

NextEra Energy Canada, ULC

# **Final Decommissioning Plan Report – Goshen Wind Energy Centre**

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# Table of Contents

	page
<b>1. Introduction</b> .....	<b>1</b>
1.1 Summary of Decommissioning Report Requirements .....	1
1.2 The Proponent .....	1
1.3 Project Study Area.....	2
<b>2. Decommissioning Plan Overview</b> .....	<b>2</b>
2.1 Decommissioning During Construction .....	2
2.2 Decommissioning After Ceasing Operations.....	2
2.2.1 Wind Turbines.....	4
2.2.2 Wind Turbine Foundations .....	4
2.2.3 Access Road Removal .....	4
2.2.4 Cable Wire Decommissioning .....	4
2.2.5 Transformer Substation and Breaker Switch Station Decommissioning .....	4
2.2.6 Crane Pad Decommissioning .....	5
2.2.7 Overhead Collector System and Transmission Lines .....	5
2.3 Procedures for Decommissioning.....	5
2.4 Land Restoration Activities .....	5
2.5 Procedures for Managing Waste Generated .....	6
2.6 Emergency Response and Communications Plan .....	7
2.7 Decommissioning Notification .....	7
2.8 Other Approvals.....	7
2.9 Conditions of Approval.....	7
<b>3. Summary and Conclusions</b> .....	<b>7</b>

## List of Figures

Figure 1-1 Project Location.....	3
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## List of Tables

Table 1-1 Adherence to Decommissioning Plan Report Requirements.....	1
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## Glossary of Terms

GE.....	General Electric
kV.....	Kilovolt
m.....	Metre
MOE.....	Ontario Ministry of the Environment
MNR.....	Ontario Ministry of Natural Resources
MTCS.....	Ontario Ministry of Tourism, Culture and Sport
MW.....	Megawatt
NextEra.....	NextEra Energy Canada, ULC
O. Reg. 359/09.....	Ontario Regulation 359/09
The Project.....	Goshen Wind Energy Centre
REA.....	Renewable Energy Approval

# 1. Introduction

Goshen Wind Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a wind energy centre project in the Municipalities of Bluewater and South Huron in Huron County, Ontario. The project will be referred to as the Goshen Wind Energy Centre (the “Project”) and will be located on private lands in the vicinity of the shoreline of Lake Huron. The wind turbine technology proposed for the Project is the GE 1.6-100 Wind Turbine and one GE 1.56-100 Wind Turbine, with a total project nameplate capacity of 102 MW. NextEra is seeking a Renewable Energy Approval (REA) for up to 72 wind turbines for the Project (however, only 63 turbines will be constructed).

This Decommissioning Plan Report was prepared in accordance with the requirements of *Ontario Regulation 359/09* (*O. Reg. 359/09*) and the Technical Guide to Renewable Energy Approvals (Ontario Ministry of the Environment (MOE), 2011). At the time of decommissioning, the Decommissioning Plan will be reviewed in accordance with applicable regulations.

The following sections outline the process of the Project’s decommissioning phase.

## 1.1 Summary of Decommissioning Report Requirements

The requirements for the Decommissioning Plan Report defined under *O.Reg. 359/09* are provided in the following table (Table 1-1).

**Table 1-1 Adherence to Decommissioning Plan Report Requirements**

Requirement	Completed	Corresponding Section
<b>Description of Decommissioning Activities</b>	Yes	2.3
<b>Site Restoration</b>	Yes	2.4
<b>Managing Excess Materials and Waste</b>	Yes	2.5
<b>Other Approvals</b>	Yes	2.8

## 1.2 The Proponent

The Project will be owned and operated by Goshen Wind Inc., a subsidiary of NextEra. NextEra Energy Canada’s indirect parent company is NextEra Energy Resources, LLC, a global leader in wind energy generation with a current operating portfolio of over 90 wind energy projects in North America. In Canada, wind energy centres currently owned and operated by NextEra include: Mount Copper and Mount Miller, (both 54 megawatts (MW)) located in Murdochville, Quebec; Pubnico Point, (31 MW) located near Yarmouth, Nova Scotia; and Ghost Pine (82 MW), located in Kneehill County, Alberta.

