of the Environment, Conservation, and Parks – provided acknowledgment of Notice of Project Initiation in an email dated February 9, 2022.
- Essex Region Conservation Authority (ERCA) – advised in an email dated February 14, 2022, that ERCA has an interest in the project and can provide input on the project.
- Ministry of Tourism, Culture and Sport – advised in an email dated January 21, 2022, that the Class EA should identify and address potential impacts to Archaeological resources, including land-based and marine; built heritage resources, including bridges and monuments; and Cultural heritage landscapes.
- Essex-Windsor Solid Waste Authority (EWSWA) – advised in an email dated January 25, 2022, that they would like to participate in the study and be notified of project updates.
- The Town of Essex – advised in an email dated January 25, 2022, that they would like to participate in the study and be notified of project updates.

- SYNAGRO – advised in an email dated January 24, 2022, that they would like to participate in the study and be notified of project updates.

9.3.2 Public Open House # 1

A total of eight (8) people attended the Open House held on June 29, 2022. A list of attendees, the open house display material, and the provided feedback form is included in **Appendix B**. The following comments (copies included in **Appendix B**) were received from review agencies and mandatory contacts.

- Ministry of Municipal Affairs and Housing – acknowledged receipt of this Notice in an email dated June 20, 2022.

- Transport Canada – advised in an email dated July 27, 2022, that the project proponent is requested to self-assess if the project will interact with a federal property and/or waterway and require approval and/or authorization under any Acts administered by Transport Canada.

9.3.3 Public Open House # 2

A total of eight (8) people attended the Open House held on January 31, 2023. A list of attendees, the open house display material, and the provided feedback form is included in **Appendix B**. The following comments (copies included in **Appendix B**) were received from review agencies and mandatory contacts.

- City of Windsor Planning & Building Services – advised in an email dated January 24, 2023, that portions of the Lou Romano Water Reclamation Plant (LRWRP) and the Windsor Biosolids Processing Facility are in areas of high archaeological potential and works proposed would have to be subject to the City of Windsor adopted Archaeological Management Plant (WAMP) and Official Plan policies concerning archaeology.

- Fisheries and Oceans Canada – advised in an email dated January 24, 2023, that the Fish and Fish Habitat Protection Program is not able to provide comment regarding general planning. If planned works may cause any of the prohibited effects under the Fisheries Act or Species at Risk Act, a Request for Review form should be completed for the works and submitted to FisheriesProtection@dfo-mpo.gc.ca

- Windsor Police Services – advised in an email dated January 23, 2023, that they have no additional comments or concerns at this time. If any aspect of the project could impact public safety in any way, to notify them for further conversations.

- COTFN – advised via online consultation tool on February 16, 2023, that they have no comments or concerns with the preferred design concepts after reviewing PIC No.2 material.

9.3.4 Notice of Draft Environmental Study Report

The notice of Draft ESR did not generate any public response. The following responses (copies included in **Appendix B**) were received from review agencies and mandatory contacts.

- Ministry of Citizenship and Multiculturalism – provided comments on the Draft ESR in a letter dated August 1, 2023. The MCM found that due diligence has been undertaken in preparing the ESR.
- Essex Region Conservation Authority – provided comments in an email dated August 1, 2023. ECRA is in support of Site Alternative No. 2 (the recommended alternative) as this address is not subject to regulation by ERCA under the *Conservation Authorities Act* (Ontario Regulation No. 158/06). However, ERCA noted that the site is partially within the Event Based Area for Source Water Protection and may be subject to subject to Source Water Protection regulations per Section 36 of the *Clean Water Act*.
- Ministry of Municipal Affairs and Housing – indicated in an email on August 2, 2023, that they do not have any provincial land use planning concerns at this time.
- Windsor Police Services – indicated in an email on August 3, 2023, that they do not have any concerns with the project at this stage, nor do they have any specific comments. In addition, they noted that they may provide feedback on review of site plans should any layout changes be contemplated.
- Ministry of the Environment, Conservation, and Parks – provided comments on the Draft ESR in a letter dated August 15, 2023.
- Essex Region Conservation Authority, Source Water Protection Team – provided comments in a letter dated August 18, 2023.

9.4 INDIGENOUS CONSULTATION

Consultation with Indigenous communities is ongoing in accordance with the Municipal Class EA requirements. As part of this Environmental Assessment, communications with Indigenous agencies and communities are being undertaken in parallel with the other stakeholder communications and consultations. This report will be sent to the Indigenous groups and organizations to solicit their interest or non-interest in the study. The communities contacted as part of this EA study include:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Walpole Island First Nation (Bkejwanong Territory)
- Chippewas of the Thames First Nation
- Chippewas of Kettle & Stony Point First Nation
- Oneida Nation of the Thames (ONYOTA'A:KA)
- Métis Nation of Ontario

- Moravian of the Thames (Delaware Nation)

Documentation of consultation with First Nations communities during the Environmental Assessment Process is located in **Appendix B**.

10.0 SUMMARY

The City of Windsor owns and operates two wastewater treatment facilities, the LRWRP and the LRPCP, which produce approximately 8,500 and 2,500 dry tonnes of biosolids each year, respectively. Currently dewatered sludge from the two WWTPs are heat dried and pelletized at the City-owned WBPF. Based on future biosolids projections, the biosolids management facility should have the capacity to treat upwards of 24,000 dry tonnes of biosolids each year (20 – year projection) and 34,500 dry tonnes of biosolids each year (ultimate projection). To address current and future biosolids management needs at the two wastewater treatment plants, the City initiated this study to identify the preferred means of processing biosolids. This problem / opportunity statement was developed in fulfillment of Phase 1 of the Class EA process.

In **Section 5.0**, alternative design solutions for the management of wastewater residuals from the two WWTPs were identified and evaluated based on a variety of social, natural environmental, economic, and technical criteria. This section of the report was completed in fulfillment of Phase 2 of the Class EA process. The most preferred alternative and therefore the recommended solution was determined to be 'Anaerobic Digestion and Biogas Utilization'. Under this strategy, the biosolids produced in the City's two WWTPs would be processed at a centralized anaerobic digestion facility. The biogas produced from the anaerobic digesters is a form of renewable energy which can be used as a source to produce heat, electricity, and/or fuel. Biogas utilization within the City of Windsor is expected to result in significant energy savings and reduced GHG emissions for the two wastewater treatment facilities. A quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions is shown in **Section 5.8**.

In **Section 6.0,** alternative design concepts (technical alternatives) for the preferred solution were identified and evaluated with the objective of determining which alternative best addresses the preferred solution. This section of the report was completed in fulfillment of Phase 3 of the Class EA process. The most preferred alternatives and therefore the recommended design concepts were determined to be:

Sludge Handling Alternative → LRPCP Sludge Cake Trucked to Anaerobic Digestion Facility
Sludge Pretreatment Alternative → Thermal Pretreatment via THP (Interim Solution – No Pretreatment)
Type of Anaerobic Digestion Alternative → Mesophilic Anaerobic Digesters
Site Selection Alternative → WBPF
Digestate Handling Alternative – Solids Disposal → Storage and Land Application
(Interim Solution – Continued use of WBPF)
Biogas Utilization Alternative → Combined Heat and Power

The most preferred alternatives within each category form the recommended solution and are outlined in **Table 7.1.** The simple process schematic for the preferred design is shown in **Figure 7.1** of **Section 7.0**.

This study follows the Class Environmental Assessment process of the Municipal Engineers Association and is documented within this Environmental Study Report. This Environmental Study Report documents the planning, design, and consultation process for the project and was completed in fulfilment of Phase 4 of the Class EA process.

APPENDIX

APPENDIX A: BACKGROUND

1. Environmental Compliance Approval for Lou Romano Water Reclamation Plant (2018)
2. Environmental Compliance Approval for Little River Pollution Control Plant (2021)

Appendix A

Environmental Compliance Approval for Lou Romano Water Reclamation Plant (2018)

Content Copy Of Original

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 1853-B43PVC
Issue Date: September 28, 2018

The Corporation of the City of Windsor
Post Office Box, No. 1607
350 City Hall Square West
Windsor, Ontario
N9A 6S1

Site Location: Lou Romano Water Reclamation Plant
4155 Ojibway Parkway
Windsor, Ontario
N9C 4A5

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

usage and operation of existing municipal sewage works, for the treatment of sanitary sewage and disposal of effluent to Detroit River via a Sewage Treatment Plant (Lou Romano Water Reclamation Plant) and Final Effluent disposal facilities as follows:

Classification of Collection System: Partially Separated Sewer System

Classification of Sewage Treatment Plant: Secondary

Design Capacity of Sewage Treatment Plant

Design Capacity with all Treatment Trains in Operation	Upon Issuance of This Approval
Rated Capacity	218,000 m^3/d
Primary Treatment Capacity	545,000 m^3/d
Secondary Treatment Capacity	436,000 m^3/d

Influent, Imported Sewage and Processed Organic Waste

Receiving Location	Types
In Collection System	Sanitary Sewage/Septage/Leachate/Pretreated Leachate/Pretreated Industrial Wastewater
At Sewage Treatment Plant	Septage/Holding Tank Waste/Portable Toilet Waste/Leachate/Processed Organic Waste

Existing Works:

Lou Romano Water Reclamation Plant

Influent Sewers

- two (2) 2400 mm diameter inlet sewers to the Raw Sewage Pumping Station;

Raw Sewage Pumping Station

- a 14.8 m x 8.0 m wet well/dry well type sewage pumping station located at 4155 Ojibway Parkway, City of Windsor, equipped with a total of six (6) pumps, including (2) pumps with variable frequency drives each rated at 175,000 m^3/d at a TDH of 14.6 m, two (2) pumps each rated at 125,000 m^3/d at a TDH of 14.6 m and two (2) pumps each rated at 175,000 m^3/day at a TDH of 15.5 m;
- two (2) mechanical bar screens ahead of the wet well, each with a Peak Instantaneous Flow Rate of 9160 L/s including screenings handling system;

Imported Sewage Receiving Facilities

- facilities to receive truck delivered Imported Sewage from other sewage works within the Municipalities of the City of Windsor and Essex County;

Preliminary Treatment System

- Screening
    - three (3) mechanically cleaned fine bar screens (one standby), each with a Peak Instantaneous Flow Rate of 3935 L/s;
- Grit Removal
    - two (2) 4.6 m diameter vortex grit removal units, each with a Peak Hourly Flow Rate of 5958 m^3/h and each equipped with a grit pump, a grit blower and a cyclone separator;
    - four (4) 4.6 m x 12.75 m aerated grit tanks, each with a Peak Flow Rate of 114,000 m^3/day;
    - four (4) submerged grit conveyors and four (4) grit pumps and four (4) cyclone separators, one for each of the existing aerated tanks;
    - three (3) grit classifiers;
- three (3) grit and screening hoppers;
- an emergency/maintenance bypass channel;

Influent Flow Measurement and Sampling Point

- flow measurement devices at the flow metering chamber and flow distribution channels;

- automatic composite sampler at the Grit Removal Building;

Primary Treatment System

- eight (8) 36.6 m diameter x 3.82 m SWD primary clarifiers and one (1) 52 m diameter x 3.82 m SWD primary clarifier with a total Peak Daily Flow Rate of 545,000 m^3/d;
- a pumping station equipped with four (4) pumps, each rated at 2,270 L/s at 4.7 m TDH to lift primary effluent and recycle backwash into the biological aerated filter treatment system;

Secondary Treatment Systems

- Biological Aerated Filter Treatment System
  - one (1) biological aerated filter with a Peak Daily Flow Rate of 436,000 m^3/d, consisting of 16 cells, each having a filtration area of 140 m^2 and a media depth of 3.9 m with backwash returned to primary clarifiers for co-settling;
  - two (2) air blowers, each rated at 13,000 m^3/h;
  - four (4) air blowers (4 standby), each rated at 8,870 m^3/h;

Disinfection System

- three (3) UV disinfection channels equipped with 2 banks of low pressure UV lamps in each channel with a Peak Hourly Flow Rate of 18,166.7 m^3/h to disinfect effluent from the biological aerated filter;
- one (1) 26,200 L sodium hypochlorite chemical storage tank and three (3) chemical metering pumps each rated at 890 L/h, to disinfect plant Overflow;

Final Effluent Flow Measurement and Sampling Point

- flow measurement device at inlet of disinfection channel;
- automatic composite sampler at outlet of disinfection channel;

Sludge Management System

- Sludge Pumping
  - four (4) pumps in Sludge Pumphouse #1, each rated at 21 L/s at 35 m TDH;
  - four (4) pumps in Sludge Pumphouse #2, each rated at 21 L/s at 35 m TDH;

        - two (2) pumps in Sludge Pumphouse #3, each rated at 21 L/s at 35 m TDH;

- Sludge Dewatering
    - three (3) centrifuge dewatering units, two (2) each with a capacity of 2.7 dry tonnes per hour and one (1) with a capacity of 6.2 dry tonnes per hour, complete with macerators, sludge feed pumps, horizontal/inclined conveyors, and sludge storage hoppers loading facility;
    - one (1) 75 m^3 sludge holding tank;
    - two (2) dry polymer make-up units, two (2) 13.5 m^3 mixing tanks and two (2) 54 m^3 age tanks;

- Biosolids Storage and Disposal
    - a Biosolids Truck Loading Facility with one (1) loading bay and four (4) hoppers, each with weigh scales and a combined storage capacity of 120,000 kg;

Final Effluent Disposal Facilities

900 metres of 2725 mm diameter effluent sewer from the outfall building connected to 114 metres of

2125 mm by 3025 mm box sewer discharging to the Detroit River;

including all other mechanical system, electrical system, instrumentation and control system, standby power system, piping, pumps, valves and appurtenances essential for the proper, safe and reliable operation of the Works in accordance with this Approval, in the context of process performance and general principles of wastewater engineering only;

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

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

2. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;

3. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

4. "Bypass" means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities;

5. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

6. "Combined Sewers" means pipes that collect and convey both wastewater from residential, commercial, institutional and industrial buildings and facilities (including infiltration and inflow) and stormwater runoff through a single-pipe system;

7. "Combined Sewer Overflow" (CSO) means a discharge to the environment from a Combined Sewer System that usually occurs as a result of a precipitation event when the capacity of the Combined Sewer is exceeded. An intervening time of twelve hours or greater separating a CSO from the last prior CSO at the same location is considered to separate one overflow event from another;

8. "Combined Sewer Systems" means collection systems that contains Combined Sewers and includes Combined Sewer Overflow structures if any, and also includes Partially Separated Sewer Systems in which roof leaders or foundation drains still contribute stormwater inflow to the sewer system conveying sanitary flows;

9. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

10. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;

11. "*E. coli*" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

12. "EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended;

13. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements and performance specifications of the piece(s) of equipment to be substituted;

14. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

15. “Existing Works” means those portions of the Works included in the Approval that have been constructed previously;

16. "Final Effluent" means effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s);

17. "Imported Sewage" means sewage hauled to the Sewage Treatment Plant by licensed waste management system operators of the types and quantities approved for co-treatment in the Sewage Treatment Plant, including hauled sewage and leachate within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended;

18. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage but excluding process return flows;

19. "Limited Operational Flexibility” (LOF) means the conditions that the Owner shall follow in order to undertake any modification that is pre-authorized as part of this Approval;

20. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

21. "Monthly Average Effluent Concentration" is the mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, calculated and reported as per the methodology specified in Schedule F;

22. "Monthly Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar month divided by the number of days during which Final Effluent was discharged that month;

23. "Monthly Average Daily Effluent Loading" means the value obtained by multiplying the Monthly Average Effluent Concentration of a contaminant by the Monthly Average Daily Effluent Flow over the same calendar month;

24. "Monthly Geometric Mean Density" is the mean of all Single Sample Results of *E.coli* measurement in the samples taken during a calendar month, calculated and reported as per the methodology specified in Schedule F;

25. “Normal Operating Condition” means the condition when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity;

26. “Operating Agency” means the Owner or the entity that is authorized by the Owner for the management, operation, maintenance, or alteration of the Works in accordance with this Approval;

27. "Overflow" means a discharge to the environment from the Works at designed location(s) other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

28. "Owner" means The Corporation of the City of Windsor and its successors and assignees;

29. "OWRA" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

30. "Partially Separated Sewer Systems" means wastewater collection systems that originally had Combined Sewers and where either only a portion of a system was retrofitted to separate sewers, or in which roof leaders or foundation drains still contribute stormwater inflow to the separated sewer conveying sanitary sewage, and/or a new development area served by separate sewers was added to an area served by Combined Sewers;

31. "Peak Daily Flow Rate" (also referred to as maximum daily flow or maximum day flow) means the largest volume of flow to be received during a one-day period for which the sewage treatment process unit or equipment is designed to handle;

32. "Peak Hourly Flow Rate" (also referred to as maximum hourly flow or maximum hour flow) means the largest volume of flow to be received during a one-hour period for which the sewage treatment process unit or equipment is designed to handle;

33. "Peak Instantaneous Flow Rate" means the instantaneous maximum flow rate as measured by a metering device for which the sewage treatment process unit or equipment is designed to handle;

34. “Preliminary Treatment System” means all facilities in the Sewage Treatment Plant

associated with screening and grit removal;

35. “Primary Treatment System” means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;

36. “Processed Organic Waste” means organic waste within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended, that is hauled to the Sewage Treatment Plant of the types and quantities approved for co-processing in the sludge management system;

37. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

38. “Secondary Treatment System” means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;

39. “Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;

40. “Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;

41. "Works" means the approved sewage works, and includes Existing Works and modifications made under Limited Operational Flexibility.

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

TERMS AND CONDITIONS

1. **GENERAL PROVISIONS**

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

3. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

4. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

5. **CHANGE OF OWNER AND OPERATING AGENCY**

6. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the District Manager the Municipal and Local Services Board Wastewater System Profile Information Form, as amended (Schedule G) under any of the following situations:

a. the form has not been previously submitted for the Works;
b. this Approval is issued for extension, re-rating or process treatment upgrade of the Works;
c. when a notification is provided to the District Manager in compliance with requirements of change of Owner or Operating Agency under this condition.

7. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

a. change of address of Owner;
b. change of Owner, including address of new owner;
c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17*, as amended, shall be included in the notification;
d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39*, as amended, shall be included in the notification.

8. The Owner shall notify the District Manager, in writing, of any of the following changes within thirty (30) days of the change occurring:

a. change of address of Operating Agency;
b. change of Operating Agency, including address of new Operating Agency.

9. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the District Manager.

10. The Owner shall ensure that all communications made pursuant to this condition

refer to the environmental compliance approval number.

11. **RECORD DRAWINGS**

12. A set of record drawings of the Works shall be kept up to date through revisions undertaken from time to time and a copy shall be readily accessible for reference at the Works.

13. **BYPASSES**

14. Any Bypass is prohibited, except:

a. an emergency Bypass when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed;

b. a planned Bypass that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the District Manager has given written consent of the Bypass;

15. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) prior to bypassing.

16. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the type of the Bypass as indicated in Paragraph 1 and the reason(s) for the Bypass;

b. the date and time of the beginning of the Bypass;

c. the treatment process(es) gone through prior to the Bypass and the treatment process(es) bypassed;

d. the effort(s) done to maximize the flow through the downstream treatment process(es) and the reason(s) why the Bypass was not avoided.

17. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the date and time of the end of the Bypass;

b. the estimated or measured volume of Bypass.

18. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition, except for *E. coli* , toxicity to Rainbow Trout and Daphnia magna, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled monitoring day.

19. The Owner shall submit a summary report of the Bypass Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5) and either a statement of compliance or a summary of the non-compliance notifications submitted as required under Paragraph 1 of Condition 11. If there is no Bypass Event during a quarter, a statement of no occurrence of Bypass is deemed sufficient.

20. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Bypass Event.

21. **OVERFLOWS**

22. Any Overflow is prohibited, except:

a. an emergency Overflow in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

b. a planned Overflow that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the District Manager has given written consent of the Overflow;

c. a designed Overflow under the following flow conditions:
    i. Overflow before the primary treatment system when flow rate to the primary treatment system exceeds 545,000 m^3/d;
    ii. Overflow from the primary treatment system when flow rate to the secondary treatment system exceeds 18,166 m^3/h (436,000 m^3/d);

23. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) and Bypass(es) prior to overflowing.

24. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the type of the Overflow as indicated in Paragraph 1 and the reason(s) for the Overflow;
b. the date and time of the beginning of the Overflow;
c. the point of the Overflow from the Works, the treatment process(es) gone through prior to the Overflow, the disinfection status of the Overflow and whether the Overflow is discharged through the effluent disposal facilities or an alternate location;
d. the effort(s) done to maximize the flow through the downstream treatment process(es) and Bypass(es) and the reason(s) why the Overflow was not avoided.

25. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the date and time of the end of the Overflow;
b. the estimated or measured volume of the Overflow.

26. For any Overflow Event

a. in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD5, total suspended solids, total phosphorus, total ammonia nitrogen, nitrate as N, nitrite as N, total Kjeldahl nitrogen and *E. coli.*except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen only.

b. at a sewage pumping station in the collection system, the Owner shall collect at least one (1) grab sample representative of the Overflow Event and have it analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen.

27. The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient.

28. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Overflow Event.

29. **DESIGN OBJECTIVES**

30. The Owner shall design and undertake everything practicable to operate the Sewage Treatment Plant in accordance with the following objectives:

a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B.
b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.
c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

31. **COMPLIANCE LIMITS**

1. The Owner shall operate and maintain the Sewage Treatment Plant such that compliance limits for the Final Effluent parameters listed in the table(s) included in Schedule C are met.

2. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent is disinfected continuously year-round

32.

OPERATION AND MAINTENANCE

1. The Owner shall ensure that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall maintain the operations manual for the Works, that includes, but not necessarily limited to, the following information:

a. operating procedures for the Works under Normal Operating Conditions;
b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;
c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;
d. procedures for the inspection and calibration of monitoring equipment;
e. operating procedures for the Works to handle situations outside Normal Operating Conditions and emergency situations such as a structural, mechanical or electrical failure, or an unforeseen flow condition, including procedures to minimize Bypasses and Overflows;
f. a spill prevention and contingency plan, consisting of procedures and contingency plans, including notification to the District Manager, to reduce the risk of spills of pollutants and prevent, eliminate or ameliorate any adverse effects that result or may result from spills of pollutants;
g. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and make the manual readily accessible for reference at the Works.

4. The Owner shall ensure that the Operating Agency fulfills the requirements under O. Reg. 129/04, as amended for the Works, including the classification of facilities, licensing of operators and operating standards.

33. **MONITORING AND RECORDING**

34. The Owner shall, upon commencement of operation of the Works, carry out a

scheduled monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.

b. a schedule of the day of the week/month for the scheduled sampling shall be created. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month for the scheduled sampling program, except when the actual scheduled monitoring frequency is three (3) or more times per week.

c. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.

d. definitions for frequency:
    i. Daily means once every day;
    ii. Weekly means once every week;
    iii. Monthly means once every month;
    iv. Quarterly means once every three months;
    v. Annually means once every year;

35. In addition to the scheduled monitoring program required in Paragraph 1, the Owner shall collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D, except for *E. coli* , toxicity to Rainbow Trout and Daphnia magna, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia.

36. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents and all analysis shall be conducted by a laboratory accredited to the ISO/IEC:17025 standard or as directed by the District Manager:

a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

b. the Ministry's publication "Protocol for the Sampling and Analysis of

Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended;

c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

d. the Environment Canada publications "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" (EPS 1/RM/13 Second Edition - December 2000) and "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*" (EPS 1/RM/14 Second Edition - December 2000), as amended, subject to the following:
    i. the use of pH stabilization in the determination of acute lethality of Final Effluent to Rainbow Trout in accordance with the Environment Canada publication “Procedure for pH Stabilization during the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout (EPS 1/RM/50)” (2008), as amended, is permitted only if:
        a. all the three criteria stipulated in the Environment Canada EPS 1/RM/50 are met; and
        b. the Final Effluent is not discharged to a receiver in which the Final Effluent contributes more than 50% of the total flow in the receiving water, unless the District Manager, having reviewed additional information submitted regarding the Final Effluent and the receiving water approves on the use of RM50 on a site-specific basis.

37. The minimum monitoring frequency with respect to acute lethality to Rainbow Trout and Daphnia magna shall, after eight (8) consecutive quarters of monitoring results not indicating acute lethality, be reduced to annually. If any Final Effluent sample indicates acute lethality to Rainbow Trout or Daphnia magna, the monitoring frequency shall revert back to quarterly and the Owner shall carry out the following immediately:

a. Review the following:
    i. Final Effluent quality and confirm that concentrations of ammonia are within the limits;
    ii. plant operations around the time of the toxicity event; and
    iii. all data available regarding plant operations and Final Effluent quality.

b. If the observed effluent toxicity is not associated with ammonia, an investigation shall be undertaken to determine the cause or source of the toxicity.

c. Upon determination of cause or source of acute lethality to Rainbow Trout and Daphnia magna, the Owner shall determine appropriate control measures to achieve non-acutely lethal effluent and time lines for the implementation of identified control measures. The Owner shall submit the proposed control measures and implementation time lines for approval to the District Manager.

38. The Owner shall monitor and record the flow rate and daily quantity using flow measuring devices or other methods of measurement as approved below calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate of the following:

a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates/details of other methods (e.g. top water elevation of lagoons), or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates/details of other methods (e.g. level of lagoons), or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
c. each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices/pumping rates/haul truck manifests;
d. Processed Organic Waste received for co-processing at the Sewage Treatment Plant by flow measuring devices/pumping rates/haul truck manifests.

39. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

40.

LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant in Works in accordance with the document “Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works” (Schedule E), as amended, subject to the following:

a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids treatment trains as originally designed and approved.

b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended, Ministry's regulations, policies, guidelines, and industry engineering standards;

c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;

d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (Schedule E), as amended shall be completed with declarations from a Professional Engineer and the Owner and retained on-site prior to the scheduled implementation date. All supporting information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF shall remain on-site for future inspection.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

a. Modifications that involve addition or extension of process structures, tankages or channels;

b. Modifications that involve relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

c. Modifications that involve addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

d. Modifications that require changes to be made to the emergency response, spill prevention and contingency plan; or

e. Modifications that are required pursuant to an order issued by the Ministry.

41. **REPORTING**

1. The Owner shall report to the District Manager orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the EPA, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

a. a summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;
b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;
c. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;
d. a summary of all operating issues encountered and corrective actions taken;
e. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;
f. a summary of any effluent quality assurance or control measures undertaken;
g. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;
h. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:
    i. when any of the design objectives are not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;
    ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;
i. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;
j. a summary of any complaints received and any steps taken to address the

complaints;

k. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

l. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.

m. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted and a summary of efforts made to achieve conformance with Procedure F-5-5 and establish /maintain a Pollution Prevention and Control Plan (PPCP).

n. any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Proposed Works.

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

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of Owner and Operating Agency is included to ensure that the Ministry records are kept accurate and current with respect to ownership and Operating Agency of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding construction of record drawings is included to ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

1. Field Alert # 1858-ALLMQS, dated April 20, 2017, created by Cara Salustro, Provincial Officer, Water Inspector, Safe Drinking Water Branch, Ministry of the

Environment and Climate Change, Windsor Area Office;
2.
3. Application for Environmental Compliance Approval submitted by Jian Li of Stantec Consulting received on Mar 31, 2015 for the proposed Headworks Upgrades, including Environmental Study Report, design report, final plans and specifications.

Schedule B

Final Effluent Design Objectives

Concentration Objectives

Final Effluent Parameter	Averaging Calculator	Objective
CBOD5	Monthly Average Effluent Concentration	10.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	10.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.4 mg/L
E. coli	Monthly Geometric Mean Density	100 CFU/100 mL
pH	Single Sample Result	between 6.5 - 9.0 inclusive
Unionized Ammonia	Monthly Average Effluent Concentration	0.08 mg/L

*If the MPN method is utilized for *E.coli* analysis the objective shall be 100 MPN/100 mL

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	15.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	15.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.5 mg/L
E. coli	Monthly Geometric Mean Density	200 CFU/100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

Toxicity to Rainbow Trout and Daphnia magna	Single Sample Result	Non-acutely lethal (no more than 50% mortality)
Unionized Ammonia	Monthly Average Effluent Concentration	0.1 mg/L

*If the MPN method is utilized for *E.coli* analysis the limit shall be 200 MPN/100 mL

Loading Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Daily Effluent Loading	3,270 kg/d
Total Suspended Solids	Monthly Average Daily Effluent Loading	3,270 kg/d
Total Phosphorus	Monthly Average Daily Effluent Loading	109 kg/d

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly

Imported Sewage - Imported Sewage Receiving Station

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Final Effluent - Outlet of UV disinfection

Parameters	Sample Type	Minimum Frequency
CBOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Ammonia Nitrogen	24 hour composite	Weekly

Total Kjeldahl Nitrogen	24 hour composite	Weekly
Nitrate as Nitrogen	24 hour composite	Weekly
Nitrite as Nitrogen	24 hour composite	Weekly
E. coli	Grab	Weekly
Acute Lethality to Rainbow Trout and Daphnia magna	Grab	Monthly
pH*	Grab/Probe/Analyzer	Weekly
Temperature*	Grab/Probe/Analyzer	Weekly
Un-ionized Ammonia**	As Calculated	Weekly

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Sludge – holding tank/truck loading bay

Parameters	Sample Type	Minimum Frequency
Total Solids	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Ammonia Nitrogen	Grab	Quarterly
Nitrate as Nitrogen	Grab	Quarterly
Metal Scan - Arsenic - Cadmium - Cobalt - Chromium - Copper - Lead - Mercury - Molybdenum - Nickel - Potassium - Selenium - Zinc	Grab	Quarterly

Leachate Related - Outlet of UV disinfection

Parameters	Sample Type	Minimum Frequency
Boron	Grab	Quarterly
Cobalt	Grab	Quarterly
Magnesium	Grab	Quarterly
Manganese	Grab	Quarterly

Potassium	Grab	Quarterly
Strontium	Grab	Quarterly
Bis (2-ethylhexyl) Phthalate	Grab	Quarterly

Industrial Wastewater Related - Outlet of UV disinfection

Parameters	Sample Type	Minimum Frequency
Lindane	Composite	Quarterly
Chlordane	Composite	Quarterly
Aldrin/dieldrin	Composite	Quarterly
Cadmium	Composite	Quarterly
Mercury	Composite	Quarterly
PCBs	Composite	Quarterly
Benzo(a)pyrene	Composite	Quarterly
Hexachlorobenzene	Composite	Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. **General**

2. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

3. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

4. The Owner shall consult the District Manager on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

5. The Owner shall ensure that any pre-authorized modifications will not:

f. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

g. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

h. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

9. **Modifications that do not require pre-authorization:**

10. Sewage works that are exempt from Ministry approval requirements;

11. Modifications to the electrical system, instrumentation and control system.

12. **Pre-authorized modifications that do not require preparation of “Notice of Modification to Sewage Works”**

13. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

a. Repairing a piece of equipment and putting it back into operation, including replacement of minor components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

14. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

15. **Pre-Authorized Modifications that require preparation of “Notice of Modification to Sewage Works”**

16. Pumping Stations

q. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

r. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

s. Replacement or installation of inlet screens to the wetwell;

t. Replacement or installation of flowmeters, construction of station bypass;

u. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

v. Replacement, realignment of existing forcemain(s) including valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

23. Sewage Treatment Plant

24. Sewers and appurtenances

a. Replacement, realignment of existing sewers (including pipes and channels) or construction of new sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the Works.

25. Flow Distribution Chambers/Splitters

a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements or installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

26. Imported Sewage Receiving Facility

    a. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;
    b. Replacement, relocation or installation of screens, grit removal units and compactors;
    c. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;
    d. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;
    e. Replacement, relocation or installation of flow measurement and sampling equipment;
    f. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity and waste loading of each type of Imported Sewage already approved for co-treatment.

27. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement or upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.
    b. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

28. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;
    b. Replacement or installation of scum removal mechanism, including scum chamber;
    c. Replacement or installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

29. Secondary Treatment System

1. Biological Treatment
    a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;
    b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;
    c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of submersible mixer(s);
    d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.
2. Secondary Sedimentation
    a. Replacement of sludge removal mechanism, including sludge chamber;
    b. Replacement or installation of scum removal mechanism, including scum chamber;
    c. Replacement or installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

30. Post-Secondary Treatment System

a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

31. Disinfection System

1. UV Irradiation
    a. Replacement of UV irradiation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.
2. Chlorination/Dechlorination and Ozonation Systems

a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

b. Replacement or installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

32. Supplementary Treatment Systems

1. Chemical systems
    a. Replacement, relocation or installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;
    b. Replacement or installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.
    c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;
    d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

33. Sludge Management System

1. Sludge Holding and Thickening
    a. Replacement or installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;
2. Sludge Digestion
    a. Replacement or installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;
    b. replacement of sludge digester covers.
3. Sludge Dewatering and Disposal
    a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

4. Processed Organic Waste
    a. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity already approved for co-processing.

34. Standby Power System

1. Replacement or installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

35. Pilot Study

1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:
    a. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;
    b. no proprietary treatment process or propriety chemical is involved in the pilot study;
    c. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;
    d. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;
    e. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the District Manager within one month of completion of the pilot project.

36. Lagoons

a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;
b. raise top elevation of lagoon berms to increase free-board;
c. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;
d. replace or install mechanical aerators, or replace mechanical aerators with

diffused aeration system provided that the mixing and aeration capacity are not reduced;

e. removal of accumulated sludge and disposal to an approved location offsite.

37. Final Effluent Disposal Facilities

al. Replacement or realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

This page contains an image of the form entitled "Notice of Modification to Sewage Works". A digital copy can be obtained from the District Manager.

Ontario

Ministry of the Environment, Conservation and Parks

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:

1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:

1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number
Signature	Date (mm/dd/yy)
Name of Employer	

Part 4 – Declaration by Owner

I hereby declare that:

1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
Owner Representative's Signature	Date (mm/dd/yy)

EAPB Form July 26, 2018

Schedule F

Methodology for Calculating and Reporting

Monthly Average Effluent Concentration, Annual Average Effluent Concentration and Monthly Geometric Mean Density

1. Monthly Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;
b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar month, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;
c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, then proceed to Step 2;
d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar month separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar month and record it as **Monthly Average NBPD Effluent Concentration**;

c. Obtain the "**Total Monthly NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar month;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar month and record it as **Monthly Average**

BPD Effluent Concentration;

e. Obtain the "**Total Monthly BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar month;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Monthly Average NBPD Effluent Concentration × Total Monthly NBPD Flow) + (Monthly Average BPD Effluent Concentration × Total Monthly BPD Flow)] ÷ (Total Monthly NBPD Flow + Total Monthly BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the month, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval.

2. Annual Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar year, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar year separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar year and record it as **Annual Average NBPD Effluent Concentration**;

c. Obtain the "**Total Annual NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar year;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar year and record it as **Annual Average BPD Effluent Concentration**;

e. Obtain the "**Total Annual BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar year;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Annual Average NBPD Effluent Concentration × Total Annual NBPD Flow) + (Annual Average BPD Effluent Concentration × Total Annual BPD Flow)] ÷ (Total Annual NBPD Flow + Total Annual BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the calendar year, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Annual Average Effluent Concentration for this parameter where applicable in this Approval.

3. Monthly Geometric Mean Density

Geometric mean is defined as the n^{th} root of the product of n numbers. In the context of calculating Monthly Geometric Mean Density for *E.coli*, the following formula shall be used:

$$\sqrt[n]{x_1 x_2 x_3 \cdots x_n}$$

in which,

"n" is the number of samples collected during the calendar month; and

"x" is the value of each Single Sample Result.

For example, four weekly grab samples were collected and tested for *E.coli* during the calendar month. The *E.coli* densities in the Final Effluent were found below:

Sample Number	***E.coli* Densities* (CFU/100 mL)**
1	10
2	100
3	300
4	50

The Geometric Mean Density for these data:

$$\sqrt[4]{10 \times 100 \times 300 \times 50} = 62$$

*If a particular result is zero (0), then a value of one (1) will be substituted into the calculation of the Monthly Geometric Mean Density. If the MPN method is utilized for E.coli analysis, values in the table shall be MPN/100 mL.

Schedule G

Municipal and Local Services Board Wastewater System

Profile Information Form

(For reference only, images of the form are attached on the next four pages. A digital copy can be obtained from the District Manger.)

Ontario

Ministry of the Environment, Conservation and Parks

Municipal and Local Services Board Wastewater System Profile Information Form

The information in this form is necessary to administer the Ministry's approvals, compliance and enforcement programs with respect to wastewater treatment and collection systems owned by municipalities and local services boards. These programs are authorized under the *Ontario Water Resources Act*, the *Environmental Protection Act*, the *Nutrient Management Act* and their respective regulations.

Email the completed form to: waterforms@ontario.ca
For any questions call 1-888-793-2588.

[A] SYSTEM PROFILE INFORMATION

Wastewater System Number *(if assigned)*	☐ New Profile ☐ Update Existing Profile

Name of System

Name of Municipality or Local Services Board

Level of Treatment (select one*)
☐ Primary
☐ Secondary
☐ Tertiary
☐ Secondary Equivalent
☐ Other (specify):
See Terms and Concepts on page 4

Population Served	Population (Design)	Type of System ☐ Treatment & Collection System ☐ Collection System Only

Design Rated Capacity (m^3/day)	Peak Flow Rate (m^3/day)	Current Environmental Compliance Approval (ECA) Number	Current ECA Issue Date (yyyy/mm/dd):

The treatment plant receives sewage from: (Check all that applies.* If you have checked more than one option below, indicate the approximate %)
☐ Sanitary Sewer ☐ Combined Sewer
☐ Nominally Separated Sewer ☐ Partially Separated Sewer *See Terms and Concepts on page 4*

[B] OWNER INFORMATION

Legal Name of Municipality or Local Services Board

Unit No	Street No.	Street Name	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Owner Contact First Name	Owner Contact Last Name	Owner Contact Job Title

Tel. No. ( ) - ext.	Fax Number ( ) -	Email address

[C] OPERATING AUTHORITY ☐ Check if same as owner

Legal Name of Operator

Unit No	Street No.	Street Name	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Operator Contact First Name	Operator Contact Last Name	Operator Contact Job Title

Tel. No. ( ) - ext.	Fax Number ( ) -	Email address

[D] 24/7 CONTACT

☐ Dr ☐ Miss ☒ Mr ☐ Mrs ☐ Ms	First Name	Last Name	Job Title

Tel. No. ( ) - ext.	Fax Number ( ) -	Email address

[E] SYSTEM CIVIC LOCATION ADDRESS (I.E. ADDRESS OF TREATMENT PLANT)

Unit No	Street No.	Street Name:	Street Type (St. Rd. etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

If the Wastewater System has no street address

Geographical Township	Lot	Concession

Geographical Referencing (if known, enter the Geographical Reference Information for this Wastewater System)

Map Datum	Geo-Referencing Method	Accuracy Estimate	Location Reference	
Latitude	Longitude	Zone	Easting	Northing

[F] TREATMENT PROCESS

Preliminary	Primary	Secondary	Secondary Equivalent	Post-Secondary	Additional Treatment
☐ Screening	☐ Settling/sedimentation/ clarification	☐ Conventional Activated Sludge (CAS)	☐ Aerated Lagoon	☐ Filtration	☐ Phosphorous Removal ☐ Biological ☐ Chemical If chemical is used, specify:
☐ Shredding/ grinding	☐ Scum Removal	☐ Extended Aeration	☐ Facultative Lagoon	☐ Clarification	☐ Nitrification
☐ Grit Removal	☐ Polymer Addition	☐ Membrane Bioreactor (MBR)	☐ Anaerobic Lagoon	☐ Intermittent Sand Filter (after lagoons)	☐ Denitrification
☐ Other(specify):	☐ Other(specify):	☐ Sequencing Batch Reactor (SBR)	☐ Aerobic Lagoon	☐ Polishing Wetlands	☐ Other(specify)
		☐ Rotating Biological Contactor (RBC)	☐ Other(specify):	☐ Polishing Lagoons	
		☐ Trickling Filter (TF)		☐ Other(specify)	
		☐ Biological Aerated Filter (BAF)			
		☐ Other(specify):			

[G] DISINFECTION

Method of Disinfection	Disinfection Period
☐ Chlorination If you chlorinate, do you practice de-chlorination? ☐ Yes ☐ No	☐ Continuous ☐ Seasonal
☐ Ultraviolet Irradiation	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

[H] SLUDGE	
Sludge Stabilization Process	Method of Sludge Disposal/Utilization
☐ Aerobic Digestion	☐ Agricultural
☐ Anaerobic Digestion	☐ Landfill
☐ Drying & Pelletization	☐ Incineration
☐ Lime Treatment	☐ Other (specify):
☐ Composting	
☐ Other (specify):	
Available Sludge Storage Capacity (m^3):	

[I] EFFLUENT	
Effluent Disposal Method	Effluent Discharge Frequency
☐ Surface Water Receiving Water Body Name:	☐ Continuous ☐ Seasonal
☐ Subsurface	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

Is the effluent discharged in a vulnerable area identified in the local source protection assessment report approved under the Clean Water Act, 2006?
☐ Yes ☐ No

[J] INFLUENT

Does the plant receive sewage from another municipality or local services board either through an interconnected collection system or hauled sewage?

☐ Yes ☐ No
(if yes, name(s) of other municipality or local services board):

Plant receives: ☐ Leachate (approximate annual volume in m^3):

☐ Septage (approximate annual volume in m^3):

☐ Industrial input (approximate annual volume in m^3):

or (approximate volume in %):

Terms and Concepts

The following Terms and Concepts are provided to assist you when completing Wastewater System Profile Information Form.

In order to determine the level of treatment that applies to the wastewater system, the effluent quality objectives that the wastewater treatment plant was designed to meet must be considered. The process based approach often used in the past has led to confusion and is open to interpretation due to recent developments and practices in the wastewater treatment industry. For example, a plant with a high rate filter (often referred to as a tertiary filter) after its secondary treatment was considered a tertiary treatment in the past since the filter was designed and operated to produce a tertiary quality effluent. However, secondary plants are now being constructed with these filters as a safeguard against any potential secondary clarifier performance degradation and not for the purpose of ensuring tertiary treatment performance. Also, new technologies have evolved that can produce tertiary quality effluent without having these high rate filters (e.g., membrane bioreactors). Lagoons were considered in the past as being capable of providing only secondary equivalent treatment. However, with add-on treatment after the lagoons (e.g. intermittent sand filters), many lagoon treatment systems are capable of producing secondary or tertiary quality effluent.

During the establishment of sewage works, site-specific effluent limits (including averaging periods) are provided by the Ministry's Regional Technical Support Section, considering the assimilative capacity of the receivers and the minimum treatment requirements provided in Procedure F-5-1. The designer of the sewage works then selects objective values that are acceptable to the Ministry and are less (i.e. more stringent) than the effluent limits , in order to provide an adequate safety factor based on the designer's confidence/experience with the technology chosen and other site-specific conditions. The sewage works are then designed (and operated) to meet these design objectives in a reliable and consistent manner. Therefore, the values that are to be used in the determination of the level of treatment that applies to the sewage works must be based on the design objectives, and not the effluent limits.

Two common parameters used in almost all sewage works designs and performance evaluations are $CBOD_5$ (carbonaceous biochemical oxygen demand) (BOD_5 – biochemical oxygen demand - for primary sewage works) and total suspended solids (TSS). Therefore, it is logical that the **objective values** of these two parameters are used to determine the level of treatment at the sewage works.

Level of Treatment:

Primary:
Wastewater treatment plants that have only settling/sedimentation (with or without chemical addition) and providing 30% and 50% or better reduction of BOD_5 and TSS respectively are considered primary plants (MOE Procedures F-5-1 and F-5-5).

Secondary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 15 mg/L or better are considered secondary plants (MOE Design Guidelines for Sewage Works, 2008).

Secondary Equivalent:
Wastewater treatment plants producing an effluent quality of $CBOD_5$ of 25 mg/L and TSS of 30 mg/L or better are considered as secondary equivalent plants.

Note: Wastewater treatment plants that provide only primary settling of solids and the addition of chemicals to improve the removal of TSS (and phosphorus) are not considered as secondary treatment plants or secondary equivalent plants (MOE Design Guidelines for Sewage Works, 2008).

Tertiary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) and/or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 5 mg/L or better are considered tertiary plants.

Note: Biological processes such as nitrification, denitrification and enhanced biological phosphorus removal can be part of either a secondary or tertiary treatment plant. They may be described as secondary treatment plant with nitrification, secondary treatment plant with enhanced biological phosphorus removal, tertiary treatment plant with nitrification etc.

Sewer System Type:

Sanitary Sewers:
Pipes that convey sanitary sewage flows made up of wastewater discharges from residential, commercial, institutional and industrial establishments plus extraneous flow components from such sources as groundwater and surface run off.

Combined Sewers:
Pipes that convey both sanitary sewage and stormwater runoff through a single-pipe system.

Partially Separated Sewers:
Exist when either a portion of the combined sewer area was retrofitted to separate (sanitary and storm) sewers and/or a service area with combined sewers has had a new development area with separate sewers added to the service area; whatever the case may be, the final flows will be combined sewage.

Nominally Separated Sewers:
These sewers are constructed as separate sewers, but the sanitary sewers accept stormwater from roof and foundation drains (i.e., these are separated sewers in name only).

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 7061-9ZKGM3 issued on September 21, 2015.

In accordance with Section 139 of the Environmental Protection Act, you may by written

Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary***** Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 28th day of September, 2018

Fariha Pannu, P.Eng.
Director

appointed for the purposes of Part II.1 of the *Environmental Protection Act*

FL/
c: Area Manager, MECP Windsor
c: District Manager, MECP Sarnia
Paul Drca, The Corporation of the City of Windsor

Appendix A

Environmental Compliance Approval for Little River Pollution Control Plant (2021)

Content Copy Of Original

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 4681-BT3L39
Issue Date: January 29, 2021

The Corporation of the City of Windsor
4155 Ojibway Pky
Windsor, Ontario
N9A 6S1

Site Location: Little River Pollution Control Plant
9400 Little River Road
City of Windsor, County Of Essex

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

usage and operation of existing municipal sewage works, for the treatment of sanitary sewage and disposal of effluent to Little River via a Sewage Treatment Plant (Little River Wastewater Treatment Plant) and Final Effluent disposal facilities as follows:

Classification of Collection System: Separate Sanitary Sewer System

Classification of Sewage Treatment Plant: Secondary

Design Capacity of Sewage Treatment Plant

Design Capacity with All Treatment Trains in Operation	Existing Works
Rated Capacity	72,800 m^3/d

Influent and Imported Sewage

Receiving Location	Types
In Collection System	Sanitary Sewage
At Sewage Treatment Plant	Leachate

Existing Works:

Little River Wastewater Treatment Plant (WWTP)

Leachate Unloading Facility

- one (1) storage tank with a total effective storage volume of 734 m^3, designed to receive up to 210 m^3/d of leachate from Landfill #3 and Essex-Windsor Regional Landfill;

- one (1) submersible pump rated at 2.31 L/s at a total dynamic head (TDH) of 10 m, discharging to the inlet chamber;
- one (1) leachate metering gravity drain line;

Influent Sewers

- one (1) 1,500 mm diameter sanitary sewer and one (1) 900 mm diameter sanitary sewer to the Preliminary Treatment System;

Preliminary Treatment System

- inlet chamber and screening
  - a 13.4 m x 6.4 m inlet chamber consisting of two (2) screen channels, each equipped with an automatically cleaned bar screen with 19 mm clear openings, inlet and outlet isolating sluice gates;
  - a 1,800 mm diameter sewer to the raw sewage pumping station;
- Raw Sewage Pumping Station
  - a 16.9 m x 2.21 m with 8.4 m depth wet well;
  - one (1) vertical centrifugal pump (RSP#1) rated at 56.4 m^3/min. at a TDH of 16.2 m, equipped with variable speed drive;
  - one (1) vertical centrifugal pump (RSP#2) rated at 59.0 m^3/min. at a TDH of 16.6 m, equipped with constant speed drive;
  - one (1) vertical centrifugal pump (RSP#3) rated at 59.0 m^3/min. at a TDH of 16.6 m, equipped with variable speed drive;
  - one (1) vertical centrifugal pump (RSP#4) rated at 60.9 m^3/min. at a TDH of 17.1 m, equipped with constant speed drive;
  - two (2) 600 mm diameter forcemains on easements from Raw Sewage Pumping Station to inlet feed channels at the Grit Removal Facility;
- Grit Removal
  - two (2) 7.92 x 7.92 m grit separators equipped with mechanical grit removal mechanism and reciprocating rake type grit clarifier;
  - two (2) 1.22 m x 3.05 m deep channels to the Flow Distribution Chamber and overflow through storm overflow weirs and sluice gates via a 1070 mm diameter overflow pipe to the Storm Overflow Chamber;

Flow Distribution/Areated Chamber

- one (1) 7.92 m x 7.92 m with nominal depth of 5.69 m flow distribution/aerated chamber located downstream of the Storm Overflow Chamber and Influent Flow Measurement Facility, equipped with six (6) downward opening weir type outlet side gates and discharging to the primary clarifiers of Plant #1 and Plant #2 and two (2) by-pass gates, electric motor operators, handwheel operators;

Storm Overflow Chamber

- one (1) storm overflow chamber to the overflow disinfection system;

Influent Flow Measurement and Sampling Point

- flow measurement device at the two (2) 1.22 m x 3.05 m deep channels;
- automatic composite sampler at the Raw Sewage Pumping Station;

Plant 1

Primary Treatment System

- four (4) 24.4 m diameter by 2.74 m side water depth (SWD), centre feed type primary clarifiers (PSTs #1 to #4), each equipped with sludge storage and thickening compartment, each having a hydraulic capacity of 9,092 m^3/d, discharging to aeration tanks;
- sludge collection mechanisms and scum removal systems;
- two (2) sludge and scum pumps for PST #1 and PST #2, each with a maximum capacity of 750 L/min;
- two (2) sludge and scum pumps for PST #3 and PST #4, with a maximum capacity of 750 L/min and a maximum capacity of 662 L/min;
- one (1) washwater pump with a capacity of 1,893 L/min at a TDH of 70 m;

Secondary Treatment Systems

- Biological Treatment
  - four (4) 37.5 m x 9.1 m x 3.9 m SWD aeration tanks, each equipped with fine bubble aeration system and divided into four

    (4) 9.1 m square compartments by a baffle wall, discharging to the secondary settling tanks, discharging to the secondary settling tanks;
  - anoxic selector zones in first stage AT #1, AT #3 and AT #4;
  - 900 mm diameter interconnection to aeration tanks in Plant 2;
  - four (4) multistage centrifugal air blowers rated at 2,975 m^3/h at 49 kPa and 3,600 rpm;
- Secondary Sedimentation
  - four (4) 24.4 m diameter with 2.74 m SWD, centre feed type secondary settling tanks (FSTs #1 to #4) with sludge collection mechanisms and scum removal system, discharging to an effluent disinfection system;
  - one (1) 5.7 m x 2.59 m x 3.15 m activated sludge pump well;
  - two (2) variable speed vertical centrifugal return activated sludge pumps (RAS #6 and RAS #7), each rated at 13.2 m^3/min at a TDH of 10.7 m and 1,200 rpm;
  - one (1) constant speed return activated sludge pump (RAS #5) rated at 15.1 m^3/min at a TDH of 10.7 m and 870 rpm;

Effluent Aeration System

- an aeration chamber with fine bubble are diffusers, two (2) centrifugal type are blowers with a rated capacity of 470 m^3/h at 4,75 psi gauge pressure, discharging to the disinfection system;

Disinfection System

- two (2) 1.46 m wide channels each equipped with 352 ultraviolet germicidal lamps to disinfect effluent serving FSTs #1 to #4, discharging to final effluent disposal facility;

Final Effluent Flow Measurement and Sampling Point

- flow measurement device installed in the outlet channel, for measuring Plant 1 flow;
- automatic composite sampler at outlet of disinfection channel;

Final Effluent Disposal Facilities

- one (1) 0.94 m wide x 1.575 m deep outlet channel, discharging to an elliptical underground pipe;
- 0.96 m x 1.52 m elliptical underground pipe connected to the outfall chamber (outfall No. 1) discharging to the Little River;

Effluent Water System

- one (1) effluent water system with two (2) centrifugal pumps, each rated at 11.4 L/s at a TDH of 47 m, a hydropneumatic pressure tank, sourcing effluent water from the contact chamber;
- a back-up connection to the municipal water supply;

Plant 2

Primary Treatment System

- two (2) 30.5 m diameter with 3.35 m SWD, centre feed type primary clarifiers (PSTs #5 and #6), each equipped with sludge storage and thickening compartment, each having a hydraulic capacity of 18,184 m^3/d, discharging to the aeration tanks;
- sludge collection mechanisms and scum removal systems;
- two (2) sludge and scum pumps for PST #5 and PST #6, each with a maximum capacity of 908 L/min;
- one (1) washwater pump with a capacity of 1,893 L/min at a TDH of 70 m;

Secondary Treatment Systems

- Biological Treatment
  - six (6) 30.5 m x 7.6 m with an average liquid depth of 6.04 m aeration tanks (ATs #9 to #14), each equipped with fine bubble air diffusers and divided into two (2) 7.6 m square compartments and one (1) 14.7 m x 7.6 m compartment by a baffle walls;
  - anoxic selector zones in first stage AT#10, AT#11 and AT#14;
  - 900 mm diameter interconnection to aeration tanks in Plant 1;
  - three (3) multistage centrifugal air blowers rated at 3,960 m^3/h at 61 kPa and 3,600 rpm;
- Secondary Sedimentation
  - two (2) 37.4 m diameter with 4.01 m SWD, centre feed type secondary settling tanks (FSTs #5 and #6) with sludge collection mechanisms and scum removal system, discharging to the disinfection system;
  - one (1) 7.9 m x 2.59 m x 2.0 m x 4.98 m activated sludge pump well;
  - two (2) variable speed vertical centrifugal return activated sludge pumps (RAS #1 and #2), each rated at 12.7 m^3/min at a TDH of 5.8 m and 875 rpm, one (1) constant speed return activated sludge pump (RAS #3), rated at 12.7 m^3/min at a TDH of 5.8 m and 875 rpm, discharging to the aeration tanks distribution chamber;
  - one (1) constant speed waste activated sludge pump, rated at 1.1 m^3/min at a TDH of 8.4 m and 1,750 rpm, discharging to the sludge management system;

Disinfection System

- two (2) 1.08 m wide channels each equipped with 265 ultraviolet germicidal lamps to disinfect effluent serving FSTs #5 and #6, discharging to the final effluent disposal facility;

Final Effluent Disposal Facilities

- a 1.83 m wide effluent aeration channel equipped with fine bubble are diffusers,equipped with two (2) centrifugal type are blowers with a rated capacity of 635 m^3/h at 4 psi gauge pressure;
- a 1050 mm diameter pipe to outfall chamber to Little River;

Final Effluent Flow Measurement and Sampling Point

- flow measurement device at outlet of effluent aeration channel;
- automatic composite sampler at outlet of disinfection channel;

Effluent Water System

- one (1) effluent water system with one (1) centrifugal pump rated at 3.15 L/s at a TDH of 61 m, a hydropneumatic pressure tank, sourcing effluent water from the effluent aeration channel;

Overflow Disinfection System

- a double wall sodium hypochlorite storage tank with a storage capacity of 24.5 m^3, located within a containment area, equipped with diaphragm metering pumps and contact chamber, for the disinfection of overflow from storm overflow chamber to the outfall chamber (outfall No. 1), and serves as a back up to UV disinfection System for Plant 1;

Supplementary Treatment System

- Phosphorus Removal
  - three (3) vertical, circular, fibreglass reinforced, above ground outdoor phosphorus removal chemical storage tanks with two (2) tanks having a storage capacity of 56,750 L capacity and one (1) tank having a storage capacity of 63,560 L;
  - two (2) diaphragm metering feed pumps with a maximum capacity of 341 L/h, from the storage tanks to the raw sewage flow upstream of primary clarifiers;

Sludge Management System

- Sludge Dewatering

- two (2) inclined macerator pumps, discharging to one (1) 3.65 m x 2.4 m x 3,5 m sludge holding tank;
- three (3) variable speed progressive cavity pumps, each rated at up to 1,120 L/min at a TDH of 28.2 m and 265 rpm;
- three (3) solid bowl centrifuges, each rated at up to 34.2 m^3/h operating at 2,600 rpm;
- polymer feed system, sludge cake transport system and odour control system;
- a truck loading system capable of loading two (2) trucks consecutively and simultaneously with eight (8) sludge discharge port;

- Sludge Condition System
  - two (2) polymer batching and feed system to aid in bulking of solids in the centrifuges, consisting of:
    - one (1) dry polymer batch feeding and wetting unit for metering dry polymer from a bulk bag supply to prepare polymer solution and transfer it to either of the two (2) mixing/holding tank, capable of supplying up to 1.25 L/s of solution;
    - two (2) mixing/holding tanks, each with a capacity of 3,028 L, stainless steel mixing impeller, alternate on a fill-use cycle;
    - three (3) single positive displacement, progressing cavity type polymer pump with variable speed drive to pump polymer solution through static mixer to the centrifuge, with rated capacity of 4 to 60 L/min at a maximum pressure of 50 psi;
    - three (3) polymer dilution and mixing units (one unit per polymer pumps) with rotameter and static mixer;
    - three water meters to measure and record dilution water used when doing polymer to suction side of the sludge feed pumps;

Odour Control Facility

- one (1) odour control unit for removing odours resulting from primary sludge, domestic and industrial waste, and activated sludge secondary treatment facilities;
- one (1) above ground hypochlorite storage tank with a capacity of 2,400 L;

including all other mechanical system, electrical system, instrumentation and control system, standby power system, piping, pumps, valves and appurtenances essential for the proper, safe and reliable operation of the Works in accordance with this Approval, in the context of process performance and general principles of wastewater engineering only;

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

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

2. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;

3. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

4. "Bypass" means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities;

5. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

6. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

7. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;

8. "*E. coli*" refers to coliform bacteria that possess the enzyme beta-glucuronidase and are capable of cleaving a fluorogenic or chromogenic substrate with the corresponding release of a fluorogen or chromogen, that produces fluorescence under long wavelength (366 nm) UV light, or color development, respectively. Enumeration methods include tube, membrane filter, or multi-well procedures. Depending on the method selected, incubation temperatures include 35.5 + 0.5 °C or 44.5 + 0.2 °C (to enumerate thermotolerant species). Depending on the procedure used, data are reported as either colony forming units (CFU) per 100 mL (for membrane filtration methods) or as most probable number (MPN) per 100 mL (for tube or multi-well

methods);

9. "EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended;

10. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements and performance specifications of the piece(s) of equipment to be substituted;

11. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

12. "Existing Works" means those portions of the Works included in the Approval that have been constructed previously;

13. "Final Effluent" means effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s);

14. "Imported Sewage" means sewage hauled to the Sewage Treatment Plant by licensed waste management system operators of the types and quantities approved for co-treatment in the Sewage Treatment Plant, including hauled sewage and leachate within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended;

15. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage;

16. "Limited Operational Flexibility" (LOF) means the conditions that the Owner shall follow in order to undertake any modification that is pre-authorized as part of this Approval;

17. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

18. "Monthly Average Effluent Concentration" is the mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, calculated and reported as per the methodology specified in Schedule F;

19. "Monthly Geometric Mean Density" is the mean of all Single Sample Results of *E. coli* measurement in the samples taken during a calendar month, calculated and reported as per the methodology specified in Schedule F;

20. "Normal Operating Condition" means the condition when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity;

21. "Operating Agency" means the Owner or the entity that is authorized by the Owner for the management, operation, maintenance, or alteration of the Works in accordance with this Approval;

22. "Overflow" means a discharge to the environment from the Works at designed location(s) other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

23. "Owner" means The Corporation of the City of Windsor and its successors and assignees;

24. "OWRA" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

25. "Preliminary Treatment System" means all facilities in the Sewage Treatment Plant associated with screening and grit removal;

26. "Primary Treatment System" means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;

27. "Professional Engineer" means a person entitled to practice as a Professional Engineer in the Province of Ontario under a license issued under the Professional Engineers Act;

28. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

29. "Sanitary Sewers" means pipes that collect and convey wastewater from residential, commercial, institutional and industrial buildings, and some infiltration and inflow from extraneous sources such as groundwater and surface runoff through means other than stormwater catch basins;

30. "Secondary Effluent" means the effluent from the Secondary Treatment System that

are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Secondary Treatment Effluent sampling point;

31. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;

32. "Separate Sewer Systems" means wastewater collection systems that comprised of Sanitary Sewers while runoff from precipitation and snowmelt are separately collected in Storm Sewers;

33. "Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;

34. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or sample, as required;

35. "Source Protection Authority" has the same meaning as in the *Clean Water Act, 2006*;

36. “Source Protection Plan" means a drinking water source protection plan prepared under the *Clean Water Act, 2006*;

37. "Storm Sewers" means pipes that collect and convey runoff resulting from precipitation and snowmelt (including infiltration and inflow);

38. "Works" means the approved sewage works, and includes Existing Works and modifications made under Limited Operational Flexibility.

