DILLON CONSULTING

Invenergy

Environmental Review Report

Proposed Upgrade of the St. Clair Energy Centre

July 2023 - 22-5016

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Acronyms, Abbreviations, Definitions

AA	Archaeological Assessment
AAQC	Ambient Air Quality Criteria
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AGP	Advanced Gas Path
ANSI	Area of Natural and Scientific Interest
AQIA	Air Quality Impact Assessment
BOP	Balance of Plant
CEAA	Canadian Environmental Assessment Act
CDPQ	Caisse de Dépôt et Placement du Québec
CHS	Cultural Heritage Screening
CSA	Contractual Services Agreement
DLN	Dry Low NOx
EA	Environmental Assessment
EAA	Ontario Environmental Assessment Act
EAAB	Environmental Assessment and Approvals Branch
ECA	Environmental Compliance Approval
EMP	Environmental Management Plan
ERR	Environmental Review Report
ERS	Environmental Review Stage
ESA	Environmentally Significant Areas
ESP	Environmental Screening Process
ESR	Environmental Screening Report
GE	General Electric
GSU	Generator Step-up

HRSGs	Heat Recovery Steam Generators
IESO	Independent Electricity System Operator
LFA	Lambton Federation of Agriculture
MMBTU	Metric Million British Thermal Unit
MCM	Ministry of Citizenship and Multiculturalism
MECP	Ministry of the Environment, Conservation and Parks
MMAH	Ministry of Municipal Affairs and Housing
MVA	megavolt amperes
MW	Megawatts
OEM	Original Equipment Manufacturer
O.Reg. 116/01	Ontario Regulation 116/01
PPS	Provincial Policy Statement
PTTW	Permit to Take Water
RFP	Request for Proposal
RO	Reverse Osmosis System
SAR	Species at Risk
SCP	Stakeholder Consultation Program
SLEP	Sarnia Lambton Economic Partnership
TMCH	TMHC Inc.
VIS	Virtual Information Session

Definitions

Dillon	Dillon Consulting Limited
Facility	St. Clair Energy Centre
Ontario Regulation 116/01	Electricity Projects Regulation
Project	The St. Clair Energy Centre Upgrade
Guide	Guide to Environmental Assessment Requirements for Electricity projects

Executive Summary

This report presents the Environmental Screening Process for the proposed Upgrade of the St. Clair Energy Centre (Facility), located in St. Clair Township, Ontario, Canada.

This report constitutes the full Environmental Screening Process as required under the Electricity Projects Regulation (*Ontario Regulation 116/01*) under the provincial *Environmental Assessment Act*. According to *O.Reg. 116/01*, the proposed Project at the Facility is considered a Category B, which is subject to an Environmental Screening Process in accordance with the Ministry of Environment, Conservation and Parks (MECP) "Guide to Environmental Assessment Requirements for Electricity projects" dated as updated in 2011 (the *Guide*) (MECP, 2011).

The Proponent has chosen to elevate the assessment to an Environmental Review Report (ERR) that allows for detailed studies and consultation to address outstanding concerns and provide a comprehensive assessment of the Project. Dillon Consulting Limited (Dillon) was retained by Invenergy to complete an ERR for the proposed Upgrade of the existing Facility.

The Facility is a 584-megawatt combined-cycle natural gas turbine generation facility, which began operations in 2009. Invenergy, the proponent of the Facility, is proposing modernization upgrades of the Facility (Project). The upgrades would add an additional 70 megawatts (MW) of electricity generation capacity and assist the province of Ontario's emerging electricity system needs.

The proposed upgrade to the Facility involves Advanced Gas Path (AGP) and Dry Low NOx (DLN) 2.6+ combustor upgrade, referred to as the Upgrade(s), for the Facility's two existing General Electric (GE) 7FA gas turbine generators and associated equipment. These Upgrades will allow for an increase in the firing temperature of the gas turbine generators, thereby enhancing the base load generation capability. Additionally, the increased exhaust energy will enable greater steam generation in the Heat Recovery Steam Generators (HRSGs), resulting in increased output from the two steam turbine generators. The Upgrades are expected to have minimal negative effects on air quality and noise, as extensive studies have shown that the emissions will meet regulatory standards and have negligible impacts.

Due to the nature of the Upgrades, air quality and potential incidental spill during construction and operation are the only negative effects anticipated from this Project. Comprehensive air and noise analyses was conducted to ensure that the emissions meet the MECP standard, and the results of these studied concluded that the overages identified (BaP and Benzene) are negligible.

A comprehensive stakeholder consultation program was conducted, engaging adjacent landowners, the general public, agencies, Indigenous Communities, and other interested parties. Various communication channels were utilized, including email notifications, mailings, advertisements, meetings, a virtual open house, and Indigenous Community consultations.

The outcome of the Environmental Screening Process determined that there are no significant impacts to the cultural, natural, or socio-economic environment as a result of the Project, including, construction related activities or operation of the Facility. Actions to ensure no significant impacts occur from the implementation of the Project have been identified within this report.

1.0 Introduction and Background

1.1 Background

Following a decade of strong supply, Ontario is entering a period of emerging electricity system needs driven by increasing demand, the retirement of the Pickering Nuclear Generating Station, the refurbishment of other existing nuclear generating units, as well as expiring contracts for existing facilities. Recognizing the necessity to address these needs in a timely, cost-effective, and flexible manner, the Independent Electricity System Operator (IESO) has engaged with stakeholders in the development of a Resource Adequacy Framework.

To address these needs, the IESO is seeking to competitively secure 4,000 MW of capacity through a series of complementary expedited procurement processes, which includes the Same Technology Upgrades Solicitation (IESO, 2022a). The 2022 Annual Acquisition Report and the Resource Eligibility Interim Report describe these mechanisms and needs in more detail (IESO, 2022b).

It is expected that upgrades and efficiency improvements to the existing contracted facilities, contemplated as part of the Same Technology Upgrades Solicitation, will provide for the timeliest and most cost-effective capacity increases to the electricity system (IESO, 2022a). The streamlined process aims to incent additional output from existing dispatchable resources that can deliver a continuous amount of electricity for at least eight consecutive hours and is expected to be in service between 2025 and May 1, 2026.

In the fall of 2022, existing suppliers, such as the St. Clair Energy Centre, were invited to make submissions to the IESO to increase the capacity of their facility by means of a permitted upgrade. An eligible permitted upgrade is generally defined by the IESO as the following:

- An incremental increase to the generation capacity of the facility including both the existing contract capacity and any existing uncontracted capacity;
- Uses substantially the same technology and fuel type as the existing facility that does not involve the installation of new generating equipment except where such new generating equipment is a replacement or upgrade of existing generating equipment;

- Is at the same connection point(s) as the existing facility;
- Will be dispatchable with load-following capability for a minimum of eight hours; and,
- Is expected to have an in-service date between 2025 and May 1, 2026.

1.2 The Proponent

Invenergy is the world's largest privately held developer, owner, and operator of sustainable energy solutions. Headquartered in Chicago, with Canadian offices in Toronto and Montreal, Invenergy is proud to have significant Canadian investment through our long-standing partnership with Quebec's pension fund, Caisse de Dépôt et Placement du Québec (CDPQ). Since 2005, Invenergy has commissioned over 1 gigawatt of power projects in Ontario and Quebec. These projects include wind, solar, and natural gas facilities and have generated significant financial investments in the local communities where they are located.

Globally, Invenergy invests C$348 million annually in the home communities where its projects are located via the creation of high-quality jobs, lease payments, and local taxes. The company has successfully developed more than 200 projects worldwide, totaling over 30,000 MW, including wind, solar, transmission infrastructure, natural gas power generation, and advanced energy storage projects.

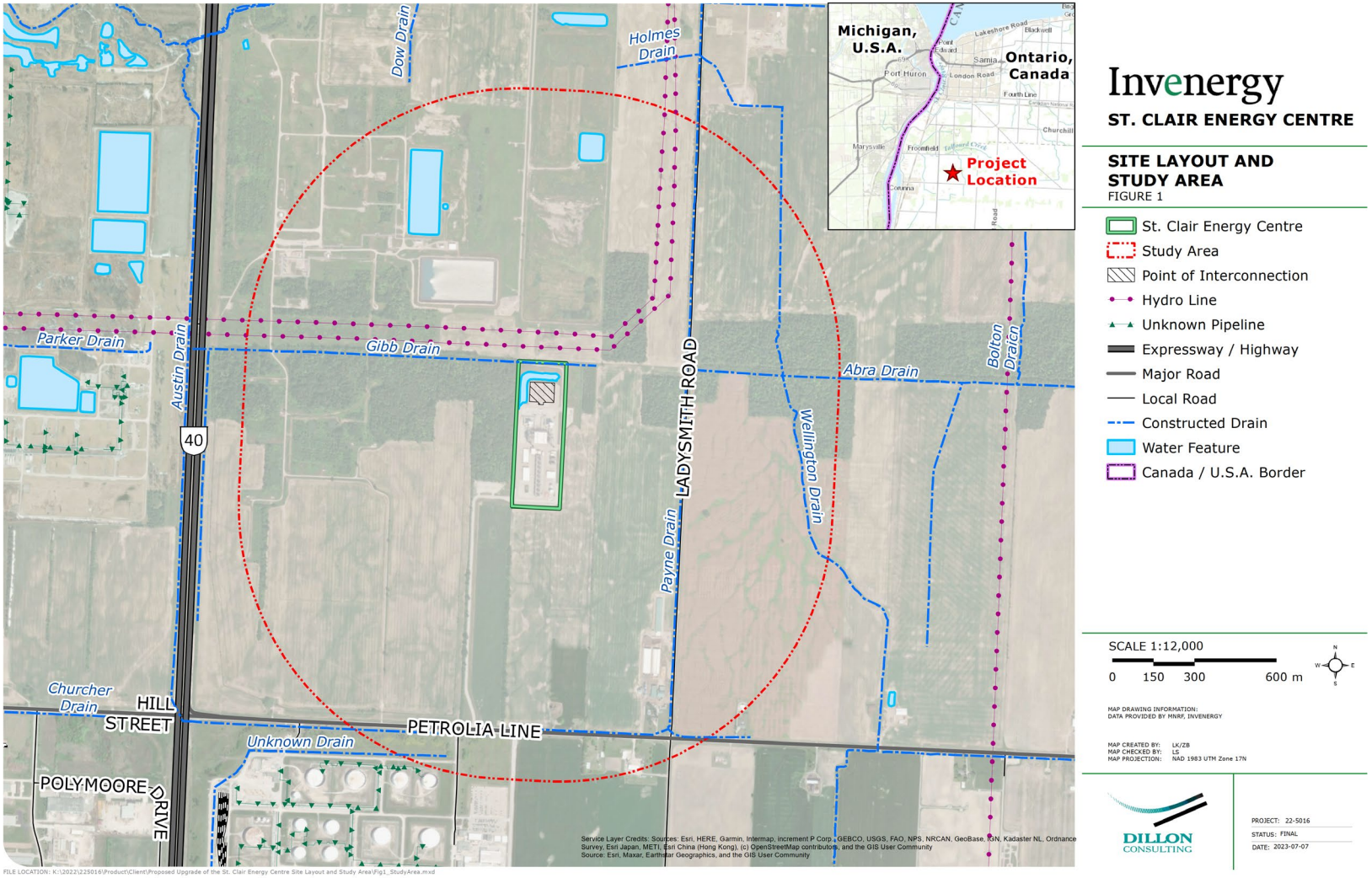
1.3 Project Overview

1.3.1 Existing Facility

The St. Clair Energy Centre is an existing 584-megawatt combined-cycle natural gas turbine generation facility. The Facility is located in St. Clair Township, in the province of Ontario, Canada and began operations in 2009. The Facility is located at 790 Petrolia Line, Corunna.

Figure 1 shows the Study Area and property boundary.

Figure 1: Site Layout and Natural Environment Impact Area



Power generated from the Facility is transported to the provincial electrical transmission network through an onsite transformer station, where it is eventually delivered and utilized by consumers.

1.3.2 Proposed Upgrade Overview

Invenergy is proposing modernization Upgrades of the Facility. The Upgrades would add an additional 70-80 MW of electricity generation capacity and assist the province of Ontario's emerging electricity system needs.

The proposed Upgrade to the existing St. Clair Energy Centre will involve the installation of upgraded equipment associated with the gas turbine generators and associated equipment. The upgraded equipment will enable the firing temperature of the two gas turbine generators to be increased, thereby increasing the base load generation capability. Additionally, increased exhaust energy will enable additional steam generation capability and thus increase output in the two steam turbine generators. Planned equipment improvements will result in an incremental addition to the contract capacity of approximately 70 MW.

Dillon Consulting Limited was retained by Invenergy to complete an Environmental Assessment (EA) of the Upgrade Project. The main deliverable of the EA is an Environmental Review Report (ERR).

The initial scope of the project included an upgrade followed by an 'Expansion' to the existing facility. The proposed Expansion was for the purpose of an additional generating capacity of 100-120 MW. However, due to the changes to the Project timeline the decision was made to proceed with the Upgrade only and address the Expansion through a standalone ERR if and when necessary.

1.4 Need for the Project

The St. Clair Energy Centre Upgrade is being developed in response to the Minister of Energy's Directive. The Directive instructed the IESO to invite submissions through the Same Technology Upgrades Solicitation to increase the capacity of existing electricity facilities. Specifically, the Directive requested the IESO to target an increase in capacity from dispatchable resources that can provide a continuous amount of electricity for at least eight consecutive hours and can be in service by 2026.

1.5 Environmental Assessment Requirements

1.5.1 Electricity Projects

Electricity projects in Ontario are classified based on the type of fuel used, the size of the Facility, and the efficiency of the Facility. There are three categories:

- **Category A:** These projects, such as small-scale wind, solar, natural gas, and cogeneration, are expected to have minimal environmental effects. They do not require approval under the Ontario *Environmental Assessment Act*.
- **Category B**: These projects, including larger-scale wind turbines, natural gas, biogas, and cogeneration, have potential environmental effects that can be mitigated. They require completion of the Environmental Screening Process (ESP).
- **Category C**: These are major projects with known environmental impacts, such as coal, large-scale hydroelectric facilities, and oil. These projects require an individual EA.

A determination has been made that the St Clair Energy Centre Upgrade will be classified as a Category B project.

1.5.2 Environmental Screening Process (ESP)

All Category B projects are subject to the ESP. All projects subject to the ESP are required to go through the screening stage to identify the potential environmental effects of project activities as required by the MECP. This Process aims to determine the impacts on various local and regional conditions. The St Clair Energy Centre Upgrade is subject to Electricity Regulation (*O.Reg. 116/01*). This regulation includes the *Guide to Environmental Assessment Requirements for Electricity Projects* pursuant to the Ontario

Environmental Assessment Act (EAA). As part of the assessment analysis, the proponent is required to consider the potential effects on:

- Air Quality and Noise;
- Surface and Groundwater (Water Resources);
- Land uses (within 250-500 m, or 1,640 ft. of the site);
- Human and Ecological Health;
- Vegetation;
- Wildlife and Birds;
- Soils;
- Social and Economic Conditions;
- Natural and Cultural Heritage; and,
- Visual/Architecture.

If no significant environmental or public issues are raised, the proponent must prepare a Notice of Completion of Environmental Screening Report (ESR) and post it for a 30-day comment period. If no significant environmental or public issues are raised during this period and no 'elevation requests' are received, the proponent submits a Statement of Completion to the Director of EA and Approvals Branch (EAAB) of the MECP. Following this, the proponent may proceed with construction, subject to any other required approvals.

The Environmental Screening and Review Process, as outlined in the *Guide*, is summarized in **Figure 2**.

