Petawawa Net Zero Facility Decommissioning Plan Report

Amended June 20, 2025

Contents

1 Introduction

This Decommissioning Plant Report has been written in accordance with the guidelines provided by the Ministry of the Environment, Conservation and Parks (MECP) entitled: "Chapter 7: Guidance for preparing the Decommissioning Plan Report" as presented on the Government of Ontario. This report is required by the MECP to satisfy parts of the requirements for a Renewable Energy Approval (REA) under Ontario Regulation 359/09 Renewable Energy Approvals under Part V.0.1. Of the Environmental Protection Act (O. Reg. 359/09).

This report provides a description of the activities that will be undertaken when the facility will be decommissioned in order to attempt to restore the project site to pre-development conditions that will include retiring the elements of the renewable energy generation facility, restoring the land and water, and managing excess materials and waste.

Specifically the Decommissioning Plan Report will describe the following:

- Procedures for decommissioning during construction in the event that the project is abandoned;
- Decommissioning activities after ceasing operations;
- Restoration of lands negatively affected by the Facility;
- Plans to manage excess material and waste;
- Emergency Response and Communication Plans;
- Decommissioning notification;
- List of required approvals for decommissioning; and
- Financial Assurance.

1.1 Project Overview

The Petawawa Net Zero project (Project) will transform 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, and reducing GHG emissions. This will involve the generation and utilization of biogas at site in a Combined Heat and Power (CHP) Unit and move the WPCP towards Net Zero, and in the future include upgrading biogas to Renewable Natural Gas (RNG).

The location of the project site is situated within the Petawawa WPCP (Water Pollution Control Plant) located at 560 Abbie Lane, Petawawa, County of Renfrew, K8H 2X2 (Site).

The basic components of the Town of Petawawa Net Zero Energy project will include the following:

- Slurry & Septage Reception Skid
- Dedicated Insulated & Heat-Traced Organics Reception Tank
- Organics Slurry feed pumps to Anaerobic Digestion
- Sludge Screw Thickener (SST) skid
- Anaerobic Digester (s) Mixers

- Replacement of existing Anaerobic Digester Roof with double membrane geo textile roof.
- Upgrade of existing biogas system
    - Combined Heat and Power Unit
    - Biogas Upgrading to RNG
- Overall process control system.

The Project will be built in phases, primarily Phase 0 and Phase 1-2. The first is Phase 0, which include addition of CHP, upgrades to digesters and organics receiving. Phase 1-2 involves the addition of a waste reception building, sludge thickening, biosolids dewatering and the capability of producing Renewable Natural Gas with a biogas upgrading unit, along with an increase in the amount of organics received at the facility. Phase 0 will be implemented in the near term, with future phases following on the lessons learned in Phase 0. The two phases are:

Phase 0

- Upgrades to existing digesters to co-digest biosolids and organic slurry to produce renewable energy.
- Installation of Combined Heat & Power (CHP) Engine to combust biogas produced from co digestion of biosolids and polished organic slurry and generate electricity and heat. Electricity will be used to offset plant electrical demand and heat will be used to heat anaerobic digesters.

Phase 1-2

- Augment digestate management with dewatering. The dry digestate (Cake) will be sent out for beneficial use.
- Additional biogas generated will be used for producing RNG. RNG will be injected in the natural gas grid system.

2 Decommissioning Stages

The proposed project is taking place at the existing Petawawa Water Pollution Control Plant (WPCP). Decommissioning stages will consider continued operation of the as a WPCP following decommissioning of the net zero facility.

Decommissioning of the Petawawa Net Zero Facility would include the planned shutdown of the net zero facility. No further feedstock would be received on the site. The digesters would finish digesting the materials in the reception tanks, which would take approximately 100 days, and would continue to digest sewage sludge only. Planned decommissioning would involve a gradual ceasing of product delivery to avoid any excess materials on the site at the same time of decommissioning.

Chemicals that are used to control foaming are stored on the site in 1,000 litre totes. All unused chemicals will remain in sealed totes and be returned to the supplier. All partially used chemicals will be taken off-site by a licensed waste hauler for appropriate treatment and/or disposal. Effluent created by the process would continue to be treated in the WPCP and discharged as specified in the WPCP Certificate of Authorization.