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

TERMS AND CONDITIONS

1. **GENERAL PROVISIONS**

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

3. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

4. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

5. **CHANGE OF OWNER AND OPERATING AGENCY**

6. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the District Manager the Municipal and Local Services Board Wastewater System Profile Information Form, as amended (Schedule G) under any of the following situations:

a. the form has not been previously submitted for the Works;
b. this Approval is issued for extension, re-rating or process treatment upgrade of the Works;
c. when a notification is provided to the District Manager in compliance with requirements of change of Owner or Operating Agency under this condition.

7. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

a. change of address of Owner;
b. change of Owner, including address of new owner;
c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17*, as amended, shall be included in the notification;
d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39*, as amended, shall be included in the notification.

8. The Owner shall notify the District Manager, in writing, of any of the following changes within thirty (30) days of the change occurring:

a. change of address of Operating Agency;
b. change of Operating Agency, including address of new Operating Agency.

9. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of

the notice to the District Manager.

10. The Owner shall ensure that all communications made pursuant to this condition refer to the environmental compliance approval number.

11. **RECORD DRAWINGS**

12. A set of record drawings of the Works shall be kept up to date through revisions undertaken from time to time and a copy shall be readily accessible for reference at the Works.

13. **BYPASSES**

14. Any Bypass is prohibited, except:

a. an emergency Bypass when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed;
b. a planned Bypass that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the District Manager has given written consent of the Bypass;

15. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) prior to bypassing.

16. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the type of the Bypass as indicated in Paragraph 1 and the reason(s) for the Bypass;
b. the date and time of the beginning of the Bypass;
c. the treatment process(es) gone through prior to the Bypass and the treatment process(es) bypassed;

d. the effort(s) done to maximize the flow through the downstream treatment process(es) and the reason(s) why the Bypass was not avoided.

17. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the date and time of the end of the Bypass;

b. the estimated or measured volume of Bypass.

18. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition that require composite samples, following the same protocol specified in the Monitoring and Recording condition for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition. If the Event occurs on a scheduled monitoring day, the regular sampling requirements prevail. If representative sample for the effluent parameter(s) that require sample cannot be obtained, they shall be collected after the Event at the earliest time when situation returns to normal.

19. The Owner shall submit a summary report of the Bypass Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5) and either a statement of compliance or a summary of the non-compliance notifications submitted as required under Paragraph 1 of Condition 11. If there is no Bypass Event during a quarter, a statement of no occurrence of Bypass is deemed sufficient.

20. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Bypass Event.

21. **OVERFLOWS**

22. Any Overflow is prohibited, except:

a. an emergency Overflow in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

b. a planned Overflow that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the District Manager has given written consent of the Overflow;

23. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) and Bypass(es) prior to overflowing.

24. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the type of the Overflow as indicated in Paragraph 1 and the reason(s) for the Overflow;

b. the date and time of the beginning of the Overflow;

c. the point of the Overflow from the Works, the treatment process(es) gone through prior to the Overflow, the disinfection status of the Overflow and whether the Overflow is discharged through the effluent disposal facilities or an alternate location;

d. the effort(s) done to maximize the flow through the downstream treatment process(es) and Bypass(es) and the reason(s) why the Overflow was not avoided.

25. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

a. the date and time of the end of the Overflow;

b. the estimated or measured volume of the Overflow.

26. For any Overflow Event

a. in the Sewage Treatment Plant, the Owner shall collect sample(s) of the Overflow (Storm Overflow Chamber), at the frequency specified, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D.

b. at a sewage pumping station in the collection system, the Owner shall collect at least one (1) sample representative of the Overflow Event and have it analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen.

27. The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient.

28. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Overflow Event.

29. The Owner shall develop a response plan for any unplanned Overflows, consisting of measures to mitigate and prevent the contamination of drinking water.

30. **DESIGN OBJECTIVES**

31. The Owner shall design and undertake everything practicable to operate the Sewage Treatment Plant in accordance with the following objectives:

a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B.
b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.
c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

32. **COMPLIANCE LIMITS**

1. The Owner shall operate and maintain the Sewage Treatment Plant such that compliance limits for both the Monthly Average Effluent and the Single Sample Results included in Schedule C are met.

2. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent is disinfected during the disinfection period between May 1 and October 31 inclusive.

33.

OPERATION AND MAINTENANCE

1. The Owner shall ensure that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall maintain the operations manual for the Works, that includes, but not necessarily limited to, the following information:

a. operating procedures for the Works under Normal Operating Conditions;
b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;
c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;
d. procedures for the inspection and calibration of monitoring equipment;
e. operating procedures for the Works to handle situations outside Normal Operating Conditions and emergency situations such as a structural, mechanical or electrical failure, or an unforeseen flow condition, including procedures to minimize Bypasses and Overflows;
f. a spill prevention and contingency plan, consisting of procedures and contingency plans, including notification to the District Manager, to reduce the risk of spills of pollutants and prevent, eliminate or ameliorate any adverse effects that result or may result from spills of pollutants;
g. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and make the manual readily accessible for reference at the Works.

4. The Owner shall ensure that the Operating Agency fulfills the requirements under O. Reg. 129/04, as amended for the Works, including the classification of facilities, licensing of operators and operating standards.

34. **MONITORING AND RECORDING**

35. The Owner shall, upon commencement of operation of the Works, carry out a

scheduled monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.
b. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.
c. definitions for frequency:
    i. Daily means once every day;
    ii. Weekly means once every week;
    iii. Quarterly means once every three months;
d. a schedule of the day of the week/month for the scheduled sampling shall be created. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month for the scheduled sampling program, except when the actual scheduled monitoring frequency is three (3) or more times per week.

36. In addition to the scheduled monitoring program required in Paragraph 1, the Owner shall collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions, and analyze for all effluent parameters outlined in Compliance Limits condition that require composite samples, following the same protocol specified in this condition for the regular samples. If the Event occurs on a scheduled monitoring day, the regular sampling requirements prevail. If representative sample for the effluent parameter(s) that require sample cannot be obtained, they shall be collected after the Event at the earliest time when situation returns to normal.

37. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents and all analysis shall be conducted by a laboratory accredited to the ISO/IEC:17025 standard or as directed by the District Manager:

a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;
b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended;

c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

38. The Owner shall monitor and record the flow rate and daily quantity using flow measuring devices or other methods of measurement as approved below calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate of the following:

a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
c. each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices/pumping rates/haul truck manifests;

39. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

40.

LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant in Works in accordance with the document "Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works" (Schedule E), as amended, subject to the following:

a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids treatment trains as originally designed and approved.
b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry’s publication “Design Guidelines for Sewage Works 2008”, as amended, Ministry’s regulations, policies, guidelines, and industry engineering standards;

c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;

d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (Schedule E), as amended shall be completed with declarations from a Professional Engineer and the Owner and retained on-site prior to the scheduled implementation date. All supporting information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF shall remain on-site for future inspection.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

a. Modifications that involve addition or extension of process structures, tankages or channels;

b. Modifications that involve relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

c. Modifications that involve addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

d. Modifications that require changes to be made to the emergency response, spill prevention and contingency plan; or

e. Modifications that are required pursuant to an order issued by the Ministry.

41. **REPORTING**

1. The Owner shall report to the District Manager orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the EPA, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff, Source Protection Authority and any other parties identified in the Source Protection Plans.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

a. a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;
b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;
c. a summary of all operating issues encountered and corrective actions taken;
d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;
e. a summary of any effluent quality assurance or control measures undertaken;
f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;
g. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:
    i. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;
    ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;
h. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;
i. a summary of any complaints received and any steps taken to address the complaints;
j. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;
k. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of

all modification.

l. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.

m. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year.

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

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of Owner and Operating Agency is included to ensure that the Ministry records are kept accurate and current with respect to ownership and Operating Agency of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding record drawings is included to ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

1. Application for Approval of Municipal and Private Sewage Works dated September 1, 2009 and submitted under covering letter dated August 31, 2009 by K.J. Madill, P.Eng., of Stantec Consulting Ltd, consulting Engineers;

2. Physical Description, Little River Pollution Control Plant, Corporation of the City of Windsor, revised May 2002, prepared by Jack McRae of the City of Windsor;

3. Application for Approval of Municipal and Private Water and Sewage Works submitted by the City of Windsor dated August 2, 2000, the plans and specifications prepared by Stantec Consulting Ltd. and the treatability testing report prepared by Hydromantis, Inc. dated November 9, 1998.(Ref# 5858-4N8JMA);

4. Application for Approval of Sewage Works dated May 18, 2011, with cover letter submitted by Jian Li, P.Eng., of Stantec Consulting Ltd, Consulting Engineers, dated April 18, 2011;

5. Application for Environmental Compliance Approval dated April 8, 2020 and received May 27, 2020, submitted by The Corporation of the City of Windsor.

Schedule B

Final Effluent Design Objectives

Concentration Objectives

Final Effluent Parameter	Averaging Calculator	Objective (milligrams per litre unless otherwise indicated)
pH	Single Sample Result	6.5 - 9.0 inclusive
Dissolved Oxygen	Single Sample Result	greater than or equal to 4.0 mg/L

Schedule C

Final Effluent Compliance Limits - Monthly Average Effluent Concentration

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	15 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	15 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	1.0 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	6 mg/L
E. coli	Monthly Geometric Mean Density	*200 CFU/100 mL (from May 1 to October 31)

*If the MPN method is utilized for *E. coli* analysis the limit shall be 200 MPN/100 mL

**For the purpose of compliance limits, the effluent value shall be calculated using flow weighted average of Plant 1 and Plant 2 effluent parameters

Concentration Limits at the outlet of Plant 1 and Plant 2 - Single Sample Result

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Single Sample Result	25 mg/L
Total Suspended Solids	Single Sample Result	25 mg/L
Total Phosphorus	Single Sample Result	1.5 mg/L
Total Ammonia Nitrogen	Single Sample Result	8 mg/L
E. coli	Single Geometric Mean Density	*1000 CFU/100 mL (from May 1 to October 31)
pH	Single Sample Result	between 6.5 - 9.0 inclusive

*If the MPN method is utilized for *E. coli* analysis the limit shall be 1000 MPN/100 mL

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Ammonia Nitrogen	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Alkalinity	24 hour composite	Weekly
pH	Grab/Probe	Daily
Temperature	Grab/Probe	Daily

Storm Overflow Chamber - chamber sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	composite	every 2 hours (having same sample volume during the bypass event)
Total Suspended Solids	composite	every 2 hours (having same sample volume during the bypass event)
Total Phosphorus	composite	every 2 hours (having same sample volume during the bypass event)
E. coli	discrete grab	during the first hour of the event

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
CBOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Ammonia Nitrogen	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Nitrate as Nitrogen	24 hour composite	Weekly
Nitrite as Nitrogen	24 hour composite	Weekly
E. coli	Grab	Weekly (from May 1 to October 31)
Dissolved Oxygen	Grab/Probe	Daily
pH*	Grab/Probe	Daily
Temperature*	Grab/Probe	Daily
Un-ionized Ammonia**	As Calculated	Weekly

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Sludge/Biosolids – holding tank/truck loading bay

Parameters	Sample Type	Minimum Frequency
Total Solids	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Ammonia Nitrogen	Grab	Quarterly
Nitrate as Nitrogen	Grab	Quarterly
Metal Scan - Arsenic - Cadmium - Cobalt - Chromium - Copper - Lead - Mercury - Molybdenum - Nickel - Potassium - Selenium - Zinc	Grab	Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. **General**

2. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

3. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

4. The Owner shall consult the District Manager on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

5. The Owner shall ensure that any pre-authorized modifications will not:

f. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

g. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

h. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

9. **Modifications that do not require pre-authorization:**

10. Sewage works that are exempt from Ministry approval requirements;

11. Modifications to the electrical system, instrumentation and control system.

12. **Pre-authorized modifications that do not require preparation of “Notice of Modification to Sewage Works”**

13. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

a. Repairing a piece of equipment and putting it back into operation, including replacement of minor components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

14. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

15. **Pre-Authorized Modifications that require preparation of “Notice of Modification to Sewage Works”**

16. Pumping Stations

q. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

r. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

s. Replacement or installation of inlet screens to the wetwell;

t. Replacement or installation of flowmeters, construction of station bypass;

u. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

v. Replacement, realignment of existing forcemain(s) including valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

23. Sewage Treatment Plant

24. Sewers and appurtenances

   a. Replacement, realignment of existing sewers (including pipes and channels) or construction of new sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the Works.

25. Flow Distribution Chambers/Splitters

   a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements or installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

26. Imported Sewage Receiving Facility

   a. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;
   b. Replacement, relocation or installation of screens, grit removal units and compactors;
   c. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;
   d. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;
   e. Replacement, relocation or installation of flow measurement and sampling equipment;
   f. Changes to the source(s) or quantity from each source, provided that changes will

not result in an increase in the total quantity and waste loading of each type of Imported Sewage already approved for co-treatment.

27. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement or upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.
    b. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

28. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;
    b. Replacement or installation of scum removal mechanism, including scum chamber;
    c. Replacement or installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

29. Secondary Treatment System

    1. Biological Treatment
        a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;
        b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;
        c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of submersible mixer(s);
        d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.
    2. Secondary Sedimentation

a. Replacement of sludge removal mechanism, including sludge chamber;

b. Replacement or installation of scum removal mechanism, including scum chamber;

c. Replacement or installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

30. Post-Secondary Treatment System

a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

31. Disinfection System

1. UV Irradiation
   a. Replacement of UV irradiation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

2. Chlorination/Dechlorination and Ozonation Systems
   a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

   b. Replacement or installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

32. Supplementary Treatment Systems

1. Chemical systems
   a. Replacement, relocation or installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;

   b. Replacement or installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.

   c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;

d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

33. Sludge Management System

1. Sludge Holding and Thickening
   a. Replacement or installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

2. Sludge Digestion
   a. Replacement or installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;
   b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal
   a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

4. Processed Organic Waste
   a. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity already approved for co-processing.

34. Standby Power System

1. Replacement or installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

35. Pilot Study

1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:

a. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;
b. no proprietary treatment process or propriety chemical is involved in the pilot study;
c. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;
d. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;
e. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the District Manager within one month of completion of the pilot project.

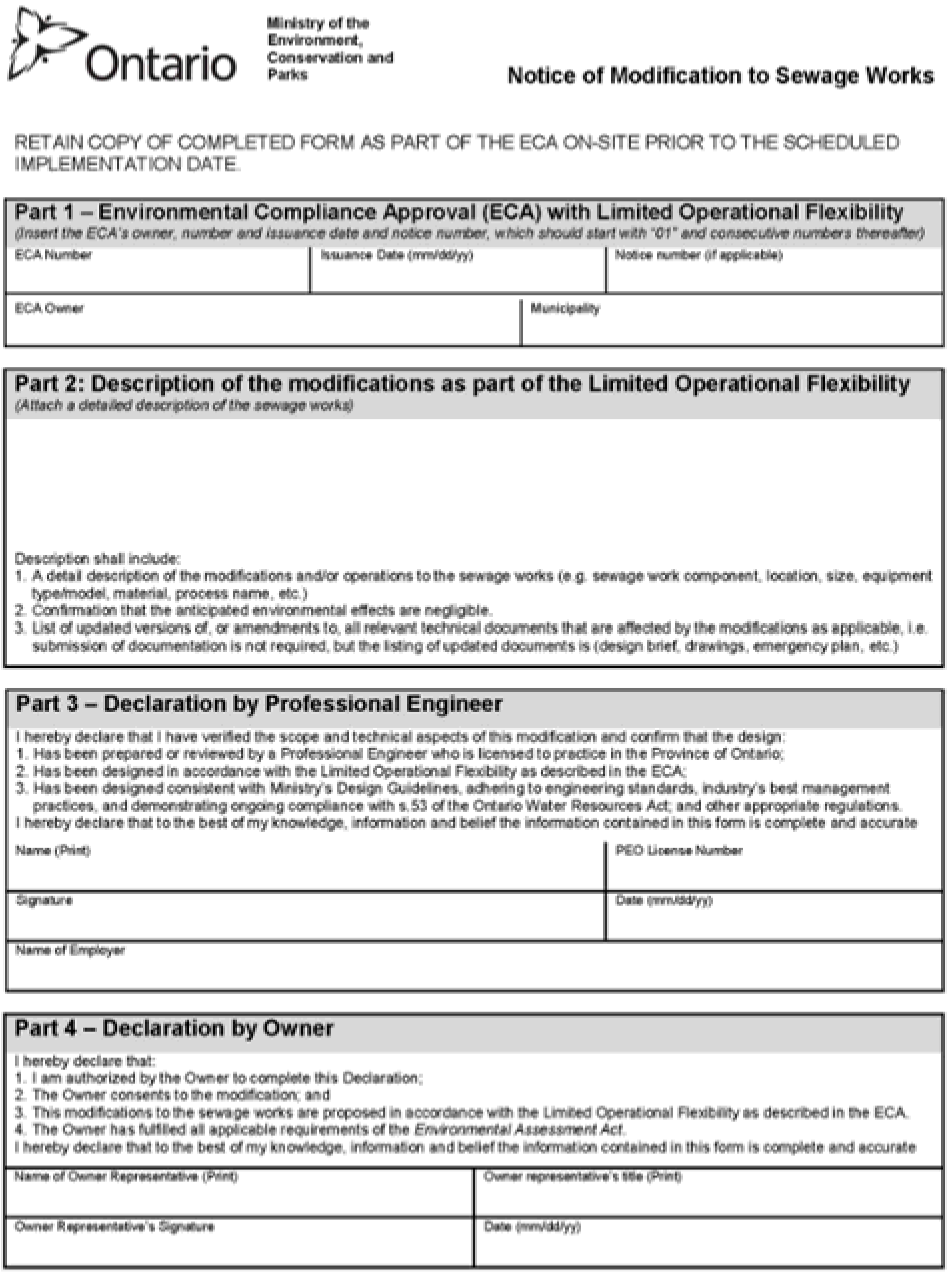
36. Lagoons

a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;
b. raise top elevation of lagoon berms to increase free-board;
c. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;
d. replace or install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;
e. removal of accumulated sludge and disposal to an approved location offsite.

37. Final Effluent Disposal Facilities

al. Replacement or realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

This page contains an image of the form entitled "Notice of Modification to Sewage Works". A digital copy can be obtained from the District Manager.



Ministry of the Environment, Conservation and Parks

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility
(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility
(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number
Signature	Date (mm/dd/yy)
Name of Employer	

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
Owner Representative's Signature	Date (mm/dd/yy)

Schedule F

Methodology for Calculating and Reporting

Monthly Average Effluent Concentration, Annual Average Effluent Concentration and Monthly Geometric Mean Density

1. Monthly Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar month, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar month separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar month and record it as **Monthly Average NBPD Effluent Concentration**;

c. Obtain the "**Total Monthly NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar month;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar month and record it as **Monthly Average BPD Effluent Concentration**;

e. Obtain the "**Total Monthly BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar month;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Monthly Average NBPD Effluent Concentration × Total Monthly NBPD Flow) + (Monthly Average BPD Effluent Concentration × Total Monthly BPD Flow)] ÷ (Total Monthly NBPD Flow + Total Monthly BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the month, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval.

2. Annual Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar year, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, the

Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar year separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar year and record it as **Annual Average NBPD Effluent Concentration**;

c. Obtain the "**Total Annual NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar year;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar year and record it as **Annual Average BPD Effluent Concentration**;

e. Obtain the "**Total Annual BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar year;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Annual Average NBPD Effluent Concentration × Total Annual NBPD Flow) + (Annual Average BPD Effluent Concentration × Total Annual BPD Flow)] ÷ (Total Annual NBPD Flow + Total Annual BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the calendar year, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Annual Average Effluent Concentration for this parameter where applicable in this Approval.

3. Monthly Geometric Mean Density

Geometric mean is defined as the n^{th} root of the product of *n* numbers. In the context of calculating Monthly Geometric Mean Density for *E. coli*, the following formula shall be used:

$$\sqrt[n]{x_1 x_2 x_3 \cdots x_n}$$

in which,

"*n*" is the number of samples collected during the calendar month; and

"*x*" is the value of each Single Sample Result.

For example, four weekly samples were collected and tested for *E. coli* during the calendar month. The *E. coli* densities in the Final Effluent were found below:

Sample Number	***E. coli* Densities* (CFU/100 mL)**
1	10
2	100
3	300
4	50

The Geometric Mean Density for these data:

$$\sqrt[4]{10 \times 100 \times 300 \times 50} = 62$$

*If a particular result is zero (0), then a value of one (1) will be substituted into the calculation of the Monthly Geometric Mean Density. If the MPN method is utilized for E. coli analysis, values in the table shall be MPN/100 mL.

Schedule G

Municipal and Local Services Board Wastewater System

Profile Information Form

(For reference only, images of the form are attached on the next four pages. A digital copy can be obtained from the District Manger.)

Ontario

Ministry of the Environment, Conservation and Parks

Municipal and Local Services Board Wastewater System Profile Information Form

The information in this form is necessary to administer the Ministry's approvals, compliance and enforcement programs with respect to wastewater treatment and collection systems owned by municipalities and local services boards. These programs are authorized under the *Ontario Water Resources Act*, the *Environmental Protection Act*, the *Nutrient Management Act* and their respective regulations.

Email the completed form to: waterforms@ontario.ca
For any questions call 1-888-793-2588.

[A] SYSTEM PROFILE INFORMATION

Wastewater System Number *(if assigned)*

☐ New Profile
☐ Update Existing Profile

Name of System

Name of Municipality or Local Services Board

Level of Treatment (select one*)
☐ Primary
☐ Secondary
☐ Tertiary
☐ Secondary Equivalent
☐ Other (specify):
See Terms and Concepts on page 4

Population Served

Population (Design)

Type of System
☐ Treatment & Collection System ☐ Collection System Only

Design Rated Capacity (m^3/day)

Peak Flow Rate (m^3/day)

Current Environmental Compliance Approval (ECA) Number

Current ECA Issue Date (yyyy/mm/dd):

The treatment plant receives sewage from: (Check all that applies.* If you have checked more than one option below, indicate the approximate %)

☐ Sanitary Sewer ☐ Combined Sewer
☐ Nominally Separated Sewer ☐ Partially Separated Sewer

See Terms and Concepts on page 4

[B] OWNER INFORMATION

Legal Name of Municipality or Local Services Board

Unit No	Street No.	Street Name	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Owner Contact First Name	Owner Contact Last Name	Owner Contact Job Title

Tel. No.	Fax Number	Email address
( ) - ext.	( ) -	

[C] OPERATING AUTHORITY ☐ Check if same as owner

Legal Name of Operator

Unit No	Street No.	Street Name	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Operator Contact First Name	Operator Contact Last Name	Operator Contact Job Title

Tel. No.	Fax Number	Email address
( ) - ext.	( ) -	

[D] 24/7 CONTACT

☐ Dr ☐ Miss ☒ Mr ☐ Mrs ☐ Ms	First Name	Last Name	Job Title

Tel. No.	Fax Number	Email address
( ) - ext.	( ) -	

[E] SYSTEM CIVIC LOCATION ADDRESS (I.E. ADDRESS OF TREATMENT PLANT)

Unit No	Street No.	Street Name	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

If the Wastewater System has no street address

Geographical Township	Lot	Concession

Geographical Referencing (if known, enter the Geographical Reference Information for this Wastewater System)

Map Datum	Geo-Referencing Method	Accuracy Estimate	Location Reference	
Latitude	Longitude	Zone	Easting	Northing

[F] TREATMENT PROCESS

Preliminary	Primary	Secondary	Secondary Equivalent	Post-Secondary	Additional Treatment
☐ Screening ☐ Shredding/ grinding ☐ Grit Removal ☐ Other(specify):	☐ Settling/sedimentation/ clarification ☐ Scum Removal ☐ Polymer Addition ☐ Other(specify):	☐ Conventional Activated Sludge (CAS) ☐ Extended Aeration ☐ Membrane Bioreactor (MBR) ☐ Sequencing Batch Reactor (SBR) ☐ Rotating Biological Contactor (RBC) ☐ Trickling Filter (TF) ☐ Biological Aerated Filter (BAF) ☐ Other(specify):	☐ Aerated Lagoon ☐ Facultative Lagoon ☐ Anaerobic Lagoon ☐ Aerobic Lagoon ☐ Other(specify):	☐ Filtration ☐ Clarification ☐ Intermittent Sand Filter (after lagoons) ☐ Polishing Wetlands ☐ Polishing Lagoons ☐ Other(specify)	☐ Phosphorous Removal ☐ Biological ☐ Chemical If chemical is used, specify. ☐ Nitrification ☐ Denitrification ☐ Other(specify)

[G] DISINFECTION

Method of Disinfection	Disinfection Period
☐ Chlorination If you chlorinate, do you practice de-chlorination? ☐ Yes ☐ No	☐ Continuous ☐ Seasonal
☐ Ultraviolet Irradiation	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

[H] SLUDGE

Sludge Stabilization Process	Method of Sludge Disposal/Utilization
☐ Aerobic Digestion	☐ Agricultural
☐ Anaerobic Digestion	☐ Landfill
☐ Drying & Pelletization	☐ Incineration
☐ Lime Treatment	☐ Other (specify):
☐ Composting	
☐ Other (specify):	

Available Sludge Storage Capacity (m^3):

[I] EFFLUENT

Effluent Disposal Method	Effluent Discharge Frequency
☐ Surface Water Receiving Water Body Name:	☐ Continuous ☐ Seasonal
☐ Subsurface	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

Is the effluent discharged in a vulnerable area identified in the local source protection assessment report approved under the Clean Water Act, 2006?
☐ Yes ☐ No

[J] INFLUENT

Does the plant receive sewage from another municipality or local services board either through an interconnected collection system or hauled sewage?
☐ Yes ☐ No
(if yes, name(s) of other municipality or local services board):

Plant receives:
☐ Leachate (approximate annual volume in m^3):
☐ Septage (approximate annual volume in m^3):
☐ Industrial input (approximate annual volume in m^3):
or (approximate volume in %):

Terms and Concepts

The following Terms and Concepts are provided to assist you when completing Wastewater System Profile Information Form.

In order to determine the level of treatment that applies to the wastewater system, the effluent quality objectives that the wastewater treatment plant was designed to meet must be considered. The process based approach often used in the past has led to confusion and is open to interpretation due to recent developments and practices in the wastewater treatment industry. For example, a plant with a high rate filter (often referred to as a tertiary filter) after its secondary treatment was considered a tertiary treatment in the past since the filter was designed and operated to produce a tertiary quality effluent. However, secondary plants are now being constructed with these filters as a safeguard against any potential secondary clarifier performance degradation and not for the purpose of ensuring tertiary treatment performance. Also, new technologies have evolved that can produce tertiary quality effluent without having these high rate filters (e.g., membrane bioreactors). Lagoons were considered in the past as being capable of providing only secondary equivalent treatment. However, with add-on treatment after the lagoons (e.g. intermittent sand filters), many lagoon treatment systems are capable of producing secondary or tertiary quality effluent.

During the establishment of sewage works, site-specific effluent limits (including averaging periods) are provided by the Ministry's Regional Technical Support Section, considering the assimilative capacity of the receivers and the minimum treatment requirements provided in Procedure F-5-1. The designer of the sewage works then selects objective values that are acceptable to the Ministry and are less (i.e. more stringent) than the effluent limits , in order to provide an adequate safety factor based on the designer's confidence/experience with the technology chosen and other site-specific conditions. The sewage works are then designed (and operated) to meet these design objectives in a reliable and consistent manner. Therefore, the values that are to be used in the determination of the level of treatment that applies to the sewage works must be based on the design objectives, and not the effluent limits.

Two common parameters used in almost all sewage works designs and performance evaluations are $CBOD_5$ (carbonaceous biochemical oxygen demand) (BOD_5 – biochemical oxygen demand - for primary sewage works) and total suspended solids (TSS). Therefore, it is logical that the **objective values** of these two parameters are used to determine the level of treatment at the sewage works.

Level of Treatment:

Primary:
Wastewater treatment plants that have only settling/sedimentation (with or without chemical addition) and providing 30% and 50% or better reduction of BOD_5 and TSS respectively are considered primary plants (MOE Procedures F-5-1 and F-5-5).

Secondary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 15 mg/L or better are considered secondary plants (MOE Design Guidelines for Sewage Works, 2008).

Secondary Equivalent:
Wastewater treatment plants producing an effluent quality of $CBOD_5$ of 25 mg/L and TSS of 30 mg/L or better are considered as secondary equivalent plants.

Note: Wastewater treatment plants that provide only primary settling of solids and the addition of chemicals to improve the removal of TSS (and phosphorus) are not considered as secondary treatment plants or secondary equivalent plants (MOE Design Guidelines for Sewage Works, 2008).

Tertiary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) and/or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 5 mg/L or better are considered tertiary plants.

Note: Biological processes such as nitrification, denitrification and enhanced biological phosphorus removal can be part of either a secondary or tertiary treatment plant. They may be described as secondary treatment plant with nitrification, secondary treatment plant with enhanced biological phosphorus removal, tertiary treatment plant with nitrification etc.

Sewer System Type:

Sanitary Sewers:
Pipes that convey sanitary sewage flows made up of wastewater discharges from residential, commercial, institutional and industrial establishments plus extraneous flow components from such sources as groundwater and surface run off.

Combined Sewers:
Pipes that convey both sanitary sewage and stormwater runoff through a single-pipe system.

Partially Separated Sewers:
Exist when either a portion of the combined sewer area was retrofitted to separate (sanitary and storm) sewers and/or a service area with combined sewers has had a new development area with separate sewers added to the service area; whatever the case may be, the final flows will be combined sewage.

Nominally Separated Sewers:
These sewers are constructed as separate sewers, but the sanitary sewers accept stormwater from roof and foundation drains (i.e., these are separated sewers in name only).

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 8532-8JBLBT issued on July 26, 2011.

In accordance with Section 139 of the Environmental Protection Act, you may by written

Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary***** Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 29th day of January, 2021

Aziz Ahmed, P.Eng.
Director

appointed for the purposes of Part II.1 of the *Environmental Protection Act*

LW/
c: Area Manager, MECP Windsor
c: District Manager, DWECD, MECP Sarnia
Pompiliu Ignat, The Corporation of the City of Windsor

APPENDIX B: CONSULTATION

1. Notice of Study Commencement
2. Public Information Centre No. 1
3. Public Information Centre No. 2
4. Email Packages to Review Agencies
5. Response to Notice of Project Commencement
6. Response to Public Open House No. 1
7. Response to Public Open House No. 2
8. Response to Notice of Draft ESR
9. First Nations Consultation

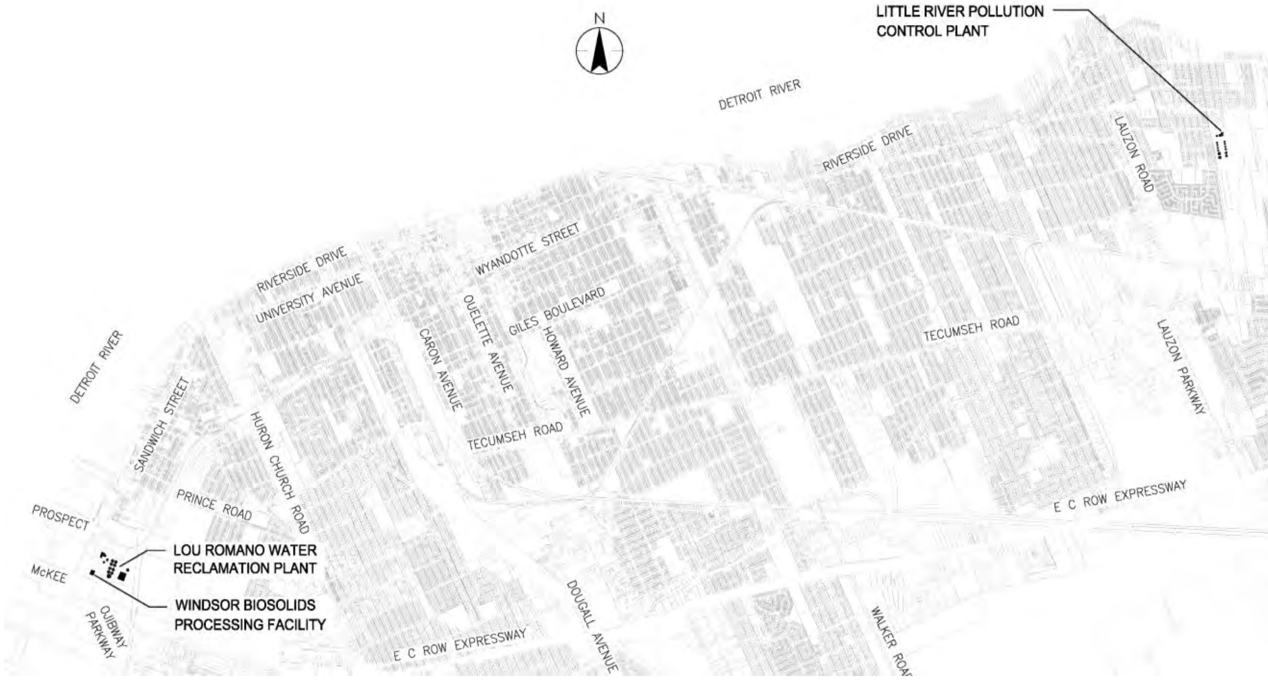
APPENDIX B

Notice of Study Commencement

1. Notice of Study Commencement
2. Notice of Study Commencement – Windsor Star Advertisement

NOTICE OF STUDY COMMENCEMENT
CLASS ENVIRONMENTAL ASSESSMENT
BIOSOLIDS MANAGEMENT PLAN

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants, the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will look at how the City is currently managing and processing biosolids at our two wastewater treatment plants and guides how we will continue to meet the demands of our growing community over the next 30 years.



This Class EA will review and identify opportunity of co-processing biosolids and source separated organics (SSO). The key elements of the study include identifying and evaluating options for processing biosolids and SSO that may generate renewable energy and reduce greenhouse gas emissions. A variety of potential biosolids and SSO management options will be assessed to identify the preferred solution. The preferred option will then be further refined with an evaluation of alternative design concepts leading to selection of a recommended design.

The study is being completed as a 'Schedule C' project under the Municipal Class Environmental Assessment (June 2000, as amended in 2007, 2011 and 2015) under the Ontario *Environmental Assessment Act*. A key component of the study will be consultation with interested stakeholders. Public Information Centres (PIC) will be held during the course of this project. The PICs will be held to review existing study area conditions, present and discuss study findings, and provide an assessment of alternative solutions and design concepts. Notice of planned PICs will be advertised. Anyone wishing to be directly advised of planned PICs should contact one of the project team members listed below.

If you wish to comment on this project, have your name added to the project mailing list, or have any questions about this project, please contact one of the individuals identified below:

Mr. Ed Valdez, P. Eng.
Manager of Process Engineering & Maintenance
City of Windsor
4155 Ojibway Parkway
Windsor, Ontario N9C 4A5
Tel.: (519) 253-7111 x 3366
E-mail : evaldez@citywindsor.ca

Dr. Jian Li, P. Eng.
Consultant Project Manager
Stantec Consulting Ltd.
140 Ouellette Place, Suite 100
Windsor ON N8X 1L9
Tel.: (519)966-2250 x 240
E-mail : jian.li@stantec.com

Under the *Municipal Freedom of Information and Protection of Privacy Act* and the *Ontario Environmental Assessment Act*, unless otherwise stated in the submission, with the exception of personal information, all comments will become part of the public record and will be released, if requested, to any person.

In Memoriams

Helen Hunt-LaMarsh
Sept. 24, 1931 - Jan. 16, 2021
It is one year since our dear Mother, Daughter, Wife, Aunt, Sister, Nannie, Great Nannie & Friend left us.
Your loving kindness & special concern for all is cherished and deeply missed.
Forever in our prayers.
I miss you so much Mom.
Love Torrie & Steve Wright & Family

In Loving Memory Of
Luigi Tricarico
March 3, 1931 - Jan. 13, 2013

Nine Years has gone, we miss you so;
In our memory you are near.
Loved, remembered, longed for always,
Bringing many a silent tear.
Love your wife Lina and children,
Jo-Anne, Carey, Maria, George, Louise, Jerry, and all your grandchildren and great grandchildren.

In Loving Memory Of Ellen Rose Simpson
September 26, 1922 - January 15, 2021
In our Hearts Forever. Keep Dancing with Dad and the dogs!
Love, Your Family

REMEMBERING
MOTHER

In Loving Memory Of
Giovanna Lus TAIARIOL
Feb 10, 1911 - Jan 12, 1982
Mama, forty years ago you left us, much much too soon. Our hearts were broken and still ache missing you....your caring spirit, your willingness to help others, your non-stop energy...all that you did for your family, paesani and neighbours. I miss you today as much as I did forty years ago. You are always with me. Love you. Till we meet again. Mirella

In Loving Memory Of
Jim McFadden
January 18th, 2021
It's been a year since
we said our good-byes
As I held you in my arms
with tears in my eyes
The days are long
and the nights are too
While I sit here alone without you
Our memories are now
my go to place
Until we meet again
in a warm embrace
You are in my thoughts every day
and forever in my heart. Sue

In Loving Memory Of
Jim McFadden
January 18th, 2021
One year later
the sadness is still strong
It's hard to accept you are not here
where you belong
That night we shed a lot of tears
Remembering the memories
of the past 36 years
You patiently taught us
everything you knew
And we are who we are
because of you
Miss you Jimmer
Jason, Kevin, Steve and families

Keith Simpson
December 9, 1932
January 16, 2020

In memory of my husband who passed away January 16, 2020.

Fondly loved and deeply mourned,
Part of my heart, I miss you so,
Often my darling my tears will flow
Dimming your picture where e'er you go
Tis sad but true, I will abide
Until some day we'll be side by side

Miss you, Elaine, Michael, Anne, Adam and Aaron

In Loving Memory Of
Linda May Levac
May 15, 1947 - January 16, 2021
In memory of Linda May Levac (nee Corbett).
It has been a year since COVID 19 stole you from us. On January 16, 2021 at 5:30 am the good Lord called you home. We didn't get the chance to say one last "I love you" or our final "goodbyes ", which has been one of the hardest parts. You were the rock of our family. To say you are missed is a huge understatement.
You were the BEST Wife, Mother, Grandmother, Great Grandmother and friend any of us could have asked for. Your unconditional love, kindness and zest for life will live on in us for the rest of our days.
We know you are in the hands of God and you have found your eternal peace.
Until we meet again
Love, Ray, Heidi, Joe, Monique, Chris, Tangie, Mike, Ashley and Jeff

In Loving Memory Of
Denis Gerard Joseph Morand
Dec. 6, 1954 - Jan. 15, 2018
Lonely for the sound of your voice
And sad with the longing to see
The face of our own precious loved one
Framed so deep in our memory.

Until we meet again,

Cathy, Suzanne (Nick), Lise (Alex) & Gwen

In Loving Memory Of
Silvio Campanaro
Nov 18, 1933 - Jan 16, 1984
In life we loved you dearly, in death we love you still. In our hearts you hold a place, no one will ever fill.
Wife Antonietta and daughters Teresa and Daniela.

In Loving Memory Of
Sonny Gherasim
September 23, 1936 - January 17, 2014
In loving memory of a dear Husband, Father and Step Father who passed away eight years ago January 17th. He is gone but not forgotten, and as dawns another year, in our lonely hours of thinking, thoughts of him are always near. Friends may think the wound is healed but they little know the sorrow that lies within the heart concealed.

Loving you forever, Virginia and Family

In Loving Memory of
Chickee, Othello
April 19, 1947 - January 17, 2021

We miss you,
And God bless the world,
We pray for everyone

The family

PARENT

In memory of a Beloved Husband, Father, and Grandfather,
Clement (Clem) Parent
who passed away January 16, 2013

Nine years have come and gone
And yet, it doesn't seem that long.
Many changes have happened
in that time
Our Grandchildren
have become young adults
And the four of them are doing fine.
Two more have been added
to the family line
Little ones whom
you didn't know or see,
But with photos and stories
always shared,
They will know that you were a
special part of our family.

Loved, never forgotten, Marie, Children and Grandchildren.

Public Notices

THE CITY OF WINDSOR

NOTICE OF STUDY COMMENCEMENT
CLASS ENVIRONMENTAL ASSESSMENT
BIOSOLIDS MANAGEMENT STUDY

The City of Windsor is undertaking the Class EA process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This Class EA will review and identify opportunity of co-processing biosolids and source separated organics (SSO). The key elements of the study include identifying and evaluating options for processing biosolids and SSO that may generate renewable energy and reduce greenhouse gas emissions.

All content and instructions on how to submit questions or wish to be added to the study mailing list will be available on the project webpage,
https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

Community - Other

Ukrainian Restaurant
Selling: Perogi, Stew, Soup , Dessert, Stuffed Pepper $8.00, Dozen Cabbage Rolls $18.00 EAT IN
@1148 Marion 519-253-3981

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Celebrating

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Birthdays

90th Birthday
Don McNamara

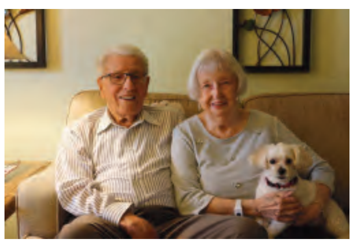
Cheers to 90 years!!!

Happy Birthday Don
(Dad, Grandpa)

Love Kitty, John, Angie, Joe, Tanya, Aidan, Joey, Jack, and Ella. XOXO

Anniversaries

Anniversary



Alec and Jean Fauteux
Celebrating 70 years, January 19, 2022.Married at St. Anne's in Tecumseh, 6 children, 20 grandchildren, and 19 great-grandchildren

Let us in on your BIG NEWS...
• Birth • Engagement
• Wedding
•Graduation
• Retirement

APPENDIX B

Public Information Centre No. 1

1. Notice of Public Information Centre No. 1
2. Notice of PIC No. 1 – Windsor Star Advertisement
3. PIC No. 1 – Sign In Sheet
4. PIC No. 1 – Feedback Form
5. PIC No. 1 – Presentation

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

NOTICE OF PUBLIC INFORMATION CENTRE

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants; the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will review the current management and processing of biosolids for the two wastewater treatment plants and become a guide for how the City of Windsor will meet the needs of our growing community over the next 30 years. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan.

The City is hosting a Public Information Centre (PIC) to present the evaluation of alternative design solutions for managing biosolids. Consultation is an integral part of the EA process and members of the public, agencies, and other interested persons are invited to participate in the upcoming PIC.

PUBLIC INFORMATION CENTRE
Wednesday June 29th, 2022
3:00 p.m. – 7:00 p.m.
Capri Pizzeria Recreation Centre, Black Oak Room
2555 Pulford St, Windsor, ON

Information regarding this Environmental Assessment can be found on the City's project website:https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

Following the PIC, comments are welcomed and will be received until **July 22nd, 2022**.

For further information, please contact:

Ed Valdez, P.Eng.
Manager of Process Engineering and Maintenance
City of Windsor
350 City Hall Square West, Suite 310
Windsor, ON N9A 6S1
519-255-6100 x 3366
evaldez@citywindsor.ca

Jian Li, Ph.D., P. Eng.
Project Manager
Stantec Consulting
2555 Ouellette Avenue, Suite 100
Windsor, Ontario N8X 1L9
519-966-2250 x 240
jian.li@stantec.com

Personal information submitted is collected, maintained, and disclosed under the authority of the *Environmental Assessment Act and the Municipal Freedom of Information and Protection of Privacy Act* for transparency and consultation purposes. Personal information you submit will become part of a public record that is available to the general public, unless you request that your personal information remain confidential.

CLASSIFIEDS

Public Notices

TOWN OF LASALLE

NOTICE OF PUBLIC MEETING
REGARDING 2022 TOWN-CENTRE AREA-SPECIFIC WASTEWATER DEVELOPMENT CHARGE

Take notice that on Tuesday August 9th, 2022 the Council of the Town of LaSalle will hold a public meeting pursuant to the *Development Charges Act, 1997*, regarding a proposed development charge rate for wastewater services to be applied in the Town Centre District of the Town of LaSalle (shown on the attached map). It is proposed that the enactment of an Amending Development Charge By-law by Council would occur on a date subsequent to the public meeting.

Development Charges are levied against new development and are a primary source of funding for growth-related capital expenditures. The 2022 Area-Specific Development Charge Background Study relates to the provision of sanitary services in the Town Centre District to facilitate intensification. The Development Charge provides for the recovery of growth-related costs for wastewater infrastructure.

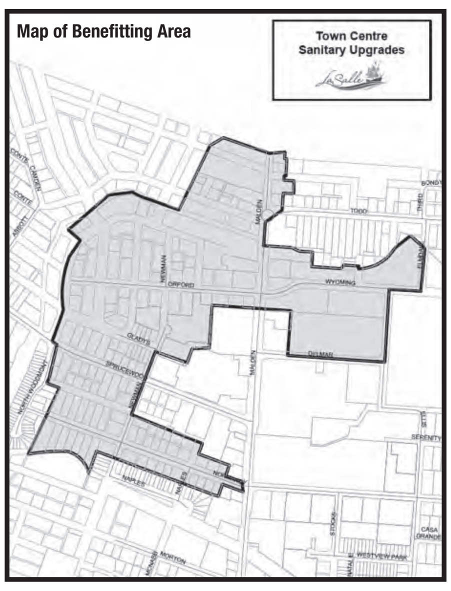
Council is required, under the *Development Charges Act, 1997*, to hold a public meeting to allow the public the opportunity to review and provide comment on the 2022 Area-Specific Development Charges Background Study and the proposed Amending Development Charge By-law.

All interested parties are invited to attend the public meeting on:

Date and Time: **Tuesday August 9th at 6:00 p.m.**
Location: Town of LaSalle, Council Chambers
5950 Malden Road, LaSalle, Ontario

The 2022 Area-Specific Development Charge Background Report, along with the draft Amending Development Charges By-law for the Town Centre Area is available for review from the Town Hall Office at 5950 Malden Road, in the Town of LaSalle, or from the Municipality's website at www.lasalle.ca.

Map of Benefitting Area



Any person may attend the public meeting and make written or verbal representation either in support of or in opposition to the By-law. Written submissions are invited and should be directed to the undersigned. Written comments received prior to the meeting and submissions made at the public meeting will be considered by Council prior to the of Amending Development Charge By-law. All submissions received will become part of a public record.

Dated at the Town of LaSalle this 15th day of June, 2022.

Jonathan Osborne, Director of Public Works
Town of LaSalle
5950 Malden Road, LaSalle
josborne@lasalle.ca

Gudrin Beggs, Director of Planning & Development
Town of LaSalle
5950 Malden Road, LaSalle
gbeggs@lasalle.ca

THE CITY OF WINDSOR ONTARIO, CANADA — Notice

BIOSOLIDS MANAGEMENT STRATEGY
CLASS ENVIRONMENTAL ASSESSMENT

NOTICE OF PUBLIC INFORMATION CENTRE

The City of Windsor is undertaking the Class EA process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This Class EA will identify biosolids processing options and opportunities for the co-processing of source separated organics (SSO) and evaluate options that may generate renewable energy and reduce greenhouse gas emissions.

The City is hosting a Public Information Centre (PIC) to present the evaluation of alternative design solutions for managing biosolids and receive input from interested residents and stakeholders. The PIC will be held on Wednesday June 29th, 2022 (3:00 to 7:00 pm) at the Capri Pizzeria Recreation Centre, Black Oak Room, 2555 Pulford St, Windsor, ON.

Additional details regarding the PIC are available on the City of Windsor's project webpage: https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

THE CITY OF WINDSOR ONTARIO, CANADA

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Jeff Gardiner at jgardiner@rafihautogroup.com

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Leamington GM, 108 Erie St N., Leamington	Countryside Chrysler, 458 Talbot Rd N., Essex; Brampton Chrysler, 190 Canam Crescent, Brampton	Countryside Chrysler, 458 Talbot Rd N., Essex; Brampton Chrysler, 190 Canam Crescent, Brampton	Countryside Chrysler, 458 Talbot Rd N., Essex; Brampton Chrysler, 190 Canam Crescent, Brampton	Countryside Chrysler, 458 Talbot Rd N., Essex; Brampton Chrysler, 190 Canam Crescent, Brampton
Mercedes-Benz of Windsor, 9225 Tecumseh Rd E., Windsor	Mercedes-Benz of Windsor, 9225 Tecumseh Rd E., Windsor	Overseas Motors BMW, 9425 Tecumseh Rd E., Windsor	Performance Ford Lincoln, 1150 Provincial Rd, Windsor	Performance Ford Lincoln, 1150 Provincial Rd, Windsor
Performance Ford Lincoln Superstore, 1155 Provincial Rd, Windsor	Brampton Chrysler, 190 Canam Crescent, Brampton	Eastway Toyota, 9375 Tecumseh Rd, Windsor	Windsor Mazda, 1155 Provincial Rd, Windsor	Leamington GM, 108 Erie St N., Leamington
OAKRIDGE FORD, 601 Oxford St W, London	Leamington GM, 108 Erie St N., Leamington	Leamington GM, 108 Erie St N., Leamington	Countryside Chrysler, 458 Talbot Rd N., Essex; Brampton Chrysler, 190 Canam Crescent, Brampton	Midtown Honda, 3400 Dufferin St., Toronto

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Michelle King @ 519-255-5581 or michelleking@postmedia.com

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THE SCOOP

Drake releases surprise album

Drake has unexpectedly released a new album. The rapper gave fans just a few hours notice that he would drop his seventh studio effort — Honestly, Nevermind — early on Friday. The 14-track LP features Drake mostly singing instead of rapping and includes a collaboration with 21 Savage titled Jimmy Cook's. Honestly, Nevermind follows Drake's September release, Certified Lover Boy.

Game of Thrones spinoff in works

Kit Harington will reprise his role as Jon Snow in a Game of Thrones spinoff. HBO is reportedly in the early stages of developing the new show, says The Hollywood Reporter. The network has explored multiple spinoff series since Game of Thrones ended in 2019, with House of the Dragon set to première in August, but this is the first one set after the events of the main show. So it could mean the return of other surviving characters such as Sansa and Arya Stark (Sophie Turner and Maisie Williams) and Tyrion Lannister (Peter Dinklage).

Eurovision 2023 location up in air

Eurovision Song Contest organizers have ruled out holding the 2023 edition in Ukraine and are looking into staging it in the U.K. instead. Traditionally, the winning nation hosts the competition in the following year, but members of the European Broadcasting Union (EBU) announced "with deep regret" they are seeking an alternative for 2023 because of Russia's ongoing invasion of Ukraine. Since British singer-songwriter Sam Ryder came second to Ukrainian rap-folk group Kalush Orchestra at last month's contest, organizers are planning to work the BBC to hold the competition in the U.K.

Stranger Things No. 1 in streaming

Netflix's horror sci-fi series Stranger Things was the most-streamed offering for the week of June 9-15, according to U.S.-based streaming aggregator Reelgood. With the first part of season 4 released May 27, it dethroned Top Gun: Maverick on Paramount+ and Amazon Prime Video. The Tom Cruise film had spent two consecutive weeks in the top spot. Superhero series The Boys, which debuted its third season June 3 on Amazon Prime Video, came in at No. 3. It was trailed by the Adam Sandler film Hustle (released June 3 on Netflix) at No. 4, and the Marvel Comics show Ms. Marvel (released June 8 on Disney+) at No. 5.

Podcast to focus on Sainte-Marie

A podcast about Buffy Sainte-Marie launches June 21, National Indigenous Peoples Day, though CBC Podcasts. Falen Johnson hosts the five-part series Buffy, exploring how the singer-songwriter's life is essential to understanding Indigenous resilience. In honour of National Indigenous History Month, Sainte-Marie will be interviewed June 20 on CBC's The National, and June 30 on CBC Radio One's Q with Tom Power.

CITY OF WINDSOR
CLASS ENVIRONMENTAL ASSESSMENT
BIOSOLIDS MANAGEMENT STRATEGY
PUBLIC INFORMATION CENTRE
Capri Pizzeria Recreation Complex
June 29th, 2022 – 3:00 p.m. to 7:00 p.m.
SIGN-IN SHEET

No.	Name (Please Print)	Address	Telephone Number
1	Bob Demers	[redacted] Sandwich St	[redacted]
2	Allan Botham	[redacted] abotham@countyofessex.ca	
3	ANDREW NELSON	[redacted] SANDWICH ST	
4	ED VALDEZ	COW	
5	Cathy Copot-Nepszy	EWSWA	
6	Michelle Bishop.	EWSWA	
7	CHRIS NEPSZY	COW	
8	ROBIN TREPANIER	OCWA	
9			
10			
11			
12			

PUBLIC INFORMATION CENTRE
COMMENT FORM

BIOSOLIDS MANAGEMENT STRATEGY

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants; the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will review the current management and processing of biosolids for the two wastewater treatment plants and become a guide for how the City of Windsor will meet the needs of our growing community over the next 30 years.

This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. A variety of potential biosolids management options will be assessed to identify the preferred solution. The preferred option will then be further refined with an evaluation of alternative design concepts leading to selection of a recommended design.

THANK YOU

Thank you for your interest in this project and attendance at this public information centre. Copies of the Public Information Centre material are available on the project website below:

https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

Please return your completed comment form on or before **July 22nd, 2022**, to:

Chrissy Jung, M.A.Sc., E.I.T.
Stantec Consulting Ltd.
Environmental Engineer in Training
Mobile: 519-567-9537
chrissy.jung@stantec.com

Attention: Chrissy Jung
Stantec Consulting Ltd.
2555 Ouellette Avenue, Unit 100
Windsor ON
N8X 1L9

Stantec

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIORNMENTAL ASSESSMENT
PUBLIC INFORMATION CENTRE – COMMENT FORM

Please provide your comments or concerns on the presented material for the Biosolids Management Study:

NAME ______________________________

EMAIL ADDRESS ______________________________

TELEPHONE NO. (   ) ______________________________

DATE ______________________ SIGNATURE ______________________

Stantec

Personal information submitted is collected, maintained, and disclosed under the authority of the *Environmental Assessment Act and the Municipal Freedom of Information and Protection of Privacy Act* for transparency and consultation purposes. Personal information you submit will become part of a public record that is available to the general public, unless you request that your personal information remain confidential.

City of Windsor

Biosolids Management Study

PUBLIC INFORMATION CENTER

WELCOME

Municipal Class Environmental Assessment (Class EA)

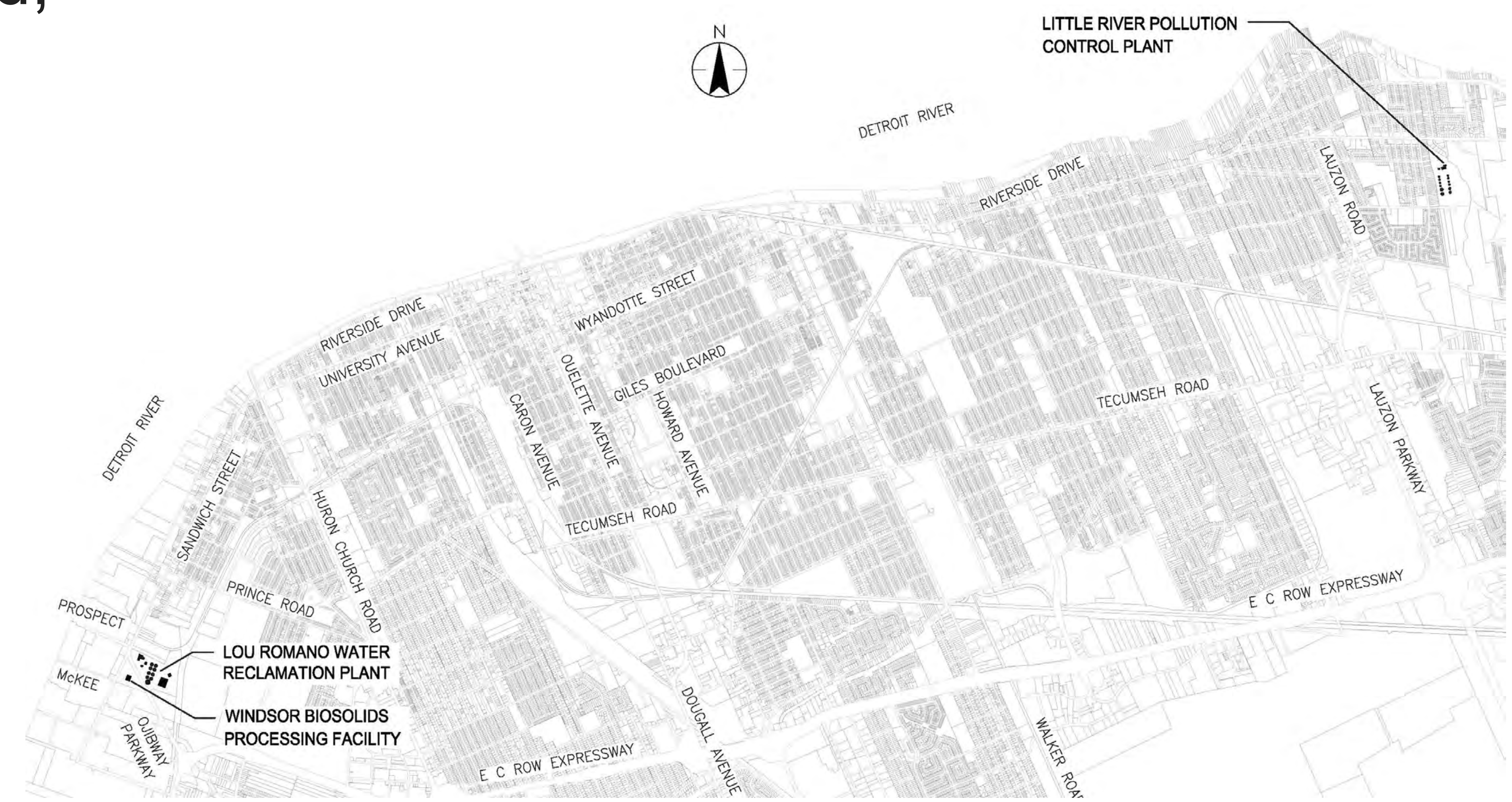
Wednesday, June 29th, 2022

Study Overview

The purpose of this study is to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants.