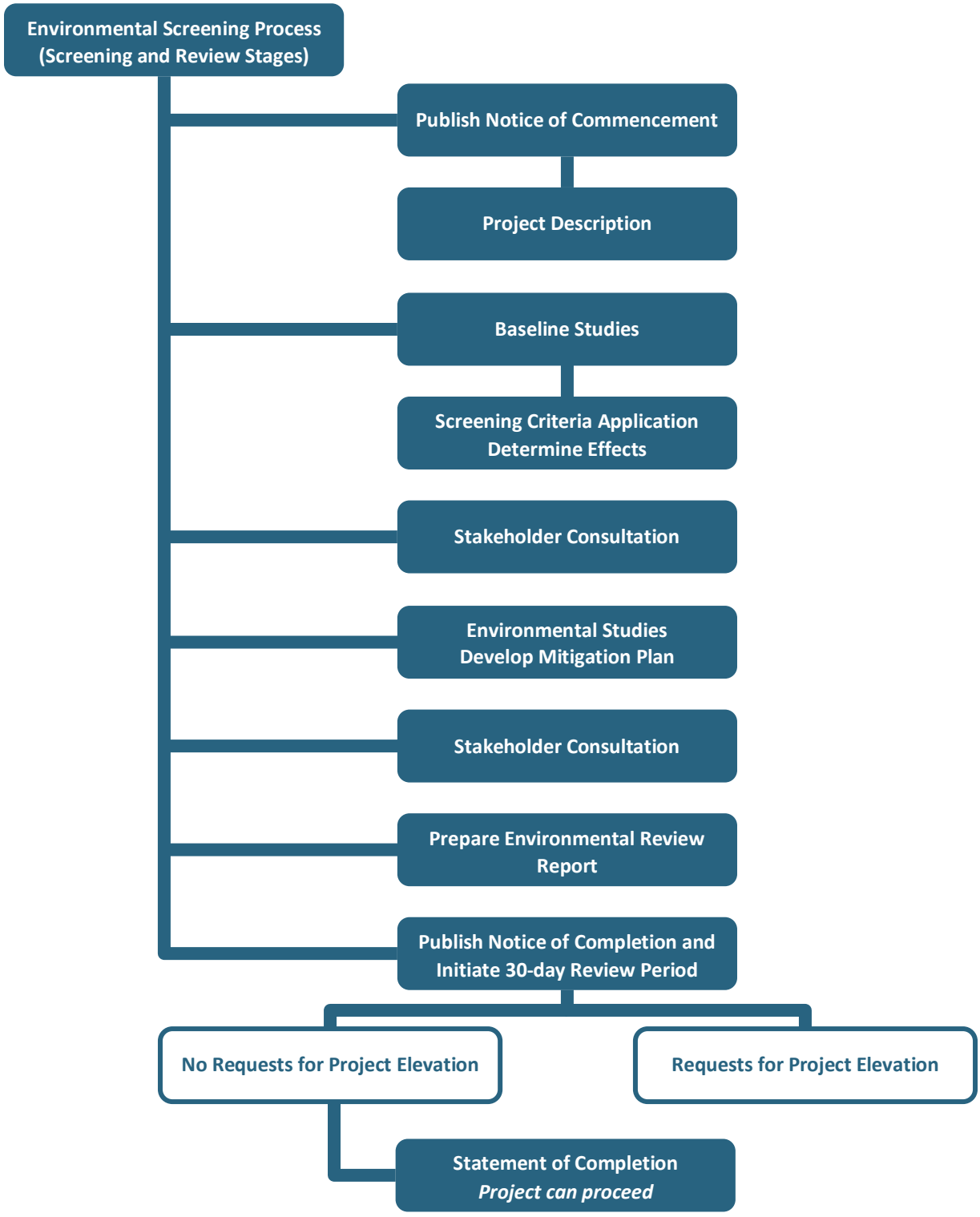


Figure 2: The Screening and Review Stages of the Environmental Screening Process

1.5.3 Environmental Review Stage (ERS)

A project may proceed to the Environmental Review Stage (ERS) if one or more of the following conditions are met:

1. There are potentially significant negative environmental effects or public issues raised;
2. Substantive public or agency concerns are received during the 30-day review of the Screening Report; or,
3. The Director of the EAAB receives substantive elevation requests from the public or government agencies during the 30-day period.

If any of these conditions are met, additional studies may be required, and these will be determined in consultation with the public and relevant agencies. The ERS report, which includes the results of the review and consultation, as well as any impact management commitments, must be prepared and made available for public review for a period of 30 days.

1.5.4 Elevation Requests

The *Guide* has a provision for a party to request that the EA status of a project be "elevated" to a higher level. These elevation requests must be submitted to the proponent during the 30-day review period after the issuance of the Notice of Completion.

There are two possible elevations:

1. Screening to Environmental Review or Individual EA: A Screening can be elevated to either an Environmental Review or an Individual EA, depending on the circumstances and the significance of the project's potential environmental effects; and,
2. Environmental Review to Individual EA: An Environmental Review can only be elevated to an Individual EA.

If the proponent declines to voluntarily elevate the project during the 30-day period, the party making the request may submit it to the Director of the EAAB. The Director then has 30 days to plan a response to the request and has several different options to consider. These options range from denying the request to referring the matter for mediation or recommending that the project be elevated to a higher level of assessment.

1.6 Environmental Assessment for the Project

A key environmental approval for this Project is meeting the requirements of the EAA. The Project was completed in accordance with the MECP Environmental Review as set out in the Electricity Projects Regulation *O.Reg 116/01*.

1.6.1 Proponent Self-Elevation

The *Guide* suggests that the completion of an ESR is sufficient for this Project. However, the Proponent has chosen to self-elevate the EA to an ERR for a more comprehensive assessment of the Project and to facilitate a more in-depth review of the potential environmental effects and engagement with stakeholders, Indigenous Communities and other interested parties.

The following provides the rationale for the self-elevated ERR identified by the Proponent:

- An ESR for the Facility was completed in 2006 and should proceed based on the same precedent;
- The proposed addition to the Facility is between 70-80 MW, representing a change of 5 MW or more of output capacity as determined in the Guide;
- The completion of an ERR provides stakeholders, agencies, and Indigenous Communities with a more comprehensive assessment regarding the planned Project, its potential effects and mitigation being proposed; and,
- Provide an opportunity to address anticipated sensitivities regarding the use of natural gas for electricity generation and its important role as baseload capacity to enable additional renewable generation.

1.6.2 Environmental Review

The ERR reviews and summarizes details of the potential environmental impacts of the Facility Upgrade, as well as how Invenergy intends to mitigate these impacts, and presents the results of public and agency consultation and as well as engagement with Indigenous Communities.

As part of the Environmental Review requirements, a consultation process has been undertaken to provide an opportunity for all stakeholders to identify any issues they may have with the Project and obtain information to address their concerns.

An evaluation of the proposed Upgrade to the Facility considered the possibility of triggering an EA under the Canadian Environmental Assessment Act (CEAA). No triggers were identified.

1.6.3 Approach to ERR

The Study Area was established with a radius of approximately 1 kilometre (km) around the Facility. This selection was made specifically for consultation purposes and to assess the impacts on landowners within proximity to the Facility. Throughout the report, multiple studies were conducted, each focusing on a specific 'potential impact area' relevant to the analysis being performed. These areas vary based on the nature of the study being conducted and are clearly differentiated in the report. The Project Area refers to the jurisdictional boundary of the Facility and its associated property features.

The potential impacts of the Project were assessed through desktop assessments, technical reports, and other supporting information. An examination of the local environment surrounding the Facility, including lands within the Study Area, was conducted to document existing conditions. Various technical areas were reviewed, including terrestrial and aquatic habitat, vegetation, air quality, noise, existing and proposed land uses, planning policies, and socio-economic considerations.

1.6.4 Project Timeline

The following schedule outlines the key milestones and timelines for the Project and is summarized in **Figure 3**.

The initiation of the EA Process and the introduction of the Project to Indigenous Communities began in October 2022. Subsequently, a Notice of Commencement and Open House was distributed to the stakeholders, and a virtual open house was held in December 2022 to engage stakeholders, Indigenous Communities, and interested parties, and to gather input. Further details on the stakeholder and Indigenous

consultation are described in **Section 3**. From October 2022 to June 2023, the Project team conducted technical studies and gathered relevant information for analysis.

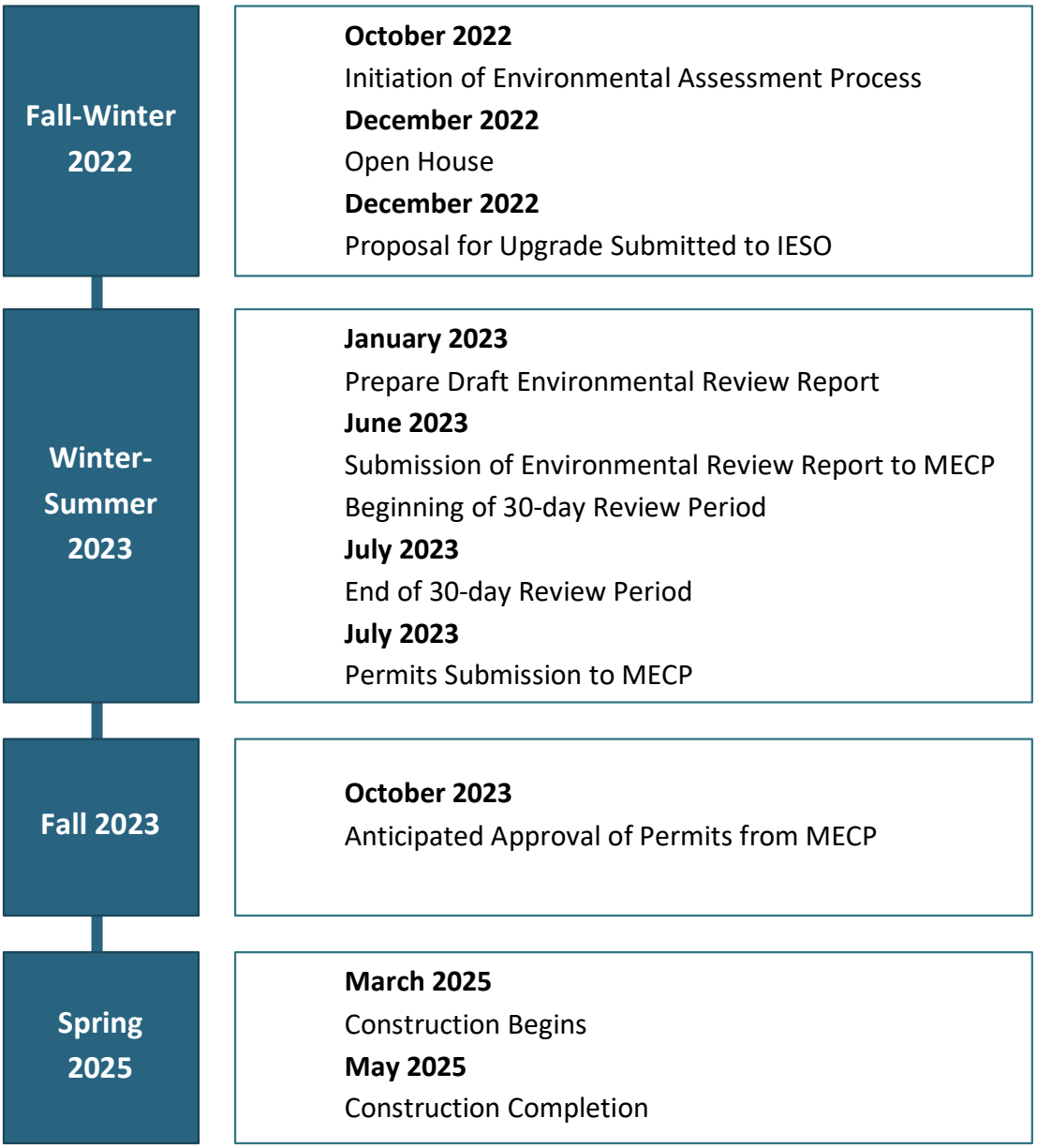


Figure 3: Project Timeline

1.6.5 Required Permits and Approvals

Following the ERR completion in June 2023, permits are planned to be submitted in the form of amendments to existing facility approvals to the MECP for the necessary approvals. The MECP will review the ERR from August to October 2023, ensuring compliance with environmental regulations. Anticipated approval of permits is expected to be granted between October 2023 and June 2024, allowing the Project to progress to the next stage.

1.6.5.1 Provincial Environmental Approvals

1.6.6 Environmental Compliance Approval (ECA)

Key permits and approvals for the Upgrade include (to be submitted as amendments to the existing facility permits):

- **Environmental Compliance Approval (ECA) [Air and Noise]**, for atmospheric and noise emissions, in accordance with section 9 of the *Environmental Protection Act* (*EPA*), with permit issuance by the MECP; and,
- **Environmental Compliance Approval (ECA) [Industrial Sewage]**, for wastewater discharges (including stormwater), in accordance with section 53 with permit issuance by the MECP.

1.6.6.1 Federal Environmental Approvals

The proposed Project does not currently trigger the need for a federal Impact Assessment under the *Canadian Impact Assessment Act*.

There are no additional federal approvals expected to be required for the Project.

1.6.7 Environmental Review Requirements and Report Organization

The following sections of this report will provide the identification, analysis, and mitigation measures of potential negative environmental effects of the Project. This report outlines the Indigenous, agency and stakeholder engagement and consultation methods used to address possible concerns about the potential effects of the Project. The Environmental Screening requirements, set out in the MECP's *Guide* (MECP, 2022), are summarized in **Table 1**.

Table 1: Environmental Screening Requirements

Screening Requirements	Corresponding Report Section(s)
Map of the Project location.	1.0, Figure 1
Background information including a description of the Project, the purpose of the Project and an outline of the basic technologies to be used.	1.1, 1.3
Description of other required approvals and permits.	1.6.5
Description of the local environment and conditions.	3.0
Information on public and agency consultation, including a description of the consultation program and activities/events, and a summary of public and agency concerns and how they have been resolved or addressed.	4.0 Appendix F, G, H
Completed Screening Criteria Checklist.	5.2, Table 15
Information, analysis and discussion of mitigation and impact management measures for potential negative effects identified through application of the screening criteria, including an assessment of the significance of any net effects.	6.0, Table 22
Commitments to mitigation, impact management, monitoring and/or further consultation and the mechanisms for their implementation and reporting.	6.0, Table 22, 6.1
Summary of mitigation, impact management and monitoring commitments.	6.0
Description of how environmental effects or issues may be addressed through other required approvals.	6.0, Table 22
Review of the overall environmental advantages and disadvantages of the Project, to include discussion of any benefits that may offset negative environmental effects.	7.0, Table 23

2.0 Description of the Proposed Upgrades

The proposed Upgrade to the St. Clair Energy Centre includes an AGP and Dry Low NOx DLNb2.6+ combustor upgrade for the Facility's two existing GE 7FA gas turbine generators and associated equipment. These Upgrades will allow for an increase in the firing temperature of the gas turbine generators, thereby enhancing the base load generation capability. Additionally, the increased exhaust energy will enable greater steam generation in the Heat Recovery Steam Generators HRSGs, resulting in increased output from the two steam turbine generators.

To support the enhanced capacity and avoid any potential bottlenecks with the Balance of Plant (BOP) equipment, the Upgrades will be accompanied by improvements to the plant's Reverse Osmosis (RO) system and the replacement of the HRSGs' reheat control valves to enhance the attemperation of steam and accommodate the higher gas turbine exhaust energy. Furthermore, due to the increased electrical generating capacity of the plant, an upgrade of the Generator Step-Up (GSU) transformers is necessary to transfer the generated electrical energy to the provincial grid.

2.1 Gas Turbine and Balance of Plant Equipment Upgrades

A description of gas turbine and balance of plant equipment retrofit required to achieve the planned St. Clair Energy Centre Upgrade are described below.

2.1.1 Gas Turbine Generators

GE proprietary AGP and DLN2.6+ upgrades to existing gas turbine generators, will refine aerodynamics through better sealing, creating higher efficiency performance. Components replaced will use advanced materials that are more durable and reduced overall component stress. Cooling technology in the turbines will be replaced and allow higher operating temperatures and increase energy output.

2.1.2 HRSG Reheat Control Valves

Upgrading of attemperation systems will be completed to maintain steam temperatures below the protection limits of downstream piping and equipment.

2.1.3 Reverse Osmosis System Upgrade

The volume of purified water output will be increased from 50 to 100 gallons per minute to allow for sufficient make-up of losses in the water-steam cycle during start-up, shutdown, and normal operations.

2.1.4 Generator Step-Up Transformers

The two existing GSU transformers, each with a rating of 370 megavolt amperes (MVA), will be replaced with two Upgraded GSU transformers, each with a rating of 400 MVA. The increased MVA rating is necessary to facilitate the increased generation of the Facility. These units will be of a roughly similar size and positioned in a similar location as the current GSUs. Modification to the foundation and containment systems will be further studied during detailed engineering prior to construction. It is anticipated that some civil works, such as excavation, removal of the existing GSU foundation, and pouring of a new foundation may be required.

Based on information received from the manufacturer, each GSU transformer is estimated to contain approximately 24,400 gallons of oil. The volume of oil and appropriate design of the foundation and oily water separator and transformer spill containment system will be designed to suite the final specifications of the GSUs manufactured. Excavated material will be used onsite to fill around the foundations and no excess material is anticipated.

2.2 Interconnection

Modification to the adjacent interconnection gear is not anticipated at this time but will be further studied during detailed engineering prior to construction to accommodate the new GSUs being installed. No change to the circuits the Facility interconnects to is anticipated. A Connection Impact Assessment will be undertaken in collaboration with Hydro One Networks Inc to update the Facility's Transmission Connection Agreement with the increased capacity.

2.3 Natural Gas Supply

Natural gas for the St. Clair Energy Centre is supplied by Enbridge, utilizing the existing distribution infrastructure. The current peak consumption of the Facility is

approximately 108,000 Million British Thermal Unit (MMBTU) per day. With the Upgrade in service, it is anticipated that the peak daily consumption may increase to approximately 116,500 MMBTU, representing a rise of 8,500 MMBTU per day.

The existing natural gas fuel delivery system for the St. Clair Energy Centre consists of a lateral pipe from the Enbridge system and a gas metering and control system located northeast of the Facility, outside the fenced area. Enbridge is responsible for the maintenance and operation of the existing lateral pipeline, gas metering, and control equipment. The natural gas is supplied to the Facility at a sufficiently high pressure to meet the increased requirements of the Upgrade, eliminating the need for additional gas compression or modifications to the natural gas delivery infrastructure.

2.4 Other Facility Components

Other than the gas turbine and balance of plant equipment upgrades, as well as the increased volume of natural gas supply described above, no other modifications to the Facility's equipment or operations are anticipated to be necessary for the St. Clair Energy Centre Upgrade.