The primary contacts for the Project are as follows:

Project Proponent	Project Consultant
Nicole Geneau Project Director NextEra Energy Canada, ULC 390 Bay Street, Suite 1720, Toronto, Ontario M5H 2Y2 Phone: 1-416-364-9714 Email: Goshen.Wind@NextEraEnergy.com Website: www.NextEraEnergyCanada.com	Marc Rose Senior Environmental Planner AECOM 300-300 Town Centre Blvd., Markham, Ontario L3R 5Z6 Phone: 905-477-8400 x388 Email: marc.rose@aecom.com

### 1.3 Project Study Area

The proposed Project is located in Huron County, within the Municipalities of Bluewater and South Huron. The Project Study Area consists of the areas being studied for the wind farm components (Wind Energy Centre Study Area), as well as for the interconnection route (i.e., the area being studied for transmission lines to connect the Project to the electrical grid) (Transmission Line Study Area) (Figure 1-1). The Wind Energy Centre Study Area is generally bounded by Klondyke Road to the west, Rogerville Road to the north, Parr Line to the east, and Mount Carmel Drive to the south, in the Municipalities of Bluewater and South Huron. The Transmission Line Study Area is located to the east of the Wind Energy Centre Study Area, and is generally bounded by Parr Line to the west, Thames Road to the north, Perth 164 Road to the east, and Park Road to the south, extending into the Municipality of South Huron.

The location of the Project Study Area was defined early in the planning process for the proposed wind energy centre, based on the availability of wind resources, approximate area required for the proposed Project, and availability of existing infrastructure for connection to the electrical grid. The Project Study Area was used to facilitate information collection.

## 2. Decommissioning Plan Overview

The anticipated life of the Project is estimated to be at least 30 years. The following sections describe how the proposed Project will be dismantled either during construction (although unlikely) or following the operations phase of the Project. The wind turbine decommissioning process will be initiated upon the termination of the leases with the landowners. The decommissioning process will involve removing the wind turbine, including the tower, generator, auxiliary equipment, above ground cables/poles, fixtures, all other personal property and otherwise restoring the premises to its original condition. If it is agreed upon with the landowner, access roads and underground cables may be left in place. Foundations shall be removed to original soil depth or 1 metre (m) below grade, whichever is the lesser, and replaced with topsoil. Within 12 months of initiating the decommissioning process, the Project owner will have removed the relevant components from the leased land.

The decommissioning of the Goshen Wind Energy Centre will be undertaken in compliance with this Decommissioning Plan and the Ontario *Occupational Health and Safety Act* along with any other applicable regulatory requirements and standards, including those from the Ontario Ministry of Natural Resources (MNR), Conservation Authorities or Ontario Ministry of Tourism, Culture and Sport (MTCS). As with construction, a manager responsible for safety will be present on site for the duration of the work.