The purpose of this Public Information Center (PIC) is to:

- Introduce the study background, problem and opportunity statements, and describe the Class EA process
- Present an evaluation of the alternative solutions for managing biosolids
- Obtain public feedback on the preferred solution



Background
Lou Romano Water Reclamation Plant (WRP)

Service Area:

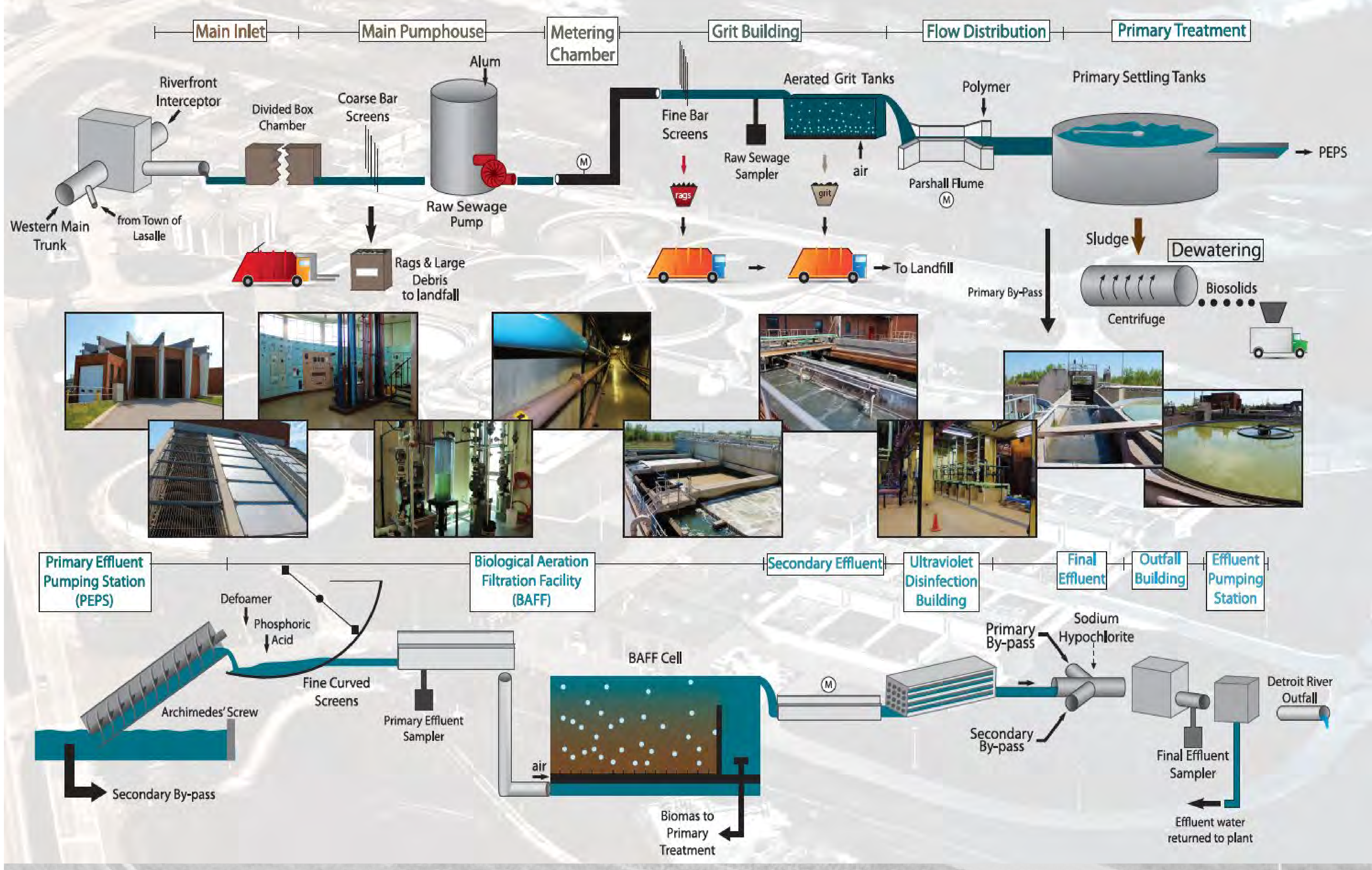
- Central and western portion of the City
- Northern portion of the Town of LaSalle

Treatment Capacity:

- Provides treatment for municipal and industrial wastewater
- Rated primary capacity of 273,000 m^3/d
- Rated secondary capacity of 218,000 m^3/d

Treatment Process

- Coarse and fine screening, grit removal, primary enhanced clarification, biological aerated filtration, and UV disinfection
- Sludge dewatering by centrifuge



Background

Little River Pollution Control Plant (PCP)

Service Area:

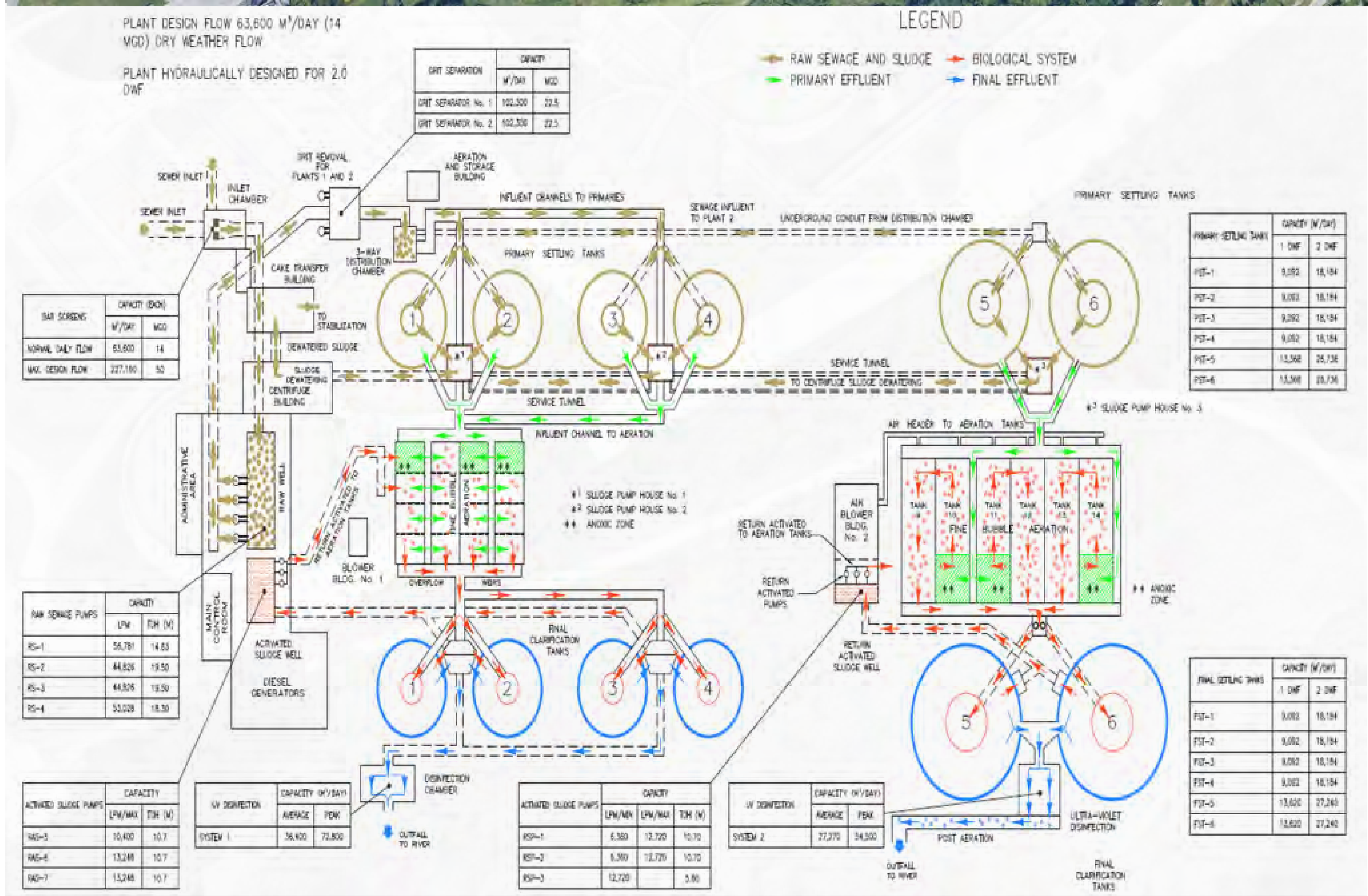
- Eastern portion of the City
- Town of Tecumseh

Treatment Capacity:

- Provides treatment for municipal and industrial wastewater
- Rated secondary capacity of 73,000 m^3/d

Treatment Process

- Fine bar screening, grit removal, primary enhanced clarification, conventional activated sludge with nitrification, and UV disinfection
- Sludge dewatering by centrifuge



Background
Existing Biosolids Management Strategy

Biosolids Production:

- Dewatered sludge cake have a dry solids content of approximately 30%
- Lou Romano WRP currently produces 8,500 dry tonnes of biosolids/year
- Little River PCP currently produces 2,400 dry tonnes of biosolids/year

Biosolids Management:

- Dewatered sludge cake from both plants are transferred to the Windsor Biosolids Processing Facility (WBPF)
- Sludge cake are heat dried and pelletized to form fertilizer products sold throughout Southwestern Ontario

Problem Statement

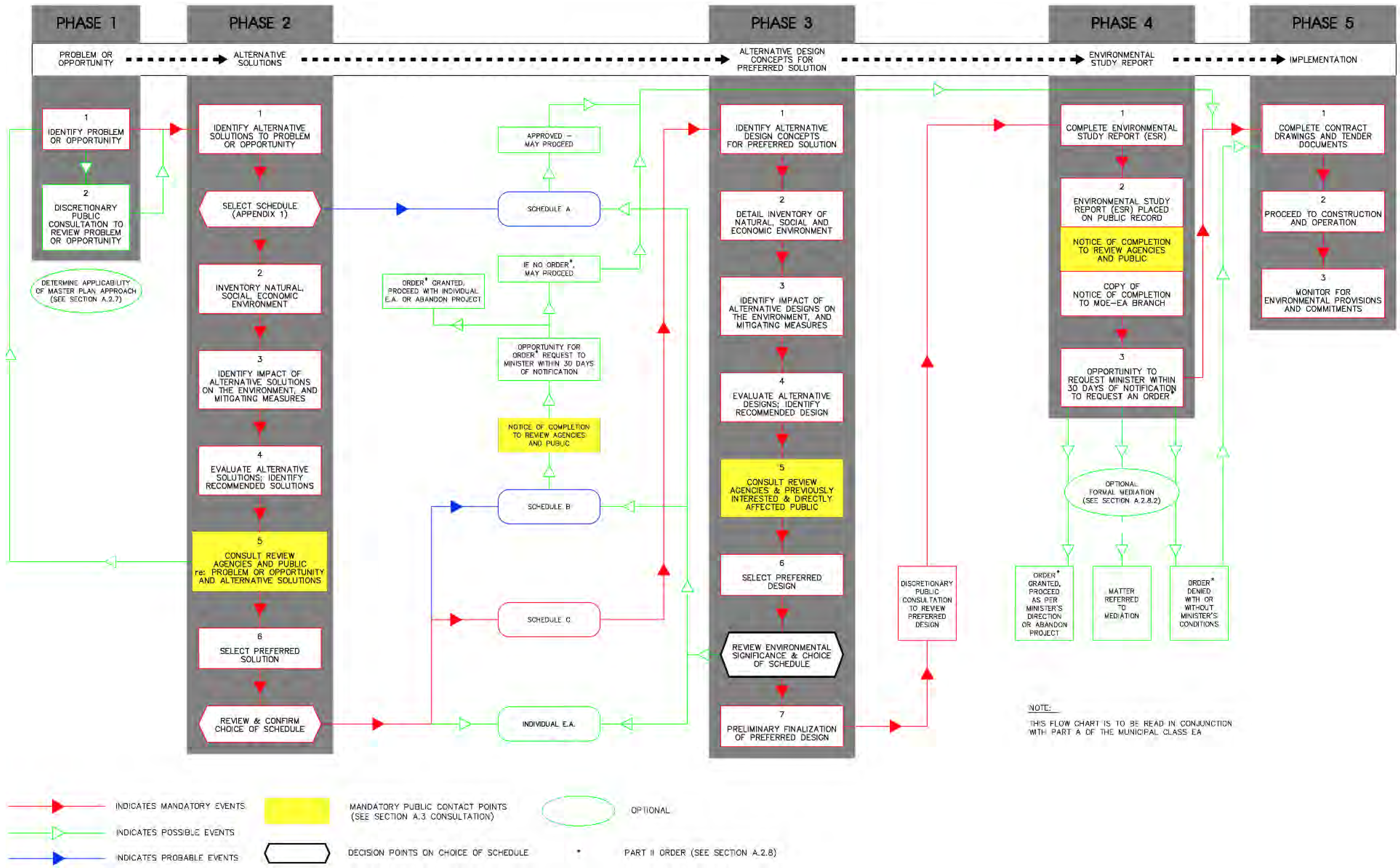
The purpose of this study is to:

- Assess biosolids management strategy to meet future needs at the two wastewater treatment facilities
- Improve upon energy conservation commitments outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan (CEP)

This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the CEP.

Background

Overview of the Class EA Process



Background

Key Features of the Class EA Process

The project is being conducted in accordance with the Class EA requirements for 'Schedule C Projects', which is to be approved subject to completion of the following Class EA process:

Municipal Class EA Phases
Phase 1 – Review and identify problem or opportunity
Phase 2 – Alternative solutions to problem
Phase 3 – Alternative design concepts for the preferred solution
Phase 4 – Environmental Study Report
Phase 5 – Implementation of the preferred design

This open house is being held as a part of Phase 1 and 2

Design Alternatives
Evaluation Criteria

Component	Evaluation Criteria
Technical Suitability	• Ability to meet biosolids management needs • Constructability, implementation timeline, and reliability • Flexibility to meet future needs or climate change predictions • No adverse impacts on existing infrastructure operations or maintenance
Social	• Impact to archaeological, built heritage, and cultural heritage • Noise, vibration, odour, or air pollution emissions • Permanent changes or impacts to society • Development policies and agreements
Natural Environment	• Impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and soil / geology. • Development and planning policies • Reduction of energy consumption and/or greenhouse gas (GHG) emissions
Economic	• Capital, operational, and maintenance (lifecycle) costs • Energy savings

Design Alternatives
Overview

Alternative Solutions considered in this phase for the management and processing of wastewater residuals in the City of Windsor include:

Alternative 1:	Do Nothing
Alternative 2:	Process Improvements at the Existing WBPF
Alternative 3:	Incineration
Alternative 4:	Composting
Alternative 5:	Anaerobic Digestion with Biogas Utilization

Design Alternatives
Alternative No. 1 – Do Nothing

- Poor
- Fair
- Good
- Very Good

Technical Suitability:

- Unable to meet future biosolids management needs

Social:

- Inconsistent with City's Community Energy Plan

Natural Environment:

- High energy consumption and GHG emissions

Economic:

- High operation and maintenance costs

Design Alternatives
Alternative No. 2 – WBPF Upgrade

- Poor (red)
- Fair (yellow)
- Good (light green)
- Very Good (green)

- Technical Suitability: (Fair)
  - Unable to meet future biosolids management needs
  - Proven and reliable solution; however, WBPF is nearing the end of its service life
  - Not viable as a long-term solution
- Social: (Poor)
  - Inconsistent with City's Community Energy Plan
- Natural Environment: (Poor)
  - High energy consumption and GHG emissions
- Economic: (Good)
  - Moderate capital cost investment

Design Alternatives
Alternative No. 3 – Incineration

- Poor
- Fair
- Good
- Very Good

- Technical Suitability:
  - Flexible to meet current and future biosolids management needs
- Social:
  - Increased risk of air pollution emissions
- Natural Environment:
  - Slight reduction in energy consumption and GHG emissions with appropriate engineering controls
  - Restrictive permitting requirements
- Economic:
  - High capital cost investment

Design Alternatives
Alternative No. 4 – Composting

- Poor
- Fair
- Good
- Very Good

- Technical Suitability:
  - Flexible to meet current and future biosolids management needs
  - Proven and reliable solution
  - Less complex construction and operation
  - Large land area requirements
- Social:
  - Higher potential for odour emissions
- Natural Environment:
  - Moderate reduction in energy consumption and GHG emissions
- Economic:
  - Moderate capital cost investment

Design Alternatives

Alternative No. 5 – Anaerobic Digestion

- Poor
- Fair
- Good
- Very Good

Technical Suitability:

- Able to meet management needs
- Flexible to meet future needs
- More complex construction and operation
- Smaller land area requirements

Social:

- Low to no potential for odour emissions

Natural Environment:

- High reduction in energy consumption and GHG emissions

Economic:

- High capital cost investment
- Higher potential for federal and provincial grant programs

Design Alternatives
Evaluation Summary

- Poor
- Fair
- Good
- Very Good

Alternative	Technical	Social	Natural Environment	Economic	Evaluation Result
Alternative 1: Do Nothing	Poor	Poor	Poor	Very Good	Not the preferred alternative as it will not meet future biosolids management needs.
Alternative 2: WBPF Upgrade	Fair	Poor	Poor	Good	Not the preferred alternative as it will not meet future biosolids management needs and the WBPF is near its end of service life.
Alternative 3: Incineration	Good	Poor	Poor	Poor	Not the preferred alternative due to prohibitive cost and permitting requirements.
Alternative 4: Composting	Good	Poor	Fair	Fair	Not the preferred alternative due to large land area requirements and high potential for odour emissions.
Alternative 5: Anaerobic Digestion	Good	Very Good	Very Good	Fair	**Selected as the preferred alternative based on the ability to address future biosolids management needs while providing energy savings and GHG emission reductions.**

Preferred Solution

Anaerobic Digestion with Biogas Utilization

- Anaerobic digestion is a solids stabilization process which utilizes microorganisms to decompose organic materials while simultaneously reducing odours and pathogens from the solids stream

- Anaerobic digestion produces biogas which may be used via combined heat and power or processed and upgraded to renewable natural gas

- Biogas can be used as an alternative for the renewable production of heat, electricity, and/or fuel

- Remaining solids from anaerobic digestion can be used in the agricultural sector as a fertilizer

Preferred Solution

Anaerobic Digestion with Biogas Utilization

Next Steps

Project Component	Date
Evaluation of Alternative Design Concepts	Summer/Fall 2022
Public Information Centre No. 2 - Preferred Design Concepts	Fall 2022
Environmental Study Report	Fall 2022
Council Presentation	Winter 2022
Notice of Completion	Winter 2022

Thank You

Please visit the City of Windsor's project website to submit a feedback form.
Biosolids Management Strategy (citywindsor.ca)

APPENDIX B

Public Information Centre No. 2

1. Notice of Public Information Centre No. 2
2. Notice of PIC No. 2 – Windsor Star Advertisement
3. PIC No. 2 – Sign In Sheet
4. PIC No. 2 – Feedback Form
5. PIC No. 2 – Presentation

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

NOTICE OF PUBLIC INFORMATION CENTRE NO.2

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants; the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will review the current management and processing of biosolids for the two wastewater treatment plants and become a guide for how the City of Windsor will meet the needs of our growing community over the next 30 years. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan.

The City is hosting a second Public Information Centre (PIC) to present the evaluation of alternative design concepts for biosolids management utilizing anaerobic digestion technologies. Consultation is an integral part of the EA process and members of the public, agencies, and other interested persons are invited to participate in the upcoming PIC.

PUBLIC INFORMATION CENTRE NO. 2
Tuesday January 31st, 2023
4:00 p.m. – 7:00 p.m.
Capri Pizzeria Recreation Centre, Black Oak Room
2555 Pulford St, Windsor, ON

Information regarding this Environmental Assessment can be found on the City's project website:https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

Following the PIC, comments are welcomed and will be received until **February 28th, 2023**.

For further information, please contact:

Ed Valdez, P.Eng.
Manager of Process Engineering and Maintenance
City of Windsor
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In 2022, interest rates moved back up to more sustainable levels, price-to-earnings multiples came down and investor behaviour became more rational — all keys to better returns, says Tom Bradley. *ANDREW KELLY/REUTERS*

COMMENT

Why investing now is better than in the go-go days of 2021

New landscape conducive to steady corporate profits, *Tom Bradley* writes.

In my year-end letter to clients, I talked about 2022 as a year of normalization. Interest rates moved back up to more sustainable levels, price-to-earnings (P/E) multiples came down and investor behaviour became more rational. The investment landscape is now more conducive to generating attractive investment returns.

Let's look at the assumptions that underpin this view.

FIXED-INCOME FIXING

Savers can once again generate an income by holding fixed-income securities and guaranteed investment certificates (GICs). To call yields more normal, however, assumes that inflation comes down significantly. If it doesn't and was to stay at, say, eight per cent, then a bond yielding five per cent would have a real yield of minus three per cent. The holder would have significantly less purchasing power when the bond matured compared to when it was bought.

Negative real yields run counter to economic theory, but there were a few noteworthy periods when they persisted. Bond holders suffered in the 1970s when yields didn't keep up with spiralling inflation. Interest rates rose, but real yields were still negative. That happened again in 2019, but for a different reason. Central banks pushed interest rates down near zero (below modest inflation) to stimulate the economy (and appease investors).

Real yields have stayed negative since then, but the reason has flipped back to the 1970s scenario. Even though the stimulation pump was turned off, yields failed to keep up with the rapid rise in inflation.

Fortunately, recent data suggests inflation is starting to decline, although it will be months before we know if buying a five-per-cent bond was a good purchase or not. I'm betting it will be.

BETTER PRICING

Prior to last year, P/E multiples were running well above their historical range. Starting from a peak in the summer of 2021, however, the broad market P/E dropped to its long-term average of 16x (as measured by the Value Line Investment Survey) from the low 20s.

P/Es have come down because of declines to the P (stock prices), but what about the E? Don't earnings have to hold up for valuations to be considered reasonable? An economic slowdown will undoubtedly hinder profit growth and result in losses for some companies. Nonetheless, I'm now comfortable with valuations for two reasons.

First, I think profits will hold up better than the recession doomsayers suggest. Sales volumes are likely to fall, but some of the cost headwinds corporations are facing — labour shortages, supply chain challenges, high input prices and a strong United States dollar — will abate, too. And, whether we like it or not, many industries are highly concentrated and are more cooperative than competitive.

Second, an average P/E is a good measure for comparing a stock price to the company's ongoing earnings power. But when earnings are depressed, investors look further out to the company's longer-term potential. I have no doubt we'll read about an economist applying an average multiple to trough earnings and declaring the market overvalued, but it doesn't work that way. Indeed, the best time to buy a resource or other highly cyclical stock is when the P/E is sky high, or infinite (no profits).

I don't deny that stocks are vulnerable to lower profit estimates, but I am happy to buy a great business at a good price. If that price goes from good to great, I'll buy more.

INVESTOR SENTIMENT

The third thing to normalize is investor sentiment. Prior to the market decline, investor behaviour could only be described as speculative, euphoric and go-for-broke. We had it all. Meme stocks were hot, as were loss-making tech companies, cryptocurrencies and non-fungible tokens. Individual investors traded like bandits and there was an unprecedented level of options trading. I've never seen anything like it, and I was around during the dot.com boom in the late 1990s.

Since then, investor sentiment has come full circle, hitting extreme levels of fear last summer and early fall. The bearishness has moderated recently, but investors are still cautious, which makes it easier for companies to meet, or beat, expectations.

If yields are better, inflation is trending down, stocks are reasonably priced and investors are acting more rationally, what will drive returns from here?

Well, the answer isn't very exciting, especially compared to the go-go days of 2021. It's the same thing that always drives returns: corporate profits. No matter the hype around trends and macro issues, stock prices are ultimately linked to companies expanding, making a profit and paying dividends.

Boring, right? Well, maybe, but I like investors' chances way more now than I did in the exciting new world of 2021.

Financial Post

Tom Bradley is chair and co-founder of Steadyhand Investment Funds, a company that offers individual investors low-fee investment funds and clear-cut advice. He can be reached at tbradley@steadyhand.com

Wave of tech layoffs tips power back in favour of employers

TARA DESCHAMPS

TORONTO Members of Canada's technology industry say another wave of layoffs the sector saw this week is tipping the power dynamic back in favour of employers.

Tech workers have had more power to negotiate better salaries and roles in recent years because they were growing so fast amid pandemic-era demand and needed top talent to keep up, said Marissa McNeelands, chief executive of women's tech collective Toast.

Now that cuts have spread to even the most prominent tech companies with layoffs this week at Amazon and Google, she says there are increasing numbers of laid-off workers. As a result, companies can be more choosy about hiring and less generous with salaries.

"So for the last year and a half, two years, it's really been workers who have the leverage, have the power and there was a shortage, and now we're tipping the other way," she said Friday in an interview.

Abdullah Snobar, executive director of the DMZ tech hub in Toronto, noticed the same shift and said it began about 12 months ago, after companies had been speeding to hire and borrowing money was so cheap that large salaries were even more possible.

However, inflation is now stubbornly high, interest rates have been hiked significantly and many economists foresee a recession.

"An employee can't walk into the interview and ask for everything under the sun anymore," Snobar said.

His assessment comes as Google chief executive Sundar Pichai told staff Friday that his company would be laying off 12,000 workers.

"Over the past two years we've seen periods of dramatic growth," he said in an open memo announcing the cut.

"To match and fuel that growth, we hired for a different economic reality than the one we face today."

Tech companies have been reducing their workforces since last spring, when valuations began falling and investor interest faded as consumers returned to pre-pandemic habits.

Earlier in the week, Amazon laid off 18,000 staff, Microsoft slashed 10,000 jobs and WeWork cut 300 workers.

In Canada, layoffs included 300 people at Lightspeed, 150 at Clutch and 70 at Hootsuite.

They followed other prominent tech companies like Shopify Inc., Meta, Netflix, Lyft and Stripe, which conducted layoffs over the last year.

Layoffs aggregator Layoffs.fyi has counted 55,324 global tech workers who have lost their jobs since 2023 began and 2022 ended with 155,126 departing.

The number of layoffs could also change how attractive Canadian tech workers are to U.S. companies. Canada has long lamented the "brain drain," a phenomenon where people educated in the country flock south of the border for jobs and financial or lifestyle reasons.

A 2018 study based on the LinkedIn profiles of graduates from the universities of Toronto, British Columbia and Waterloo in 2015 and 2016 revealed 66 per cent of software engineering and 30 per cent of computer science students were leaving Canada for work after graduation.

> *U.S. companies now have a much larger pool to pick from ... so they might not be looking to go to someone in Canada.*

The study's U of T and Brock University researchers found students moved because they felt a big employer would boost their future hiring prospects, their scope of work would be larger and they were promised higher salaries.

U.S. companies relished their ability to hire Canadian workers, which are known for their artificial intelligence skills, because they helped plug shortages and boost the country's talent ranks.

The layoffs may "keep more Canadians within Canada" because U.S. companies must abide by a different set of payroll, compliance and tax laws when hiring outside the country they are incorporated in, McNeelands said.

"U.S. companies now have a much larger pool to pick from with layoffs happening, so they might not be looking to go to someone in Canada."

The Canadian Press

Patriot Battery surges on lithium drill results

NAIMUL KARIM

Patriot Battery Metals Inc.'s shares surged this week after the miner reported its "widest, highest" lithium drill reading to date at a deposit the company is exploring in northern Quebec.

Vancouver-based Patriot Battery, which changed its name from Gaia Metals Corp. in 2021, is focused on exploring properties in B.C., Northwest Territories, Quebec and Idaho. Its chief executive, Blair Way, has worked in the resources sector for more than three decades, including a stint as a project director at BHP Group Ltd.

Way is now leading one of the hottest companies on the TSX Venture Exchange with its stock up about 275 per cent from a year ago. Patriot's bet is on its Corvette property, a 21,357-hectare spread in the James Bay region in Quebec, which it discovered in 2016 after going through previous data on the property left by miners who were looking for gold.

The property is near Australia-based Allkem Ltd.'s James Bay lithium deposit, a project that is far more advanced. Allkem received federal approval on Monday to develop a mine, leaving approval of the provincial government as the final major hurdle.

Patriot reported results from 14 drill holes on Wednesday. One, named CV22-083, returned an assay — a chemical analysis that determines the proportion of metal present — of 2.12 per cent lithium at an interval of 156.9 metres, signifying the possibility of the presence of a good amount of lithium in that specific region of the deposit. Patriot reported at least four other positive assays.

"It is hard to find words to adequately describe the impressive nature of the lithium mineralization in drill hole CV22-083," said Darren Smith, the company's vice-president of exploration, in a news release.

Shares jumped 22 per cent Thursday in Toronto to $9.69 and were up more than five per cent Friday.

Financial Post

CITY OF WINDSOR
CLASS ENVIRONMENTAL ASSESSMENT
BIOSOLIDS MANAGEMENT STRATEGY
PUBLIC INFORMATION CENTRE NO. 2
Capri Pizzeria Recreation Complex
January 31st, 2022 – 4:00 p.m. to 7:00 p.m.
SIGN-IN SHEET

No.	Name (Please Print)	Address / company	Telephone Number
1	Eric Carducci (	(Enbridge GAS)	[redacted]
2	ANDREW NELSON	SYNAGRO	
3	BOB DEMERS	"	
4	Jake Renaud	City of Windsor	
5	Ed Valdoz	COW	
6	CHRIS MANZON	ENWIN	
7	Mike Reaume	ENWIN	
8	Aaron Lawt	OCWA	
9			
10			
11			
12			

PUBLIC INFORMATION CENTRE NO. 2
COMMENT FORM

BIOSOLIDS MANAGEMENT STRATEGY

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants; the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will review the current management and processing of biosolids for the two wastewater treatment plants and become a guide for how the City of Windsor will meet the needs of our growing community over the next 30 years.

This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. A variety of potential biosolids management options were assessed to identify the preferred solution (anaerobic digestion with biogas utilization). The preferred option will be further refined with an evaluation of alternative design concepts leading to selection of a recommended design.

THANK YOU

Thank you for your interest in this project and attendance at this public information centre. Copies of the Public Information Centre material are available on the project website below:

https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Biosolids-Management-Strategy.aspx

Please return your completed comment form on or before **February 24th, 2023**, to:

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Stantec

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIORNMENTAL ASSESSMENT
PUBLIC INFORMATION CENTRE NO. 2 – COMMENT FORM

Please provide your comments or concerns on the presented material for the Biosolids Management Study:

NAME ____

EMAIL ADDRESS ____________________________________

TELEPHONE NO. (   ) ______________________________

DATE____________________SIGNATURE ____________________

Stantec

Personal information submitted is collected, maintained, and disclosed under the authority of the *Environmental Assessment Act and the Municipal Freedom of Information and Protection of Privacy Act* for transparency and consultation purposes. Personal information you submit will become part of a public record that is available to the general public, unless you request that your personal information remain confidential.

City of Windsor

BIOSOLIDS MANAGEMENT STUDY

PUBLIC INFORMATION CENTER NO.2

WELCOME

Municipal Class Environmental Assessment (Class EA)

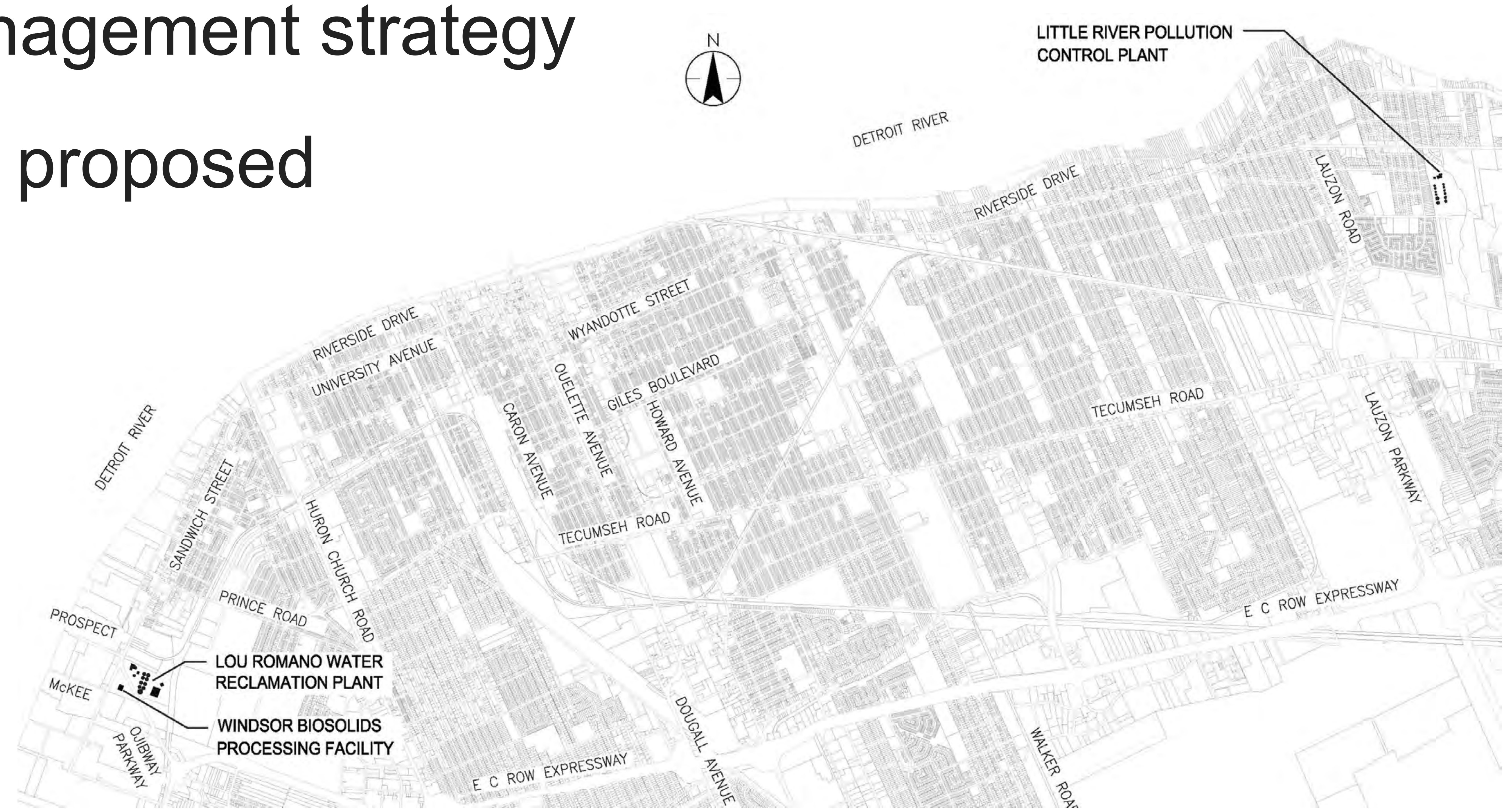
Tuesday January 31st, 2023

Study Overview

The purpose of this study is to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants.

The purpose of this Public Information Center (PIC) is to:

- Present an evaluation of alternative design concepts for the preferred biosolids management strategy
- Obtain public feedback on the proposed design concepts
- Include feedback from the public and review agencies in the evaluation process to finalize the selection of the preferred design



Background
Introduction

The City of Windsor owns and operates two wastewater treatment plants:

- ➢ Lou Romano Water Reclamation Plant (LRWRP)
- ➢ Little River Pollution Control Plant (LRPCP)

- LRWRP and LRPCP produce excess solids known as waste activated sludge (WAS)
- Biosolids management deals with all aspects of handling this WAS including storage, dewatering or thickening, stabilization, and ultimate disposal
- Currently, WAS from the LRWRP and LRPCP is stored and dewatered onsite via centrifuge and then transferred to the Windsor Biosolids Processing Facility (WBPF) where it is heat dried and pelletized to form a fertilizer product

Background

Existing Biosolids Management Strategy

LRWRP → Sludge → **Centrifuge Dewatering** → Sludge Cake → **Windsor Biosolids Processing Facility** → Fertilizer → **Land Application**

LRPCP → Sludge → **Centrifuge Dewatering** → **Windsor Biosolids Processing Facility**

Waste activated sludge from the treatment processes is dewatered via centrifuge at each treatment plant.	Dewatered sludge cake is transferred from the two plants to the WBPF via tractor trailers.	Dewatered sludge cake is heat dried and pelletized at the WBPF to form fertilizer products sold throughout Southwestern Ontario.

Background
Current and Future Biosolids Loading

Biosolids loading in tonnes of dry solids per year:

	Existing Load (Historic Average 2018 – 2021)	20-Year Design	Ultimate Design
LRWRP	8,500	16,000	24,000
LRPCP	2,500	8,000	10,500
Total	**11,000**	**24,000**	**34,500**

- 2:1 sludge production ratio for the LRWRP:LRPCP
- The biosolids management facility will be designed for the 20-year sludge projection with an initial capacity of 24,000 tDS/yr and potential for future expansion to 35,000 tDS/yr
- This design provides interim capacity for supplementary feedstock materials

Problem Statement

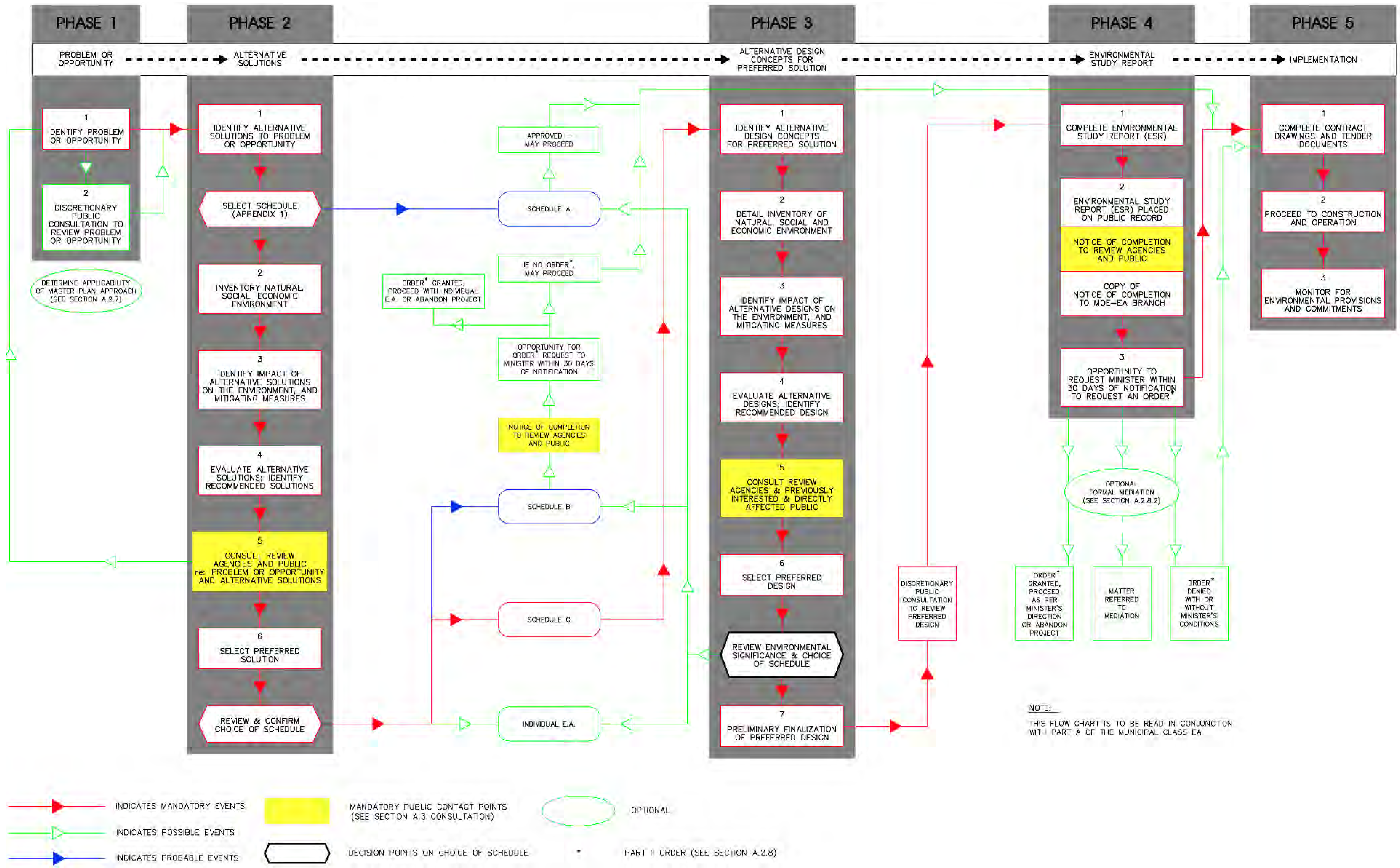
The purpose of this study is to:

- Assess biosolids management strategy to meet future needs at the two wastewater treatment facilities
- Improve upon energy conservation commitments outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan (CEP)

This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the CEP.

Environmental Assessment Process

Overview of the Class EA Process



Environmental Assessment Process

Key Features of the Class EA Process

The project is being conducted in accordance with the Class EA requirements for 'Schedule C Projects', which is to be approved subject to completion of the following Class EA process:

Municipal Class EA Phases
Phase 1 – Review and identify problem or opportunity
Phase 2 – Alternative solutions to problem
Phase 3 – Alternative design concepts for the preferred solution
Phase 4 – Environmental Study Report
Phase 5 – Implementation of the preferred design

This open house is being held as a part of Phase 3

Environmental Assessment Process

Phase 1 & 2 Class EA – Completed

The preferred design solution for biosolids management has been identified:

- Anaerobic Digestion with Biogas Utilization
- Located on City owned Lands adjacent to the Lou Romano Water Reclamation Plant (LRWRP) and/or Windsor Biosolids Processing Facility

Phase 3 Class EA – Ongoing

- Review alternative design concepts which may satisfy the preferred solution
- Identify alternative anaerobic digestion and biogas utilization technologies that might be considered for reducing energy consumption and GHG emissions at the two wastewater treatment facilities
- Select preferred design, which satisfies biosolids management criteria; minimizes undesirable impacts on the natural, social and economic environment; and is acceptable to the public and regulatory agencies

This open house is being held as a part of Phase 3

Design Alternatives
Evaluation Criteria

Component	Evaluation Criteria
Technical Suitability	• Ability to meet biosolids management needs • Constructability, implementation timeline, and reliability • Flexibility to meet future needs or climate change predictions • No adverse impacts on existing infrastructure operations or maintenance
Social	• Impact to archaeological, built heritage, and cultural heritage • Noise, vibration, odour, or air pollution emissions • Permanent changes or impacts to society • Development policies and agreements
Natural Environment	• Impacts to vegetation, fish and wildlife, areas of natural and scientific interest, environmentally sensitive areas, and soil / geology. • Development and planning policies • Reduction of energy consumption and/or greenhouse gas (GHG) emissions
Economic	• Capital, operational, and maintenance (lifecycle) costs • Energy savings

Design Alternatives
Overview of Biosolids Management Alternatives

Alternative design concepts considered for the implementation of the preferred biosolids management strategy fall into the following general categories:

Sludge Handling
- Trucking LRPCP Sludge Cake
- Pumping LRPCP Liquid Sludge

Sludge Pretreatment
- Biological
- Thermal
- Mechanical / Electrical
- Chemical

Type of Anaerobic Digestion
- Mesophilic Anaerobic Digesters
- Thermophilic Anaerobic Digesters
- Temperature Phased Anaerobic Digesters
- Acid / Gas Phased Anaerobic Digesters

Site Selection
- LRWRP
- WBPF

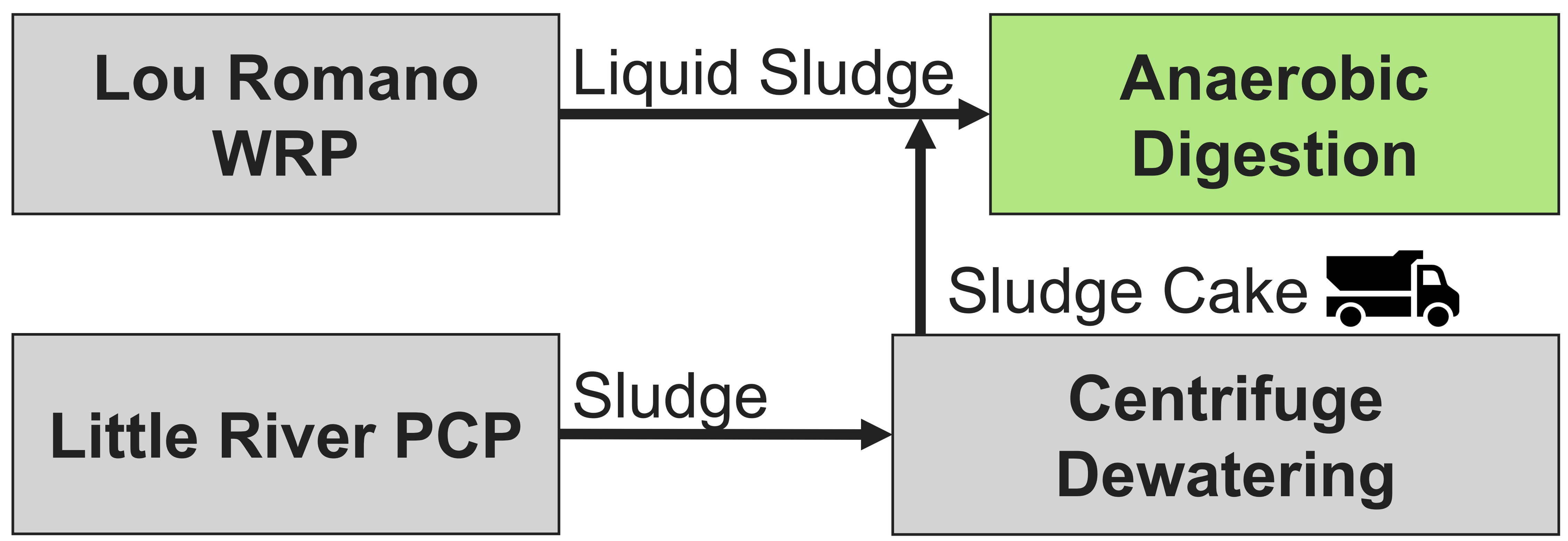
Digestate Handling
- WBPF
- Storage and Land Application

Biogas Utilization
- Heat (via boiler)
- Combined Heat and Power (CHP)
- Renewable Compressed Natural Gas (R-CNG)
- Renewable Natural Gas (RNG)

Evaluation of Design Alternatives
Sludge Handling

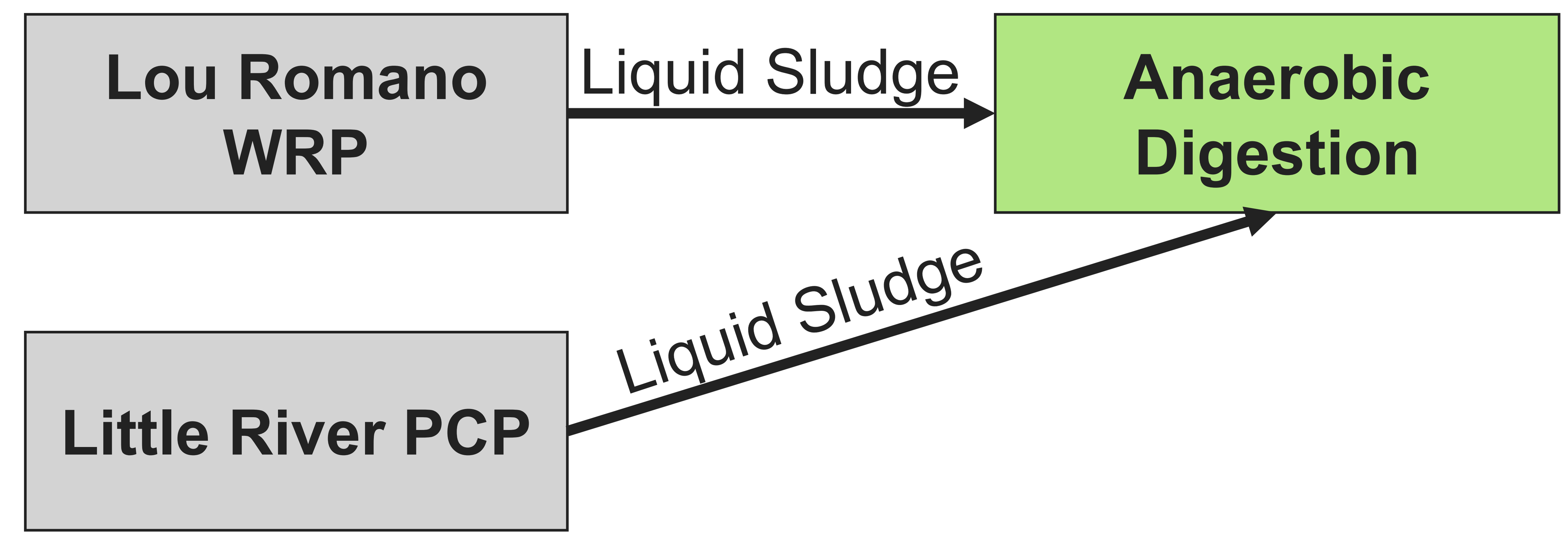
Alternative design concepts considered for sludge handling include:

LRPCP Sludge Cake Trucked to Anaerobic Digestion



- Liquid sludge from LRPCP centrifuged onsite to a dry solids content of approximately 27 %
- Dewatered sludge cake trucked via tractor trailer to a sludge holding tank at the anaerobic digestion facility
- Liquid sludge from LRWRP removed from treatment process with a solids content of approximately 5 % and pumped to anaerobic digestion facility
- Sludge from LRWRP mixed with sludge cake from LRPRP in sludge holding tank, diluted (as necessary), and fed to anaerobic digestion at approximately 8 % dry solids

LRPCP Sludge Piped to Anaerobic Digestion



- Liquid sludge from LRPCP removed from treatment process and diluted (as necessary) to a solids content of approximately 2 %
- Liquid pumped via pipeline to a sludge holding tank at the anaerobic digestion facility
- Liquid sludge from LRWRP removed from treatment process with a solids content of approximately 5 % and pumped to anaerobic digestion facility
- Sludge from LRWRP and LRPCP mixed, thickened (as necessary) and fed to anaerobic digestion at approximately 4 % dry solids

Evaluation of Design Alternatives

Sludge Handling

Poor
Fair
Good
Very Good

	LRPCP Sludge Cake Trucked to LRWRP	LRPCP Sludge Piped to LRWRP
Technical Suitability	• Suitable solids content for anaerobic digestion or sludge pretreatment technologies • High level of control over solids concentration fed to anaerobic digestion • Flexible to meet future needs • Simple O&M	• Centrifuging may be required to reach suitable solids content for anaerobic digestion or pretreatment Lower level of control over solids concentration fed to anaerobic digestion • Less flexible to meet future needs • Complex construction / O&M
Social & Natural Environment	• Emissions from transportation across the City (equivalent to existing management strategy)	• High social and environmental impact from installation of approximately 20 km of forcemain piping and multiple pumping stations
Economic	• No capital cost • Moderate O&M	• High capital cost • Low-moderate O&M cost
Overall	Good	Fair

Trucking LRPCP sludge cake to the anaerobic digestion facility appears to be preferred because it provides increased control over solids concentration, lower capital cost, and is flexible to meet future needs. Piping sludge from LRPCP to the anaerobic digesters should be reconsidered during future expansion studies or when major upgrades to the LRPCP centrifuges are expected.

Evaluation of Design Alternatives
Sludge Pretreatment

Pretreatment may be implemented at the anaerobic digestion facility for improved biogas production, biosolids quality, digestion capacity, and digestate dewaterability.

Alternative design concepts considered for sludge pretreatment include:

Biological Pretreatment	• Includes enzymatic hydrolysis and microbial electrolysis cells • Biological pretreatment employs microorganisms to breakdown biomass rendering it more bioavailable for anaerobic digestion
Thermal Pretreatment	• Thermal Hydrolysis Process (THP) is a pre-digestion conditioning process which treats solids in a batch reaction at elevated temperature and pressure to breakdown biomass rendering it more bioavailable for anaerobic digestion
Mechanical / Electrical Pretreatment	• Includes ultrasonification, microwave irradiation, electrokinetic disinigration, and high-pressure homogenization • Mechanical / electrical pretreatment methods work to break apart sludge flocs and denature complex biological molecules making biomass more bioavailable for anaerobic digestion
Chemical Pretreatment	• Includes acidic and alkali pretreatment, ozonation, fenton oxidation, and Fe(II)-activated persulfate oxidation • Chemical pretreatment employs strong reagents to deform biomass cell wall rendering it more bioavailable for anaerobic digestion

Evaluation of Design Alternatives

Sludge Pretreatment

Legend
Poor
Fair
Good
Very Good

	Biological	Thermal	Mechanical / Electrical	Chemical
Technical Suitability	Poor • Limited full-scale applications • Moderately robust and resilient • Complex O&M	Very Good • Proven and reliable full-scale applications • Highly robust and resilient • Complex O&M • Reduces biosolids volume for improved anaerobic digester capacity	Fair • Limited full-scale applications • Highly robust and resilient • Complex O&M	Fair • Limited full-scale applications • Highly robust and resilient • Complex O&M
Social & Natural Environment	Very Good • Small footprint • No chemical use	Very Good • Small footprint • No chemical use	Very Good • Small footprint • No chemical use	Fair • Moderate footprint • Chemical use
Economic	Good • High capital cost • High O&M cost • Improved biogas production and energy savings	Good • High capital cost • High O&M Cost • Improved biogas production and energy savings	Fair • High capital cost • High O&M costs • Higher energy cost • Improved biogas production and energy savings	Fair • High capital cost • High O& M costs • Chemical cost • Improved biogas production and energy savings
Overall	Good	Very Good	Good	Fair

Thermal Pretreatment (THP) appears to be preferred because it is a proven and reliable technology, is robust and resilient, and effectively reduces biosolids volume resulting in improved anaerobic digester capacity.

Evaluation of Design Alternatives
Type of Anaerobic Digestion

Alternative design concepts considered for type of anaerobic digestion include:

Mesophilic Anaerobic Digesters (MAD)	• Mesophilic organisms thrive in the temperature range of 30 °C to 38 °C • Proven and reliable technology which makes up majority (~90 %) of anaerobic digestion processes at WWTPs • Retention time for MAD is greater than 15 days
Thermophilic Anaerobic Digesters (TAD)	• Thermophilic organisms thrive in the temperature range of 50 °C to 57 °C • Higher operating temperature increases digestion rate and biogas production • Retention time for TAD is greater than 15 days
Temperature Phased Anaerobic Digesters (TPAD)	• TPAD incorporates both thermophilic and mesophilic reactors connected in series • Combines the higher digestion rate of TAD and higher stability of MAD • Limited full-scale applications; thermal pretreatment provides similar advantages and is increasingly more common worldwide
Acid / Gas Phased Anaerobic Digesters (A/G Phase)	• In this process, the acid-forming steps and gas-forming steps of the anaerobic digestion process are conducted in separate digestion tanks • Allows for improved control of operating conditions optimizing biogas production • Limited full-scale applications

Evaluation of Design Alternatives
Type of Anaerobic Digestion

Poor
Fair
Good
Very Good

	MAD	TAD	TPAD	A/G Phased
Technical Suitability	Very Good • Proven and reliable • Class B biosolids (without pretreatment) • High stability • Less complex O&M • High biogas potential	Poor • Limited municipal applications • Potential for Class A biosolids (without pretreatment) • Lower stability • Complex O&M • High biogas potential	Fair • Limited full-scale applications • Potential for Class A biosolids (without pretreatment) • Moderate stability • More complex O&M • High biogas potential	Poor • Limited full-scale applications with poor process reliability • Potential for Class A biosolids (without pretreatment) • Moderate stability • More complex O&M • High biogas potential
Social & Natural Environment	Very Good • Moderate footprint • Less odour potential in digestate material	Good • Small footprint • Higher odour potential in digestate material	Very Good • Moderate footprint • Less odour potential in digestate material	Very Good • Moderate footprint • Less odour potential in digestate material
Economic	Very Good • Moderate O&M cost • Moderate capital cost	Fair • Higher O&M cost • Higher capital cost • Higher energy requirements	Fair • Higher O&M cost • Higher capital cost • Higher energy requirements	Fair • Higher O&M cost • Higher capital cost
Overall	Very Good	Fair	Good	Fair

Mesophilic Anaerobic Digesters (MAD) appears to be preferred because it is a proven and reliable technology with high process stability and less complex O&M.

