Proposed East Windsor Generation Facility Expansion

A reliable backstop to help meet Windsor's future power needs

Capital Power

May 2024

There is an immediate need for new electricity supply in Ontario. In response, Capital Power is proposing the East Windsor Generation Facility Expansion.

This 100 megawatt simple-cycle gas turbine generator would help address the projected generation shortfall in the Windsor-Essex area that could occur as early as 2025 and support economic growth in the region.

Designed to operate as a peaking facility, the project would provide dependable capacity when other generation sources (wind, solar, baseload generation) cannot meet demand.

Architectural rendering of the proposed expansion project (right) alongside the existing EWCC facility (left)

Welcome

Proposed East Windsor Generation Facility Expansion

Open House | May 1, 2024

Capital Power

Powering Change by Changing Power™

About Us

Capital Power is a growth-oriented North American power producer, publicly traded (TSX: CPX) and headquartered in Edmonton, Alberta. We create innovative electricity solutions to electrify the world reliably and affordably while protecting the planet for future generations.

Land Acknowledgement

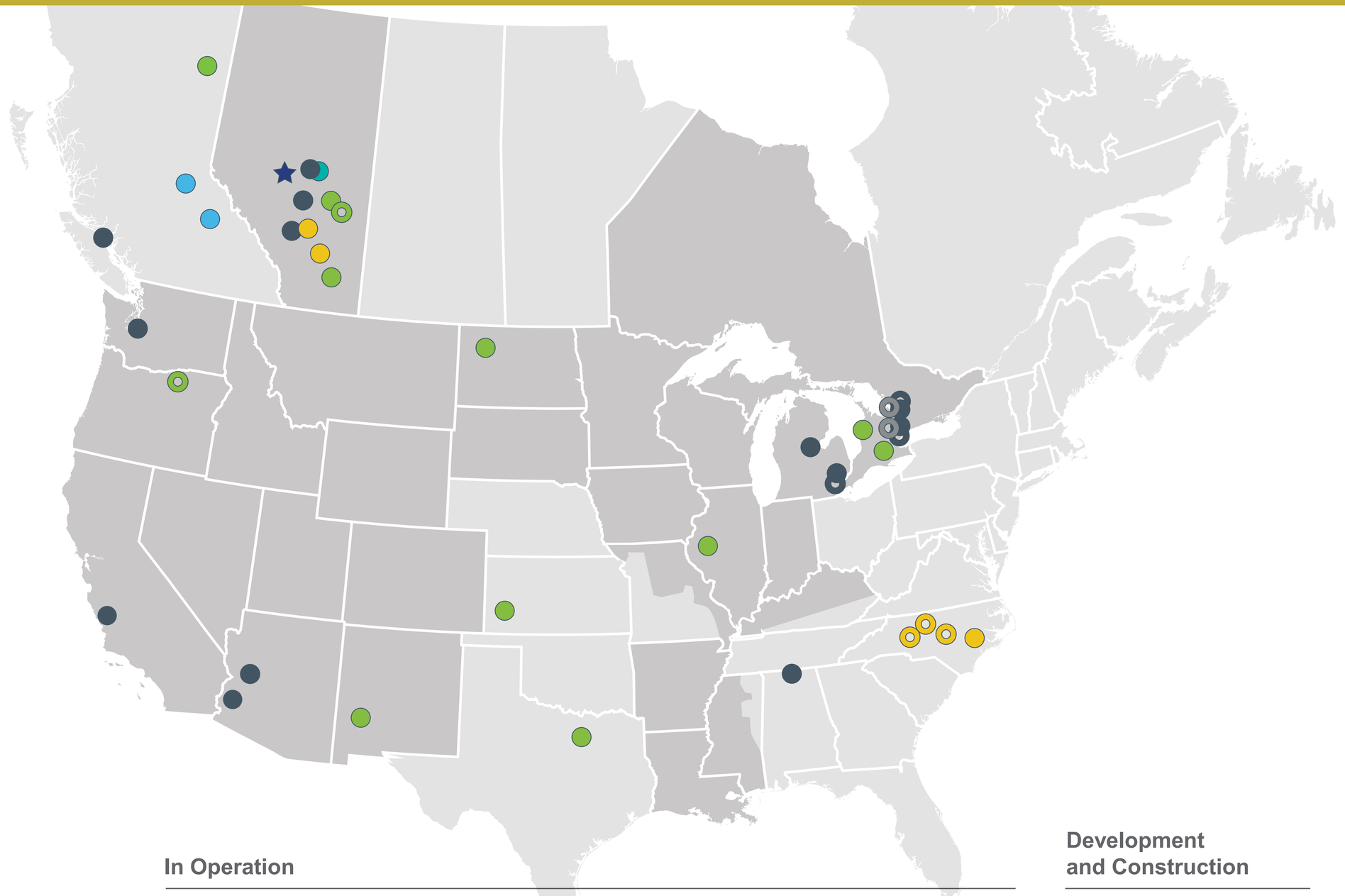
We acknowledge the land on which we gather is the Traditional Territory of the Three Fires Confederacy of First Nations, which includes the Ojibwa, the Odawa, and the Potawatomie.

Capital Power respectfully acknowledges that we operate within the ancestral homelands, traditional and treaty territories of the Indigenous Peoples of Turtle Island, or North America. We acknowledge the diverse Indigenous communities that are located in these areas and whose presence continues to enrich the community.

Capital Power's Generation Facilities

32
Operating Facilities

~9,300
Megawatts (MW)



*Genesee 1, 2, 3 shown as one facility; includes the Genesee Repowering Project.

May 2024

Providing Safe, Reliable Electricity to Ontario

East Windsor Cogeneration Centre

York Energy Centre*

Goreway Power Station

Port Dover and Nanticoke Wind

Kingsbridge Wind

* Owned in a 50/50 partnership with Manulife.

~350MW of new generation and storage capacity in development

5
Facilities

1,500MW
Approximately

40
Employees

$millions spent annually on locally contracted support and equipment

Existing East Windsor Cogeneration Centre (EWCC)

- 84 MW peaking facility
- Began operations in 2009; acquired by Capital Power in 2017
- EWCC is dispatched by the IESO to meet overall system needs
- Serves as a source of reliable power to meet peak-system needs (heat-waves, cold-snaps, high industrial demand)

Supporting the community

Capital Power invests to create positive impacts in communities.

In 2023, we donated over $3.4M to community organizations in Canada and the U.S. that support Climate Action, Equity and Opportunity, and Wellbeing.

We are proud to have supported local community organizations and initiatives in the Windsor area:

- The Windsor Residence for Young Men (WRYM)
- Drouillard Place
- Ford City Business Improvement Association
- The United Church Downtown Mission of Windsor INC
- Noah's House Mental Health Foundation
- Family Services Windsor-Essex
- Downtown Mission of Windsor
- Windsor & Essex County Crime Stoppers, Inc.
- The Windsor Parade Corporation
- Windsor Lifeline Outreach
- Hiatus House
- East Windsor Community Service Centre

Your Input is Important

Please provide your comments on our feedback forms. Comments received will inform the Environmental Review process.

Comments, questions, or wish to be added to our email list? Contact us at:

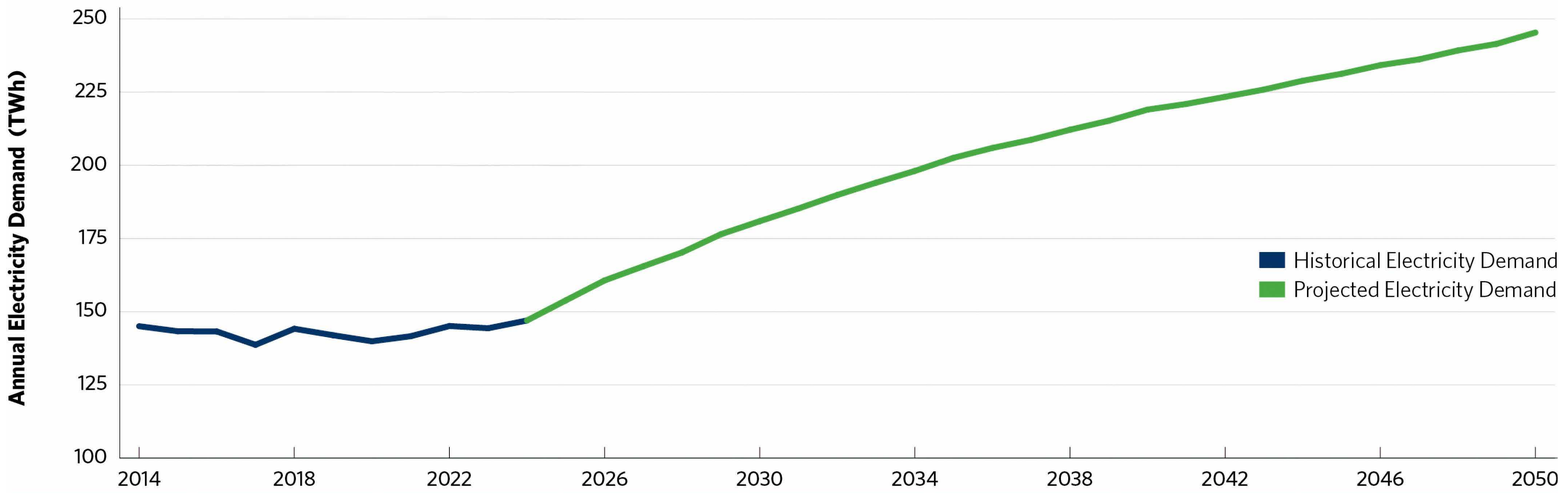
Email: info@capitalpower.com

Phone: 1-855-703-5005

Mail: Capital Power
224 Cadillac Street
Windsor, ON N8Y 2S7

capitalpower.com

Ontario’s Electricity Demand to Grow 60% by 2050

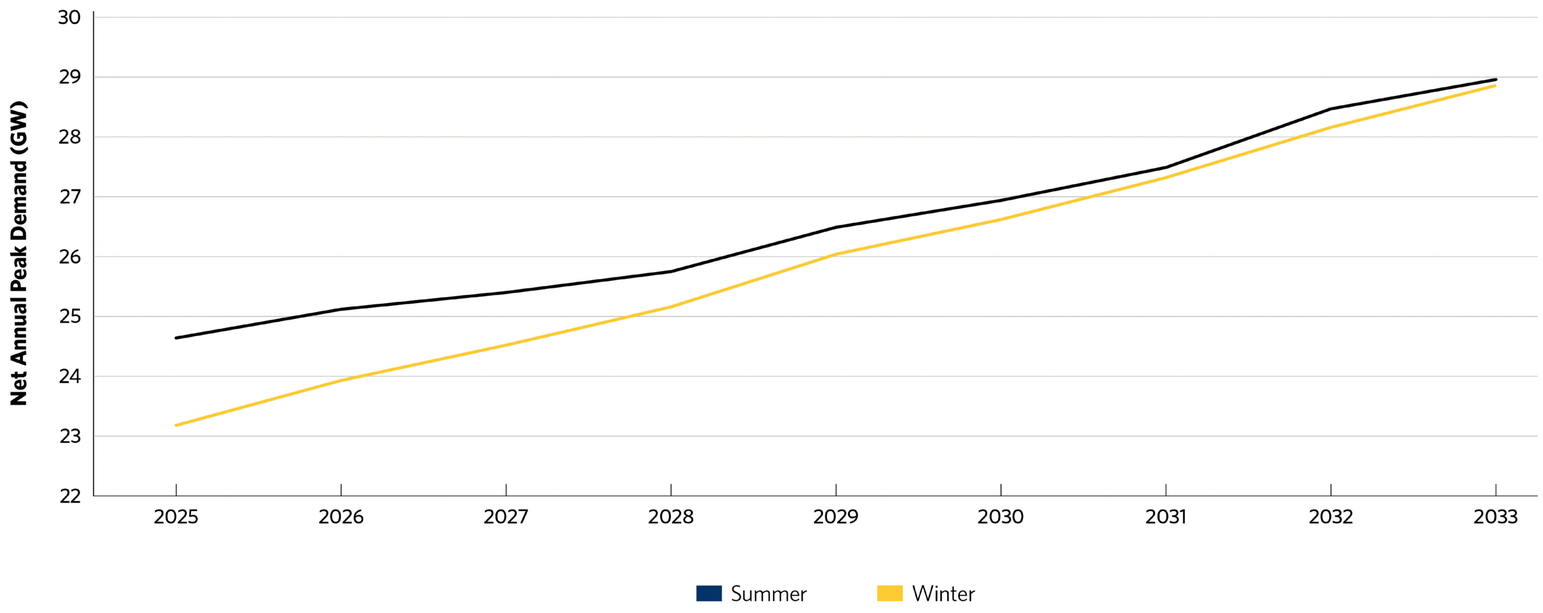


Ontario’s Electricity Demand – Historical and Forecast

Electricity demand in Ontario remains on course to rise steadily year over year, with total demand increasing 60 per cent over the next 25 years. This is driven by a multitude of factors: new industrial projects, including mining and electric vehicle manufacturing; greenhouse expansion; electrification of transportation; and continued population growth.

Ontario Seasonal Peaks 2025 to 2033

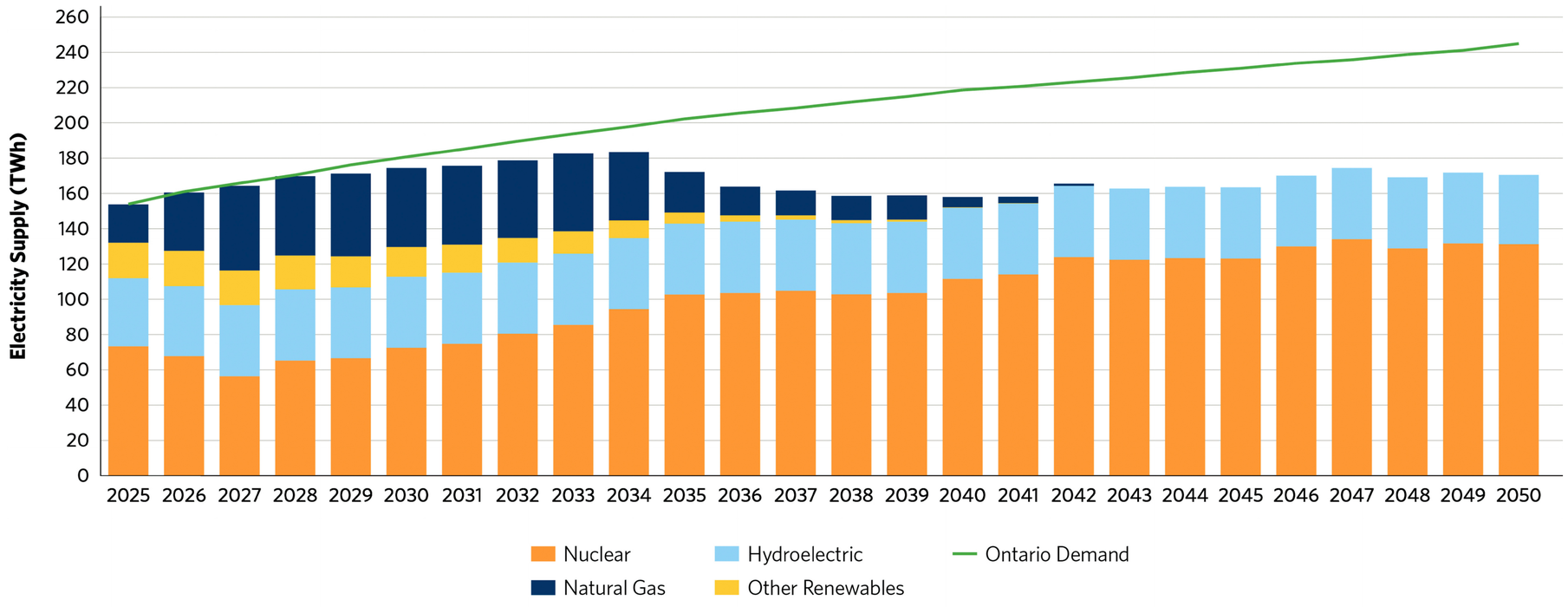
In Ontario, electricity demand peaks in summer due to air conditioners. However, with growing energy demand in agriculture, home heating and transportation, Ontario is expected to become dual peaking by the early 2030s.



Source: Ontario’s Independent Electricity System Operator

New Energy Needed to Supply Ontario Communities

Energy Adequacy Outlook



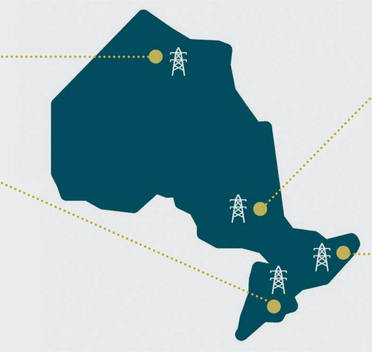
The IESO is working to address overall energy production needs in the next decade and has ongoing competitive procurements to help address these shortfalls, including upcoming procurements that seek supply from wind, solar, hydro and biofuel sources.

Remote Communities

Connecting First Nations communities, large mining operations, renewable generation and remote areas of northern Ontario.

Southern and Central Ontario

Incorporating new non-emitting supply such as small modular reactors and storage; integrating potential Bruce Power expansions; enabling economic development and increasing supply to the Greater Toronto Area.



Northern Ontario

Exploring transmission expansion between Toronto and Sudbury to increase overall reliability and deliver power from generators in the north.

Eastern Ontario

Evaluating transmission equipment end of life, support to Ottawa and other parts of eastern Ontario as well as import capacity with Quebec and New York.

As more electricity is needed to support economic growth and increasing demand, the IESO is recommending transmission projects that will deliver the new supply to where it is needed, as well as replace and upgrade aging infrastructure.

Source: Ontario's Independent Electricity System Operator

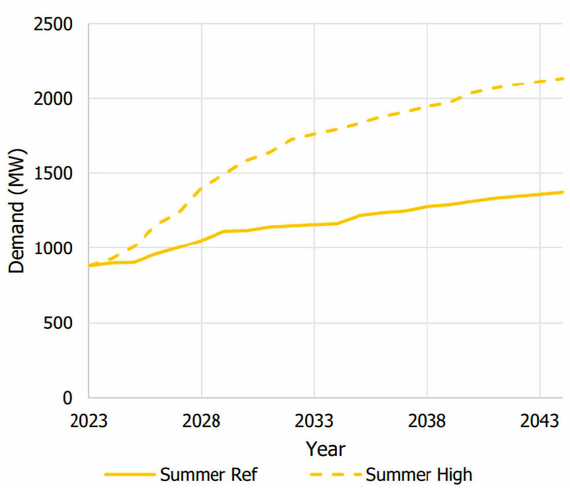
Growing Demand for Electricity in the Windsor-Essex Region

The region encompasses a number of municipalities and Indigenous communities from the western portion of the Municipality of Chatham-Kent going west towards the City of Windsor, the Town of LaSalle, and the Town of Amherstburg.

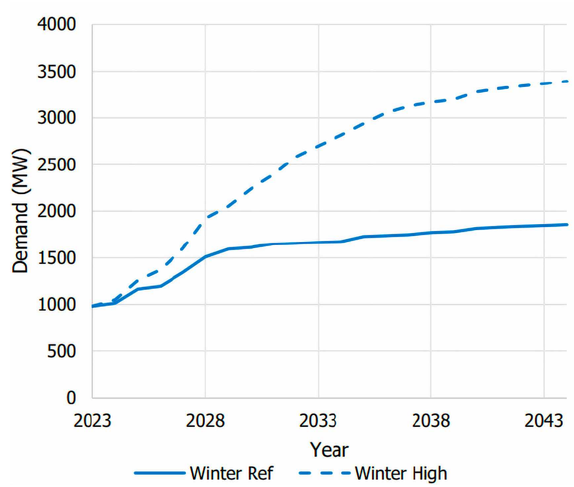
IESO is using a multipronged approach to develop solutions that will provide 2,300MW of additional capacity by 2035 in Windsor-Essex and Chatham-Kent area, including:

- New switching station in the Municipality of Lakeshore;
- Three new sets of transmission lines (Chatham to Lakeshore, Lambton to Chatham and Longwood to Lakeshore);
- Targeted energy efficiency programs and innovative projects; and
- Local generation sources.

Draft Windsor-Essex Summer Forecasts



Draft Windsor-Essex Winter Forecasts



Windsor-Essex growth is driven by higher uses within all demand sectors, including residential, industrial, and commercial. While strong indoor agricultural growth has been driving electricity demand and needs in the region over the last few years, economic manufacturing and automotive development across the region, electrification, and local climate action plans are expected to be key factors for future electricity needs.

Near term summer electricity demand is expected to grow twice the 20-year average of 2% per year. Near term winter electricity demand is expected to grow 9% in the near term.

This growing demand drives the need for incremental generating capacity and transmission.

Graphs are draft forecasts from the ongoing Windsor-Essex Integrated Regional Resource Plan.

Proposed Project Background

- New simple-cycle gas turbine generator capable of generating approximately 100 megawatts (MW).*
- Peaking facility would provide reliable capacity when other sources cannot meet demand.
- **Would run on contract with Ontario's Independent Electricity System Operator (IESO), which decides when to dispatch the facility, based on electricity demand.**
- Gas turbine generator would have the ability to quickly ramp up to full output within 10 to 20 minutes.

*Actual generation output is dependent on atmospheric conditions, such as temperature and relative humidity. The unit would generate more power in colder, and less in warmer, more humid conditions. The reference to 100MW is stated as an approximation based on cumulative appraisal of weather conditions throughout the year. The project will have a gross nameplate capacity of 88.6MW, which references conditions at 60% relative humidity at 15 degrees Celsius.

Simple cycle facilities quickly respond to electricity demand spikes during peak usage periods.

Location, Layout and Key Components

- Located on a section of land currently used for site access, parking, and storage.
- Project includes these and other components:
  - Simple-cycle gas turbine generator and auxiliary equipment (gas compressor, exhaust stack, power distribution, air-cooled heat exchanger, etc.)
  - Equipment building for the power generation equipment
  - Step-up transformer connecting the project to the electricity grid
  - Stormwater management system, including an underground stormwater tank
  - Storage building
  - Landscaping improvements
- Buildings have been designed to be consistent with the architectural character of the surrounding neighbourhood and to ensure the facility is compliant with provincial noise regulations.
- The project would make use of some existing infrastructure, including tying into the existing East Windsor Cogeneration Centre (EWCC) high-voltage interconnection line to avoid the need for a new connection to the provincial electricity grid.