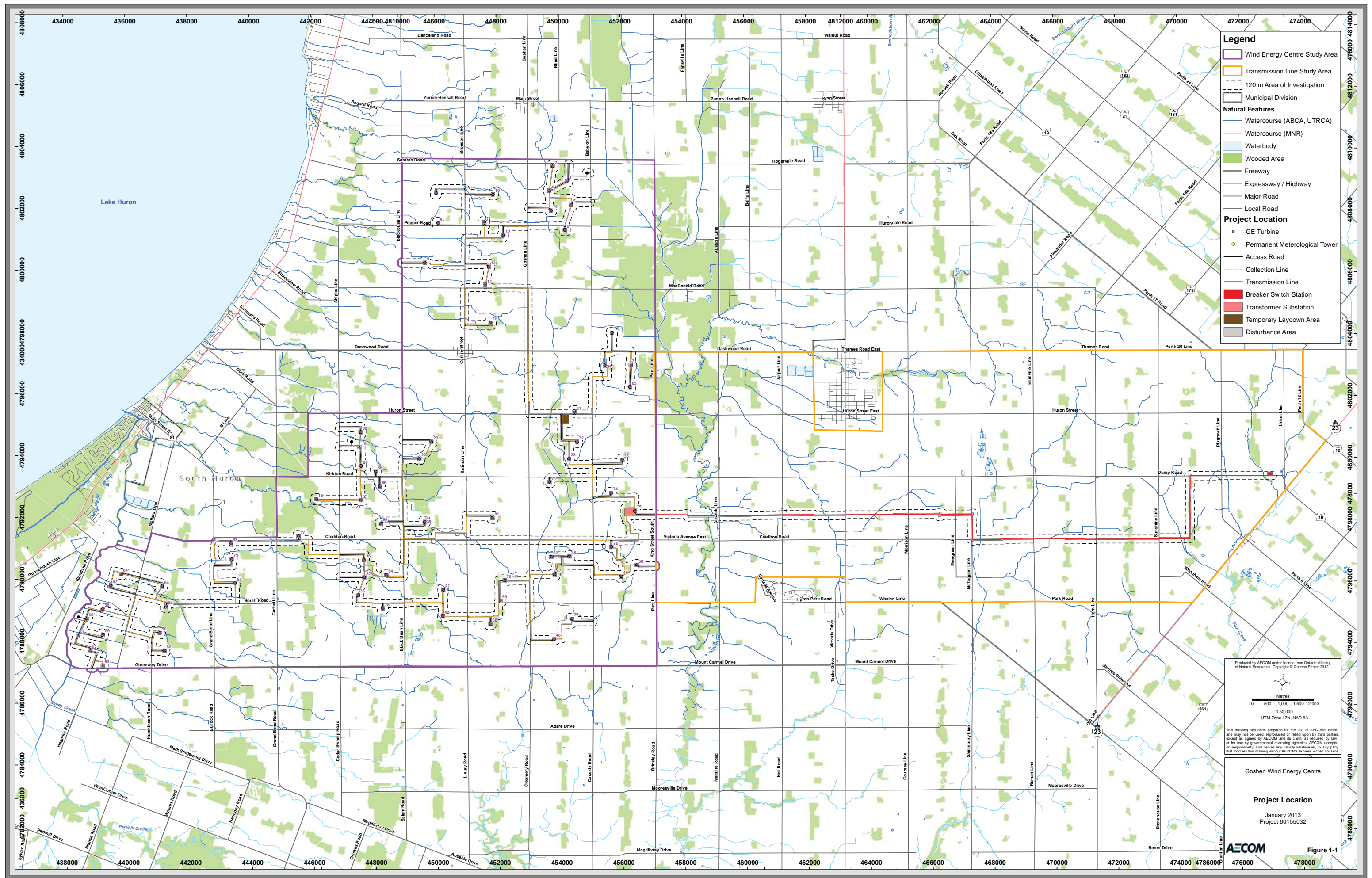
### 2.1 Decommissioning During Construction

Although it is unlikely that the Project would be decommissioned before the operations phase, should this occur, the actual procedures for dismantling the Project would depend upon the state of construction. Dismantling would follow the steps outlined in Section 2.3 of this report and any exposed soils would be re-seeded in consultation with the landowner. Mitigation measures as described in the Environmental Effects Management Plan (part of the Design and Operations Report, AECOM 2013) would also be implemented.

### 2.2 Decommissioning After Ceasing Operations

Properly maintained wind turbines have an expected life of at least 30 years. At the end of the project life, depending on market conditions and project viability, the wind turbines may be 're-powered' with new nacelles, towers, and/or blades, thus extending the useful life of the Project and delaying any decommissioning activities. Alternatively, the wind turbines may be decommissioned.





**Legend**

- Wind Energy Centre Study Area
- Transmission Line Study Area
- 120 m Area of Investigation
- Municipal Division

**Natural Features**

- Watercourse (ABCA, UTRCA)
- Watercourse (MNR)
- Waterbody
- Wooded Area
- Freeway
- Expressway / Highway
- Major Road
- Local Road

**Project Location**

- GE Turbine
- Permanent Meteorological Tower
- Access Road
- Collection Line
- Transmission Line
- Breaker Switch Station
- Transformer Substation
- Temporary Laydown Area
- Disturbance Area

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Metres  
0 500 1,000 1,500 2,000

1:50,000  
UTM Zone 17N, NAD 83

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Goshen Wind Energy Centre

**Project Location**

January 2013  
Project 60155032

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Figure 1-1

The following activities for the removal of the components will be undertaken once decommissioning is initiated:

- Remove above-ground collection and transmission system including substation and switchyard unless the transmission facilities are to be used by another qualified utility;
- Remove wind turbines;
- Partial removal of wind turbine foundations;
- Remove underground cables, if required by landowners; and
- Remove turbine access roads, if required by landowners.