2.5 Construction Phase

Construction related to the installation of new equipment for the planned Upgrade is expected to span a period of forty-five days. The construction schedule will be coordinated with planned outages for regular maintenance of gas-fired turbines. Based on this, construction is projected to occur between March and May of 2025.

An amendment to the Facility’s Contractual Services Agreement (CSA) is anticipated to be executed with the gas turbine’s Original Equipment Manufacturer (OEM), GE, to oversee equipment installation, calibration, and start-up services for the Gas Turbine Upgrades for the duration of the construction phase. Other general contractors will be hired for speciality work regarding systems other than the gas turbines, as needed. Detailed construction plans for the Gas Turbine Upgrades will be developed by GE in collaboration with St. Clair Power, L.P, while existing staff members will monitor construction activities and contractors and ensure compliance with environmental, engineering, construction and safety standards, permits and approvals.

If necessary, mobile trailers will be used to provide site staff with additional office space during construction.

2.5.1 Generation Outage

The proposed Upgrade for one of the gas turbine units will coincide with planned maintenance activities and is not expected to require any incremental downtime to complete. An incremental outage of 30 days will be necessary to complete the Gas Turbine Upgrade for the other unit, since the unit is only scheduled for a brief 15-day seasonal outage in the spring of 2025.

2.5.2 Construction-Related Equipment

To undertake the Gas Turbine Upgrades, one or more cranes may be required, as well as some temporary scaffolding in the area immediately surrounding the two gas turbines.

2.6 Operations Phase

The Upgrade is anticipated to result in each turbine unit running an additional 500 hours per year, with an additional 9 starts in total per year. The exact number of additional hours and starts is conditional based on the electrical system at any particular time during operation. With the exception of the number of hours of generation, the operation of the St. Clair Energy Centre is not anticipated to change. The Facility will continue to operate in conformance with the amended Clean Energy Supply Contract, Facility permits and approvals, and relevant provincial regulations.

2.7 Existing Environmental Monitoring

An Environmental Management Plan is in place for the operations of the St. Clair Energy Centre. Regular reviews of the power plant are conducted to identify areas where improvements in environmental performance can be made and to monitor the effectiveness of environmental controls. This includes:

- Monitoring air emissions:
  - CO_2, NO and O_2; and,
  - Thermal Efficiency Test every two years to confirm the plant's operating efficiency.

- Industrial Sewage Works Permit:
  - pH for TRC, Total Suspended Solids (TSS), oil and grease;
  - Quarterly lethality testing; and,
  - Temperatures and the difference between intake and outfall (release point).

Additionally, specific audits and studies are conducted, as necessary, to assess environmental performance.

Environmental monitoring is the responsibility of plant operating personnel. The St. Clair Energy Centre manager ensures reviews of monitoring results are completed and timely corrective action is taken for identified problems.

2.8 Decommissioning Phase

The decommissioning of the existing power plant was previously addressed as part of the St. Clair Energy Centre EA completed in 2006. The commitments made in the June 2006 EA are still considered appropriate.

In this environmental review, the discussion of power plant decommissioning focuses on identifying relevant dismantling activities that will be carried out at the Project site once the St. Clair Energy Centre has reached the end of its planned operational life. The objective of decommissioning is to permanently retire the power plant in a manner that ensures the health, security, and safety of workers, the public, and the environment.

For the purpose of this environmental review, it is anticipated that the power plant will be shut down in 2040, or as otherwise determined based on electricity market capacity needs or emission-related regulations.

Prior to decommissioning, St. Clair Energy Centre will undertake the necessary actions to comply with the requirements of the Ontario *Environmental Assessment Act* and other applicable federal and provincial regulations and policies.

2.9 Malfunctions and Accidents

Identification of possible accidents and malfunctions in this section focuses on events that could occur in the context of the specific works and activities associated with the upgrading of equipment during construction and operations. It is not the intent of this assessment to address all conceivable abnormal occurrences but rather to address only

those that have a reasonable probability of occurring, considering the specific aspect of the site conditions, Project design and scope, and operations.

Malfunctions and accidents were considered for the two separate phases of the Project, including construction and operations. The identified potential malfunctions and accidents are summarized in **Table 2**.

Table 2: Potential Malfunctions and Accidents Summary

Project Phase	Accident Scenario
Construction	• Spill of construction-related equipment fuel or lubricants stored on-site; and, • Heavy equipment failure during construction.
Operations	• Chemical or hazardous material handling (spill); • Process upset (uncontrolled spike of process chemicals); • Failure of the stormwater management system; and, • Hazardous waste transportation accident.

Each of these malfunction and accidents are further discussed in **Table 3**.

Table 3: Potential Malfunctions and Accidents Screening Decisions

Potential Event	Screening Decision
Construction Phase	
On-site spill of construction-related equipment fuel or lubricants stored on-site.	**Potentially credible event** advanced for effects assessment. Construction might require the use of certain amounts of chemical or hazardous materials and fuel for vehicles and lifting/craning equipment. While the likelihood of an accident occurring is considered minimal due to the relatively small volumes to be handled and since prevention/control and mitigation measures are available at the existing Facility, the potential occurrence warrants further assessment as it relates to the construction period.
Equipment and operator failure during construction leading to the collapse or dropping of heavy equipment, and parts.	**No credible event** A contractor with proven experience in the undertaking of these works will be used. This provides a high level of confidence that the construction phase will be carried out in conformance with design, best construction practices, and safety plans that have been specifically developed to reduce the potential for equipment failure.

Potential Event	Screening Decision
Operations Phase	
On-site spill of chemical or hazardous material handling (spill);	**No credible event** Operations might require the use of certain amounts of chemical or hazardous materials and fuel for vehicles and lifting/craning equipment. The likelihood of an accident occurring is considered minimal due to the relatively small quantities to be handled and the existing Facility has appropriate Environmental Management Plan and material handling process are in place. Given the existence of prevention and control measures at the existing Facility which meet or exceed provincial standards and are sufficient to address the concern it does not warrant further assessment during the operation period.
Process upset (uncontrolled spike of process chemicals)	**No credible event** Accidental spikes of chemical additives in the process effluent entering the primary discharge are considered unlikely and quantities of chemical additives are relatively small. The existing Facility has appropriate Environmental Management Plan and material handling process in place that includes prevention and control measures which meet or exceed provincial standards sufficient to address the concern. No further assessment during the operation period is warranted.
Failure of the stormwater management system	**No credible event** There is an existing stormwater management Facility which was sized based on operational need in addition to required storm event criteria. The Facility has been in operation for approximately 14 years and no stormwater exceedances have occurred. The existing Facility has appropriate Environmental Management Plan and existing monitoring and control measures which meet or exceed provincial standards. However, some minimal changes to the Facility, including the alteration of GSU foundations and oily water separator and transformer spill containment system will be required.

Potential Event	Screening Decision
Hazardous waste transportation accident.	**No credible event** The planned Upgrade does not alter existing processes for handling of hazardous waste transportation. Waste transfer operations either to site or to off-site landfill approved hazardous waste disposal facilities is carried out using appropriate third parties which use standard controls and well-established safety procedures. Waste transfers are in conformance with applicable transportation regulations. No further assessment during the operation period is warranted.

3.0 Existing Environmental Conditions

The assessment of existing local conditions was undertaken to describe the natural and socio-economic environment within which the Upgrade will take place. The Study Area was used for analysis of baseline conditions of the Facility. Other studies were conducted, each noting a specific 'potential impact area' relevant to the analysis being performed. These areas vary based on the nature of the study being conducted as discussed in specific sections below, such as the review of archaeological, air, and noise conditions.

3.1 Natural Heritage: Terrestrial, Aquatic and Species at Risk

The Natural Environment Heritage Assessment was carried out to evaluate the natural features surrounding the Facility. The assessment focused on an area extending 250 metres around the existing Facility's footprint, referred to as the Natural Environment Impact Area.

A site reconnaissance was conducted on November 18, 2022, to assess natural features within the Natural Environment Impact Area. Potential habitat for Species at Risk (SAR) was identified in the area, but no SARs were observed during the reconnaissance, and no negative impacts on SARs or their habitat are expected.

The Natural Environment Impact Area is located within the St. Clair River tributary and currently drains through overland flow pathways to the Gibb Drain. Since the drain is identified as having intermittent/ephemeral flow, it is unlikely that fish have access to this drain except during periods of higher flow.

Deciduous forests are present to the north, east, and west of the Facility within the Natural Environment Impact Area. These forests meet the significance criteria for being considered Significant Woodlands based on their size.

During the site reconnaissance, the following candidate Significant Wildlife Habitats were identified within the Natural Environment Impact Area:

- Bat Maternity Colonies;
- Reptile Hibernaculum;
- Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat;

- Amphibian Breeding Habitat; and,
- Special Concern and Rare Wildlife Species.

A detailed assessment of these features is included in **Appendix C**.

3.2 Air and Noise

3.2.1 Air Quality

The following sections provides a summary of the air quality assessment of the St Clair Energy Centre, including the results of ambient air quality monitoring and air dispersion modelling. More detailed information on the methodologies and results can be found in **Appendix A**.

3.2.1.1 Local Climatology

The climate normals were obtained from Environment Canada's Sarnia Airport Station, located about 13 km northeast of the Facility. These normals provide insight into the average atmospheric conditions at the site, shown in **Table 4** below, for the period 1981 to 2010.

Table 4: Sarnia Airport Station Climate Normals (1981-2010)

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Daily Average (°C)	-4.8	-3.7	0.6	6.9	12.7	18.2	21.1	20	16.4	10.1	4.3	-1.8	8.3
Mean Daily Maximum (°C)	-1.2	0.2	4.9	12	18.3	23.8	26.4	25.2	21.7	14.7	8	1.5	13
Mean Daily Minimum (°C)	-8.3	-7.5	-3.6	1.7	7.1	12.6	15.8	14.8	11	5.3	0.6	-5.1	3.7
Mean Rainfall (mm)	22.9	26.4	38	66.8	79.7	83.1	78.5	78.5	104.7	75.6	76.3	39.6	770
Mean Snowfall (cm)	31	24.9	19.1	4.5	0	0	0	0	0	0.5	5.9	26.1	112
Total Precipitation (mm)	51.5	50.9	57.5	71.5	79.7	83.1	78.5	78.5	104.7	76.1	82.4	63.9	878.2
Days with Precipitation (>= 0.2 mm)	15	11.9	12.9	14	12.6	10.9	10.9	10.4	11.4	12.2	13.7	14.2	150

The climate normals data indicate a humid continental climate, with cold winters and warm, humid summers. Precipitation is evenly distributed throughout the year.

Wind Data

The London regional meteorological dataset is important for air dispersion modelling, which helps to determine how emissions from sources affect air quality. Wind direction is a critical factor in determining the impact of emission sources. The annual wind rose for the Project Location, shown in **Figure 4**, indicates that the predominant wind directions at the site come from the west sectors.

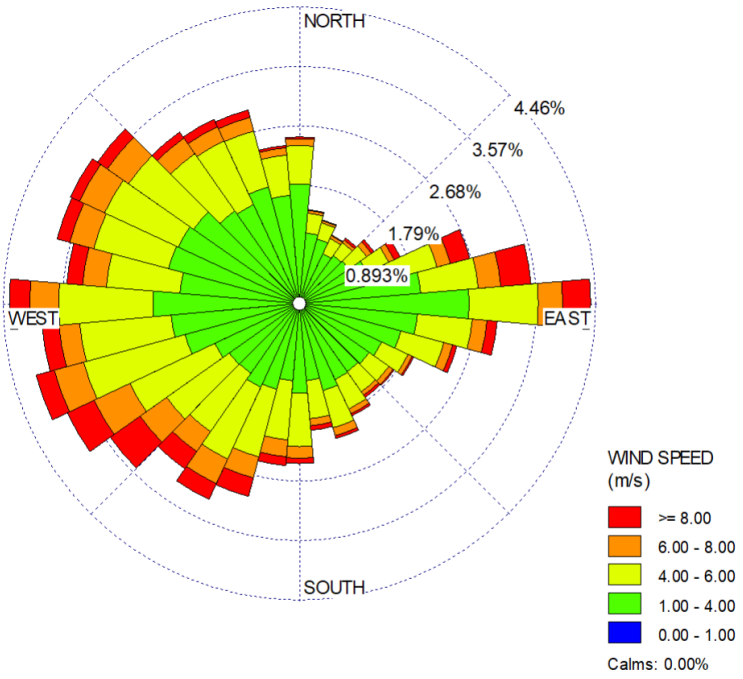


Figure 4: Annual Windrose for London Region, Ontario (1996-200)

3.2.1.2 Existing Ambient Air Quality

A facility that burns fuel for its operations can release chemicals into the air. These chemicals are called Criteria Air Contaminants (CACs), Volatile Organic Compounds (VOCs), and Polycyclic Aromatic Hydrocarbons (PAHs).

The CACs resulting from fuel combustion include nitrogen oxides (NO_x), particulate matter (PM), sulphur dioxide (SO_2), carbon monoxide (CO), and Ozone (O_3). Based on emission data across all loads, the most significant air contaminant emitted from turbine engine combustions is NO_x, while other CACs are also emitted in smaller quantities.

Ambient Monitoring Stations

Air quality in Ontario is closely monitored by the Ontario MECP. In Sarnia, there are currently two active air monitoring stations: the AAMJIWNAANG station and the SARNIA station. The AAMJIWNAANG station, located about 2.1 km northwest of the Facility, monitors most contaminants of concern except O_3, which is only monitored at the SARNIA station. CO is not monitored at any air monitoring stations in Sarnia, so data from the Windsor Downtown Station from 2018 to 2020 was used to estimate the background concentrations.

Air Quality Regulations and Guidelines

Ontario has established specific standards for air quality through a set of regulations known as *Ontario Regulation 419/05* (*O.Reg. 419/05*) and Ambient Air Quality Criteria (AAQC). *O.Reg. 419/05* sets limits on the concentration of contaminants in the air to set compliance benchmarks. The AAQC, developed by MECP, are commonly used to assess the impact of air quality on the environment, public health, and communities.

Background Air Quality

Background air quality was quantified by compiling historic monitoring records in the region of the Facility. The MECP and ECCC air monitoring stations were reviewed for each indicator compound. The closest monitoring station with a three-year dataset was selected to represent the background air quality. The background air quality for indicator compounds was then compared against the applicable regulations and standards. The results are summarized in **Table 5**.

Table 5: Background Air Quality and Applicable Standards

Indicator Compound	CAS#	Averaging Period	Background Concentration (µg/m3)			Percentage of Criterion			Criterion	Regulation/ Standards
			Max	90th Percentile	Average	Max	90th Percentile	Average	(µg/m³)	
TSP	NA_TSP	24 hr	98	43	24	81%	36%	20%	120	Ontario AAQC O.Reg. 415/05
PM_{10}	NA_PM_{10}	Annual	-	-	24	-	-	40%	60	Ontario AAQC
$PM_{2.5}$	NA_$PM_{2.5}$	24 hr	54	24	13	108%	48%	27%	50	Ontario AAQC
NO^2	10102-44-0	1 hr	79	19	10	20%	5%	3%	400	Ontario AAQC
		24 hr	38	17	10	19%	8%	5%	200	Ontario AAQC
CO	630-08-0	0.5 hr	3375	478	336	56%	8%	6%	6000	Ontario AAQC
		1 hr	2812	398	280	8%	1%	1%	36,200	O.Reg. 415/05
		8 hr	1602	392	280	10%	2%	2%	15,700	Ontario AAQC
Sulphur Dioxide (SO_2)	744-09-05	1 hr	257	8.8	4.1	37%	1%	1%	690	Ontario AAQC
		1 hr	257	8.8	4.1	241%	8%	4%	106	O.Reg. 415/05
		1 hr	257	8.8	4.1	257%	9%	4%	100	O.Reg. 415/05 future
		24 hr	50		4.1	18%	3%	1%	275	O.Reg. 415/05
		Annual	-	-	4.1	-	-	39%	11	Ontario AAQC
		Annual	-	-	4.1	-	-	41%	10	O.Reg. 415/05 future
Benzo(a)pyrene	50-32-8	24 hr	0.000132	0.000070	0.000038	264%	141%	77%	0.00005	Ontario AAQC
		Annual	-	-	0.000038	-	-	385%	0.00001	Ontario AAQC
Benzene		24 hr	4.8	2.1	1.1	210%	90%	46%	2.3	Ontario AAQC
		Annual	-	-		-	-	238%	0.45	Ontario AAQC
Ozone (O_3)		1 hr	198	86	56	120%	52%	34%	165	Ontario AAQC

3.2.1.3 Air Dispersion Modelling

The short-range atmospheric dispersion of contaminants from the Facility is simulated using computer modeling to assess its potential impact on the environment. This modelling predicts the ground-level concentrations of contaminants resulting from the Facility's operations using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) atmospheric dispersion model.

Model Description

AERMOD considers wind patterns, building shapes, and terrain to accurately predict the dispersion of pollutants. It creates a plume of PM and uses mathematical equations to determine how it will disperse in the surrounding area.

For this modeling study, pre-processed meteorological and terrain data provided by the MECP were used. The meteorological dataset included observations from the London surface station and White Lake upper air station. Additionally, a Canadian Digital Elevation Model file provided by the MECP was used to incorporate terrain information and enhance the accuracy of the model's output.