General project site

Proposed Schedule

Construction would not start until all approvals and permits have been received.

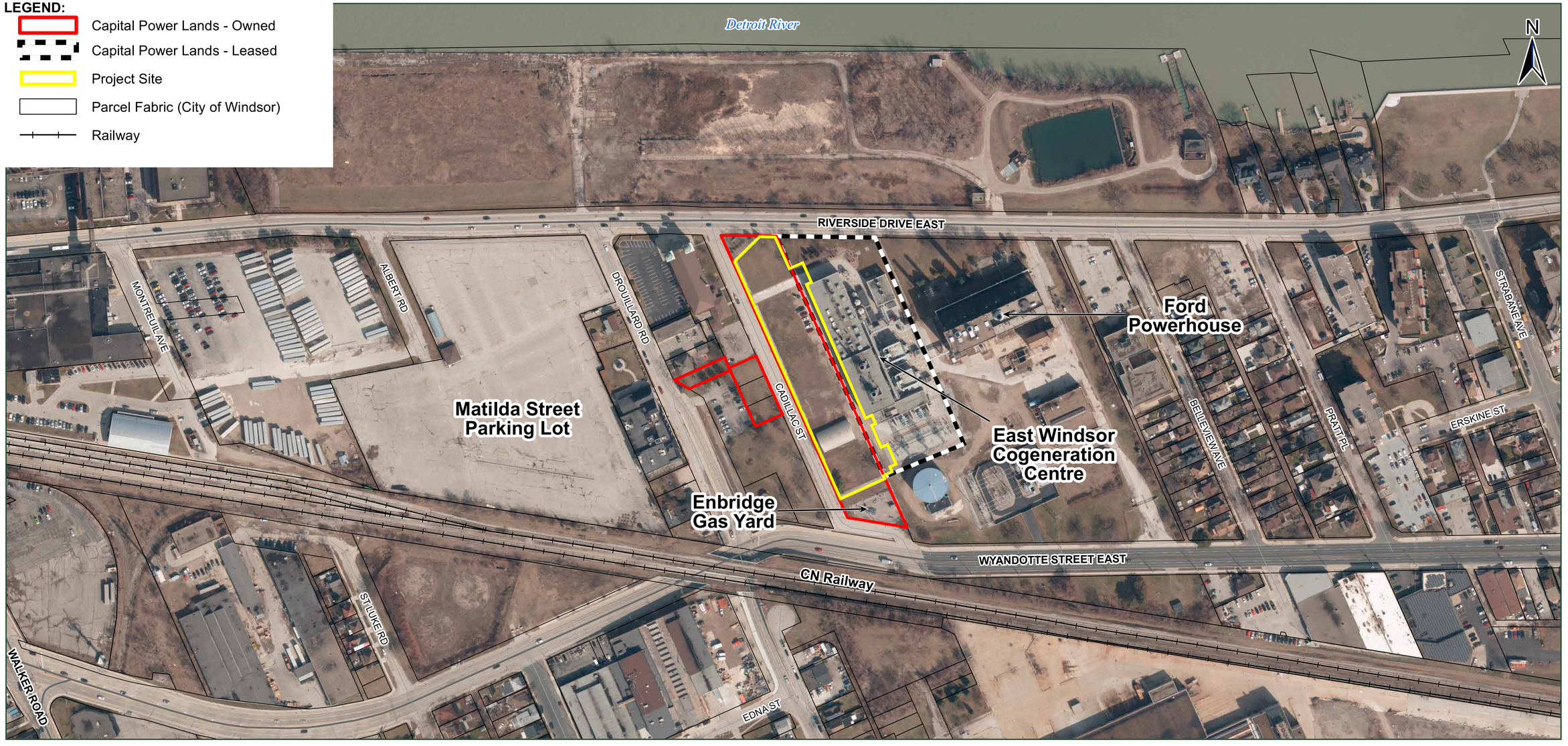
Milestone	Anticipated timing
Environmental studies and regulatory approvals	**2023–2024**
Activities below are pending regulatory approval	
Delivery of project components	Late 2024
Construction start	Early 2025
Installation of project components	2025–2026
Commercial operation target	Mid 2026

The IESO has identified the Windsor-Essex area as a region with pressing needs for new power supply, with forecasts suggesting that local demand will outstrip current capacity in this region as early as 2025.

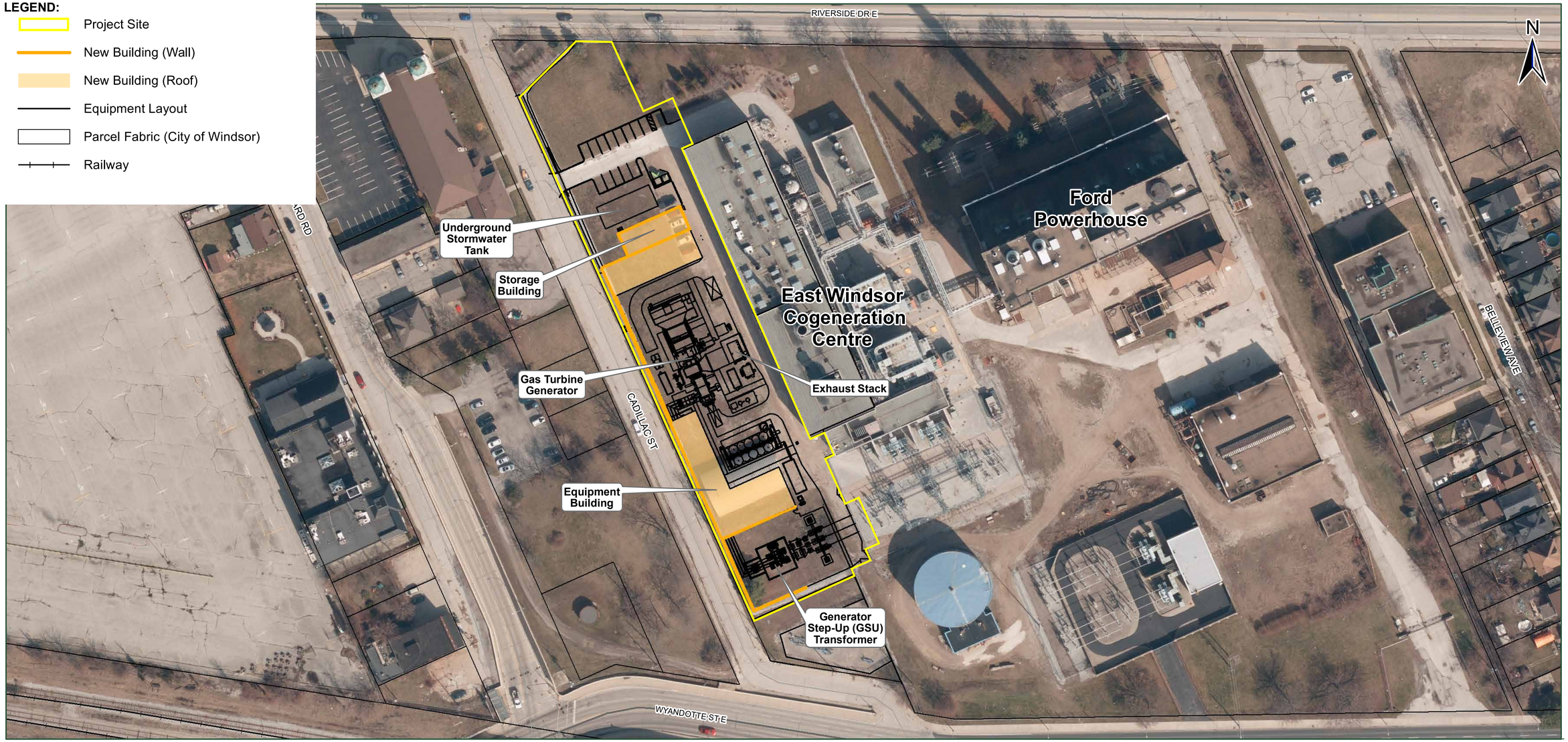
Electricity demand in the Windsor-Essex and Chatham-Kent area is forecast to grow from ~500MW of peak demand to ~2,100MW by 2035.

Powering Ontario's Growth, Government of Ontario

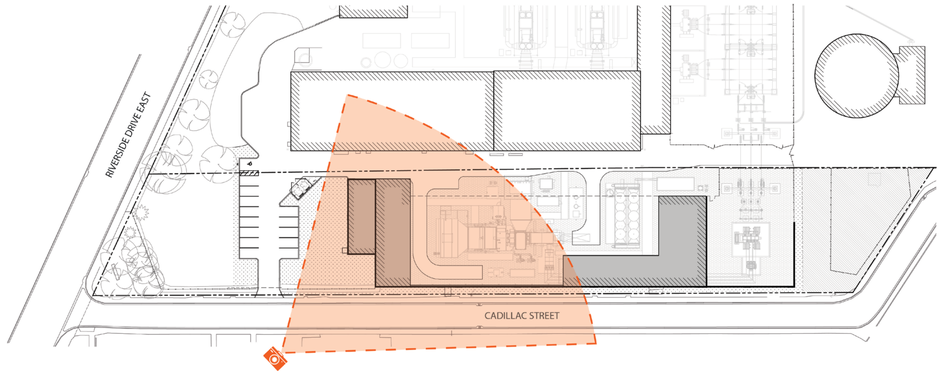
Proposed Expansion Project Location



Proposed Expansion Project Site Plan



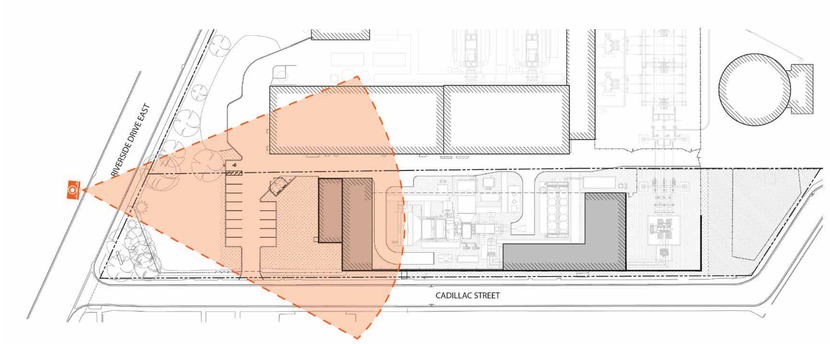
Architectural Rendering



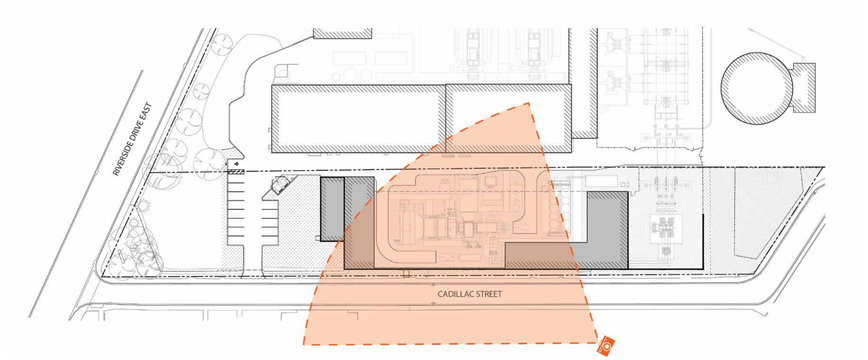
Facing southeast from Cadillac Street

Architectural renderings of proposed structures. Final design pending approval from the City of Windsor.

