

Goshen Wind, Inc.

**Natural Heritage Environmental Effects  
Monitoring Plan (EEMP) for the  
Goshen Wind Energy Centre**

Report

Goshen Wind, Inc.

# **Natural Heritage Environmental Effects Monitoring Plan (EEMP) for the Goshen Wind Energy Centre**

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# 1. Purpose of the Natural Heritage Environmental Effects Monitoring Plan

Goshen Wind Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a wind energy project in the Municipalities of Bluewater and South Huron, Huron County, Ontario. The project will be referred to as the Goshen Wind Energy Centre (the "Project"). All turbines will be located on private lands. AECOM Canada Ltd. (AECOM) was retained by NextEra to prepare an application for the proposed Project in accordance with the requirements of the Renewable Energy Approval (REA) process outlined in Ontario Regulation 359/09 (O. Reg. 359/09) under the *Environmental Protection Act* and the Technical Guide to Renewable Energy Approvals (Ontario Ministry of the Environment, 2011).

Under the Renewable Energy Approval (REA) process, an environmental effects monitoring plan (EEMP) must be prepared to address negative environmental effects that may result from engaging in the renewable energy project. The EEMP must set out:

- Performance objectives in respect of the potential negative environmental effects of the project;
- Mitigation measures to assist in achieving the performance objectives;
- A program for monitoring negative environmental effects to ensure that mitigation measures are meeting performance objectives; and,
- A contingency plan to be implemented should monitoring reveal that mitigation measures have failed.

Furthermore, proponents for all Class 3 and 4 wind facilities must prepare an EEMP in respect of birds and bats in accordance with the following publications of the Ministry of Natural Resources (MNR):

1. Bats and Bat Habitats: Guidelines for Wind Power Projects (MNR, 2011a); and
2. Birds and Bird Habitats: Guidelines for Wind Power Projects (MNR, 2011b).

The post-construction monitoring plan described in this EEMP has been prepared for submission to the MNR and Ministry of the Environment (MOE) as part of the REA Application for the Project. This document has been prepared in accordance with O. Reg. 359/09, MNR's *Bats and Bat Habitats: Guidelines for Wind Power Projects* (July 2011) and MNR's *Birds and Bird Habitats: Guidelines for Wind Power Projects* (December 2011).

## 2. Project Overview

A Feed In Tariff (FIT) contract was awarded to Goshen Wind Inc. by the Ontario Power Authority (OPA) for the construction of the Goshen Wind Energy Centre. The Project has a nameplate capacity of 102 MW and is categorized as a Class 4 wind project under the REA regulation (O. Reg. 359/09). The project is proposed to be developed on private land and public land at the following location(s):

**Upper-tier Municipality:**..... Huron County  
**Lower-tier Municipalities:** ..... Bluewater and South Huron  
**Lot(s) and Concession(s):** ..... Numerous (see Figure 1)

The project will consist of the following permanent infrastructure as mapped in Figure 1:

- Up to 69 GE 1.6-100 Wind Turbine generator locations and pad mounted step-up transformers and one GE 1.56-100 Wind Turbine generator location and pad mounted step-up transformer (however, only 63 turbines will be constructed);

- A transformer substation and ancillary equipment;
- 34.5 kV electrical collection lines to connect the turbines to the transformer substation and other ancillary equipment such as above-ground junction boxes;
- 115 kV transmission line to run from the transformer substation to a breaker switch station which will connect the electricity generated by the project to the existing Hydro One 115 kV transmission line;
- Turbine access roads;
- Three permanent meteorological towers; and
- An operations and maintenance building and ancillary equipment such as an electrical service line connected to the local distribution service.

The project will consist of the following temporary infrastructure as mapped in Figure 1:

- Turbine laydown and storage areas (including temporary staging areas, crane pads and turnaround areas surrounding each wind turbine); and
- Construction laydown area for the purposes of providing temporary storage of construction materials and temporary construction offices and ancillary equipment such as electrical service from the local electrical distribution line.

### 3. Post-Construction Monitoring for Significant Natural Features

Significant natural features potentially affected by the Goshen Wind Energy Centre are described in the following reports:

- Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report (AECOM, 2013a);
- Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Addendum (AECOM, 2013b);
- Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Second Addendum (AECOM, 2013c);
- Goshen Wind Energy Centre Waterfowl (Tundra Swan) Stopover and Staging Areas (Terrestrial) Pre-construction Evaluation of Significance Survey Results Letter (AECOM, 2013d);
- Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Third Addendum (AECOM, 2013e); and
- Goshen Wind Energy Centre Bat Maternity Colony Exit Survey Results Memo (NRSI, 2013).

As indicated in the above reports, which were prepared in accordance with Section 38(2) of the REA Regulation (O. Reg. 359/09), the following confirmed or treated as significant and provincially significant natural features will receive post-construction monitoring:

- Bat Maternity Colony features BMC-189, BMC-229, BMC-249<sup>Δ</sup>, BMC-326, BMC-342, BMC-358<sup>Δ</sup>, BMC-372<sup>Δ</sup> and BMC-757;
- Colonially-nesting Bird Breeding Habitat (Tree/Shrub) feature CNB-01<sup>Δ</sup>;
- Amphibian Breeding Habitat (Woodland) features AWO-14, AWO-25, AWO-27, AWO-30 and AWO-36; and
- Habitat for Bird Species of Conservation Concern (Red-headed Woodpecker) feature SCB-03.

*Note: Δ Indicates property access was not granted and feature is treated as significant. Turbines within 120 m of the feature will be monitored for bird and bat mortality, specifically turbines 10, 12, 55, 56 and 86.*

The following natural features were treated as significant and will receive post-construction monitoring if confirmed to be significant based on the outcome of pre-construction evaluation surveys:

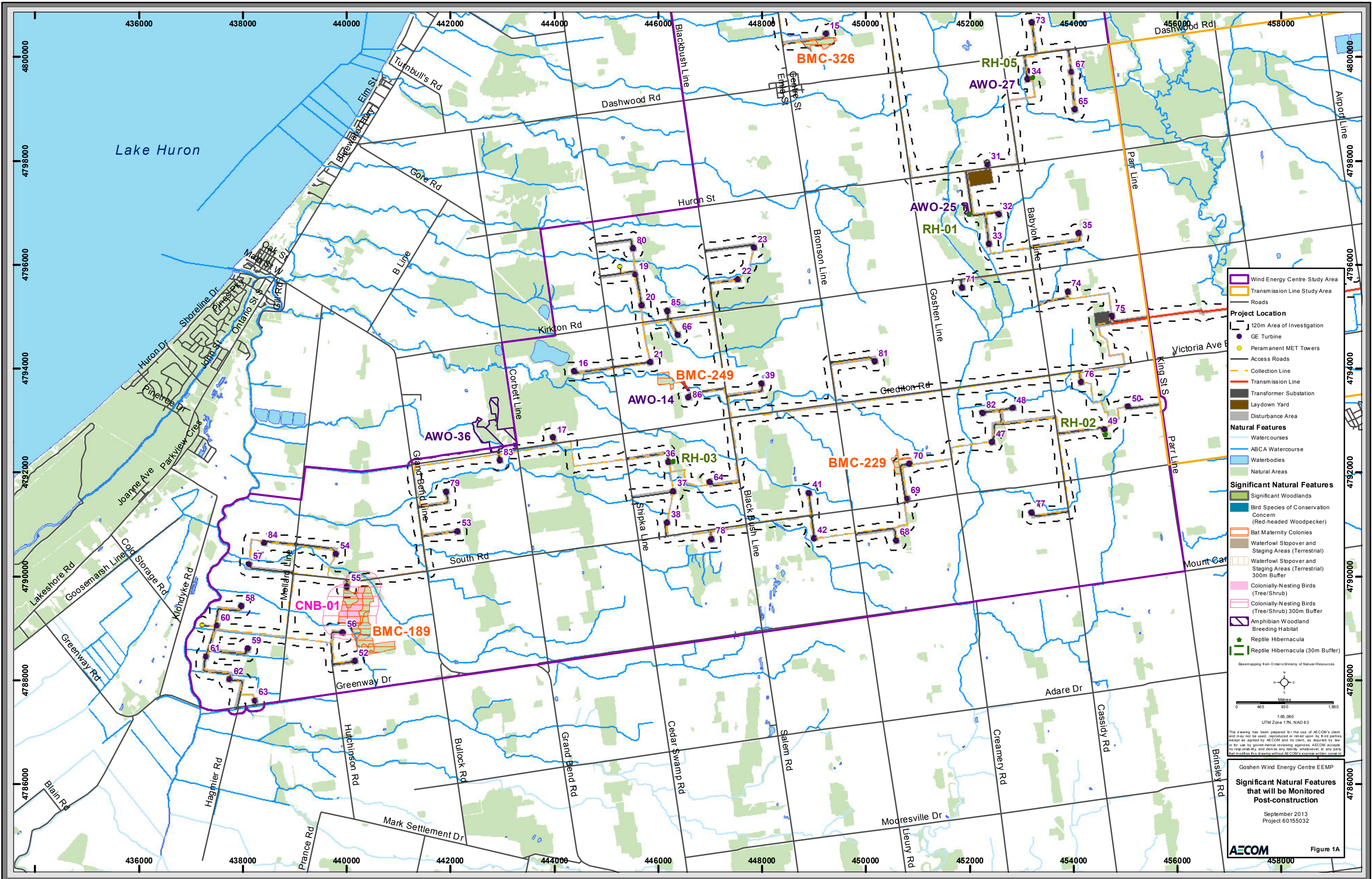
- Reptile Hibernacula features RH-01, RH-02, RH-03 and RH-05; and
- Amphibian Breeding Habitat (Woodland) features AWO-33, AWO-34 and AWO-35.

The location of each significant or provincially significant natural feature, including features treated as significant as described above, which require post-construction monitoring is shown in Figure 1. The potential negative environmental effects, performance objectives, mitigation strategy, environmental effects monitoring plan and contingency measures are described in Table 1 (originally described in AECOM, 2013a; AECOM, 2013b; AECOM, 2013c; AECOM, 2013d; AECOM, 2013e and AECOM, 2013f). The environmental effects monitoring plan for each feature includes the post-construction survey methods, monitoring locations, frequency and duration of sample collection, technical and statistical value of the data, and reporting requirements.

### **3.1 Contingency Measures**

Where mitigation measures are found to not be effective, the contingency measure identified in Table 1 will be implemented immediately. If contingency measures need to be implemented, MNR will be notified immediately, and if required, MNR will be consulted to determine appropriate contingency measures.





- Wind Energy Centre Study Area
- Transmission Line Study Area
- Roads
- Project Location**
- 120m Area of Investigation
- GE Turbine
- Permanent MET Towers
- Access Roads
- Collection Line
- Transmission Line
- Transformer Substation
- Laydown Yard
- Disturbance Area
- Natural Features**
- Watercourses
- ABCA Watercourse
- Waterbodies
- Natural Areas
- Significant Natural Features**
- Significant Woodlands
- Bird Species of Conservation Concern (Red-headed Woodpecker)
- Bat Maternity Colonies
- Waterfowl Stopover and Staging Areas (Terrestrial)
- Waterfowl Stopover and Staging Areas (Terrestrial) 300m Buffer
- Colonially-Nesting Birds (Tree/Shrub)
- Colonially-Nesting Birds (Tree/Shrub) 300m Buffer
- Amphibian Woodland Breeding Habitat
- Reptile Hibernacula
- Reptile Hibernacula (30m Buffer)

Basemapping from Ontario Ministry of Natural Resources

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UTM Zone 17N, NAD 83

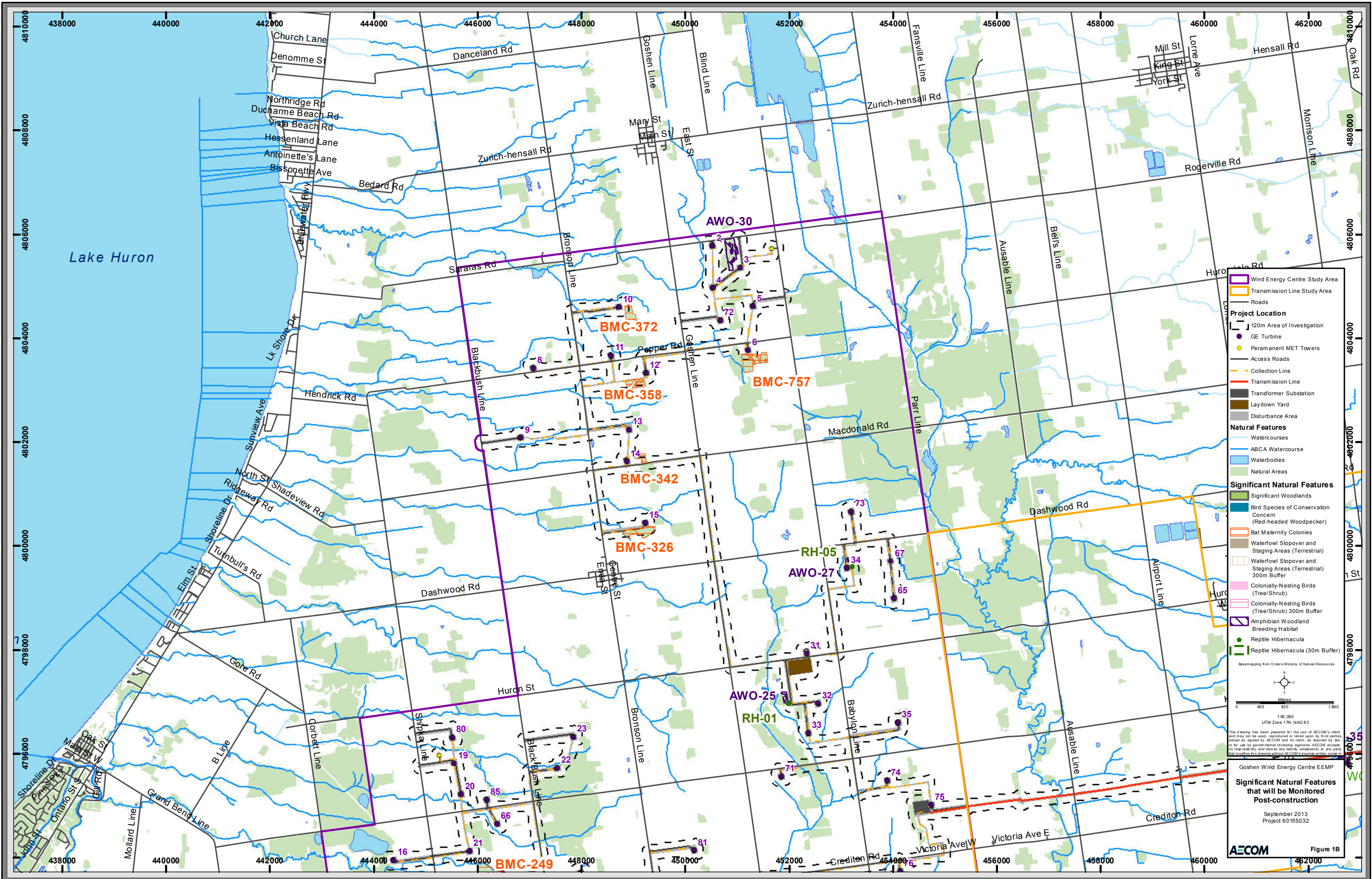
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Goshen Wind Energy Centre EEMP