Evaluation of Design Alternatives

Site Selection

Alternative design concepts considered for site selection include:

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<tr><th>LRWRP</th><th>WBPF</th></tr>
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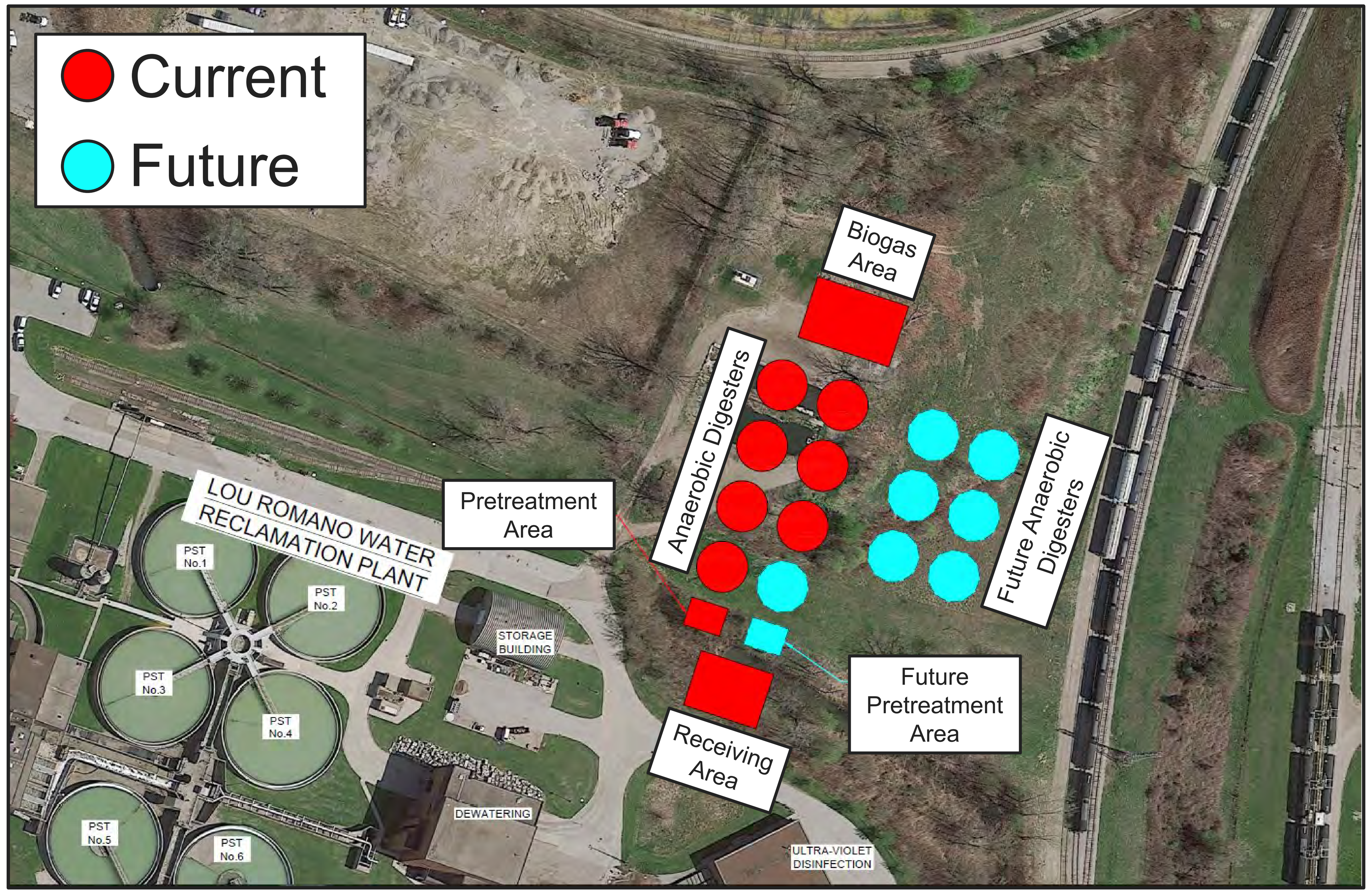

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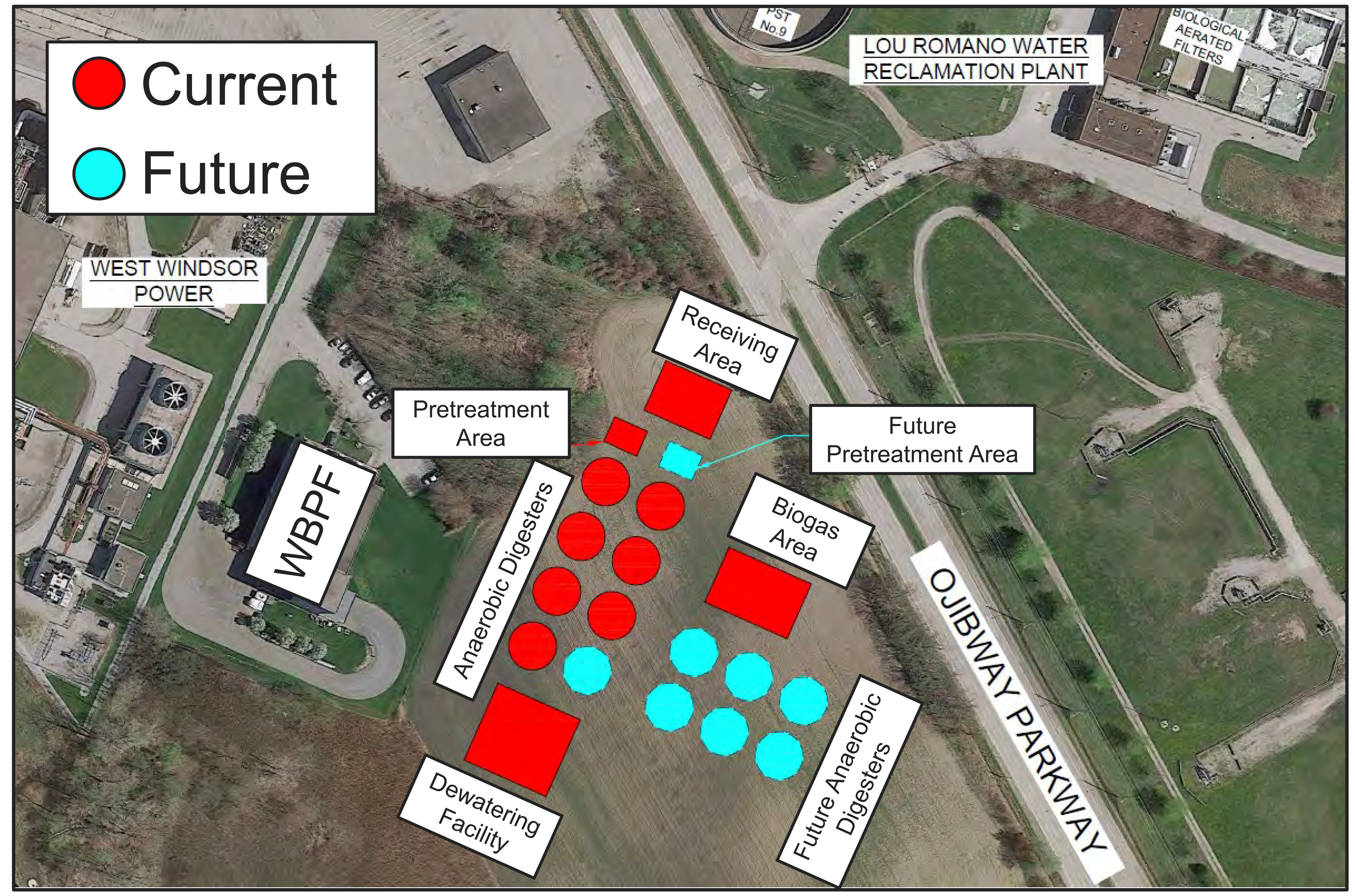

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- Located north of LRWRP
- Land owned by the City of Windsor
- Area ~ 30,000 m^2

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- Located east of the WBPF
- Land owned by the City of Windsor
- Area ~ 40,000 m^2

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Note: The preliminary layouts displayed are for display purposes; the exact location and layout of site features is to be determined during the detailed design phase.

Evaluation of Design Alternatives

Site Selection

Legend
Poor
Fair
Good
Very Good

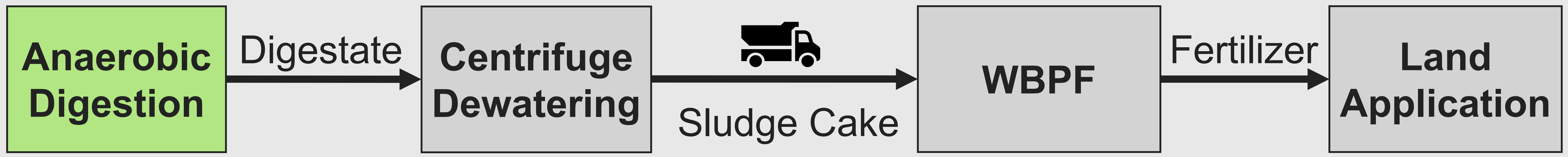
	LRWRP	WBPF
Technical Suitability	Poor • Limited space • Additional space for digestate storage would be required with option to be located at the WBPF site • Close to the existing sludge holding tank and dewatering facility allowing for beneficial reuse and easy transfer of sludge and digestate • Increased construction complexity and site restrictions due to underground utilities	Good • Adequate space • Adequate space for digestate storage • Farther from the existing sludge holding tank and dewatering facility
Social & Natural Environment	Very Good • Land zoned for heavy industrial use • Far from residential areas	Very Good • Land zoned for heavy industrial use • Far from residential areas
Economic	Very Good • Similar capital cost • Similar O&M cost	Very Good • Similar capital cost • Similar O&M cost
Overall	Good	Very Good

The WBPF site appears to be preferred because it has adequate space for current and future biosolids processing needs.

Evaluation of Design Alternatives
Digestate Handling

Alternative design concepts considered for digestate handling include:

WBPF



- Digestate dewatered via centrifuge and transferred to the existing WBPF building
- Heat drying and pelletization resulting in a Class A fertilizer
- Fertilizer stored at the WBPF and then sold throughout Southwestern Ontario

Storage and Land Application

- Digestate dewatered via centrifuge
- Dried and stored as a Class B fertilizer (sold during summer months)
- Potential for Class A fertilizer with sludge pretreatment
- Fertilizer may be stored on-site (Class B) or off-site (Class A) and then sold throughout Southwestern Ontario

Evaluation of Design Alternatives
Digestate Handling

Legend
🔴 Poor
🟡 Fair
🟢 Good
🟢 Very Good

	WBPF	Storage and Land Application
Technical Suitability	Fair • Production of Class A fertilizer product • Complex O&M • Short-term solution • Significant upgrade requirements to meet future capacity needs	Very Good • Production of Class B fertilizer product • Potential for Class A fertilizer with sludge pretreatment • Simple O&M • Long-term solution • Minimal construction requirements
Social & Natural Environment	Fair • Higher energy requirements • Small footprint	Very Good • Low energy requirements • Moderate footprint
Economic	Poor • High capital cost (upgrades) • High O&M cost • Revenue from fertilizer	Very Good • Low capital cost • Low O&M cost • Revenue from fertilizer
Overall	Fair	Very Good

Storage and land application appears to be the most preferred because of its simplicity with low capital, operation, and maintenance costs.

Evaluation of Design Alternatives
Biogas Utilization

Alternative design concepts considered for biogas utilization include:

Heat for WBPF Thermal Drying and LRWRP Buildings	• Conditioned biogas from the anaerobic digesters may be used onsite via boilers to maintain operating temperature at approximately 37 °C • Excess gas may be used to supply heat to buildings during the colder months and/or drying processes year round
Combined Heat and Power (CHP)	• Conditioned biogas from the anaerobic digesters may be used onsite via reciprocating engines or turbines to produce heat and power • This renewable heat and power may be used to support anaerobic digestion and other processes at the LRWRP
Renewable Compressed Natural Gas (R-CNG)	• Conditioned biogas from the anaerobic digesters may be further upgraded to R-CNG for use as an alternative fuel source for City of Windsor fleet vehicles
Renewable Natural Gas (RNG)	• Conditioned biogas from the anaerobic digesters may be further upgraded to RNG injected to the local natural gas pipeline • 100% of RNG production is sold to the pipeline and then repurchased at a discounted price to heat/power the LRWRP processes

Evaluation of Design Alternatives
Biogas Utilization

- Poor
- Fair
- Good
- Very Good

	Heat (via boiler)	CHP	R-CNG	RNG Injection
Technical Suitability	• Proven and reliable • Less complex O&M • Poor biogas utilization if heat requirements are significantly less than heat production	• Proven and reliable • Less complex O&M • Improved biogas utilization	• Proven and reliable • Complex O&M • Improved biogas utilization • Requires specialized staff • Requires construction and O&M of biogas upgrading unit and R-CNG fueling station	• Proven and reliable • Complex O&M • Improved biogas utilization • Requires specialized staff • Requires construction and O&M of biogas upgrading unit and RNG injection station
Social & Natural Environment	• Small footprint • Enhances heating reliability • Reduces emissions of GHG and other air pollutants by displacing grid power (for heat)	• Moderate footprint • Enhances heating and power reliability • Reduces emissions of GHG and other air pollutants by displacing grid power	• Moderate footprint • Enhances fuel reliability • Reduces emissions of GHG and other air pollutants by displacing fossil fuel • Increased vehicle traffic to fueling station	• Moderate footprint • Enhances power reliability Reduces emissions of GHG and other air pollutants by displacing grid power • Complex permitting requirements
Economic	• Low capital cost • Low O&M cost • Energy cost savings	• Moderate capital cost • Moderate O&M cost • Energy cost savings	• High capital cost • Moderate O&M cost • Fuel cost savings	• High capital cost • Moderate O&M cost • High energy cost savings
Overall	Very Good	Very Good	Fair	Fair

Heat (via boiler) and Combined heat and power (CHP) appear to be the most preferred because they are proven and reliable technologies with potential for energy cost savings and GHG emission reduction. CHP would require a larger capital cost investment that can be offset by improved energy savings and potential government incentive programs.

Preferred Design
Overview of Preferred Design

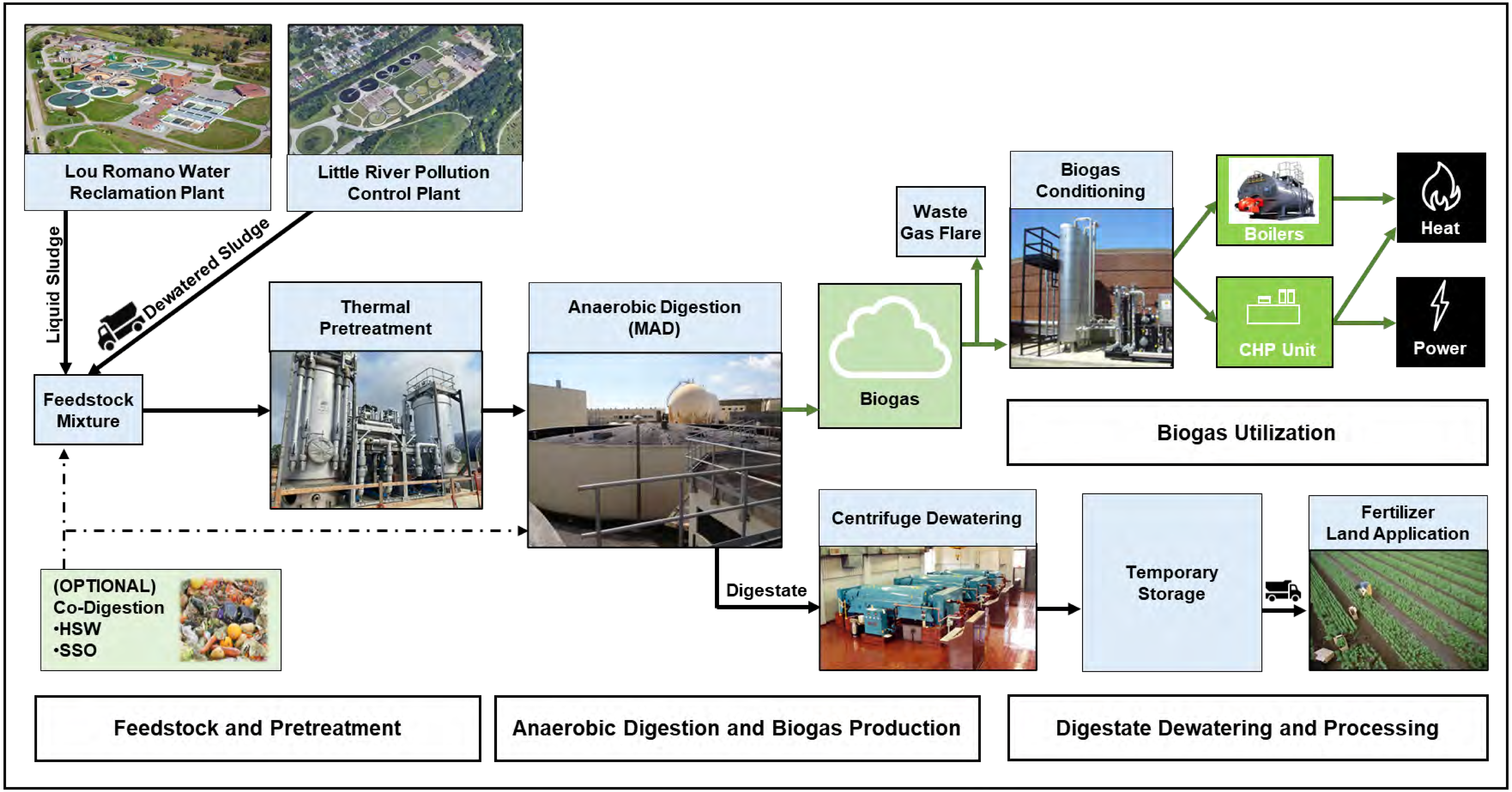
- The anaerobic digestion facility will be design with an initial capacity of 24,000 tDS/yr and potential for future expansion to 35,000 tDS/yr
- The current biosolids loads is 11,000 tDS/yr; therefore, the proposed facility will have interim capacity for the co-digestion with supplementary feedstocks

Preferred Design Concepts:

- **Sludge Handling >** LRPCP Sludge Cake Trucked to Anaerobic Digestion Facility
- **Sludge Pretreatment >** Thermal Pretreatment
- **Type of Anaerobic Digestion >** Mesophilic Anaerobic Digesters
- **Site Selection >** WBPF
- **Digestate Handling >** Storage and Land Application
- **Biogas Utilization >** Boilers or Combined Heat and Power

Preferred Design

Anaerobic Digestion with Biogas Utilization



Next Steps

Project Component	Date
Public Information Centre No. 2 - Preferred Design Concepts	January 2023
Environmental Study Report	March 2023
Council Presentation	Spring 2023
Notice of Completion	Spring 2023

Thank You

Please visit the City of Windsor's project website to submit a feedback form.
Biosolids Management Strategy (citywindsor.ca)

APPENDIX B

Email Packages to Review Agencies

1. Email Package – Notice of Commencement
2. Contact List
3. Email Package – Notice of PIC No. 1
4. Email Package – Notice of PIC No. 2

From:	Rindlisbacher, Hannah
To:	[redacted]
Subject:	165620242 Notice of Study Commencement - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Friday, January 21, 2022 10:45:00 AM
Attachments:	Notice of Commencement_windsor_biosolids_management__study.pdf

Dear [redacted],

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This Class EA will review and identify the opportunity of co-processing biosolids and source separated organics (SSO). The key elements of the study include identifying and evaluating options for processing biosolids and SSO that can generate renewable energy and reduce greenhouse gas emissions. A copy of the Notice of Study Commencement for the project is attached.

On behalf of the City of Windsor, we are inviting you to participate in this project and to assist us in identifying the environmental, social and cultural values your community may have within the Project Area. A reply by February 18, 2022, would be appreciated so that we may consider your comments early in this study stage.

If you have any comments or concerns regarding this project and wish to provide input into the Study, please contact the undersigned below or one of the individuals named in the attached Notice of Commencement

Sincerely,

Hannah Rindlisbacher
BASc, Environmental Engineering Intern

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

Surname	First Name	Organization	Department	Job Title	Address	City/Prov	Postal Code	Tel.	E-Mail	Notice of Commencement Sent via Email	Notice of PIC Sent via Email	Notice of PIC No.2 sent via Email
Local Municipalities												
Botham	Allan	County of Essex		Director of Infrastructure and Planning	360 Fairview Avenue West	Essex, Ontario	N8M 1Y6	519-776-6441 ex 1397	abotham@countyofessex.ca	01/21/22	06/17/22	01/20/23
Marra	Peter	Town of LaSalle		Deputy Chief Administrative Officer	5950 Malden Road	LaSalle, Ontario	N9H 1S4	519-969-7770	pmarra@lasalle.ca	01/21/22	06/17/22	01/20/23
Graf	Andy	Town of Essex		Manager of Environmental Services	33 Talbot Street South	Essex, Ontario	N8M 1A8		agraf@essex.ca	01/25/22	06/17/22	not delivered
Girard	Kevin	Town of Essex		Director of Infrastructure Services	33 Talbot Street South	Essex, Ontario	N8M 1A8	519-776-7336 ext 1119	kgirard@essex.ca	01/21/22	06/17/22	01/20/23
Burgess	Karen	OCWA (Town of Essex)		Town's Operating Authority					kburgess@ocwa.com	01/25/22	06/17/22	01/20/23
Giofu	Antonietta	Town of Amherstburg		Director of Engineering & Public Works	271 Sandwich Street South	Amherstburg, ON	N9V 2A5	519-736-0012	agiofu@amherstburg.ca	01/21/22	06/17/22	01/20/23
Bartnik	Phil	Town of Tecumseh		Director Public Works & Engineering Services	917 Lesperance Road	Tecumseh, ON	N8N 1W9	519-735-2184	pbartnik@tecumseh.ca	01/21/22	06/17/22	01/20/23
Kalbol	Krystal	Municipality of Lakeshore		Corporate Leader - Operations	419 Notre Dame Street	Belle River, ON	N0R 1A0	519-728-2488 x655	kkalbol@lakeshore.ca	01/21/22	06/17/22	01/20/23
Belleau	Shannon	Municipality of Leamington		Manager of Environmental Services	111 Erie St N	Leamington ON	N8H 279	519-326-5761 x1650	sbelleau@leamington.ca	01/21/22	06/17/22	01/20/23
Plancke	Andrew	Town of Kingsville		Director of Infrastructure and Engineering	2021 Division Rd North	Kingsville, ON	N9Y2Y9		aplancke@kingsville.ca	01/21/22	06/17/22	01/20/23
Tang	Kristina	City of Windsor	Planning & Building Services	Heritage Planner	350 City Hall Square West	Windsor, ON	N9A 6S1	519-255-6543 x 6179	ktang@citywindsor.ca		06/17/22	01/20/23
Essex-Windsor Solid Waste Authority (EWSWA)												
Bishop	Michelle	Essex-Windsor Solid Waste Authority		General Manager	360 Fairview Avenue West	Essex, Ontario	N8M 3G4	519-776-6441 ext. 1225	mbishop@ewswa.org	01/21/22	06/17/22	01/20/23
Marentette	Tom	Essex-Windsor Solid Waste Authority		Manager, Waste Disposal	360 Fairview Avenue West	Essex, Ontario	N8M 3G4	519-776-6441 ext. 1961	tommarentette@ewswa.org	01/21/22	06/17/22	01/20/23
Conservation Authority												
Martin	Tian	Essex Region Conservation Authority		Water Resources Engineer	360 Fairview Avenue West, Suite 311	Essex, ON	N8M 1Y6		tmartin@erca.org		06/17/22	01/20/23
(ERCA) Please send all Class EA study correspondence to the Planning inbox in the future, including Notices of Study Commencements, PICs, Completions,					planning@erca.org							01/20/23
Emergency Services												
Krauter	Bruce	Essex-Windsor EMS	c/o Administrative Assistant, Office of the Chief	Chief	360 Fairview Ave West	Essex, ON	N8M 1Y6	519-776-6441 x 2654	bkrauter@countyofessex.on.ca	01/21/22	06/17/22	01/20/23
										01/21/22		
Horrobin	Barry	Windsor Police Service	Police Headquarters	Director of Planning & Physical Resources	150 Goyeau Street, PO Box 60	Windsor, ON	N9A 6J5	519-255-6700 x4471	bhorrobin@police.windsor.on.ca	01/21/22	06/17/22	01/20/23
Laforet	Stephen	Windsor Fire and Rescue		Fire Chief	815 Goyeau Street	Windsor, ON	N9A 1H7	519-253-6573	slaforet@citywindsor.ca	01/24/22	06/17/22	01/20/23
Benoit	Josh	Central Ambulance Communications Centre			4510 Rhodes Drive, Suite 320	Windsor, ON	N8W 5K5	519-256-2373	josh.benoit@ontario.ca	01/24/22	06/17/22	01/20/23
Interest Groups												
Yeomans	Brian	Downtown Windsor Business Improvement Association		Chair				519-252-5723	byeomans39@gmail.com	01/24/22	06/17/22	01/20/23
Naidu	Rakesh	Windsor-Essex Regional Chamber of Commerce		President & CEO	2575 Ouellette Place	Windsor, ON	N8X 1L9	519-966-3696 x222	rnaidu@windsoressexchamber.org	01/21/22	06/17/22	01/20/23
Bosinger	Andrew	SYNAGRO		VP, Strategic Accounts & Partnerships	6326 Wilson Road	Ann Arbor, MI	48108	1-410-271-1020	ABosinger@SYNAGRO.com	01/21/22	06/17/22	01/20/23

Surname	First Name	Organization	Department	Job Title	Address	City/Prov	Postal Code	Tel.	E-Mail	Notice of Commencement	Notice of PIC sent via Email	Notice of PIC No.2 Sent Via Email
Provincial Agencies												
Carlow	Dan	Ontario Ministy of Agriculture, Food and Rural Affairs		Manager of Innovation, Engineering and Program Delivery, Western Region	581 Huron St,	Stratford, ON	N5A 5T8		dan.carlow@ontario.ca	01/21/22	06/17/22	1/20/2023
Brunke	Richard	Ontario Ministy of Agriculture, Food and Rural Affairs		Nutrient Management Engineer	581 Huron St,	Stratford, ON	N5A 5T8		richard.brunke@ontario.ca	01/21/22	06/17/22	1/20/2023
Badali	Mark	Ministry of the Environment, Conservation and Parks	Project Review Unit | Environmental Assessment Branch	Regional Environmental Planner (REP) – Southwest				(416) 457-2155	Mark.Badali1@ontario.ca	01/21/22	06/17/22	1/20/2023
		MECP Regional Email address							eanotification.swregion@ontario.ca			1/20/2023
Barboza	Karla	Ministry of Heritage, Sport, Tourism and Culture Industries		Team Lead - Heritage	5th Flr, 400 University Ave	Toronto, ON	M7A 2R9	416-660-1027	karla.barboza@ontario.ca	01/21/22	06/17/22	1/20/2023
Romeo	Laura	Ministry of Heritage, Sport, Tourism and Culture Industries		Heritage Planner	5th Flr, 400 University Ave	Toronto, ON	M7A 2R9	437-996-5218	laura.romeo@ontario.ca	01/24/22	06/17/22	1/20/2023
Kwan	Helen	Ministry of Energy		Manager of Renewables Policy Unit	5th Flr, 77 Grenville St	Toronto, ON	M7A 2C1	416-697-5814	helen.l.kwan@ontario.ca	01/21/22	06/17/22	1/20/2023
Allan	Fraser	Ministry of Energy		Manager of Renewable Facilitation and Analysis Unit	5th Flr, 77 Grenville St	Toronto, ON	M7A 2C1	437-993-1269	fraser.allan@ontario.ca	01/21/22	06/17/22	1/20/2023
Cotnam	Erin	Ministry of Northern Development, Mines, Natural Resources and Forestry (NRF)		Municipal Planning Advisor, Land Use Planning and Strategic Issues Section	4th Flr S, 300 Water St,	Peterborough, ON	K9J 3C7	705-313-4719	erin.cotnam@ontario.ca	01/21/22	06/17/22	1/20/2023
Creighton	Nancy	Ministry of Economic Development, Job Creation and Trade	Windsor Office	Senior Business Advisor	Roundhouse Centre Suite 214, 3155 Howard Ave	Windsor, Ontario	N8X 4Y8	519-259-5509	nancy.creighton@ontario.ca	01/21/22	06/17/22	1/20/2023
Kerr	Ian	Ministry of Municipal Affairs and Housing	Municipal Services Office - Western Ontario Region	Regional Director	659 Exeter Road, 2nd Floor	London, ON	N6E 1L3	519-873-4026	ian.kerr@ontario.ca	01/21/22	06/17/22	1/20/2023
Boyd	Eric	Ministry of Municipal Affairs and Housing	Community Planning and Development	Manager	659 Exeter Road, 2nd Floor	London, ON	N6E 1L3	519-873-4025	erick.boyd@ontario.ca	01/21/22	06/17/22	1/20/2023
Eckert	Anneleis	Ministry of Environment and Climate Change							anneleis.eckert@ontario.ca	1/28/2022	06/17/22	1/20/2023
Perry	Elizabeth	Ontario Ministry of Transportation	Transportation Infrastructure Management Division Design and Engineering Branch Engineering Program Delivery West	Head, Environmental	659 Exeter Road	London, ON	N6E 1L3	519-619-4086	elizabeth.perry@ontario.ca	1/28/2022	06/17/22	1/20/2023
Swim	Michael	Ontario Ministry of Transportation	Transportation Infrastructure Management Division Asset Management Branch Capital Planning and Program Office Capital Planning & Program Development (West)	Head, Capital Planning & Program Development (W)	Exeter Road Complex, 659 Exeter Rd	London, ON	N6E 1L3	519-619-1153	michael.swim@ontario.ca	01/21/22	06/17/22	1/20/2023
Sargent	Kaitlin	Ontario Ministry of Transportation	Transportation Infrastructure Management Division	Director of Design and Engineering Branch	301 St. Paul St W	St Catharines, ON	ON L2R 7R4	705-497-6687	Kaitlin.Sargent@ontario.ca	01/24/22	06/17/22	1/20/2023
Mentley	Ryan	Ontario Ministry of Transportation	Highway Corridor Management Section	Corridor Management Planner	659 Exeter Road	London, ON	N6E 1L3	(519) 878-4026	Ryan.Mentley@ontario.ca		06/17/22	1/20/2023
Federal Agencies												
Leonardelli	Sandro	Environment Canada, Ontario Region	Environmental Assessment Section	Head				416-739-5858	sandro.leonardelli@ec.gc.ca	01/24/22	06/17/22	1/20/2023
Eddy	Sara	Fisheries and Oceans Canada - Central and Arctic Region	Fisheries Protection Program	Senior Fisheries Protection Biologist	867 Lakeshore Road, PO Box 5050	Burlington, ON	L7R 4A6	(905) 336-4535	Sara.Eddy@dfo-mpo.gc.ca	01/21/22	06/17/22	1/20/2023
Shea	Suzanne	Transport Canada Marine	Navigable Water Protection Officer		100 Front Street South, 1st Floor	Sarnia, ON	N7T 2M4	519-383-1863	NPPONT-PPNONT@tc.gc.ca	01/21/22	06/17/22	1/20/2023
Barry	Peter	Windsor Port Authority		Director	3190 Sandwich Street	Windsor, ON	N9C 1A6	519-258-5741 xt.211	pberry@portwindsor.com	01/24/22	06/17/22	1/20/2023
Hatt	Chris	Windsor-Detroit Bridge Authority		Manager of Procurement	100 Ouellette Ave, Suite 400	Windsor, ON	N9A 6T3		chris.hatt@wdbridge.com	01/24/22	06/17/22	1/20/2023
Winger	Darren	Ministry of Citizenship, Immigration & International Trade / Ministry of Tourism, Culture & Sport	Windsor Office	Regional Development Advisor	221 Mill Street	Windsor, ON	N9C 2R1		darren.winger@ontario.ca	01/21/22	06/17/22	1/20/2023

Surname	First Name	Organization	Department	Job Title	Address	City/Prov	Postal Code	Tel.	E-Mail	Notice of Commencement Sent via Email	Notice of PIC sent via Email	Notice of PIC No.2 sent via email
Utilities												
Manzon	Christopher	ENWIN Utilities	Windsor Utilities Commission	Director, Engineering (Water)	787 Ouellette Avenue, PO Box 1625 Stn A	Windsor, ON	N9A 5T7	(519) 566-3897	cmanzon@enwin.com	01/21/22	06/17/22	01/20/23
Ogg	Bruce	ENWIN Utilities	Water						bogg@enwin.com	01/21/22	06/17/22	01/20/23
		ENWIN Utilities	HYDRO	General					tsd@enwin.com		06/17/22	01/20/23
Fuerth	Tyson	Bell Canada		Manager, Network Provisioning	1149 Goyeau Street, PO Box 1601	Windsor, ON	N9A 1H9	519-973-4711	tyson.fuerth@bell.ca	01/21/22	06/17/22	01/20/23
Markc	Rachel	Bell Canada							rachel.marks@bell.ca	01/21/22	06/17/22	01/20/23
		TELUS	team email						telusutilitymarkups@telecon.ca		06/17/22	01/20/23
		ROGERS	planning support						planningsupport.team@rci.rogers.com		06/17/22	01/20/23
Jones	Mark	MNSI							mjones@mnsi.net	01/21/22	06/17/22	01/20/23
Hartleib	Dave	MNSI							hartleib@mnsi.net	01/21/22	06/17/22	01/20/23
Raymond	Frank	Cogeco Cable Services			2225 Dougall Avenue	Windsor, ON	N8X 5A7		raymond.frank@cogeco.com	01/21/22	06/17/22	01/20/23
Haggins	Daniel	Cogeco Cable Services							daniel.haggins@cogeco.com	01/21/22	06/17/22	01/20/23
Ceccacci	Will	Union Gas			50 Keil Drive North	Chatham, ON	N7M 5M1		wceccacci@uniongas.com	01/21/22	06/17/22	01/20/23
Nicholls	Jennifer	Union Gas							jennifer.nicholls@uniongas.com	01/21/22	not delivered	01/20/23
Clavet	Anthony	Essex Power							aclavet@essexpowerlines.ca		06/17/22	01/20/23
Hyder	Farooq	E.L.K Energy							fhyder@elkenergy.com		06/17/22	01/20/23
MacAulay	Norman	E.L.K Energy		Operations Manager					nmacaulay@elkenergy.com	01/21/22	06/17/22	01/20/23
		Ontario Power Generation							Executivevp.lawanddevelopment@opg.com		06/17/22	01/20/23
		Essex Terminal Railway Company			1601 Lincoln Road	Windsor, ON	N8Y 2J3	519-973-8222	info@etr.ca		06/17/22	01/20/23
Maga	Jessica	Hydro One		Manager-Government Relations					jessica.maga@hydroone.com	01/21/22	06/17/22	01/20/23
Budden	Susan	Ontario Clean Water Agency	Southwest Regional Hub Office	Business Development Manager	450 Sunset Drive, Suite 370	St. Thomas ON	N5R 5V1	(519) 637-8334	sbudden@ocwa.com	01/21/22	06/17/22	01/20/23

Surname	First Name	Organization	Department	Job Title	Address	City/Prov	Postal Code	Tel.	E-Mail	Notice of Commencement Sent via Email	Notice of PIC sent via Email	Notice of PIC No.2 sent via Email
Aboriginal Agencies												
Mann	Molly	Ministry of Indigenous Affairs Assistant Deputy Minister's Office - Indigenous Relations and Programs Division Indigenous Relations Branch	Manager, Indigenous Relations Unit		Suite 400, 160 Bloor Street East	Toronto, ON	M7A 2E6		molly.mann@ontario.ca	1/20/2022	6/17/2022	1/20/2023
Levecque	Heather	Ministry of Indigenous Affairs Assistant Deputy Minister's Office - Indigenous Relations and Programs Division	Director, Indigenous Relations		Suite 400, 160 Bloor Street East	Toronto, ON	M7A 2E6	416-325-7032	heather.levecque@ontario.ca	1/20/2022	6/17/2022	1/20/2023
Whiteye	Jennifer	Southern First Nations Secretariat		Executive Director	22361 Austin Line	Bothwell, ON	N0L 1Y0	519-692-5868 x242	jenwhiteye@sfns.on.ca	1/20/2022	6/17/2022	1/20/2023
First Nation Communities/Métis Groups												
Jacobs	Dean	Walpole Island First Nation / Bkejwanong Territory		Independent Consultant	117 Tahgahoning Road,R.R. #3	Wallaceburg, ON	N8A 4K9	519-627-1475 ext. 101	dean.jacobs@wifn.org	1/20/2022	6/17/2022	1/20/2023
MacBeth	Janet	Walpole Island First Nation / Bkejwanong Territory		Consultation Manager	117 Tahgahoning Road,R.R. #3	Wallaceburg, ON	N8A 4K9	519-627-1481 ext. 108	janet.macbeth@wifn.org	1/20/2022	6/17/2022	1/20/2023
Hillier	Louise	Caldwell First Nation		Band Rep	14 Orange Street	Leamington, ON	N8H 1P5		band.rep@caldwellfirstnation.ca	1/20/2022	Notice submitted via online consultation tool on June 17th, 2022. www.consultwithcaldwell.ca	Notice submitted via online consultation tool on January 20th, 2023.
Ierullo	Julia	Caldwell First Nation		Consultation Coordinator	14 Orange Street	Leamington, ON	N8H 1P5		consultation@caldwellfirstnation.ca	-		
Sands	Brianna	Caldwell First Nation		Environmental & Consultation Coordinator	14 Orange Street	Leamington, ON	N8H 1P5		ecc@caldwellfirstnation.ca	-		
Plain	Chris	Aamjiwnaang First Nation		Chief	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5	519-336-8410	cplain@aamjiwnaang.ca	1/20/2022	6/17/2022	1/20/2023
Rogers	Joanne	Aamjiwnaang First Nation		Councillor	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5	519-336-8410	jrogers@aamjiwnaang.ca	1/20/2022	6/17/2022	1/20/2023
O'Brien	Cathleen	Aamjiwnaang First Nation		Environmental Coordinator	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5	519-336-8410	cobrien@aamjiwnaang.ca	1/20/2022	6/17/2022	1/20/2023
Jackson	Courtney	Aamjiwnaang First Nation		Environment Worker	978 Tashmoo Avenue	Sarnia, ON	N7T 7H5	519-336-8410	cjackson@aamjiwnaang.ca	1/20/2022	6/17/2022	1/20/2023
Jacqueline	French	Chippewas of the Thames First Nation		Chief	320 Chippewa Road	Muncey, ON	N0L 1Y0	519-289-5555	jfrench@cottfn.com	Notice submitted via online consultation tool on June 17th, 2022. www.nationsconnect.ca	Notice submitted via online consultation tool on June 17th, 2022. www.nationsconnect.ca	Notice submitted via online consultation tool on January 20th, 2023.
Riley	Kelly	Chippewas of the Thames First Nation		Director of Treaties, Lands & Environment	320 Chippewa Road	Muncey, ON	N0L 1Y0	519-289-5555 x 209	kriley@cottfn.com			
Burch	Fallon	Chippewas of the Thames First Nation		Consultation Coordinator	320 Chippewa Road	Muncey, ON	N0L 1Y0	519-289-5555 x 213	fburch@cottfn.com			
Henry	Jason	Chippewas of Kettle & Stony Point First Nation		Chief	6247 Indian Lane, RR#2	Forest, ON	N0N 1J1	519-786-2125	Jason.Henry@kettlepoint.org	1/20/2022	6/17/2022	1/20/2023
Chrisjohn	Adrian	Onelda Nation of the Thames ONYOTA'A:KA		Chief	2212 Elm Avenue	Southwold, ON	N0L 2G0	519-318-4598	adrian.chrisjohn@oneida.on.ca	1/20/2022	6/17/2022	1/20/2023
Hill	Cherilyn	Onelda Nation of the Thames ONYOTA'A:KA		Political Office Manager	2212 Elm Avenue	Southwold, ON	N0L 2G0	(519) 318-4593	cherilyn.hill@oneida.on.ca	1/20/2022	6/17/2022	1/20/2023
Froh	Margaret	Métis Nation of Ontario		Director, Lands, Resources and Consultations	75 Sherbourne Street, Suite 311	Toronto, ON	M5A 2P9	416-977-9881	margaretF@metisnation.org	1/20/2022	6/17/2022	1/20/2023
		MNO Windsor-Essex Métis Council							consultations@metisnation.org	1/20/2022	6/17/2022	1/20/2023
Anderson	Kathleen	Métis Nation of Ontario, Thames Bluewater Métis Council		President	183 Summerset Crescent	London, ON	N6K 3S5		tbwmc.president@gmail.com	1/20/2022	6/17/2022	1/20/2023
Stonefish	Denise	Moravian of the Thames (Delaware Nation)		Chief	14760 School House Line, RR 3	Thamesville, ON	N0P 2K0	519-692-3936 ext 128	denise.stonefish@delawarenation.on.ca	1/20/2022	6/17/2022	1/20/2023

From:	Rindlisbacher, Hannah
To:	[redacted]
Subject:	165620242: Notice of Public Information Centre - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Friday, June 17, 2022 1:25:00 PM
Attachments:	2. Public Open House Feedback Form - Final.pdf 1. Notice of Public Information Centre - Final.pdf

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Dear [redacted],

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This Class EA will review and identify opportunity of co-processing biosolids and source separated organics (SSO). The key elements of the study include identifying and evaluating options for processing biosolids and SSO that may generate renewable energy and reduce greenhouse gas emissions.

The City is hosting a Public Information Centre (PIC) to present the evaluation of alternative design solutions for managing biosolids and receive input from interested residents and stakeholders. The PIC will be held on Wednesday June 29th, 2022 (3:00 to 7:00 pm) at the Capri Pizzeria Recreation Centre, Black Oak Room, 2555 Pulford St, Windsor, ON. A copy of the Notice of Public Information Centre for the project is attached and additional information regarding the project is available on the City Webpage: Biosolids Management Strategy (citywindsor.ca).

If you have any comments or concerns regarding this project, please contact the undersigned.

Sincerely,

Hannah Rindlisbacher B.A.Sc., E.I.T.
Environmental Engineering Intern

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

From: Rindlisbacher, Hannah
To: [redacted]
Subject: 165620242: Notice of Public Information Centre No. 2 - Class EA Biosolids Management Study, City of Windsor, Ontario
Date: Friday, January 20, 2023 3:09:00 PM
Attachments: 1. Notice of Public Information Centre - Final.pdf
2. Public Open House Feedback Form - Final.pdf

Dear [redacted],

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan.

The City is hosting a second Public Information Centre (PIC) to present the evaluation of alternative design concepts for biosolids management utilizing anaerobic digestion technologies and receive input from interested residents and stakeholders. The PIC will be held on Tuesday January 31st, 2023 (4:00 to 7:00 pm) at the Capri Pizzeria Recreation Centre, Black Oak Room, 2555 Pulford St, Windsor, ON. A copy of the Notice of Public Information Centre for the project is attached and additional information regarding the project is available on the City Webpage: Biosolids Management Strategy (citywindsor.ca). If you have any comments or concerns regarding this project, please contact the undersigned.

Sincerely,

Hannah Rindlisbacher B.A.Sc., E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

APPENDIX B

Response to Notice of Project Commencement

Ministry of Heritage, Sport, Tourism and Culture Industries

Programs and Services Branch
400 University Ave, 5th Flr
Toronto, ON M7A 2R9
Tel: 437.996.5218

Ministère des Industries du Patrimoine, du Sport, du Tourisme et de la Culture

Direction des programmes et des services
400, av. University, 5e étage
Toronto, ON M7A 2R9
Tél: 437.996.5218

Ontario

February 16, 2022 EMAIL ONLY

Dr. Jian Li
Consultant Project Manager
Stantec Consulting Ltd.
140 Ouellette Place, Suite 100
Windsor ON N8X 1L9
jian.li@stantec.com

MHSTCI File	**:**	**0016049**
Proponent	**:**	**City of Windsor**
Subject	**:**	**Notice of Commencement – Schedule C**
Project	**:**	**Biosolids Management Plan MCEA**
Location	**:**	**City of Windsor, Ontario**

Dear Dr. Li:

Thank you for providing the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) with the Notice of Commencement for the above-referenced project. MHSTCI's interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage, which includes:

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

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

Project Summary
The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants, the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will look at how the City is currently managing and processing biosolids at its two wastewater treatment plants and guides how it will continue to meet the demands over the next 30 years.

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

Archaeological Resources
This EA project may impact archaeological resources and should be screened using the MHSTCI *Criteria for Evaluating Archaeological Potential* and *Criteria for Evaluating Marine Archaeological Potential* to determine if an archaeological assessment is needed. MHSTCI archaeological sites data are available at *archaeology@ontario.ca*.

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

Built Heritage Resources and Cultural Heritage Landscapes
For the two municipal wastewater treatment plants properties, the MHSTCI *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact built heritage resources and/or cultural heritage landscapes. If other properties are being considered, please complete the checklist for those as well.

If there is potential for built heritage resources and/or cultural heritage landscapes on the property(ies), a Cultural Heritage Evaluation Report (CHER) should be undertaken by a qualified person to determine the cultural heritage value or interest of the property. If the property is determined to be of cultural heritage value or interest and alterations or development is proposed, MHSTCI recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, be completed to assess potential project impacts. Our Ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. Please send the HIA to MHSTCI (and the local municipality as appropriate) for review and comment, and make it available to local organizations or individuals who have expressed interest in review.

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

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

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

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

Sincerely,

Laura Romeo
Heritage Planner (A)
laura.romeo@ontario.ca

Copied to: Ed Valdez, Manager of Process Engineering and Maintenance, City of Windsor
Karla Barboza, Team Lead (A), Heritage Planning Unit, MHSTCI

or supporting documentation submitted as part of the EA process, and in no way shall MHSTCI be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MHSTCI (at archaeology@ontario.ca) if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists*.

If human remains are encountered, all activities must cease immediately, and the local police and coroner must be contacted. In situations where human remains are associated with archaeological resources, MHSTCI should also be notified (at archaeology@ontario.ca) to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Ontario

Ministry of the Environment, Conservation and Parks	Ministère de l'Environnement, de la Protection de la nature et des Parcs
Environmental Assessment Branch	Direction des évaluations environnementales
1st Floor 135 St. Clair Avenue W Toronto ON M4V 1P5 **Tel.**: 416 314-8001 **Fax**.: 416 314-8452	Rez-de-chaussée 135, avenue St. Clair Ouest Toronto ON M4V 1P5 **Tél.** : 416 314-8001 **Téléc.** : 416 314-8452

February 9, 2022

Ed Valdez
Manager of Process Engineering & Maintenance
City of Windsor
evaldez@citywindsor.ca

Re: **Biosolids Management Plan**
City of Windsor
Municipal Class EA
Response to Notice of Commencement

Dear Ed Valdez,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the City of Windsor (proponent) has indicated that the study is following the approved environmental planning process for a Schedule C project under the Municipal Class Environmental Assessment (Class EA).

The **updated (February 2021)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- Aamjiwnaang First Nation
- Bkejwanong (Walpole Island)
- Caldwell First Nation
- Chippewas of Kettle and Stony Point
- Chippewas of the Thames First Nation
- Oneida Nation of the Thames

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances subsequent to initial discussions with the communities identified by the MECP:

- 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 with Indigenous communities or other stakeholders has reached an impasse

- A Part II Order request is expected on the basis of impacts to Aboriginal or treaty rights

The MECP 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 should additional steps and activities be required.

A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also ensure a copy of the final notice is sent to the ministry's Southwest Region EA notification email account (eanotification.swregion@ontario.ca) after the draft report is reviewed and finalized.

Should you or any members of your project team have any questions regarding the material above, please contact me at mark.badali1@ontario.ca.

Yours truly,

Mark Badali

Mark Badali
Regional Environmental Planner – Southwest Region

Cc: Marcelina Wilson, Supervisor, Windsor Area Office, MECP
Marc Bechard, Water Compliance Supervisor, Sarnia District Office, MECP
Jian Li, Consultant Project Manager, Stantec Consulting Ltd.

Encl. Areas of Interest
A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. February 2021)

It is suggested that you check off each section after you have considered / addressed it.

☐ **Planning and Policy**

- Projects located in MECP Central Region are subject to **A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020).** Parts of the study area may also be subject to the Oak Ridges Moraine Conservation Plan (2017), Niagara Escarpment Plan (2017), Greenbelt Plan (2017) or Lake Simcoe Protection Plan (2014). Applicable plans and the applicable policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.

- The **Provincial Policy Statement (2020)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

☐ **Source Water Protection**

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

    - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

    - If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and 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.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: http://www.applications.ene.gov.on.ca/swp/en/index.php. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the "Map Legend" bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

- **Climate Change**

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

  1. Consider during the assessment of alternative solutions and alternative designs, the following:
     a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
     b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
  2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

☐ **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
    - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
    - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
    - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, you may consider the provisions of the Rouge Park Management Plan if applicable.

☐ **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario’s Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client’s Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

Surface Water

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

  - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
  - Watershed information, drainage conditions, and other relevant background information
  - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
  - Information on maintenance and monitoring commitments.

- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

☐ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements

Contaminated Sites

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP's D-4 guideline for land use considerations near landfills and dumps.
    - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

☐ **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

☐ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

☐ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and <u>**describes how they have been addressed by the proponent**</u> throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

- **Class EA Process**

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**

- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020
Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address (for projects in MECP Southwest Region, the email is eanotification.swregion@ontario.ca).

The public has the ability to request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Part II Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests on those matters should be addressed in writing to:

Minister Jeff Yurek
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;

- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;

- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;

- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

From:	Rindlisbacher, Hannah
To:	Tom Marentette
Cc:	Ed Valdez; Li, Jian
Subject:	RE: 165620242 Notice of Study Commencement - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Tuesday, January 25, 2022 9:13:18 AM

Good morning Tom,

Thanks for your inputs. Your comments will be considered during the course of this study. We will keep you informed as the study progresses.

Thanks,

Hannah Rindlisbacher
BASc, Environmental Engineering Intern

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

From: Tom Marentette <TomMarentette@ewswa.org>
Sent: Tuesday, January 25, 2022 9:00 AM
To: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Subject: RE: 165620242 Notice of Study Commencement - Class EA Biosolids Management Study, City of Windsor, Ontario

Hannah,

I will participate in the project. Some of the factors that must be front and center is location of the transfer facility if delivered to a merchant facility (Packer to transfer trailers) are; facility should be geographically positioned to benefit a regional plan & partnership and must be constructed to minimize or eliminate associated odours. Following this, education must be a continuing priority to increase diversion awareness and sustainability of our existing landfill resources. Collaboration with the Greenhouse industry should also be front and center. While we are diverting SSO from residential customers, we are filling the landfill with greenhouse vines causing increased volumes of leachate and gas generation. Please provide update during to process.

Thanks, Tom

From: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>

Sent: Friday, January 21, 2022 3:30 PM
To: Tom Marentette <TomMarentette@ewswa.org>
Subject: 165620242 Notice of Study Commencement - Class EA Biosolids Management Study, City of Windsor, Ontario

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Tom,

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This Class EA will review and identify the opportunity of co-processing biosolids and source separated organics (SSO). The key elements of the study include identifying and evaluating options for processing biosolids and SSO that can generate renewable energy and reduce greenhouse gas emissions. A copy of the Notice of Study Commencement for the project is attached.

On behalf of the City of Windsor, we are inviting you to participate in this project and to assist us in identifying the environmental, social and cultural values your community may have within the Project Area. A reply by February 18, 2022, would be appreciated so that we may consider your comments early in this study stage.

If you have any comments or concerns regarding this project and wish to provide input into the Study, please contact the undersigned below or one of the individuals named in the attached Notice of Commencement

Sincerely,

Hannah Rindlisbacher
BASc, Environmental Engineering Intern

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

APPENDIX B

Response to Public Open House No. 1

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIORNMENTAL ASSESSMENT
PUBLIC INFORMATION CENTRE – COMMENT FORM

Please provide your comments or concerns on the presented material for the Biosolids Management Study:

- regional consideration (other municipal wastewater biosolids producers) in the overall site capacity and future facility- utilizing the existing the existing pellitizer facility as long as possible due to its current well maintained condition to delay the capital requirement for the digestor- incorporating SSO's into the facility to maximize the efficiency of the operation and thinking long term in the best interest of the municipality and the region including not requiring another landfill- consideration of level initial dewatering of sludge at both locations for impact on transportation to feed digestors

NAME Chris Manzon

EMAIL ADDRESS ctmanzon@outlook.com

TELEPHONE NO. ( ) 519-735-0054

DATE July 22, 2022 SIGNATURE

Stantec

Personal information submitted is collected, maintained, and disclosed under the authority of the *Environmental Assessment Act and the Municipal Freedom of Information and Protection of Privacy Act* for transparency and consultation purposes. Personal information you submit will become part of a public record that is available to the general public, unless you request that your personal information remain confidential.

BIOSOLIDS MANAGEMENT STRATEGY
MUNICIPAL CLASS ENVIORNMENTAL ASSESSMENT
PUBLIC INFORMATION CENTRE – COMMENT FORM

Please provide your comments or concerns on the presented material for the Biosolids Management Study:

I agree with the preferred solution as indication by the PIC presentation documents. Anaerobic digestion appears to be the solution that allows for a more positive environmental impact and I think it's worth it to make the finacial commitment.

NAME Kristen Laughton

EMAIL ADDRESS kristen.laughton@gmail.com

TELEPHONE NO. ( ) 5199621546

DATE July 21 2022 SIGNATURE

Stantec

Personal information submitted is collected, maintained, and disclosed under the authority of the *Environmental Assessment Act and the Municipal Freedom of Information and Protection of Privacy Act* for transparency and consultation purposes. Personal information you submit will become part of a public record that is available to the general public, unless you request that your personal information remain confidential.

APPENDIX B

Response to Public Open House No. 2

From:	Rindlisbacher, Hannah
To:	Jung, Chrissy
Subject:	FW: 165620242: Notice of Public Information Centre No. 2 - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Monday, January 23, 2023 9:25:00 AM

FYI

From: Horrobin, Barry <bhorrobin@windsorpolice.ca>
Sent: Monday, January 23, 2023 9:24 AM
To: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Subject: RE: 165620242: Notice of Public Information Centre No. 2 - Class EA Biosolids Management Study, City of Windsor, Ontario

Hannah:

Thanks for this update on the project. Windsor Police has no additional comments at this time and we certainly do not have any concerns with it. If any aspect of the project could impact public safety in any way, just let us know and we can have a further dialogue to address things.

Regards,

Barry Horrobin, B.A., M.A., CLEP, CMM-III
Director of Planning & Physical Resources
WINDSOR POLICE SERVICE
IALEP INTERNATIONAL ASSOCIATION OF LAW ENFORCEMENT PLANNERS
Advanced Certified Law Enforcement Planner

From: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Sent: Friday, January 20, 2023 12:47 PM
To: Horrobin, Barry <bhorrobin@windsorpolice.ca>
Subject: 165620242: Notice of Public Information Centre No. 2 - Class EA Biosolids Management Study, City of Windsor, Ontario

Dear Barry,

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan.

The City is hosting a second Public Information Centre (PIC) to present the evaluation of alternative design concepts for biosolids management utilizing anaerobic digestion technologies and receive input from interested residents and stakeholders. The PIC will be held on Tuesday January 31st, 2023 (4:00 to 7:00 pm) at the Capri Pizzeria Recreation Centre, Black Oak Room, 2555 Pulford St, Windsor, ON. A copy of the Notice of Public Information Centre for the project is attached and additional information regarding the project is available on the City Webpage: Biosolids Management Strategy (citywindsor.ca). If you have any comments or concerns regarding this project, please contact the undersigned.

Sincerely,

Hannah Rindlisbacher B.A.Sc., E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 519 966-2250 ext 258
Mobile: 226 268-3033
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

APPENDIX B

Response to Notice of Draft ESR

Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Tel.: 613.242.3743

Ministère des Affaires civiques et du Multiculturalisme

Unité de la planification relative au patrimoine
Direction du patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
Tél.: 613.242.3743

August 1, 2023 EMAIL ONLY

Hannah Rindlisbacher E.I.T.
Environmental Engineer in Training
Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9
hannah.rindlisbacher@stantec.com

MCM File	**:**	**0016049**
Proponent	**:**	**City of Windsor**
Subject	**:**	**Municipal Class EA – Schedule C – Notice of Draft Environmental Study Report**
Project	**:**	**Biosolids Management Plan MCEA**
Location	**:**	**City of Windsor**

Dear Hannah Rindlisbacher:

Thank you for making the *City of Windsor Biosolids Management Strategy - "Schedule C" Class EA - draft Environmental Study Report* (dated July 4, 2023, prepared by Stantec) available for the Ministry of Citizenship and Multiculturalism's (MCM) review.

MCM's interest in this project relates to its mandate of conserving Ontario's cultural heritage.

Project Summary

The City of Windsor has initiated a Municipal Class Environmental Assessment (Class EA) to develop an integrated long-term, sustainable, and cost-effective biosolids management plan for the two municipal wastewater treatment plants, the Lou Romano Water Reclamation Plant and the Little River Pollution Control Plant. The Class EA will look at how the City is currently managing and processing biosolids at its two wastewater treatment plants and guides how it will continue to meet the demands over the next 30 years.

Comments

MCM finds that due diligence has been undertaken in preparing the ESR by:

- Undertaking a Stage 1 archaeological assessment and report (under Project Information Form (PIF) P422-0031-2023, and included in Appendix C) which has been entered into the Ontario Public Register of Archaeological Reports recommending no further assessment.

- Completing the Ministry's screening checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes (included in Appendix C), which determined the study area to have low potential for built heritage resources and cultural heritage landscapes.

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

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | karla.barboza@ontario.ca
- Joseph Harvey, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 613-242-3743 | joseph.harvey@ontario.ca

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

Sincerely,

Joseph Harvey
Heritage Planner
Heritage Planning Unit
joseph.harvey@Ontario.ca

Copied to: Ed Valdez, Manager of Process Engineering & Maintenance, City of Windsor
Jian Li, Consultant Project Manager, Stantec Consulting Ltd.
Mark Badali, Environmental Resource Planner & EA Coordinator, MECP

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

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

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

From:	Rindlisbacher, Hannah
To:	"Alicia Good"
Subject:	RE: City of Windsor Biosolids Management Environmental Report - ERCA Comments
Date:	Tuesday, August 8, 2023 11:17:00 AM

Good morning Alicia,

Thank you for reviewing the Draft Environmental Study Report and providing your comments. We will keep ERCA informed as the project progresses.