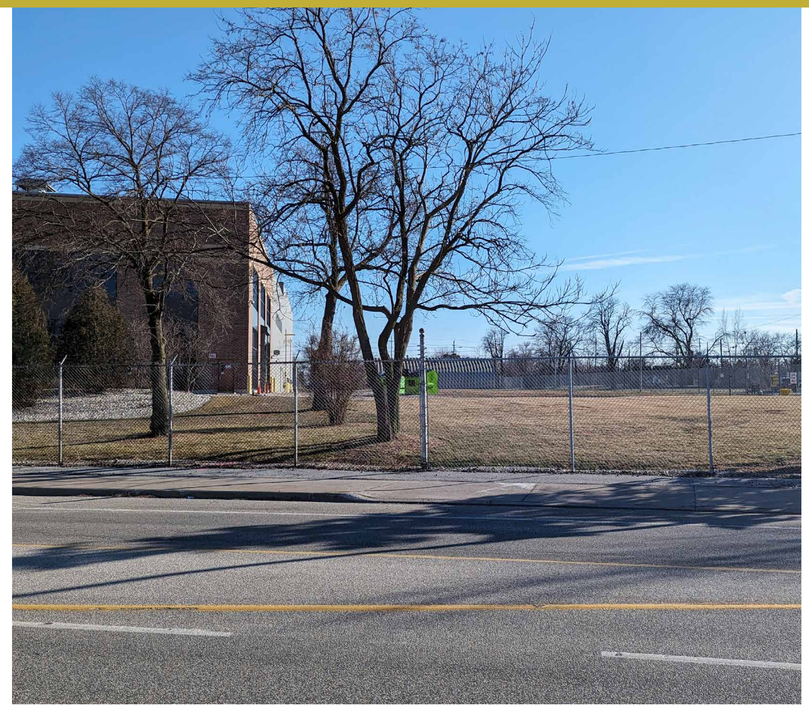
Architectural Rendering



Facing south from Riverside Drive

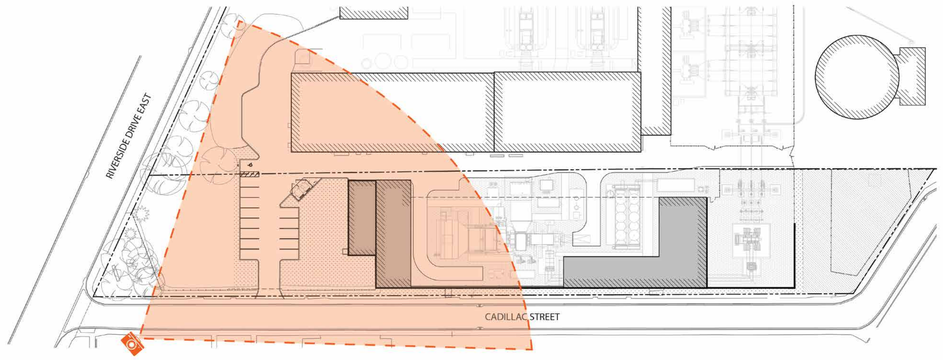


Facing northeast from Cadillac Street Park

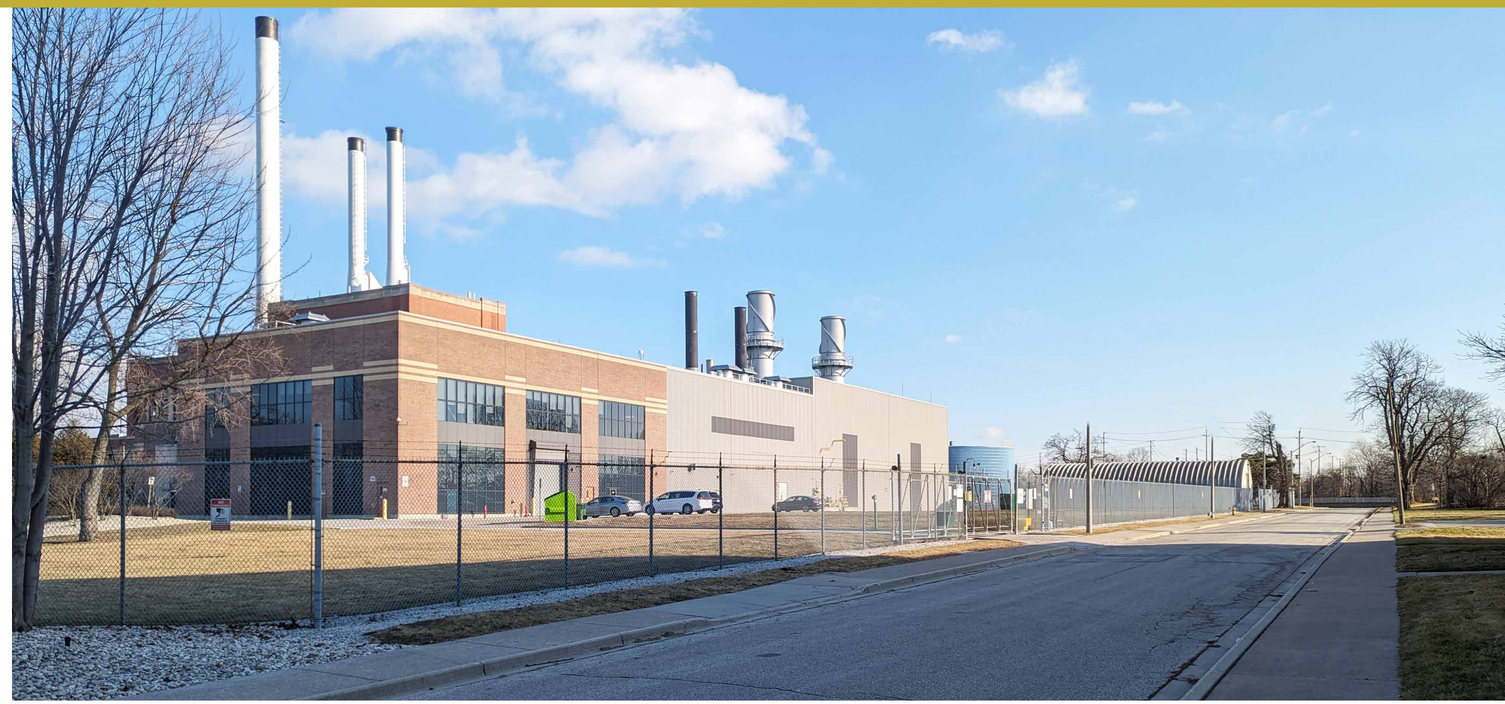


Architectural renderings of proposed structures. Final design pending approval from the City of Windsor.

Architectural Rendering



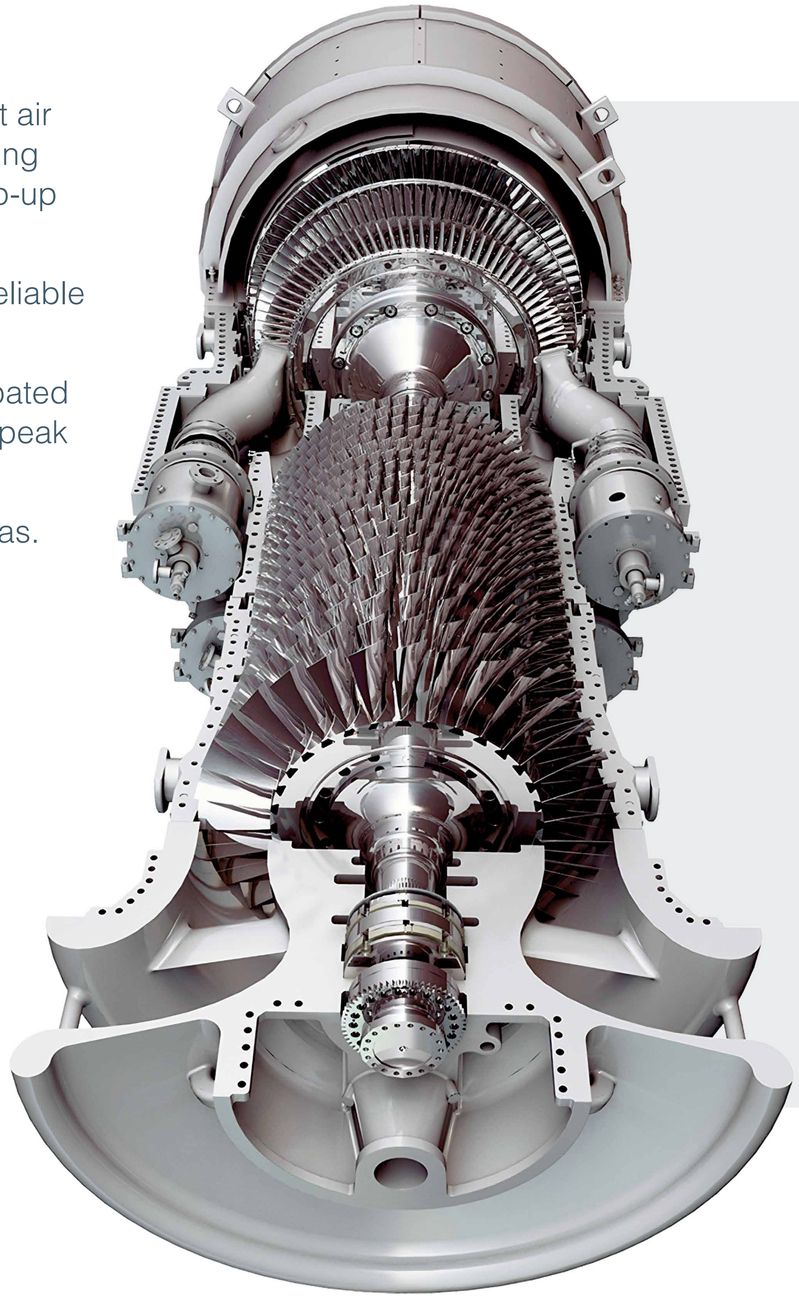
Facing southeast from Cadillac Street and Riverside Drive



Architectural renderings of proposed structures. Final design pending approval from the City of Windsor.

Simple-Cycle Gas Turbine Generator

- Project includes a GE 7E.03 natural gas turbine, inlet air filter, exhaust stack, fuel gas compressor, gas handling system, control systems, and a single generator step-up transformer.
- System's quick start-up time (10-20 min) allows for reliable and efficient response to peak usage spikes.
- Turbine is designed for peaking needs and is anticipated to run less than 150 hours annually during Ontario's peak demand hours, as determined by IESO.
- Capable of using a blend of hydrogen and natural gas.



How it works

Air is drawn into the compressor, pressurized, and fed to the turbine combustion chamber at high speeds.

Pressurized natural gas is injected into the combustion chamber and burned with the air, creating a high temperature, high pressure gas stream.

The hot gas stream expands through the turbine blades and spins the shaft.

In the generator, the spinning turbine shaft rotates a large magnet surrounded by coils of copper wire. Using the principal of electromagnetic induction, mechanical energy is converted into electricity!