**Significant Natural Features that will be Monitored Post-construction**

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**AECOM** Figure 1A



**Wind Energy Centre Study Area**

**Transmission Line Study Area**

**Roads**

**Project Location**

- 120m Area of Investigation
- GE Turbine
- Permanent MET Towers
- Access Roads
- Collection Line
- Transmission Line
- Transformer Substation
- Laydown Yard
- Disturbance Area

**Natural Features**

- Watercourses
- ABCA Watercourse
- Waterbodies
- Natural Areas

**Significant Natural Features**

- Significant Woodlands
- Bird Species of Conservation Concern (Red-headed Woodpecker)
- Bat Maternity Colonies
- Waterfowl Stopover and Staging Areas (Terrestrial)
- Waterfowl Stopover and Staging Areas (Terrestrial) 300m Buffer
- Colonially-Nesting Birds (Tree/Shrub)
- Colonially-Nesting Birds (Tree/Shrub) 300m Buffer
- Amphibian Woodland Breeding Habitat
- Reptile Hibernacula
- Reptile Hibernacula (30m Buffer)

Basemapping from Ontario Ministry of Natural Resources

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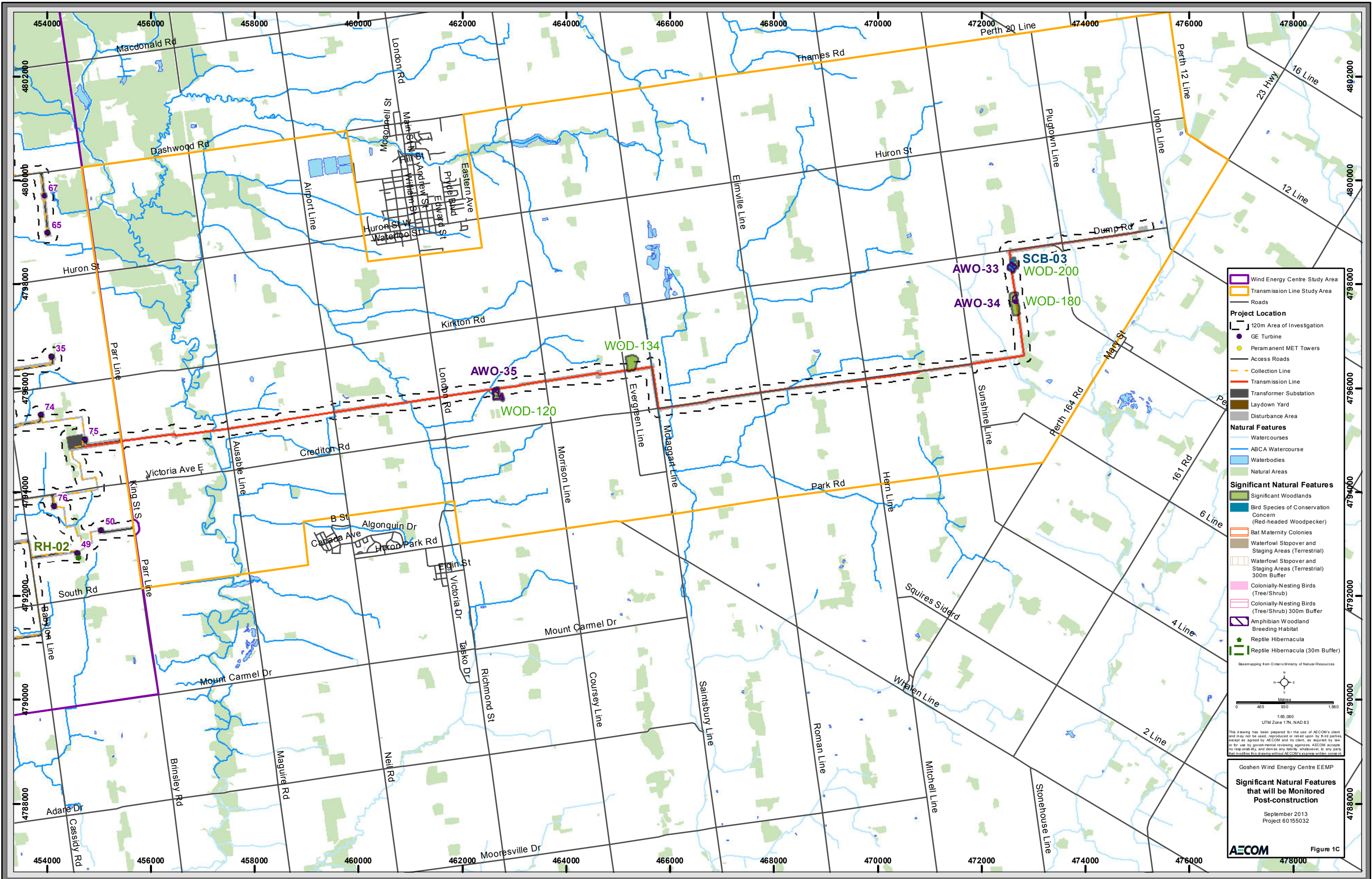
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**Significant Natural Features that will be Monitored Post-construction**

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**AECOM** Figure 1B



- Wind Energy Centre Study Area
- Transmission Line Study Area
- Roads
- Project Location**
- 120m Area of Investigation
- GE Turbine
- Permanent MET Towers
- Access Roads
- Collection Line
- Transmission Line
- Transformer Substation
- Laydown Yard
- Disturbance Area
- Natural Features**
- Watercourses
- ABCA Watercourse
- Waterbodies
- Natural Areas
- Significant Natural Features**
- Significant Woodlands
- Bird Species of Conservation Concern (Red-headed Woodpecker)
- Bat Maternity Colonies
- Waterfowl Stopover and Staging Areas (Terrestrial)
- Waterfowl Stopover and Staging Areas (Terrestrial) 300m Buffer
- Colonially-Nesting Birds (Tree/Shrub)
- Colonially-Nesting Birds (Tree/Shrub) 300m Buffer
- Amphibian Woodland Breeding Habitat
- Reptile Hibernacula
- Reptile Hibernacula (30m Buffer)

Basemapping from Ontario Ministry of Natural Resources

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Goshen Wind Energy Centre EEMP