Thanks,

Hannah Rindlisbacher E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 226-704-3060
Fax: 519-966-2253
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

From: Alicia Good <AGood@erca.org>
Sent: Tuesday, August 1, 2023 11:10 AM
To: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Subject: City of Windsor Biosolids Management Environmental Report - ERCA Comments

Good morning,

Thank you for circulation our office on the Environmental Study Report (ESR) for the City of Windsor Biosolids Management Strategy - "Schedule C" Class EA, dated July 4, 2023, prepared by Stantec Consulting Ltd. This ESR seeks to address biosolids management needs in the city of Windsor.

Our office has undertaken a preliminary review of the information you have submitted. We offer the following comments at this time:

ERCA is in support of the Preferred Option #2 as the Windsor Biosolids Processing Facility located at 4365 Sandwich Street, Windsor, as this address is not subject to regulation by ERCA under the *Conservation Authorities Act* (Ontario Regulation No. 158/06).

However, we note that this site is partially within the Event Based Area for Source Water Protection and may be subject to Source Water Protection regulations per Section 36 of the *Clean Water Act*. The Risk Management Official has been notified of this ESR and may have further comment to provide.

Please continue to circulate our office on this proposal as we may have further comment to provide at the time of application for Site Plan Control.

Thank you,

Alicia Good

Alicia Good (she/her)
Watershed Planner
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 | Essex, Ontario | N8M 1Y6
P. 519-776-5209 x3794 | F. 519-776-8688
agood@erca.org www.essexregionconservation.ca

From:	Rindlisbacher, Hannah
To:	Kim, Gabriel (MMAH)
Cc:	Boyd, Erick (MMAH)
Subject:	RE: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Tuesday, August 8, 2023 11:05:00 AM
Attachments:	image001.png

Good morning Gabriel,

Thank you for reviewing the Draft Environmental Study Report. We will include your response in the appendices of the report.

Thanks,

Hannah Rindlisbacher E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 226-704-3060
Fax: 519-966-2253
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

From: Kim, Gabriel (MMAH) <Gabriel.Kim@ontario.ca>
Sent: Wednesday, August 2, 2023 2:16 PM
To: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Cc: Boyd, Erick (MMAH) <Erick.Boyd@ontario.ca>
Subject: RE: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario

Hello Hannah,

Thank you for circulating the Draft Environmental Study Report. The report was forwarded to me for review as I am the Planner overseeing the City of Windsor at Erick's team. Upon review, I do not have any provincial land use planning concerns at this point.

Warm regards,

Gabriel Kim
Planner, Western Municipal Services Office
Ministry of Municipal Affairs and Housing
Cell: 519-860-1456

From: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Sent: July 14, 2023 11:15 AM
To: Boyd, Erick (MMAH) <Erick.Boyd@ontario.ca>
Subject: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario

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

Dear Erick,

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. This study was completed in accordance with Phases 1 through 4 of the Municipal Class Environmental Assessment process. A Draft Environmental Study Report was prepared to document the activities and recommendations from the Class EA process.

You are invited to submit comments on the Draft Environmental Study Report. In an effort to conserve paper and reduce printing costs, the report is being distributed in electronic format. Please use the following link and login information to access the report:
Login Information
FTP link: https://tmpsftp.stantec.com
Login name: s0719071400
Password: 4854383
Disk Quota: 20 GB
NEW Expiry Date: 7/26/2023

This file sharing service will expire on July 26th, 2023, if you require access after this date, please contact the undersigned.

Additional project details are available on the City Webpage: Biosolids Management Strategy (citywindsor.ca).

If you have any comments or concerns regarding this Draft Environmental Study Report, please contact the undersigned. We would appreciate receiving any comments on the draft report by August 4th, 2023.

Sincerely,

Hannah Rindlisbacher E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 226-704-3060
Direct: 519-966-2250 ext
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue

From:	Rindlisbacher, Hannah
To:	"Horrobin, Barry"
Subject:	RE: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario
Date:	Tuesday, August 8, 2023 11:14:00 AM

Good morning Barry,

Thank you for reviewing the Draft Environmental Study Report. We will your response in the appendices of the report and keep you informed as the project progresses.

Thanks,

Hannah Rindlisbacher E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 226-704-3060
Fax: 519-966-2253
hannah.rindlisbacher@stantec.com

Stantec
100-2555 Ouellette Avenue
Windsor ON N8X 1L9

From: Horrobin, Barry <bhorrobin@windsorpolice.ca>
Sent: Thursday, August 3, 2023 4:19 PM
To: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Subject: RE: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario

Hannah:

My apologies that I never formally responded back to you on this project, following your attached email to me a couple of weeks ago. The Windsor Police Service certainly has no concerns with this project at this Class EA stage of things, nor do we have any specific comments to share at this point either. One thing we would however offer some feedback on is a review of the site plans for these two treatment plant locations, should any physical layout changes be contemplated. We would offer such input from a threat and risk prevention perspective, if that is applicable for this project.

Respectfully,

Barry Horrobin, B.A., M.A., CLEP, CMM-III
Director of Planning & Physical Resources
WINDSOR POLICE SERVICE

Advanced Certified Law Enforcement Planner

From: Rindlisbacher, Hannah <Hannah.Rindlisbacher@stantec.com>
Sent: Friday, July 14, 2023 10:58 AM
To: Horrobin, Barry <bhorrobin@windsorpolice.ca>
Subject: 165620242: Notice of Draft Environmental Study Report - Class EA Biosolids Management Study, City of Windsor, Ontario

EXTERNAL EMAIL: Do not click any links or open any attachments unless you trust the sender and know the content is safe. The Original Sender of this email is "Rindlisbacher, Hannah" <Hannah.Rindlisbacher@stantec.com>

Dear Barry,

The City of Windsor is undertaking the Class Environmental Assessment (EA) process to develop a long-term biosolids management plan for the two municipal wastewater treatment plants. This study will offer an opportunity to consider biosolids management solutions that improve energy efficiency, plan for effective land use, reduce energy consumption, limit greenhouse gas (GHG) emissions, and promote smart / green energy solutions as outlined in the City of Windsor Corporate Energy Management Plan and Community Energy Plan. This study was completed in accordance with Phases 1 through 4 of the Municipal Class Environmental Assessment process. A Draft Environmental Study Report was prepared to document the activities and recommendations from the Class EA process.

You are invited to submit comments on the Draft Environmental Study Report. In an effort to conserve paper and reduce printing costs, the report is being distributed in electronic format. Please use the following link and login information to access the report:
Login Information
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NEW Expiry Date: 7/26/2023

This file sharing service will expire on July 26th, 2023, if you require access after this date, please contact the undersigned.

Additional project details are available on the City Webpage: Biosolids Management Strategy (citywindsor.ca).

If you have any comments or concerns regarding this Draft Environmental Study Report, please contact the undersigned. We would appreciate receiving any comments on the draft report by August 4th, 2023.

Sincerely,

Hannah Rindlisbacher E.I.T., LEED Green Associate
Environmental Engineer in Training

Direct: 226-704-3060
Direct: 519-966-2250 ext
hannah.rindlisbacher@stantec.com

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Ontario

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
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Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
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Téléc. : 416 314-8452

Via E-mail Only

August 15, 2023

Hannah Rindlisbacher
Environmental Engineer in Training
Stantec Consulting Ltd.
hannah.rindlisbacher@stantec.com

Re: Biosolids Management Strategy
City of Windsor
Municipal Class Environmental Assessment – Schedule C
Project Review Unit Comments – Draft Environmental Study Report

Dear Hannah Rindlisbacher,

Thank you for providing the ministry with an opportunity to comment on the draft Environmental Study Report (ESR) for the above noted Class Environmental Assessment (EA) project. Our understanding is that in order to address current and future biosolids management needs at the Lou Romano Water Reclamation Plant (LRWRP) and the Little River Pollution Control Plant (LRPCP), the City of Windsor (the proponent) has determined that the preferred alternative is to an Anaerobic Digestion and Biogas Utilization strategy whereby biosolids produced in the City's two wastewater treatment plants would be processed at a new centralized anaerobic digestion facility located at the Windsor Biosolids Processing Facility. The preferred design involves trucking LRPCP sludge cake and pumping LRWRP liquid sludge to the new anaerobic digestion facility, applying thermal sludge pretreatment and mesophilic anaerobic digesters, storage and land application of the digestate material, and utilizing biogas with combined heat and power (aka cogeneration) technology.

The Ministry of the Environment, Conservation and Parks (ministry) provides the following comments for your consideration.

General

1) There are references to "Section 4.8" in section 5.6.1, 5.6.2, and 6.7 of the ESR states. As there is no Section 4.8 in the ESR, these references should be corrected.

2) Section 7.1 of the ESR includes a repetition of the line "…*processed for utilization. Implementation of a pretreatment unit for the anaerobic digestion site may be…*" at the page break between pages 101 and 102. The erroneous duplicated line should be deleted.

Air Quality

3) The ESR discusses air quality and emissions generally throughout the evaluation of alternative solutions and designs, and discusses environmental effects to ambient air quality of the preferred alternative design during construction, specifically.

   Please note that if a quantitative Air Quality Impact Assessment is not required for the project, the ministry expects that the report contain a qualitative assessment which includes:

   - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
   - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
   - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
   - A discussion of potential mitigation measures.

   Please revise the ESR to include a qualitative air quality assessment as described above with respect to the preferred alternative design for the project.

Indigenous Consultation

4) The Consultation Log in Appendix B of the ESR identifies that Caldwell First Nation had asked the proponent to agree to a "technical review agreement", and in response the proponent advised that they would not be able to provide funding for the review of Class EA study materials for this project. The Consultation Log does not document a response from Caldwell First Nation with respect to the proponent's response declining the technical review agreement request. Please ensure that the ESR includes documentation of any follow-up correspondence with Caldwell First Nation and please share any relevant correspondence or information with the ministry.

5) The proponent should continue to engage with all communities that have been engaged with to date as the Class EA process proceeds.

Planning and Policy

6) One reference to the 2014 version of the PPS is made in Section 8.2.3 of the ESR. The proponent should ensure that any discussion of the PPS reflects the content of the version that came into effect in 2020.

7) A discussion of the provincial planning and policy context, particularly of the Provincial Policy Statement (PPS), 2020, is largely missing from the ESR. As noted in Section C.1.1 of the Municipal Class EA document, the PPS is a key consideration for identifying land-use planning objectives and evaluating alternative solutions in Phases 2 and 3 of the Class EA process for water/wastewater projects. The ministry notes that the City of Windsor Official Plan, referenced throughout the ESR, is expected to be kept up-to-date with the PPS in order to protect provincial interests, as per section 4.6 of the PPS, 2020 (www.ontario.ca/page/provincial-policy-statement-2020). Regardless, the ministry notes that policies of the PPS continue to apply even after adoption and approval of an official plan. The ministry recommends revising the Report to include a discussion of the PPS.

Renewable Energy Approval

8) Facilities that use bio-gas to produce electricity onsite may be required to obtain a Renewable Energy Approval (REA) per Ontario Regulation 359/09, from the ministry, depending on the fuel mixture and other factors. Proponents proposing to generate electricity using bio-gas and other organics are encouraged to have a pre-submission meeting with MECP to discuss whether REA or other permissions may apply. Pre-submission meeting requests can be submitted in writing to enviropermissions@ontario.ca.

Source Water Protection

9) In October 2015 the Municipal Engineers Association parent Class EA document was amended to include reference to the *Clean Water Act* in Section A.2.10.6, which indicates that proponents of a Class EA project must identify early in their process whether a project is or could potentially be occurring within a vulnerable area. The ministry recommends that the proponent include a section on source water protection in the main body of ESR to clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed, whether there were any source protection plan policies that applied, and if so, how they impacted the project, as well as identify mitigating measures to address any negative environmental impacts to those sources (considering natural, economic and social/cultural environmental impacts).

10) For further information about the source protection plan and assistance in identifying all applicable policies and their requirements, proponents should contact source protection program manager for the applicable source protection region (resources available online: https://conservationontario.ca/conservation-authorities/source-water-protection/source-protection-plans-and-resources/).

Species at Risk

11) The ministry's Species at Risk Branch (SARB) completed an initial species at risk (SAR) information screening under the *Endangered Species Act, 2007* (ESA) for the project location with respect to endangered and threatened species in Ontario. There are known occurrences of the following SAR in the general area with potential to also occur at the project location:

- Eastern Foxsnake – Carolinian population (endangered) – receives species and regulated habitat protection.
    - There are number of records for Eastern Foxsnake within 1500 metres, including in the immediate Sandwich Street area. As a result, both project locations (Site 1 and Site 2) fall within regulated habitat for this species.
- Butler's Gartersnake (endangered) – receives species and general habitat protection
- SAR bats (endangered) – receive species and general habitat protection
- SAR trees, including American Chestnut (endangered), Kentucky Coffee-tree (threatened) – receive species and general habitat protection
- SAR birds, including Red-headed Woodpecker (endangered), Bank Swallow (threatened), Bobolink (threatened), Eastern Meadowlark (threatened) – receive species and general habitat protection
- Blanding's Turtle (threatened) – receives species and general habitat protection
- SAR plants, including Dense Blazing Star (threatened), Willowleaf Aster (threatened) – receive species and general habitat protection

Based on the Environmental Study Report (dated July 4th, 2023), suitable habitat for the above-noted species at risk is present on both Site 1 and Site 2, including meadow, woodland/forest, march and fallow/old fields, based on the Ecological Land Classification inventory. However, appropriate field assessments, including species-specific surveys and habitat assessments, have not been completed to date.

Section 8.5 (Survey Recommendations) outlines proposed studies during the detailed design phase to determine if SAR are present:

- Birds: Breeding bird surveys – Two surveys during the breeding season of May to July
    - Note, SARB recommends that three surveys be completed during the breeding bird season
- Snakes – artificial cover object survey and visual encounter surveys per the Survey Protocol for Ontario's Species at Risk Snakes
    - Note, SARB recommends that a habitat assessment be completed for Eastern Foxsnake, given that the project falls within regulated habitat for this species. Mapping should be completed identifying all suitable habitat, including habitat features (e.g. hibernacula, nesting areas, thermoregulation features), mapped and categorized using the habitat regulation and the Categorizing and Protecting Habitat under the Endangered Species Act policy.
- Bats – acoustic monitoring
- Plants – one botanical survey in July
    - Note, SARB recommends that full season surveys be completed, which should capture the fall flowering period from late September to November for Willowleaf Aster, to determine if this species may be impacted by the project.

Section 8.4 (Permitting Considerations) states that consultation with MECP will occur once design details are available to confirm mitigation measures and determine potential authorization and mitigation requirements.

At this point, SARB cannot comment on potential ESA authorization requirements or appropriate mitigation measures because fieldwork has not been completed to determine presence of and potential impacts to species at risk and/or ESA-protected habitat.

Future consultation with SARB is recommended, following the completion of field assessments and once specific project details (e.g. detailed design) are available, to determine if authorization under the *Endangered Species Act, 2007* will be required for any of the project components. SARB recommends that an Information Gathering Form will be submitted to SAROntario@ontario.ca for review. Based on the information in the Environmental Study Report, the project may impact species at risk and/or protected habitat and may require authorization under the *Endangered Species Act, 2007*.

Surface Water

12) Depending on the area of the new construction as well as municipal requirements a stormwater strategy may be required, which in turn will require an Environmental Compliance Approval application to the ministry.

Thank you for circulating this draft Report for the ministry's consideration. Please document the provision of the draft Report to the ministry as well as this Project Review Unit Comments letter in the final report, and please provide an accompanying response letter to support our review of the final report. A copy of the final Notice should be sent to the ministry's Southwest Region EA notification email account (eanotification.swregion@ontario.ca).

Should you or any members of your project team have any questions regarding the material above, please contact me at mark.badali1@ontario.ca.

Sincerely,

Mark Badali

Mark Badali,
Senior Project Evaluator
Environmental Assessment Program Support, Environmental Assessment Branch
Ontario Ministry of the Environment, Conservation and Parks

cc Zeljko Romic, Manager, Environmental Assessment Program Support, MECP
Marcelina Wilson, Supervisor, Windsor Area Office, MECP
Marc Bechard, Water Compliance Supervisor, Sarnia District Office, MECP

Stantec Consulting Ltd.
140 Ouellette Place, Unit 140
Windsor ON N8X 1L9

August 18, 2023
File: 165620239

Attention: Mr. Mark Badali, Regional Environmental Planner

Ministry of the Environment, Conservation, and Parks
135 St. Clair Avenue W, 1st Floor
Toronto ON, M4V 1P5

Dear Mr. Badali,

Reference: Project Review Unit Comments – Draft Environmental Study Report Municipal Class Environmental Assessment – Schedule C Biosolids Management Strategy, City of Windsor

Thank you for your prompt response to the July 14, 2023, Draft Environmental Study Report (ESR) for the Biosolids Management Strategy, City of Windsor. Please note that the ESR will be updated to reflect the comments provided in your letter of August 15, 2023. The following is in response to your comments:

1) General – Reference to Section 4.8

   The reference to the quantitative analysis of the anticipated biogas production, energy savings, and reduction in GHG emissions has been updated accordingly (**Section 4.8 → Section 5.8)**.

2) General – Repeated Line in Section 7.1

   Repeated line has been removed.

3) Air Quality

   In Phase 5 implementation of this project, during the detailed design phase and after the preferred size, layout, and technical specifications for the facility are determined an Emission Summary and Dispersion Modelling (ESDM) Report should be prepared in accordance with Ontario Regulation 419/05. The ESDM Report will outline the potential impact of the proposed facility on local air quality as well as mitigation measures to be followed during the design, construction, and operation of the proposed facility. A brief discussion of the local air quality and nearby sensitive receptors was added to the report (**Section 8.5.2**).

4) Indigenous Consultation – Technical Review Agreement

   The Caldwell First Nation indicated in an email on October 12th, 2022, that they would not be allotting technical staff to review the Draft or Final ESR due to lack of funding. The Aboriginal Consultation Log in **Appendix C** of the ESR has been updated such that the outcome of the request for a Technical Review Agreement is noted.

5) Indigenous Consultation – Continued Engagement with all Communities

The proponent will continue to engage with all communities that have been engaged with to date as the Class EA process proceeds.

6) Planning and Policy – Provincial Policy Statement References

The reference and subject matter of the Provincial Policy Statement has been updated accordingly (2014 → 2020).

7) Planning and Policy – Provincial Policy Statement Section

A section discussing the the Provincial Policy Statement (PPS 2020) has been added to the ESR (**Section 3.2**).

8) Renewable Energy Approval

In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding potential Renewable Energy Approval (REA) requirements. Should a REA application be required, the proponent will obtain an REA prior to starting the construction of the proposed work. The ESR has been updated such that it is noted in **Section 6.4 Permitting Considerations Subsection 8.4.3 MECP**.

9/10) Source Water Protection

A section discussing the Essex Region Source Protection Plan (SPP) and assessing the requirements for Source Water Protection was added to the ESR (**Section 8.2.8**).

11) Species at Risk

As a part of this Class EA process a field investigation was carried out to document existing conditions at the proposed work site. The field investigation consisted of vegetation and wildlife habitat assessments which focused on documenting and describing natural heritage features, vegetation communities, wildlife habitat, rare species, Species at Risk (SAR) and their habitats, and fish habitat within the Study Areas. The number, location, and species of bird nests found in trees or vegetated areas that may be affected by the proposed work were documented in the Natural Heritage Impact Assessment Report which is available in **Appendix C** of the ESR.

Suitable habitat for ten (10) Species of Conservation Concern (SOCC) and five (5) Species at Risk (SAR) were identified to be potentially present at the preferred site (Outlined in Table 5 and 6 of the Natural Heritage Impact Assessment Report). The assessments were completed using field data collected in the late Winter and therefore recommendations were made for additional surveys to occur during the growing season as a part of the detailed design process. In addition, this report outlines proposed mitigation measures to reduce the risk of impacts to natural heritage during the design and construction phases.

It is proposed for the layout of the anaerobic digestion facility to be in the open agricultural field and avoid the forested area. During the detailed design process and once project specific details such as the size and layout of the facility are determined, further consultation with the Species at Risk Branch (SARB) will be undertaken.

12) Surface Water – Potential for Environmental Compliance Approval (ECA)

In Phase 5 implementation of this project, the proponent will consult further with the MECP Environmental Permissions Branch regarding potential ECA requirements. Should a stormwater management strategy and/or ECA application be required, the proponent will obtain an ECA prior to starting the construction of the proposed work. The ESR has been updated such that it is noted in **Section 6.4 Permitting Considerations Subsection 8.4.3 MECP**.

Sincerely,
Stantec Consulting Ltd.

Chrissy Jung

Chrissy Jung M.A.Sc., P.Eng.
Environmental Engineer
Phone: 226 704 3037
chrissy.jung@stantec.com

Jian Li

Jian Li Ph.D., P.Eng., PE
Project Manager
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c. Ed Valdez, Manager of Process Engineering & Maintenance, City of Windsor
Zeljko Romic, Manager, Environmental Assessment Program Support, MECP
Marcelina Wilson, Supervisor, Windsor Area Office, MECP
Marc Bechard, Water Compliance Supervisor, Sarnia District Office, MECP

Ontario

Ministry of the Environment, Conservation and Parks	**Ministère de l'Environnement, de la Protection de la nature et des Parcs**
Environmental Assessment Branch	Direction des évaluations environnementales
1st Floor 135 St. Clair Avenue W Toronto ON M4V 1P5 **Tel.**: 416 314-8001 **Fax**.: 416 314-8452	Rez-de-chaussée 135, avenue St. Clair Ouest Toronto ON M4V 1P5 **Tél.** : 416 314-8001 **Téléc.** : 416 314-8452

Via E-mail Only

September 7, 2023

Chrissy Jung
Environmental Engineer
Stantec Consulting Ltd.
chrissy.jung@stantec.com

Re: Biosolids Management Strategy
City of Windsor
Municipal Class Environmental Assessment – Schedule C
Project Review Unit Comments – Revised Draft Environmental Study Report

Dear Chrissy Jung,

Thank you for providing the Ministry of the Environment, Conservation and Parks (ministry) with an opportunity to comment on the revised draft Environmental Study Report (ESR), dated August 31, 2023 for the above noted Class Environmental Assessment (EA) project, further to the ministry's initial Project Review Unit (PRU) Comments letter dated August 15, 2023 and Stantec's response letter dated August 18, 2023. The ministry offers the following additional comments for your consideration.

Air Quality

A. Section 8.5.2 of the ESR should include the following additional information:

   i. Additional details of the mitigation measures, emission controls and odour management best practices that will prevent offsite odour and air impacts for the preferred alternative. Section 5.6.2 states, "…*all of the processes employed at the proposed anaerobic digestion facility (receiving building, pretreatment unit, anaerobic digesters, biogas utilization unit, and dewatering facility) would be covered or enclosed with air pollution control devices. Therefore, noise, vibration, odour, and air* *pollution emitted from this facility are anticipated to be minimal…*" This statement is not a sufficient mitigation plan and does not guarantee that the project will not cause any offsite air or odour impacts.

   ii. Indication that an Air Environmental Compliance Approval (ECA) will be required.

   iii. Commitment to the development of an Odour Management and Mitigation Plan prior to implementation of the project.

   iv. A brief description of how any odour complaints from the new facility will be addressed.

B. Any mitigation measures and emission controls need to be documented and assessed in the Emission Summary and Dispersion Modelling (ESDM) report when it is prepared.

C. If source separated organics are to be processed at the new facility, this needs to be assessed in the ESDM report.

Please document the provision of the revised draft ESR to the ministry as well as this PRU Comments letter (dated September 7, 2023) in the final report.

Besides the additional comments provided above that pertain to comment #3 of the initial PRU Comments letter dated August 15, 2023, the ministry is satisfied that the revised draft ESR generally addresses the ministry's other comments that were provided in that letter.

Should you or any members of your project team have any questions regarding the material above, please contact me at mark.badali1@ontario.ca.

Sincerely,

Mark Badali

Mark Badali,
Senior Project Evaluator
Environmental Assessment Program Support, Environmental Assessment Branch
Ontario Ministry of the Environment, Conservation and Parks

cc Zeljko Romic, Manager, Environmental Assessment Program Support, MECP
Marcelina Wilson, Supervisor, Windsor Area Office, MECP
Marc Bechard, Water Compliance Supervisor, Sarnia District Office, MECP
Ed Valdez, Manager of Process Engineering & Maintenance, City of Windsor
Hannah Rindlisbacher, Environmental Engineer in Training, Stantec Consulting Ltd.
Jian Li, Project Manager, Stantec Consulting Ltd.

Stantec

Stantec Consulting Ltd.
140 Ouellette Place, Unit 140
Windsor ON N8X 1L9

September 20, 2023
File: 165620242

Attention: Mr. Mark Badali, Regional Environmental Planner

Ministry of the Environment, Conservation, and Parks
135 St. Clair Avenue W, 1st Floor
Toronto ON, M4V 1P5

Dear Mr. Badali,

**Reference: Project Review Unit Comments – Revised Draft Environmental Study Report
Municipal Class Environmental Assessment – Schedule C
Biosolids Management Strategy, City of Windsor**

Thank you for your prompt response to the August 31st, 2023, Revised Draft Environmental Study Report (ESR) for the Biosolids Management Strategy, City of Windsor. Please note that the ESR will be updated to reflect the additional comments provided in your letter of September 7th, 2023. The following is in response to your comments:

Air Quality

A) Section 8.5.2 – Air Quality Impact Assessment

i. The ESDM Report will identify and assess project specific mitigation measures, emission controls, and odour best management practices (BMPs) that will prevent offsite odour and air impacts from the proposed anaerobic digestion facility. An outline of the method to be used to develop and implement these mitigation measures, controls, BMPs has been added to **Section 8.5.2.**

ii. The ESR has been updated such that the requirement for an Air Environmental Compliance Approval (ECA) is noted in **Section 8.4 Permitting Considerations (Subsection 8.4.3 MECP)** and **Section 8.5.2.**

iii. Commitment to develop an Odour Management and Mitigation Plan during detailed design and prior to implementation has been indicated in **Section 8.5.2**.

iv. A brief description of how odour complaints from the facility will be addressed was added to **Section 8.5.2**.

B) Mitigation Measures and Emission Controls

In Phase 5 (implementation of this project), mitigation measures and emission controls will be documented and assessed in an Emission Summary and Dispersion Modelling (ESDM) report.

Reference: Project Review Unit Comments – Revised Draft Environmental Study Report Municipal Class Environmental Assessment – Schedule C Biosolids Management Strategy, City of Windsor

C) Source Separated Organics

Prior to or early in Phase 5 (implementation of this project) the inclusion of source separated organics will be confirmed. If source separate organics are to be processed at the new facility the ESDM Report will include this in the assessment.

Sincerely,
Stantec Consulting Ltd.

Chrissy Jung

Chrissy Jung M.A.Sc., P.Eng.
Environmental Engineer
Phone: 226 704 3037
chrissy.jung@stantec.com

Jian Li Ph.D., P.Eng., PE
Project Manager
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c. Ed Valdez, Manager of Process Engineering & Maintenance, City of Windsor
Zeljko Romic, Manager, Environmental Assessment Program Support, MECP
Marcelina Wilson, Supervisor, Windsor Area Office, MECP
Marc Bechard, Water Compliance Supervisor, Sarnia District Office, MECP

kstammler@erca.org
P.519.776.5209 ext 342
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360 Fairview Avenue West
Suite 311, Essex, ON N8M 1Y6

18 August 2023

Chrissy Jung
Stantec Consulting Ltd.
300W-675 Conchrane Drive
Markham, ON
L3R 0B8

RE: City of Windsor biosolids management strategy – "Schedule C" Class EA Environmental study report

Dear Ms.Jung

Thank you for the opportunity to review the information related to the City of Windsor biosolids management strategy as it relates to Source Water Protection in the Essex Region. The area where the preferred option is proposed to be located is within the Event Based Area for the Handling and Storage of large volumes of liquid fuel (see attached map). In addition, it should be noted that the application and storage of hauled sewage is a significant drinking water threat in Windsor IPZ-1 and Windsor IPZ-2. The Little River Water Treatment Plant is located within Windsor IPZ-2. Further information is provided below, and we would ask that you continue to consult with Source Protection staff on this project as it progresses.

We suggest that the final project proposal include an evaluation and assessment of risk as it pertains to Source Water Protection, particularly in regards to Hauled Sewage. While we don't anticipate any issues, it will expedite review if this information is included.

<u>Significant Drinking Water Threats</u>
The property for the proposed project is in the Event Based Area (EBA) for the Amherstburg Water Treatment Plant. In this area, the above grade handling and storage of liquid fuel in volumes greater than 3,000,000 L (3 million litres) is identified as a Significant Drinking Water Threat (SDWT). Based on the information provided, it does not appear that fuel of this volume will be used or installed as a direct result of the proposed project. Should fuel of this volume be necessary during or as a result of the proposed project, a Risk Management Plan will be required.

Currently, the application of hauled sewage is prohibited in Windsor-IPZ 1 and Windsor IPZ-2. The Essex Region Source Protection Plan is under review and revision to bring it in line with the 2021 Director Technical Rules. Under the new Rules, the storage of hauled sewage will be identified as a significant drinking water threat in Windsor IPZ-2 and Windsor IPZ-2. Draft policies have been prepared but are not yet approved. Because the Little River Water Treatment Plant is within the Windsor IPZ-2 and the project will involve transporting sewage, the project proposal should include an assessment of this activity as it pertains to Source Water Protection.

Again, we thank you for the opportunity to provide comments on this project and look forward to hearing more as it progresses.

Sincerely,

Katie Stammler, PhD
Source Water Protection Project Manager

Stantec Consulting Ltd.
140 Ouellette Place, Unit 140
Windsor ON N8X 1L9

August 23, 2023
File: 165620239

Attention: Katie Stammler, Ph.D.
Source Water Protection Project Manager
Essex Regional Conservation Authority
360 Fairview Ave W Suite 311
Essex, ON
N8M 1Y6

Dear Ms. Stammler,

Reference: Project Review Comments – Draft Environmental Study Report
Municipal Class Environmental Assessment – Schedule C
Biosolids Management Strategy, City of Windsor

Thank you for your prompt response to the July 14, 2023, Draft Environmental Study Report (ESR) for the Biosolids Management Strategy, City of Windsor. This letter is in response to your comments received on August 18th, 2023.

Please note that a section regarding source water protection has been added to **Section 8.0** of the report '**Environmental Impacts and Mitigating Measures**'. This section includes an evaluation and assessment of risk as it pertains to Source Water Protection for the anaerobic digestion facility and transfer of dewatered sludge from the Little River Pollution Control Plant (LRPCP).

Anaerobic Digestion Facility

The recommended location of the anaerobic digestion facility is 4365 Sandwich St., Windsor, across the road from the existing Lou Romano Water Reclamation Plant (LRWRP). This property is located in the Intake Protection Zone (IPZ) 3 for the Amherstburg Water Treatment Plant (refer to Map 10 of the Essex Region Source Protection Plan (SPP)). Above grade handling and storage of liquid fuel in volumes greater than 3,000,000 L (3 ML) is identified as a Significant Drinking Water Threat (SDWT) in all Event Based Areas in the Essex Region. **The proposed anaerobic digestion facility, which is a biological waste treatment process, will not require nor result in the handling or storage of large volumes of liquid fuel.**

Transfer of Dewatered Sludge

It should be noted that dewatered sludge (containing 25-32% solids, also called sludge cake) differs from sewage in that a significant volume of water has been removed and the remaining material can be handled as a solid. Currently, the transferring of dewatered sludge cake from LRPCP to the existing Biosolids Facility (near the LRWRP) is carried out with specialized trucks. The transferring of sludge cake from the LRPCP to the anaerobic digestion facility will not require any changes to the existing biosolids transferring protocol.

As a part of this Class Environmental Assessment, two alternatives were evaluated for the transferring of biosolids from the LRPCP to the anaerobic digestion facility. Alternative No. 1 was

Reference: Project Review Comments – Draft Environmental Study Report Municipal Class Environmental Assessment – Schedule C Biosolids Management Strategy, City of Windsor

to construct a forcemain across the City and Alternative No. 2 was to maintain the status quo (truck dewatered sludge). Based on this analysis, trucking sludge cake to the anaerobic digestion facility was recommended. Benefits of this alternative include the increased control over the solid's concentration fed to the pretreatment unit or anaerobic digesters, lower capital cost, and flexibility to meet future needs. Further, this alternative would avoid the negative social, economic, and natural environmental impacts of installing a long forcemain from the LRPCP to the LRWRP which would likely require multiple pumping stations across the City of Windsor.

The LRPCP, is located in the IPZ-2 for the A.H. Weeks (Windsor) Water Treatment Plant (refer to Map 8 of the Essex Region SPP). The application and storage of hauled sewage is considered a SDWT in this zone and further is prohibited in Windsor IPZ-1 and IPZ-2. **No sewage will be applied, transported, or stored as a part of this work.**

We hope this letter addresses your comments and we will continue to consult with the Source Protection Staff on this project as it progresses.

Please contact the undersigned should you have any additional questions or concerns.

Sincerely,

Stantec Consulting Ltd.

Chrissy Jung

Chrissy Jung M.A.Sc., P.Eng.
Environmental Engineer
Phone: 226 704 3037
chrissy.jung@stantec.com

Jian Li Ph.D., P.Eng., PE
Project Manager
Phone: 226 704 3039
jian.li@stantec.com

c. Ed Valdez, Manager of Process Engineering & Maintenance, City of Windsor

APPENDIX B

First Nations Consultation Log

Aboriginal Consultation Log
Municipal Class Environmental Assessment
City of Windsor Biosolids Management Study

Contact Information	Date/Method of Communication	Correspondence Received and/or Project Information Distributed	Consultant Response
Ministry of Indigenous Affairs Molly Mann molly.mann@ontario.ca Manager, Indigenous Relations Unit Heather Levecque heather.levecque@ontario.ca Director, Indigenous Relations Unit Suite 400, 160 Bloor Street East Toronto, ON M7A 2E6	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Molly Mann and Heather Levecque, on January 20th, 2022, via Email	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Molly Mann and Heather Levecque on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Molly Mann and Heather Levecque on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Southern First Nations Secretariat Ms. Jennifer Whiteye jenwhiteye@sfns.on.ca Executive Director 22361 Austin Line Bothwell, ON N0L 1Y0	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Jennifer Whiteye on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Jennifer Whiteye on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Jennifer Whiteye on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Walpole Island First Nation / Bkejwanong Territory Dr. Dean Jacobs dean.jacobs@wifn.org Independent Consultant Janet MacBeth janet.macbeth@wifn.org Consultation Manager 117 Tahgahoning Road,R.R. #3 Wallaceburg, ON N8A 4K9	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Dr. Dean Jacobs and Janet MacBeth on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Dean Jacobs and Janet MacBeth on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Dean Jacobs and Janet McBeth on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A

Aboriginal Consultation Log
Municipal Class Environmental Assessment
City of Windsor Biosolids Management Study

Contact Information	Date/Method of Communication	Correspondence Received and/or Project Information Distributed	Consultant Response
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Métis Nation of Ontario, Thames Bluewater Métis Council Kathleen Anderson tbwmc.president@gmail.com President 183 Summerset Crescent London, ON N6K 3S5	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Kathleen Anderson on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Kathleen Anderson on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Kathleen Anderson on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Caldwell First Nation Louise Hillier band.rep@caldwellfirstnation.ca Band Rep. Julia Ierullo, MES consultation@caldwellfirstnation.ca Consultation Coordinator Brianna Sands ecc@caldwellfirstnation.ca Environmental Consultation Coordinator 14 Orange Street Leamington, ON N8H 1P5	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Louise Hillier on January 20th, 2022, via Email. The Notice of Commencement was submitted to their consultation website on February 1st, 2022.	Consultation request submitted through online consultation tool: www.consultwithcaldwell.ca Received an email from Zack Hamm on June 13, 2022, via email. Caldwell First Nation would like to engage in detailed consultation with the proponent. A 'Fieldwork Participation Agreement' and 'Technical Review Agreement' which outlined capacity funding was sent to the City on July 15, 2022. The City advised via email on October 11, 2022, that they would not be able to provide funding for the review of Class EA study materials for this municipal class environmental assessments. Caldwell First Nation indicated that they would not be allotting technical staff to review the Draft ESR due to lack of funding. The City was willing to commit to a Fieldwork Participation Agreement for this project; however, no stage two archaeological assessments or field surveying was completed for this project. During the implementation phase of this project the proponent will continue to engage with the Caldwell First Nation and facilitate the participation in archaeological field work (if applicable).
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email Zack Hamm and submitted to the consultation website on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email Zack Hamm and submitted to the consultation website on on February 23, 2019. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A

Aboriginal Consultation Log
Municipal Class Environmental Assessment
City of Windsor Biosolids Management Study

Contact Information	Date/Method of Communication	Correspondence Received and/or Project Information Distributed	Consultant Response
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Aamjiwnaang First Nation Chris Plain cplain@aamjiwnaang.ca Chief Joanne Rogers jrogers@aamjiwnaang.ca Councillor Cathleen O'Brien cobrien@aamjiwnaang.ca Environmental Coordinator Courtney Jackson cjackson@aamjiwnaang.ca Environment Worker 978 Tashmoo Avenue Sarnia, ON N7T 7H5	**Notice of Commencement** Date: January 20, 2022 Method: Via Email	The Notice of Commencement was sent to Chief Chris Plain, Joanne Rogers, Cathleen O'Brien and Courtney Jackson on January 20, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Chris Plain, Joanne Rogers, Cathleen O'Brien and Courtney Jackson on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Chris Plain, Joanne Rogers, Cathleen O'Brien and Courtney Jackson on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Delaware Nation (Moravian of the Thames) Denise Stonefish denise.stonefish@delawarenation.on.ca Chief 14760 School House Line Thamesville ON N0P 2K0	**Notice of Commencement** Date: January 20, 2022 Method: via Email	The Notice of Commencement was sent to Denise Stonefish on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Denise Stonefish on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Denise Stonefish on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD

Aboriginal Consultation Log
Municipal Class Environmental Assessment
City of Windsor Biosolids Management Study

Contact Information	Date/Method of Communication	Correspondence Received and/or Project Information Distributed	Consultant Response
Metis Nation of Ontario Margaret Froh margaretF@metisnation.org Director, Lands, Resources and Consultations 75 Sherbourne Street, Unit 311 Toronto ON M5A 2P9	**Notice of Commencement** Date: January 20, 2022 Method: via Email	The Notice of Commencement was sent to Margaret Froh on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Margaret Froh on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Margaret Froh on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Chippewas of Kettle and Stony Point First Nation Jason Henry Jason.Henry@kettlepoint.org Chief 6247 Indian Lane, R.R. #2 Forest, ON N0N 1J1	**Notice of Commencement** Date: January 20, 2022 Method: via Email	The Notice of Commencement was sent to Jason Henry and Valerie George on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Jason Henry and Valerie George on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Jason Henry on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Chippewas of the Thames First Nation Jacqueline French jfrench@cottfn.com Chief Kelly Riley kriley@cottfn.com Director of Treaties, Lands & Environment	**Notice of Commencement** Date: January 20, 2022 Method: via Email	The Notice of Commencement was sent to Chief Jacqueline French, Kelly Riley and Fallon Burch January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Jacqueline French, Kelly Riley and Fallon Burch on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was submitted on nationsconnect.ca on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	COTFN noted in an email on February 16th, 2023, that they do not have any comments or concerns with the preferred design concepts. They look forward to the opportunity to review the ESR.

Aboriginal Consultation Log
Municipal Class Environmental Assessment
City of Windsor Biosolids Management Study

Contact Information	Date/Method of Communication	Correspondence Received and/or Project Information Distributed	Consultant Response
Fallon Burch fburch@cottfn.com Consultation Coordinator 320 Chippewa Road Muncey, ON N0L 1Y0	**Draft ESR** Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD
Onelda Nation of the Thames ONYOTA'A:KA Adrian Chrisjohn adrian.chrisjohn@oneida.on.ca Chief Cherilyn Hill cherilyn.hill@oneida.on.ca Political Office Manager 2212 Elm Avenue Southwold, ON N0L 2G0	**Notice of Commencement** Date: January 20, 2022 Method: via Email	The Notice of Commencement was sent to Chief Adrian Chrisjohn and Cherilyn Hill on January 20th, 2022, via Email.	N/A
	1st Open House Date: June 29th, 2022 Method: Newspaper and Email	The Notice of the 1st Open House was sent by email to Adrian Chrisjohn and Cherilyn Hill on June 17th, 2022. The Notice of 1st Open House was published in the Windsor Star on June 18th, 2022.	N/A
	2nd Open House Date: January 31st, 2023 Method: Newspaper and Email	The Notice of 2nd Open House was sent by email to Adrian Chrisjohn and Cherilyn Hill on January 20, 2023. The Notice of 2nd Open House was published in the Windsor Star on January 21, 2023.	N/A
	Draft ESR Date: July 14th, 2023 Method: Email	The Notice of Draft ESR was sent by email on July 14th, 2023.	N/A
	Notice of Completion Date: TBD Method: Newspaper and Email	A Notice of Completion, including access information to the electronic copy of final draft ESR report, was mailed to individual Aboriginal communities to solicit comments and inputs on TBD.	TBD

From:	Kwusen Support on behalf of NationsConnect
To:	Rindlisbacher, Hannah
Subject:	NationsConnect: Notice of Public Information Centre No. 2 regarding CLASS ENVIRONMENTAL ASSESSMENT BIOSOLIDS MANAGEMENT PLAN
Date:	Thursday, February 16, 2023 11:00:16 AM

A reply has been sent and you have been involved in the conversation or were indicated as a person to notify.

Subject:	Notice of Public Information Centre No. 2
Body:	Good morning, Thank you for the opportunity to review the Public information Session No. 2 Based on the review, we have no comments or concerns with the Preferred Design Concepts. We look forward to the opportunity to review the Environmental Study Report. If you have any questions, please feel free to contact me. Thank you, Fallon Burch Consultation Coordinator Chippewas of the Thames First Nation (519) 289-5555 Ext. 251

View message and reply via NationsConnect

APPENDIX C: FIELD INVESTIGATIONS

1. Archaeological Assessment Report
2. Natural Heritage Impact Assessment Report
3. Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes - Checklist

APPENDIX C

Archaeological Assessment Report

Ministry of Citizenship and Multiculturalism (MCM)

Archaeology Program Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Floor, 400 University Ave.
Toronto ON M7A 2R9
Tel.: (416) 414-7787
Email: Jessica.Marr@ontario.ca

Ministère des Affaires civiques et du Multiculturalisme (MCM)

Unité des programme d'archéologie
Direction du patrimoine
Division de la citoyenneté, de l'inclusion et du patrimoine
5e étage, 400 ave. University
Toronto ON M7A 2R9
Tél. : (416) 414-7787
Email: Jessica.Marr@ontario.ca

Jul 4, 2023

Darren Kipping (P422)
Stantec Consulting
600 - 171 Queen's London ON N6A 5J7

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment: Windsor Biosolids Municipal Class Environmental Assessment, Part of Lots 57, 58, and 59, Concession 1 Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario ", Dated Jun 30, 2023, Filed with MCM Toronto Office on N/A, MCM Project Information Form Number P422-0031-2023, MCM File Number 0018760

Dear Mr. Kipping:

The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.[1]

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to Archaeology@Ontario.ca

cc. Archaeology Licensing Officer
Ed Valdez,City of Windsor
Ed Valdez,City of Windsor

[1]*In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.*

Stantec

Stage 1 Archaeological Assessment: Windsor Biosolids Municipal Class Environmental Assessment

Part of Lots 57, 58, and 59, Concession 1 Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario

June 30, 2023

Prepared for:
City of Windsor
4155 Ojibway Parkway
Windsor, Ontario N9C 4A5

Prepared by:
Stantec Consulting Ltd.
600-171 Queens Avenue
London, Ontario N6A 5J7

Licensee: Darren Kipping, MA
Licence Number: P422
Project Information Form Number:
P422-0031-2023

Project Number:
165620242

ORIGINAL REPORT

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor (the City) to complete a Stage 1 archaeological assessment for the Windsor Biosolids Management Facility (the Project). The Stage 1 archaeological assessment was undertaken in the preliminary planning and design process as part of the Environmental Study Report (ESR) for the Municipal Class Environmental Assessment (Class EA) for the Project under the Ontario *Environmental Assessment Act* (Government of Ontario 1990a).

The study area for the Project comprises two potential locations, i.e., Parcel 1 and Parcel 2, for the construction of biosolids facilities. The Parcel 1 study area comprises approximately 5.04 hectares and is located in parts of Lots 57 and 58, Concession 1, Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario. The Parcel 2 study area comprises approximately 2.66 hectares and is located in part of Lot 59, Concession 1, Petite Côte, Geographic Township of Sandwich, now City of Windsor, Essex County, Ontario.

The Stage 1 archaeological assessment, including background research and property inspection, was completed under Project Information Form number P422-0031-2023 issued to Darren Kipping, MA, by the Ministry of Citizenship and Multiculturalism (MCM). The property inspection was completed on March 17, 2023.

The Stage 1 archaeological assessment determined that the Parcel 1 study area has been previously assessed and no further archaeological assessment was recommended (Archaeological Services Inc. 2008, 2010). The Stage 1 archaeological assessment determined that the Parcel 2 study area retains low to no archaeological potential for the identification or recovery of archaeological resources due to deep and extensive disturbance. In accordance with Section 1.3.2 and Section 7.7.4 of the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is not required for the study area.**

The MCM is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Table of Contents

List of Tables

List of Figures

Project Personnel

Licensed Archaeologist:	Darren Kipping, MA, RPA (R422)
Project Manager:	Jian Li, Ph.D., P.Eng., PE
Licensed Field Director:	Darren Kipping, MA (R422)
Mapping:	Baljeet Kaur
Report Writer:	Ruth Dickau, Ph.D. (R1171)
Quality Review:	Parker Dickson, MA (P256)
Independent Review:	Tracie Carmichael, BA. B.Ed. (R140)

Acknowledgements

The City of Windsor:	Ed Valdez, P.Eng. – Manager, Process Engineering and Maintenance
Ministry of Citizenship and Multiculturalism:	Robert von Bitter – Archaeological Data Coordinator

1 Project Context

1.1 Development Context

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor (the City) to complete a Stage 1 archaeological assessment for the Windsor Biosolids Management Facility (the Project). The Stage 1 archaeological assessment was undertaken in the preliminary planning and design process as part of the Environmental Study Report (ESR) for the Municipal Class Environmental Assessment (Class EA) for the Project under the Ontario *Environmental Assessment Act* (Government of Ontario 1990a).

The study area for the Project comprises two potential locations, i.e., Parcel 1 and Parcel 2, for the construction of biosolids facilities (Figure 1 and Figure 2). The Parcel 1 study area comprises approximately 5.04 hectares and is located in parts of Lots 57 and 58, Concession 1, Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario. The Parcel 2 study area comprises approximately 2.66 hectares and is located in part of Lot 59, Concession 1, Petite Côte, Geographic Township of Sandwich, now City of Windsor, Essex County, Ontario.

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Citizenship and Multiculturalism's (MCM) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 archaeological assessment are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork, and current land conditions.
- To evaluate the study area's archaeological potential, which will support recommendations for Stage 2 survey for the property.
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives, Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historical, and environmental literature pertaining to the study area.
- A review of the land use history, including pertinent historical maps.
- A review of the City of Windsor's *Archaeological Master Plan* (Cultural Resource Management [CRM] Group Limited *et al*. 2005).
- An examination of the *Ontario Archaeological Sites Database* to determine the presence of registered archaeological sites in and around the study area.
- A review of the *Ontario Public Register of Archaeological Reports* to identify previous archaeological assessments completed within 50 metres of the study area.
- A property inspection of the study area.

Permission to enter the study area and document features of archaeological potential was provided by the City.

1.2 Historical Context

"Contact" is typically used as chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

1.2.1 Pre-Contact Indigenous Resources

This portion of southwestern Ontario has been occupied by Indigenous peoples since the retreat of the Wisconsin glacier approximately 11,000 years ago. Much of what is understood about the lifeways of Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based in observed changes in formal lithic tools, and separated into the Early Paleo, Late Paleo, Early Archaic, Middle Archaic, and Late Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. The current understanding of Indigenous archaeological culture is summarized in Table 1, based on Ellis and Ferris (1990). The provided time periods are based on the "Common Era" calendar notation system, i.e., Before Common Era (BCE) and Common Era (CE).

Table 1: Generalized Cultural Chronology for Essex County

Period	Characteristics	Time Period	Comments
Early Paleo	Fluted Projectiles	9000 – 8400 BCE	Spruce parkland/caribou hunters
Late Paleo	Hi-Lo Projectiles	8400 – 8000 BCE	Smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 – 6000 BCE	Slow population growth
Middle Archaic	Brewerton-like Points	6000 – 2500 BCE	Environment similar to present
Late Archaic	Narrow Point	2500 – 1800 BCE	Increasing site size
	Broad Point	1800 – 1500 BCE	Large chipped lithic tools
	Small Point	1500 – 1100 BCE	Introduction of bow hunting
Terminal Archaic	Hind Points	1100 – 950 BCE	Emergence of true cemeteries
Early Woodland	Meadowood Points	950 – 400 BCE	Introduction of pottery
Middle Woodland	Couture Corded Pottery	400 BCE – 500 CE	Increased sedentism
	Riviere au Vase Phase	500 – 800 CE	Seasonal hunting and gathering
Late Woodland	Younge Phase	800 – 1200 CE	Incipient agriculture
	Springwells Phase	1200 – 1400 CE	Agricultural villages
	Wolf Phase	1400 – 1550 CE	Earth worked villages, warfare

Period	Characteristics	Time Period	Comments
Contact Indigenous	Various Algonquian and Iroquoian Groups	1600 – 1875 CE	Early written records and treaties
Historical	French/Euro-Canadian	1749 CE – present	European settlement

Between 9000 and 8000 BCE, Indigenous populations were sustained by hunting, fishing, and foraging and lived a relatively mobile existence across an extensive geographic territory. Despite these wide territories, social ties were maintained between groups. One method in particular was through gift exchange, evident through exotic lithic material documented on many sites (Ellis 2013:35-40).

By approximately 8000 BCE, evidence exists and becomes more common for the production of ground-stone tools such as axes, chisels, and adzes. These tools themselves are believed to be indicative specifically of woodworking. This evidence can be extended to indicate an increase in craft production and arguably craft specialization. This latter statement is also supported by evidence dating to approximately 7000 BCE of ornately carved stone objects which would be laborious to produce and have explicit aesthetic qualities (Ellis 2013:41). This is indirectly indicative of changes in social organization which permitted individuals to devote time and effort to craft specialization. Since 8000 BCE, the Great Lakes basin experienced a low-water phase, with shorelines significantly below modern lake levels (Stewart 2013: Figure 1.1.C). It is presumed that the majority of human settlements would have been focused along these former shorelines. At approximately 6500 BCE the climate had warmed considerably since the recession of the glaciers and the environment had grown more similar to the present day. By approximately 4500 BCE, evidence exists from southern Ontario for the utilization of native copper, i.e., naturally occurring pure copper metal (Ellis 2013:42). The recorded origin of this material along the north shore of Lake Superior indicates the existence of extensive exchange networks across the Great Lakes basin.

At approximately 3500 BCE, the isostatic rebound of the North American plate following the melt of the Laurentide glacier had reached a point which significantly affected the watershed of the Great Lakes basin. Prior to this, the Upper Great Lakes had drained down the Ottawa Valley via the French-Mattawa River valleys. Following this shift in the watershed, the drainage course of the Great Lakes basin had changed to its present course. This also prompted a significant increase in water-level to approximately modern levels (with a brief high-water period); this change in water levels is believed to have occurred catastrophically (Stewart 2013:28-30). This change in geography coincides with the earliest evidence for cemeteries (Ellis 2013:46). By 2500 BCE, the earliest evidence exists for the construction of fishing weirs (Ellis *et al*. 1990: Figure 4.1). There is some evidence to suggest that fishing weirs had been constructed much earlier. A radiocarbon sample from a weir site in Lovesick Lake along the Trent-Severn Waterway provided a date of 4600 BCE (Stevens 2004). Construction of these weirs would have required a large amount of communal labour and are indicative of the continued development of social organization and communal identity. The large-scale procurement of food at a single location also has significant implications for permanence of settlement within the landscape. This period is also marked by further population increase and by 1500 BCE evidence exists for substantial permanent structures (Ellis 2013:45-46).

By approximately 950 BCE, the earliest evidence exists for populations using ceramics. Populations are understood to have continued to seasonally exploit natural resources. This advent of ceramic technology correlated, however, with the intensive exploitation of seed foods such as goosefoot and knotweed as well as nuts (Williamson 2013:48). The use of ceramics implies changes in the social organization of food storage as well as in the cooking of food and changes in diet. Fish also continued to be an important facet of the economy at this time. Evidence continues to exist for the expansion of social organization (including hierarchy), group identity, ceremonialism (particularly in burial), interregional exchange throughout the Great Lakes basin and beyond, and craft production (Williamson 2013:48-54).

By approximately 550 CE, evidence emergences for the introduction of maize into southern Ontario. This crop would have initially only supplemented the Indigenous diet and economy (Birch and Williamson 2013:13-14). Maize-based agriculture gradually became more important to societies and by approximately 900 CE permanent communities emerge which are primarily focused on agriculture and the storage of crops, with satellite locations oriented toward the procurement of other resources such as hunting, fishing, and foraging. By approximately 1250 CE, evidence exists for the common cultivation of historic Indigenous cultigens, including maize, beans, squash, sunflower, and tobacco. The cultural affiliation of populations within the region of the study area at this time period is debated, whether they may have spoken a form of Iroquoian language or Algonquian (Murphy and Ferris 1990). The extant archaeological record demonstrates many cultural traits similar to historical Indigenous nations (Williamson 2013:55).

By the Late Woodland period there was a distinctive cultural occupation in southwestern Ontario, including Essex, Kent, and Lambton counties. The primary Late Woodland occupants of the Windsor area were populations described by archaeologists as belonging to the Western Basin Tradition. Murphy and Ferris (1990:189) indicate that these people had ties with populations in southeastern Michigan and northwestern Ohio and represent an *in situ* cultural development from the earlier Middle Woodland groups. The Western Basin Tradition seems to have been centered in the territory comprising the eastern drainage basin of Lake Erie, Lake St. Clair, and the southern end of Lake Huron. The Western Basin Tradition is divided into four phases based on differences in settlement and subsistence strategies and pottery attributes. By the time of increased European interaction in the last half of the 16th century and early 17th century, there were no Western Basin Tradition sites in the Essex County area, having moved west into Michigan (Ferris 2009:32-33).

1.2.2 Post-Contact Indigenous Resources

At the turn of the 16th century, the study area is documented to have been occupied by the Western Basin Tradition archaeological culture. Following the turn of the 17th century, the region of the study area is understood to have been within the territory of the Fire Nation, Algonquian group occupying the western end of Lake Erie. It is argued, however, that Iroquoian populations who are historically described as the *Atawandaron* (by the Huron-Wendat), the *Neutre* (by the French), and the Neutral (by the English) (their autonym is not conclusively known [Birch 2015]) expanded extensively westward, displacing the Fire Nation (Murphy and Ferris 1990:193-194). Historians suggest that the displaced Fire Nation moved across the St. Clair and Detroit Rivers into what is modern-day lower Michigan, and their populations are synonymous with the later Kickapoo, Miami, Potawatomi, Fox, and Sauk (Heidenreich 1990: Figure 15.1).

Bkejwanong (Walpole Island) First Nation oral tradition states that nations of the Three Fires (a political confederacy constituted of the Potawatomi, Ojibwa, and Ottawa) have occupied the delta of the St. Clair River and the surrounding region continually for thousands of years. In 1649, the Seneca and the Mohawk led a campaign into southern Ontario and dispersed the resident populations, and the Seneca used the lower Great Lakes basin as a prolific hinterland for beaver hunting (Heidenreich 1978; Trigger 1978:345). By 1690, Ojibwa-speaking people had begun to displace the Seneca from southern Ontario.

The Indigenous economy, since the turn of the 18th century, focused on fishing and the fur trade, supplemented by agriculture and hunting (Konrad 1981; Rogers 1978). The study area falls within the traditional territory of the Aamjiwnaang (Sarnia) First Nation (Aamjiwnaang First Nation), the Walpole Island First Nation (WIFN), the Wiiwkwedong and Aazhoodena (Kettle Point and Stony Point) First Nation (Lytwyn 2009), the Deshkaan Ziibing Anishnaabeg (Chippewas of the Thames First Nation), and the Zaaga'iganiniwag (Caldwell First Nation). Some populations of Wyandot (an Indigenous population of historically amalgamated Petun and Huron-Wendat individuals) also had moved to the region of Lake St. Clair at the turn of the 18th century and resided with the Three Fires (Tooker 1978:398).

In Essex County, and specifically in the Windsor region, a splinter group of Ottawa settled in the area (CRM Group Limited *et al.* 2005: 2-14 to 2-15). Also, the surviving remnants of the Huron and Petun were settling in the Windsor region as the Wyandot, exhibiting continuities with their 16th and 17th century predecessors from the Midland and Blue Mountain regions (Garrad 2014; Steckley 2014). Given the amalgamated nature of the Wyandot people, sometimes one of the contributing Indigenous peoples was recognized over another, the Wyandot were known as Huron in the Windsor region (Garrad 2014:16-54). Therefore, the Wyandot settlement in the Windsor region is commonly referred to as the "Huron Village" and related place names survive in Windsor today, such as Huron Church Road (but also note Wyandotte Street).

A 1749 French map of the Detroit River region (Chaussegros de Léry 1752) depicts both Ottawa and the Huron villages on the waterfront of the Windsor region. The study area for the Project is depicted on the 1749 map, north of a river, identified as number "32" on the map and "Riviere aux dinde" (Turkey River, now Turkey Creek) in the legend (Figure 3). North of the study area is a creek labeled as the "Riviere de la Vielle Reine" (River of the Old Queen, no modern equivalent identified). The study area is located in an area where plots of land were laid out between these two rivers or creeks, identified as number "40" on the map and "Nouvelle habitation francaise de 1749" (New French dwelling from 1749) in the legend. The plots are designated as "Q" in the north to "V" in the south. The islands to the south of the study area, identified as "15" and "16" on the map and "isle aux dinde" and "isle aux dinde" and "petite isle aux dinde" respectively (Turkey island and Little Turkey island, now Fighting Island) in the legend.

Despite the dispersal and movement of Indigenous groups throughout southern Ontario during the 17th and 18th centuries, archaeologically they can be characterized by continuity with their pre-Contact Indigenous counterparts. These peoples still maintained a Terminal Woodland archaeological culture, albeit with some features of European colonial powers, there was equally a definite persistence of Indigenous socio-cultural practices since these groups were not so profoundly affected by European contact that they left their former lifeways behind (Ferris 2009).