By-products of the facility would continue to be sold to third party end uses as commodities. Commodities include the digested materials (digestate) for land application by the local farming community.

2.1 Decommissioning During Construction – Abandonment of Project

In the event that the facility is abandoned before the construction is complete, the project site will be decommissioned. Decommissioning activities will be dependent on the stage of construction should the project be abandoned prior to completion. The site has been used as a WPCP and has undergone upgrades throughout its lifetime. There is no vegetation located on site with the exception of grasses and herbaceous vegetation (e.g. dandelions).

In the event of abandonment, materials placed on site would be removed. The removal of both surface works and structures would be decommissioned in the same fashion as presented in Section 3.0 of this report. The site would be restored as closely as possible to conditions prior to commencing construction.

2.2 Decommissioning When Operations Cease

The facility is expected to be in operation for the expected 20-year lifetime of the facility. Facility components will be maintained and replaced as needed which could allow the facility to operate beyond 20 years.

Decommissioning activities are not expected to commence prior to 2043. When the Petawawa Net Zero facility ceases operation, adaptive reuse of the property and on-site components will be considered. Components of the Petawawa Net Zero facility that can be used for other purposes will remain on the site. In the event that no adaptive reuse is desired or found, the facility will be demolished (excluding the WPCP structures, which will remain functioning). Preliminary estimates will require approximately 4 months to demolish the facility which will involve the removal of both above ground and underground structures associated with the Petawawa Net Zero Facility. Section 3.0 of this report provides a detailed plan for the decommissioning of the project should the facility be demolished

3 Decommissioning Structures, Equipment, and Site Components

3.1 Aboveground Structures and Components

3.1.1 On-Site Buildings

Two new buildings will be added to the site in the proposed project in Phase 1-2 (no buildings for Phase 0): the thickening building and the dewatering building. The proposed buildings will be constructed of a concrete slab, with steel columns, metal clad siding with a sloped metal or ethylene propylene diene monomer roof. In the event that the landowner requires the removal of these buildings following the facility shutdown, the following steps will be taken:

- Remove equipment installed inside of the onsite buildings;
    - Drain all input and output lines to building sump pits;
    - Isolate process lines to equipment (process water, chemical lines, compressed air, etc.);
    - Isolate equipment using the inlet and discharge isolation valves;
    - Isolate equipment from power and disconnect power and instrumentation;
    - Utilize forklifts to remove equipment, and move equipment to staging area / scrap yard;
    - Protect equipment if to be reutilized or resold;
    - Organize disposal of equipment at an appropriate location;
        - If metal components, the equipment to be recycled as scrap;
        - If non-metal components, the equipment to be disposed of in a non-hazardous landfill;
- Dismantling building;
    - Isolate all power to the building;
    - Utilizing 45-ton external crane, remove all ancillary equipment (i.e. HVAC, exhaust fans, etc.);
    - Dismantle building structure;
        - Remove siding / insulation;
        - Remove roof;
        - Remove framing structure;
    - All metal components will be removed from the site and recycled as scrap.
    - The concrete base will be removed along with other engineered site surfaces and recycled at a concrete recycling facility for re-use in the construction and/or aggregate industries.
- Restoration of building pad;
    - Provide native fill to return to natural conditions;
    - Compact and grade material as appropriate;
    - Sod and seed;
    - If previous building is to be reutilized for another application, appropriate fill can be provided at this stage;

As previously established in the Construction Plan Report, any dismantling process will utilize erosion and sedimentation controls including the following:

- Light duty sediment fence made of filter fabric (i.e. no plastic-braided fencing) to be placed around the work area. The fencing shall be secured along the base by digging in the filter fabric and backfilling with earth to grade, to prevent sediment runoff. A double fence with a row of hay bales should be installed on the overland draining area installed in a shallow (approx. 5 cm) trench packed tightly together;
- Light duty sediment fence made of filter fabric along the base of all spoil piles to prevent sediment runoff from entering ditches; and
- Rock check dams and/or hay bales will be installed in project-affected drainage ditches to entrap sediments.