The following anticipated detailed Decommissioning Plan is based on current procedures and experience. The specifics of these procedures may be adjusted to reflect additional decommissioning experience in the future.

### 2.2.1 Wind Turbines

The first stage of disassembly will include wiring crews disconnecting the tower from the collection system and disconnecting the wiring between turbine sections. A disassembly crew will then use a crane to remove the blades, the rotor, nacelle and then the towers section by section. The lubricating oil will be drained from the gearbox once it has been placed on the ground, and the oil will be disposed of in accordance with applicable regulations. As the turbine is being disassembled, the various components will be transported off-site.

### 2.2.2 Wind Turbine Foundations

Once all the turbine components have been cleared from a site, the top metre of overburden around the foundation will be excavated and stockpiled. Once cleared, the top 1 m of the foundation (or to bedrock) will be demolished. The resulting concrete and reinforcing bar (rebar) will be hauled off-site and disposed of at a licensed facility. Afterwards, the stockpiled soil will be used to replace the now cleared area. The disturbed area will be feathered out and graded. No off-site soil is predicted to be needed.

### 2.2.3 Access Road Removal

Access roads will be left at the landowner's request or graded to restore terrain profiles (as much as possible), and vegetated.

### 2.2.4 Cable Wire Decommissioning

At the time of decommissioning, if appropriate and with the consent of the landowner, the underground cables will be left in place. The lines will be cut and the ends buried to 1 m below grade.

### 2.2.5 Transformer Substation and Breaker Switch Station Decommissioning

The substation and breaker switch station electrical components will be either removed as a whole or disassembled, pending reuse or recycling. Once cleared, the gravel around the yard will be reclaimed (unless the landowner wishes to keep the area as is) and the fence removed. The substation and breaker switch station foundation will be excavated and the top 1 m of concrete (or to bedrock) will be demolished and hauled off-site to be disposed of at a licensed facility. The excavated area will then be filled in with native soil and re-graded. Any material that has been used as a sound attenuating berm will be levelled and replanted to the requirements of the landowner.

### 2.2.6 Crane Pad Decommissioning

The crane pad aggregate will be removed and areas will be filled unless the landowner asks for it to remain.

### 2.2.7 Overhead Collector System and Transmission Lines

Overhead cables and transmission poles will be removed or sold to an acceptable Transmission/Distribution Operator. Transmission pole holes will be filled with clean fill and disturbed areas will be reseeded with native vegetation, where required. Overhead lines will be removed and recycled, reused, or disposed of in accordance with regulatory requirements at the time of decommissioning.

## 2.3 Procedures for Decommissioning

Decommissioning procedures will be similar to the construction phase. The procedures, which will be finalized prior to decommissioning in accordance with REA requirements, are anticipated to include:

1. The creation of temporary work areas. In order to provide sufficient area for the lay-down of the disassembled wind turbine components and loading onto trucks, a 122 m by 122 m square must be cleared, levelled and made accessible to trucks. The topsoil will be removed and some material may need to be added.
2. The creation of crane pads. The crane pads will typically be 15 m x 35 m in size and will be located within the temporary work area around each wind turbine. The topsoil at the crane pad will be removed and approximately 600 mm of compacted crushed gravel will be added. Once the turbine disassembly is complete, the gravel area around each turbine will be removed and the area will be restored to prior use using stockpiled topsoil.
3. The use of cranes to remove the blades, hub and tower segments.
4. The use of trucks for the removal of turbines, towers and associated equipment.
5. The removal of the top 1 m of the turbine foundations and replacement with clean fill and stockpiled topsoil. The fill and topsoil will be contoured to allow cultivation in the case of agricultural lands.
6. Road bedding material will be removed and replaced with clean subsoil and topsoil for reuse by the landowner for agricultural purposes. It is proposed to leave culverts in place following the operations phase.
7. Cutting underground electrical lines, burying the ends to 1 m below grade, and leaving the lines in place with the consent of the landowner. Above-ground lines and poles that are not shared with another Transmission/Distribution Operator will be removed and the holes will be filled with clean fill.
8. The demolition of the substation, breaker switch station and operations and maintenance building. These will be decommissioned in a manner appropriate to and in accordance with the standards of the day. All materials will be recycled, where possible, or disposed off-site at an approved and appropriate facility.

