

Petawawa Net Zero Project

Renewable Energy Approvals Application: Project Description Report

Submitted to:

Ministry of Environment, Conservation and Parks
Environmental Permissions Branch

Revision Date: 2025-06-20

Applicant: The Corporation of Town of Petawawa

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Document Revision History

Revision	Date	Reason for Update
Rev. 0	2022-08-03	N/A
Rev. 1	2025-06-20	Revision to PDR to reflect project updates (addition of Groundwater Management Plan and Stormwater Management Plan/Secondary Containment)

1. General Information

1.1 Name of the project and applicant

The Petawawa Net Zero project (Project) will transform the existing Petawawa Water Pollution Control Plant (WPCP) into a Resource Recovery Facility by upgrading its anaerobic digesters to divert waste from landfill and boost biogas production for use as electricity, making the plant energy neutral or positive (Net Zero), and reducing GHG emissions. This will involve the utilization of biogas in a Combined Heat and Power (CHP) unit for the purpose of making the WWTP Net Zero. The project also aims to find beneficial usage of remaining biogas as clean fuel in the future.

The Project has previously undergone stakeholder outreach under the name of “Petawawa Co-digestion and Energy Generation Feasibility Study” in 2019.

The project received a grant of \$2.7 Million from Low carbon Economy Challenge Fund in November 2019 under name “Petawawa Wastewater Treatment Plant (WWTP) Energy Recovery and Waste Diversion Net Zero Project”.

1.2 Project location

The Project is situated within the Petawawa Water Pollution Control Plant, located at 560 Abbie Lane, Petawawa, County of Renfrew, K8H 2E6 (Site). The Site has an area of 75.3 acres and is registered as Range Lake Lot 17 RP, Petawawa, County of Renfrew; roll number 477907902006900.



Figure 1 General Site Location

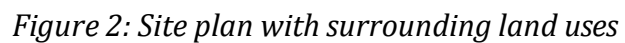


Figure 2: Site plan with surrounding land uses

1.3 Proposed energy facility

An anaerobic digestion (AD) facility is defined in O.Reg. 359/09 as a renewable energy generation facility at which biogas made from anaerobic generation is used to generate electricity. Since the facility is not located on a farm, it is defined as a Class 3 anaerobic digestion facility by the regulation.

Nameplate capacity of the proposed Combined Heat and Power (CHP) facility will be 200 kWe at final completion.

1.4 Contact information

This Project is being undertaken in partnership with the Town of Petawawa as the site owner, OCWA as operating authority and project manager, and Anaergia as the consulting engineer and technology provider. The project will be delivered under an alternative delivery model with investments from all three parties.

The primary project contacts are as listed below:

- Mr. David Unrau, Director of Public Works, Town of Petawawa. (dunrau@petawawa.ca)
- Mr. Indra Maharjan, Director of Innovation, Technology and Alternate Delivery, Energy, Climate Change and Resource Recovery, Ontario Clean Water Agency (imaharjan@ocwa.com ; 416-775-0056)

1.5 Other approvals required

It is expected that a revised Environmental Compliance Approval will be developed as a result of the changes to the WPCP entailed by this Project as well as other unrelated ongoing process improvement projects. Also, the digester units will be upgraded to meet an order issued by the Technical Standards and Safety Authority (TSSA) by 2022.

The proponent is undergoing the Connection Impact Assessment process with Hydro One, with the expectation of a future Distribution Connection Agreement for the Project as a part of a net metering contract.

Local municipal building permits will be obtained as required.

The Site is not under the jurisdiction of a conservation authority (see Figure 3 where the site is represented by the black dot), so a conservation authority permit or approval is not required.