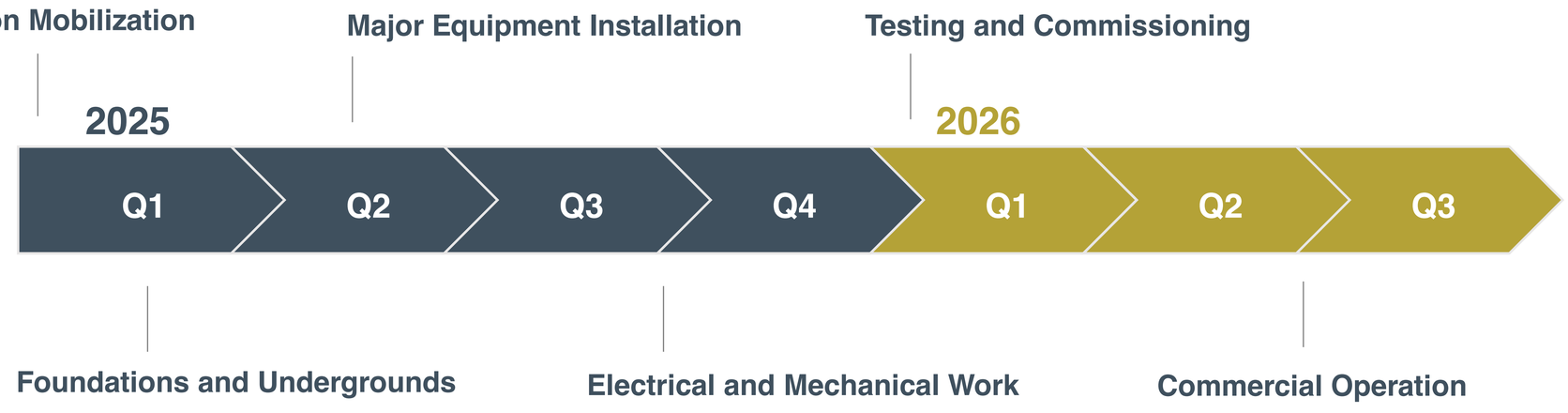
Construction Planning and Key Activities

- Construction start is anticipated in early 2025 with activities occurring over 16-18 months
- Pre-construction actions:
  - Identification of potential hazards
  - Site survey and clearance confirmation
  - Identify existing utilities
  - Placement of temporary storage containers or structures
  - Vegetation removal
  - Develop Project Environmental Management Plan

Key construction activities:

- Mobilization
- Establishing temporary laydown areas and services
- Site preparation, including sediment and erosion control structure installation
- Stormwater system installation
- Foundation installation
- Structural steel installation
- Installation of components and building
- Installation of cabling and piping
- Equipment energization and commissioning
- Post-construction site restoration and landscaping
- Demobilization

Construction Timeline *(anticipated)*



Minimizing Noise and Vibration

Continuous Flight Auger Method

- Concrete piles are required for stable building and equipment foundations.
- We'll use the eco-friendly and quieter Continuous Flight Auger (CFA) piling technique.
- Auger drills the pile depth, then removed, and concrete is pumped under pressure to fill the cavity.
- A reinforcement cage is inserted into the fresh concrete.
- CFA is a better installation method than driven pile due to less noise and vibration.

1

The rig is set up on the pile position and the auger plug is placed prior to the commencement of drilling.

2

As the bore is advanced the spoil remains on the auger and provides temporary ground support.

3

At the required toe level, the plug is ejected and concreting commences.

4

Concrete is pumped through the hollow auger stem, filling the pile from its base upwards during the extraction process.

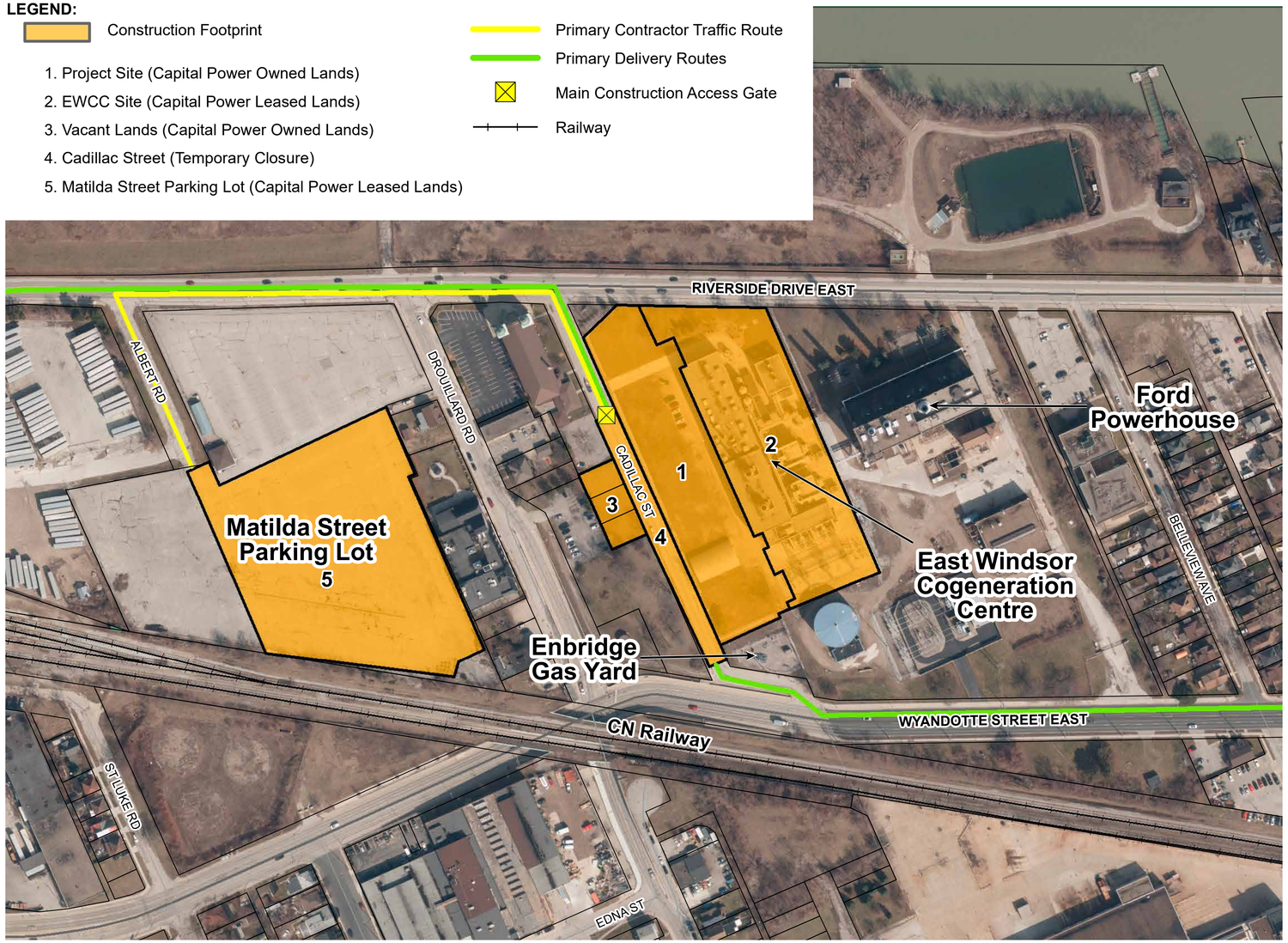
5

Once the auger has been withdrawn, the pile head is cleaned to expose the fresh fluid concrete through which the cage is plunged.

6

The pile is completed.

Temporary Construction Laydown Areas and Traffic



- Temporary construction areas are required for storage, equipment, staging, trailers, and parking.
- Cadillac Street will be temporarily closed during construction. The main project site access gate will be at the north end of the closure.
- Contractor parking and storage will be in the Matilda Street parking lot.
- Workers will use Riverside Drive to reach the project site from Matilda Street parking lot.
- Plant components and materials will be delivered via Riverside Drive and Wyandotte Street.
- Drouillard Street will not be used as a primary route for project traffic in order to reduce disruption to adjacent residents and businesses.
- Capital Power will work with its general contractor to develop a traffic management plan to minimize traffic impacts.

Environmental Screening Process for Electricity Projects (ESP)

Capital Power has voluntarily undertaken the more rigorous Environmental Review Stage of the ESP.

- The project is subject to the ESP for Electricity Projects in accordance with Ontario Regulation 50/24 under the *Environmental Assessment Act*.
- As the project will result in a > 5 MW increase in nameplate capacity of the EWCC, it is classified as a “significant modification” in the Regulation, and must undergo the ESP.
- **The ESP has two tiers of assessment:**
  1. Screening Stage: can be based primarily on existing or readily available information, and
  2. Environmental Review Stage: additional work programs, studies and consultation are undertaken to assess environmental effects and address unresolved concerns and issues.

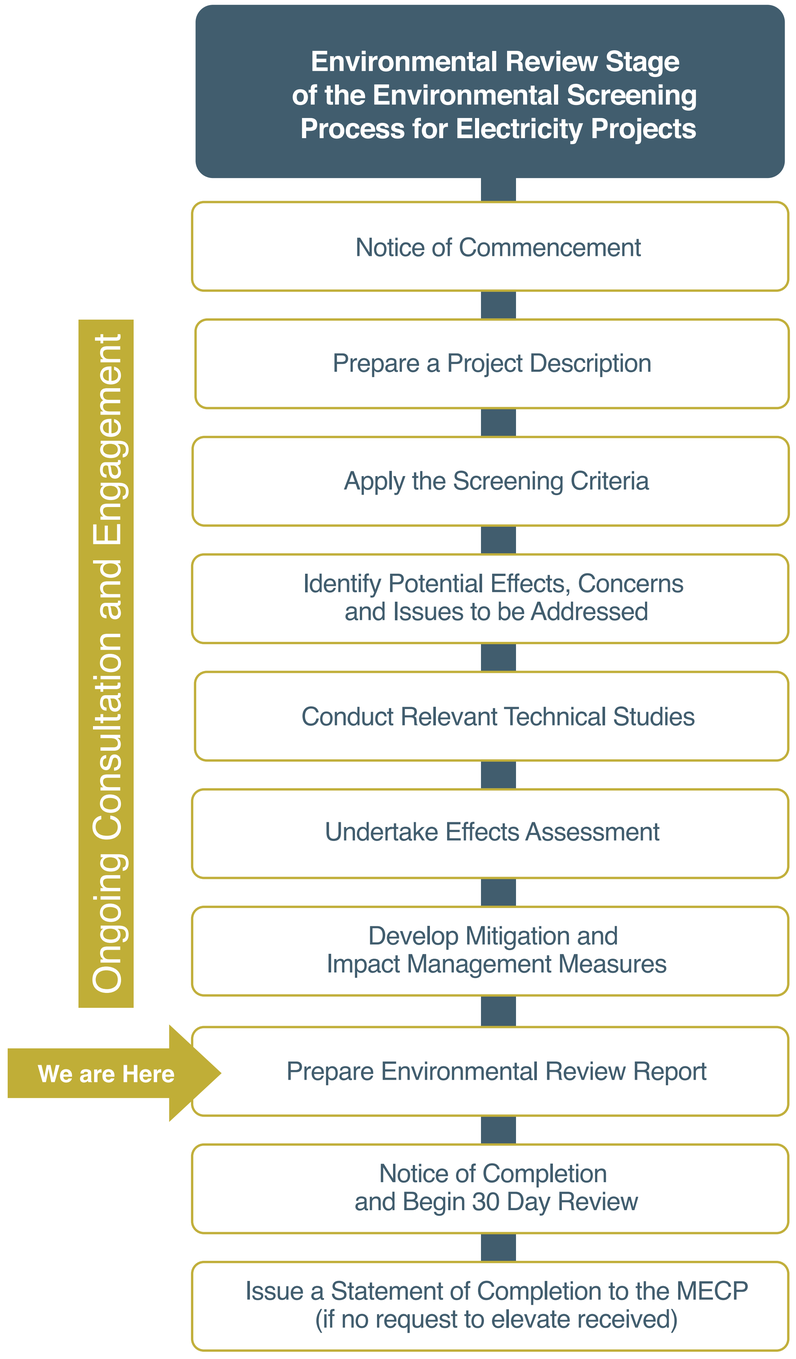
Other Permits & Approvals

Ministry of the Environment, Conservation and Parks (MECP):