In the middle of the 18th century, the Chippewa were located on the south shores of Lake Huron, the east shores of Georgian Bay, and on the west end of Lake Ontario. Indigenous peoples and their communities continue to play a large role in the occupation of the study area and its environs. Under British administration in the 19th century, the various Indigenous groups were divided into separate bands. The Anishinaabe included the western Algonquian peoples, among them the Chippewa and the Ottawa. Until the 18th century, the central Algonquian-speaking peoples, including the Potawatomi, were located in the Michigan Peninsula (Blackbird 1887).

Following the American Revolutionary War, Britain focused on the settlement of European immigrants into what became the province of Upper Canada in 1791. To enable widespread settlement, the British government (the Crown) negotiated a series of treaties with Indigenous peoples. One of the earliest treaties involving lands located in close proximity to the study area was made on May 19, 1790 (Figure 4). Originally identified as the Detroit Treaty, the chiefs of the Ottawa, Chippewa, Potawatomi, and Huron (or Wyandot) and representatives of the Crown established a vast tract of land "…from the Detroit River easterly to Catfish Creek and south of the river La Tranche [now Thames River] and Chenail Ecarte [now St. Clair River], and contains Essex County except Anderdon Township and Part of West Sandwich; Kent County except Zone Township, and Gores of Camden and Chatham; Elgin County except Bayham Township and parts of South Dorchester and Malahide…[i]n Middlesex County, Del[a]ware and Westminster Township and part of North Dorchester" (Morris 1943:17). Today, this treaty is identified as Treaty Number 2, illustrated by the letter "C" on Figure 5. A commemorative plaque erected by the Historic Sites and Monuments Board of Canada further identifies this treaty as *McKee's Purchase*. The plaque, located in Blenheim Memorial Park in Blenheim, Ontario, reads (Parks Canada 2023):

> *In May 1790 Alexander McKee, Deputy Agent of the British Indian Department, and the principal chiefs of the Ottawa, Potawatomi, Chippewa and Wyandot negotiated a treaty whereby the British Crown acquired title to what is now southwestern Ontario. This treaty completed the process begun with Niagara treaties of 1781 and 1784, with the result that most of the Ontario peninsula was soon opened to British and Loyalist settlement.*

Caldwell First Nation were not part of the negotiations or signing of Treaty Number 2 (*Mckee's Purchase*) and, therefore, were not able to secure rights and benefits from the treaty (Caldwell First Nation 2021). Without a treaty, Caldwell First Nation's traditional territory remained in possession of private and government interests. In November 2020, Caldwell First Nation received land designation from the Crown and established a Reserve for their community (Caldwell First Nation 2021).

In addition to the above, Figure 6 reproduces a map from the *History of the Windsor Border Region* (Lajeunesse 1960) which depicts several Indigenous sites and trails documented in Essex County during the late 18th century. The study area is illustrated along "Trail F" identified as the River Shore path, now Highway 20 and Front Road, in part. The trail connects two Huron villages, a village north of the study area identified as number "14" on the map along Huron Church line (Lajeunesse 1960:xxxix), likely the same Huron site illustrated as "C" on the 1749 map (see Figure 3, village and letter are partly obscured) and a village south of the study area identified as number "12" on the map, adjacent to River Canard and the associated cornfields identified as number "13". Across the Detroit River from the study area, in Michigan, the map shows the location of two large mounds identified as "18" and "19" (Lajeunesse

1960:xxxix). West and north west of the study area, the map shows the location of a burial mound at number “15”, and the location of an Ottawa village and cemetery at number “16” (Lajeunesse 1960:xxxix).

The nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon Indigenous territory. However, despite this shift, “written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to…systems of ideology and thought” (Ferris 2009:114). As a result, Indigenous peoples have left behind archaeological resources throughout the region which show continuity with past peoples, even if they have not been explicitly recorded in Euro-Canadian documentation.

1.2.3 Euro-Canadian Resources

In 1791, the Provinces of Upper Canada and Lower Canada were created from the former Province of Quebec by an act of British Parliament. At this time, Colonel John Graves Simcoe was appointed as the Lieutenant Governor of Upper Canada and was tasked with governing the new province, directly its settlement, and establishing a constitutional government modelled after that of Britain. In 1792, Simcoe divided Upper Canada into 19 counties consisting of previously settled lands, new lands opened for settlement, and lands not yet acquired by the Crown. These new counties stretched from Essex in the west to Glengarry in the east. The study area for the Project is within the Geographic Township of Sandwich (now the City of Windsor) in Essex County, Ontario.

The first French settlers arrived in the Detroit-Windsor area in 1701 when the Sieur De Lamothe Cadillac and roughly 100 military and civilian personnel established Fort Pontchartrain on the Detroit side of the Detroit River (Fuller 1972:6-8). The French settlement remained on the Detroit side until 1748 when the Jesuit mission to the Huron was established on the south shore near the foot of the present-day Huron Church Road and the Ambassador Bridge. Fort Pontchartrain surrendered to the British in 1760 and remained under British control until 1796, although it was officially a part of the United States from 1783 onwards. During this period, the settlement continued to grow, but remained predominantly French. The area across the river from Fort Pontchartrain (later to become Detroit), and now in present-day Windsor, was called “Petite côte” (small coast) and served the agricultural needs of the fort (Archives of Ontario 2014). The street pattern of the City of Windsor still reflects the French method of agricultural land division; for example, the long narrow parcels fronting the river where the “Petite côte” was located (Morrison 1954:3-4). In 1796, the original townsite of Sandwich was established to accommodate new immigrants of both French and British origin from the United States who wished to remain under British rule following American occupation of Detroit. This constituted the first urban settlement in what is now the City of Windsor and the first significant migration of English-speaking people into the Windsor area (Neal 1909:86-87).

Essex County was originally part of the District of Hesse and, in 1792, was renamed the Western District. On January 1, 1800, in the *Act for the Better Division of the Province*, the townships of Rochester, Mersea, Gosfield, Maidstone, Sandwich, and Malden were created as part of the County of Essex. The townships of Essex County were surveyed by Patrick McNiff, Abraham Iredell, and Thomas Smith (Clarke 2010).

As the area began to attract more Euro-Canadian interest, Patrick McNiff was assigned to survey and organize the area into a township, also to be named Sandwich. His survey of the township was completed in 1793. The form of the concessions, noted as “Petite côte”, were dictated by the land divisions already used by the French farmers in the “Petite côte” area, in what was to become Concession 1 Petite Côte. In fact, on his original township map where he measured the Concession 1 lots, Patrick McNiff notes that “on my measuring the farms in front from No.1 to No. 154 found their division Lines to run in the very irregular manner they appear on the Plan” (McNiff 1956). The most accurate map produced of the township at this time was completed by Abraham Iredell in 1797, who resurveyed the area and renumbered the lots from Lot 82 onwards in Concession 1 to 3 Petite Côte (Morris 1943), reproduced here as Figure 7 (Iredell 1797). Lots 56 and 57 (now Lots 57 and 58), containing the Parcel 1 study area, is listed as belonging to Baptiste Parre, and Lot 58 (now Lot 59), containing the Parcel 2 study area, is listed as belonging to Colonel Alexander McKee (Figure 7). The map shows the study area adjacent to Naggs Creek. A large plot of land listed as “Huron Reserve” on the Iredell map is depicted north of Lot 58. No structures are illustrated on the 1797 map in association with the study area.

Alexander McKee was born in 1735 on the Pennsylvania frontier. His father was a trader from Ireland and his mother was Shawnee (Horsman 1979). Growing up on the frontier and among Indigenous people, McKee became an accomplished woodsman and learned several Indigenous languages. His skill and knowledge led to his attainment of the rank of Lieutenant during the Seven Years War. During the conflict he worked closely with the British military and their Indigenous allies. In 1760, he joined the Indian Department and in 1772 was promoted to Chief Indian Agent at Fort Pitt (Horsman 1979; Hoberg 1934). At the start of the American Revolutionary War, McKee was considered a trusted supporter of the Crown by colonial officials (Hoberg 1934). His loyalty forced him to flee Pittsburgh in 1778. He escaped to Detroit where he joined the British Army and became a captain and interpreter (Horsman 1979).

After the war, McKee became a prominent official in Essex County. Initially, he resided in Detroit, which remained under British occupation until 1796. He served as a deputy agent in the Indian Department, was a lieutenant-colonel in the militia, a justice of the court, and a member of the District Land Board. (Horsman 1979).

The 1815 Royal Navy survey of the Detroit River by Captain W.F.W. Owen, published in 1828 (Owen 1828), illustrates various structures/buildings, windmills, and roads/trails (Figure 8). The trail on the Owen’s 1828 map is likely the same Indigenous “Trail F” or River Shore Path identified on Lajeunesse’s (1960) map (see Figure 6). Owen’s (1828) map also shows numerous structures to the north and south of the study area, but no structures fall within the study area.

In the 1830s, the town of Sandwich became an important terminal on the Underground Railroad following the American *Emancipation Act* in 1833. Escaped African American slaves, numbering between 30,000 and 100,000, made their journey from the southern United States into Upper Canada by way of Sandwich, with many settling in the town (City of Windsor 2021). By 1830, the population of Sandwich Township had increased to 2,201 (Chewett 1831:52).

By the mid-1850s, the community of Windsor became more established and grew large enough to compete with the adjacent community of Sandwich for important industrial development. For example, the Great Western Railway chose Windsor over Sandwich as its termination point in 1854. The arrival of the railway also allowed for the foundation of Walkerville, the third oldest settlement that is now part of the City of Windsor. In 1857, Hiram Walker established his distillery in the downtown area of Windsor where the Great Western Railway first met the waterfront (Morrison 1954:26).

In 1858, both Windsor and Sandwich were incorporated as towns (Morrison 1954:42). In 1861, the Township of Sandwich was subdivided into the Townships of Sandwich West, Sandwich East, and Sandwich South (Neal 1909:12). The 1877 *Map of Essex County, Ontario* (Walling 1877) depicts a developed township with robust transportation routes (Figure 9). Lot 57, Concession 1 Petite Côte, was owned by R. Adams and Co. and a structure is depicted fronting the Detroit River. Lot 58, Concession 1 Petite Côte, was owned by the Honorable J.C. Potter, but no structures are depicted. The former Lot 59, Concession 1 Petite Côte, is shown as part of the town plot of Sandwich and subdivided into several lots with a creek (now Naggs Creek) running through them, but no landowners or structures are illustrated.

The 1881 Essex Supplement in the *Illustrated Atlas of the Dominion of Canada* (Belden & Co. 1881) shows a continuation of the road network in the Town of Sandwich, and a fish hatchery is depicted east of the study areas (Figure 10). The Dominion Fish Hatchery opened in 1875 in Lot 59, Concession 1 Petite Côte along the Detroit River. The hatchery was the fourth to be established in Canada and hatched whitefish and pickerel (Neal 1909:61-62). No landowners are depicted in the study areas on the 1881 map. The Essex County historical atlas of 1881 documents a total population of 36,258 for Essex County (Belden & Co. 1881:8). Of the total population, 25,303 settlers lived in rural settings, while 10,955 lived in urban settings (Belden & Co. 1881:8).

In 1902, the Essex Terminal Railway (ETR) was constructed between Windsor and Amherstburg and ran east of the Parcel 2 study area. The ETR facilitated the development of industry in the area, and numerous spur lines were built to service these industries (ETR 2013).

In discussing 19th century historical atlas mapping it must be remembered that many historical county atlases were produced primarily to identify factories, offices, residences, and landholdings of subscribers and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984). Further, review of 18th and 19th century historical mapping has inherent accuracy difficulties due to potential error in georeferencing. Georeferencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in "fixed" locations over time (e.g., road intersections, road alignments, watercourses, shorelines, etc.), errors/difficulties of scale and the relative idealism of the historical cartography, historical maps may not translate accurately into real space points. This may provide obvious inconsistencies during historical map review.

1.2.4 Aerial Photography

Aerial photography of the study area was obtained from Wayne State University Library's DTE Aerial Photo Collection (Wayne State 2023) and the Essex Region Conservation Authority (ERCA) mapping website (ERCA 2023). The air photos from 1949 to 1997 illustrate that Parcel 1 remained undeveloped until sometime between 1997 and 2000 when a structure was built in the west part of the parcel. The remainder of the parcel remained as agricultural field or scrubland until today (Figure 11).

The air photos from 1949 to 1997 for the Parcel 2 study area show changing disturbance of the parcel through the second half of the 20th century. In 1949, the area was disturbed by dirt or gravel trails and lay down areas. In 1961, most of the trails are no longer visible, but a new road or trail traverses the study area from the southwest to the northeast. By 1981, the trail or road has been changed again and there is a new spur rail line through the study area from the ETR railroad to the north part of the wastewater treatment plant. In addition, a structure or water treatment pool has been constructed in the west part of the study area. This structure and the spur line are still visible in the 1997 aerial photo. In 2006, the northern part of Parcel 2 appears to have been used as an area for dumping fill or other material, and the area remains largely disturbed until 2015 when it reverts to scrubland.

1.3 Archaeological Context

1.3.1 The Natural Environment

The study area is situated in the St. Clair Clay Plains physiographic region, as identified by Chapman and Putnam (1984). This region is described as:

> *Adjoining Lake St. Clair in Essex and Kent County Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles. The region is one of little relief, lying between 575 and 700 feet a.s.l., except for the moraine at Ridgetown and Blenheim which rises 50 to 500 feet higher….Glacial Lake Whittlesey, which deeply covered all of these lands, and Lake Warren which subsequently covered nearly the whole area, failed to leave deep stratified beds of sediment on the underlying clay till except around Chatham, between Blenheim and the Rondeau marshes, and in a few other smaller areas. Most of Lambton and Essex Counties, therefore, are essentially till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action.*

(Chapman and Putnam 1984:147)

The soil of Parcel 1 is classified as Granby Sand. The soils of Parcel 2, prior to disturbance and fill episodes, are classified as Berrien Sand with Marsh along the former path of Naggs Creek. Granby Sand is a dark grey sandy loam formed over grey or mottled sand, with poor natural drainage. The soil can be used to grow some crops but is more frequently left as woodlot or used for pasture (Richards *et al*. 1949). Berrien Sand is a relatively shallow brown and yellow sand deposit over clay, formed by sand bars as a result of wave action from post-glacial lakes (Richards *et al*. 1949). Berrien Sands are imperfectly drained but are well suited for growing cash crops, as well as tobacco, early vegetables, raspberries, and strawberries, and would have been suitable for early agriculture (Richards *et al*. 1949).

The closest potable water source is the Naggs Creek. The creek is depicted on historical mapping; however, its present course is the result of modern ditching and channel realignments in the 20th century. The Parcel 1 study area lies approximately 350 metres southwest of Naggs Creek and the Parcel 2 study area is crossed by the creek. The Detroit River is 780 metres west of Parcel 1 and 1,050 metres west of Parcel 2. Use of the Detroit River has evolved over time from being a transportation route used by early Indigenous inhabitants and Euro-Canadian explorers and settlers, to an industrial power source to support the early mills of the area, to a commercial shipping route, and finally to a water course used for recreational purposes throughout the 20th and 21st centuries.

1.3.2 Registered Archaeological Sites and Surveys

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MCM who maintain the *Ontario Archaeological Sites Database*. The study area under review is located within Borden Block AbHs.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990b). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MCM will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that there are 20 archaeological sites registered within a one-kilometre radius of the study area (Government of Ontario 2023a). None of the registered archaeological sites are within 50 metres of the study area. Table 2 provides a summary of the registered archaeological sites within one kilometre of the study area.

Table 2: Registered Archaeological Sites within One Kilometre of the Study Area

Borden #	Site Name	Site Type	Cultural Affiliation
AbHs-5	-	House	Euro-Canadian
AbHs-6	Morton Terminal 2	House, midden	Euro-Canadian
AbHs-12	Mackenzie Hall	19th century Jail	Euro-Canadian
AbHs-17	Ojibway 1	Homestead	Euro-Canadian
AbHs-18	Ojibway 2	Scatter	Indigenous; Euro-Canadian
AbHs-19	Ojibway 3	Homestead	Euro-Canadian

Borden #	Site Name	Site Type	Cultural Affiliation
AbHs-20	Ojibway 4	Burial	Indigenous, Late Archaic
AbHs-21	Nordic Power	Dump	Euro-Canadian
AbHs-38	DRIC H14	Isolated find	Euro-Canadian
AbHs-58	Sideline, P15	Scatter, midden	Indigenous, Woodland; Euro-Canadian
AbHs-63	Essex County Jail	Jail, burials	Euro-Canadian
AbHs-69	-	Scatter	Euro-Canadian
AbHs-75	Location 4	Homestead	Euro-Canadian
AbHs-77	Location 5	Homestead	Euro-Canadian
AbHs-78	Location 6	Homestead	Euro-Canadian
AbHs-79	Location 7	Homestead	Euro-Canadian
AbHs-80	Location 8	Homestead	Euro-Canadian
AbHs-81	Location 9	Homestead	Euro-Canadian
AbHs-82	Location 10	Homestead	Euro-Canadian
AbHs-83	Location 11	Homestead	Euro-Canadian

A query of the *Ontario Public Register of Archaeological Reports* (Government of Ontario 2023b) has identified two archaeological assessments which document work within 50 metres of the study area (Table 3).

Table 3: Previous Archaeological Assessments within 50 Metres of the Study Area

Company	Report	Project Information Form (PIF) Number	Year
Archaeological Services Inc. (ASI)	*Stage 1 Archaeological Assessment Report, Detroit River International Crossing, City of Windsor and Essex County (Town of LaSalle and Town of Tecumseh), Ontario*	P057-141	2006
ASI	*REVISED: Stage 2 Archaeological Assessment of the Detroit River International Crossing (DRIC), City of Windsor and County of Essex, (Town of LaSalle and Town of Tecumseh), Ontario.*	P057-0270-2006 P057-0454-2007 P057-0441-2007	2010

In 2005, Archaeological Services Inc. (ASI) conducted a Stage 1 archaeological assessment for the Detroit River International Crossing (DRIC) project (ASI 2006). The Stage 1 archaeological assessment covered a large corridor of the City of Windsor focused on lands to be impacted for the construction of the DRIC project, including the Parcel 1 study area property. ASI determined that the Parcel 1 study area retained archaeological potential (ASI 2006).

Subsequently, in 2006 and 2007 ASI conducted a Stage 2 archaeological assessment for the DRIC project (ASI 2010). Part of the ASI (2010) study area overlaps with Parcel 1 of the current study area. During the Stage 2 assessment, ASI (2010) conducted pedestrian survey of the existing agricultural field in Parcel 1 and test pit survey of the areas of scrubland lawn in Parcel 1. The remainder of the Parcel 1 (the existing building and parking lot) was determined to be disturbed (ASI 2008, 2010). Although Parcel

2 was included in the Project area for the DRIC, no permission to enter was granted and the land associated with Parcel 2 was not assessed by ASI (2008, 2010).

1.3.3 City of Windsor's Archaeology Master Plan

The City of Windsor's *Archaeological Master Plan Study Report* (CRM Group Limited *et al*. 2005) discusses the City of Windsor's and the northern portion of the Town of LaSalle's archaeological context in general. As of 2005, archaeologists had registered 23 archaeological sites within the city limits or within the immediate vicinity (CRM Group Limited *et al*. 2005). However, the authors of the archaeological management plan recognized that several poorly documented sites exist and there are many sites still to be documented, especially since the majority of the archaeological studies discussed in the archaeological management plan maps are concentrated along the Detroit River or in southwest Windsor (CRM Group Limited *et al*. 2005:3-1 to 3-23). Additionally, several newly identified archaeological sites have been registered within the city limits since the time of the study report. Both the Parcel 1 study area and Parcel 2 study area are in areas identified as retaining varying degrees of archaeological potential on the archaeological management plan's archaeological potential mapping (CRM Group Limited *et al*. 2005: Figure 4).

1.3.4 Existing Conditions

The Parcel 1 study area comprises approximately 5.04 hectares and consists of a portion of Lot 57 and Lot 58, Concession 1 Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario (Figure 1 and Figure 2). The study area is bounded by Ojibway Parkway to the northeast and contains the existing Synagra Biosolids facility and adjacent lands. The study area comprises agricultural field, scrubland, manicured lawn, and disturbance such as existing buildings, paved driveway and parking lot, and utilities.

The Parcel 2 study area comprises approximately 2.66 hectares and consists of a portion of Lot 59, Concession 1 Petite Côte, Geographic Township of Sandwich, former Essex County, now City of Windsor, Ontario (Figure 1 and Figure 2). The study area is bounded by a spur line of the ETR to the north, the ETR mainline to the east, the Lou Romano Water Treatment Facility to the south, and industrial lands to the west. The study area comprises disturbances such as an artificially mounded area of dumped fill, gravel roads and parking lot, existing sewage treatment infrastructure, a former railway bed, and buried utilities.

2 Field Methods

The Stage 1 archaeological assessment compiled information concerning registered and/or potential archaeological resources within the study area. A property inspection was conducted on March 17, 2023, under PIF P422-0031-2023 issued to Darren Kipping, MA, by the MCM. The property inspection involved examining the entirety of the study area to identify the presence or absence of any features of archaeological potential, in accordance with Section 1.2 of the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). During the property inspection the weather was overcast and cool and visibility of land features was excellent. Field, lighting, and weather conditions were not detrimental to the identification of features of archaeological potential in accordance with Section 1.2 Standard 2 of the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The photography from the property inspection (see Section 7.1) confirms that the requirements for a Stage 1 property inspection were met, as per Section 1.2 and Section 7.7.2 Standard 1 of the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The property inspection of the Parcel 1 study area demonstrated an area consisting of an agricultural field, scrubland, manicured lawn, and previous disturbance such as existing buildings, paved driveway and parking lot, and utilities. Photos 1 through 4 illustrate the general conditions of the Parcel 1 study area. The property inspection of the Parcel 2 study area demonstrated areas of previous and extensive disturbance due to mounded area of dumped fill, gravel road and turn area, existing sewage treatment infrastructure, a former railway bed, and buried utilities. Photos 5 to 11 illustrate the Parcel 2 study area.

3 Analysis and Conclusions

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by the MCM (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites; distance to various types of water sources; soil texture and drainage; glacial geomorphology; elevated topography; and the general topographic variability of the area. However, it is worth noting that extensive land disturbance can eradicate archaeological potential (Government of Ontario 2011).

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect site locations and types to varying degrees. The MCM categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, and creeks.
- Secondary water sources: intermittent streams and creeks, springs, marshes, and swamps.
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes.
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

Naggs Creek crosses the Parcel 1 study area and is approximately 350 metres from the Parcel 2 study area. Moreover, the Detroit River is 780 metres west of Parcel 1 and 1,050 metres west of Parcel 2. The Detroit River was a major transportation route and resource area used by Indigenous inhabitants. Although the Granby Sands of Parcel 1 are generally to wet to have been suitable for Indigenous agriculture, the Berrien Sand of Parcel 2 could have been used for cultivation in the past. Early mapping shows that a Huron village was located north of the study area, and another village and corn fields were located south of the study area. An Indigenous trail connecting these villages ran along the eastern side of the Detroit River, west of the study area. An examination of the *Ontario Archaeological Sites Database* has shown that there are three registered Indigenous archaeological sites within one kilometre of the study area (Government of Ontario 2023a).

Archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* (Government of Ontario 1990c) or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical mapping demonstrates that the study area was one of the first areas of Sandwich Township settled by Europeans; initially by French settlers associated with farms that supplied Fort Pontchartrain (later Detroit) along the "Petite côte", and then by English military officers after the capture of the Fort in 1796, included Alexander McKee. To the north of the study area was the settlement of Sandwich, which later was incorporated into the City of Windsor. Much of the established road and settlement from the early 19th century is still visible today.

When the above listed criteria are applied, the study area retains archaeological potential. This is supported by archaeological potential mapping from the City of Windsor's *Archaeological Master Plan* (CRM Group Limited *et al.* 2005). However, as noted above, extensive and deep land alteration can eradicate archaeological potential. The Stage 1 background research, including examination of aerial photography from the late 20th century, along with a property inspection, confirmed that the entirety of the Parcel 2 study area has been subject to deep and extensive land disturbance including the construction of railway and wastewater treatment infrastructure, and deposition of fill. The Parcel 2 study area therefore retains low to no potential for archaeological resources. The Parcel 1 study area was previously assessed by ASI as disturbed and no further archaeological work was recommended (ASI 2008, 2010).

4 Recommendations

The Stage 1 archaeological assessment determined that the Parcel 1 study area has been previously assessed by ASI (2008, 2010) and no further archaeological work is required. The Stage 1 archaeological assessment determined that the Parcel 2 study area retains low to no archaeological potential for the identification or recovery of archaeological resources due to extensive disturbance. In accordance with Section 1.3.2 and Section 7.7.4 of the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is not required for the study area (Figure 12).**

The MCM is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

5 Advice on Compliance with Legislation

In accordance with Section 7.5.9 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), the following standard statements are a required component of archaeological reporting and are provided from the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. O.18 (Government of Ontario 1990c). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990c) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990c).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c).

The *Funeral, Burial and Cremation Services Act,* 2002, S.O. 2002, c. 33 (Government of Ontario 2002), requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery is also immediately notified.

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7 Images

7.1 Photographs

Photo 1: View of Parcel 1 study area showing existing building and infrastructure, previously assessed by ASI (2008, 2010), facing southwest.

Photo 2: View of Parcel 1 study area showing scrubland, previously assessed by ASI (2008, 2010), facing west.

Photo 3: View of Parcel 1 study area showing agricultural field, previously assessed by ASI (2008, 2010), facing southeast.

Photo 4: View of Parcel 1 study area showing scrubland, previously assessed by ASI (2008, 2010), facing south.

Photo 5: View of Parcel 2 study area, showing disturbed and infilled area, facing southwest.

Photo 6: View of Parcel 2 study area, showing disturbed and infilled area, facing north.

Photo 7: View of Parcel 2 study area, showing buried utilities and former disturbed trail, facing east.

Photo 8: View of Parcel 2 study area, showing former rail line bed and buried utilities, facing northeast.

Photo 9: View of Parcel 2 study area, showing disturbed area, facing southwest.

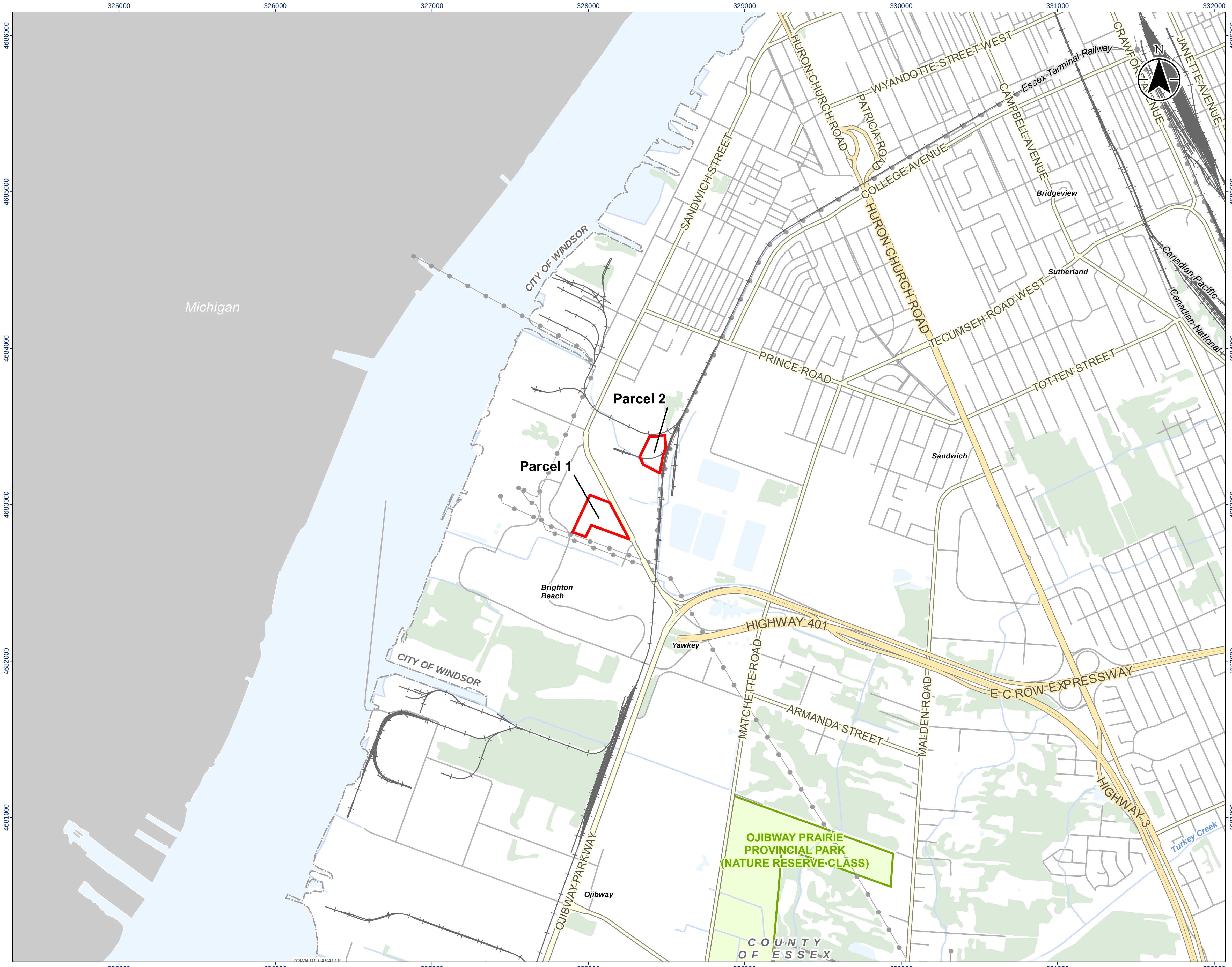
Photo 10: View of Parcel 2 study area, showing disturbed and infilled area, facing southeast.

Photo 11: View of Parcel 2 study area, showing disturbed trail and utilities, facing northeast.

Photo 12: View of Parcel 2 study area, showing disturbed municipal drain (ditching and realignment of Naggs Creek), facing southeast.

8 Maps

Maps of the study area for the Stage 1 archaeological assessment follow on succeeding pages.



Stantec

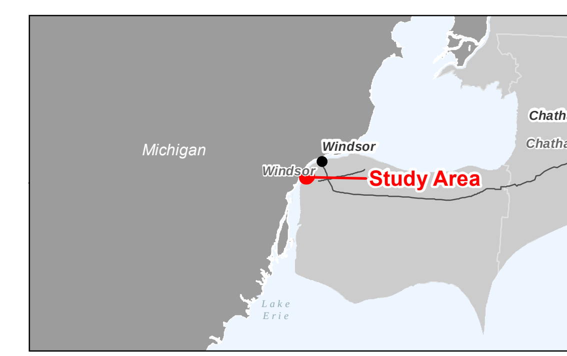
Legend

- Study Area
- Highway
- Major Road
- Minor Road
- Hydro Line
- Railway
- Watercourse
- Municipal Boundary
- Municipal Boundary, Lower
- Provincial Park
- Waterbody
- Wooded Area

0 0.5 1 km

1:25,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.



Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-17
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
1

Title
Location of the Project

Stantec

Legend

- Study Area
- Railway
- Watercourse

0 100 200 Metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2021.

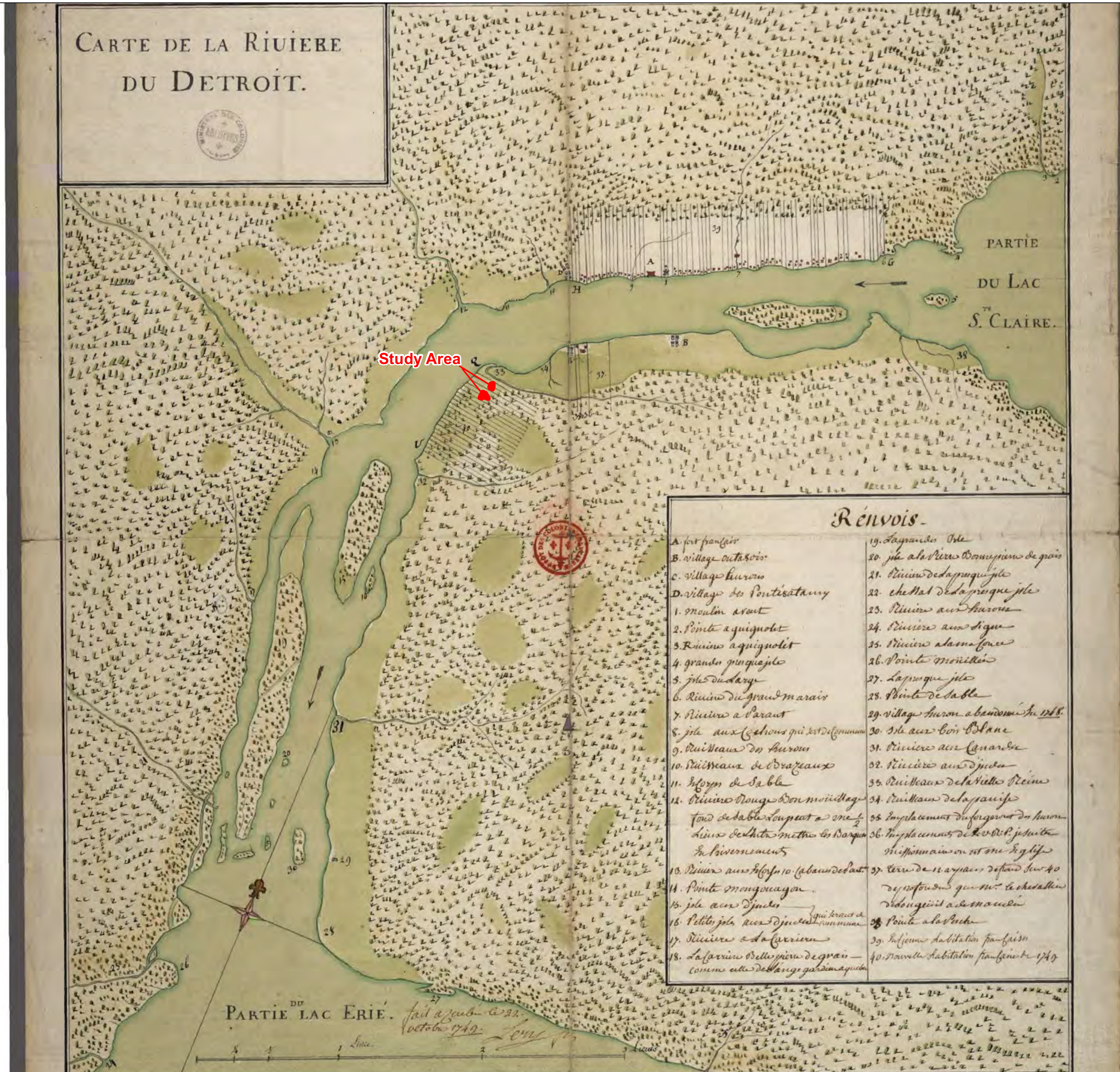
Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-15
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
2

Title
Location of the Study Area



Legend

Study Area (Approximate)

Figure Not to Scale

Notes

1. Reference: Chaussegros de Lery, Gaspar-Joseph. 1752. Carte de La Riviere du Detroit depuis de le Lac Erie jusques au Lac S. Claire. Department of Marine, Paris.

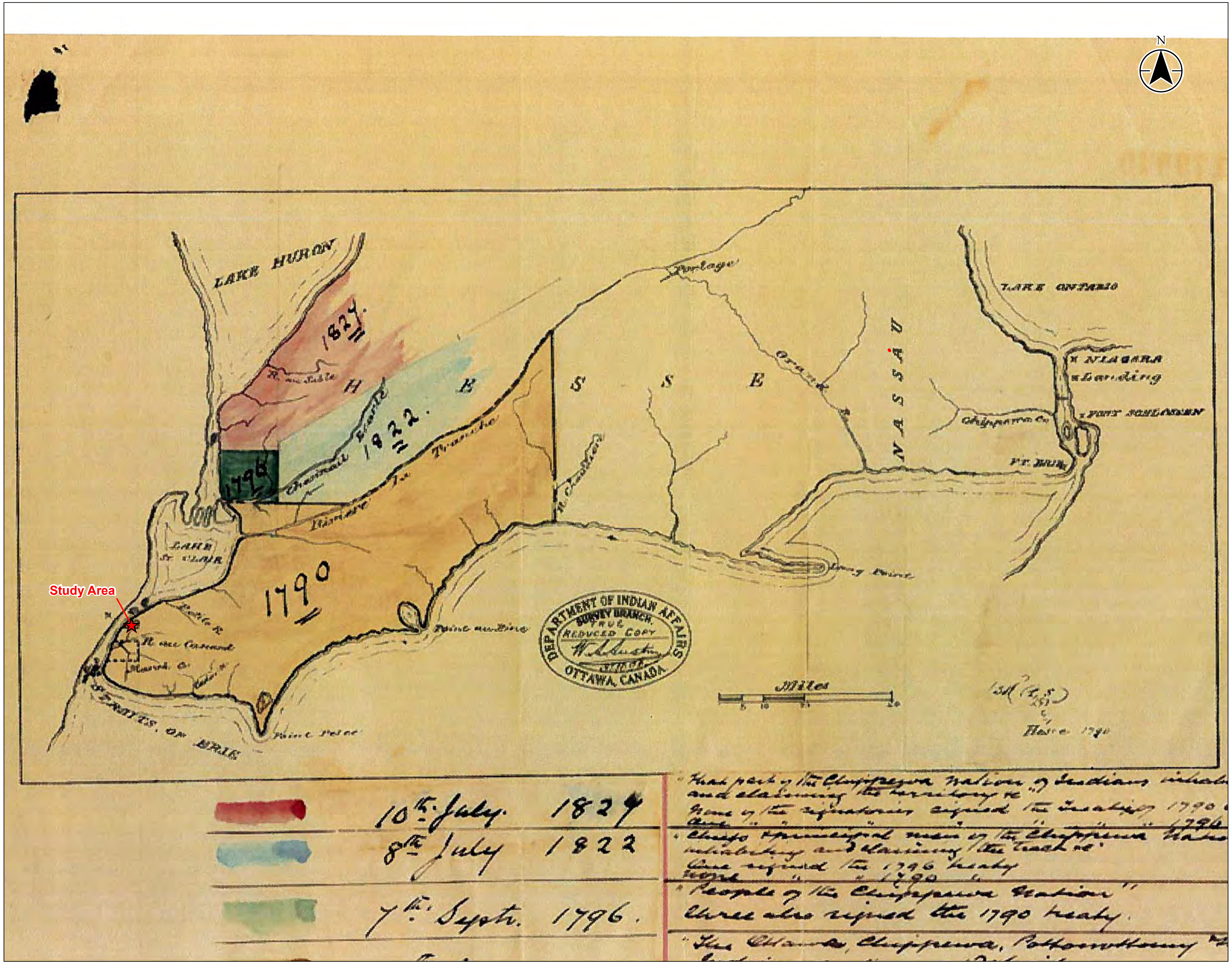
Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-17
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
3

Title
Portion of the 1749 Map of the Detroit River



Stantec

Legend

★ Study Area (Approximate)

Figure Not to Scale

Notes
1. Reference: Government of Canada. n.d. Map of Treaty Areas in Upper Canada. Ottawa: Department of Indian Affairs. Survey Branch.

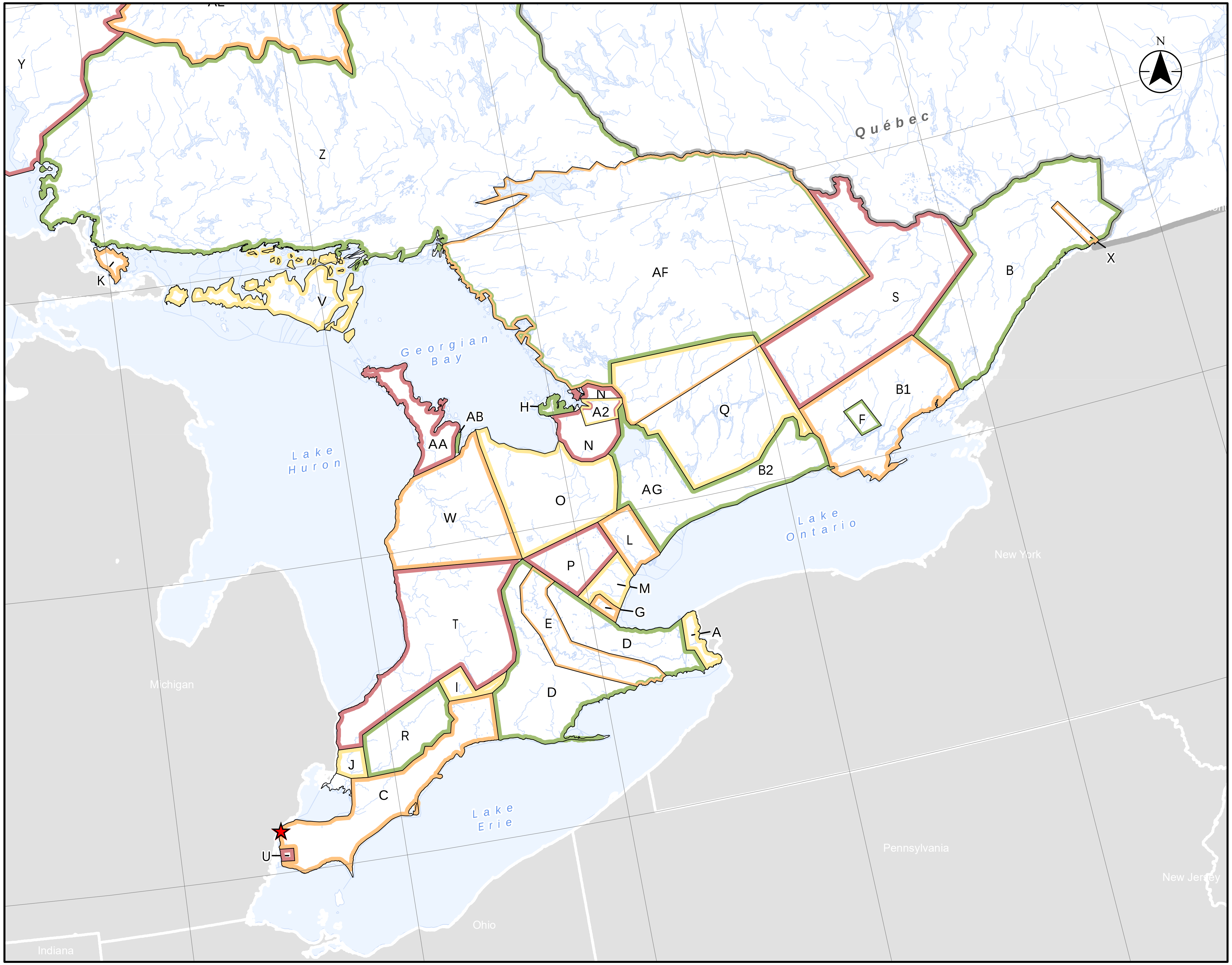
Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-17
Technical Review by SPE on 2023-05-10

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
4

Title
Map of Treaty Areas in Upper Canada



Stantec

Legend

Study Area

Waterbody

A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
AA Treaty No. 72, October 30th, 1854 (Chippewa)
AB Treaty No. 82, February 9th, 1857 (Chippewa)
AE Treaty No. 9, James Bay 1905, 1906 (Ojibway and Cree)
AF Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG Williams Treaty, October 31st, 1923 (Chippewa)
A2 John Collins' Purchase, 1785 (Chippewa)
B Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1 Crawford's Purchase, October 9th, 1783 (Mississauga)
B2 Crawford's Purchase, 1783, 1787, 1788 (Mississauga)
C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D Treaty No. 3, December 2nd, 1792 (Mississauga)
E Haldimand Tract: from the Crown to the Mohawk, 1793
F Tyendinaga: from the Crown to the Mohawk, 1793
G Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th, 1795
H Treaty No. 5, May 22nd, 1798 (Chippewa)
I Treaty No. 6, September 7th, 1796 (Chippewa)
J Treaty No. 7, September 7th, 1796 (Chippewa)
K Treaty No. 11, June 30th, 1798 (Chippewa)
L Treaty No. 13, August 1st, 1805 (Mississauga)
M Treaty No. 13A, August 2nd, 1805 (Mississauga)
N Treaty No. 16, November 18th, 1815 (Chippewa)
O Treaty No. 18, October 17th, 1818 (Chippewa)
P Treaty No. 19, October 28th 1818 (Chippewa)
Q Treaty No. 20, November 5th, 1818 (Chippewa)
R Treaty No. 21, March 9th, 1819 (Chippewa)
S Treaty No. 27, May 31st, 1819 (Mississauga)
T Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W Treaty No. 45½, August 9th, 1836 (Saugeen)
X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y Treaty No. 60, Robinson, Superior, September 7th, 1850 (Ojibwa)
Z Treaty No. 61, Robinson, Huron, September 9th, 1850 (Ojibwa)

0 50 100 Km
1:3,000,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

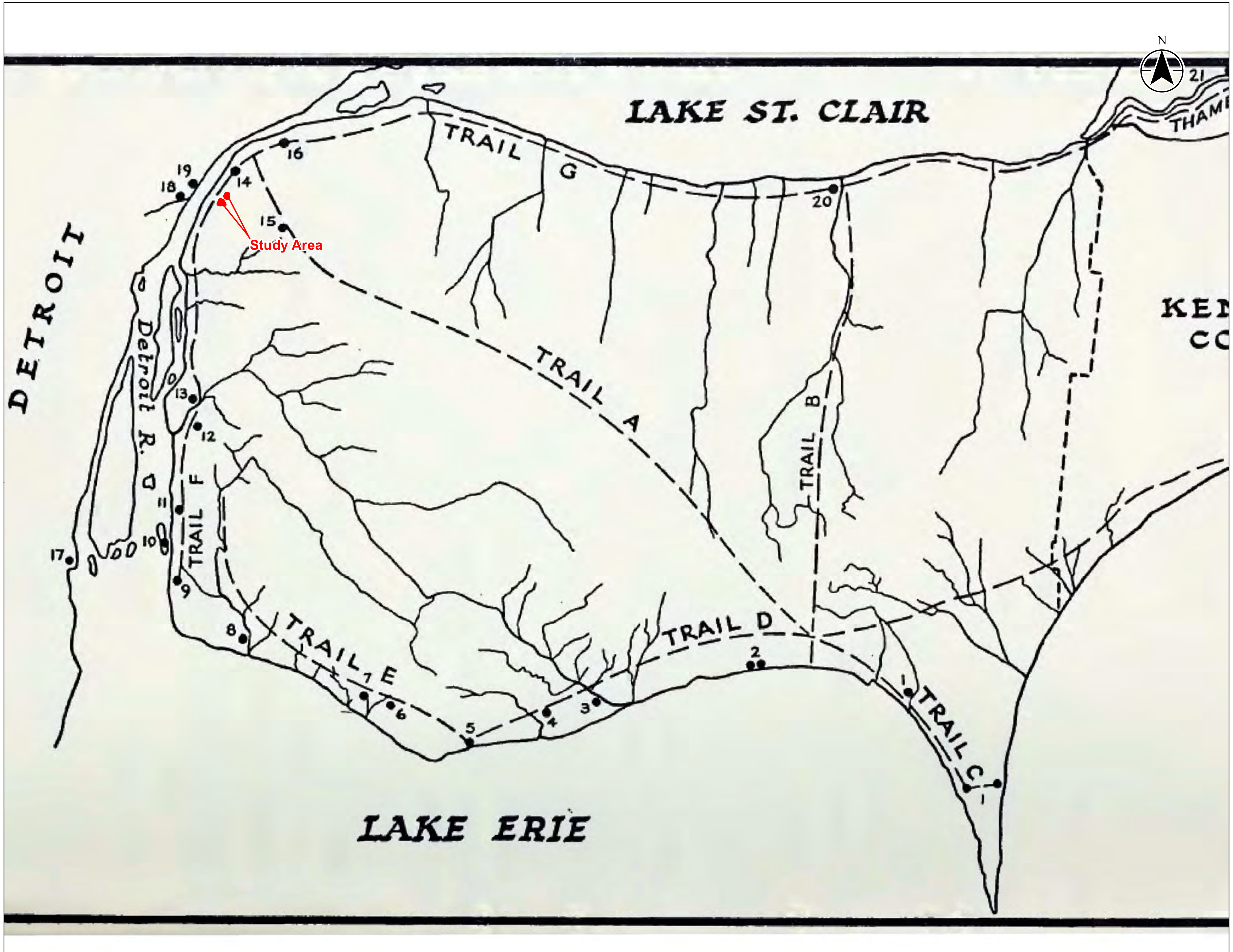
Project Location
Windsor,
Ontario

165620242 REVA
Prepared by BK on 2023-05-16
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
5

Title
Treaties and Purchases (Adapted from Morris 1943)



Legend

Study Area (Approximate)

Indigenous Places Found in Essex County and Vicinity

1. Village, cornfields, and portage, Point Pelee (plan by Iredell 1799)
2. Two Indigenous entrenchments, Gosfield Township (plan by McNiff 1794)
3. Village on Cedar Creek, entrenched, Gosfield Township
4. Village, Colchester, South Township
5. Indigenous encampment, Colchester Township (McNiff 1794)
6. Village and mound, Daniel Wright farm, Colchester Township
7. Several mounds, Colchester Township
8. Village, Big Creek (plan by Iredell 1796)
9. Former village of the Hurons abandoned in 1748 (map by Chaussegros de Léry, fils, 1749)
10. Camping site used by all tribes, Bois Blanc Island
11. Village above Fort Malden (McNiff's map of 1790)
12. Huron village, Anderdon Township (McNiff 1790)
13. Cornfields, Anderdon Township (McNiff 1790)
14. Huron village, Huron Church Line
15. Burial mound, Huron Church Line and Third Concession, Sandwich West Township (excavated by W.J. Wintemberg for National Museum of Canada 1936)
16. Ottawa village and cemetery, Louis Avenue, Windsor (Chaussegros de Léry 1754)
17. Huron village, Brownstowe, Wayne County, Michigan
18. The great mound at the mouth of the Rouge River, Wayne County, Michigan
19. Circular mound and several smaller mounds at old Fort Wayne
20. Indigenous village, Ruscom River, Rochester Township (plan by Col. Burwell 1823)
21. Chippewa town reported by Major E.B. Littlehales in 1793

Indigenous Trails and Paths

A. Talbot Road, through the county from beyond Wheatley to Sandwich (shown on McNiff's map of 1791)
B. From Lake Erie to Lake St. Clair, following the Ruscum River (Burwell's map 1823)
C. From Point Pelee to Talbot Road
D. Lake Erie trail connecting shoreline settlements
E. From Lake Erie shoreline to Amherstburg area
F. River shore path, now Highway 18
G. River and lake shoreline to the Thames River and eastward, followed by Governor Simcoe in 1793

Figure Not to Scale

Notes

1. Reference: Lajeunesse, Ernest J. 1960. The Windsor Border Region: Canada's Southernmost Frontier. The Champlain Society. Toronto: University of Toronto Press.

Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-17
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
6

Title
Documented Indigenous Activity in Essex County

Stantec

Legend

Study Area (Approximate)

Figure Not to Scale

Notes
1. Reference: Iredell, Abraham. 1797. Sandwich. Unpublished map, on file with the Ministry of Natural Resources Crown Land Survey Records Office, Peterborough, Ontario.

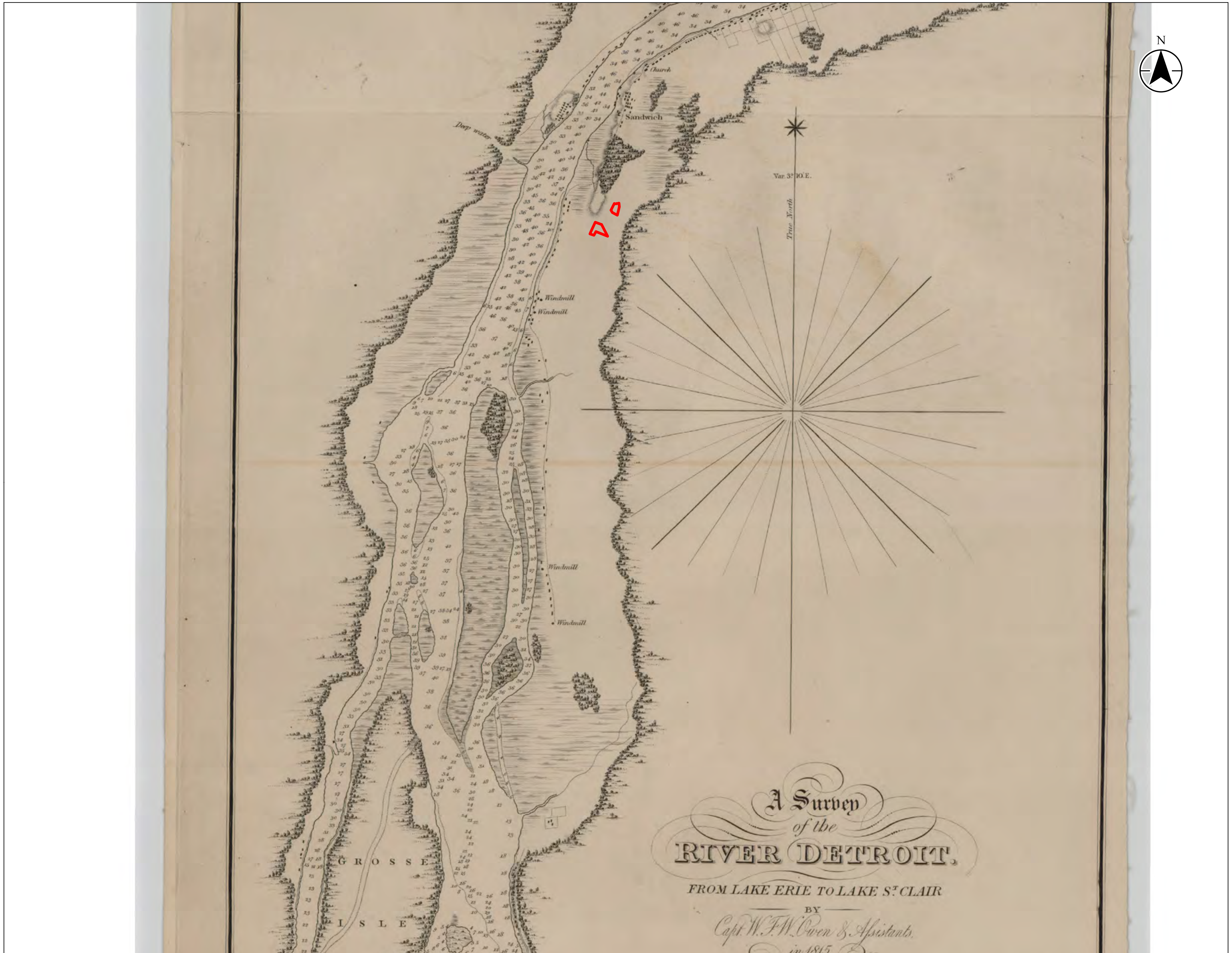
Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-16
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
7

Title
Portion of the 1797 Plan of a Portion of Sandwich Township



Stantec

Legend

Study Area (Approximate)

Figure Not to Scale

Notes

1. Reference: Owen, W.F.W.. 1828. A Survey of the River Detroit: From Lake Erie to Lake St. Clair by Capt. W. F. W. Owen & Assistants in 1815. London: J. & C. Sculpt.

Project Location
Boblo Island, Ontario

165620242 REVA
Prepared by BK on 2023-05-16
Technical Review by SPE on 2023-05-10

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
8

Title
Portion of the 1828 Historical Map of a Survey of the Detroit River

Stantec

Legend

Study Area (Approximate)

Figure Not to Scale

Notes

1. Reference: Walling, H.F. 1877. Map of Essex County, Ontario. Toronto: R.M. Tackabury.

Project Location
Windsor, Ontario

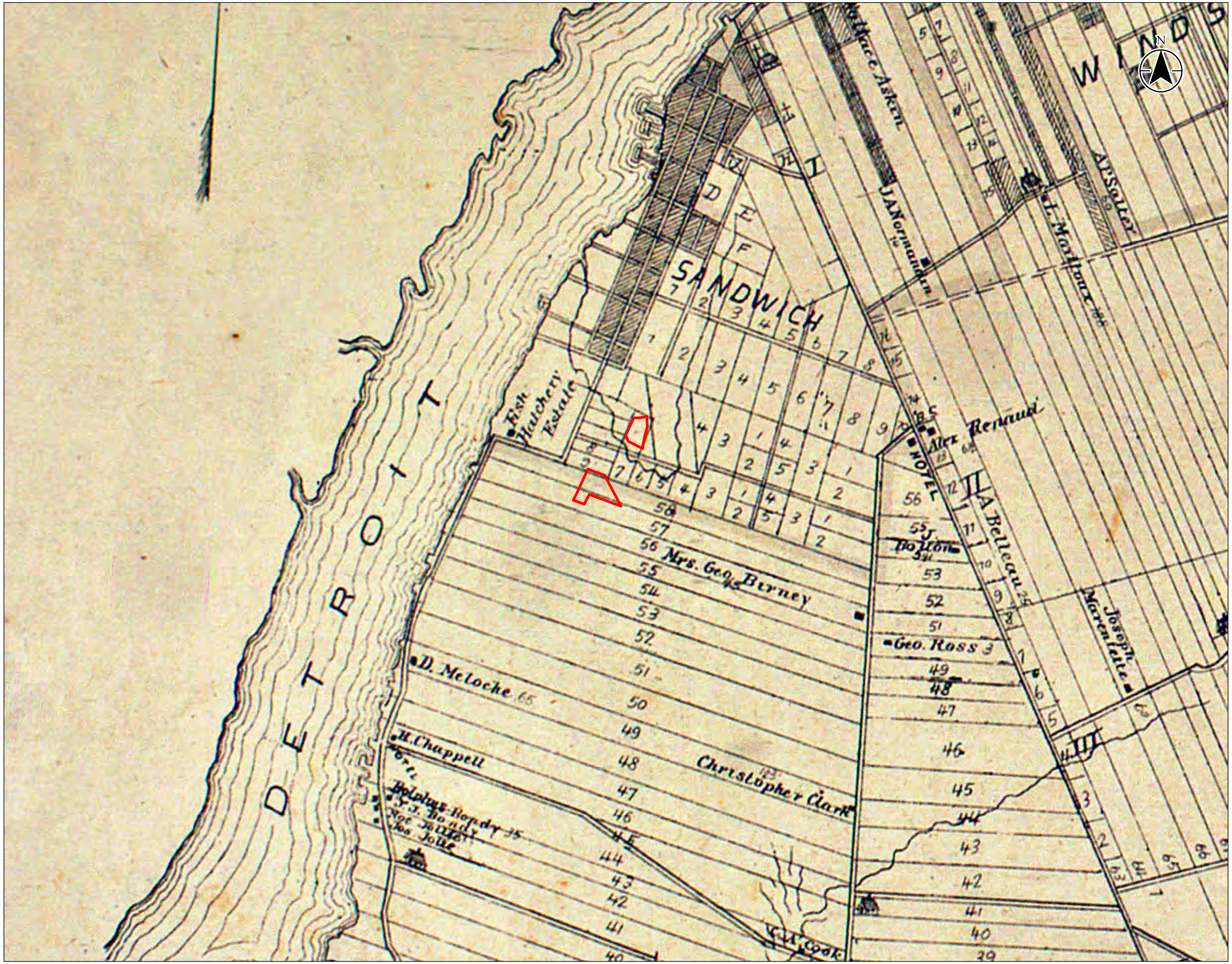
165620242 REVA
Prepared by BK on 2023-05-16
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
9

Title
Portion of the 1877 Historical Map of Essex County

\\Corp.ads\data\Virtual_Workspace\workgroup\1609\Active\165620242\03_data\gis_cad\gis\mxds\archaeology\report_figures\Stg1\165620242_Stl_2_Project_Fig09_Historic_1877.mxd Revised: 2023-05-16 By: bakaur



Stantec

Legend

Study Area (Approximate)

Figure Not to Scale

Notes

1. Reference: Belden, H. & Co. 1881. Essex Supplement. In Illustrated Atlas of the Dominion of Canada. Toronto: H. Belden and Co.