No impacts to cultural heritage are anticipated as set out in the Cultural Heritage and Archaeological Resources Report.

Building components that are not suitable for reuse or recycling will be hauled off-site as solid waste material and disposed of appropriately at the closest solid waste landfill or according to the regulations at the time of decommissioning.

3.1.2 Buffer Tank and Slurry Holding Tank

The buffer tank and slurry holding tanks will be bolted steel tanks. Components of the Bolted Steel tanks include panels, bolts, mastic, applied floor membrane, rebar, and concrete. The removal of all of these tanks will require demolition.

- Empty tanks;
- Release any tank pressure and allow any collected gas to be evacuated;
- Isolate inlet and outlet connections;
- Isolate power and remove any connections;
- Remove any instrumentation;
- Dismantle tank;
- Remove foundation and pad;
- Restoration of tank foundation // pad;
    - Provide native fill to return to natural conditions;
    - Compact and grade material as appropriate;
    - Sod and seed;
    - If previous building is to be reutilized for another application, appropriate fill can be provided at this stage;

As previously established in the Construction Plan Report, any dismantling process will utilize erosion and sedimentation controls including the following:

- Light duty sediment fence made of filter fabric (i.e. no plastic-braided fencing) to be placed around the work area. The fencing shall be secured along the base by digging in the filter fabric and backfilling with earth to grade, to prevent sediment runoff. A double fence with a row of hay bales should be installed on the overland draining area installed in a shallow (approx. 5 cm) trench packed tightly together;
- Light duty sediment fence made of filter fabric along the base of all spoil piles to prevent sediment runoff from entering ditches; and
- Rock check dams and/or hay bales will be installed in project-affected drainage ditches to entrap sediments.

No impacts to cultural heritage are anticipated as set out in the Cultural Heritage and Archaeological Resources Report.

Concrete will be removed from the site and shipped via truck to a recycling facility. Material that cannot be recycled will be trucked off site to an approved solid waste disposal facility in accordance with the regulations at the time of disposal. Scrap metals associated with stairways, metal railings, platforms, and piping will be removed and separated for transportation to suitable recycling facilities. Mixers and electrical components will be removed and, pending their condition, will be sold or disposed of in a landfill. All insulation and cladding materials will be disposed of in a landfill. The slurry reception and buffer tanks contain metal roofs and will be recycled.

3.1.3 Aboveground Piping

All above ground piping will be removed from the site. Various piping materials will exist between facility components throughout the site. Materials can be placed into two categories including different types of iron, steel, and plastics. All steel piping will be removed and sent to a scrap metal recycler. Plastic piping will be removed and hauled off-site via truck for disposal at a site appropriate at the time of decommissioning. All supports for piping will also be recycled where appropriate.

3.1.4 Paved Areas (Concrete and Asphalt)

Concrete and asphalt areas of the site will be removed upon the demolition of the facility, unless repurposed for the WPCP. In the event that these surfaces are removed from the site, they would be demolished and removed from the site via truck to an appropriate recycling facility. Third party recyclers such as the numerous organizations registered with Aggregate Recycling Ontario, would be contacted for the receipt of materials for re-use.

3.1.5 Internal Roadways

Internal roadways would be left on the site post decommissioning activities. Roadways will be at grade with other fill materials placed on the site. This will allow the site to be used as a WPCP (post-construction land use). Maintaining the grade of the surface area will allow for continued stormwater management on the site post decommissioning activities.

3.1.6 Fill Materials

The project site will contain fill materials post construction (e.g. aggregate materials). This material will not be removed from the site during decommissioning of the facility in order to maintain the stormwater management functions of the site.