- Environmental Compliance Approval (Air & Noise)
- Environmental Compliance Approval (Industrial Sewage Works for Stormwater)

City of Windsor:

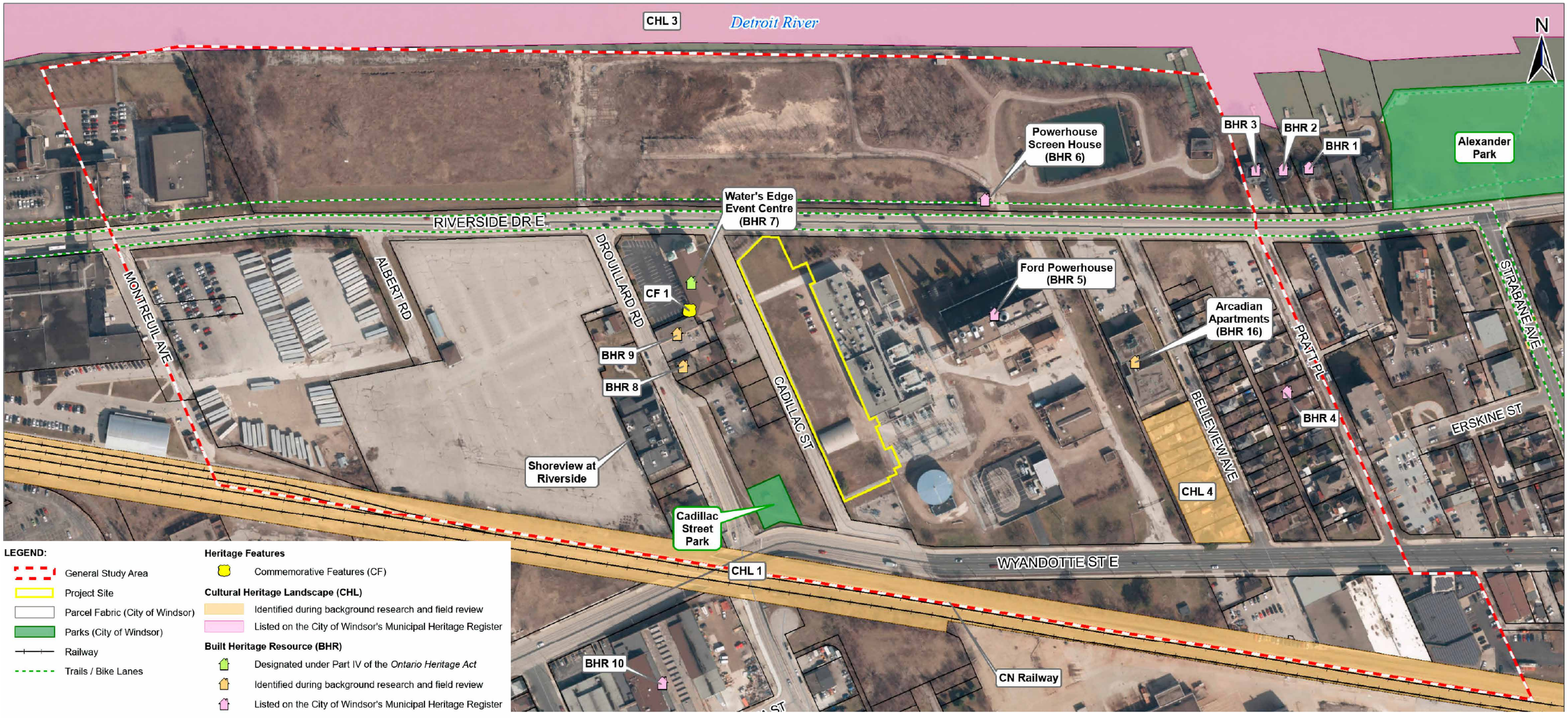
- Site Plan Approval
- Hoarding Permit (Cadillac Street temporary closure)
- Building Permits



Study Area and Key Existing Features

Key features in the General Study Area include:

- Water's Edge Event Centre
- Cadillac Street Park
- Riverside Drive (Scenic Drive and Civic Way)
- Local Residences and Businesses
- CN Railway
- Ford Powerhouse



Environmental Effects Screening

To identify potential environmental effects, the Environmental Screening Process for Electricity Projects (ESP) requires the project to be reviewed against specific screening criteria:

- Surface and Ground Water
- Land Use
- Air and Noise
- Natural Environment
- Resources
- Socio-economic
- Heritage and Culture
- Indigenous Communities
- Other (e.g., waste management)

The urbanized and industrial nature of the project site resulted in many environmental features not being present, therefore these were screened out.

Potential effects on the following screening criteria required further assessment:

- Groundwater
- Air Quality
- Greenhouse Gas (GHG) Emissions
- Noise and Vibration
- Socio-economic Environment
- Cultural Heritage
- Aesthetically Pleasing Landscapes and Views
- Climate Change Resilience
- Human Health Risk
- Accidental Spills and Waste Management

Environmental Management

In addition to the “mitigation by design” approach, environmental protection and management measures will be adopted throughout the life of the project.

Construction Project Environmental Management Plan (PEMP)

Potential effects are typical of most construction projects:

- Temporary small scale construction dewatering (Groundwater)
- Nuisance effects including those associated with dust, noise and traffic

Construction-related effects will be avoided or mitigated with industry standard best management practices, such as:

- Adherence to regulatory approvals, permits and by-laws
- Limiting vehicle and equipment idle times
- Covering open bodied trucks that transport fill and aggregates
- Developing and implementing a Traffic Management Plan

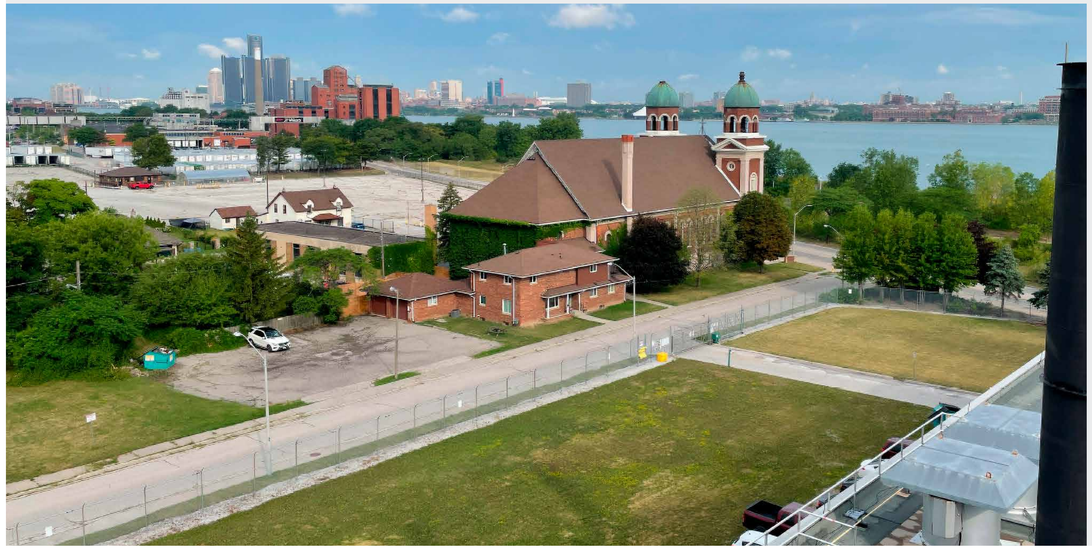
Where no potential effects are anticipated, contingency measures will be in place for unexpected events, including:

- Encountering previously unknown contamination
- Spill prevention, containment and response
- Wildlife management
- Discovery of undocumented archaeological resources

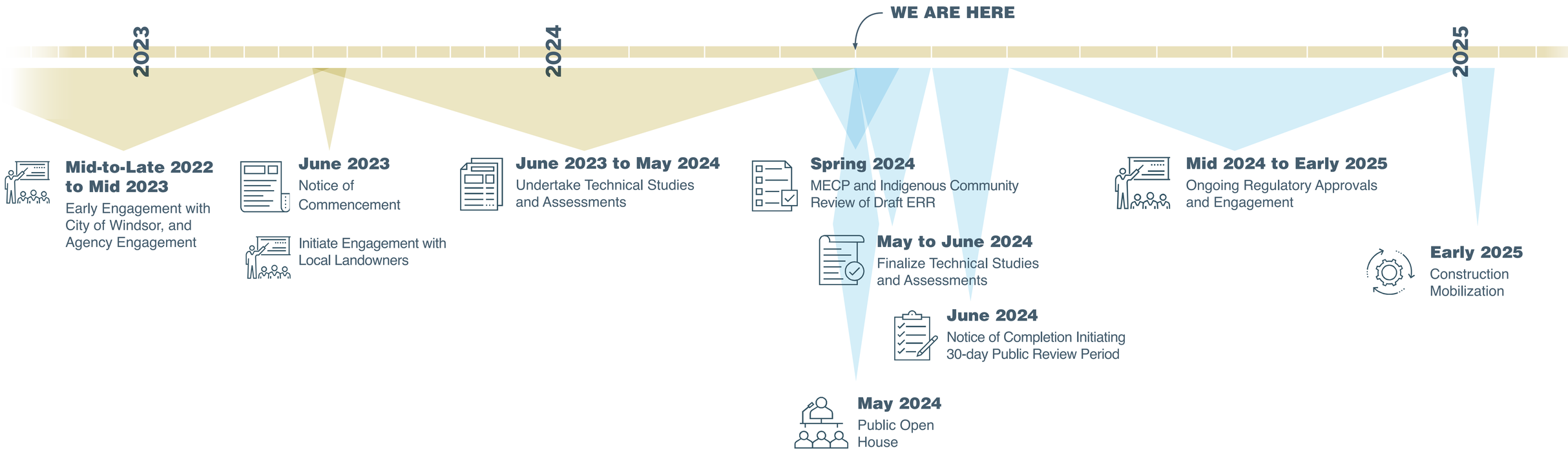
Mitigation by Design

- Architectural design elements are compatible with the surrounding historic industrial buildings
- Equipment building is designed to mitigate operational noise
- Gas turbine is equipped with a dry low NO_X combustion system – a lower emission technology compared to other turbines in its class
- Continuous flight auger construction methods to reduce construction noise and vibration

Project operational activities will adhere to site-specific operational standards, procedures and regulatory requirements.



Consultation and Engagement



A key part of the ESP is ongoing engagement with interested and potentially affected parties, including adjacent property owners, Indigenous communities, regulatory agencies, interest groups, and members of the public.

Ongoing Engagement

Capital Power will continue to share information and listen to feedback throughout the life cycle of the project (permitting, approvals, construction, and operations).