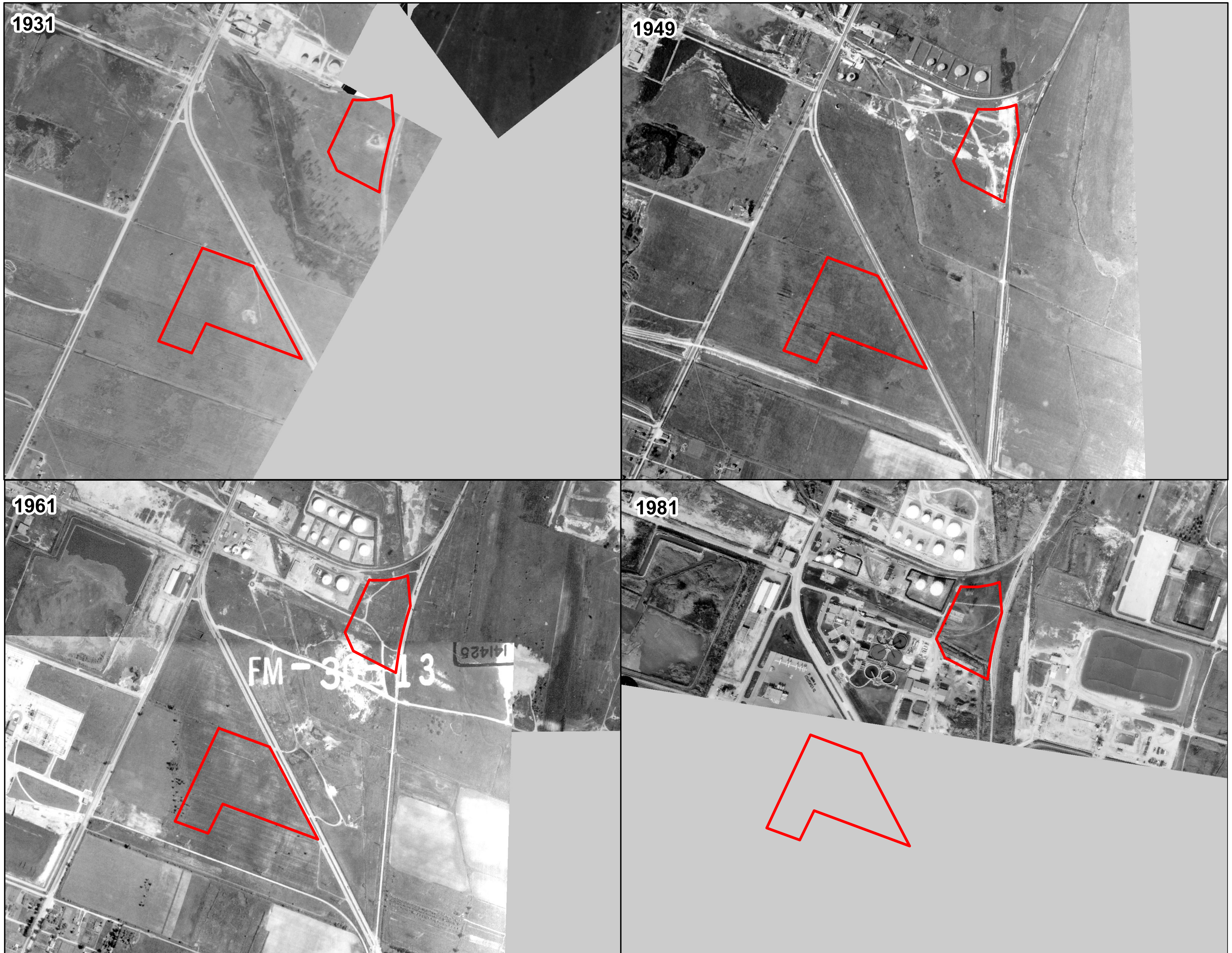
Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-16
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
10

Title
Portion of the 1881 Historical Map of Sandwich Township



Stantec

Legend

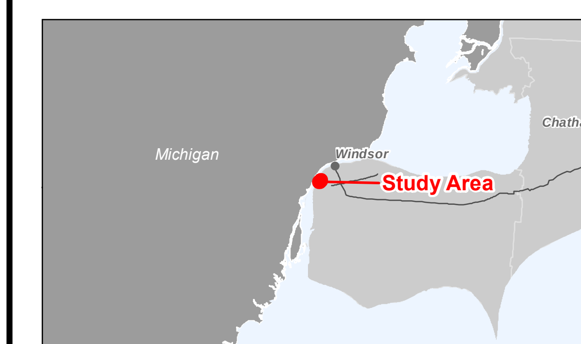
Study Area (Approximate)

No Imagery Available

Figure Not to Scale

Notes

1. Reference: Essex Regional Conservation Authority. 2023. Public Interactive Mapping, Air Photos (Historic) and Air Photo Library layers. Electronic ArcGIS document: http://ercamaps.countyofessex.ca/.



Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-18
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
11-1

Title
Aerial Photography – 1931, 1949, 1961, and 1981

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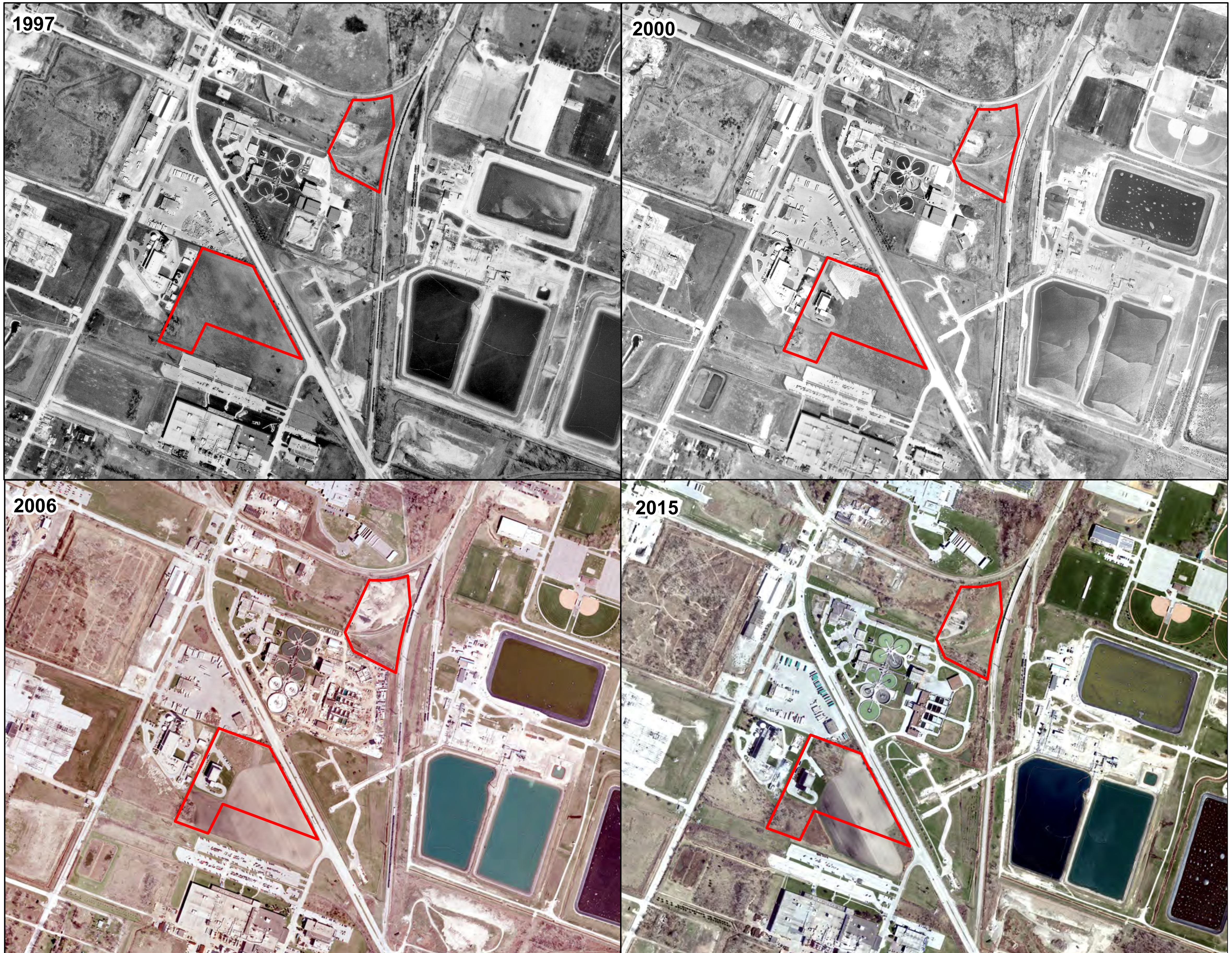


Stantec

Legend

Study Area (Approximate)

Figure Not to Scale

Notes

1. Reference: Essex Regional Conservation Authority. 2023. Public Interactive Mapping, Air Photos (Historic) and Air Photo Library layers. Electronic ArcGIS document: http://ercamaps.countyofessex.ca/.

Project Location
Windsor, Ontario

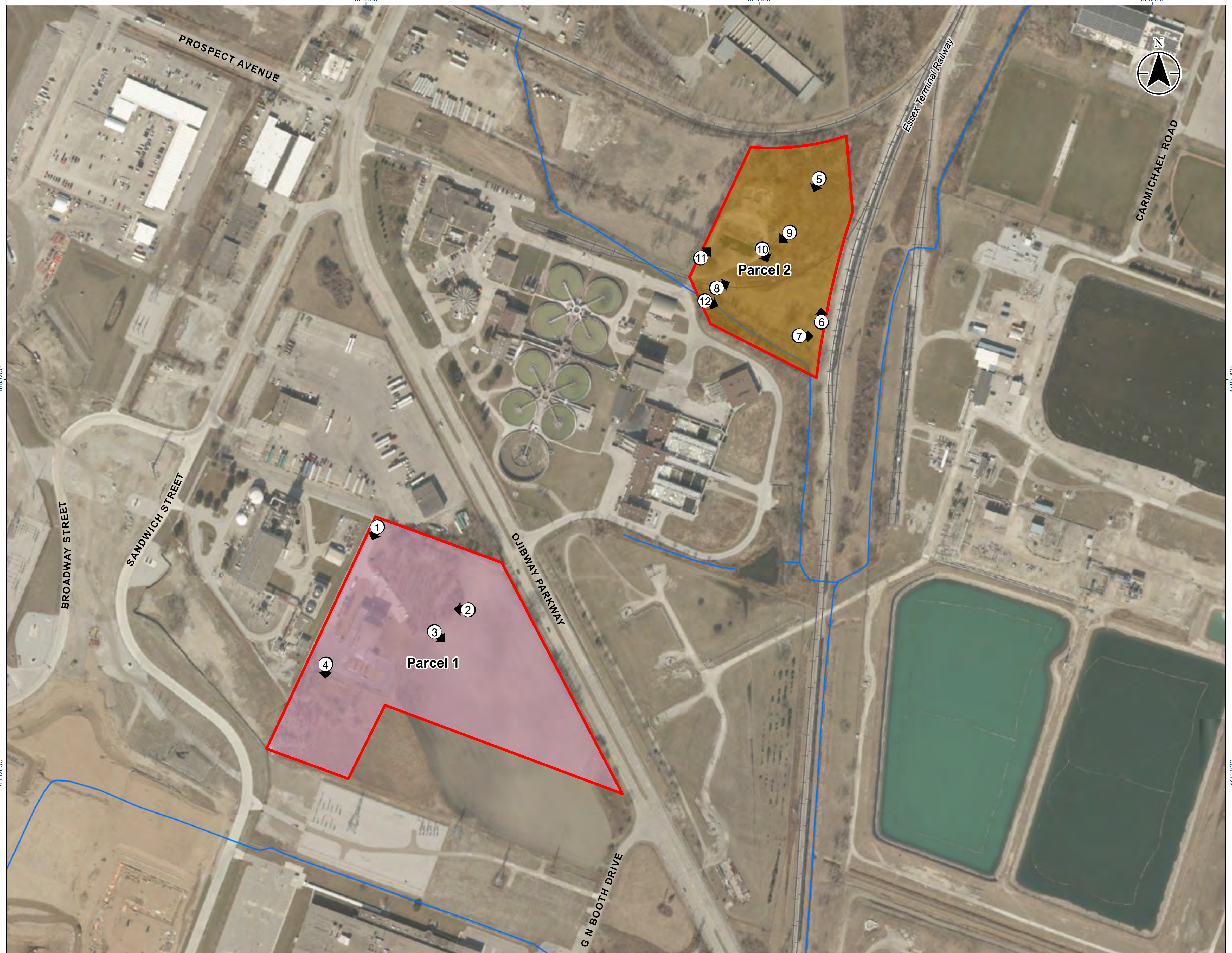
165620242 REVA
Prepared by BK on 2023-05-29
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
11-2

Title
Aerial Photography – 1997, 2000, 2006, and 2015

\\Corp.ads\data\Virtual Workspace\workgroup\1609\Active\165620242\03_data\gis_cad\gis\mxds\archaeology\report_figures\Stg1\165620242_Stg1_2_Project_Fig11_2_Historic_Aerials3.mxd Revised: 2023-05-29 By: bakaur



Stantec

Legend

- Study Area
- Archaeology Photo Log
- Railway
- Watercourse

Assessment Method

- Previously Disturbed, Low to No Archaeological Potential – No Further Archaeological Work Required
- Previously Assessed (ASI 2008, 2010) – No Further Archaeological Work Required

0 75 150 Metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, 2021.

Project Location
Windsor, Ontario

165620242 REVA
Prepared by BK on 2023-05-29
Technical Review by SPE on 2023-05-15

Client/Project
CITY OF WINDSOR
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: WINDSOR BIOSOLIDS CLASS EA

Figure No.
12

Title
Archaeological Potential

9 Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report. We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Quality Review ______________________________________

Parker Dickson – Senior Associate, Environmental Services

Independent Review ________________________________

Tracie Carmichael – Managing Principal, Environmental Services

APPENDIX C

Natural Heritage Impact Assessment Report

Windsor Biosolids Management Strategy – “Schedule C” Class EA: Natural Heritage Assessment

FINAL REPORT

April 12, 2023

Prepared for:
The City of Windsor

Prepared by:
Stantec Consulting Ltd.
600-171 Queens Avenue
London, ON N6A 5J7

Project Number:
165620242

Limitations and Sign-off

The conclusions in the Report titled Windsor Biosolids Management Strategy – "Schedule C" Class EA: Natural Heritage Assessment are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from The City of Windsor (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by:	Signature	Prepared by:	Signature
	Mitch Ellah, B.Sc. Ecologist Printed Name		Brian Miller Botanist, Terrestrial Ecologist Printed Name
Reviewed by:	Signature	Reviewed by:	Signature
	Andrew Taylor Senior Ecologist Printed Name		Nancy Harttrup, B.Sc. Senior Fisheries Biologist Printed Name

Table of Contents

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List of Appendices

Acronyms / Abbreviations

ANSI	Area of Natural and Scientific Interest
DFO	Fisheries and Oceans Canada
ESA	*Endangered Species Act,* 2007 (Ontario)
LIO	Land Information Ontario
MNRF	Ontario Ministry of Natural Resources and Forestry
NHIC	Natural Heritage Information Centre
OBBA	Ontario Breeding Bird Atlas
OBA	Ontario Butterfly Atlas
OMA	Ontario Moth Atlas
ORAA	Ontario Reptile and Amphibian Atlas
PSW	Provincially Significant Wetland
SAR	Species at Risk
SARA	Species at Risk Act
SARO	Species at Risk in Ontario
SOCC	Species of Conservation Concern

1 Introduction

The City of Windsor (the City) retained Stantec Consulting Ltd. to conduct a Schedule C Class Environmental Assessment (EA) for a Biosolids Management Strategy (BMS) for two City wastewater treatment facilities, the Lou Romano Water Reclamation Plant (LRWRP) and the Little River Pollution Control Plant (the Project).

The BMS identifies new facility construction, extension, and enlargement of an existing biosolids management facility. The Environmental Study Report of the EA (Stantec 2023) identifies two locations that may be utilized for facility expansion, hereafter referred to as Alternative No. 1, and Alternative No. 2.

Both expansion locations are located within the City of Windsor. Alternative No. 1 is located at the LRWRP site to the to the northeast of the existing dewatering facility. Alternative No. 2 is located at the Windsor Biosolids Processing Facility (WBPF) site to the southeast of the existing facility (**Figure 1, Appendix A**).

As part of the EA, Stantec completed a natural heritage assessment for each potential expansion. The assessment was conducted within boundary of each of the two existing facilities, plus adjacent lands within 120 m, collectively known as the Study Area (**Figure 1, Appendix A**), and included a desktop review of natural heritage background data and a field investigation. The assessment focused on documenting and describing natural heritage features, vegetation communities, wildlife habitat, rare species, Species at Risk (SAR) and their habitats, and fish habitat within the Study Areas.

This report provides the results of the natural heritage assessment and includes a review of natural heritage constraints, general mitigation measures and anticipated natural heritage related permit needs for the Project.

2 Desktop Review

2.1 Background Information Sources

The following background documents and information sources were consulted to obtain natural heritage designations for the Study Area. Sources of information reviewed included:

- Natural Heritage Information Centre (NHIC) (MNRF 2023a)
- Land Information Ontario (LIO) (MNRF 2023b)
- Ontario Ministry of Agriculture, Food and Rural Affairs Ag. Maps (OMAFRA) (OMAFRA 2023)
- Essex Region Natural Heritage System Study (ERNHSS) (Essex Region 2013)
- Essex Region Conservation Authority (ERCA) Public Interactive Mapping (ERCA 2022)
- City of Windsor Official Plan (City of Windsor 2023)

Online natural heritage databases, wildlife atlases and SAR mapping were reviewed to identify flora and fauna records for the Study Area. Records of SAR and Species of Conservation Concern (SOCC), occurrences of amphibians, reptiles, birds and mammals, Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), and fish and fish habitat data were obtained from the following sources:

- Natural Heritage Information Centre (NHIC) (MNRF 2023a)
- Land Information Ontario (LIO) (MNRF 2023b)
- Species at Risk in Ontario (SARO) List (MECP 2023)
- Species List on Schedule 1 of the S*pecies at Risk Act* (SARA) (Government of Canada 2023)
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map (DFO 2023)
- Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2019)
- Ontario Breeding Bird Atlas (OBBA) (Cadman et al. 2007)
- Ontario Butterfly Atlas (OBA) (Toronto Entomologists' Association (TEA) 2023a)
- Ontario Moth Atlas (OMA) (Toronto Entomologists' Association 2023b)
- eBird Online Database (eBird 2023)
- iNaturalist Online Observations (iNaturalist 2023)

Many of these resources do not provide the exact locations of a species occurrence, with accuracy ranging from 1-km² (e.g., NHIC) to 10-km² (wildlife atlases). As such they are used as an indicator of potential occurrence in the Study Area.

2.2 Results

2.2.1 Natural Heritage Landscape Context

The Study Areas are in Windsor, Ontario in Ecoregion 7E in Essex Ecodistrict (7E-1). This is the most southerly ecoregion and district in Canada. The district is dominated by agriculture (~90%). Natural areas such as deciduous forested woodlots occupy a small portion of the land.

The Study Areas are situated in an industrial section of Windsor, Ontario and near the Ojibway Prairie Complex. The prairie remnants in the Ojibway Prairie area provide unique tallgrass prairie, savanna, and black oak woods habitat for a great variety of rare plant and animal life found in few other places in Ontario. This area is part of a complex of Life Science ANSIs and PSWs. Several SAR and SOCC occur here and can be found sporadically throughout the City and surrounding area. The vegetation located within and adjacent Alternatives No. 1 and 2 has a history of disturbance from past and current industrial land use activities.

2.2.2 Natural Heritage Designations and Features

2.2.2.1 Alternative No. 1

Alternative No. 1 is located within the ERCA Regulated Area (ERCA 2022) associated with McKee Creek (**Figure 1, Appendix A**). Within the Alternative No. 1, site boundary, McKee Creek and its riparian area is identified as a Priority Restoration Opportunity for the Detroit River Drainage Area (North) Watershed by the ERCA (Essex Region 2013, ERCA 2022). A designated Existing Natural Feature: Forest, is present in the Alternative No. 1 Study Area (Essex Region 2013, ERCA 2022). This same feature is considered a Woodland in the NHIC database (MNRF 2023a) (**Figure 1, Appendix A**).

McKee Creek is located in the south portion of the Alternative No. 1 site boundary (**Figure 1, Appendix A**). The creek has a permanent flow regime (MNRF 2023b) and is designated a municipal drain and a Class F drain (OMAFRA 2023). Class F drains have an intermittent flow regime (DFO 2017). McKee Creek does not have an assigned thermal regime (MNRF 2023b). A fish community survey in McKee Creek in 2009 documented the following diverse fish community: Bluegill, Bluntnose Minnow, Brown Bullhead, Common Carp, Emerald Shiner, Gizzard Shad, Largemouth Bass, Northern Pike, Pumpkinseed, Spottail Shiner, Lepomis sp., White Bass and Yellow Perch (MNRF 2023b). The fish community in McKee Creek prefer warmwater habitats.

A second watercourse is present in the Alternative No. 1 Study Area called the McKee Drain. The McKee Drain is located on the east side of the Study Area, east of the railway (**Figure 1, Appendix A**). McKee Drain connects with McKee Creek at the south end of the Study Area. McKee Drain is a municipal drain with intermittent flow and a Class F drain (MNRF 2023b). No other data were available for McKee Drain, however, considering the connectivity to McKee Creek, the watercourses may have a similar fish community.

There are no PSWs or ANSIs in the Alternative No. 1 Study Area (MNRF 2023a).

2.2.2.2 Alternative No. 2

Alternative No. 2 is outside of the ERCA Regulated Area (ERCA 2022). A designated Existing Natural Feature: Forest, is present in the Alternative No. 2 site boundary (Essex Region 2013, ERCA 2022).

There are no mapped watercourses or drains within the Alternative No. 2 site boundary. The mapped watercourse in the south end of the Study Area has a permanent flow regime (MNRF 2023b) (**Figure 1, Appendix A**). There are no other data available for this watercourse and it is not a constructed drain.

There are no PSWs or ANSIs in the Alternative No. 2 Study Area (MNRF 2023a).

Both Study Areas are within the Detroit River Drainage Area (North) (Essex Region 2013).

2.2.3 Species of Conservation Concern

Species of Conservation Concern (SOCC) are those species that are provincially rare (S1-S3 ranked species), listed as special concern (SC) on the SARO list or are listed as threatened or endangered on Schedule 1 of the *Species at Risk Act, 2002.* Species that are protected by the *Endangered Species Act, 2007* (ESA) are not SOCC; they are considered SAR and discussed in the following section.

Status rankings (S-ranks) for wildlife are based on the number of occurrences in Ontario and have the following meanings (OMNR 2000):

- S1: extremely rare; usually 5 or fewer occurrences in the province
- S2: very rare; usually between 5 and 20 occurrences in the province
- S3: rare to uncommon; usually between 20 and 100 occurrences in the province
- S4: common; usually more than 100 occurrences in the province
- S#B: breeding status rank
- S#N: Non-breeding status rank

Sixty-eight (68) SOCC were identified in the background review as having potential to be present within or near the Study Areas (Table 1). The potential for SOCC to be present in the Study Areas is limited by the presence of suitable habitat in the Study Area.

Table 1: Species of Conservation Concern known to occur in or near the Study Areas

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Birds					
Barn Swallow	*Hirundo rustica*	SC	THR	S4B	eBird[1], NHIC[2]
Common Nighthawk	*Chordeiles minor*	SC	THR	S4B	eBird
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B	eBird
Peregrine falcon	*Falco peregrinus*	SC	SC	S3B	eBird
Wood Thrush	*Hylocichla mustelina*	SC	THR	S4B	eBird

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Fish					
Silver Lamprey (Great Lakes - Upper St. Lawrence populations)	*Ichthyomyzon unicuspis pop. 1*	SC	SC	S3	NHIC
Insects					
American Bumble Bee	*Bombus pensylvanicus*	NA	SC	S3, S4	NHIC
Azure Bluet	*Enallagma aspersum*	-	-	S4	NHIC
Cicada Killer	*Sphecius speciosus*	-	-	S1S2	NHIC
Cobra Clubtail	*Gomphurus vastus*	-	-	S2	NHIC
Common Sanddragon	*Progomphus obscurus*	-	-	S2	NHIC
Double-striped Bluet	*Enallagma basidens*	-	-	S3	NHIC
Elusive Clubtail	*Stylurus notatus*	-	-	S3	NHIC
Hackberry Emperor	*Asterocampa celtis*	-	-	S3	NHIC
Monarch	*Danaus plexippus*	SC	SC	S4B, S2N	TEA[3]
Swamp Darner	*Epiaeschna heros*	-	-	S3S4	NHIC
Tawny Emperor	*Asterocampa clyton*	-	-	S3	NHIC
Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	S3, S5	NHIC
Molluscs					
Globose Dome	*Ventridens ligera*	-	-	S2	NHIC
Mapleleaf Mussel	*Quadrula quadrula*	SC	SC	S2	NHIC
Plants					
Arrowfeather Threeawn Grass	*Aristida purpurascens*	-	-	S1	NHIC
Biennial Gaura	*Oenothera gaura*	-	-	S3	NHIC
Black Gum	*Nyssa sylvatica*	-	-	S3	NHIC
Blood Milkwort	*Polygala sanguinea*	-	-	S3	NHIC
Bushy Aster	*Symphyotrichum dumosum*	-	-	S2	NHIC
Bushy Seedbox	*Ludwigia alternifolia*	-	-	S1	NHIC
Buttonbush Dodder	*Cuscuta cephalanthi*	-	-	S2	NHIC
Crowned Beggarticks	*Bidens trichosperma*	-	-	S2	NHIC
Culver's Root	*Veronicastrum virginicum*	-	-	S2	NHIC
Early-branching Panicgrass	*Dichanthelium praecocius*	-	-	S3	NHIC
Eastern Stiff-leaved Goldenrod	*Solidago rigida ssp. rigida*	-	-	S3	NHIC
Eastern Yellow Stargrass	*Hypoxis hirsuta*	-	-	S2S3	NHIC
Field Thistle	*Cirsium discolor*	-	-	S3	NHIC

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Gentian-leaved St. John's-wort	*Hypericum gentianoides*	-	-	S1	NHIC
Giant Ironweed	*Vernonia gigantea*	-	-	S1?	NHIC
Gray-headed Prairie Coneflower	*Ratibida pinnata*	-	-	S3	NHIC
Great Plains Ladies'-tresses	*Spiranthes magnicamporum*	-	-	S3?	NHIC
Green Cornet Milkweed	*Asclepias viridiflora*	-	-	S2	NHIC
Greene's Rush	*Juncus greenei*	-	-	S3	NHIC
Hairy Pinweed	*Lechea mucronata*	-	-	S3	NHIC
Leggett's Pinweed	*Lechea pulchella*	-	-	S1	NHIC
Many-fruited Seedbox	*Ludwigia polycarpa*	-	-	S2	NHIC
Mead's Sedge	*Carex meadii*	-	-	S2	NHIC
Missouri Ironweed	*Vernonia missurica*	-	-	S3?	NHIC
Ohio Spiderwort	*Tradescantia ohiensis*	-	-	S2	NHIC
Pignut Hickory	*Carya glabra*	-	-	S3	NHIC
Prairie Milkweed	*Asclepias sullivantii*	-	-	S2S3	NHIC
Purple Milkweed	*Asclepias purpurascens*	-	-	S1	
Riddell's Goldenrod	*Solidago riddellii*	SC	SC	S3	NHIC
Rigid Sedge	*Carex tetanica*	-	-	S3?	NHIC
Round-fruited Panicgrass	*Dichanthelium sphaerocarpon*	-	-	S3	NHIC
Saltmarsh Sand-spurrey	*Spergularia marina*	-	-	S1	NHIC
Short-fruited Rush	*Juncus brachycarpus*	-	-	S1	NHIC
Stiff Cowbane	*Oxypolis rigidior*	-	-	S2	NHIC
Slender Paspalum	*Paspalum setaceum*	-	-	S2	NHIC
Sundial Lupine	*Lupinus perennis*	-	-	S2S3	NHIC
Tall Green Milkweed	*Asclepias hirtella*	-	-	S1	NHIC
Tall Nutrush	*Scleria triglomerata*	-	-	S1	NHIC
Tall Tickseed	*Coreopsis tripteris*	-	-	S1S2	NHIC
Two-flowered Dwarf-dandelion	*Krigia biflora*	-	-	S2	NHIC
Two-flowered Rush	*Juncus biflorus*	-	-	S1	NHIC
Upright Carrionflower	*Smilax ecirrata*	-	-	S3?	NHIC
White Blue-eyed Grass	*Sisyrinchium albidum*	-	-	S1	NHIC
Winged Loosestrife	*Lythrum alatum*	-	-	S3	NHIC
Yellow Wild Indigo	*Baptisia tinctoria*	-	-	S1S2	NHIC

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Reptiles					
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	Ontario Nature[3]
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	Ontario Nature
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	NHIC, Ontario Nature

1 eBird Canada 2023
2 MNRF 2023a
3 Ontario Nature 2019
4 TEA 2023a

2.2.4 Species at Risk

Species at Risk are those species that are listed as endangered (END) or threatened (THR) under the provincial *Endangered Species Act, 2007* (ESA).

The ESA was created to protect SAR and their habitats. Endangered, threatened, and extirpated species listed on the SARO automatically receive legal protection from harm or harassment. The habitat of a given species is classified as either general habitat protection or regulated habitat protection (i.e., defined under regulation).

Thirty-nine (39) SAR were identified in the background review as having potential to be present within or near the Study Area (Table 2). The potential for SAR to be present in the Study Area is limited by the presence of suitable habitat in the Study Area.

Table 2: Species at Risk known to occur near or in the Study Areas

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Birds					
Acadian Flycatcher	*Empidonax virescens*	END	END	S2S3B	NHIC[1]
Bank Swallow	*Riparia riparia*	THR	THR	S4B	eBird[2], NHIC
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	eBird
Chimney Swift	*Chaetura pelagica*	THR	THR	S4B, S4N	eBird
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	eBird, NHIC
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	eBird
Yellow-breasted Chat	*Icteria virens*	END	END	S2B	NHIC

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Fishes					
Channel Darter	*Percina copelandi*	THR	NA	S3	NHIC
Eastern Sand Darter	*Ammocrypta pellucida*	END	THR	S2	NHIC
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	*Acipenser fulvescens pop. 3*	THR	THR	S2	NHIC
Northern Madtom	*Noturus stigmosus*	END	END	S3	NHIC
Mammals					
Eastern Small-footed Myotis	*Myotis leibii*	END	Not Listed	S2S3	SARO[3]
Little Brown Myotis	*Myotis lucifugus*	END	END	S3	SARO
Northern Myotis	*Myotis septentrionalis*	END	END	S3	SARO
Tricolored Bat	*Perimyotis subflavus*	END	END	S3?	SARO
Molluscs – Mussels					
Eastern Pondmussel	*Ligumia nasuta*	END	SC	S2	NHIC
Fawnsfoot	*Truncilla donaciformis*	END	END	S1	NHIC
Hickorynut	*Obovaria olivaria*	END	END	S1?	NHIC
Kidneyshell	*Ptychobranchus fasciolaris*	END	END	S1	NHIC
Northern Riffleshell	*Epioblasma rangiana*	END	END	S1	NHIC
Purple Wartyback	Cyclonaias tuberculata	Not Listed	THR	S2	NHIC
Round Hickorynut	*Obovaria subrotunda*	END	END	S1	NHIC
Round Pigtoe	*Pleurobema sintoxia*	END	END	S1	NHIC
Snuffbox	*Epioblasma triquetra*	END	END	S1	NHIC
Molluscs - Snails					
Proud Globelet	*Patera pennsylvanica*	END	END	S2	NHIC
Plants					
American Chestnut	*Castanea dentata*	END	END	S1S2	NHIC
Dense Blazing-star	*Liatris spicata*	THR	THR	S2	NHIC
Eastern Prairie Fringed-Orchid	*Platanthera leucophaea*	END	END	S2	NHIC
Pink Milkwort	*Polygala incarnata*	END	END	S1	NHIC
Red Mulberry	*Morus rubra*	END	END	S2	NHIC
White Colicroot	*Aletris farinosa*	END	END	S2	NHIC
Willow-leaved Aster	*Symphyotrichum praealtum*	THR	THR	S2	NHIC

Common Name	Scientific Name	SARO Status	SARA Status	S-Rank Status	Source(s)
Reptiles					
Blandings Turtle	*Emydoidea blandingi*	THR	THR	S3	Ontario Nature[4]
Butler's Gartersnake	*Thamnophis butleri*	END	END	S4B	NHIC, Ontario Nature
Eastern Foxsnake (Carolinian)	*Pantherophis gloydi*	END	END	S2	Ontario Nature
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	S3	Ontario Nature
Five-lined Skink	*Eumeces fasciatus*	END	END	S2	NHIC
Spiny Softshell	*Apalone spinifera spinifera*	END	END	S3	NHIC
Spotted Turtle	*Clemmys guttata*	END	END	S3	NHIC

1 MNRF 2023a

2 eBird Canada 2023

3 MECP 2023

4 Ontario Nature 2019

3 Field Investigation

A field investigation was completed on February 16, 2023. Weather conditions were overcast, with an air temperature of 1 to 2°C and moderate winds. The field investigation was completed where land access was permitted and included the area within the Site boundary and portions of the Study Area. Private lands in the Study Area were assessed from the limit of accessible lands.

3.1 Methods

3.1.1 Ecological Land Classification

Ecological Land Classification (ELC) surveys were completed to identify and map natural and anthropogenic vegetation communities in the Study Area. Surveys were completed outside of the growing season, so a complete assessment of vegetation communities was not possible. However, it was possible to document the dominant vegetation forms and species in most cases.

Identification and mapping of vegetation communities follows the protocols of the ELC field guide for Southern Ontario (Lee et al., 1998). Updates to vegetation community names and codes follow the 2008 catalogue of ELC vegetation communities. ELC mapping was completed to the finest level of resolution (Vegetation Type) where possible. Vegetation communities were first identified on aerial imagery and then checked in the field. Provincial significance of vegetation communities was based on the rankings assigned by the NHIC (MNRF 2023a).

To the extent possible given the winter conditions and in the absence of snow cover, SAR and SOCC plants such as the endangered butternut tree were surveyed for and mapped if encountered.

3.1.2 Migratory Bird Nest Survey

Migratory birds and their nests are protected under the *Migratory Bird Convention Act, 1994* (MBCA), and are afforded protection on all lands. Observed bird nests were documented during the site visit.

3.1.3 Bat Maternity Roost Tree Survey

Trees in the Study Area were assessed for potential suitability as bat maternity roosts. The assessment followed the recommended methods in the MNRF Guelph District *Bat and Bat Habitat Surveys of Treed Habitats* (MNRF 2017). Although the protocol was developed for treed communities, Stantec took a conservative approach and also applied the protocol to isolated trees in the Study Area. According to the MNRF Guelph District protocol, the best candidate trees for maternity colonies are likely to contain several characteristics (to be considered a potential treed roost habitat, not all habitat characteristics listed below needed to be present), which include:

- Height – where trees are tallest in the stand
- Diameter – where trees have a large diameter at breast height (DBH)

- Loose/peeling bark – where trees have a large amount of peeling/loose bark
- Cavity height – where cavity height is high on the tree (>10 m high)
- Open canopy – located in an area of open canopy for accessibility in and out of tree
- Decay – where the tree exhibits early stages of decay

Surveys focused on all trees that were > 10 cm in DBH in the Study Area. The following data were also recorded for trees over 10 cm DBH with cavities or a large amount of peeling bark:

- GPS location
- tree species
- Diameter at breast height
- tree height
- cavity height

3.1.1 Significant Wildlife Habitat Assessment

The MNRF's Significant Wildlife Habitat Technical Guide (SWHTG) (MNR 2000) describes significant wildlife habitat (SWH) in four categories:

1. Seasonal concentration areas
2. Rare vegetation communities or specialized habitats for wildlife
3. Habitat for SOCC (excluding habitat for Endangered or Threatened species)
4. Animal movement corridors

Habitats within the Study Areas were assessed for candidate SWH, as defined in the Ecoregion 7E Criterion Schedule (MNRF 2015). Wildlife observations and evidence of wildlife (e.g., tracks, burrows, vocalizations) were recorded during the site visit. Targeted species-use surveys are generally required to determine if candidate features qualify as confirmed SWH. Because targeted species-use surveys were not conducted, identified SWH features were considered candidate, unless they were confirmed through direct observations or background review.

3.1.2 Species at Risk Habitat Suitability Assessment

SAR habitat suitability assessments were completed in the Study Areas concurrently during the site visit.

These assessments focused on the identification of potential SAR habitat features (e.g., SAR bat maternity roost trees) or occurrences (e.g., butternut). SAR habitat suitability assessments were completed for species protected under the provincial ESA that may occur in the area, including species identified in the NHIC database and Ontario wildlife atlases during the literature review process. If encountered, these features were identified, recorded and assessed for potential use by SAR and wildlife species occurrences were observed by sight, sound and/or through distinctive signs (e.g., tracks, scat).

3.1.3 Fish Habitat Assessment

The fish habitat assessment characterized potential fish habitat in McKee Creek within the Alternative No. 1 site boundary, based on the presence/absence of key aquatic habitat elements such as instream cover, aquatic and riparian vegetation and water depth. McKee Creek was assessed by walking the shoreline and visually documented physical habitat characteristics. If present, fish habitat features were identified, characterized, and recorded digitally with Stantec field forms on data collection software (ArcGIS) and a digital camera. Fish community sampling was not conducted during the field investigation.

McKee Drain in Study Area for Alternative No. 1 and the watercourse in the Study Area for Alternative No. 2 were not assessed due to land access restriction.

3.2 Results

A photographic record of Alternative No. 1 and Alternative No. 2 and the natural heritage features observed in the Study Area for both locations is provided in **Appendix B**.

3.2.1 Ecological Land Classification

3.2.1.1 Alternative No. 1

No SAR or SOCC plant species were observed within or adjacent Alternative No. 1. No tallgrass prairie, savanna or black oak woodland or other unique vegetation communities were observed. The vegetation present within and adjacent Alternative No. 1 is disturbed in nature and contains few opportunities for SAR or SOCC plants to occur. For example, a small patch of woodland (WODM5) is present within and adjacent the Study Area. The vegetation in this area is of low quality. It is partially located on the side of a large pile of soil. Exotic species such as white mulberry, Manitoba maple and common reed (Phragmites) occur frequently throughout with limited native flora. It is unlikely, but not impossible that SAR or SOCC plants occur in this woodland area or in other disturbed vegetation communities in the Study Area.

ELC mapping within Alternative No. 1 Study Area is shown on Figure 2, Appendix A. Vegetation communities are described in **Table 3** (below). None of the vegetation community types identified in February 2023 are considered rare in Ontario.

Table 3: Ecological Land Classification (ELC Vegetation Types Within Alternative No. 1

ELC TYPE	Community Description
Meadow (ME)	
MEGM4 Fresh – Moist Graminoid Meadow	This area is situated on a large mound of soil / substrate that occupies a large portion of the site. Common reed (Phragmites) is the dominant vegetation. Young Manitoba maple, white mulberry and black walnut also occur occasionally. A few larger eastern cottonwood occur at the perimeter of this community.
MEMM3 Dry – Fresh Mixed Meadow	This meadow is dominated by smooth brome grass, goldenrods, Kentucky bluegrass and raspberries. Common milkweed occurs frequently.

ELC TYPE	Community Description
Woodland (WO)	
WODM5 Fresh – Moist Deciduous Woodland	This woodland is partially situated on the same large mound of soil / substrate that the MEGM4b community occupies. An open canopy semi-mature eastern cottonwood occurs in this community. The understory contains occasional Manitoba maple and white mulberry.
Marsh (MA)	
MASM1-12 Common Reed Mineral Shallow Marsh / **WODM5** Fresh - Moist Deciduous Woodland	Common reed (Phragmites) occurs abundantly in and along the watercourse in this community. Semi-mature eastern cottonwood occurs occasionally along with black walnut which occurs sparsely next to the watercourse.

3.2.1.2 Alternative No. 2

No SAR or SOCC plant species were observed within Alternative No. 2 Study Area. No tallgrass prairie, savanna or black oak woodland or other unique vegetation communities were observed. The vegetation present within and adjacent Alternatives No. 2 is disturbed in nature and contains few opportunities for SAR or SOCC plants to occur. For example, a small patch of forest (FODM4-12) is present. The vegetation in this area is of low quality. It is dominated by exotic tree species such as the tree-of-heaven *(Ailanthus altissima*) and other exotic or weedy flora with limited native plant species. It is unlikely that SAR or SOCC plants occur in this forest patch or in other disturbed vegetation communities in the Study Area.

ELC mapping within Alternative No. 2 Study Area is shown on **Figure 2, Appendix A**. Vegetation communities are described in **Table 4** (below). None of the vegetation community types identified in February 2023 are considered rare in Ontario.

Table 4: Ecological Land Classification (ELC Vegetation Types Within Alternative No. 2

ELC TYPE	Community Description
Meadow (ME)	
MEGM4b Fresh – Moist Graminoid Meadow	This area is situated on a large mound of soil / substrate that occupies a large portion of the site. Common reed (Phragmites) is the dominant vegetation. Young Manitoba maple, white mulberry and black walnut also occur occasionally. A few larger eastern cottonwood occur at the perimeter of this community.
Forest (FO)	
FODM4-12 Exotic Deciduous Forest	This disturbed forest patch is dominated at the sub-canopy level by the exotic tree-of-heaven, which occurs much more frequently than Manitoba maple and soft maple (Freeman’s or silver). A few large cottonwood and Siberian elm occur in the canopy. The understory is dominated by regeneration of Manitoba maple and tree-of-heaven. Common reed (Phragmites) also occurs occasionally. The herbaceous ground layer is composed of species that are typical of disturbed areas.

ELC TYPE	Community Description
FODM11 Naturalized Deciduous Hedgerow	This hedgerow is next to the Ojibway Parkway. It is dominated by semi-mature tree-of-heaven. Soft maple (Freeman's or silver) and Siberian elm occur occasionally. Young tree-of-heaven and common reed (Phragmites) occur in the understory.
Marsh (MA)	
MAMM1-12 Common Reed Graminoid Mineral Meadow Marsh / **SWDM4** Mineral Deciduous Swamp	This lowland area is dominated by dense common reed (Phragmites) with occasional wetland willow shrubs. Mature eastern cottonwood in one section within the dense Phragmites (SWDM4).
Agricultural Fields	
OAG (Fallow) Open Agriculture	This agricultural field was not under current crop production. Agricultural weeds were frequent throughout the field.

3.2.2 Bird Nests

Bird nests were observed in various locations within both Study Areas, although the species were unknown.

3.2.3 Bats

One tree was documented within Alternative No. 1 site boundary that had features suitable to support bat maternity roost habitat, including maternity roost habitat for bat SAR (**Figure 2, Appendix A**). This tree may be impacted by the development footprint. Treed areas at either site that may be adversely affected (removed) for the Project should be surveyed for presence of SAR bats.

3.2.4 Significant Wildlife Habitat

Evaluation criteria and the SWH assessment results appear in **Appendix C.** A brief description of the four SWH categories is provided below:

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. Only the best examples of these concentration areas are usually designated as SWH.

Seasonal Concentration Areas were not identified in the Study Areas.

Rare Vegetation Communities and Specialized Habitat for Wildlife

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species.

- **Candidate**: The MAMM1-12/SWDM4 that is within Alternative No. 2 site boundary may provide suitable habitat for one type of specialized habitat: Terrestrial Crayfish

Species of Conservation Concern

There are four types of SOCC: those which are rare, those whose populations are significantly declining, those which have been identified as being at risk from certain common activities and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, federally rare with designations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), provincially rare with designations by the Committee on the Status of Species at Risk in Ontario (COSSARO), regionally rare (at the Site Region level), and locally rare (in the municipality or Site District). This is also the order of priority that should be assigned to the importance of maintaining species. While these species are considered rare, they are not regulated under the ESA or the federal *Species at Risk Act*. Species designated as Special Concern provincially or federally are included as SOCC. A habitat assessment for SOCC that fall into this category that have ranges that overlap with the Study Area is in **Appendix C**. The presence or absence of these species would need to be assessed through completion of targeted surveys at the appropriate time of year.

Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to habitat loss such as marsh, open country and shrub/early successional breeding birds.

Suitable habitat for sixteen (16) of the sixty-eight (68) SOCC identified in the background review was present in the Study Areas. In some instances, habitat for SOCC was present at either one or both Study Areas. All 16 SOCC are potentially present in the Alternative No. 1 Study Area and 10 SOCC are potentially present in the Alternative No. 2 Study Area. The list of SOCC identified as potentially present in the Study Areas is provided in Table 5. This assessment was completed using field data collected in the winter and should be updated with additional surveys during the growing season.

Table 5: SOCC Identified as Potentially Present in the Study Areas based on Habitat Suitability Assessment

Species	Alternative No. 1	Alternative No. 2
Birds		
Barn Swallow	✓	✓
Common Nighthawk	✓	✓
Eastern Wood-pewee	✓	
Plants		
Biennial Gaura	✓	✓
Eastern Stiff-leaved Goldenrod	✓	
Field Thistle	✓	✓
Giant Ironweed	✓	✓
Gray-headed Prairie Coneflower	✓	
Many-fruited Seedbox	✓	✓
Missouri Ironweed	✓	✓
Prairie Milkweed	✓	
Riddell's Goldenrod	✓	
Saltmarsh Sand-spurrey	✓	✓
Slender Paspalum	✓	✓
Tall Tickseed	✓	✓
Reptiles		
Snapping Turtle	✓	

Animal Movement Corridors

Migration corridors are areas that are traditionally used by wildlife to move to one habitat from another. This is usually in response to different seasonal habitat requirements. There is one type of animal movement corridor in Ecoregion 7E - amphibian movement corridors.

- **Candidate:** Amphibian movement corridor may be present within the Alternative No. 1 Study Area.

3.2.5 Species at Risk

Suitable habitat for six (6) of the 39 SAR identified in the background review was present in the Study Areas. All six SAR may be present in the Alternative No. 1 Study Area, and five SAR may be present in the Alternative No. 2 Study Area. In some instances, habitat for SAR was present at either one or both Study Areas.

3.2.5.1 Alternative No. 1

The naturalizing nature of Alternative No. 1 and the onsite and surrounding natural features including McKee Creek, forest, marsh, thicket, and meadow may provide suitable habitat for SAR. SAR bats may be utilizing treed areas within the site boundary and a tree providing suitable bat maternity roost features (Section 3.1.3) was present within the site boundary. Butler's Garternsnake can persist in disturbed areas and Eastern Foxsnake are commonly found in drainage ditches, thereby making habitat within Alternative No. 1 site boundary potentially suitable for those species as well.

3.2.5.2 Alternative No. 2

The treed areas present within the Alternative No. 2 site boundary may provide suitable habitat for SAR bats. Although the habitat within the site boundary is isolated and of poor quality, given that Butler's Gartersnake can persist in disturbed areas, there is potential that this species could be present at Alternative No. 2.

The list of SAR identified as potentially present in the Study Areas is provided in Table 6.

The SAR habitat suitability assessment is provided in **Appendix D**.

Table 6: SAR Identified as Potentially Present in the Study Areas based on the Habitat Suitability Assessment

Species	Alternative No. 1	Alternative No. 2	Habitat Suitability Description
Mammals			
Eastern Small-footed Myotis	✓	✓	Potential habitat in treed habitat present in both Study Areas
Little Brown Myotis	✓	✓	Potential habitat in treed habitat present in both Study Areas
Northern Myotis	✓	✓	Potential habitat in treed habitat present in both Study Areas
Tricoloured Bat	✓	✓	Potential habitat in treed habitat present in both Study Areas
Reptiles			
Butler's Gartersnake	✓	✓	Potential habitat in the Alternative No. 1 and Alternative No. 2 Study Area
Eastern Foxsnake (Carolinian)	✓	-	Potential habitat in the Alternative No. 1 Study Area

3.2.6 Fish Habitat

Within the Alternative No. 1 site boundary, McKee Creek was located in straight trapezoidal channel with high banks. At the time of the field investigation, standing water in the channel had a wetted width of 3.0 m and was 0.5 m deep. Fines of clay, silt and sand with detritus were the dominant substrates. Duckweed and filamentous algae were present in the standing water. Banks were stable with herbaceous, tree and shrub vegetation cover, and the predominant vegetation on the banks and in the channel was common reed (Phragmites). Vegetation clearing had recently occurred on the north bank. The channel was open within the site boundary however, to the west of the site, the channel was piped underground in a culvert for approximately 185 m. Fish were not observed during the habitat assessment; however, fish habitat is assumed to be present based on presence of water and the background fish community data.

4 Natural Heritage Constraints

This section provides a summary of natural heritage features that were identified in the Study Areas.

4.1 Alternative No. 1

- Candidate SWH based on habitat suitability but not confirmed through habitat use studies: Suitable habitat for 16 SOCC including three (3) birds, 12 plants and one (1) reptile.
- Candidate SWH based on habitat suitability but not confirmed through habitat use studies: Amphibian movement corridor between McKee Creek and surrounding natural areas.
- Terrestrial SAR species potentially present based on background data and habitat suitability: Suitable habitat for six (6) SAR.
- Fish habitat in McKee Creek and McKee Drain

4.2 Alternative No. 2

- Candidate SWH based on habitat suitability but not confirmed through habitat use studies: Suitable habitat for 16 SOCC including three (2) birds, six (6) insects, and eight (8) plants.
- Candidate SWH in the MAMM1-12/SWDM4 for one type of specialized habitat: Terrestrial Crayfish
- Terrestrial SAR species potentially present based on background data and habitat suitability: Suitable habitat for five (5) SAR.

Section 6.4 outlines proposed field surveys to assess the presence of SOCC, SWH and SAR. SOCC and SAR presence and SWH designations can be refined after those surveys are complete.

5 Mitigation Measures

5.1 Design

During site selection and design, the following measures should be considered to reduce the risk of impacts to natural heritage:

Fish and Fish Habitat

- Design the project to avoid the need for in-water work where fish habitat has been identified.
- If applicable, apply natural channel design principles to design channel relocation.
- Design drainage system to reduce changes in drainage to watercourses that provide fish habitat.
- Design and plan activities and works such that loss of fish habitat or disturbance to fish habitat is reduced to the extent possible.
- Design stormwater management measures to reduce effects on watercourses that provide fish habitat to the extent possible.
- Design a rehabilitation/re-vegetation plan for long-term stability of areas disturbed during construction.
- For rock reinforcement below the normal high-water level (if required), use appropriately sized material and install at a similar slope to the existing, maintain a uniform bank/shoreline and maintain a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile.

Wildlife and Terrestrial Habitat

- Limit infrastructure overlaps with woodland and wetland (if applicable) areas, to the extent possible.
- Plan to rehabilitate temporary disturbance areas with a native seed mix with a mix dependent of the existing vegetation community.

5.2 Construction

5.2.1 Standard Mitigation Measures

The following standard mitigation measures/best practices are provided to reduce potential impacts to natural heritage features during construction:

- Delineate the Project footprint with tree protection fencing prior to construction to reduce impacts to adjacent natural features.

- Wash, refuel and/or service equipment a minimum of 30 m from surface waters to reduce the risk of deleterious substances from entering surface waters. Check machinery regularly for fluid leaks.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment / spread of invasive species.
- To reduce the potential for spread of insect pests such as the Emerald Ash Borer, trees cut should be disposed of on site (either through spreading of wood chips or trees cut and sawed into logs).
- Develop a Spill Management Plan and have it on site for implementation in the event of an accidental spill. Keep an emergency spill kit on site.
- Stabilize and re-vegetate areas of disturbed/exposed soil, as soon as practicably possible with native seed mixes and woody vegetation.
- Maintain erosion and sediment control measures until the restoration measures have been assessed and determined to be secure and stable.

5.2.2 Erosion and Sediment Control

An erosion and sediment control (ESC) plan should be developed and employed during construction to reduce the risk of erosion and the entry of sediment into surface water and other natural features. Mitigation included in the plan should include the following measures:

- Implement project-specific temporary ESC measures per prior to starting work (e.g. silt fence and/or sediment logs).
- Keep additional ESC materials available on site to provide a contingency supply in the event of an emergency.
- Monitor and maintain erosion and sediment controls, as required. Controls are to be removed only after the soils of the construction area have stabilized and vegetation cover has re-established.
- Stabilize materials requiring stockpiling (fill, topsoil, etc.) and keep a safe distance (> 30 m) from watercourses.

5.2.3 Protection of Migratory Birds

The MBCA provides legal protection of migratory birds and their nests in Canada. Construction timing must consider restrictions imposed by the MBCA. To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of any vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on Environment Canada’s Nesting Calendars and the period for which due diligence mitigation measures are generally recommended).

The primary nesting period (PNP) identified for southern Ontario is April 1 - August 31, although nesting also infrequently occurs outside of this period (Environment Canada 2014). Vegetation removal during this core nesting period is not recommended; however, if required, a nest survey may be carried out by a qualified person in simple habitats such as an urban park, a vacant lot with few possible nest sites, a previously cleared area, or a structure (Government of Canada 2022). If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by an avian biologist. The radius of the buffer generally varies from 5 m - 60 m depending on the sensitivity of the nesting species. The Project will not resume within the nest buffer until the nest is confirmed to be no longer active.

5.2.4 Wildlife Protection

The following mitigation measures are recommended to avoid impacts to wildlife during Project construction:

- A visual search of the work area will be conducted before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles, and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.
- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.
- Any sediment and erosion control measures, such as fencing or blanket, utilized on the site during construction will avoid products with plastic mesh due to risk of entanglement of snakes or other wildlife.
- Eastern Foxsnake are considered arboreal (climbers) and as such, exclusionary fencing is recommended to be 200 cm in height above ground (MNRF 2016). Specifications for reptile exclusion fencing should follow Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (MNR 2013) and Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario (MNRF 2016). A terrestrial ecologist should be consulted during exclusionary fencing design.
- Any observations of species at risk or species of conservation concern should be reported to MECP and MNRF within 48 hours. Species at risk should not be handled, harassed, or moved in any way, unless they are in immediate danger.
- If wildlife handling and relocation (e.g., amphibians, reptiles) is anticipated during construction such as vegetation clearing or during in-water work, the Contractor must obtain a Wildlife Scientific Collectors Authorization from the MNRF prior to the commencement of work.

5.2.5 Protection of Fish and Fish Habitat

Implementation of the following measures will protect fish and fish habitat during construction if in-water work is required:

- Reduce the duration of in-water work to the extent possible.
- Conduct in-water work during periods of low flow to allow work in water to be isolated from flows.
- Schedule in-water work to occur during the applicable in-water work timing window. Based on the fish species known to occur in McKee Creek, in-water work can occur from July 16 to March 14 (no in-water work from March 15 to July 15) (MNR 2013b).
- If in-water work is required, develop, and implement a project-specific fish relocation plan to relocate fish from within an in-water work area. The Contractor must obtain a Licence to Collect Fish for Scientific Purposes from the MNRF prior to the commencement of in-water work.
- Screen water intake pipes to prevent entrainment or impingement of fish following the measures as outlined in DFO's Interim Code of Practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020b).
- Where applicable, manage and treat dewatering discharge to reduce the risk of erosion and/or release of sediment-laden or contaminated water to surface waters.

6 Permitting Considerations

6.1 Conservation Authorities

6.1.1 Conservation Authorities Act

Development within the ERCA Regulation Limit is subject to the policies outlined in Ontario Regulation 158/06 under the *Conservation Authorities Act*. Regulated areas are associated the wetlands, watercourse, and floodplains at Alternative No. 1. Prior to any new development in regulated areas, including the placement or removal of fill material, grading activities, and the erection of any buildings or structures, and/or the alteration of regulated features, written approval (i.e., a Permit or a Letter of Permission) will be required from ERCA. Consultation with ERCA is recommended to determine permitting requirements.

Alternative No. 2 is outside the ERCA Limit of Regulated Area.

6.2 Ministry of the Environment, Conservation and Parks

6.2.1 Endangered Species Act, 2007

The provincial *Endangered Species Act* (ESA) prohibits the killing, harming, harassing, capturing, or taking of a living member of a species listed as Threatened, Endangered or Extirpated by the Species at Risk in Ontario (SARO) list (O. Reg 230/08) (S.9), or the damage to habitat of similarly designated species (S.10). An exception is where a permit is issued under S.17(2) of the same Act or the Activity is registered under Ontario Regulation 242/08 or 830/21.

Based on preliminary assessment, impacts to SAR and/or SAR habitat may occur due to the Project. As such, targeted surveys to determine the presence/absence of SAR are recommended for both Study Areas (Section 6.4).

6.3 Fisheries and Oceans Canada

6.3.1 Fisheries Act

The *Fisheries Act* prohibits causing the death of fish and he harmful alteration, disruption, or destruction (HADD) of fish habitat, unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. This applies to work being conducted in waters that support fish and fish habitat. The fish and fish habitat protection provisions of the *Fisheries Act* apply to all fish and fish habitat in Canada.