The model covered an area of 10 km by 10 km, centered on the Facility site. Meteorological variables, terrain data, and building shapes were carefully considered during the modeling process to simulate the movement of pollution effectively.

3.2.2 Noise

The following sections provides a summary of the noise assessment of the St. Clair Energy Centre, including the results of the existing sound environment and noise propagation modelling. More detailed information on the methodologies and results can be found in **Appendix B**.

3.2.2.1 Noise Criteria

MECP Publication NPC-300 (2013) outlines applicable noise criteria for industrial and commercial stationary noise sources. The noise criteria are defined using area classifications, which are based on the receptor's existing acoustical environment. NPC-300 classifications are as follows:

- **Class 1 area:** an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."
- **Class 2 area:** an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas as follows:
  - Sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours); and,
  - Low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).
- **Class 3 area:** a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as:
  - A small community;
  - An agricultural area;
  - A rural recreational area such as a cottage or a resort area; or,
  - A wilderness area.
- Class 4 area: an area or specific site that would otherwise be defined as Class 1 or 2 and which:
  - Is an area intended for development with new noise sensitive land use(s) that are not yet built;
  - Is in proximity to existing, lawfully established stationary source(s); and,
  - Has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process.
- Additionally, areas with existing noise sensitive land use(s) cannot be classified as Class 4 areas.

The MECP exclusionary sound level limits (1-hour L_{eq}) for stationary noise sources, per each area classification are presented in **Table 6**.

Table 6: Exclusionary Limits for Stationary Noise Sources

Assessment Location	Time Period	Exclusionary Sound Level Limit - L_{eq} 1hr			
		Class 1	Class 2	Class 3	Class 4
Plane of window for living area or sleeping quarters	Daytime (07:00 – 19:00)	50 dBA	50 dBA	45 dBA	60 dBA
	Evening (19:00 – 23:00)	50 dBA	50 dBA	40 dBA	60 dBA
	Nighttime (23:00 – 07:00)	45 dBA	45 dBA	40 dBA	55 dBA
Outdoor points of reception	Daytime (07:00 – 19:00)	50 dBA	50 dBA	45 dBA	55 dBA
	Evening (19:00 – 23:00)	50 dBA	45 dBA	40 dBA	55 dBA

Sound levels from steady stationary noise sources, such as the St. Clair Facility, are measured using the A-weighted energy equivalent sound level (L_{eq}). The areas surrounding the Facility are classified as a 'Class 1 Area', where ambient noise is influenced by existing industrial activities (such as heavy industry and oil refineries) and transportation noise (such as road traffic).

For a Class 1 Area, during daytime and evening hours (i.e., 7:00 a.m. to 11:00 p.m.), the limit at a noise-sensitive receptor (e.g., plane of window of a residential dwelling), for steady noise from a stationary source is the higher of either the lowest one-hour L_{eq} (ambient noise level) resulting from road traffic and any industry which is not under investigation for noise impact, or 50 dBA. During nighttime hours (11:00 p.m. to 7:00 a.m.), the sound level limit is the higher of either the ambient (road traffic plus industry) one-hour L_{eq} noise level or 45 dBA. For outdoor Points of Reception (PORs) such as backyards/front yards, the same noise limits as plane of window apply, however, the limits are for daytime and evening hours only.

Emergency equipment, such as emergency generators and fire pumps operating in an emergency scenario, are exempt from the applicable noise limits. When emergency equipment is operated for maintenance purposes (i.e., TSSA requirement for emergency equipment testing, 1 hour per month or 30 minutes every two weeks), the limits

(daytime/evening/nighttime) are 5 dBA above the applicable steady state limits, as stated above.

3.2.2.2 Existing Sound Environment

As part of this assessment, an ambient noise monitoring campaign was undertaken at the nearest relevant PORs between April 25, 2023, and April 27, 2023. The ambient noise monitoring campaign consisted of long-term ambient noise monitoring at the nearest PORs (at approximately 900 m south of the Facility). The ambient noise monitoring was carried out during plant shutdown period to ensure operations at the Facility were not impacting the measured ambient noise levels. Two RION Model NL-52 Type I noise level analyzers were used for the ambient noise monitoring campaign. In addition to laboratory calibrated, the analyzers were field calibrated using a Larson-Davis 114.0 dB, at 1 kHz acoustic calibrator prior to setup and at the end of the monitoring campaign.

The weather during the monitoring campaign consisted of mix of sun and cloud, with temperatures ranging between 1^{o} C and 8^{o} C, and generally calm conditions (low winds). The meteorological data for the monitoring period is provided in **Appendix B** of the Noise Assessment Report.

The minimum hourly background (ambient) sound levels for daytime, evening nighttime periods, measured at the two monitoring locations are summarized in **Table 7**. Also included in this table are the exclusionary limits for a Class 1 Area, as per MECP guideline NPC-300.

As explained above, the applicable performance limit is the higher of the existing ambient noise level (measured for this assessment) or the MECP's exclusionary limits. For the three identified closest receptors, the applicable performance limits are presented in '**bold**' in **Table 7**.

Table 7: Hourly Ambient Noise Monitoring Results

POR	Time of Day	Equivalent Sound Level Limit, Leq (1-hour) [dBA]	
		Exclusionary Limit	Minimum Background Sound Level
R2	07:00 – 19:00	**50**	49
	19:00 – 23:00	**50**	37.3
	23:00 – 07:00	**45**	33.7
R1/R3	07:00 – 19:00	50	**60.4**
	19:00 – 23:00	50	**54.2**
	23:00 – 07:00	45	**45.3**

Note: Applicable performance limits are shown in **bold**.

3.2.2.3 Noise Propagation Modelling

The noise impact at the identified representative PORs, associated with the operations of the Facility (including the proposed Upgrades) were determined through noise propagation modelling. Sound power levels for dominant on-site noise sources were used as input to a noise propagation model to predict receptor noise levels. CADNA/A computer software, developed by DataKustik GmbH, was used to determine receptor noise levels. This outdoor noise propagation model is based on ISO Standard 9613, Part 1: Calculation of the absorption of sound by the atmosphere, 1993 and Part 2: General method of calculation (ISO-9613-2:1996). The model is capable of incorporating various site-specific features, such as elevation, berms, absorptive grounds, and barriers to accurately predict noise levels at specific receptors, pertaining to noise emissions from a particular source/sources. The ISO-based model accounts for reduction in sound level due to increased distance and geometrical spreading, air absorption, ground attenuation, and acoustical shielding by intervening structures and topography. The model is considered conservative as it represents atmospheric conditions that promote propagation of sound from source to receiver.

The following propagation assumptions and considerations were incorporated in the model:

- **Reflections:** Conservatively, noise sources were modelled assuming a third order of reflection;

- **Ground Absorption:** A ground absorption coefficient of 0.50 was used for areas with aggregates (mainly within the Facility property boundary), and 0.70 for the more absorptive vegetated lands between the Facility and the surrounding areas;
- **Sound Quality:** Several of the dominant onsite noise sources emit noise with tonal characteristics. As such, a +5 dB tonal penalty was applied to these noise sources (see **Table 9**);
- **Source Operating Time:** The majority of noise sources at the Facility were assumed to operate simultaneously and on continuous basis for the duration of at least one hour during daytime, evening and/or nighttime periods;
- **Topography:** The site and surrounding area are generally flat. As such, land topography was not incorporated in the modelling domain; and,
- **Operating Mode:** In addition to start-up, shutdown and steady-state operation, the Facility can also operate under winter maintenance mode where two heaters are used to keep the HRSGs warm during cold winter months, or emergency equipment maintenance mode for testing of emergency fire-water pump or emergency generator. The assessment of impact for various operating modes are presented in the Noise Study Report Technical Supporting Document. For the purposes of the ERR, the results for the worst-case operating scenario (i.e., start-up and steady-state operation) are presented herein.

3.3 Geology and Soils

The Study Area is situated on shale rock and the surrounding physiography is described as Bevelled Till Plain. This plain was formed by reworked till deposits that were overlaid by a subsequent glacial advance. The soils in the area are predominantly poorly draining clay. However, agricultural tile drainage is present in the Study Area to improve soil draining conditions for farming.

3.4 Hydrogeology

The Study Area lies within the St. Clair River tributary and drains through overland flow pathways to the Gibb Drain. The Gibb Drain is a constructed drain located along the northern boundary of the Project Location and flows east to west. This drain has intermittent/ephemeral flow, and may be completely devoid of water in dry seasons. Dry open drains called Facility Drains are found within the area. The Study Area has

minimal potential for surface ponding despite the poor draining soil as agricultural tile drainage is found throughout most of the area.

The St. Clair River is about 4 km west of the Facility, and the topography of the region suggests that the groundwater flow direction is predominantly westward. However, local shallow groundwater flow may be influenced by factors such as local drainage materials and fill materials (Golder, 2006).

3.5 Socio-Economic Conditions

This section reviews the proposed Upgrade and how the Project may impact land use designations, nearby residences, air quality, and contributions to nuisance effects (e.g., noise, traffic) within the Study Area.

3.5.1 Planning Policies

Municipalities have the main responsibility for making decisions for their communities and are required to implement provincial policies through municipal official plans and planning-related decisions.

The plans and policies reviewed as part of the Project include:

- Provincial Policy Statement, 2020 (MMAH, 2020);
- Lambton County Official Plan (2020);
- St. Clair Township Official Plan (2005); and,
- St. Clair Township Zoning By-law (2003).

3.5.1.1 Provincial Policy Statement (PPS)

The Provincial Policy Statement (PPS), 2020 is issued under Section 3 of the *Planning Act* (RSO 1990, c. P.13) and came into effect on May 1, 2020. The PPS is regulated by the Province of Ontario's Ministry of Municipal Affairs and Housing (MMAH).

Energy generation is defined as 'infrastructure' under the PPS, 2020.

The Project is in line with section 1.6.11, *Energy Supply*, which states that "Planning authorities should provide opportunities for the development of energy supply including electricity generation facilities and transmission and distribution systems, district

energy, and renewable energy systems and alternative energy systems, to accommodate current and projected needs" (MMAH, 2020. pg. 22).

The Project also complies with the policies outlined in section 1.1.5*, Rural Lands in Municipalities*, which states that developments must be compatible with the rural landscape and shall be appropriate with existing or planned infrastructure (MMAH, 2020).

3.5.1.2 Lambton County Official Plan (2020)

The Lambton County Official Plan, updated in 2020, guides land use planning and development in the County and its eleven local municipalities, including St. Clair Township. The interests within the Official Plan are consistent with the PPS.

The Project's potential to increase power supply is in line with the County's objectives of ensuring adequate infrastructure to support sustainable future growth and development outlined in Section 7 of the Official Plan (Lambton County, 2020). More specifically, section 7.8, *Utility Corridors: Electricity/Pipelines/Communications*, outlines the objectives for Utility Corridors, which includes electricity, pipelines, and communications, and has a goal to "To facilitate the provision of services that are important to the Lambton County economy, while ensuring that agricultural and natural heritage areas are protected and preserved and settlement areas are not adversely affected or put at risk by the proximity of utility corridors" (Lambton County, 2020, pg. 7-10).

3.5.1.3 St. Clair Township Official Plan (2011)

The St. Clair Township Official Plan serves as a framework for decision-making and a guide for the growth and development of the Township. The plan establishes a basis for long-term planning goals while conforming to PPS and Lambton County Official Plan planning policies, considering relevant social, economic, and environmental factors (Lambton County, 2005).

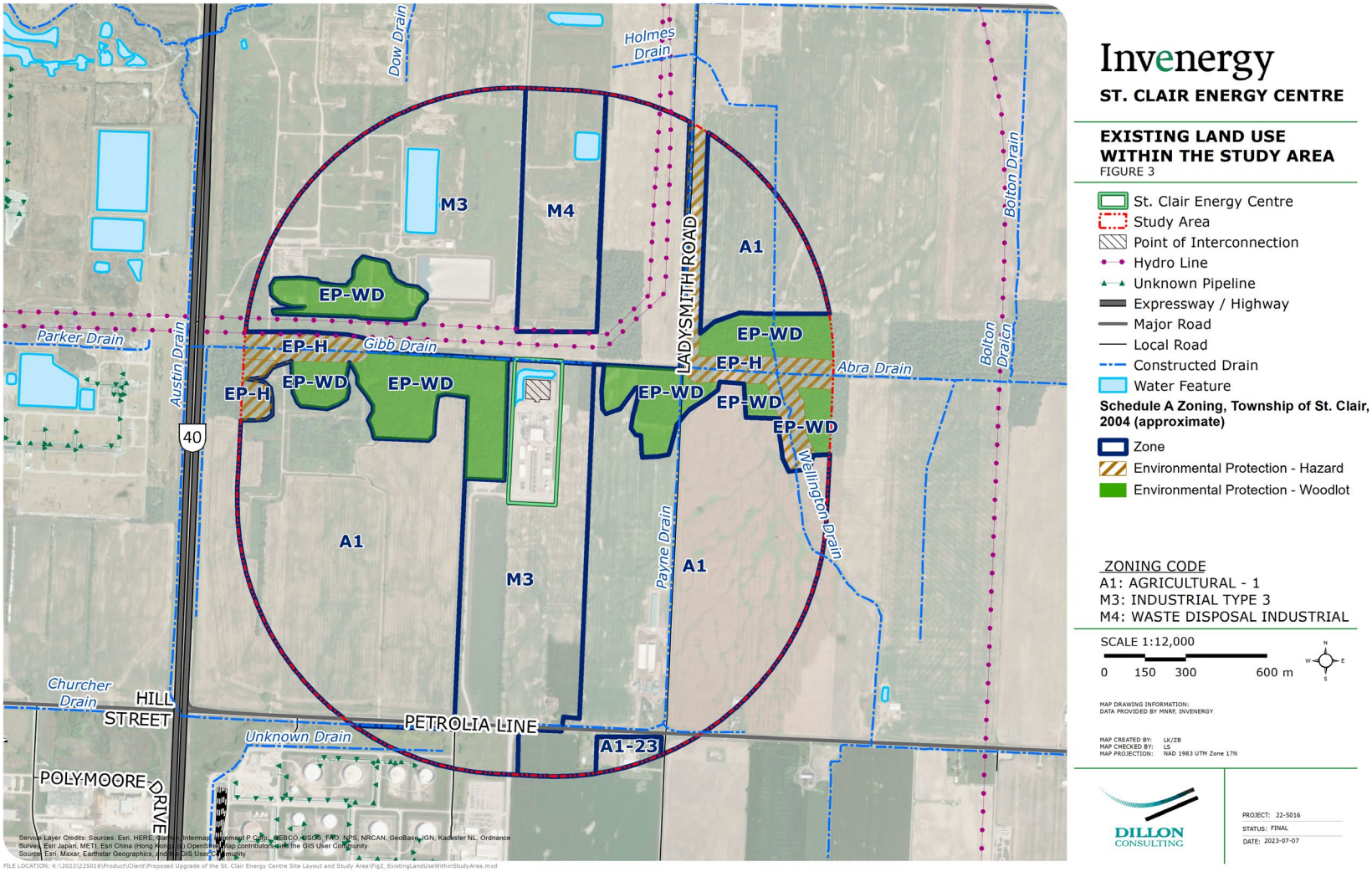
According to section 2.1 of the Township Official Plan, energy generation facilities are permitted in all land use categories, as long as they comply with the development policies outlined in the Plan (Lambton County, 2005).

3.5.1.4 St. Clair Township Zoning By-Law (2011)

The Facility property falls under the 'Industrial Use, Type 3' zoning category in the St. Clair Township Zoning By-Law (2003). This is defined as "a place of business for medium to heavy-scaled industry or any business or industry which by reason of the process involved or the method of manufacture or the nature of the material or goods used, produced or stored is likely to cause or causes by reason of destructive gas or fumes, dust, objectionable odour, noise or vibration, or unsightly storage of goods, wares, merchandise, waste or other material" and "defining the type 3 industrial use to include electrical generation facility" (Lambton County, 2003, pg. 23).

The surrounding zoning categories include a mix of 'Industrial Use, Type 3' and 'Agricultural.' The Project conforms to the existing zoning by-law and a by-law amendment will not be required. **Figure 5** shows the existing land use within Study Area.

Figure 5: Existing Land Use within the Study Area



3.5.2 Population and Demographics

According to the latest 2021 Census data from Statistics Canada, the population of St. Clair Township has increased by 4% from 2016 to 14,659 people (Statistics Canada, 2022). Comparatively, the Province of Ontario experienced a population increase of approximately 5.8% over the same period (Statistics Canada, 2017). As of 2021, the average population density of St. Clair is approximately 23.7 people per square kilometre, and the average age of the population was 43.5 years (Statistics Canada, 2022).

3.5.3 Employment and Economy

Sarnia-Lambton's employment and economy are anchored by its Advanced Manufacturing, Energy, and Agriculture sectors, and includes a diverse array of chemical facilities that make up the Hybrid Chemistry Cluster. According to the Sarnia Lambton Economic Partnership (SLEP), this region is a large contributor for Ontario's economy and workforce.

The Advanced Manufacturing industry benefits from a diverse range of products being produced locally, including chemicals, industrial equipment, automotive and transportation parts. The Sarnia-Lambton area represents the country's second-largest collection of companies in the petrochemical and refining sector. The area is also known as 'chemical valley' due to the range of over thirty-five chemical facilities across the area (SLEP, 2023).