**Significant Natural Features that will be Monitored Post-construction**

September 2013  
 Project 60155032

**AECOM** Figure 1C

**Table 1. Summary of the Environmental Effects Monitoring Plan for Significant/Provincially Significant Natural Features In or Within 120 m of the Goshen Wind Energy Centre where an Operational Impact Has the Potential to Occur**

Unique Feature ID	Potential Negative Environmental Effects	Performance Objective	Mitigation Strategy	Environmental Effects Monitoring Plan					Contingency Measure
				Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
<p><b>Bat Maternity Colonies</b>                      BMC-189, BMC-229, BMC-249<sup>A</sup>, BMC-326, BMC-342, BMC-358<sup>A</sup>, BMC-372<sup>A</sup>, BMC-757</p> <p><sup>A</sup> Indicates property access not granted therefore these features treated as significant and turbines within 120 m will be monitored for bird and bat mortality.</p>	<ul style="list-style-type: none"> <li>Avoidance caused by turbine lighting.</li> <li>Bats may be disturbed by noise from operation of turbines.</li> </ul>	<ul style="list-style-type: none"> <li>Protect bat roosting habitat</li> <li>Continued use of habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Propose a lighting scheme that will minimize potential disturbance to bats, while fulfilling Transport Canada requirements.</li> <li>Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring.</li> <li>Post-construction monitoring to ensure continued use of habitat.</li> <li>If significant declines or disappearance of species is detected, determine whether likely to have been caused by the Project. If so, corrective measures will be taken and will be determined through consultation with MNR.</li> <li>Additional monitoring will be conducted to determine effectiveness of the mitigation.</li> <li>Mitigation will be based on best available information and science. Emerging technology will be explored.</li> <li>Where bat mortality at a single turbine within 120 m of a significant bat maternity colony exceeds 10 bats/turbine, MNR will be consulted and appropriate mitigation will be implemented, which may include periodic shut-down or blade feathering during high mortality periods (e.g. migration).</li> </ul>	<ul style="list-style-type: none"> <li>Conduct 3 years of post-construction monitoring for features BMC-189, BMC-229, BMC-326, BMC-342 and BMC-757 according to protocol described for pre-construction survey in the March 2010 Draft version of <i>Bats and Bat Habitats: Guidelines for Wind Power Projects</i> (MNR, 2010). See Appendix A for detailed survey methods.</li> <li>Note that pre-construction surveys were not completed because access was not granted for the following features: BMC-249, BMC-358 and BMC-372. As post-construction habitat monitoring cannot occur without access to the habitat and baseline studies for comparison, turbines within 120 m of the assumed significant habitats (Turbines 10, 12 and 86) will be included in the subset of turbines selected for mortality monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Within features at snags/tree cavities monitored during pre-construction surveys. If this is not possible (e.g. due to change in permission to enter private property), MNR will be consulted.</li> <li>Co-ordinates (UTMs) of monitoring locations are provided in Appendix A. See Appendix B (Figure 1) for map of monitoring locations.</li> </ul>	<ul style="list-style-type: none"> <li>Post-construction surveys will be conducted in:                             <ul style="list-style-type: none"> <li>June 2015</li> <li>June 2016</li> <li>June 2017</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Determine if there is a displacement or avoidance effect caused by turbines located in proximity to bat maternity colonies.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Reports submitted to MNR. Estimated Report Submission Dates:                             <ul style="list-style-type: none"> <li>February 2016 (yr 1 post-construction)</li> <li>February 2017 (yr 2 post-construction)</li> <li>February 2018 (yr 3 post-construction)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Institute changes to turbine operation if disturbance effects are detected through post-construction monitoring.</li> <li>Consultation with MNR to determine additional contingency measures if necessary.</li> </ul>
<p><b>Red-headed Woodpecker Habitat SCB-03</b></p>	<ul style="list-style-type: none"> <li>Red-headed Woodpecker Breeding Habitat may be disturbed by routine maintenance of the transmission line corridor.</li> <li>Absence of vegetation within Red-Headed Woodpecker Breeding Habitat removed during construction of transmission line.</li> </ul>	<ul style="list-style-type: none"> <li>No displacement of breeding Red-headed Woodpeckers from habitat.</li> <li>No destruction of breeding/nesting habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Perform maintenance operations such as vegetation clearing outside the breeding season of May 1 to July 31. If maintenance operations must occur during this timing window, nest searches will be conducted by a qualified Biologist prior to vegetation clearing.</li> <li>Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through post-construction monitoring.</li> <li>Consideration of Red-headed Woodpecker habitat requirements in development of Compensation Plan for tree removal in significant woodland.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct 3 years of post-construction monitoring for Feature SCB-03, according to protocol described for pre-construction survey.</li> <li>See Appendix A for detailed survey methods.</li> </ul>	<ul style="list-style-type: none"> <li>Point count station established within feature SCB-03 during pre-construction surveys will be monitored during post-construction surveys. If this is not possible (e.g. due to change in permission to enter private property), MNR will be consulted.</li> <li>Utility poles will be examined for signs of nesting Red-headed Woodpecker.</li> <li>Co-ordinates (UTMs) of monitoring locations are provided in Appendix A. See Appendix B (Figure 2) for map of monitoring locations.</li> </ul>	<ul style="list-style-type: none"> <li>If determined to be significant, post-construction surveys:                             <ul style="list-style-type: none"> <li>Spring/Summer 2015</li> <li>Spring/Summer 2016</li> <li>Spring/Summer 2017</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Determine if there is displacement of breeding Red-headed Woodpeckers from the habitat as a result of construction and routine maintenance of the transmission line.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Reports submitted to MNR. Estimated Report Submission Dates:                             <ul style="list-style-type: none"> <li>February 2016 (yr 1 post-construction)</li> <li>February 2017 (yr 2 post-construction)</li> <li>February 2018 (yr 3 post-construction)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>If significant declines or disappearance of species is detected, determine whether likely to have been caused by the Project. If so, corrective measures will be taken, to be determined through consultation with MNR. Habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.</li> </ul>
<p><b>Reptile Hibernacula RH-01*, RH-02*, RH-03* and RH-05*</b>                      (*pre-construction survey required to verify significance of this feature. If not significant, the mitigation measures, monitoring plan and contingency measures will not be implemented)</p>	<ul style="list-style-type: none"> <li>Possible snake mortality from vehicles using access roads near significant features.</li> </ul>	<ul style="list-style-type: none"> <li>No snake mortality along access roads.</li> </ul>	<ul style="list-style-type: none"> <li>Advise operations staff to take extra care while driving access roads near features RH-01, RH-02, RH-03 and RH-05, particularly during timing windows when snakes emerge (April 15 - May 31) and return (September 1 – October 15) to hibernacula.</li> <li>Maintain wildlife crossing signs and limit speed of vehicles near crossings (30 km/hr).</li> <li>Erect long term drift fence between edge of habitat (RH-01, RH-02, RH-03 and RH-05) and road if hibernaculum determined to be large (&gt;25 snakes). If required, MNR will be consulted regarding the details and timing of this mitigation measure.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct reptile hibernacula survey for 3 years post-construction according to protocol described for pre-construction surveys to assess any potential changes in snake populations or species composition.</li> <li>See Appendix A for detailed survey methods.</li> </ul>	<ul style="list-style-type: none"> <li>Examination of features (e.g. rock piles) and vicinity during post-construction surveys. If this is not possible (e.g. due to change in permission to enter private property), MNR will be consulted.</li> <li>Co-ordinates (UTMs) of monitoring locations are provided in Appendix A. See Appendix B (Figures 3 to 6) for map of monitoring locations.</li> </ul>	<ul style="list-style-type: none"> <li>Pre-construction survey:                             <ul style="list-style-type: none"> <li>Spring 2013</li> </ul> </li> <li>If determined to be significant, post-construction surveys:                             <ul style="list-style-type: none"> <li>Spring 2015</li> <li>Spring 2016</li> <li>Spring 2017</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Determine if there are any changes in snake populations as a result of access roads near significant features.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Reports submitted to MNR. Estimated Report Submission Dates:                             <ul style="list-style-type: none"> <li>Summer 2013 (pre-construction data)</li> <li>February 2016 (yr 1 post-construction)</li> <li>February 2017 (yr 2 post-construction)</li> <li>February 2018 (yr 3 post-construction)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>If significant declines or disappearances of species are detected, determine whether likely to have been caused by the Project. If so, corrective measures will be taken, to be determined through consultation with MNR.</li> </ul>