3.1.7 Site Equipment

Equipment used in the operations of the facility include:

Utilized in Phase 0:

- Food Waste Reception Skid;
- Heat Exchanger;
- Transfer Pumps;
- Hot Water Pumps;
- Gas Analyzers;
- H2S Removal System
- Biogas Blower;
- Biogas Conditioning Skid (for CHP), including;
    - Heat Exchanger and Knock-out tank;
    - Activated Carbon Filter;
    - Chiller (located off-skid and outside of classified area);
- Combined Heat and Power Unit;
- Emergency Flare; and
- Control Systems;

Installed in Phase 1-2, in addition to Phase 0:

- Heating Coils (for buffer tank and slurry holding tank);
- Dewatering Screw Press;
- Septage Receiving Skid;
- Screw Presses;
- Chemical Dosing System;
- Polymer Make-down Systems;
- Scale;
- Conveyors;
- Filtrate Transfer Tank;
- H2S Removal System Upgrade (second H2S Vessel);
- Biogas Conditioning Skid (for biogas upgrade), including;
    - Biogas Blower
    - Heat Exchanger and Knock-out tank;
    - Activated Carbon Filter;
    - Chiller (located off-skid and outside of classified area);
- Biogas Upgrading System, including;
    - Compressor;
    - Membrane System for CO2/CH4 removal;
    - Compressor, to reach injection pressure for Natural Gas Line;

- Instrumentation to provide QA/QC analysis for Natural Gas injection.

In addition to the equipment above, extension legs and mezzanines will be provided for the thickening and dewatering processes in phase 1-2.

Pipes, pumps, electrical components and other materials used to connect the equipment to associated components of the facility will be removed. The equipment will be maintained and replaced as needed throughout the life cycle of the facility in order to maintain efficient operations. Therefore, the equipment on the site is considered to have inherent value and can be sold to third parties for continued use. In the event that the equipment does not have a residual value at the time of decommissioning, it will be deconstructed and, where possible, all scrap metal will be sent to scrap metal recyclers and waste material not able to be recycled will be shipped off-site for disposal as appropriate at the time of decommissioning.

3.1.8 Step-up Transformer, Collector Circuits, and Switchgear

The transformer, switchgear, and control and monitoring equipment are located within the existing building South of the CHP. Upon facility decommissioning, the components of the electrical connection into the WPCP plant's power transmission network will be removed from the site. Where possible, all usable equipment will be sold to third parties. The remainder of equipment will be separated into scrap metal, electrical components and waste products. The scrap metal and electrical components will be removed from the site via truck and sent to recycling facilities where possible. Materials that cannot be recycled will be shipped off-site by truck for proper disposal as required under law at the time of decommissioning. Drainable liquids (i.e., dielectric fluids) from electrical equipment will be treated as waste products and handled in accordance with waste regulations in force at the time of decommissioning.

3.1.9 Renewable Natural Gas Injection Line and Interconnection Point (Phase 1-2)

The natural gas pipeline will be required to connect the biogas upgrading system to the natural gas main for injection. When the Petawawa Net Zero Energy facility is decommissioned, the natural gas main and all injection lines and instrumentation to monitor RNG quality will be removed from site. The scrap metal and electrical components will be removed from the site via truck and sent to recycling facilities where possible.

3.1.10 Secondary Containment Dry Pond

The secondary containment dry pond was constructed to provide containment for potential major spills at the plant. Upon decommissioning, the knife gate valve on the discharge culvert will be removed, and any free water in the pond will be given time to dry, ensuring dry ground before starting earthworks. The pond will be filled in with clean, native soil, restoring natural grading conditions. The fill will be compacted to ensure stability and proper drainage. Topsoil and seed will be applied to match surrounding vegetation.

3.1.11 Groundwater Monitoring Wells

The plant contains three existing and one new groundwater monitoring well, which allow for sampling of ground water to ensure plant activities do not impact groundwater quality. Decommissioning will follow industry best practices to prevent potential pathways for contamination. This includes removing well casings and screens, sealing of the boreholes with bentonite or cement grout, and restoration of the surface to match surrounding conditions.

3.2 Decommissioning Underground Structures and Components

3.2.1 Underground Piping

A network of underground pipes exist underneath the existing digester galleries. These underground pipes will be utilized to transfer solids and filtrate when appropriate and will not be disposed of after decommissioning to avoid service disruption of the WPCP. Pipes from the Net Zero system will be isolated and removed to provide additional space in the existing buildings when appropriate. The removed pipeline components that are able to be recycled as scrap metal will be removed from the site along with other scrap steel. Components of the underground pipeline that are not able to be recycled will be removed from the site for disposal at an appropriate landfill as per regulations at the time of decommissioning.