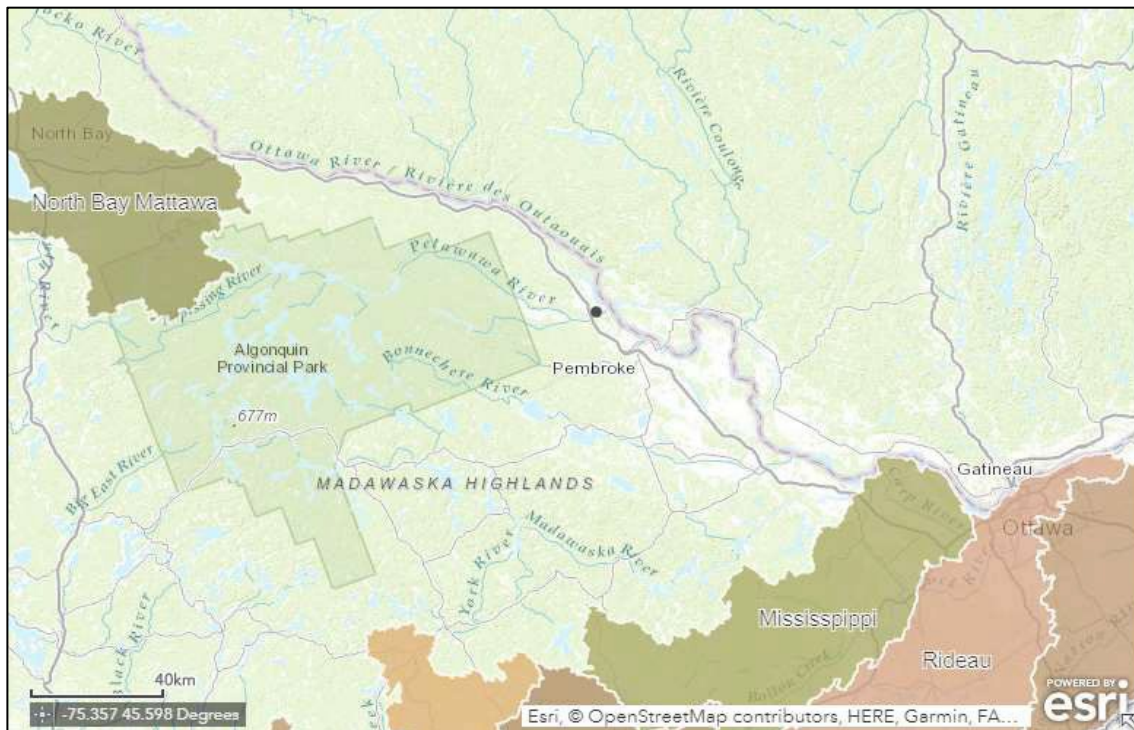


Figure 3 Conservation Authority Coverage (Conservation Ontario, 2020)

1.6 Federal involvement

The project is supported by the federal government's Low Carbon Economy Challenge program (LCEF). The LCEF program has approved a grant of \$2.7 Million for this project.

2. Project Information

The Project involves upgrading the existing anaerobic digestion technology with new innovative technology to convert the WPCP from its traditional treatment-based process to a Resource Recovery process, achieving the goal of being an Energy Net Zero Plant. The proposed Project involves upgrading the plant's existing anaerobic digester(s), improving the digestion efficiency of the WPCP sludge and allowing additional wastewater solids and organics (from food waste or fats, oils and grease) to be brought into WPCP from the Town and neighboring wastewater plants as well as other organics producers (breweries, commercial establishments, restaurants, etc.). Biogas generated through the anaerobic digestion process would be used to produce renewable energy on-site through Combined Heat and Power (CHP) engines and other beneficial use of biogas.

2.1 Facility components

The Project is comprised of four component groups:

1. Incoming Organics Reception & Processing
2. Anaerobic Digestion Upgrades and New Equipment
3. Digestate Management
4. Biogas Utilization

On-site Project equipment is anticipated to include:

- Slurry Reception Quick-Connect and storage
- Rock Trap
- Grinding/Screening Equipment
- Dedicated Insulated & Heat-Traced Organics Reception Tank
- Organics Slurry feed to Anaerobic Digestion
- Sludge Screw Thickener (SST) equipment and sludge storage
- Anaergia PSM High-Solids Mixers
- Replacement of existing Anaerobic Digester Roof
- Upgrades to existing biogas system
- Combined Heat and Power unit
- Biosolids dewatering

Specific proposed equipment is as shown on Anaergia's Equipment & Instrument Lists in its Design & Operations Report and a diagram is shown in Figure 4.