**Table 1. Summary of the Environmental Effects Monitoring Plan for Significant/Provincially Significant Natural Features In or Within 120 m of the Goshen Wind Energy Centre where an Operational Impact Has the Potential to Occur**

Unique Feature ID	Potential Negative Environmental Effects	Performance Objective	Mitigation Strategy	Environmental Effects Monitoring Plan					Contingency Measure
				Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
<p><b>Colonially-nesting Bird Breeding Habitat (Tree/Shrub) CNB-01<sup>A</sup></b></p> <p><sup>A</sup> Indicates property access not granted therefore this feature treated as significant and turbines within 120 m will be monitored for bird and bat mortality.</p>	<ul style="list-style-type: none"> <li>Colonially nesting birds may be disturbed by noise from operations of turbines.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize disturbance to colonially-nesting birds (Great Blue Herons).</li> </ul>	<ul style="list-style-type: none"> <li>Post-construction monitoring to ensure continued use of the habitat. Turbines within 120 m of the assumed significant habitat (Turbines 55 and 56) will be included in the subset of turbines selected for mortality monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct 3 years of post-construction colonially-nesting bird monitoring at feature CNB-01 according to protocol described for pre-construction surveys.</li> <li>See Appendix A for detailed survey methods.</li> </ul>	<ul style="list-style-type: none"> <li>At least one vantage point/listening station will be placed along the fence line north of Turbine 56. If this is not possible (e.g. due to change in permission to enter private property), MNR will be consulted.</li> <li>Co-ordinates (UTMs) of monitoring locations are provided in Appendix A. See Appendix B (Figure 7) for map of monitoring locations.</li> </ul>	<ul style="list-style-type: none"> <li>Pre-construction survey:                             <ul style="list-style-type: none"> <li>Spring 2013</li> </ul> </li> <li>If determined to be significant, post-construction surveys:                             <ul style="list-style-type: none"> <li>Spring 2015</li> <li>Spring 2016</li> <li>Spring 2017</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Determine if there are any changes in colonially-nesting breeding bird populations as a result of noise disturbance from the operation of nearby Turbines 55 and 56.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Reports submitted to MNR. Estimated Report Submission Dates:                             <ul style="list-style-type: none"> <li>Summer 2013 (pre-construction data)</li> <li>February 2016 (yr 1 post-construction)</li> <li>February 2017 (yr 2 post-construction)</li> <li>February 2018 (yr 3 post-construction)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>If significant declines or disappearance of species is detected, determine whether this is likely to have been caused by the Project. Monitoring results will be discussed with MNR prior to implementing mitigation measures, which will be developed through consultation with MNR.</li> </ul>
<p><b>Amphibian Woodland Breeding Habitat AWO-14, AWO-25, AWO-27, AWO-30, AWO-33*, AWO-34*, AWO-35*, AWO-36</b></p> <p>(*pre-construction survey required to verify significance of this feature. If not significant, the mitigation measures, monitoring plan and contingency measures will not be implemented)</p>	<ul style="list-style-type: none"> <li>Risk of mortality to amphibians moving between breeding pools and home range.</li> <li>Breeding amphibians may be disturbed by routine maintenance of transmission line corridor.</li> <li>Removal of vegetation within amphibian woodland breeding habitats resulting from clearing for transmission line.</li> <li>Risk of disturbance and/or mortality from herbicide spraying along transmission line.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize amphibian mortality along access roads.</li> <li>Minimize disturbance due to maintenance activities.</li> <li>Minimize disturbance to amphibian breeding habitat due to transmission line maintenance activities.</li> <li>No destruction of breeding ponds.</li> <li>Minimize disturbance and/or mortality from herbicide spraying.</li> </ul>	<ul style="list-style-type: none"> <li>Advise operations staff to avoid driving roads or undertaking maintenance activities in proximity to these features at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible.</li> <li>Most access road traffic will be confined to daytime hours. Avoid access road use at night.</li> <li>Maintain wildlife crossing signs and limit speed of vehicles near crossings (30 km/hr).</li> <li>Conduct area searches for amphibians prior to beginning transmission line maintenance activities if required to take place within the above timing windows.</li> <li>Schedule vegetation clearing for transmission line maintenance within the woodland to outside April 1 and June 30. Implement contingency mitigation measures (as per consultation with MNR) if disturbance effects are detected through construction monitoring. If this is not possible, MNR will be consulted regarding additional mitigation measures that may be required.</li> <li>Minimize aerial extent of herbicide spraying along transmission line.</li> <li>Only apply herbicide when wind speeds are low and no significant precipitation is expected.</li> <li>Maintain 10 m buffer to pond where no herbicides area applied.</li> <li>Apply only herbicides approved for use adjacent to water bodies within riparian buffer areas.</li> <li>Only apply herbicides using hand spraying within riparian buffer areas.</li> <li>A dye solution will be used in herbicide mix to visually detect uniform coverage of spray area.</li> <li>Conduct area searches for amphibians prior to herbicide application.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct 3 years post-construction amphibian call surveys (frogs and toads) and egg mass or adult surveys (salamanders) according to protocol described for pre-construction surveys to assess any potential changes in amphibian breeding populations or species distribution.</li> <li>See Appendix A for detailed survey methods.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring stations established during pre-construction surveys (typically within features located at the edge of vernal pools or ponds) will be monitored during post-construction surveys. If this is not possible (e.g. due to change in permission to enter private property), MNR will be consulted.</li> <li>Co-ordinates (UTMs) of monitoring locations are provided in Appendix A. See Appendix B (Figures 8 to 15) for map of monitoring locations.</li> </ul>	<ul style="list-style-type: none"> <li>Pre-construction survey:                             <ul style="list-style-type: none"> <li>Spring 2013</li> </ul> </li> <li>If determined to be significant, post-construction surveys:                             <ul style="list-style-type: none"> <li>Spring 2015</li> <li>Spring 2016</li> <li>Spring 2017</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Determine if there are any changes in amphibian breeding populations as a result of access roads or the transmission line.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Reports submitted to MNR. Estimated Report Submission Dates:                             <ul style="list-style-type: none"> <li>Summer 2013 (pre-construction data)</li> <li>February 2016 (yr 1 post-construction)</li> <li>February 2017 (yr 2 post-construction)</li> <li>February 2018 (yr 3 post-construction)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>If significant declines or disappearance of species is detected, determine whether likely to have been caused by the Project. If so, corrective measures will be taken, to be determined through consultation with MNR.</li> <li>If features are affected by the transmission line (AWO-33, AWO-34 and/or AWO-35), habitat compensation or restoration measures will be described in a Compensation Plan, to be submitted to MNR.</li> </ul>

## 4. Post-Construction Monitoring for Bat and Bird Mortality

Post-construction mortality surveys are required for all Class 3 and 4 wind power projects. This Post-Construction Monitoring Plan is one component of the EEMP of the REA Application for the Project, and has been prepared in accordance with MNR's *Bats and Bat Habitats: Guidelines for Wind Power Projects* (July 2011) and MNR's *Birds and Bird Habitats: Guidelines for Wind Power Projects* (December 2011).