## 2.4 Land Restoration Activities

Once all of the turbines and ancillary facilities are removed, the remaining decommissioning work will consist of shaping and grading the areas to, as near as practicable, the original contours prior to construction of the wind



turbines and access roads. Existing agricultural capacity will be restored and the land graded to maintain proper drainage. All areas, including the access roads, transformer pads and crane pads will be restored to, as near as practical, their original condition with native soils and seeding. If there is insufficient material onsite, topsoil and/or subsoil will be imported from a source acceptable to the landowner.

Although strict spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. The soil conditions of the turbine areas will be surveyed to determine if any effects have occurred. Should soil effects be noted, the affected soils will be identified, excavated, and removed to the applicable standards from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled subsoil and topsoil, if available. If none are available, clean fill and topsoil will be imported.

Decommissioning may temporarily affect the agricultural practices directly around the access roads, substation and turbine locations, but only during their removal. Similar to the construction phase, decommissioning will follow a stormwater protection plan that will ensure proper steps are followed to mitigate erosion and silt/sediment runoff.

As with the Project's construction, noise levels around the decommissioning work will be higher than average. Proper steps will be followed to minimize this disturbance, such as avoiding work outside of daylight hours. All decommissioning project activities will conform to applicable local municipal noise by-laws. Also, as with the Project's construction, road traffic in the area will increase temporarily due to crews and heavy equipment movements. If required, a traffic management plan will be prepared to mitigate the effects of increased road traffic, in consultation with the local municipality.

## **2.5 Procedures for Managing Waste Generated**

As discussed above, the waste generated by the decommissioning of the Project is minimal, and there are anticipated to be no toxic residues. Any waste generated will be disposed of according to the applicable standards with the emphasis on recycling materials whenever possible.

The major components of the wind turbines (tower, nacelle, blades) are modular items that allow for ease of construction and disassembly of the wind turbines during replacement or decommissioning. Dismantled wind turbines have a high salvage value due to the steel and copper components. These components are easily recyclable and there is a ready market for scrap metals. Transformers and transmission lines are designed for a 50 year lifespan so these items could be refurbished and sold for reuse.

Based on the construction details for the GE wind turbines and associated tower and components, it is assumed that both the tower and nacelle will yield approximately 80% salvageable materials. Since the hub assembly and bedplate is manufactured steel, it is anticipated that the hub will yield 100% salvageable metallic materials. Copper salvage estimates were derived by assuming 5% of the total tower and nacelle weight consists of salvageable copper bearing materials. Since the rotor/blades are constructed of predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibres), no salvage for the rotor or blades is currently assumed.

It is assumed that 75% of the aggregate material from the decommissioning of the crane pads can be salvaged for future use as aggregate base course. The remaining materials would be viable for general fill on non-structural fill areas. The geotextile fabric cannot be salvaged.



## **2.6 Emergency Response and Communications Plan**

The *Emergency Response and Communications Plan* is included in the Design and Operations Report (AECOM, 2013) prepared as part of the REA application for the proposed Goshen Wind Energy Centre.

## **2.7 Decommissioning Notification**

The process for notification of decommissioning activities will be the same as the process for notification of construction activities and is detailed in Section 5 of the *Emergency Response and Communications Plan* in the Design and Operations Report (AECOM, 2013).

## **2.8 Other Approvals**

The Project owners will ensure that all of the required approvals at the time of decommissioning of the proposed facility are adhered to.

## **2.9 Conditions of Approval**

The Project owner will ensure that the decommissioning stage of the proposed Project is carried out in accordance with REA requirements and the measures/practices as described in this report as well as any conditions imposed in the REA approval.

# **3. Summary and Conclusions**

This Decommissioning Plan Report has been completed to assist the Project owner in fulfilling regulatory requirements for the decommissioning of the Goshen Wind Energy Centre project. This report is consistent with the provisions of Ontario Regulation 359/09 for a Class 4 Wind Farm facility.