Sarnia-Lambton has a long history of energy production, ranging in gas power, solar power, wind power, and landfill gas-to-energy. The region generates 2,688 MW in gas power production, and 559 MW of renewables (SLEP, 2023).

Agriculture and agri-business represent Sarnia-Lambton's second-largest economic sector. The region's over 2,000 farms operate more than 500,000 acres of crop (SLEP, 2023). Sarnia-Lambton's excellent location, access to raw materials, transportation routes to markets worldwide, and prime agricultural land are contributors to this successful industry.

The Township of St. Clair has a labor participation rate of 52.8% and an unemployment rate of 8.7%, according to the 2021 Census. In contrast, the Province of Ontario has a

higher labor participation rate of 62.8% and a higher unemployment rate of 12.2%, according to Statistics Canada (2022). The 2021 Census also indicates that Manufacturing and Agriculture are the main employers of the Township (Statistics Canada, 2022).

The St. Clair Township Industrial Park, located adjacent to the St Clair Energy Centre, houses numerous manufacturing, chemical, and transportation facilities including:

- Advanced Finishing Technology
- Allerion Oilfield Services
- ANJ Industrial Fabricating Ltd
- Canadian IPG
- Chemfab Industries
- CIMS Limited Partnership
- CMF Group
- Feddes Fabrications Inc.
- Filter Bix Liner
- GFL Corunna
- Goodfellow Construction Ltd
- Harmac Transportation Inc.
- HD Industrial Services Inc.
- HQN Industrial Inc.
- Katoen Natie Canada
- LamSar Inc.
- Le Groupe G3
- Maviro Catalyst Canada Inc.
- McKenney Storage Solutions
- MRC Global
- Ontario Hose Specialities
- Specialty Machine & Fabrication
- Sterling Crane
- Woodbridge Foam Corporation

Other industries in the area include Nova Chemicals Corporation, Pembina Pipeline Corporation, and Shell Chemicals. Farmland and agriculture from Wilson Farms and Bonnefield Farmland surround the industrial land use of the St. Clair Energy Centre.

These industries surrounding the Project Area contribute to the surrounding community's employment and economy by providing skilled labour positions and job opportunities.

3.5.4 Local Aesthetics and Amenities

St. Clair Township's agricultural industry has shaped the area's history, economy, and culture. The many farms, artisan crafts, breweries, wineries, and historic museums tie into the events and festivals that bring the residents of St. Clair Township together. The Township is also known for its agrotourism and ecotourism, which connects residents and tourists to nature.

In addition to its agricultural and industrial offerings, the area surrounding the Facility boasts a number of local aesthetic features and amenities. One such feature is the Dow Wetland, a 35-acre nature reserve located approximately 2km northeast of the Project Area. This man-made wetland was created to provide clean soil to cap a former Dow Chemical Canada Inc. landfill and now features walking trails, a memorial forest, a distinctive bridge, and a light festival around the holidays called the Winter Walk. The wetland is home to a diverse range of wildlife and vegetation species (Catterson, 2009).

The Lambton College Fire School, located approximately 2.5km northeast of the Facility, is another notable feature within the area. Established in 1976, it is Canada's first industrial fire school and serves as a training grounds for industrial firefighting. It features a modern learning campus, a number of training buildings, industrial training grounds, and a fleet of emergency response vehicles (Lambton College, 2020).

The Corunna Athletic Park, located approximately 4km southwest of the Project Area, is a recreational park that features a variety of sport pitches, like baseball diamonds, tennis courts, and soccer fields. The park also includes a skatepark, playground, and pavilion.

These local amenities are valued by the community and contribute to the quality of life in the area surrounding the Facility.

3.5.5 Agriculture

St. Clair Township has a thriving agricultural industry that has played a significant role in the region's history and continues to shape its economy and culture. The Lambton Federation of Agriculture (LFA) is a notable organization that represents the interests of farmers in the area. It advocates for policies that promote sustainable agriculture and works to enhance the economic viability of local farms (LFA, 2023).

St. Clair Township has a variety of markets that offer locally grown produce and artisan goods. The Township features orchards, breweries, wineries, and farmers markets as well as handmade crafts and preserves, highlighting the area's diverse agricultural resources (Locally Lambton, 2023).

To the east of the Facility lies mainly agricultural land owned by Wilson Farms and Bonnefield Farmland. These farmlands are a vital component of the township's

agricultural industry, producing a variety of crops, providing employment opportunities, and contributing to the region's rich agricultural heritage.

3.6 Cultural Resources

3.6.1 Archaeological Resources

A Stage 1 Archeological Assessment (AA) was completed in the fall of 2022 by TMHC Inc. (TMHC), which consisted of a review of current land use; historic and modern maps; registered archaeological sites and previous archaeological studies; past settlement history for the area; and a consideration of topographic and physiographic features, soils, and drainage.

Based on the background study completed, it was determined that the Project Area is not in proximity (i.e., within 300 m) to any features that signal archaeological potential. A review of historical aerial imagery shows that the Project Area underwent extensive ground disturbance during the construction of the existing Facility. In addition, the previous assessment completed by TMHC in 2006, which also included a site visit and photo-documentation of the Project Area, did not recommend further work for the property. No further property inspections were completed based on the lack of archaeological potential and extensive disturbance.

Based on the results of the Stage 1 AA, no Stage 2 assessment is recommended.

A copy of the Stage 1 Archaeological Assessment report prepared for the Project as well as the acceptance letter from Ministry of Citizenship and Multiculturalism (MCM) is provided in **Appendix D.**

3.6.2 Cultural Heritage Resources

A Cultural Heritage Screening (CHS) checklist was completed for the Project and was prepared in accordance with the MCM Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes.

The purpose of the checklist is to determine if a property(ies) or project area:

- Is a recognized heritage property; and,
- 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; and,
- Temporary roads and detours.

Based on the completed checklist, there is low potential for built heritage or cultural heritage landscape on the property. No cultural heritage resources were identified for the Project Area through Indigenous consultation. Therefore, no further action is required.

A copy of the completed CHS is provided in **Appendix E**.

4.0 Stakeholder and Indigenous Consultation

The following sections summarize the consultation and engagement activities that were undertaken throughout the Project. These activities can be characterized by three phases: Pre-Notice of Commencement; Pre-EA Submission, and Pre-Construction and Operations.

Consultation and engagement with Indigenous Communities, and engagement with stakeholders (public/community members, local elected officials, and interest groups) and agencies was undertaken early in the planning process and continued throughout the development of the Project. Engagement involved working collaboratively to understand interested stakeholders perspectives, keeping members of the public apprised of the Project and initiating dialogue to address possible concerns raised.

4.1 Objectives

Invenergy is committed to a comprehensive consultation plan as part of its development activities. Consultation and engagement is an integral component of the EA process, which provides opportunities for two-way communication with interested stakeholders, agencies, and Indigenous Communities. This can assist in identifying potential environmental issues to ensure they are given appropriate consideration from the early stages and throughout the decision-making process.

The EA process also requires that proponents of a project undertake consultation and engagement early in the planning process and continue to consult throughout the development of the project. Early-onset consultation assists in the success and acceptance of a project by involving the community, keeping members of the public informed of the project, and working collaboratively to address concerns.

Invenergy's commitment to consultation and engagement will continue throughout the Project including the construction phase. The overall objectives of the Stakeholder Consultation Program (SCP) are to:

- Identify potentially interested stakeholders, agencies, and Indigenous Communities and the nature of their interests;

- Inform stakeholders of preliminary plans for the Project and how the Project might affect the physical, natural, social and economic environment in the community; and,
- Incorporate stakeholder, agency, and Indigenous Community interests into the planning, design, construction, and operation of the Facility, where feasible.

4.2 Engagement Activities

A number of methods were used to inform and engage Indigenous Communities and stakeholders including:

- Identification of potentially interested Indigenous Community members during the Study Area definition process including engagement prior to the release of the notice of commencement (e.g., pre-notice consultation phase of the Project);
- Identification of potentially interested community members and special interest groups during the Study Area definition process;
- Meetings and/or correspondence with local and regional government and provincial agencies to collect data and identify issues associated with the Project;
- Meetings and/or correspondence with adjacent landowners prior to public announcements in order to inform them and identify any issues;
- Advertising in local newspapers such as the Sarnia Observer and the Sarnia/Lambton This Week introducing the Project and providing Notices;
- Production and analysis of a Project questionnaire for the virtual information session;
- Creation of a Project specific website to provide information on the Project and online access to the ERR and supporting documents; and,
- Communication with government agencies and local and regional government stakeholders.

The SCP also used various engagement techniques to build awareness about the Project and solicit comments and feedback. Specific communication methods included: one-on-one and small group meetings, Project presentations, telephone discussions, direct mail notices and letters, publications in community newspapers, emails, virtual information sessions, site visits, and a regularly updated Project website.

A Project email (info@stclairenergycentre.com) was set up to provide a consistent electronic communication method for individuals to contact the Project team. This email was provided in written communications. The Project website

(www.stclairenergycentre.com) includes an overview of the Project and up-to-date information on Notices and events.

The SCP was initiated in October 2022, and was organized into three phases, with each phase building on the previous one (see **Table 8** below):

- Phase 1: Pre-Notice of Commencement;
- Phase 2: Pre- EA Submission; and,
- Phase 3: Construction and Operations.

Table 8: Engagement Phases of the Project and Planned Activities

Phase	Purpose	Activities
Phase 1: Pre-Notice of Commencement	• Introduce the Project to the community and Indigenous Groups; • Identify potentially impacted stakeholders, and determine level of community interest; • Raise awareness of the Project; • Advise stakeholders of the proposed Project in the community through notices and the Project website; and, • Consult with agencies.	• One-on-one meetings with neighbours, agencies, environmental interest groups, the Township and Region (if and as required); • Small group meetings with stakeholder interest groups (if and as required); • Online research; • Telephone discussion; • Mail-out and distribution of letters; and, • Launch of Project website.
Phase 2: Pre-ERR Submission	• Identify potential community concerns of community and discuss proposed plans; • Consult with agencies through Notices; • Incorporate stakeholder input into Project development; and, • Discuss draft copy of the ERR.	• Discussions with the local Township, Planning Department, and residents; • Discussions with the Regional Municipality; • Mail-out and distribution of letters; • One-on-one, agency and community meetings as required, including pre-submission consultation; • Telephone discussions; • Preparation and distribution of Notice of Commencement and Virtual Information Session; • Virtual Information Session; and, • Response to media inquiries.

Phase	Purpose	Activities
Phase 3: Construction and Operations	• Raise awareness and understanding of construction and operation of Project; and, • Respond to interests raised.	• Development and management of a Community Liaison Committee (if required); • Website updates; and, • One-on-one meetings (if required).

4.2.1 Circulation List

A list of regulatory agencies and interest groups active in the area was compiled through desktop research and published information including government listings, previous studies completed in the area, the internet, and telephone calls.

A contact list was developed that subdivided the groups into the following categories:

- Elected Officials;
- Provincial Authorities;
- Municipal Authorities;
- Indigenous Communities;
- Interest Groups;
- Local Agencies;
- Public; and,
- Utilities.

Full contact lists and consultation activities to date with the above stakeholders are summarized in **Appendix F**.

Detailed consultation with Indigenous Communities is outlined in **Section 4.3**.

4.2.2 Notices and Letters

In response to the Notice of distribution, the Project team received responses from members of the public, agencies and one interest group. Correspondence from each of the consultation phases was logged and is available in the Consultation Log (**Appendix F**).

Additionally, a Project Information Form (PIF), Project information letter, and a copy of the Notice were sent to the MECP. An acknowledgement of the letter was sent in reply from the MECP.

For all consultation materials including Notices, and accompanying letters, please see **Appendix G**.

A Notice of Commencement and Virtual Information Session (Notice) was published in the *Sarnia This Week* newspaper on November 24, 2022, and December 1, 2022, and *The Sarnia Observer* newspaper on November 22, 2022, and November 29, 2022. This

Notice provided a summary of the Project, the process, details of the virtual information session, and Project contact information. The Notice of Commencement newspaper advertisements can be found in **Appendix G**. A copy of the Notice was also posted on the Project website.

The initial scope of the project, as outlined in the project Notice (11 April, 2023), included an upgrade followed by an 'expansion' to the existing facility. The proposed expansion was for the purpose of an additional generating capacity from 60 MW to 7 MW. However, due to the changes to the Project timeline the decision was made to proceed with the Upgrade only and address the proposed expansion at a later date. No concerns about this updated were received during the comment period.

4.2.3 Public Open House

A Virtual Public Information Session (VIS) was hosted online from December 8, 2022, to December 22, 2022, on a dedicated VIS website, https://stclairenergyexpansionea.ca. The VIS website featured a virtual presentation with a voiceover that provided an overview of the Project and invited attendees to complete a Project questionnaire available on the VIS website. Downloads of the slides, voiceover transcript, and presentation video were made available for digital download. After December 22, 2022, the presentation, video transcript, and questionnaire were made available on the Project website www.stclairenergycentre.com. The materials presented at the VIS and the Project questionnaire can be found in **Appendix G**.

In total, 24 people attended the VIS, one attendee completed the questionnaire, and two attendees provided their contact information to stay informed throughout the Project process. Website traffic analytics can be found in **Appendix G**.

The Project team engaged with the stakeholder who raised the singular issue through the VIS online questionnaire via through telephone, email, and in-person meeting (described in **Section 4.2.4**) to resolve their concern. Correspondence is recorded in the Consultation Log (**Appendix F**).

4.2.4 Landowner Meetings

During the VIS, a landowner expressed concerns regarding the potential shift of overland water flows onto their property to the east of the Facility if the Expansion

project were to be developed. In response, a meeting was held with the landowner on June 13, 2023, to address these concerns directly.

During the meeting, the landowner emphasized the importance of conducting a hydrology study and implementing necessary drainage measures to prevent water from flowing onto their property in the event of the Expansion's development. In response to this, Invenergy committed to conducting appropriate hydrology modeling during the detailed design phase, provided that the facility is selected in the upcoming procurement process. This modelling will help determine the specific drainage requirements to ensure that water does not pose any issues for the landowner. Invenergy also committed to keeping this landowner informed of progress on the future Expansion project. Correspondence is recorded in the Consultation Log (**Appendix F**).

4.3 Indigenous Consultation

Consultation with Indigenous Communities is a crucial component of the EA process.

A letter was sent to the Ministry of Energy (MOE) to determine the Duty to Consult requirements, and in response, a list of Indigenous Communities identified by the Ministry as having the potential to be impacted by the Project was received (**Appendix F**).

The following Indigenous communities were consulted:

- Aamjiwnaang First Nation;
- Bkejewanong (Walpole Island) First Nation;
- Caldwell First Nation;
- Deshkan Ziibiing (Chippewas of the Thames) First Nation;
- Onyta'a:ka (Oneida Nation of the Thames) First Nation; and,
- Wiiwkwedong (Chippewas of Kettle and Stony Point) First Nation.

These Indigenous Communities were initially contacted during the Pre-Notice of Commencement phase of the Project, and consultation was ongoing as required to better understand their interests, concerns, and potential impacts on constitutionally protected Aboriginal and/or Treaty Rights.

Relevant contact list and consultation activities to date with the above Indigenous communities are summarized in **Appendix H**.

4.3.1 Notices and Letters

After identifying Indigenous Communities and their respective interests, discussions and virtual meetings were held to explain the proposed Project and understand if they had interest in the Project. Formal letters to Indigenous Communities were sent out on October 25, 2022, to inform them of the Project and invite them to participate early in the process. The letters also provided an opportunity to participate in the archaeological study, and the contact information for the Project team was included. A copy of the letters can be found in **Appendix H**.

As a result of the initial letters, five Communities requested a meeting to discuss the Project. Community specific meetings are summarized in **Section 6.3.2**.

A Notice of Project Update and accompanying letters were sent to Indigenous Communities April 13, 2023, explaining the additional generating capacity from 60 MW to 70 MW and the change to the Project timeline due to the decision to proceed with the Facility Upgrade and address the Facility Expansion at a later date. Follow-up calls were conducted on April 18, 2023, to ensure the Notice of Project Update was received and enquire if there were questions about the update. A copy of the letters can be found in **Appendix H**.

4.3.2 Community Specific Meetings

Community specific meetings were conducted based on requests from Indigenous Communities. The purpose of these meetings was to present an overview of the Project and provide the community the opportunity to provide feedback and ask questions.

Appendix H contains community specific presentation materials and meeting minutes.

4.3.2.1 Aamjiwnaang First Nation

The Project team met virtually with Aamjiwnaang First Nation (AFN) Environment Committee on January 17, 2023, and provided an overview of the Project. An opportunity to ask questions and provide comments was included as part of the meeting. The feedback received during the January 17th meeting is summarized in **Table 9** below.