### 4.1 Mortality Thresholds

As required by MNR (MNR, 2011a and MNR, 2011b), a threshold approach will be used to identify and mitigate significant bat and/or bird mortality resulting from the operation of wind turbines.

#### 4.1.1 Bats

Bat mortality is considered to be significant when a threshold of annual bat mortality (averaged across the Project) exceeds:

- 10 bats / turbine / year

This threshold has been determined by MNR based on bat mortality reported at wind power projects in Ontario and comparison with jurisdictions across North America (MNR, 2011a).

#### 4.1.2 Birds

Bird mortality is considered to be significant when a threshold of annual bird mortality exceeds:

- 14 birds / year at individual turbines or turbine groups;
- 0.2 raptors / turbine / year (all raptors) across a wind power project; or
- 0.1 raptors / turbine / year (provincially tracked raptors) across a wind power project.

Provincially tracked raptors are defined as raptors of provincial conservation concern by MNR's Natural Heritage Information Centre (NHIC) (MNR, 2011b).

These thresholds have been determined by MNR based on the range of bird mortality reported at wind power projects in Ontario and comparison with jurisdictions across North America (MNR, 2011b).

### 4.2 Post-Construction Monitoring Methods

Post construction bat and bird mortality surveys estimate bird and bat mortality from wind turbines and may identify species and specific periods of high mortality. This information can be used to evaluate the success of mitigation measures, establish protocols for operational mitigation, and inform adaptive management.

Bat and bird mortality surveys identify the number of bats or birds killed per turbine over a known period of time (expressed as bats / turbine / year or birds / turbine / year). This value represents an estimate of bat and bird mortality adjusted for carcass removal rates, searcher efficiency, and percent area searched. Standard methodologies for mortality surveys are identified below.

For bats and birds, a monitoring year is considered to be from May 1 – October 31, and continues until November 30 specifically for raptor monitoring. Should additional bat mortality be found based on supplemental monitoring (e.g., associated with significant wildlife habitat) and using the same standard protocols, this mortality will be included in the calculation of mortality rates. In this case, the year is all reporting periods in one calendar year (i.e., from January 1 – December 31).

Post-construction monitoring is required for 3 years at all Class 3 and 4 wind power projects. Post-construction monitoring will consist of:

- Regular bat/bird mortality surveys around specific wind turbines;
- Monitoring of bat/bird carcass removal rate by scavengers (or other means);
- Monitoring of bird/bat searcher efficiency (i.e., number of bat/bird fatalities present that are actually detected by surveyors);
- Avoidance-disturbance effects monitoring (where a project is located within 120 m of bat Significant Wildlife Habitat);
- For birds, subsequent 2 years of scoped mortality and cause and effects monitoring at individual turbines (and unmonitored turbines in near proximity), following any given year where an annual post-construction mortality report identifies significant bird or raptor mortality; and
- For bird and/or bats, should significant mortality be observed and operational mitigation implemented, post-construction monitoring will be conducted for an additional 3 years from the implementation of operational mitigation to evaluate the effectiveness of the mitigation.

All searchers will have updated rabies pre-exposure vaccinations.

#### 4.2.1 Effort and Timing for Bird and Bat Mortality Monitoring

Minimum requirements for post-construction monitoring of bats and birds include:

- Post-construction monitoring (including mortality surveys, carcass removal and searcher efficiency trials) will be conducted during the core season when bats are active and in co-ordination with bird mortality monitoring (May 1 to October 31) for the first 3 years of wind turbine operation.
- A sub-sample of at least 30% of turbines will be selected to cover representative areas throughout the Project location.
- Bat and Bird mortality surveys will be conducted at each monitored turbine twice per week (3 and 4 day intervals) from May 1 to October 31; surveys for raptor mortality will be continued once per week from November 1 to November 30.
- For birds, all turbines within the project location will be monitored once a month during the May 1 to November 30 survey period for evidence of raptor mortalities.
- Where significant annual bird mortality is identified, subsequent scoped mortality and cause effects monitoring will be conducted for 2 years at individual turbines (and unmonitored turbines in near proximity).

A minimum of 19 turbines (30% of 63 turbines) will be selected in consultation with MNR to cover representative areas throughout the Project location following completion of pre-construction Evaluation of Significance surveys and

determination of which turbines (63 of 69) will ultimately be constructed. Of the 19 turbines to be selected in consultation with MNR, the following turbines will be included in the post-construction mortality monitoring program:

- Turbines within 120 m of Bat Maternity Colony features BMC-249 (Turbine 86), BMC-358 (Turbine 12) and BMC-372 (Turbine 10); and
- Turbines within 120 m of Colonially-nesting Bird Breeding Habitat (Tree/Shrub) feature CNB-01 (Turbines 55 and 56).

Post-construction monitoring will begin May 1<sup>st</sup> of the year that the Project is fully operational. The commercial operation date of the Goshen Wind Energy Centre is July 21, 2014; therefore, it is anticipated that post-construction monitoring will begin May 1, 2015.

If full Project commissioning is delayed, post-construction monitoring of a partially completed project will not be delayed for longer than 1 year. If the Project is constructed in phases, monitoring for each phase will coincide with the commencement of operation of that phase. When available, post-construction monitoring data may be useful in considering potential effects on bats and bat habitat in adjacent phases.

The above monitoring methods may be modified in consultation with MNR.

#### 4.2.2 Carcass Searches

Carcass removal by scavengers is highly variable among sites (varying by vegetation cover, terrain and season) and must be considered when estimating total bat and bird mortality. Carcass searches will consider the following:

- The sub-sample of wind turbines that are monitored will include all habitat types and any significant wildlife habitat present at the site, and will cover the spatial distribution of the wind turbines. Wind turbines will be selected through a scientifically defensible system (e.g., stratification).
- The time required to search each turbine will vary depending on the surrounding habitat (e.g., open field vs. forest, etc.) and individual searchers, but searchers will aim for a consistent search time for all surveyed turbines (e.g., 20 minutes per turbine).
- Each surveyed turbine will have a search area that has a 50 m radius.
- Within this 50 m radius, the search area will be examined using transects 5.0 to 6.0 m apart allowing for a visual search of 2.5 to 3.0 m on each side. The search area may be rectangular, square or circular depending on turbine locations and arrangements and surrounding terrain.
- The search area of each turbine will be mapped into visibility classes according to the following table. Where the majority of the search area would not be searchable due to vegetation cover or other impediments (e.g., Visibility Class 4) these turbines will not be included in the sub-sample of monitored turbines.