Protecting Heritage Buildings During Construction

Heritage Buildings & Construction Vibration Study

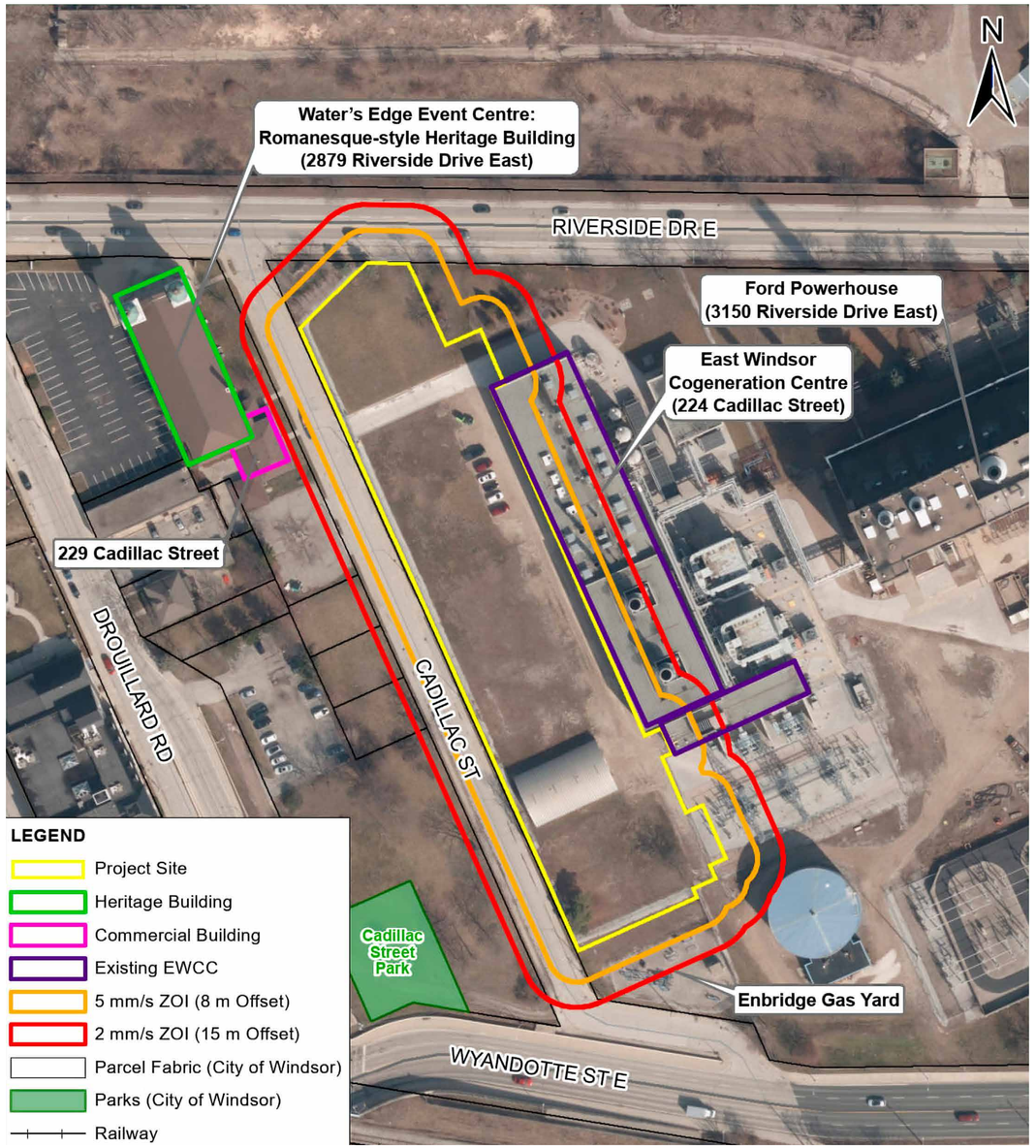
- Established the Zone of Influence (ZOI) for construction vibration impacts on buildings.
- Conservative modelling assumed high vibration equipment operating at the closest proximity to heritage property.
- A more stringent vibration threshold was applied for heritage buildings

Water's Edge Event Centre
(2879 Riverside Drive East)

Key Findings

- The ZOI encroaches on a portion of the heritage property.
- Encroachment is not associated with the heritage building, but with the frontage of the attached two-storey commercial/ residential building (229 Cadillac Street).

229 Cadillac Street



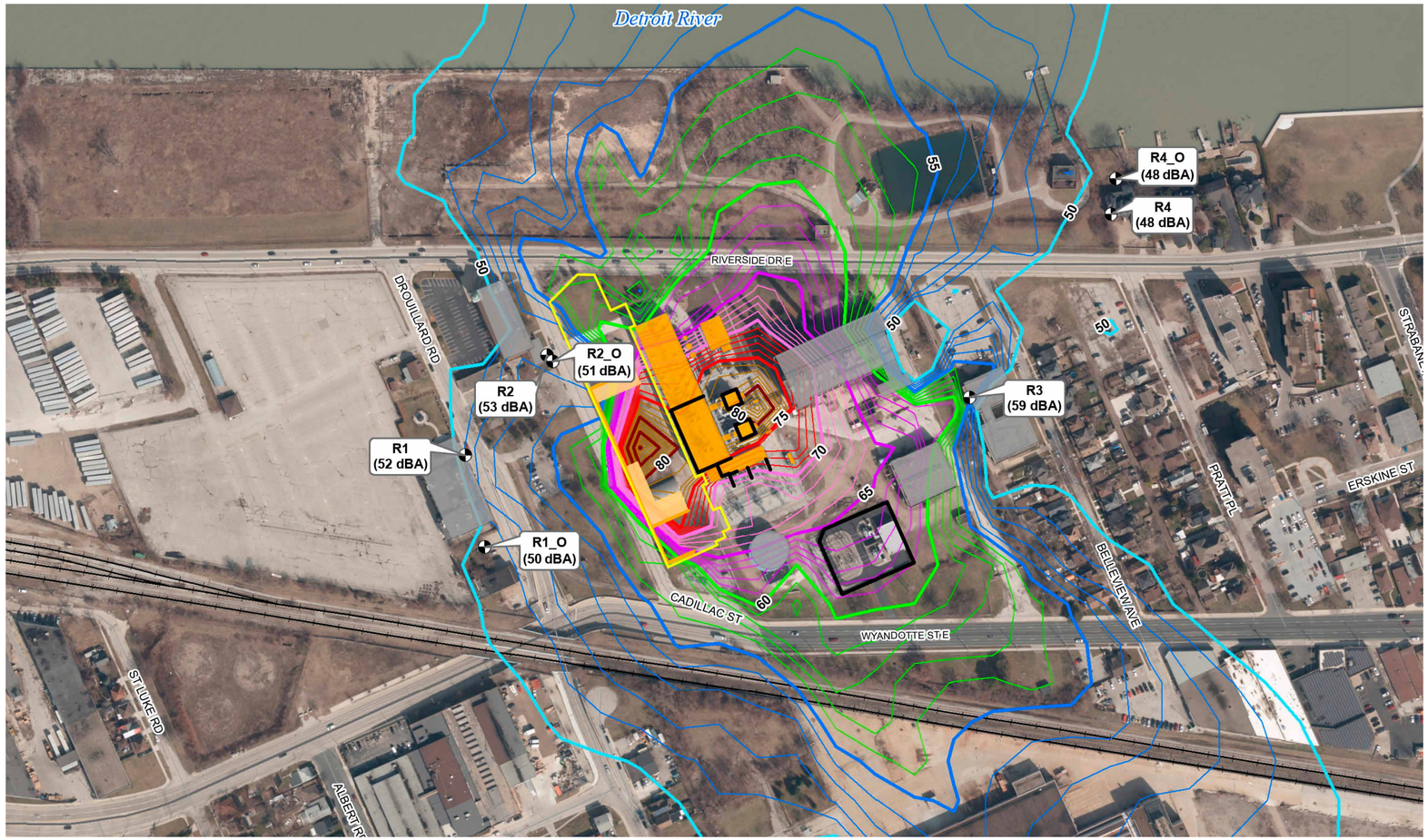
Construction Vibration Zone of Influence

Next Steps

A more detailed vibration assessment will be completed prior to construction. If the results predict a ZOI encroachment, a vibration monitoring program will be undertaken to avoid impacts to the heritage property.

Noise Modelling

Levels will meet regulatory limits



LEGEND:

Project Site		Receptor	
New Building (Wall)		≤ 50 dBA	
New Building (Roof)		≤ 55 dBA	
Existing EWCC		≤ 60 dBA	
Existing Building		≤ 65 dBA	
Existing Wall		≤ 70 dBA	
Railway		≤ 75 dBA	
		> 75 dBA	

Noise Study

- Modelled operational noise levels at representative local receptors in the surrounding community.
- Completed a combined modeling scenario (existing EWCC + project running simultaneously).
- Conservative modelling assumed all equipment was operating simultaneously.

Key Findings

- **Noise levels are predicted to meet applicable regulatory limits.**
- Approximately 3-4 decibels (dB) change for the combined scenario, which is generally defined as a **“just perceivable change”**.

Next Steps

Operational noise emissions will require an Environmental Compliance Approval from the Ministry of the Environment, Conservation and Parks.

Greenhouse Gas (GHG) Emissions Modeling

Project emissions are predicted to be below the threshold for GHG reporting under the Canadian Environmental Protection Act and Ontario's Environmental Protection Act (EPA).

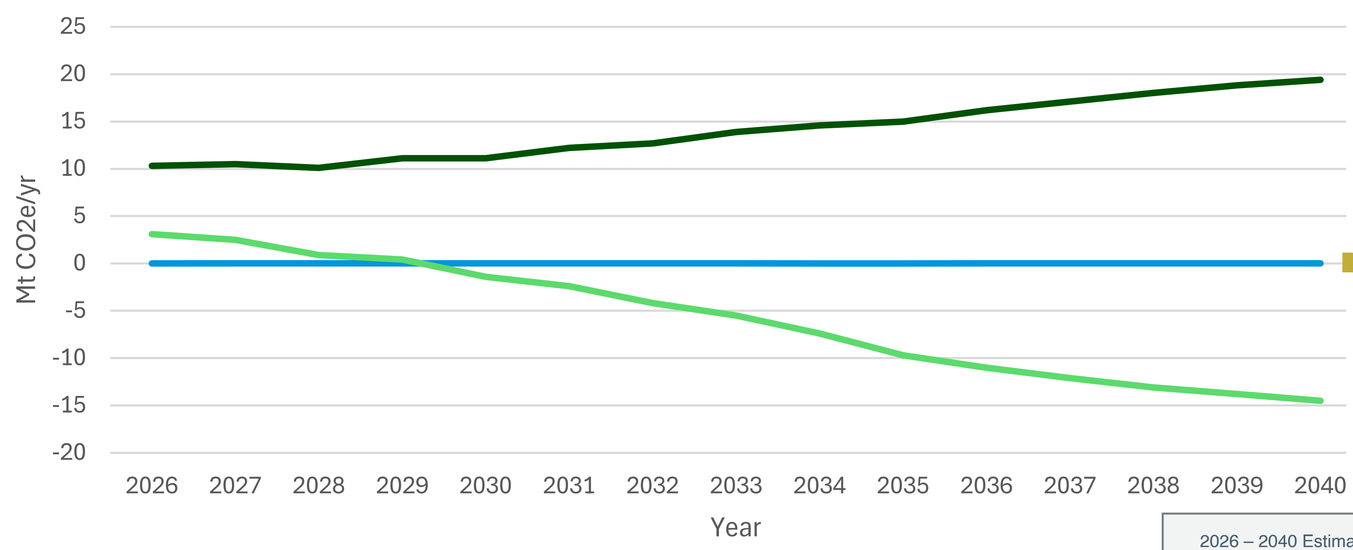
About the Study

- Estimated GHG emissions in carbon dioxide equivalent units (CO_2e) per year.
- A variety of complex market inputs were used to predict how the project will be dispatched by the IESO under future market conditions.