Following guidance and criteria provided on DFO's website regarding mitigation, waterbody types and codes of practice, proponents determine whether their projects in or near water will require review by DFO. In cases where impacts to fish and fish habitat cannot be avoided, proponents submit a Request for Review form to DFO. DFO will review the project to identify the potential risks of the project to the conservation and protection of fish and fish habitat and will work with the proponent to provide advice and guidance on how to comply with the *Fisheries Act*. If the Project can avoid impacts to fish and fish habitat, project approval is not required. If impacts cannot be avoided, proponents must apply for a *Fisheries Act* Authorization, and may be required to develop a habitat offsetting or compensation plan.

Details of the proposed infrastructure location at Alternative No. 1 will be assessed to determine the need for review by DFO; however, if in-water work (i.e., work within the bankfull width of McKee Creek) is not proposed, DFO review under the *Fisheries Act* will not likely be required. If the need for in-water work is identified, design details and construction methods will need to be reviewed to determine if the Project should be reviewed by DFO under the *Fisheries Act* through the submission of a Request for Review form.

6.4 Survey Recommendations

The following studies are proposed to determine if SAR and SOCC are present in the Study Areas:

Alternative No. 1 and Alternative No. 2 Study Areas

- **Amphibians**: Breeding amphibian surveys – Three surveys, one in each April, May and June (Alternative No. 1 only)
- **Birds**: Breeding bird surveys – Two surveys during the breeding season, from May to July
- **Snakes**: Artificial cover object survey and visual encounter surveys – Ten surveys from April to July, as per the MNRF Survey Protocol for Ontario's Species at Risk Snakes (OMNRF 2016)
- **Bats**: Acoustic bat surveys utilizing automatic recording units (ARU) – Two-week ARU survey in June
- **Plants**: Botanical survey – One survey in July

7 Next Steps

The following steps are recommended as part of detailed design:

- Complete field surveys recommended in Section 6.4
- Consultation with MECP once design details and staging plans are available to confirm mitigation measures and determine authorization and mitigation requirements, if any, for provincially regulated species at risk. Consultation with MECP is recommended 1-2 years prior to construction.
- If in-water work is required in McKee Creek, prepare a Request for Review form, and submit to DFO for review under the *Fisheries Act.*

8 Closure

Stantec was retained by the City of Windsor to conduct a natural heritage assessment and constraints analysis in support of the Windsor Biosolids Schedule C Class EA.

Based on the site conditions and assessment of SWH, SOCC and SAR, negative impacts on the habitat features or species noted in this assessment may occur from Project construction. Targeted surveys to document presence/absence of SAR and SOCC for both Study Areas is recommended.

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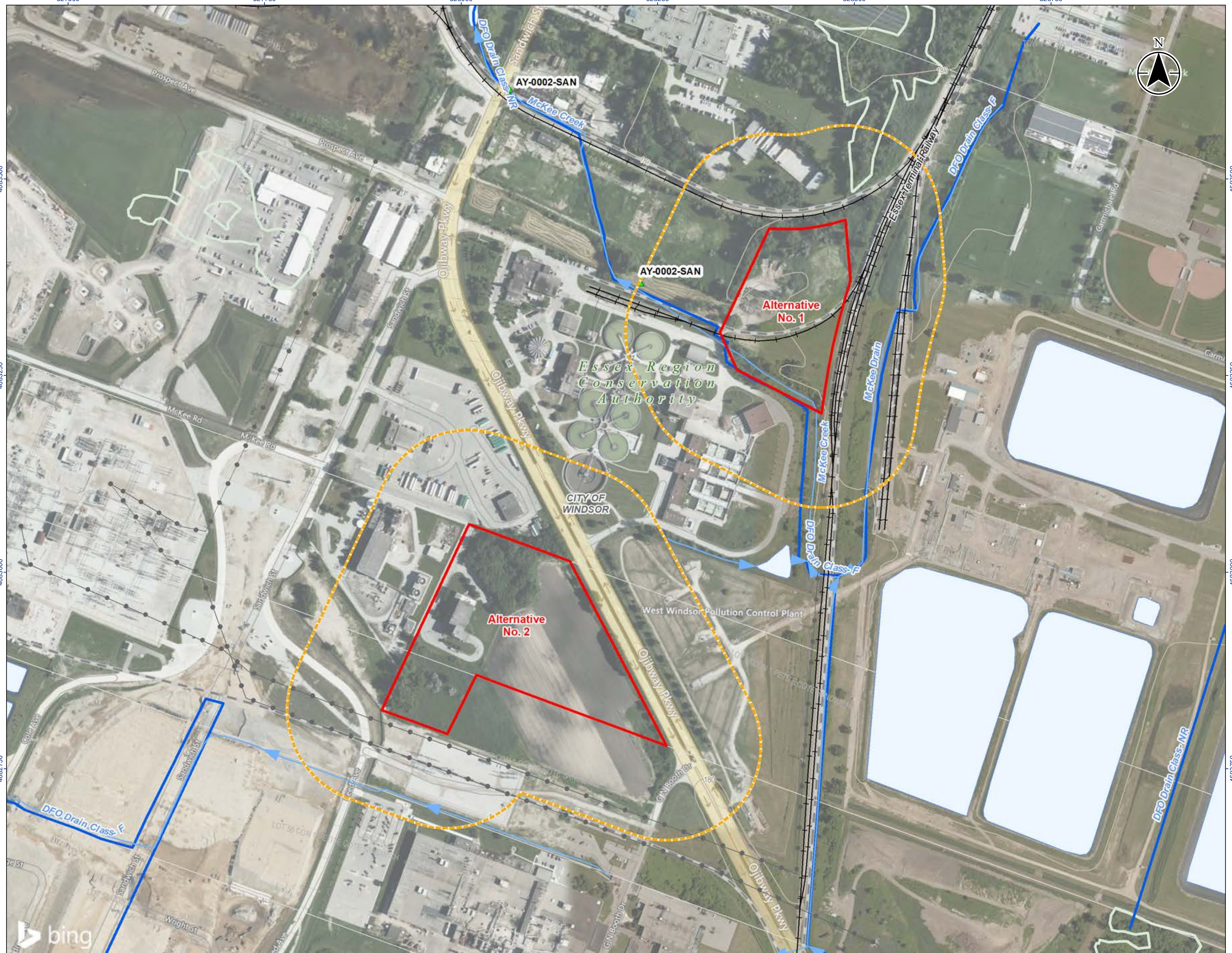
Appendices

Appendix A Figures



Stantec

Legend

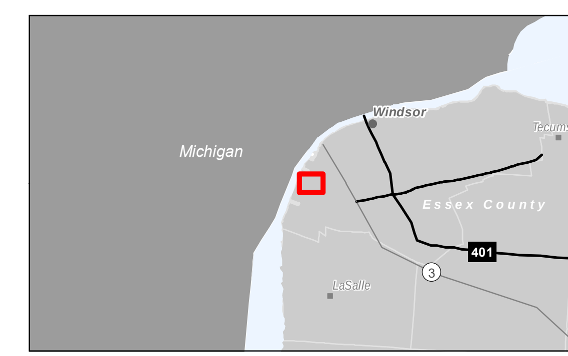
- Site Boundary
- Study Area (120 m)
- MNRF Fish Survey Point (ARA)
- Constructed Drain
- Railway
- Hydro Line
- Watercourse (Permanent)
- Direction of Flow
- Conservation Authority Administrative Boundary
- Waterbody
- Wooded Area
- Lot
- Municipal Boundary, Lower

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © 2023 Microsoft Corporation © 2023 Maxar ©CNES (2023) Distribution Airbus DS © 2023 TomTom



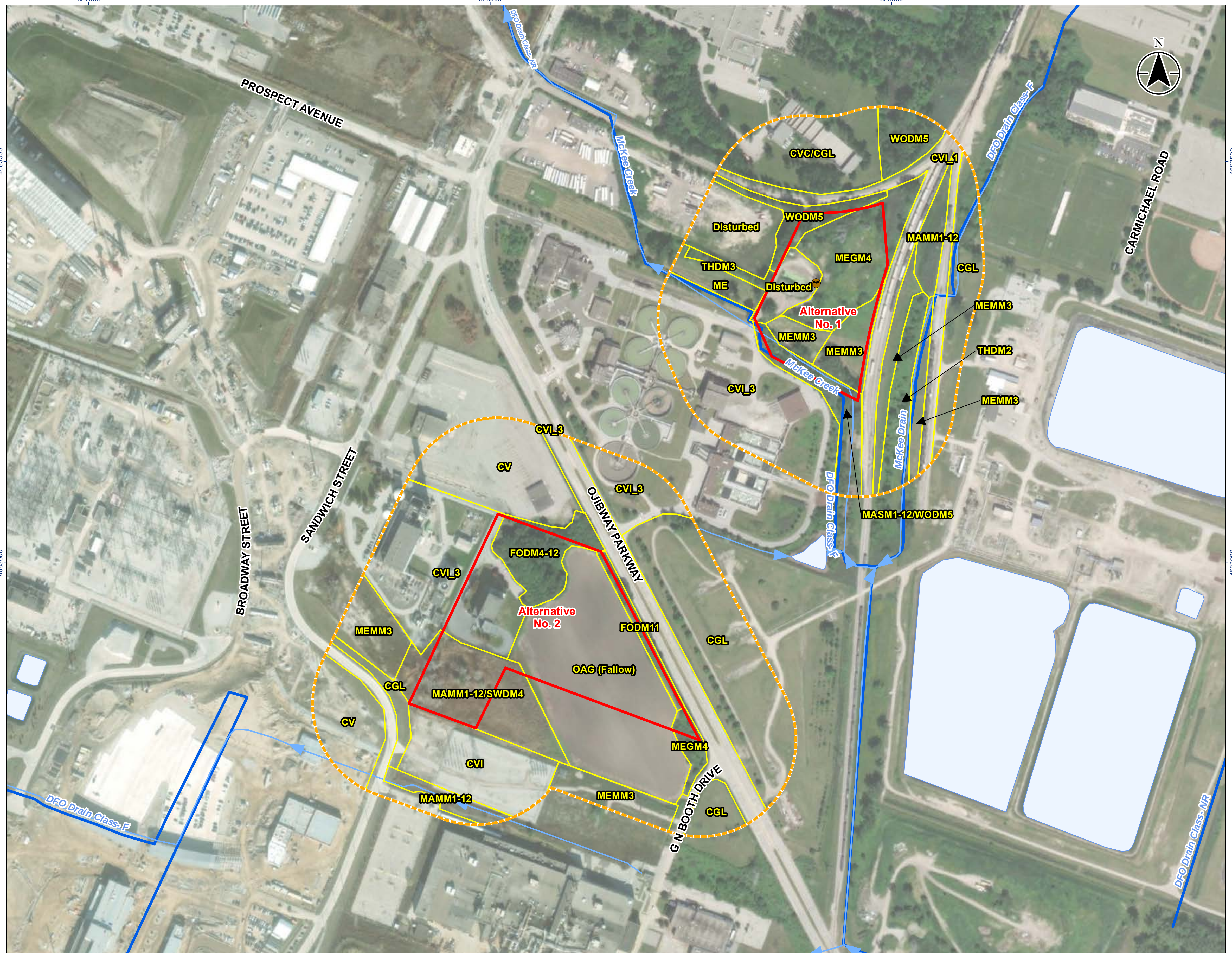
Project Location
City of Windsor

165620242 REV4
Prepared by BF on 2023-04-05
Technical Review by SE on 2023-02-14

Client/Project
CITY OF WINDSOR
WINDSOR BIOSOLIDS EA
NATURAL HERITAGE ASSESSMENT

Figure No.
1

Title
Background Data



Legend

- Site Boundary (Approx.)
- Study Area (120 m)
- ELC Communities
- Constructed Drain
- Watercourse (Permanent)
- Direction of Flow
- Waterbody
- Suitable Bat Maternity Roost Tree

ELC Description

- CGL - Green Lands
- CV - Constructed
- CVC - Commercial and Institutional
- CVC_2 - Light Industry
- CVI - Transportation and Utilities
- CVI_1 - Transportation
- CVI_3 - Sewage and Water Treatment
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- FODM4-12 - Dry - Fresh Exotic Deciduous Forest Type
- MAMM1-12/SWDM4 - Common Reed Graminoid Mineral Meadow Marsh Type/Mineral Deciduous Swamp Ecosite
- MAMM1-12 - Common Reed Graminoid Mineral Meadow Marsh Type
- MASM1-12/WODM5 - Common Reed Mineral Shallow Marsh Type/Fresh - Moist Deciduous Woodland Ecosite
- ME - Meadow
- MEGM4 - Fresh - Moist Graminoid Meadow Ecosite
- MEMM3 - Dry - Fresh Mixed Meadow Ecosite
- OAG - Open Agriculture
- THDM2 - Dry - Fresh Deciduous Shrub Thicket Ecosite
- THDM3 - Dry - Fresh Deciduous Hedgerow Thicket Ecosite
- WODM5 - Fresh - Moist Deciduous Woodland Ecosite

0 100 200 m

1:4,897 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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3. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Project Location
City of Windsor

165620242 REV4
Prepared by BF on 2023-04-11

Client/Project
CITY OF WINDSOR
WINDSOR BIOSOLIDS EA
NATURAL HERITAGE ASSESSMENT

Figure No.
2

Title
Field Results

V:\1656\Active\165620242\03_data\gis_cad\gis\mxds\ecosystems\report_figures\NH\165620242_NH_Fig02_FieldResults.mxd Revised: 2023-04-11 By: bfonseca

Appendix B Photographic Record

Photo 1: Meadow (MEMM3) – Alternative No. 1

Photo 2: Meadow and Phragmites on top of large soil pile (MEGM4) – Alternative No. 1

Photo 3: Side of large soil pile on the left dominated by Phragmites (MEGM4) – Alternative No. 1

Photo 4: Small woodland next to large soil pile dominated by Cottonwood (WODM5) – Alternative No. 1

Photo 5: Phragmites marsh (MASM1-12) along watercourse and sparse woodland next to watercourse (WODM5) – Alternative No. 1

Photo 6: Watercourse with dense Phragmities at south end of Alternative No. 1

Photo 7: Small exotic forest patch (FODM4-12) - Alternative No. 2

Photo 8: Small exotic forest patch (FODM4-12) - Alternative No. 2

Photo 9: Fallow Agricultural Field (Alternative No. 2)

Photo 10: FODM11 Hedgerow next to Ojibway Parkway (Alternative No. 2)

Photo 11: Phragmites Marsh (MAMM1-12) mixed with Cottonwood Small Cottonwood Swamp (SWDM4) – Alternative No. 2

Photo 12: Moist Sandy Meadow dominated by Phragmites (MEGM4) with occasional regen of white mulberry (Alternative No. 2)

Appendix C Significant Wildlife Habitat Assessment

Appendix C Significant Wildlife Habitat Assessment in the Windsor Biosolids EA Natural Heritage Assessment Study Areas

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Seasonal Concentration Areas			
Waterfowl Stopover and Staging Area (Terrestrial)	Fields with sheet water or utilized by tundra swans during spring (mid-March to May), or annual spring melt water flooding found in any of the following Community Types: Meadow (CUM1), Thicket (CUT1). Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless used by Tundra swans in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee Areas.	ELC assessment was used to assess features within the Study Area that may support waterfowl stopover and staging areas (terrestrial).	**No candidate habitat** for Waterfowl Stopover and Staging Areas (Terrestrial) occurred within either Study Area.
Waterfowl Stopover and Staging Area (Aquatic)	The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. The combined area of the ELC ecosites and a 100 m radius area is the SWH. Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify.	ELC assessment was used to assess features within the Study Area that may support waterfowl stopover and staging areas (aquatic).	**No candidate habitat** for Waterfowl Stopover and Staging Areas (Aquatic) occurred within either Study Area.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of amour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat.	ELC assessment was used to assess features within the Study Area that may support migratory shorebirds.	**No candidate habitat** for Shorebird Migratory Stopover Area occurred within either Study Area.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	The following community types: Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD).		
Raptor Wintering Area	At least one of the following Forest Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in combination with one of the following Upland Community Types: Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) that are >20 ha and provide roosting, foraging and resting habitats for wintering raptors. Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15 ha of the 20 ha minimum size.	ELC assessment was used to assess features within the Study Area that may support wintering raptors.	**No candidate habitat** for Raptor Wintering Area occurred within either Study Area.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts. May be found in these Community Types: Crevice (CCR), Cave (CCA).	ELC assessment was used to assess features within the Study Area that may support bat hibernacula.	**No candidate** habitat for Bat Hibernacula occurred within either Study Area.
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites. Either of the following Community Types: Deciduous Forest (FOD) or Mixed Forest (FOM), that have>10/ha wildlife trees >25 cm diameter at breast height (dbh). Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees. Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in	ELC assessment was used to assess features within the Study Area that may support bat maternity colonies.	**No candidate** habitat for Bat Maternity Colonies occurred within either Study Area.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.		
Turtle Wintering Areas	Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO). Northern Map turtle- open water areas such as deeper rivers or streams and lakes can also be used as over-wintering habitat. Water has to be deep enough not to freeze and have soft mud substrate. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	ELC assessment was used to assess features within the Study Area that may support areas of permanent standing water but not deep enough to freeze.	**No candidate** habitat for Turtle Wintering Areas occurred within either Study Area.
Snake Hibernacula	Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	ELC surveys and wildlife assessments were used to assess features within the Study Area that may support snake hibernacula.	**No candidate** habitat for Snake Hibernacula occurred within either Study Area.

Appendix C Significant Wildlife Habitat Assessment in the Windsor Biosolids EA Natural Heritage Assessment Study Areas

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (CUM), Thicket (CUT), Bluff (BL), Cliff (CL). Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.	ELC assessment was used to assess features within the Study Area that may support colonial bird breeding habitat.	**No candidate** habitat for Colonial -Nesting Bird Breeding Habitat (Bank and Cliff) within either Study Area.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	Identification of stick nests in any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Treed Fen (FET). The edge of the colony and a minimum 300 m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH. Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	ELC assessment was used to assess features within the Study Area that may support colonial bird breeding habitat (Trees/Shrubs).	**No candidate** habitat for Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs) within either Study Area.
Colonial-Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river. For Brewer's Blackbird close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (CUM), Thicket (CUT), Savannah (CUS).	ELC assessment was used to assess features within the Study Area that may support colonial bird breeding habitat (Ground).	**No candidate** habitat for Colonial-Nesting Bird Breeding Habitat (Ground) within either Study Area.

Appendix C Significant Wildlife Habitat Assessment in the Windsor Biosolids EA Natural Heritage Assessment Study Areas

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Migratory Butterfly Stopover Areas	Located within 5 km of Lake Ontario. A combination of ELC communities, one from each land class is required: Field (CUM, CUT, CUS) and Forest (FOC, FOM, FOD, CUP). Minimum of 10 ha in size with a combination of field and forest habitat present.	ELC assessment was used to assess features within the Study Area that may support migratory butterfly stopover areas.	The Study Area is not located within 5 km of the Lake Ontario shoreline. **No candidate** habitat for Migratory Butterfly Stopover Areas occurs within either Study Area.
Landbird Migratory Stopover Areas	The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD). Woodlots must be >10 ha in size and within 5 km of Lake Ontario or Lake Erie – woodlands within 2 km of Lake Ontario are more significant.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support landbird migratory stopover areas.	The Study Area is not located within 5 km of Lake Ontario or Lake Erie shoreline. **No candidate** habitat for migratory Landbird Migratory Stopover Areas is present within either Study Area.
Deer Winter Congregation Areas	Woodlots typically > 100 ha in size unless determined by the MNR as significant. (If large woodlots are rare in a planning area >50 ha.) All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD. Conifer plantations much smaller than 50 ha may also be used.	No studies required as the MNR determines this habitat.	**No candidate** habitat for Deer Winter Congregation Areas occurs within the Study Area.
Rare Vegetation Communities			
Cliffs and Talus Slopes	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris. Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT. Most cliff and talus slopes occur along the Niagara Escarpment.	ELC assessment was used to assess features within the Study Area that would be considered cliffs or talus slopes.	No cliffs or talus slopes were identified within the Study Area. **No candidate** wildlife habitat for Cliffs and Talus Slopes occurs within either Study Area.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Sand Barrens	Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. Vegetation can vary from patchy and barren to tree covered but less than 60%. Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite).	ELC assessment was used to assess features within the Study Area that would be considered to be sand barrens.	No sand barrens were identified within the Study Area. **No candidate** wildlife habitat for Sand Barrens occurs within either Study Area.
Alvars	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2 (Bedrock Cultural Woodland). An Alvar site > 0.5 ha in size.	ELC assessment was used to assess features within the Study Area that would be considered to be alvar communities.	No alvars were identified within the Study Area. **No candidate** wildlife habitat for Alvars occurs within either Study Area.

Stantec

Appendix C Significant Wildlife Habitat Assessment in the Windsor Biosolids EA Natural Heritage Assessment Study Areas

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Old-growth Forest	Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest). Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.	ELC assessment was used to assess features within the Study Area that would be considered to be old-growth forest communities.	No old growth forests were identified within the Study Areas. **No candidate** wildlife habitat for Old-growth Forest occurs within either Study Area.
Savannahs	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite).	ELC assessment was used to assess features within the Study Area that would be considered to be savannah communities.	Savannah were not identified within the Study Areas. **No candidate** wildlife habitat for Savannahs occurs within either Study Area.
Tall-grass Prairies	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in	ELC assessment was used to assess features within the Study Area that would be considered to be tall-grass communities.	Tall grass prairies were not identified within the Study Areas. **No candidate** wildlife habitat for Tall-grass Prairies occurs within either Study Area.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite).		
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG.	ELC assessment was used to assess features within the Study Area that would be considered to be other rare vegetation communities.	No rare vegetation communities were identified within the Study Areas. **No candidate** wildlife habitat for Rare Vegetation Communities occurs within the Study Areas.
Specialized Habitat for Wildlife			
Waterfowl Nesting Area	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4. Note: includes adjacency to Provincially Significant Wetlands.	ELC assessment was used to assess features within the Study Area that may support nesting waterfowl. Habitats adjacent to wetlands without standing water were not considered candidate SWH.	**No candidate** wildlife habitat for Waterfowl Nesting Area occurs within the Study Areas.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms). ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds, and wetlands.	ELC surveys and Woodland Assessments were used to assess features within the Study Area that may support nesting, foraging, and perching habitat for large raptors.	**No candidate** wildlife habitat for Bald Eagle and Osprey nesting, Foraging, and Perching Habitat occurs within the Study Areas.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands combined >30 ha and with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed	ELC surveys, Woodland Assessments and GIS analysis were used to assess features within the Study Area that may support nesting habitat for woodland raptors.	There is no woodland/forest stands combined >30 ha or >4 ha interior habitat within the Study Areas. **No candidate** wildlife habitat for Woodland Raptor Nesting Habitat occurs within the Study Areas.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.		
Turtle Nesting Areas	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1 Best nesting habitat for turtles is close to water, away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support turtle nesting areas.	**No candidate** wildlife habitat for Turtle Nesting Areas occurs within the Study Areas.
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system	The presence of seeps and springs was recorded during the field investigations.	**No candidate** wildlife habitat for Seeps and Springs occurs within the Study Areas.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Amphibian Breeding Habitat (Woodland)	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	ELC assessment was used to assess features within the Study Area that may support woodland breeding amphibians.	**No candidate** wildlife habitat for Amphibian Breeding Habitat (Woodland) occurs within the Study Areas.
Amphibian Breeding Habitat (Wetland)	ELC Community Classes SW, MA, FE, BO, OA and SA. Wetland areas >120 m from woodland habitats. Wetlands and pools (including vernal pools) >500 m^2 (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation.	ELC assessment was used to identify wetland habitat features within the Study Area including those that may support bullfrogs (i.e., natural open aquatic and marsh habitats greater than 1 ha in size).	**No candidate** wildlife habitat for Amphibian Breeding Habitat (Wetland) occurs within the Study Areas.
Habitat for Species of Conservation Concern (*Not including Endangered or Threatened Species*)			
Marsh Bird Breeding Habitat	All wetland habitats with shallow water and emergent aquatic vegetation. May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (CUM) Community Types.	ELC assessment was used to identify marshes with shallow water and emergent vegetation that may support marsh breeding birds.	**No candidate** wildlife habitat for Marsh Bird Breeding Habitat occurs within the Study Areas.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Woodland Area-sensitive Bird Breeding Habitat	Habitats >30ha where interior forest is present (at least 200 m from the forest edge); typically >60 years old. These include any of the following Community Types: Forest (FO), Treed Swamp (SW)	ELC surveys and GIS analysis were used to determine whether woodlots that occurred within the Study Area that were >30 ha with interior habitat present (>200 m from edge).	No woodlots exceeded 30 ha in size within the Study Area. **No candidate** wildlife habitat for Woodland Area-sensitive Bird Breeding Habitat occurs within the Study Areas.
Open Country Bird Breeding Habitat	Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (CUM).	ELC surveys and GIS analysis were used to identify grassland communities within the Study Area that may support area-sensitive breeding birds.	No non-agricultural grassland communities >30 ha were identified within the Study Area. **No candidate** wildlife habitat for Open Country Bird Breeding Habitat occurs within the Study Areas.
Shrub/Early Successional Bird Breeding Habitat	Oldfield areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (CUT), Savannahs (CUS), or Woodlands (CUW).	ELC surveys and GIS analysis were used to identify large CUT, CUS or CUW communities that may support shrub/early successional breeding birds.	Suitable communities were not identified within the Study Area. **No candidate** wildlife habitat for Shrub/Early Successional Bird Breeding Habitat occurs within the Study Areas.
Terrestrial Crayfish	Meadow marshes and edges of shallow marshes (no minimum size). Vegetation communities include MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3. Construct burrows in marshes, mudflats, meadows Can be found far from water	ELC assessment was used to identify shallow marsh and meadow marsh communities that occurred within the Study Area.	MAMM1-12/SWDM4 is present in the Alternative No. 2 Site, which may be suitable for terrestrial crayfish. Crayfish chimneys were not observed during the field survey. **Candidate habitat** for Terrestrial Crayfish chimneys in Alternative No. 2 Study Area.
Special Concern and Rare Wildlife Species (i.e. all special concern and S1-S3 species)			
Birds			
Barn Swallow (*Hirundo rustica*)	Live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. Attracted to open structures that include ledges where they can build their nests (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Infrastructure in both Study Areas may provide suitable habitat.

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Appendix C Significant Wildlife Habitat Assessment in the Windsor Biosolids EA Natural Heritage Assessment Study Areas

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Common Nighthawk (*Chordeiles minor*)	Habituates in open areas, with little ground vegetation, such as logged or burnt forest clearings. Rock barrens, peat bogs, lakeshores etc. Species nests in cultivated fields, orchards, mine tailings, and along gravel roads/railways (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Open areas nearby vegetation in both Study Areas may provide suitable habitat.
Eastern Wood-Pewee (*Contopus virens*)	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Potential suitable forest habitat (WODM5) in Alternative No. 1 Site and Study Area.
Peregrine Falcon (*Falco peregrinus*)	Usually nest on tall, steep cliff ledges close to large bodies of water. Birds have adapted well to city life but are usually associated with rugged wilderness (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present in either Study Area
Wood Thrush (*Hylocichla mustelina*)	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present in either Study Area
Fish			
Silver Lamprey (Great Lakes - Upper St. Lawrence populations)	Silver lampreys require clear water so they can find fish hosts, relatively clean stream beds of sand and organic debris for larvae to live in, and unrestricted migration routes for spawning. Their use of different kinds of habitat throughout their lives (rivers for spawning and early development, and lakes for adults) makes them vulnerable to changes in their environment (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present in either Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Insects			
American Bumble Bee (*Bombus pensylvanicus*)	The American Bumble Bee is a habitat generalist, and foraging workers, queens, and nests are most often found in or adjacent to open fields and meadows, grasslands, and other undisturbed open habitats. The species is a generalist pollen forager and requires a constant supply of flowering plants throughout the growing season to support colony growth and development (COSEWIC 2018).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Azure Bluet (*Enallagma aspersum*)	In southern Ontario, the Azure Bluet has become adapted to man-made ponds and is typically found in shallow, often temporary and fishless, pools and ponds that entirely freeze in the winter (Catling and Brownell, 2000).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Cicada Killer (*Sphecius speciosus*)	Forest edges, gardens, waste places; nests in the ground (Borror & White 1998).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat may be present at either Study Area.
Cobra Clubtail (*Gomphus vastus*)	The Cobra Clubtail can be found at large rivers with average to fast currents, and lake shores where there are alternating stretches of sand and gravel, and sometimes large streams. Brushes or thickets seem to be appreciated along the habitats listed previously (WATRI 2021b).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Common Sanddragon (*Progomphus obscurus)*	It can be found by streams, creeks and small rivers, flying over and around the water in search of insect prey. It rests on rocks, boulders, logs or branches (Insect Identification 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Double-striped Bluet (*Enallagma basidens*)	The Double-striped Bluetis found around ponds, especially artificial ponds including pit and quarry sites, but also along rivers (Catling and Brownell, 2000).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Elusive Clubtail (*Stylurus notatus*)	The Elusive Clubtail often likes large rivers and large lakes with sandy bottoms, sometimes also with silt and gravel (WATRI 2021d).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Hackberry Emperor (*Asterocampa celtis*)	The Hackberry Emperor is considered common at Long Point and Point Pelee where it's food source, hackberry, is abundant (Layberry, 1998). Adults can be found flying in open woodlands and roadsides where hackberry is present (Holmes et al., 1991).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area. Hackberry trees were not present in either Study Araea.
Monarch (*Danaus plexippus*)	Meadows where milkweed grows, variety of wildflowers for nectar collection (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Swamp Darner (*Epiaeschna heros*)	Swamp Darners can be found near forest pools, ponds and ditches (Catling and Brownell, 2000)	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Tawny Emperor (*Asterocampa clyton*)	A woodland species that only occurs in southwestern Ontario and regularly at Point Pelee and Pelee Island never straying far from the larval foodplant; hackberry (Layberry, 1998).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area. Hackberry trees were not present in either Study Araea.
Yellow-banded Bumble Bee (*Bombus terricola*)	This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. The Yellow-banded Bumble Bee has a large range throughout much of Canada and parts of the United States. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. Nest sites are often underground in abandoned rodent burrows or decomposing logs (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Molluscs			
Globose Dome (*Ventridens ligera*)	A small snail that lives in moist leaf litter within deciduous woodlands. Commonly found under logs, loose bark or coarse woody debris and leaf litter on forest floor (Illinois Department of Natural Resources 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Mapleleaf Mussel (*Quadrula quadrula*)	The Mapleleaf is usually found in medium to large rivers with slow to moderate currents and firmly packed sand, gravel, or clay and mud bottoms. It also lives in lakes and reservoirs. Mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish, called a host, where they consume nutrients from the fish body until they transform into juvenile mussels and then drop off. In Canada, the fish host of the Mapleleaf is the Channel catfish. Presence of the fish host is one of the key features determining whether the body of water can support a healthy mussel population (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present in either Study Area
Plants			
Arrowfeather Threeawn Grass (*Aristida purpurascens*)	Dry (rarely moist) usually sandy soil, prairies, sand barrens (Reznicek et al, 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.
Biennial Gaura (*Oenothera gaura*)	River banks, roadsides, fields, vacant lots (Reznicek, et.al. 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas.
Black Gum *(Nyssa sylvatica)*	Low wet areas across Southern Ontario. Occasionally planted as a specimen tree north and east of its range as it is adaptable to drier site (Government of Ontario, 2022).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat is not present at either Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Blood Milkwort (*Polygala sanguinea*)	Dry to moist, often sandy fields, excavations, and borders of marshes (Reznicek et al. 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Bushy Aster (*Symphyotrichum dumosum*)	Sandy to mucky or marly shores of lakes and ponds, interdunal hollows; sedge meadows, wet prairies, fens; conifer thickets, sandy banks and clearings, sometimes associated with oaks and jack pines (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Bushy Seedbox (*Ludwigia alternifolia*)	Marshy ground, borders of swamps, wet thickets, shores, clearings; usually in sandy, acidic soils (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Buttonbush Dodder (*Cuscuta cephalanthi*)	Parasitic on various host species (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Crowned Beggarticks (*Bidens trichosperma*)	Moist to wet ground on shores (sandy or mucky), mudflats, mucky bottomland, depressions in forests, sedge meadows, fens and bogs, cedar swamps, streamsides, ponds, ditches, marshes and sunny peatlands (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Culver's Root (*Veronicastrum virginicum*)	Prairie remnants, fens, and meadows; river banks; deciduous savannas (especially with oaks) (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Early-branching Panicgrass (*Dichanthelium praecocius*)	Dry open, usually sandy ground; prairies, open oak savannas, borders and fields (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Eastern Stiff-leaved Goldenrod (*Solidago rigida*)	Dry, open ground, particularly in prairie remnants in southwestern Ontario (Argus et al. 1982-1987). Occasionally along roadsides and railways and sometimes planted in prairie restorations.	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 Study Area in meadow areas. No suitable habitat in Alternative No. 2 Study Area

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Eastern Yellow Stargrass (*Hypoxis hirsuta*)	Prairies, meadows, dry open sandy woods, and alvar woodland, primarily in the Carolinian Zone, though east to Hastings County (NHIC, 2021).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Field Thistle (*Cirsium discolor*)	Meadows, fields, clearings, hillsides, river banks, sparsely forested sites; roadsides, vacant lots, pine plantations; doubtless originally in prairie openings (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Gentian-leaved St. John's-wort (*Hypericum gentianoides*)	Moist to dry open ground, usually on bare soil; sandy clearings (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Giant Ironweed (*Vernonia gigantea*)	Occurs in wet woods, thickets, and meadows, and tends to be weedy in pastures (Reznicek et al., 2011; Gleason and Cronquist, 1991).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas in meadows.
Gray-headed Prairie Coneflower (*Ratibida pinnata*)	Occurs in or near prairie remnants (including roadsides and fencerows), at margins of swamps, and in dry open ground. (Reznicek et al 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 Study Area in meadow areas. No suitable habitat in Alternative No. 2 Study Area
Great Plains Ladies'-tresses (*Spiranthes magnicamporum*)	Fens and prairies (Sheviak and Brown, 2002). Variable, but often associated with calcareous soils: dry or wet prairie, interdunal soils, riverbanks and floodplains (Natureserve, 2020).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Green Cornet Milkweed (*Asclepias viridiflora*)	Dunes and other dry sandy sites including prairies, borders of oak forests, dry fields, road cuts and railroads (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Greene’s Rush (*Juncus greenei*)	Moist to dry sandy open ground: shores, swales, fields, clearings, dunes, and interdunal depressions (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Hairy Pinweed (*Lechea mucronata*)	Found in dry or sandy soil in open forests and fields (Gleason and Cronquist, 1991).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Leggett's Pinweed (*Lechea pulchella*)	Dry to moist sandy plains, ridges, shores, and open forests (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Many-fruited Seedbox (*Ludwigia polycarpa*)	Marshy and swampy ground; ditches and sandy excavations; wet places railroads (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Mead's Sedge (*Carex meadii*)	Mead's sedge grows in open woods and cedar clearings, moist depressions, fens and in calcareous prairies (Ball and Reznicek, 2002).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas
Missouri Ironweed (*Vernonia missurica*)	River bottom (rarely upland) forests; wet prairies, fens, sedge meadows; moist or dry open ground, river banks, fencerows, fields, roadsides (Reznicek, et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Ohio Spiderwort (*Tradescantia ohiensis*)	Ohio spiderwort occurs in dry sites along roadsides and railroads, in open oak forests, forest edges, sandy ridges. Diploid species can also occur in meadows and wet ground in addition to dry places (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas
Pignut Hickory (*Carya glabra*)	Well-drained sandy soils, rolling hills and slopes, dry rocky soils, or thin soils on edge of granite outcrops (Stone, 1997).	ELC assessment was used to assess features within the Study Area that may support this species.	No hickory trees observed within the two Study Areas. No suitable habitat within the two Study Areas.
Prairie Milkweed (*Asclepias sullivantii*)	Moist prairies and relics of such habitat along roadsides and railroads (Reznicek et al, 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 Study Area in meadow areas. No suitable habitat in Alternative No. 2 Study Area
Purple Milkweed (*Asclepias purpurascens*)	Dry savanna (especially oak) and thickets; shores, prairies (Reznicek et al, 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Riddell's Goldenrod (*Solidago riddellii*)	Riddell's Goldenrod prefers open tallgrass prairie habitat with moist to wet calcium-rich soils. In Ontario, it also occurs in roadside ditches and along railway right-of-ways (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 Study Area in meadow areas. No suitable habitat in Alternative No. 2 Study Area

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Rigid Sedge (*Carex tetanica*)	Low marshy or boggy ground, meadows, shores, wet prairies and damp woodlands; often in marly places. Very local northward (Voss, 1972). Also found in seepages, fens and wet prairie habitats (Argus, et.al., 1082-1987).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas
Round-fruited Panicgrass (*Dichanthelium sphaerocarpon*)	Dry open sandy ground, fields, and sandy forests (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Saltmarsh Sand-spurrey (*Spergularia marina*)	Salty roadsides and other disturbed areas that receive salt in winter (Reznicek et al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Short-fruited Rush (*Juncus brachycarpus*)	Very local in moist, sandy meadows and swales (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Stiff Cowbane (*Oxypolis rigidior*)	Moist woods, especially with tamarack (and poison sumac); marshes, fens, and wet (rarely dry) prairies; swampy streamside thickets and shores (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Slender Paspalum (*Paspalum setaceum*)	Grows in sandy open ground, fields and oak woodlands, some populations have been located along weedy roadsides and may be introduced (Voss, 1972, Argus, et.al., 1982-1987).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Sundial Lupine (*Lupinus perennis*)	The sundial Lupine's habitat is found in dry, open forests and clearings (Gleason and Cronquist, 1991).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Tall Green Milkweed (*Asclepias hirtella*)	Green Milkweed occurs in dry to moist, open, sandy soils including meadows, prairie remnants and forest edges (Reznicek et al, 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Tall Nutrush (*Scleria triglomerata*)	Dry or moist open or shaded sandy ground such as prairies or open borders of marshes; very local (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Tall Tickseed (*Coreopsis tripteris*)	Dry to wet prairies, meadows, marshes; oak forests, especially borders and clearings; fields, roadsides, railroads (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 and No. 2 Study Areas
Two-flowered Dwarf-dandelion (*Krigia biflora*)	Savannas, especially oak or jack pine, sometimes spruce, often in moist ground and on banks and borders; fens, wet meadows (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Two-flowered Rush (*Juncus biflorus*)	Wet open often sandy ground, ditches, swales, wet prairies (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Upright Carrionflower (*Smilax ecirrata*)	Rich deciduous forests, moist forests and thickets along river banks and floodplains, oak and oak-hickory forests (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
White Blue-eyed Grass (*Sisyrinchium albidum*)	Dry often sandy open fields, prairies, railroad embankments, oak-hickory forests; grassy, sometimes moist banks, shores, and pastures, even somewhat marshy ground (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Winged Loosestrife (*Lythrum alatum*)	Shores and wet meadows, wet prairies, marshy ground, moist sandy openings (Reznicek et.al., 2011).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.
Yellow Wild Indigo (*Baptisia tinctoria*)	Grows in open, dry habitats; including prairies, savannahs, open woods and thickets; flowering in summer and occasionally fall (Newcomb, 1997, Argus, et.al., 1982-1987).	ELC assessment was used to assess features within the Study Area that may support this species.	No suitable habitat within the two Study Areas.

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Reptiles			
Eastern Musk Turtle (*Sternotherus odoratus*)	Eastern Musk Turtles are found in ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight. Nesting females dig shallow excavations in soil, decaying vegetation and rotting wood or lay eggs in muskrat lodges, on the open ground or in rock crevices (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat not present in either Study Area
Northern Map Turtle (*Graptemys geographica*)	Inhabits rivers and lakeshore basking on emergent rocks and fallen trees through spring and summer. Hibernate on the bottom of deep, slow moving sections of river. Require high-quality water that supports mollusc prey (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat not present in either Study Area
Snapping Turtle (*Chelydra serpentina*)	Generally, inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits (SARO 2023).	ELC assessment was used to assess features within the Study Area that may support this species.	Suitable habitat in Alternative No. 1 Site (McKee Creek) No suitable habitat in Alternative No. 2 Study Area
Animal Movement Corridors			
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat - Wetland is confirmed. Movement corridors should be considered when amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat (Wetland).	Candidate amphibian breeding habitat occurs within the Alternative No. 1 Study Area and potential for amphibian movement corridors. **Candidate** amphibian movement corridor in Alternative No. 1 Study Area.

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Appendix D Species at Risk Habitat Assessment

Appendix D: Species at Risk Habitat Suitability Assessment for the Windsor Biosolids EA

Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat for the Species in the Study Area (Y/N)
Birds							
Acadian Flycatcher	*Empidonax virescens*	END	END	S1B	NHIC	Its preferred breeding habitat generally consists of large mature forests and deeply wooded ravines (Friesen and Stabb, 2001). A minimum of thirty hectares of suitable habitat are required. Acadian Flycatchers generally prefer large tracts of undisturbed forest and in Ontario, the species often breeds in black ash swamps (Whitehead and Taylor, 2002). Due to its area sensitive nature, suitable habitat is limited in Ontario as forest cover within its breeding range is low and occurs as small, isolated patches. Other limiting factors include logging practices, invasive species, and encroachment on habitat by agriculture, residential development and utility corridors (COSEWIC, 2010c).	**N - Suitable habitat not present in either Study Area**
Bank Swallow	*Riparia riparia*	THR	THR	S4B	eBird, NHIC	The Bank Swallow excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits. Single nests may occur, although colonies are typical and range from two to several thousand. Adjacent grasslands and watercourses are used for foraging habitat (Cadman et al., 2007).	**N - Suitable habitat not present in either Study Area**
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	eBird	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010a).	**N - Suitable habitat not present in either Study Area**
Chimney Swift	*Chaetura pelagica*	THR	THR	S3B	eBird	Chimney Swift use chimneys for roosting and breeding, as well as walls, rafters, or gables of buildings and, less frequently, natural structures such as hollow trees, tree cavities and cracks in cliffs (Cadman et al., 2007).	**N - Suitable habitat not present in either Study Area**
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	eBird, NHIC	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011b). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011b).	**N - Suitable habitat not present in either Study Area**
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	eBird	Whip-poor-will favour open woodlands with frequent clearings. Its preferred nesting sites contain shaded leaf litter or pine needles and generally occur along wooded edges or in clearings without any herbaceous growth (Cadman et al. 2007).	**N - Suitable habitat not present in either Study Area**
Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	THR	S3	eBird	Lives near open woodland and woodland edges, often found in parks, golf courses, and cemeteries. Typically many dead snags, which are used for nesting and perching (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Yellow-breasted Chat	*Icteria virens*	END	END	S1B	NHIC	The Yellow-breasted Chat prefers scrubby, early successional habitat; dense tangles of grape vine and raspberry are features of most breeding sites. Yellow-breasted Chats have been recorded in shrub thickets, woodland edges, hedgerows, regenerating abandoned fields and young coniferous plantations, and in hydro and rail rights-of-way (Cadman et al. 2007).	**N - Suitable habitat not present in either Study Area**
Fish							
Channel Darter	Percina copelandi	THR	NA	S3	NHIC	The Channel Darter inhabits river and lake habitats. Channel Darter live in small to large rivers with moderate current and clean coarse (sand, gravel) substrates. In Lakes, the species lives in nearshore habitat with coarse substrates and moderate wave action (COSEWIC 2016).	**N - Suitable habitat not present in either Study Area**
Eastern Sand Darter	Ammocrypta pellucida	END	THR	S2	NHIC	Prefers shallow habitats in lakes, streams and rivers with clean, sandy bottoms. Often buries itself in sand. Feeds on aquatic insects, but due to small mouth prey is limited to its size (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	Acipenser fulvescens pop. 3	THR	THR	S2	NHIC	In Canada, Lake Sturgeon occur in rivers around southern Hudson Bay, in the Great Lakes, and in inland lakes and rivers from Alberta to Quebec (COSEWIC 2017a). The species inhabits a variety of aquatic ecosystem types from stepped-gradient Boreal Shield rivers, low-gradient meandering Prairie rivers, low gradient Hudson Lowland rivers and the Great Lakes and associated tributaries (COSEWIC 2017a). The limiting factor for the species is that it requires fast moving water for spawning (the base of waterfalls or a dam). A Lake Sturgeon population is known to be present in the Detroit River (COSEWIC 2017a).	**N - Suitable habitat not present in either Study Area**

Appendix D: Species at Risk Habitat Suitability Assessment for the Windsor Biosolids EA

Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat for the Species in the Study Area (Y/N)
Mammals							
Eastern Small-footed Myotis	*Myotis leibii*	END	NA	S2S3	Dobbyn	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees.These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year (SARO 2023).	**Y - Suitable habitat present in Alternative No. 1 and Alternative No. 2 Study Areas**
Little Brown Myotis	*Myotis lucifugus*	END	END	S3	Dobbyn	Trees, buildings and bridges for roosting; trees for nesting; caves and mines for hibernation (COSEWIC 2013).	**Y - Suitable habitat present in Alternative No. 1 and Alternative No. 2 Study Areas**
Northern Myotis	*Myotis septentrionalis*	END	END	S3	Dobbyn	Northern Myotis are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines (SARO 2023).	**Y - Suitable habitat present in Alternative No. 1 and Alternative No. 2 Study Areas**
Tricoloured Bat	*Perimyotis subflavus*	END	END	S3?	Dobbyn	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. At the end of the summer they travel to a location where they swarm; it is generally near the cave or underground location where they will overwinter. They overwinter in caves where they typically roost by themselves rather than part of a group (SARO 2023).	**Y - Suitable habitat present in Alternative No. 1 and Alternative No. 2 Study Areas**
Mussels							
Eastern Pondmussel	Ligumia nasuta	END	SC	S1	NHIC	In Canada, the species is only found in the delta area of Lake St. Clair (in the transition zone between wetlands and open water), in a small tributary of the upper St. Lawrence River, Lyn Creek, coastal wetlands of Lakes Erie and Ontario and several Eastern Ontario inland lakes (COSEWIC 2017b). The preferred habitat of the Eastern Pondmussel is sheltered areas of lakes or slow streams in substrates of fine sand and mud at depths up to 4.5 m (COSEWIC 2017b).	**N - Suitable habitat not present in either Study Area**
Fawnsfoot	Truncilla donaciformis	END	END	S1	NHIC	The Fawnsfoot inhabits medium and large rivers with moderate to slow flowing water. It usually inhabits shallow waters (one to five metres deep) with gravel, sand or muddy bottoms (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Hickorynut	Obovaria olivaria	END	END	S1?	NHIC	Hickorynuts live on the sandy beds in large, wide, deep rivers – usually more than two or three meters deep – with a moderate to strong current. Mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish, called a host, where they consume nutrients from the fish body until they transform into juvenile mussels and then drop off. In Canada, the fish host of the Hickorynut is the Lake Sturgeon. Presence of the fish host is one of the key features determining whether a body of water can support a healthy Hickorynut population (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Kidneyshell	Ptychobranchus fasciolaris	END	END	S1	NHIC	The Kidneyshell is most often found in small to medium-sized rivers and streams, where it prefers shallow areas with clear, swift-flowing water and substrates of firmly packed coarse gravel and sand (COSEWIC 2003b). It is rarely found in either large rivers or headwater creeks, but was historically found in low abundance on gravel shoals in Lake Erie, Lake St. Clair, Detroit and Niagara Rivers (COSEWIC 2003b). It is often found near beds of Water Willow, an aquatic plant. It is usually found deeply buried in the substrate (COSEWIC 2003b).	**N - Suitable habitat not present in either Study Area**
Northern Riffleshell	Epioblasma rangiana	END	END	S1	NHIC	The Northern Riffleshell is a mussel that lives mainly in highly oxygenated riffle areas of various sized watercourses (COSEWIC 2010). The northern riffleshell prefers to live in areas where substrates range from rocky, sandy bottoms, to firmly packed sand and fine to coarse gravel (COSEWIC 2010).	**N - Suitable habitat not present in either Study Area**
Purple Wartyback	Cyclonaias tuberculata	NA	THR	S2	NHIC	Purple Wartyback can be found in small to large rivers in moderate to swift current with various types of substrate including: areas of cobble, gravel, mixed gravel and sand, and mud (COSEWIC 2021).	**N - Suitable habitat not present in either Study Area**

Appendix D: Species at Risk Habitat Suitability Assessment for the Windsor Biosolids EA

Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat for the Species in the Study Area (Y/N)
Round Hickorynut	Obovaria subrotunda	END	END	S1	NHIC	In Ontario, the Round hickorynut is mainly found in rivers with clay, sand, or gravel bottoms. It also lives in shallow areas of lakes with firm sand. It prefers moderately fast-moving water. Like all mussels, this species filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The fish hosts of the Round hickorynut in Canada have not been confirmed but may include the Greenside darter and the Eastern sand darter, which is also a species at risk. The presence of fish hosts is one of the key features for an area to support a healthy mussel population (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Round Pigtoe	Pleurobema sintoxia	END	END	S1	NHIC	The Round pigtoe is usually found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. Known fish hosts of the Round Pigtoe include: Bluegill, Spotfin shiner, Bluntnose minnow, and Northern redbelly dace. The presence of fish hosts is one of the key features for an area to support a healthy mussel population (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Snuffbox	Epioblasma triquetra	END	END	S1	NHIC	The Snuffbox is typically found in small to medium-sized rivers in shallow riffle areas. They prefer clean, clear, swift-flowing water and firm rocky, gravel or sand river bottoms. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the main fish host for Snuffbox is the Logperch but other host fish may include various darter species, Largemouth Bass, Mottled Sculpin and Brook Stickleback. Like all freshwater mussels, the Snuffbox feeds on algae and bacteria that it filters out of the water (SARO 2023).	**N - Suitable habitat not present in either Study Area**
Plants							
American Chestnut	Castanea dentata	END	END	S1S2	NHIC	Grows in rich mixed and deciduous forests, frequently with oak; most populations have been decimated by chestnut blight (Nixon 1997). Typical habitat is upland deciduous forest on acid to neutral, sandy soil; In Ontario, it is limited to the Carolinian Zone, where the growing season is long, temperature extremes are moderated by the lower Great Lakes and moisture is well supplied (COSEWIC, 2004a).	**N - Suitable habitat not present in either Study Area**
Dense Blazing-star	Liatris spicata	THR	THR	S2	NHIC	Dense blazing star is typically a species of fresh to moist tall grass prairie habitats. Moisture regime may range from dry-mesic to very moist, and may be found in openings in oak savannahs, dune woodlands, interdune meadows, and along linear corridors such as roadside ditches, railways and hydro corridors (COSEWIC, 2010a).	**N - Suitable habitat not present in either Study Area**
Eastern Prairie Fringed-Orchid	Platanthera leucophaea	END	END	S2	NHIC	The Eastern Prairie Fringed-orchid grows in wetlands, fens, swamps and tallgrass prairie. It has been found in ditches and railroad rights of way. In Ontario, there are about 20 small populations in prairie habitat or fens in Simcoe, Essex and Lambton counties, and the municipality of Chatham-Kent (MECP 2014).	**N - Suitable habitat not present in either Study Area**
Pink Milkwort	Polygala incarnata	END	END	S1	NHIC	Populations of Pink Milkwort are known from the Walpole Island First Nation (WIFN) and Ojibway Prairie Provincial Nature Reserve in Windsor (COSWEIC 2009a). It is generally found in open sand prairies with moderate to imperfect drainage (COSEWIC 2009a).	**N - Suitable habitat not present in either Study Area**
Red Mulberry	Morus rubra	END	END	S2	NHIC	Red Mulberry occurs in moist forests habitats including river valleys, floodplains, swales, sandspits, and slopes of the Niagara Escarpment (COSEWIC 2014).	**N - Suitable habitat not present in either Study Area**
White Colicroot	Aletris farinosa	END	END	S2	NHIC	Intolerant of shade, this species is found in small colonies or large populations in southwestern Ontario. Habitats include open moist prairie, old fields, roadsides, and edges of wooded areas with sandy soil that has a coarse texture. Colicroot flowers from Late June to late July, reproducing both from seeds and from buds that form on the underground rhizomes (Species at Risk Public Registry 2021).	**N - Suitable habitat not present in either Study Area**
Willow-leaved Aster	Symphyotrichum praealtum	THR	THR	S2	NHIC	Over its North American range this aster is found in thickets, meadows and prairies, as well as in oak savannahs as found in the Windsor area and on Walpole Island. In Ontario it is also reported as found along railways, roadsides and old abandoned fields. Although now found in a variety of open disturbed sites, its typical prairie habitats have been historically reduced and impacted through human disturbance (COSEWIC 2003a).	**N - Suitable habitat not present in either Study Area**

Appendix D: Species at Risk Habitat Suitability Assessment for the Windsor Biosolids EA

Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat for the Species in the Study Area (Y/N)
Reptiles							
Blandings Turtle	*Emydoidea blandingi*	THR	THR	S3	Amphib Atlas	Blanding's Turtles frequent lakes, ponds, and marshes, and prefer shallow water with abundant aquatic vegetation and a soft bottom (MacCulloch, 2002). They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults usually occupy open or partially vegetated sites, whereas juveniles occupy areas with thick aquatic vegetation including sphagnum, water lilies and algae. Nesting occurs in dry conifer or mixed hardwood forests, up to 410 m from any body of water, in loose substrates including sand, organic soil, gravel and cobblestone, nesting may also occur along gravel roadways (COSEWIC 2005).	**N - Suitable habitat not present in either Study Area**
Butler's Gartersnake	*Thamnophis butleri*	END	END	S2	Amphib Atlas, NHIC	This species is typically found in open areas such as grasslands, old fields, tall-grass prairie habitats, urban, industrial, and disturbed sites, typically in proximity to wet areas such as seasonal marshes, swales, and small waterbodies (ECCC 2018). Butler's Gartersnakes hibernate from mid-September until early April, typically near wetland or open water within crayfish or small mammal burrows, drains, log piles, and other underground sites (ECCC 2018).	**Y - Suitable habitat in the Alternative No. 1 and Alternative No. 2 Study Areas**
Eastern Foxsnake (Carolinian)	*Pantherophis gloydi*	END	END	S2	Amphib Atlas, NHIC	Eastern Foxsnakes of the Carolinian population primarily use un-forested areas, such as old fields, prairies, marshes and dune shorelines. Farm field hedgerows and riparian zones along drainage canals are also used regularly, particularly in areas of intensive agriculture. Brush piles, table rocks, tree stumps, root systems of downed trees, driftwood are also often used for Shelter and basking sites (COSEWIC, 2008).	**Y - Suitable habitat in the Alternative No. 1 Site** **N - Suitable habitat not present in Alternative No. 2 Study Area**
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	S3	Amphib Atlas	The Eastern hog-nosed snake requires a number of factors including well-drained loose or sandy soil; open vegetative cover such as open woods; brushland or forest edge; relatively close proximity to water; and climatic conditions typical of the eastern deciduous forest, they are also a wide ranging species, often with home ranges up to 100ha (COSEWIC, 2007c). Eastern Hognose requires habitat that contains an abundance of toads as prey for adults as well an adequate supply of small amphibians such as salamanders or spring peepers, to sustain hatchlings and juveniles (Schueler 1996). It occurs in two separate areas, the Carolinian zone and in south-central Ontario, mostly on the southern part of the Canadian Shield (COSEWIC, 2007c).	**N - Suitable habitat not present in either Study Area**
Five-lined Skink	*Eumeces fasciatus*	END	END	S2	NHIC	The Carolinian population of five-lined skink is reportedly found in four or five small distinct populations in the Carolinian region, namely those of Point Pelee National Park, Rondeau Provincial Park, Pinery Provincial Park, Oxley Poison Sumac Swamp, and, possibly, Walpole Island (COSEWIC, 2007b). Carolinian populations inhabit the forests around Lakes Erie, St. Clair, and Huron. They primarily inhabit clearings such as stabilized sand dunes, open forest areas, and wetlands where they find shelter, most often under plant debris, such as decomposing tree trunks; they may also use artificial structures including construction materials and wooden boardwalks (COSEWIC, 2007).	**N - Suitable habitat not present in either Study Area**
Spiny Softshell	*Apalone spinifera spinifera*	END	END	S2	NHIC	Spiny Softshell Sub-populations in Ontario occur in the east, associated with the Ottawa and St. Lawrence River, and south, associated with Lake Erie, especially the Sydenham and Thames Rivers (COSEWIC 2002). Spiny softshells require sandy beaches and riverbanks for nesting, shallow soft-bottomed water bodies to function as nurseries and refugia, basking areas and deep pools for thermoregulation, and riffle areas for foraging, habitat features may occur over a large area, as long as the intervening habitat doesn't prevent the turtles from travelling between them (COSEWIC 2002).	**N - Suitable habitat not present in either Study Area**
Spotted Turtle	*Clemmys guttata*	END	END	S2	NHIC	Spotted Turtles inhabit unpolluted habitats of slow-moving, shallow waters of ponds, bogs, fens, marshes, vernal pools and sedge meadows. Vegetation structures such as sphagnum moss, sedge tussocks, cattails, water lilies and hydrophilic shrubs, as well as soft-bottom substrates, are important components of aquatic habitats. Hibernation and Breeding grounds of the Spotted Turtle are often communal and they exhibit high fidelity to these sites. Some populations of spotted turtles will bury themselves under ground and enter a state of dormancy to avoid the heat and aridity of summer. This generally occurs in a terrestrial site and lasts from July to September, when hibernation begins (COSEWIC, 2004b).	**N - Suitable habitat not present in either Study Area**
Snails							
Proud Globelet	Patera pennsylvanica	END	END	S2	NHIC	Found in wooded hillsides or in ravines. Has been located in Ontario in sandy oak forest and nearby former light industrial areas (SARO 2023).	**N - Suitable habitat not present in either Study Area**

APPENDIX C

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes - Checklist

Clear Form Print Form

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
    - is a recognized heritage property
    - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
    - the main project area
    - temporary storage
    - staging and working areas
    - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name
Biosolids Management Strategy, Class Environmental Assessment - Schedule 'C'

Project or Property Location (upper and lower or single tier municipality)
Field Next to Windsor Biosolids Processing Facility, 4365 Sandwich St., Windsor, ON N9C 4C8

Proponent Name
Corporation of the City of Windsor

Proponent Contact Information
Ed Valdez (evaldez@citywindsor.ca)

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☑
c. is in a Canadian Heritage River watershed?	☐	☑
d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
b. has a special association with a community, person or historical event?	☐	☑
c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
    - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

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ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

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iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

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iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act*. **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.