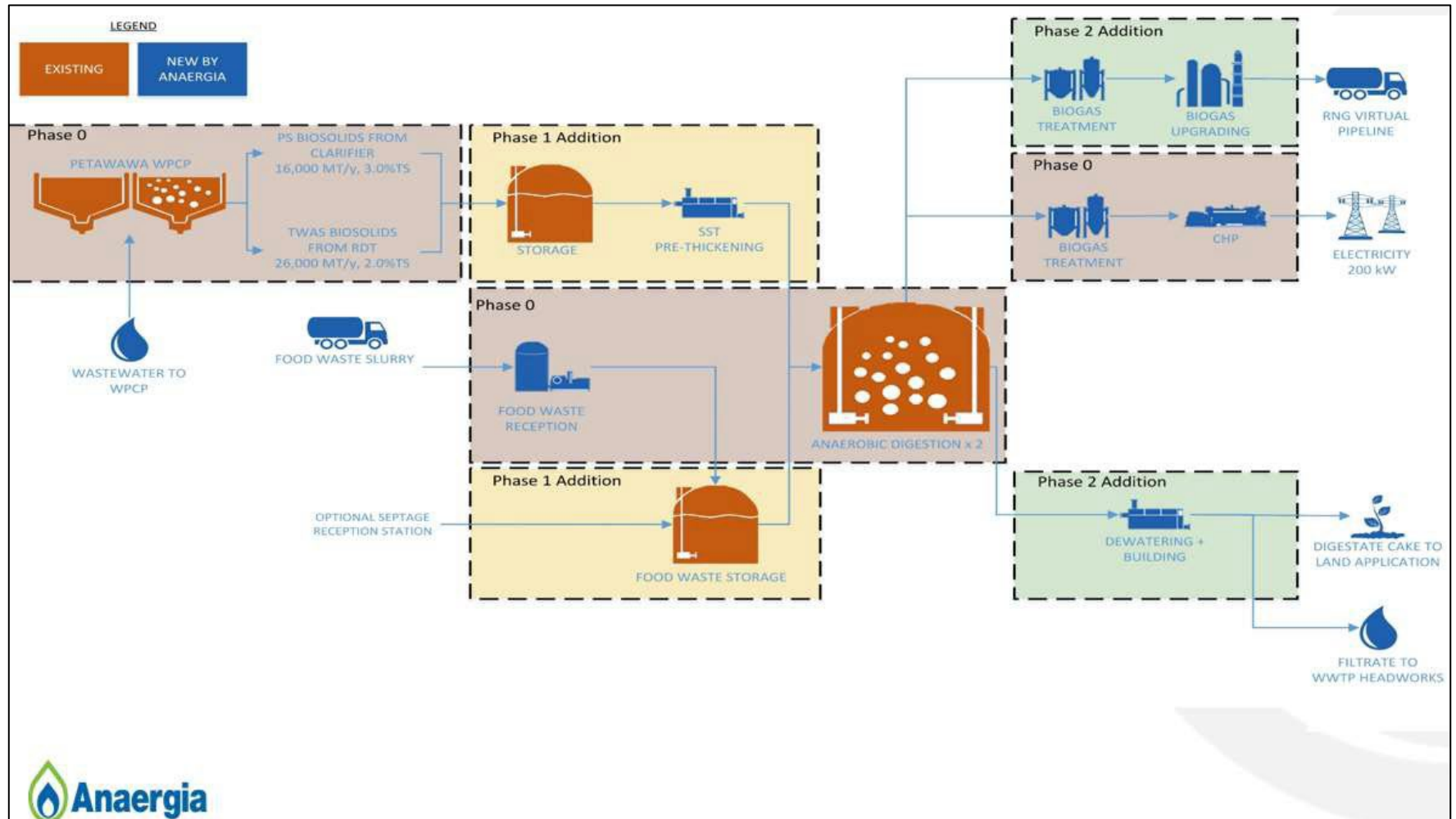


Figure 4 Conceptual Process Flow

2.2 Project activities

The Project has two key phases:

Phase 1 (Phase 0 in Figure 3)

- Upgrades to existing digesters to co-digest biosolids and external food waste to produce renewable energy;
- Installation of a Combined Heat & Power (CHP) engine to produce electricity to offset plant electrical demand.

Phase 1b

- Wastewater sludge storage and thickening;
- Food waste (off-site organics) storage.

Phase 2

- Augment digestate management with dewatering to reduce digestate volume;
- Enhance biogas utilization by adding renewable natural gas (RNG) generation

Phase 1 (also known as Phase 0) will be implemented in the near term, with future phases following on the lessons learned in Phase 1.

The overall Project timeline is as follows:

Project Task	Date
Finalization of Technical options and approach	September 2021
Project Development & Finalize Budget, Partnership & Project Financing Approach	March 2022
Procurement of long-lead items (e.g. CHP engine and biogas conditioning)	September 2022
Finalize Detailed Process, BoP & Construction Engineering	September 2022
Construction	October 2022 to October 2025
Commissioning, Ramp up and Performance Testing	October 2025 to March 2026
Implementation of Phases 1b and 2	TBD

Air and Noise emissions will be generated through the operation of the CHP Facility, with specific impacts and mitigation. Exhaust air emissions will be treated as part of the CHP package.