%Vegetation Cover	Vegetation Height	Visibility Class
≥90% bare ground	≤15 cm tall	Class 1 (Easy)
≥25% bare ground	≤15 cm tall	Class 2 (Moderate)
≤25% bare ground	≤25% > 30 cm tall	Class 3 (Difficult)
Little or no bare ground	≥25% > 30 cm tall	Class 4 (Very Difficult)

- Where possible, ground cover around turbines will be maintained at a low level in order to facilitate more accurate bat and bird mortality surveys.



- Mortality surveys that incorporate the use of trained dogs (i.e., dog handler teams to locate mortalities) to improve searcher efficiency will be considered, particularly in difficult terrain.
- All carcasses found will be photographed and recorded/labelled with species, sex, date, time, location (UTM co-ordinate), carcass condition, searcher, injuries, ground cover, and distance and direction to nearest turbine.
- Weather conditions including wind speed and precipitation will be included as part of the data collection.
- The estimated number of days since death, and condition of each carcass collected will be recorded in one of the following categories:
  - Fresh;
  - Early decomposition;
  - Moderate decomposition;
  - Advanced decomposition;
  - Complete decomposition; or
  - Scavenged.
- Bird carcasses found during mortality monitoring will be collected and stored in a freezer and used in carcass removal or searcher efficiency trials, assuming they are in reasonable condition.
- Carcasses of the following species found during bat mortality searches will be stored in a freezer and used in carcass removal or searcher efficiency trials, assuming they are in reasonable condition:
  - *Lasionycteris noctivagans* (Silver-haired Bat);
  - *Lasiurus cinereus* (Hoary Bat); and
  - *Lasiurus borealis* (Eastern Red Bat).
- Because of white-nose syndrome contamination risks, the following species will not be used in carcass removal or searcher efficiency trials (carcasses of these species may be sent to the Canadian Co-operative Wildlife Health Centre for analysis of white-nose syndrome):
  - *Myotis septentrionalis* (Northern Long-eared Bat);
  - *Myotis lucifugus* (Little Brown Bat);
  - *Myotis leibii* (Eastern Small-footed Bat);
  - *Perimyotis subflavus* (Tricolored Bat); and
  - *Eptesicus fuscus* (Big Brown Bat).

The above carcass search methods may be modified in consultation with MNR.

#### 4.2.3 Carcass Removal Trials

The level of carcass scavenging must be determined through carcass removal trials. In these trials carcasses are placed around the wind turbines and monitored until they disappear. The average carcass removal time is a factor in determining the estimated bat or bird mortality. As carcass removal rates vary considerably from one site to another and seasonally, removal trials must be conducted at every wind power project for every year of monitoring.

Below are some important considerations for conducting carcass removal rate trials:

- Carcass removal trials will be conducted at least once a season (Spring: May/June; Summer: July/August; and Fall: September/October) during the same period as the mortality surveys. Trials will be conducted once per month if vegetation changes occur during the season (e.g., crops grow, harvest, etc.).

- A minimum of 10 carcasses will be used for each trial, with **no more than 5 trial carcasses placed at any one time**.
- Carcasses will be monitored every 3-4 days in conjunction with carcass searches.
- Carcass removal trials will be conducted in a variety of weather conditions. Weather conditions will be recorded.
- Placed carcasses will be distributed across the range of different substrates/habitats and visibility classes of turbines being searched.
- To the extent possible, carcass removal trials will be conducted at turbines that are not part of the carcass search sub-sample.
- Carcasses will be placed before dusk using gloves and boots to avoid imparting human smell that might bias trial results (e.g., attract scavengers, etc.).
- Trials will continue until all carcasses are removed or have completely decomposed (generally 2 weeks).
- To avoid confusion with turbine related fatalities, trial carcasses will be discretely marked (e.g., clipping of ear, wing, fur; hole punching ear, etc.) with a unique identification so they can be identified as trial carcasses.
- Carcasses used will be as fresh as possible since frozen or decomposed carcasses are less attractive to scavengers. If frozen carcasses are used, they will be thawed prior to beginning carcass removal trials.
- To the extent possible, bat carcasses will be used for at least one third of the carcass removal trials, and bird carcasses will comprise another third of the trial carcasses. Trials using other small brown mammal or bird carcasses (e.g., mice or brown chicks) may also be used when bird and bat carcasses are not available. Larger birds (e.g. brown chickens) may be used to calculate raptor-specific correction factors for scavenging rates.
- Scavenging rates may change over time as scavengers become aware of and develop search images for new sources of food beneath turbines.
- Scavenging will be determined on a site-specific basis and rates will not be assumed to be similar between sites or used in calculations for other projects.

The above carcass removal trial methods may be modified in consultation with MNR.

#### 4.2.4 Searcher Efficiency Trials

Searcher efficiency is another important factor in creating an estimate of total bat and bird mortality. Searcher efficiency trials require a known number of discretely marked carcasses to be placed around a wind turbine. Searchers examine the wind turbine area, and the number of carcasses that they find is compared to the number of carcasses placed. Searcher efficiency can vary considerably for each searcher and from one site to another (varying by vegetation cover, terrain and season), and will be conducted as part of post-construction monitoring at every wind power project for every year of monitoring.

Below are some important considerations for conducting searcher efficiency trials:

- Searcher efficiency trials will be conducted at least once a season (Spring: May/June; Summer: July/August; and Fall: September/October) during the same period as the bat and bird mortality surveys. Trials will be conducted once per month if vegetation changes occur during the season (e.g., crops grow, harvest, etc.).
- A 'tester' will control the trials and return to collect marked trial carcasses at the completion of the trials to determine the number of carcasses remaining and if any carcasses were scavenged or removed during the trial.

- Searcher efficiency trials are to be conducted for each individual searcher or team involved in searching for carcasses (including teams using dogs). The searcher will not be notified when they are participating in an efficiency trial to avoid potential search biases.
- A minimum of 10 carcasses per searcher per season in all applicable visibility classes (see table above) are to be used. The average per searcher across all visibility classes will be used for calculations; this average may be weighted by the relative proportion of turbines in each visibility class.
- Trial carcasses will be spread out over the trial period (month or season) and conducted with the mortality surveys. **A maximum of 3 trial carcasses will be placed at any one time to avoid bias and flooding the area with carcasses.**
- Trial carcasses are placed for one search period only and then removed and recorded by the ‘tester’.
- Trial carcasses will be randomly placed within the search area and location recorded so that they can be retrieved if they are not found during the trial.
- Trial carcasses will be discreetly marked (e.g., clipping of ear, wing, leg, fur; hole-punching ear, etc.) with a unique identification so that they can be identified as a trial carcass by the tester.
- To the extent possible, bat carcasses will be used for at least one third of the carcass removal trials, and bird carcasses will comprise another third of the trial carcasses. Trials using other small brown mammal or bird carcasses (e.g., mice or brown chicks) may also be used when bird and bat carcasses are not available. Larger birds (e.g. brown chickens) may be used to calculate raptor-specific correction factors for searcher efficiency.
- If frozen carcasses are used, they will be thawed prior to beginning searcher efficiency trials.

The above searcher efficiency trial methods may be modified in consultation with MNR.