4 Management of Excess Materials and Waste

4.1 Excess Feedstock

Feedstock materials consisting of organic material (i.e.: SSO/ food waste or Industrial clean / polished organic slurry, corn syrup, fats, animal and/or vegetable oils and grease) are brought to the site for digestion are received through a food waste reception skid which slurry waste, which is chopped and pumped directly to the digesters in Phase 0 or to the slurry holding tank in Phase 1-2. When the facility manager is aware of the decommission date, plans will be put in place to reduce or refuse additional feedstock materials which will allow for a gradual slow-down of the facility until all operations cease. Stockpile of feedstock other than in the buffer tank in Phase 1-2 are not anticipated to be present on the site and, therefore, will not require removal.

4.2 Excess Chemicals

Excess chemicals used in the production of biogas are not expected to be remaining on the site at the time of decommissioning. As the plant winds down, these chemicals will be used and, based on the experience of the plant operators, additional chemicals will not be ordered or delivered to the site. Chemicals that would be stored on the site for the control of nutrient and antifoam piped in the digesters will stored in 1,000 litre totes within the Thickening Buildings containment area. Chemicals that would be stored on the site to enhance flocculation (polymer) would be stored in the Thickening Building and Dewatering Building containment areas. If there are totes located on the site that have not been opened, they will contain their original supplier seals. Sealed totes can be returned to the supplier for a refund, minus the shipping costs. Totes that have been used and contain chemicals will be shipped of site by a licensed waste hauler to an approved treatment and/or disposal facility permitted to accept this material.

Oxygen cylinders will provide oxygen required for H_2S removal processes. Agreements will be made with a third party supplier of compressed gas equipment. Dismantling of equipment upon decommissioning will be within the third party supplier's scope of work.

4.3 Filtrate from Thickening

Filtrate from the thickening screw presses will be conveyed to the front of the WPCP headworks utilizing the leachate return line located in Digester Galleries # 3 and # 4.

4.4 Filtrate from Dewatering

Filtrate from the dewatering screw presses will be conveyed to the front of the WPCP headworks utilizing the leachate return line located in the sludge storage building basement.

4.5 Digestate

Digestate will continue to be produced by the WPCP and will continue to be land applied.

4.6 Miscellaneous Waste Materials

Miscellaneous waste materials may include items like maintenance fluids, grease, hydraulic oils and other housekeeping chemicals stored on the site. These items will be stored within the site buildings in retail size containers and used and disposed of appropriately during normal operations on the site. When the site is decommissioned, the remaining products will be removed from the site by a licensed waste hauler for appropriate disposal/treatment at an approved facility to handle such products.

5 Restoration of Lands Negatively Affected by the Facility

The site is currently used as a WPCP. Due to the long use of the site as a WPCP, natural vegetation and native soils have been stripped from the site during the construction of various sections of the WPCP. Impacts related to the Net Zero facility are limited to potential spills and releases of on-site chemicals, process effluent or catastrophic releases of the contents of the digester. The facility will be constructed and operated with mitigation measures in place to reduce, control and prevent accidental spills as presented in the Design and Operations Report, submitted under separate cover as part of the REA application. Monitoring activities mandated as part of the project approvals will ensure that the mitigation measures are functioning as designed. Contingency measures put in place in the event that mitigation measures fail will be employed should an accidental release occur. Spills of any product will be cleaned up when the spill occurs and the site will be restored at that time to prevent the migration of any materials from entering the surrounding environment. During decommissioning activities, if any visual or olfactory evidence of a spill is observed, fill material (aggregates/top soil) on the site showing staining or odour would be removed by a licensed waste hauler for appropriate disposal at an approved facility.

6 Required Approvals for Decommissioning and Communication Plans

6.1 Emergency Response and Communications Plan

The emergency response and communication plans have been presented in the Design and Operations Report, submitted under separate cover as part of the REA application. The Emergency Response and Communication Plans cover all phases of the project including construction, operation and decommissioning.