It is intended that the solids produced from this project (Biosolids) will be land applied as Non-Agricultural Source Material and managed in accordance the Nutrient Management Act, 2002 and its regulations. For Phase 1, digestate management will managed using the existing process at the facility, which is land application of the digestate from the secondary digesters. In Phase 2 of the project, the team will explore options for dewatering the digestate as well as supplementary treatment of the resulting return streams from the solids treatment and handling processes. In phases 1 and 2, return streams from the digestion process will be sent to the plant headworks and treated in WPCP's liquid treatment train prior to discharge.

Some contaminants (rocks, grit, plastics, etc.) may be removed from the incoming organics stream in the organics reception skid, which is intended to be sent to landfill for disposal.

No water-taking from ground water or surface water will take place as part of the project. The existing potable water supply at the WPCP will provide water usage for operational purposes.

2.3 Map of project location

The Site where the Project is located is within the boundaries of the Petawawa Water Pollution Control Plant, (Figure 1). A more detailed map with supplementary details (e.g. off-site land uses within 300m of project location, natural features, municipal drains, area contours, and presence of wells) is provided in Figure 2.

2.4 Land ownership

The Corporation of the Town of Petawawa owns the property upon which the Petawawa WPCP and the proposed Project process components will be situated.

Arrangements regarding off-site processing of waste have not been confirmed at this time. The plan is to establish an agreement with a commercial waste supplier to secure the required quality and volume of organics during phase 1 of the project.

3. Likely environmental effects

The project is aimed to reduce GHG emissions through diversion of food waste from landfill. Methane, which would otherwise have been released to the environment by landfilling food waste, will be used to produce renewable electricity via a Combined Heat & Power (CHP) Facility.

3.1 Heritage and Archaeological Resources

The Town of Petawawa did not note any pre-existing historical and archaeological assessment reports on record. The “REA Checklist: Consideration of Potential for Heritage Resources REA Checklist: Consideration of Potential for Heritage Resources” has been completed and was submitted to the Ministry of Sports & Tourism (MSTC) in 2021. Responses from these Ministries confirmed receipt and no additional actions are required regarding heritage and archaeological resources. However, subsequent to the notice of the second public meeting, the Algonquins of Ontario requested the town do an Archeological Investigation as the site is located adjacent to the Ottawa River, which they identified as culturally important. The town is undertaking the investigation and the results will be included in the Cultural Heritage and Archaeological Resources Report.

3.2 Natural Heritage

The Natural Heritage Assessment identified wetlands within the 50m and 120m setbacks of the project location and a coldwater tributary to the Ottawa River within the 50m setback.

These wetlands and watercourse are outside of the fenced perimeter of the WPCP, so project activities would not affect these natural heritage features. No other natural features specified in O.Reg. 359/09 were identified in the natural heritage assessment, the results of which can be found in the Natural Heritage Records Review Report and Site Investigation Report.

3.3 Stormwater Management and Secondary Containment

It is anticipated that there will be negative impacts on the stormwater related to the Project throughout all phases of the Project. During the construction, installation and decommissioning phase of the Project, it is anticipated that the activities including excavation and land surface modifications will alter the quality of the stormwater that flows from the Facility. As such, a stormwater management plan has been developed to include mitigation measures during the construction, installation and decommissioning phase of the Project.

During the operation phase of the Project, it is anticipated that there will be negative impacts to the stormwater. As per condition I23 of the REA document (#5211-CM3MB6), prior to the receipt of organic waste at the Facility (excluding the sludge generated from the on-site municipal wastewater treatment plant), a secondary containment plan for the anaerobic digesters and digestate storage tanks, as well as a stormwater management plan that addresses stormwater quality and quantity controls at the Facility, is required. As stormwater trickles through the Facility, the design of the secondary containment will ensure that any organic waste spillage will not be carried out with the stormwater and will be properly treated prior to discharge.

The stormwater management and secondary containment design report includes a detailed plan for stormwater management, including the proposed secondary containment design to handle events like storm/surface water runoff, digester overflow from the tanks, or spills, to minimize environmental impacts throughout the project span. There is no expected change to overall impermeable surface areas on the site.

3.4 Water Bodies, Ground Water and Surface Water

The WPCP currently discharges treated wastewater effluent approximately 300m from the shore of the Ottawa River at an approximate depth of 2.5m below the surface. Liquid effluent from the Net Zero Project will be returned to the head of the WPCP and treated through the WPCP treatment processes and be discharged as treated wastewater effluent.

Impacts to the surface water and groundwater related to the Project's construction, installation, and decommissioning phases, including the construction of the secondary containment, are expected to be negligible. This is because there will be no need for groundwater extraction during these phases of the Project. No water extraction from groundwater or surface water will take place as part of the Project. The existing potable water supply at the wastewater treatment plant (WWTP) will provide water for all phases of the Project.