Table 9: Summary of Feedback Received during Aamjiwnaang First Nations Environment Committee Meeting

Theme	Question/Comment
Cumulative Effects – Number of Stacks (Existing and Proposed)	• AFN Environment Committee member asked about the number of stacks that are currently at the Facility and how many will be added after the Facility Upgrade. Their concern was with cumulative effects. ○ Invenergy explained they did not have the number of stacks currently at the Facility nor the number of stacks proposed. Invenergy later clarified that there is a single exhaust stack associated with each of the General Electric 7FA gas turbine generators and no additional stacks will be added as part of the Upgrade. Additional details on air quality, noise and cumulative effects, will be shared with AFN through the Air and Noise reports accompanying the ERR.
Future Expansion Inquiry (Footprint)	• AFN Environment Committee member asked how the St. Clair Energy Centre is planning on expanding over time and if the entire expansion area identified in the Site Layout Map will be developed. ○ Invenergy explained that no other thermal development for the site is currently being contemplated. The provincial and federal policy context likely precluding further development of the site was also reviewed with participants. The federal Clean Energy Regulation is likely to require the Facility to either shut down in 2036 or abate GHG emissions after this date. In addition, the IESO has released their Pathway to Decarbonization report which advances a moratorium on new natural gas generation facilities beginning in 2027. *

* The scope of the Project was reconsidered and as noted in **Section 1.3.2**, is now only focussed on the Facility Upgrades. A separate ERR including consultation will be completed at a later time.

Members of the Project team confirmed that AFN received a copy of the Stage 1 Archaeology Assessment Report and provided information regarding details presentation materials available on the Project website beginning December 8, 2022.

The Project team also met with AFN via an in-person community meeting on June 13, 2023, to discuss the Project and the results of the completed Air and Noise modelling. The community meeting took place at the Maawn Doosh Gumig Community & Youth Centre, Banquet Room at 1972 Virgil Avenue, Sarnia, ON from 5-7 PM. During this meeting, community members had an opportunity to provide comment and voice

concerns about the Project. The feedback received during the June 13th meeting is summarized in **Table 10** below.

Table 10: Summary of Feedback Received during Aamjiwnaang First Nations Community Meeting

Theme	Question/Comment

Facility Conditions	• What type of energy is produced?
	  ○ Response: Natural Gas fired turbine
	• Does this facility connect with an Enbridge pipeline?
	  ○ Response: Yes, for the purpose of obtaining the natural gas but, the power produced connects to the Hydro One transmission line outside the Facility.
	• Who accepts the industrial sewage?
	  ○ Response: The industrial sewage is processed at the municipal wastewater facility.

Air Quality	• Inquiry about how the emissions data is calculated and if emergency situations are considered in the modelling.
	  ○ Response: The emissions modelling measures outputs with the Facility operating at 100% capacity during a 24 hour period, or known as the "worst case" scenario. In reality, the Facility has historically operated at a capacity factor of less than 20%. Even during warmer ambient conditions when electrical demand is at its highest, they capacity factor remains well below 100%. For example, in July and August 2022, the average capacity factor was 57%.
	• Inquired about benzene exceedance and the effects it may have to the community.
	  ○ Response: Since the Facility will be running at between 20% and 57% capacity as indicated in the above response, the emitted levels of benzene will be much lower than the amount documented. The information will be available in the ERR for their review.

Facility Upgrade	• Why is the Facility being upgraded?
	  ○ Response: To meet future energy expectations as directed by IESO and to be able to provide dispatchable power to the surrounding community.
	• How will the Facility be producing more power without installing new generators?
	  ○ Response: The Facility will have more power output by using an upgrade to existing on-site equipment.

Theme	Question/Comment
	• Will the existing Hydro One lines be able to safely handle the increase in generating capacity? ○ Response: Yes, the ability of Hydro One transmission lines to safely handle additional output was evaluated during the early stages of the project. A System Impact Assessment is currently underway with Hydro One to finalize details and an interconnection agreement.
Facility Expansion	• What is the timeline for the Expansion Project? ○ Response: The decision from IESO regarding the Expansion Project will likely be made in July/August 2023*
Approvals	• Does the Project need to go through the Ontario Energy Board? ○ Response: No, the Project goes through MECP
Greenspace	• Will the Expansion be taking out any vegetation? ○ Response: No, the Facility will not be removing vegetation. • Is there an opportunity to provide additional greenspace around the expanded Facility? Aamjiwnaang First Nation is developing seed storage and planting services for native plant species to the St. Clair region. ○ Response: Invenergy will inquire about these services during the ERR and prior to construction of the Facility Expansion.*
Community Involvement	• Will Aamjiwnaang First Nation receive capacity funding to review the ERR? ○ Response: Yes, appropriate capacity funding will be available for review. • Is there an opportunity for local trades to be used for the Upgrade construction? ○ Response: Yes, local trades and labour will be used and will organized by GE for the Upgrade.
Decommissioning	• What happens to the Facility if Natural Gas runs out? ○ Response: Decommissioning plan commitments were put in place when the Facility was constructed in 2009. The IESO requires the Upgrade to be able to provide power up to 2035, and the lifetime of the Facility is approximately 40 years.

* The scope of the Project was reconsidered and as noted in **Section 1.3.2**, is now only focussed on the Facility Upgrades. A separate ERR including consultation will be completed at a later time.

4.3.2.2 Bkejewanong (Walpole Island) First Nation

The Project team met virtually with Bkejewanong (Walpole Island) First Nation on October 31, 2022, and provided an overview of the Project and schedule. An opportunity to ask questions and provide comments was included as part of the meeting. The feedback received during the October 31st meeting is summarized in **Table 11** below.

Table 11: Summary of Feedback Received during Bkejewanong (Walpole Island) First Nation Meeting

Theme	Question/Comment
Review of Project materials request	• There was an inquiry of when materials would be available for Bkejewanong (Walpole Island) First Nation review and ensure timelines are adequate. ○ Response: Project team provided a list of materials to be reviewed by Bkejewanong and later followed up with more details regarding the size of the draft ERR for their capacity estimates. • Request of a comment response table to be used to document any issues from Bkejewanong (Walpole Island) First Nation about the EA and proponent responses to them. ○ Response: Project team advised that a template has been created and will be populated throughout the consultation process, as needed.
Additional Project Information	• A request for a Project map was made. ○ Response: A map of the project was sent in the Engagement letter, and it was confirmed that no other maps were needed.
Energy Alternatives	• Concerns may arise from the Project being natural gas as there is a push for renewable energy. ○ Response: The Project team noted that further discussions about carbon capture or recovery to take place – the Project is responding to the Request for Proposal from IESO and will maintain compliance with necessary regulations; and, ○ Invitations for a site meeting were sent via email and phone call: no response was received, leading to the meeting not being scheduled.
Commercial and Community Betterment	• Interest in further discussions on commercial and community betterment – to be separate from environmental discussions.

Theme	Question/Comment
	○ Response: Project team advised they are committed to further discussion on this topic and will continue dialogue. Conversation with WIFN has continued on this item.

Members of the Project team discussed the anticipated results of the Stage 1 Archaeology Assessment Report and advised that there are opportunities for Bkejewanong (Walpole Island) First Nation to participate in the Stage 1 site inspections if desired. An Invitation was sent for a site visit on November 11, 2022, and November 16, 2022, with no response to date.

4.3.2.3 Caldwell First Nation

A member of the Project team met with Caldwell First Nation via phone call on November 17, 2022, and provided an overview of the Project and schedule. An opportunity to ask questions and provide comments was included as part of the meeting.

Table 12 summarizes the feedback provided during the meeting and resolutions identified.

Table 12: Summary of Feedback Received during Caldwell First Nation Meeting

Theme	Question/Comment
Stage 1 Archaeological Assessment Review and Stage 2 (If required)	• Interest in having archaeological field monitors on site was expressed, depending on whether a stage 2 assessment takes place and this could also depend on CFN's review of the Stage 1 report. ○ Response: A commitment to provide the Stage 1 Archaeology Assessment Report was made. The report was provided, capacity funding paid for the review of the report. The Stage 1 report was accepted by the MECP and no stage 2 report was recommended.

4.3.2.4 Deshkan Ziibiing (Chippewa of the Thames) First Nation

The Project team met virtually with Deshkan Ziibiing (Chippewa of the Thames) First Nation (COTTFN) on January 24, 2023, and provided an overview of the Project and schedule. An opportunity to ask questions and provide comments was included as part of the meeting.

Table 13 summarizes the feedback provided during the meeting and resolutions identified.

Table 13: Summary of Feedback Received during Deshkan Ziibiing (Chippewas of the Thames) First Nation Meeting

Theme	Question/Comment
Overview of EA Process	• COTTFN inquired about the EA process and the timeline on remaining components to finish draft report. ○ Response: Dillon estimated that the draft report will be complete sometime in Q3 (July or August). The final report is anticipated to be complete in August or September, possibly sooner; and, ○ Invenergy mentioned that depending on the outcome of the IESO procurement, one Project may be picked up and not the other. This may change the timeline of when the draft and final reports will be complete. The Notice of Project Update provided COTTFN with an update to the Project and its timeline.
Natural Environment Studies and Post Construction Monitoring	• COTTFN asked what natural environmental field studies are still planned or previously undertaken. Should the need for environmental field studies occur, COTTFN would like to be involved in the studies moving forward. ○ Response: The remaining site visits are likely for the purpose of air and noise assessment, potentially for water, as well as wastewater assessment. Natural environment and archaeology assessments were previously conducted, and no additional studies area required. • COTTFN stated being involved in post-construction monitoring is not a common practice for them but would appreciate being kept informed. ○ The Notice of Project Update provided COTTFN with an update to the Project.

Theme	Question/Comment
IESO	• COTTFN inquired why the design for the second Project (Expansion Facility) would be a simple-cycle thermal Facility instead of combined-cycle and further asked how this decision relates to the IESO and to meet peak demand. ○ Response: Invenergy explained the reasoning behind the existing Facility functions, and that the most appropriate technology to respond to future capacity needs was a low cost, fast start Facility, that is available to be dispatched during times of peak demand. A simple cycle turbine is best suited for fast starts, operating for short durations, and is lowest cost compared to a combined cycle Facility. Invenergy also added that different Facility sizes were considered.* • COTTFN asked to clarify if IESO could approve one Project and not the other, and if it had to do with different procurement streams. ○ Response: Invenergy clarified that yes, the IESO has different procurement streams and that the Upgrade Project is for the same technology stream and the Expansion Project is for the E-LT1 RFP. * • COTTFN asked when the IESO deadline for award is. ○ Response: Invenergy estimated that Mid-February in Q2 there will be an announcement with respect to the Upgrade. A decision on the Expansion could be in April or later.
Consultation and Preferred Method	• COTTFN confirmed that they would like Dillon to use Nation Connect so that all information is kept in order in their system.

* The scope of the Project was reconsidered and as noted in **Section 1.3.2**, is now only focussed on the Facility Upgrades. A separate ERR including consultation will be completed at a later time.

4.3.2.5 Wiiwkwedong (Chippewas of Kettle and Stony Point) First Nation

The Project team met with Wiiwkwedong (Chippewas of Kettle and Stony Point) First Nation (COKSPFN) via phone call on December 5, 2022, and provided an overview of the Project and schedule. An opportunity to ask questions and provide comments was included as part of the meeting.

Table 14 summarizes the feedback provided during the meeting and resolutions identified.

Table 14: Summary of Feedback Received during Wiiwkwedong (Chippewas of Kettle and Stony Point) First Nation First Nation Meeting

Theme	Question/Comment
Project Investment and Partnership	• COKSPFN expressed an interest in Project investment and partnership though the First Nation as a debt holder through a loan guarantee program. ○ Response: Invenergy mentioned that a partnership with St. Clair is not a viable option given that it is an existing and operational facility but agreed to follow-up with COKSPFN should things change.
Review of Project Material	• COKSPFN requested that they be able to review the ERR and the Stage 1 Archaeology Assessment Report and inquired regarding capacity to fund document review. ○ Response: The Stage 1 Archaeology Assessment Report was sent to COKSPFN, Three Fires Group, and Caldwell First Nation. A commitment to provide appropriate capacity funding for the review of reports was made.
Estimated Value of Projects	• COKSPFN requested the estimated value of the Projects. ○ Response: Exact numbers were not available at the time and are considered proprietary.

4.3.3 Follow Up Activities

In April 2023, follow-up activities were conducted with all six Indigenous Communities via phone calls to ensure that they received information about the Project and to identify any potential negative impacts. As detailed in **Section 4.3.2.1**, AFN requested a community meeting following the follow-up phone call to discuss the project updates and concerns regarding benzene emissions and air quality. However, the in-person follow-up meeting successfully addressed their questions and re-established the ongoing channel of communication with their Community for further inquiries, if needed.

In July 2023, the Project Team diligently communicated through emails and phone calls to address and resolve any outstanding commitments. The purpose was to ensure that all commitments were fulfilled by the team.

Indigenous Communities consultation activities are summarized in **Appendix H**.

5.0 Assessment of Environmental Impacts

5.1 Approach to the Assessment of Environmental Impacts

A central task of the EA process is to undertake an assessment of the environmental impacts resulting from the construction, operation, and decommissioning of a proposed facility. For the St. Clair Energy Centre facility Upgrades, this involved:

- A review of the Upgrades proposed to the existing Facility, its characteristics and operations;
- The identification of changes in baseline environmental conditions that may occur due to construction and operation activities of the Facility. This step included using prediction techniques ranging from atmospheric modeling for air and noise to consultation with members of the public regarding the perceived impacts of the Facility;
- The identification of the measures required to prevent or mitigate negative impacts; and,
- The evaluation of the net effects that would remain, after mitigation.

Following this analysis, a determination of significance was made regarding net effects. Significance is generally measured by asking the following questions:

- What is the value of the resource impacted?
- What is the geographic extent of the impact?
- Is this effect likely to occur for a short or long time period? How frequently is the impact likely to occur?
- How does the net effect compare to the baseline condition? Does it represent a substantive or order of magnitude negative change in the baseline condition?
- Is there a substantive public or agency concern?
- What is the ecological and social context for the impact?
- Is the impact reversible?

The following is a summary, organized by environmental parameter, of the assessment conducted to evaluate potential impacts and proposed mitigation measures to address those impacts. The assessment primarily focuses on air quality and noise, as the Upgrade to the Facility does not entail extensive construction or major alterations to

current operations. The potential impacts mainly relate to these two factors, along with surface water and socio-economic impacts. The analysis covers each phase of the Upgrade, including construction, operation, and decommissioning. Additionally, the analysis assesses the significance of any remaining or residual impacts that may persist despite the implementation of mitigation measures.

5.2 Screening Criteria

The *Guide* suggests that a screening level analysis using the screening criteria must be applied to a proposed electricity project in order to focus the main EA work on potential negative environmental impacts. In this study, the screening criteria were applied very early on in the Project planning process (as discussed in the *Guide*), subsequent to establishing an environmental baseline and understanding the construction, operation, and decommissioning phases of the proposed Facility, but prior to undertaking detailed predictions of net effects.

The results of the screening level analysis of the proposed Upgrade are summarized in **Table 15**. For the purpose of completing the checklist, mitigation or impact management measures were not considered. Each criterion is based on a question which is prefaced with the phrase: “Could the project….?” The answer “YES” to a question indicates only that there is potential for an adverse effect to occur. This adverse effect could most likely be managed through appropriate mitigation measures. This approach and criteria checklist is taken directly from the *Guide* (MECP 2023).

5.3 Project Screening Criteria Checklist

Based on preliminary investigations completed for the Project, the screening criteria outlined in **Table 15** is required to be completed and examines the following components and the potential or negative impacts resulting from the Project:

- Air;
- Noise;
- Surface Water;
- Socio-Economic; and,
- Other.

For the components that have the potential to be negatively impacted by the Project, additional considerations, including mitigation or impact management methods, are outlined in **Section 8**.

Through the screening and evaluation/assessment of the potential impacts, it is important to reiterate that the proposed Upgrade to the Facility is being conducted within the confines of the existing Facility only. The assessment has been completed to evaluate the potential impact of the proposed Upgrade where necessary, including the potential cumulative impacts from the operation of the Facility as a whole, once upgraded.

The Upgrade does not require either additional footprint requirements or major construction that would normally be anticipated with the construction of a new generating station. Equipment upgrades and retrofits are anticipated to last between 1 to 2 months and will be completed entirely within the confines of the existing Facility.

As a result, the scope of the impact assessment presented in the following sections is prominently focused on the major sources of potential impacts from the project. Additionally, the existing Facility has been in operation since 2009 and was approved to operate with the completion of an ERR and operating permits.

Table 15: Screening Criteria Checklist

Criterion (Will the Project…)	Yes	No	Additional Information
1. Have negative effects on surface water quality, quantities, or flow?	---	X	
2. Have negative effects on ground water quality, quantity, or movement?	X	---	The only potential for negative effects is through spills, which is reflected in #4 in this table.
3. Cause significant sedimentation, soil erosion or shoreline or riverbank erosion on or off site?	---	X	
4. Cause potential negative effects on surface or ground water from accidental spills or releases to the environment?	X	---	The Project may require a minor update to the containment of the GSU transformers with a greater capacity to retain liquids. As such, this is being carried forward to the impact assessment.