6.2 Decommissioning Notification

A Decommissioning Notification will be prepared when decommissioning activities are expected to occur. The Decommissioning Notification will include a timeline and brief description of facility decommissioning activities that will occur during the decommissioning phase of the project. This notice will be published in the local paper and posted on the town website, mailed to adjacent landowners and other interested stakeholders identified during the consultation phases of the project. The Township, Fire Department, County, and the MECP will be sent the Decommissioning Notification 60 days prior to planned decommissioning activities.

6.3 Other Approvals

Should the facility be demolished, a demolition permit issued from the Town of Petawawa will be required prior to any demolition activities on the site. As part of this permit, the demolition contractor must obtain necessary shut-offs clearances from Enbridge and Hydro One prior to the issuance of the demolition permit. No other known approvals are required in support of the decommissioning of the Petawawa Net Zero facility. The facility is not located in a protected region (e.g. Niagara Escarpment Commission). No natural heritage features or functions are expected to be impaired by the decommissioning of the facility. A record of site condition is not required as part of the decommissioning activities.

7 Financial Assurance

The Petawawa Net Zero Facility is owned by the Town of Petawawa. According the Ontario Guideline F-15 Financial Assurance Guideline (November 2005), financial assurance will not normally be required of municipalities, other provincial ministries, and other public bodies or institutions for the following reasons:

a. These entities are not subject to bankruptcy and financial insolvency to the same degree as are private companies;

b. Municipalities have a permanency of place which prevent them from walking away from local problems; and

c. Public institutions are generally backed by provincial or federal government resources.

8 Report Summary

The Decommissioning Plan Report was prepared in accordance with the guidelines provided by the MECP under Ontario Regulation 359/09 required for the submission of Renewable Energy Approval application.

The Town of Petawawa is proposing to upgrade existing digesters, construct and operate biogas treatment and upgrade systems to utilize CHP plants to provide heat and power to the WPCP in Phase 0, and in the future generate renewable natural gas in Phase 1-2.

Three scenarios are presented in this report and include:

1) Continued operation of the Petawawa Net Zero Facility;

2) The adaptive reuse of the facility, or parts of it; and

3) Demolition of the facility with the removal of all above ground and underground structures and facility components.

Should the Petawawa Net Zero facility remain in operation, continued maintenance and/or replacement of facility structures and components would continue until the site was decommissioned at an unknown future date. Adaptive reuse of the site structures may include reutilizing space for other wastewater treatment

plant processes. Demolition of the facility upon decommissioning would entail the removal of all structures and components.

This report provides a detailed explanation of how the demolition of the facility is proposed. Essentially, all equipment at the facility that has a residual value upon decommissioning would be sold to other third parties. The remainder of materials on the site would be sorted into three broad categories for disposal including: scrap metal, concrete and asphalt and waste products. All metal components that can be recycled would be sold to a scrap metal recycler. Concrete and asphalt removed from the site that could be recycled for further use as aggregate materials would be removed from the site to such recyclers. All other items that are not deemed fit for recycling or reuse would be removed from the site and disposed of in a landfill as permitted at the time of decommissioning.

In the event that demolition activities were pursued as the final decommissioning plan, the site would be returned, as much as possible, to baseline conditions. Baseline conditions at the site consist of a WPCP.

Petawawa Net Zero is required to have a comprehensive environmental management plan that addresses potential negative impacts to the environment, mitigation measures to prevent impacts from occurring and contingency plans in the event that mitigation measures fail. These measures are addressed in the Construction Plan Report and the Design and Operations Report. These reports have been provided under separate cover as part of the REA submission. The environmental management plan will be followed throughout the course of the entire life of the project including construction, operation and decommissioning.

The operator would require a demolition permit from the Town for the removal of on-site buildings and structures. Furthermore, a decommissioning notice would be prepared and posted on a website, published in the local paper and provided to municipal and provincial government bodies at least 60 days prior to decommissioning activities. Additional permits may be required at the time of decommissioning will be appropriately sought.