During the operational phase of the project, no effluent from the Net Zero project will be directly discharged to surface or groundwater. Also, there will be no change in the permitted discharge levels of pollutants specified in the WPCP Certificate of Approval. Also, during the operation phase, the CHP system will not impede groundwater flow in the vicinity.

Moreover, as required by the MECP under condition I23 of the REA document (#5211-CM3MB6), prior to the receipt of organic waste at the Facility (excluding the sludge generated from the on-site municipal wastewater treatment plant), a groundwater monitoring plan must be in place. This plan includes a monitoring schedule for both upgradient and downgradient of the wells and parameters to identify any leaks in the partially below-ground anaerobic digesters and digestate storage tanks. A detailed groundwater monitoring plan has been developed and was approved by the MECP on December 17, 2024.

3.5 Air, Odour, Dust

Organics brought to the WPCP will be as a liquid or slurry media (i.e. pump-able), with only a short term of exposure to the atmosphere during pumping connection, thereby mitigating odours during reception at the Site.

All new and/or modified process tanks will be enclosed, as well as all feedstock and digestate reception and loadout equipment will be enclosed to avoid odour migration. Carbon air filtration with spare units shall be connected to all of these tanks to absorb odourous compounds.

The consulting engineer undertook odour modeling for the Site to further refine requirements along the design process. No significant impacts are expected at the anticipated points of odour reception.

The plant has put in place a robust odour complaint and response process in case of odour issues for the public. Currently, there is no record of any odour complain for last 10 years.

3.6 Noise

An increase in noise levels are primarily expected to stem from two sources, namely 1) equipment operations and 2) traffic of heavy vehicles, during construction and operation phases. Traffic during the operational phases is discussed further in Section 3.7 below. While the majority of equipment will be housed indoors, start-up or malfunctions of equipment may result in above average noise levels. Mitigation measures will include muffling, noise isolation and signage installation as appropriate.

The consulting engineer undertook noise assessment for the Site to further refine requirements and mitigation measures along the design process. No significant impacts are expected from the new equipment and operations.

The Town will develop a traffic calming plan and schedules around organics and other deliveries in the plant.

3.7 Land Use and Resources

As shown in Section 2.3, there would be no land use changes for the Site resulting from the Project.

Negative environmental effects are not expected to other resources; conversely, landfill site loading is expected to be alleviated by the Project's processing of organic waste.

Land use for off-site processing is not a component of the Net Zero Project. The Town is in discussion with Ottawa Valley Waste Recovery Centre for potential usage of their facility for this purpose.

3.8 Provincial and Local Infrastructure and Interests

Two rounds of stakeholder outreach have been undertaken in March 2019 and May 2020, whereby project updates were provided and input solicited. Stakeholders canvassed include adjacent municipalities and local businesses which may be feedstock providers. Outreach also includes consultation with local Indigenous communities and the general public through sharing project reports and public meetings.

The site is fenced and the development will occur in the fenced area. It will not affect any hiking trails, recreation, etc..

Effects on local interests, land and infrastructure are primarily associated with increased traffic to and from the Site. It is estimated there will be additionally one tanker per day, 250 days per year, to deliver incoming organics feedstock to Site. Prior to further digestate processing measures (i.e. dewatering implemented in Phase 2), outgoing digestate is estimated to create traffic of approximately 10 trucks/day, for two to four weeks per season in spring and fall for land application of digestate. This is as compared to the approximate 130 trucks/year for outgoing biosolids haulage in 2015-2018.

A Traffic Management Plan will be developed to further refine requirements during the design process and provide mitigation measures. All trucks bringing in external waste will be enclosed tanker trucks. All trucks transporting biosolids away from the facility will be also be enclosed.

3.9 Public Health and Safety

The Project will be situated entirely within the Site which, as an operating WPCP, has restricted access. The location of Project-specific equipment are well set-back, with at minimum 60m distance between the closest process unit (existing digestate/biosolids storage tank) to the nearest neighbouring property line. Members of the public are not expected to come into contact with any Project components.

Project design and operating procedures will be in compliance with pertinent aspects of the Occupational Health & Safety Act, Ontario Fire Code, National Fire Protection

Association standards, Canadian Electrical Code, and Ontario Building Code to in order to protect the health & safety of on-Site staff and contractors.

3.10 Areas Protected under Provincial Plans and Policies

The Site is not located in the Lake Simcoe Watershed, or subject to the Niagara Escarpment Plan, or the Oak Ridges Moraine Conservation Plan. The Site is also not located in the Protected Countryside area defined in the Province's Greenbelt Plan.