Criterion (Will the Project…)	Yes	No	Additional Information
5. Have negative effects on residential, commercial or institutional land uses within 500 metres of the site?	---	X	
6. Be inconsistent with the Provincial Policy Statement, provincial land use or resource management plans?	---	X	
7. Be inconsistent with municipal land use policies, plans and zoning by-laws?	---	X	
8. Use hazard lands or unstable lands subject to erosion?	---	X	
9. Have potential negative effects related to the remediation of contaminated land?	---	X	
10. Have negative effects on air quality due to emissions of nitrogen dioxide, SO_2, suspended particulates, or other pollutants?	X	---	The Air Quality Impact Assessment indicate that Benzene and BaP are slightly over the MECP limits, mainly due to elevated background concentrations in the area and modeling parameters, which used worst cases assumption that are not indicative of the manner in which the facility operates in most cases. The potential for human health risk in relation to Facility-related impacts is considered negligible.
11. Cause negative effects from the emission of greenhouse gases (CO2, methane)?	X	---	Although the results of the GHG assessment indicate that the Facility generates GHG emissions that are above the annual reporting threshold and must report to ECCC, the predicted Facility emissions after the Upgrade are negligible compared to total provincial emissions.
12. Cause negative effects from the emission of dust or odour?	---	X	
13. Cause negative effects from the emission of noise?	---	X	

Criterion (Will the Project…)	Yes	No	Additional Information
14. Cause negative effects on rare, threatened, or endangered species of flora or fauna or their habitat?	---	X	
15. Cause negative effects on protected natural areas such as ANSIs (Area of Natural and Scientific Interest), ESAs (Environmentally Significant Areas), or other significant natural areas?	---	X	
16. Cause negative effects on wetlands?	---	X	
17. Have negative effects on wildlife habitat, populations, corridors, or movement?	---	X	
18. Have negative effects on fish or their habitat, spawning, movement, or environmental conditions (e.g., water temperature, turbidity, etc.)?	---	X	
19. Have negative effects on migratory birds, including effects on their habitat or staging areas?	---	X	
20. Have negative effects on locally important or valued ecosystems or vegetation?	---	X	
21. Result in inefficient (below 40%) use of a non-renewable resource (efficiency is defined as the ratio of output energy to input energy, where output energy includes electricity produced plus useful heat captured)?	---	X	
22. Have negative effects on the use of Canada Land Inventory Class 1 – 3, specialty crop, or locally significant agricultural lands?	---	X	
23. Have negative effects on existing agricultural production?	---	X	
24. Have negative effects on the availability of mineral, aggregate, or petroleum resources?	---	X	
25. Have negative effects on that availability of forest resources?	---	X	

Criterion (Will the Project…)	Yes	No	Additional Information
26. Have negative effects on game and fishery resources, including negative effects caused by creating access to previously inaccessible areas?	---	X	
27. Have negative effects on neighbourhood or community character?	---	X	
28. Have negative effects on local businesses, institutions or public facilities?	---	X	
29. Have negative effects on recreation, cottaging or tourism?	---	X	
30. Have negative effects related to increases in the demands on community services and infrastructure?	---	X	
31. Have negative effects on the economic base of a municipality or community?	---	X	
32. Have negative effects on local employment and labour supply?	---	X	
33. Have negative effects related to traffic?	---	X	
34. Cause public concerns related to public health and safety?	---	X	
35. Have negative effects on known (previously recognized) or potential built heritage resources, and cultural heritage landscapes? Have negative effects on archaeological resources or areas of archaeological potential?	---	X	
36. Have negative effects on scenic or aesthetically pleasing landscapes or views?	---	X	
37. Cause negative effects on First Nations or other Indigenous Communities?	---	X	
38. Result in the creation of waste materials requiring disposal?	X	---	Minor waste removal from construction will be required.

Criterion (Will the Project…)	Yes	No	Additional Information
39. Cause any other negative environmental effects not covered by the criteria outlined above?	---	X	

5.4 Identification of Project Impacts

Throughout the lifetime of the Facility Upgrades, a variety of activities will take place, each with their own potential positive or negative impacts. During the Installation/Operation/Maintenance/Decommissioning phases, the following activities are expected to occur:

- Procurement (generators, fuel, consumables, ancillary infrastructure);
- Mobilization and Installation (generators, fuel tanks, ancillary electrical infrastructure);
- On-going Supply and Waste Removal;
- Operation of Generators (fuel handling, combustion of fuel, etc.);
- Maintenance of Generators (management of waste oil, filters, consumables);
- De-mobilization (generators and associated infrastructure); and,
- Site Clean-Up (following demobilization).

Potential Facility malfunctions or accidents were also taken into consideration when determining possible negative impacts:

- Fire (generators, ancillary infrastructure);
- Fuel Spill (from generators or tanks);
- Delivery Truck Accident or Spill (on access road);
- Failure of Noise Abatement Equipment;
- Failure of Emission Abatement Equipment; and,
- Air Quality Impacts.

An Air Quality Impact Assessment (AQIA) was completed to assess the worst-case scenario of emissions resulting from Facility operations to provide a conservative assessment of the potential air quality impacts.

Section 3.2.1.2 considered the emissions of various contaminants expected to be emitted during the operation of the Facility, including CACs (e.g., NO_x, PM, SO_2, and CO),

VOCs (e.g., benzene), PAHs (e.g., benzo(a)pyrene or BaP), and greenhouse gases (e.g., CO_2, N_2O, and CH_4).

The AQIA determined that the potential risks to human health from Facility-related and cumulative emissions were negligible. The predicted concentrations of the indicator compounds identified in **Table 5** are below their relevant air quality criteria, except for benzene and BaP (**Table 16**). The predicted concentrations for each of the indicator compounds subject to *O.Reg. 419/05* are anticipated to meet the regulatory compliance criteria (**Table 17**). Facility-related annual concentrations make up less than 1% of the criteria for benzene and 35.1% of the criteria for BaP. It is important to note that the high concentrations of benzene and BaP are primarily attributed to existing elevated background levels in the area, rather than the Facility's operations.

The Facility-related concentrations of BaP do not exceed the applicable MECP point of impingement (POI) annual limit but do slightly exceed the applicable MECP 24-hour POI limit (1.6x). The cumulative concentration of BaP, including the background concentration and the maximum predicted concentration produced by the Facility would exceed the MECP annual POI limit by roughly 4-fold and the 24-hour POI limit by roughly 3-fold.

The risk analysis that was completed as part of AQIA, showed that the frequency of exceedance of modelled 24-hour average ambient air BaP concentrations over the applicable MECP 24-hour average POI limit is very low at sensitive receptor locations for the 5-year assessment period. At the worst-case receptor location, the exceedance frequency is only 2.2%, indicating that 98% of the time during the 5-year assessment period, there would be no exceedances of the 24-hour average POI limit at this receptor location.

It is important to note that the analysis considers a higher emissions level than the actual operating conditions of the Facility. Historical net capacity factors indicate that the Facility operates at much lower levels, leading to a very low frequency of exceedances based on the worst-case scenario analysis.

When the conservatism inherent to the air quality assessment and air quality modelling is considered in addition to the low exceedance frequency over the MECP 24-hour average POI limit, and the lack of exceedance of the facility-related maximum annual average air BaP concentration over the MECP annual average POI limit, the potential for

human health risk in relation to facility-related and cumulative 24-hour average and annual average ambient air BaP concentrations is essentially negligible.

The Facility is estimated to generate approximately 1,102 kilotonnes of GHG annually which is above the annual GHG reporting threshold of 10 kilotonnes. Therefore, the Facility is required to report annual GHG emissions to Environment and Climate Change Canada (ECCC) (**Table 18**). The Facility's predicted emissions for the Project would result in a 0.73% contribution to Ontario's total GHG emissions profile and a 1.91% contribution to Ontario's stationary combustion source emissions profile.

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Table 16: Air Quality Environmental Effects Assessment – Emission Summary Table

Contaminant Name	Total Site-Wide Emission Rate [g/s]	Maximum Modelled Concentration at Sensitive Receptors [3][5] [µg/m³]	Background Concentration [6] [µg/m³]	Maximum Cumulative Concentration at Sensitive Receptor [µg/m³]	Averaging Period [hrs]	MECP POI Criteria [µg/m³][1]	Benchmark [4]	Facility Maximum Percentage of the Criteria [%]	Maximum Cumulative Percentage of the Criteria [%]
Nitrogen Oxides	6.63E+01	80.7	19	100	1	400	AAQC/B1	20.2%	24.9%
Nitrogen Oxides	6.63E+01	19.5	17	36	24	200	AAQC/B1	9.8%	18.2%
Carbon Monoxide	1.54E+01	21.3	478	499	0.5	6,000	B1	< 1%	8.3%
Carbon Monoxide	1.54E+01	17.7	398	416	1	36,200	AAQC	< 1%	1.1%
Carbon Monoxide	1.54E+01	6.9	392	399	8	15,700	AAQC	< 1%	2.5%
Particulate Matter	4.54E+00	3.0	43	46	24	120	AAQC/B1	2.5%	38.5%
Particulate Matter	4.54E+00	0.18	24	24	Annual	60	AAQC	< 1%	40.5%
PM10	4.54E+00	3.0	24	27	24	50	AAQC	5.9%	53.9%
PM2.5	4.54E+00	3.0	13	16	24	27	AAQC	10.9%	58.9%
PM2.5	4.54E+00	0.18	7	7	Annual	8.8	AAQC	2.1%	84.3%
Sulphur Dioxide	1.87E+00	3.5	8.8	12	10-min	178	AAQC	2.0%	6.9%
Sulphur Dioxide	1.87E+00	2.1	8.8	10.9	1	100 (2)	B1	2.1%	10.9%
Sulphur Dioxide	1.87E+00	0.4	9.4	9.8	24	275	B1	< 1%	3.6%
Sulphur Dioxide	8.02E-01	0.01	4.1	4.2	Annual	10 (2)	B1	< 1%	41.5%
Benzene	6.58E-03	0.0014	2.1	2.1	24	2.3	AAQC	< 1%	90.5%
Benzene	2.83E-03	0.00005	1.1	1.1	Annual	0.45	AAQC/B1	< 1%	237.6%
Benzo[a]pyrene	4.80E-04	0.000081	0.000070	0.000151	24	0.00005	AAQC	161.3%	301.9%
Benzo[a]pyrene	1.98E-04	0.0000035	0.000038	0.000042	Annual	0.00001	AAQC/B1	35.1%	419.8%

Notes:

(1) Criteria listed in the MECP AAQC and Air Contaminants Benchmarks (ACB) List Version 3.0, dated April 2023.

(2) MECP proposed POI criteria, effective on July 1, 2023. The most stringent SO2 MECP criteria for each averaging period are used for the determination of compliance.

(3) The maximum concentrations at sensitive receptors. Meteorological anomalies were only eliminated for the results of Benzo(a)pyrene (24-hr average) following section 6.5 of the MECP's AMMGO.

(4) B1 – Benchmark 1 – Exceedance of a Benchmark 1 concentration triggers specific actions under *O.Reg. 419/05*.

B2 – Benchmark 2 – Exceedance of a Benchmark 2 concentration triggers a toxicological assessment to determine the likelihood of adverse effects.

(5) For assessing the annual concentration of contaminants, the maximum annual concentration among multiple years is used following the ADMGO.

(6) Background concentrations of contaminants are estimated based on the 90th percentile of monitoring data.

Table 17: Air Quality Compliance Assessment – Emission Summary Table

Contaminant Name	Total Site-Wide Emission Rate [g/s]	Air Dispersion Model Used	Maximum Concentration at Offsite Receptors (3)(5) [µg/m³]	Averaging Periods [hrs]	MECP POI Criteria [µg/m³](1)	Benchmark (4)	Percentage of POI Criteria [%]
Nitrogen Oxides	6.63E+01	AERMOD v. 22112	173.6	1	400	B1	43.4%
Nitrogen Oxides	6.63E+01	AERMOD v. 22112	124.3	24	200	B1	62.1%
Carbon Monoxide	1.54E+01	AERMOD v. 22112	46.3	0.5	6,000	B1	< 1%
Particulate Matter	4.54E+00	AERMOD v. 22112	8.2	24	120	B1	6.8%
Sulphur Dioxide	1.87E+00	AERMOD v. 22112	2.7	1	100 (2)	B1	2.7%
Sulphur Dioxide	1.87E+00	AERMOD v. 22112	0.7	24	275	B1	< 1%
Sulphur Dioxide	8.02E-01	AERMOD v. 22112	0.02	Annual	10 (2)	B1	< 1%
Benzene	6.58E-03	AERMOD v. 22112	0.003	24	100	DAV	< 1%
Benzene	6.58E-03	AERMOD v. 22112	0.00018	Annual	4.5	AAV	< 1%
Benzene	2.83E-03	AERMOD v. 22112	0.00008	Annual	0.45	B1	< 1%
Benzo[a]pyrene	4.80E-04	AERMOD v. 22112	0.00019	24	0.005	DAV	3.8%
Benzo[a]pyrene	4.80E-04	AERMOD v. 22112	0.000013	Annual	0.0001	AAV	13.0%
Benzo[a]pyrene	1.98E-04	AERMOD v. 22112	0.000005	Annual	0.00001	B1	53.7%

Notes:
(1) Criteria listed in the MECP AAQC and Air Contaminants Benchmarks (ACB) List Version 3.0, dated April 2023.
(2) MECP proposed POI criteria, effective on July 1, 2023. The most stringent SO2 MECP criteria for each averaging period are used for the determination of compliance.
(3) The maximum concentrations at MECP grid receptors (i.e., offsite receptors along and beyond the property boundary).
(4) B1 – Benchmark 1 – Exceedance of a Benchmark 1 concentration triggers specific actions under O.Reg. 419/05.
B2 – Benchmark 2 – Exceedance of a Benchmark 2 concentration triggers a toxicological assessment to determine the likelihood of adverse effects.
DAV– Daily Assessment Value which represents the maximum daily exposure possible based on the maximum daily emission rate.
AAV– Annual Assessment Value which represents the maximum yearly POI concentrations based on the maximum daily emission rate maintained over a whole year.
(5) For assessing the annual concentration of contaminants, the maximum annual concentration among multiple years is used following the ADMGO.

Table 18: Greenhouse Gas (GHG) Emissions

GHGs	Site-wide Annual Emission Rate	Annual Emissions	GWP(1)	CO_2 Equivalent
	g/s	t/yr	-	kt/yr
Carbon Dioxide	34,704.98	1,094,456	1	1,094
Nitrous Oxide	0.72	22.61	265	5.992
Methane	2.10	66.10	28	1.851
Facility Annual GHG Emission				1,102

Note:
1. Global Warming Potential (GWP) from the Fifth Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC).

5.4.1 Noise Impacts

The noise impact assessment results for the steady-state operation of the Facility are presented in **Table 19** and illustrated graphically in **Figure 6**. The results confirm that the Facility with the proposed Upgrades remains in compliance with applicable noise performance limits.

Table 19: Steady State Noise Impacts

Point of Reception	POR Description	Sound Level at POR, LEQ [dBA]	Performance Limit, LEQ [dBA] (Day/Evening/Night)	Compliance with Performance Limit	Acoustical Classification Area
R1	Residence – 855 Petrolia Line	43	60.4/54.2/45.3	Yes	Class 1
R1_O	Residence – 855 Petrolia Line	42	60.4/54.2/(N/A)	Yes	Class 1
R2	Residence – 894 Petrolia Line	44	50/50/45	Yes	Class 1
R2_O	Residence – 855 Petrolia Line	43	50/50/(N/A)	Yes	Class 1
R3	Residence – 885 Petrolia Line	44	60.4/54.2/45.3	Yes	Class 1
R3_O	Residence – 885 Petrolia Line	42	60.4/54.2/(N/A)	Yes	Class 1

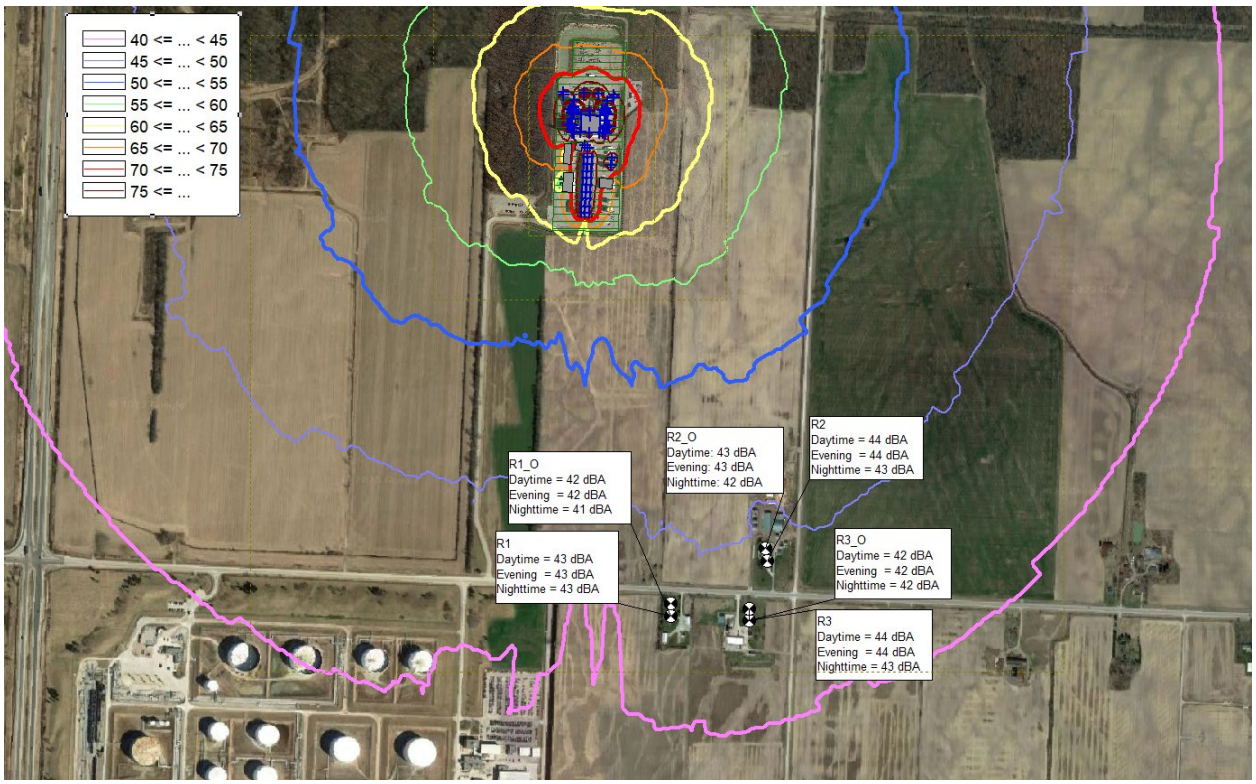

Figure 6: Noise Impact Contour Map from Steady State Operation

The noise impact assessment results for testing of the Facility's fire water pump are presented in **Table 20** and illustrated graphically in **Figure 7**. The results confirm that the Facility with the proposed Upgrades remains in compliance with applicable noise performance limits.