Key Findings

- Predicted to contribute **≤0.04% annually** to the IESO's GHG emission projections for Ontario's entire electricity sector (IESO 2022).
- **The project will assist in meeting the IESO's forecasted increased demand, while contributing a small percentage of overall provincial electricity sector generated GHGs.**

IESO GHG Projections, Electricity Sector and Net Provincial from Electrification Initiatives (IESO 2022) and East Windsor Combined Emissions (Existing + Project)



2026 – 2040 Estimated GHG Emissions (Project + EWCC)

Year	"Estimated Combined GHG Emissions (Mt CO2e/year)"
2026	0.007287
2027	0.006968
2028	0.005439
2029	0.005515
2030	0.004101
2031	0.003394
2032	0.004643
2033	0.003372
2034	0.00292
2035	0.002906
2036	0.003103
2037	0.003475
2038	0.003889
2039	0.003804
2040	0.003937

Reporting Requirements

Since the project is an electricity generation facility, it is a designated facility in Schedule 2 of O. Reg. 241/19 under Ontario's EPA and is required to report under the provincial Emission Performance Standards Program.

Independent Electricity System Operator (IESO). 2022a. Annual Planning Outlook. Available online: **www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook.**

Air Quality Modelling

About the Study

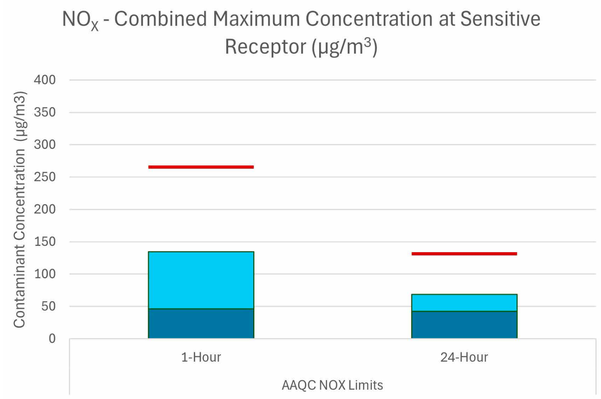
- Evaluated project emissions for various operating scenarios, including normal operating conditions, peak load (cold temperature), 100% load (average temperature), peak load (summer extreme temperature), and cold start or start-up conditions.
- Also completed a combined modelling scenario (ambient background + existing EWCC + project).
- Conservative modelling assumed both facilities operating simultaneously and continuously, 24 hours a day, 7 days a week, though both are peaker generating facilities that only operate a limited number of hours a year.
- Concentrations of oxides of nitrogen (NO_X), carbon monoxide (CO), sulphur dioxide (SO_2), and fine particulate matter ($PM_{2.5}$), were predicted using theoretical modelling at sensitive receptor locations within the surrounding community.

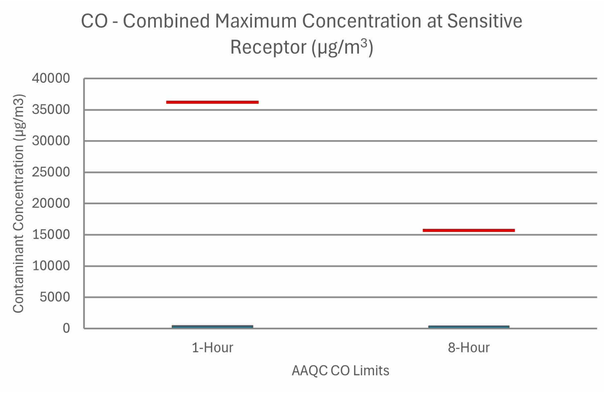
Key Findings

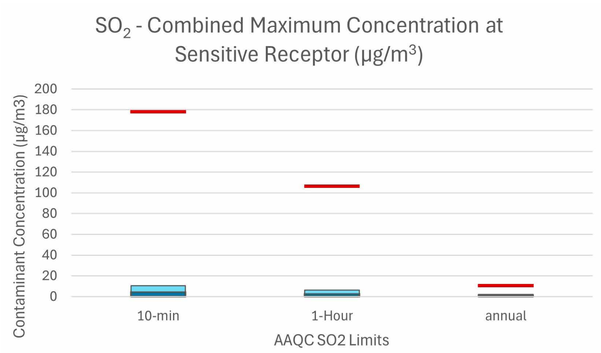
- **Air quality will meet provincial Ambient Air Quality Criteria (AAQC) standards.**
- Project emissions are predicted to be below applicable regulatory limits for all operating scenarios.
- For the combined scenario, even with conservative assumptions in the model, and despite high ambient background concentrations for NO_x and $PM_{2.5}$, **results predicted that air quality will be below provincial Ambient Air Quality Criteria (AAQC) thresholds.**

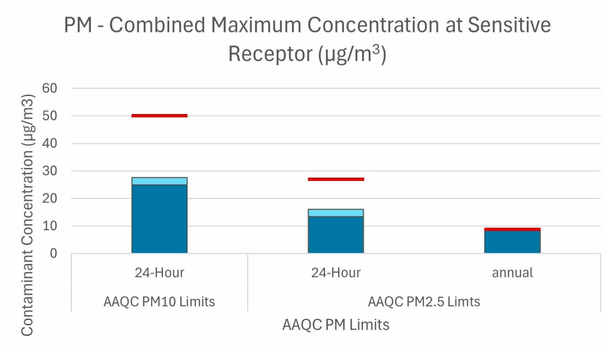
Ambient Air Quality Criteria (AAQC) standards: non-regulatory ambient air quality values that are protective against effects on health and/or the environment. AAQCs are used to assess air quality from all sources rather than a specific facility

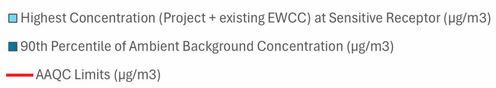
Combined Modelling Scenario Results Compared to AAQC for Normal Operating Scenario











Next Steps

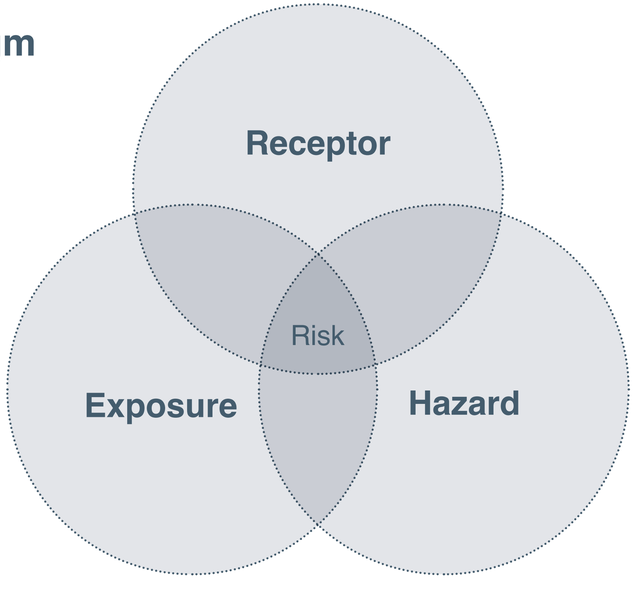
Operational air emissions will require an Environmental Compliance Approval from the Ministry of the Environment, Conservation and Parks.

Human Health Evaluation

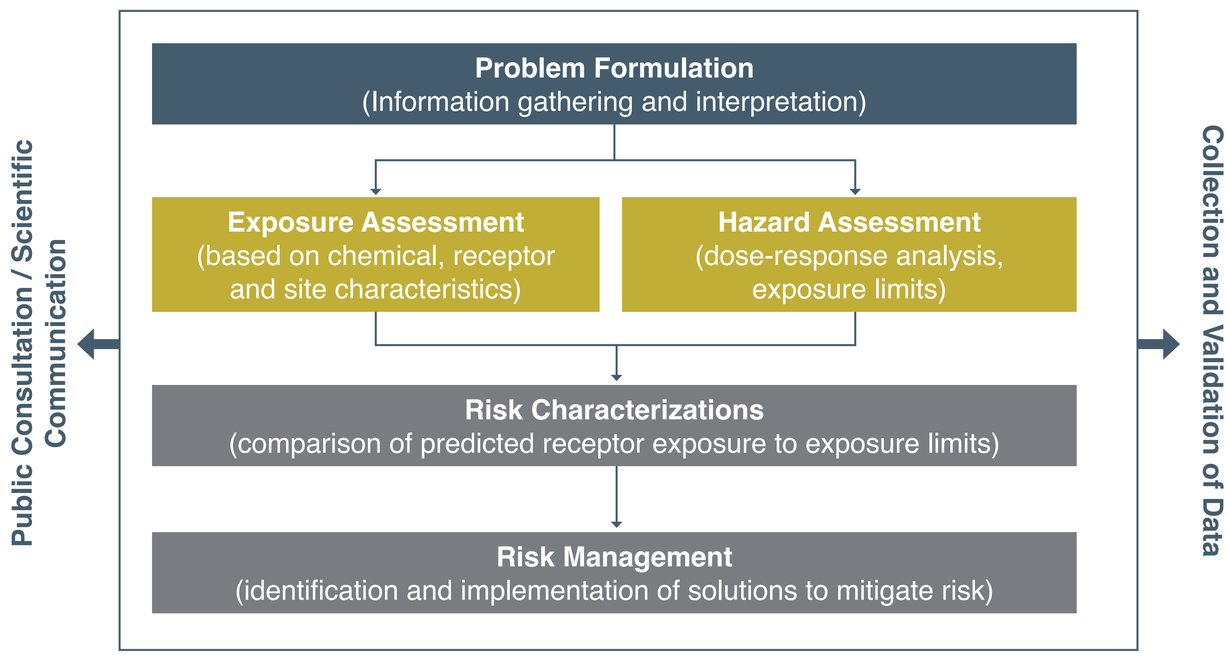
About the Study

- Evaluated the potential health impacts to individuals living around the project on both a short-term (hourly) and long-term (yearly and lifetime) basis.
- Compared predicted emissions of nitrogen (NO_x) and fine particulate matter ($PM_{2.5}$) to accepted health-based regulatory benchmarks.
- Assessed inhalation of ambient air, which includes project emissions and existing regional background conditions.
- Assumed continuous emissions from the project and existing EWCC, though both are peaker generating facilities that only operate a limited number of hours a year.
- The study is based on conservative assumptions, and likely significantly overestimates potential risk.

Risk Paradigm



Overview of Standard HHRA Framework



Key Findings

- **Project emissions are not predicted to result in a significantly elevated health risk to the surrounding community.**
- Regional background concentrations of both NO_x and $PM_{2.5}$ are elevated in the Windsor area.
- Background conditions exceed the benchmarks in some instances, indicating a potential health risk to sensitive individuals (e.g., asthmatics).