Table 20: Noise Impacts from Fire Water Pump Testing

Point of Reception	POR Description	Sound Level at POR, LEQ [dBA]	Performance Limit, LEQ [dBA] (Day/Evening/Night)	Compliance with Performance Limit	Acoustical Classification Area
R1	Residence – 855 Petrolia Line	21	60.4/54.2/45.3	Yes	Class 1
R1_O	Residence – 855 Petrolia Line	19	60.4/54.2/(N/A)	Yes	Class 1
R2	Residence – 894 Petrolia Line	24	50/50/45	Yes	Class 1
R2_O	Residence – 855 Petrolia Line	22	50/50/(N/A)	Yes	Class 1
R3	Residence – 885 Petrolia Line	20	60.4/54.2/45.3	Yes	Class 1
R3_O	Residence – 885 Petrolia Line	18	60.4/54.2/(N/A)	Yes	Class 1

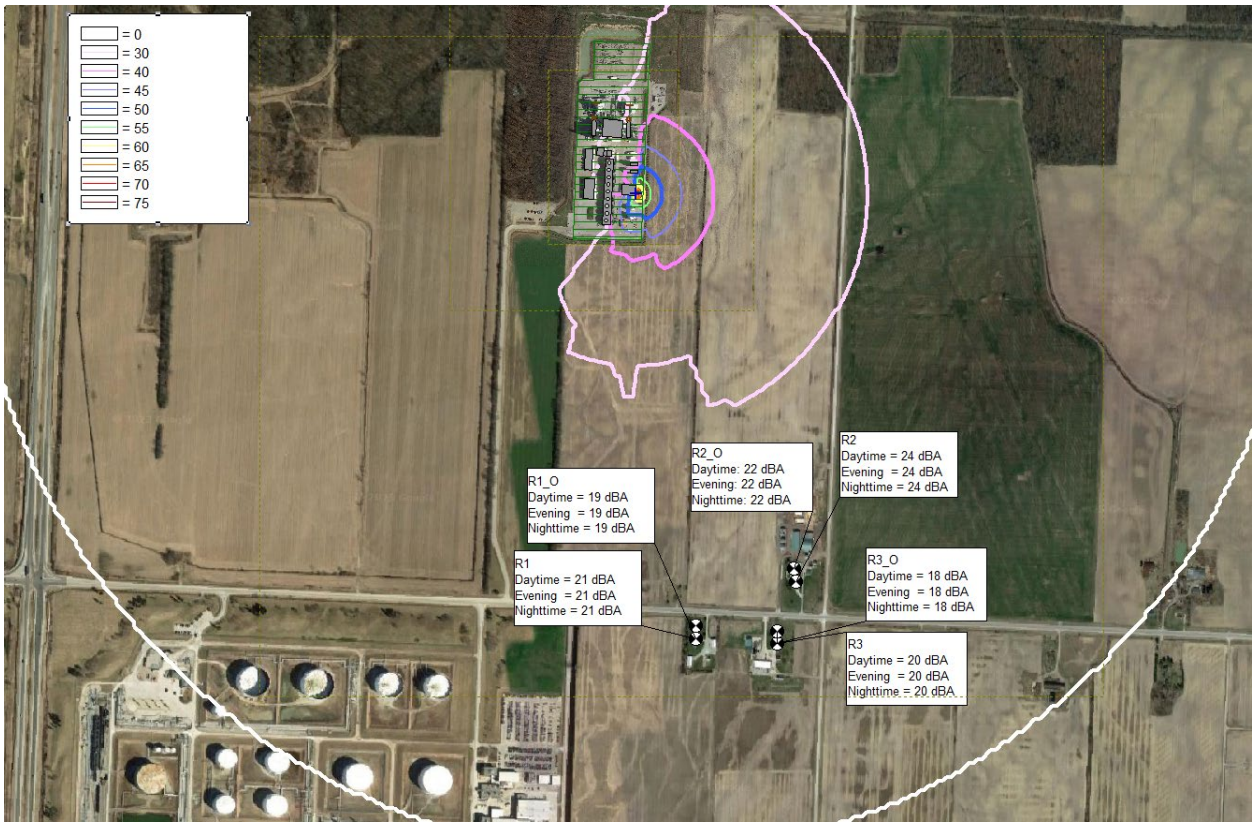

Figure 7: Noise Impact Contour Map from Testing of Fire Water Pump

5.4.2 Natural Environment Impacts

During the construction phase of the St. Clair Energy Centre Upgrade, there may be temporary minor disturbances such as noise, dust, and vibration that may impact wildlife utilizing the forest and other surrounding habitats.

There would be no increase to the noise levels during operation of the upgraded facility. There may be minimal increase is noise disturbance to wildlife as a result of small increase to the hours of operation. Therefore, it is expected that the Upgraded Facility operations will not cause any significant habitat disturbances than those already existing due to the original Facility.

The Facility Upgrades will not require any additional footprint and therefore no tree or vegetation removal is anticipated.

5.4.3 Surface Water Impacts

There is anticipated to be minimal risk of chemical spills and sedimentation that would contaminate the groundwater, surface water quality, or aquatic habitats.

5.4.4 Socio-Economic Impacts

The Upgrades to the St. Clair Energy Centre do not involve any physical expansion of the plant, therefore, it is not expected to have an impact on existing or planned land use. The Project aligns with the existing St. Clair Zoning By-Law, and no amendment to the by-law is required.

Since the Facility is located in a rural area, it is surrounded by industrial and agricultural uses that are typically set back further from the road compared to urban or residential areas. During the construction phase, there may be minimal temporary nuisances such as noise, dust, and effluent releases into the environment for a period of approximately 45 days.

The construction activities are not anticipated to cause any traffic disruptions.

As stated earlier in **Section 5.4** the construction phase will offer local procurement and temporary labor opportunities, which have been identified as areas of interest for some consulted Indigenous Communities, specifically Aamjiwnaang First Nation. Construction related to the Upgrade will be managed and undertaken by GE.

5.4.5 Cultural Heritage Resources Impacts

Studies outlined in **Section 3.6** revealed that the Project Area is not in proximity (i.e., within 300 m) to features that signal archaeological potential. Further, the Project Area underwent extensive ground disturbance during the construction of the existing Facility. As a result, no impact to archaeological resources is anticipated.

Through the completion of a CHS checklist for the Project it was determined that there is low potential for built heritage or cultural heritage landscapes on the property. Additionally, no cultural features were identified for the Project Area through Indigenous consultation. As such, no impact to cultural heritage resources is anticipated.

5.4.6 Waste Management

During the construction phase of the Project, efforts will be made to minimize the environmental impact by implementing proper waste management procedures. Waste reduction strategies will be employed, including accurate material ordering, efficient storage, recycling efforts, and careful handling to minimize material waste. Licenced waste contractors will ensure that waste is disposed of at approved waste management facilities, in compliance with local regulations.

The wastewater generated during the operation of the Facility will be managed in accordance with local regulations and best practices. The Facility will be connected to the municipal wastewater system, ensuring that the wastewater undergoes appropriate treatment before being discharged into the environment.

6.0 Mitigation Measures and Monitoring Plan

Invenergy is committed to the mitigation plan that addresses the impacts identified in **Section 5**. The following is a summary of proposed mitigation measures for the Project during construction and operations phases (**Table 21**).

Table 21: Summary of Potential Impacts, Proposed Mitigation Measures, Monitoring, and Net Effects

Parameter	Potential Impacts	Proposed Mitigation and Monitoring	Net Effects
Air Quality	Minimal increase in air emissions and dust during construction	• Equip vehicles with emission controls, as applicable, and operate within regulatory requirements; • Limit long-term idling, where possible; • Implement dust control measures during dry and windy conditions; and, • Limit construction activities during high wind events.	None
	Benzene & BaP and GHG emissions during operation resulting from Facility Upgrades	• The Facility uses modern GT technology equipped with modern emission monitoring and control/reduction technologies including: ○ Dry Low-NOx (DLN) combustors for the GTs; ○ A Continuous Emissions Monitoring System (CEMS) installed on the GT exhaust stacks to measure continuous emission concentrations of contaminants.	The Facility-related concentrations of BaP do not exceed the applicable MECP point of impingement (POI) annual limit but do slightly exceed the applicable MECP 24-hour POI limit (1.6x) under worst case scenario conditions.
Noise	Facility with the proposed Upgrades remains in compliance with applicable noise performance limits.	No mitigation is required.	None
Natural Environment	Minimal noise disturbance to wildlife as a result of Upgrade construction activities. No increase to the noise levels during operation of the upgraded facility. Minimal increase is noise disturbance to wildlife as a result of small increase to the hours of operation.	• Visual monitoring for wildlife species and avoidance, where encountered, if possible; • SAR incidentally encountered must be protected from harm and harassment; • Equipment and scaffolding will be used within the fenced Facility area on existing asphalt or gravel surface; and, • Refer to **Appendix C, Section 4.3** for detailed Wildlife Impact Mitigation Plan.	None
Surface Water	Construction Phase: • On-site spill of construction-related equipment fuel or lubricants stored on-site; and, • Equipment and operator failure during construction leading to the collapse or dropping of heavy equipment, and parts. Operation Phase: • On-site spill of chemical or hazardous material handling (spill); • Process upset (uncontrolled spike of process chemicals); and, • Failure of the stormwater management system.	Construction Phase: • Prevention/control and mitigation measures are available at the existing Facility for construction-related equipment or will be supplied by the contractors; and, • A contractor with proven experience in the undertaking of these works will be used. This provides a high level of confidence that the construction phase will be carried out in conformance with design, best construction practices, and safety plans that have been specifically developed to reduce the potential for equipment failure. Operation Phase: • Prevention/control and mitigation measures are available at the existing Facility for construction-related equipment; and, • The existing Facility has an appropriate Environmental Management Plan (EMP) and material handling process in place that includes prevention and control measures which meet or exceed provincial standards sufficient to address the concern. The EMP and material handling process will be reviewed and updated to incorporate the new alteration of GSU foundations and associated oil/water separator and catchment system.	No net effects anticipated following implementation of the recommended mitigation measures.

Parameter	Potential Impacts	Proposed Mitigation and Monitoring	Net Effects
Socio-Economic	Minimal, if any, nuisance noise, dust, and visual effects during construction	• The community will be notified regarding the start of construction; • Construction activities will be carried out in compliance with municipal Noise By-laws with respect to noise and construction equipment usage. Applicable noise by-law exemptions will be sought if construction activities cannot be avoided on Statutory Holidays, Sundays or at night; • General noise control measures will be implemented during construction (i.e., proper maintenance of equipment, muffling systems, minimum idling of equipment and vehicles); and, • Dust control measures will be implemented during dry and windy conditions and construction activities will be limited during high wind events.	None
	Job creation	• No mitigation required.	None

6.1 Future Commitments

6.1.1 General Commitments

The following general future commitments have been established:

- The existing Facility has appropriate EMP and material handling process in place that includes prevention and control measures which meet or exceed provincial standards sufficient to address the concern. The EMP and material handling process will be reviewed and updated to incorporate the new alteration of GSU foundations and associated oil/water separator and catchment system;
- The existing Facility has monitoring programs in place for air quality, wastewater discharge, etc. and will continue to perform the monitoring activities in place to ensure compliance with the facilities ECAs; and,
- As noted under **Section 2.8**, the decommissioning of the existing power plant was previously addressed as part of the St. Clair Energy Centre EA completed in 2006 and commitments made in the June 2006 EA are still considered appropriate. Prior to decommissioning, St. Clair Energy Centre will undertake the necessary actions to comply with the requirements of the Ontario *Environmental Assessment Act* and other applicable federal and provincial regulations and policies.

6.1.2 Consultation Commitments

Ongoing consultation commitments have been established with various stakeholders and Indigenous Communities. These commitments, outlined in **Section 4.0** of the report, will continue through the design and construction phase, if an ERR specifically for the proposed Facility Expansion is pursued. The following commitments have been identified:

- Invenergy will conduct follow-up activities with landowners residing in the Study Area to address any questions or concerns that may arise during the Expansion process;
- Chippewas of Kettle and Stony Point will be engaged throughout the Expansion ERR for opportunities in project investment and partnership;

- A commercial and community betterment discussion meeting will be conducted with the Walpole Island First Nation to engage in productive dialogue and explore potential areas of improvement and collaboration related to the Expansion; and,
- Deshkan Ziibiing First Nation will be involved throughout the Expansion ERR, particularly if any environmental field studies are conducted. Additionally, their interest in participating in post-construction monitoring efforts will be gauged, providing an opportunity for their involvement at that stage.

7.0 Environmental Advantages and Disadvantages

In completing the report, an evaluation of the proposed St. Clair Energy Centre Upgrade was conducted to assess its overall advantages and disadvantages. These findings are summarized in **Table 22** below. The advantages represent the net benefits that the Project would bring to the community and the surrounding environment, while the disadvantages highlight the negative effects that are anticipated.

Table 22: Advantages and Disadvantages of the Proposed Project

Advantages	Disadvantages
• New power generation to meet electricity demand: The St. Clair Energy Centre Upgrade will provide additional power generation capacity to meet the growing electricity demand in the area and using a technology requested by the IESO; and, • Supporting the adoption of renewable generation: The use of natural gas, one of the cleanest burning fuels, as a fuel source for power generation results in a net benefit to the electrical system and supports additional renewable energy generation connecting to the provincial grid.	• Negligible effect on local air quality: While there may be some localized effects on air quality during the construction and operation of the Facility, the overall impact is considered negligible. Proper mitigation measures and emission controls are implemented to minimize potential negative effects.
• Enhanced power supply reliability: The Upgrade improves the security and reliability of the power supply in Ontario.	• Temporary auditory effects: During the construction and maintenance activities, there may be temporary minor noise disturbances. However, these effects are expected to be short-term and localized, with measures in place to minimize disruptions to the surrounding community.
• Economic contribution: The St. Clair Energy Centre Upgrade brings economic benefits to the local and regional economy. It creates job opportunities during the construction, operation, and maintenance phases, stimulating economic growth and supporting local businesses and services.	

Advantages	Disadvantages
• Compliance with planning regulations: The Project conforms to the Provincial Policy Statement (PPS) and the relevant regional and municipal Official Plans.	
• Excellent proximity to related services: The project is sited in close to transmission lines and natural gas pipelines	
• Minimal construction activities: The Project does not involve major construction activities, minimizing disruptions and impacts associated with construction noise, traffic, and visual changes.	

The table above demonstrates that the advantages associated with the proposed St. Clair Energy Centre Upgrade significantly outweigh the identified disadvantages. The Project contributes to clean energy generation, enhances power supply reliability, and provides economic benefits while complying with planning regulations. The negative impacts include some localized effects on air quality during the construction and operation of the Facility, as well as temporary, short-term noise disturbances. The overall impact is considered negligible with proper mitigation measures and emission controls implementation to minimize any potential negative effects. Overall, the Project's benefits support its viability and positive contribution to the energy sector in Ontario.

8.0 Conclusions

The St. Clair Energy Centre Upgrade achieves stated electrical system needs outlined in the IESO 2022 Annual Acquisition Report and the Resource Eligibility Interim Report (2022b), including mitigating reliability concerns and fulfils the request set out in the Minister of Energy Direction letter for a certain amount of natural gas generation, as outlined in **Section 1.4**.

The EA, analysis, studies, and screening conducted for the St. Clair Energy Centre Upgrade study demonstrate that the Project aligns with environmental standards and regulatory requirements set out in *O.Reg. 116/01* and the *Guide*. The comprehensive studies on air quality, noise, and other environmental parameters indicate that the potential impacts associated with the Upgrade are negligible, localized and temporary and can be effectively mitigated.

Throughout the EA process, diligent stakeholder engagement was conducted, involving adjacent landowners, the public, agencies, Indigenous Communities, and other interested parties. Their input and concerns were considered, and efforts were made to address and mitigate issues raised.

Based on the findings of the EA, it can be concluded that the benefits of the Upgrade, such as increased power generation to address emerging electricity system needs and economic contributions, strongly outweigh potential disadvantages. The proposed Project presents a responsible and viable solution to meet Ontario's energy demands while minimizing adverse environmental effects.

9.0 References

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