#### 4.2.5 Proportion Area Searched

Based on current Ontario post-construction data, most bats and birds appear to fall within 50 m of a wind turbine base. This area therefore represents the maximum recommended search area. Since it may not always be possible to search the entire 50 m radius because of the presence of thick or tall vegetation, steep slopes, active cultivation, etc. the actual area searched during the mortality surveys will be calculated at each turbine, using a GPS or comparable device/methods. A map of the actual search area for each turbine searched, and a description of areas deemed to be unsearchable (e.g., vegetation height, type, slope, etc.), will be provided in the mortality report.

#### 4.2.6 Calculations

##### Scavenger Correction Factor

The following formula will be used to calculate the overall scavenger correction ( $S_c$ ) factors based on the proportion of carcasses remaining after each search interval are pooled:

$$S_c = \frac{n_{visit1} + n_{visit2} + n_{visit3}}{n_{visit0} + n_{visit1} + n_{visit2}}$$

Where,  $S_c$  .....is the proportion of carcasses not removed by scavengers over the search period;  
 $n_{visit0}$  .....is the total number of carcasses placed; and  
 $n_{visit1} - n_{visit3}$  .....are the numbers of carcasses on visits 1 through 3.

**Searcher Efficiency**

Searcher efficiency ( $S_e$ ) will be calculated for each searcher as follows:

$$S_e = \frac{\text{number of test carcasses found}}{\text{number of test carcasses placed} - \text{number of carcasses scavenged}}$$

The number of turbines that each individual searches will vary therefore it will be necessary to calculate a weighted average that reflects the proportion of turbines searched by each searcher. The weighted average or overall searcher efficiency will be calculated as follows:

$$S_{e0} = S_{e1}(n_1/T) + S_{e2}(n_2/T) + S_{e3}(n_3/T) \dots$$

Where,  $S_{e0}$ .....is the overall searcher efficiency;  
 $S_{e1}$  and  $2$  and  $3$ .....are individual searcher efficiency ratings;  
 $N_1$  and  $2$  and  $3$ .....are number of turbines searched by each searcher; and  
 $T$ .....is the total number of turbines searched by all searchers.

**Proportion Area Searched**

Proportion area searched ( $P_s$ ) is calculated as follows:

$$P_s = \frac{\text{actual area searched}}{\pi r^2}$$

Where  $r = 50$  m.

**Corrected Mortality Estimates**

The minimum estimated bat mortality ( $C$ ) is calculated as follows:

$$C = c / (S_{e0} \times S_c \times P_s)$$

Where,  $C$  .....is the corrected number of bat fatalities;  
 $c$ .....is the number of carcasses found;  
 $S_{e0}$ .....is the weighted proportion of carcasses expected to be found by searchers (overall searcher efficiency);  
 $S_c$  .....is the proportion of carcasses not removed by scavengers over the search period; and  
 $P_s$ .....is the proportion of the area searched.

**4.2.7 Other Considerations**

- The above calculations will be presented in corrected numbers of bats/turbine per year and birds/turbine /year. In this context, the year is from May 1 to October 31 for all bats and birds and continues until November 30 specifically for raptor monitoring.
- A separate calculation for raptor mortality will use the searcher efficiency and carcass removal results relevant to raptors.

- Carcasses may be discovered incidental to formal searches. These carcasses will be processed (i.e., collected and recorded, etc.) and fatality data will be included with the calculation of fatality rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be reported separately.
- Should additional bat mortality be found based on supplemental monitoring (e.g., associated with Significant Wildlife Habitat) and using the same standard protocols, this mortality will be included in the calculation of mortality rates. In this case, the year is all reporting periods in one calendar year (i.e., from January 1 to December 31).
- Tissue samples from bat and bird carcasses may be used in a number of DNA analyses to provide insight into population size and structure, as well as the geographic origin of migrants. The local MNR office may be contacted prior to disposing bat and bird carcasses, to determine if this type of research is occurring in the area.

### **4.3 Post-Construction Mitigation**

#### **4.3.1 Bats**

Post-construction mitigation will be required where post-construction monitoring identifies disturbance effects associated with bat Significant Wildlife Habitat. Operational mitigation is required if post-construction monitoring shows that a wind power project is causing significant bat mortality. Bat mortality is considered significant when mortality levels at a Project location exceed 10 bats / turbine / year.

Operational mitigation refers to adjustments made to the operation of wind turbines to help mitigate potential negative environmental effects on bats (i.e., significant bat mortality). Operational mitigation for bat mortality includes changing the wind turbine cut-in speed to 5.5 m/s (measured at hub height), or feathering of wind turbine blades when wind speeds are below 5.5 m/s.

The majority of bat mortalities from wind turbine operations occur during fall migration. Across North America, it is estimated that 90% of bat fatalities occur from mid-July through September. Where a post-construction monitoring annual report indicates that the annual bat mortality threshold of 10 bats / turbine / year has been exceeded, operational mitigation will be implemented across the wind power project (i.e., at all turbines) from sunset to sunrise, from July 15 to September 30. This mitigation will continue for the duration of the Project. Should site-specific monitoring indicate a shifted peak mortality period, operational mitigation may be shifted to match the peak mortality, with mitigation maintained for a minimum duration of 10 weeks. Any shift in the operational mitigation period to match peak mortality should be determined in co-ordination with and confirmed by MNR.

Where post-construction mitigation is applied, an additional 3 years of effectiveness monitoring is required. Monitoring the effectiveness of any post-construction mitigation techniques will help to evaluate the success of this mitigation.

#### **4.3.2 Birds**

Post-construction mitigation or additional scoped monitoring will be required at individual turbines or groups of turbines where post-construction monitoring identifies significant annual bird mortality, disturbance effects associated with bird Significant Wildlife Habitat, or significant bird mortality events.

For turbines located outside 120 m of bird Significant Wildlife Habitat, 2 years of subsequent scoped mortality and cause and effects monitoring are required where a significant annual mortality threshold has been exceeded. Following scoped monitoring, post-construction mitigation (e.g., operational mitigation) and effectiveness monitoring may be required at individual turbines or turbine groups where a mortality effect has been identified or significant annual mortality persists.

For turbines located within 120 m of bird Significant Wildlife Habitat, immediate post-construction mitigation (including operational mitigation), as identified in the Environmental Impact Study, and 3 years of effectiveness monitoring will be required where monitoring identifies significant annual bird mortality or disturbance effects associated with bird Significant Wildlife Habitat.

Operational mitigation techniques may include periodic shut-down of select turbines and/or blade feathering at specific times of the year when mortality risks to the affected bird species is particularly high (e.g., migration).

Emerging and new technologies may be considered to reduce bird and/or bat fatalities.

## 4.4 Contingency Plans

A contingency plan addresses immediate actions necessary in case of a significant bat or bird mortality event, or if mitigation actions fail. A contingency plan allows additional mitigation measures to be implemented in the event that unanticipated negative environmental effects are observed during a single mortality monitoring survey.

### 4.4.1 Bats

Should cut-in speed mitigation be implemented and the bat mortality threshold continue to be exceeded, additional mitigation and scoped monitoring requirements will be determined in consultation with MNR.

### 4.4.2 Birds

Should mitigation be implemented and the bird mortality threshold continue to be exceeded, additional mitigation and scoped monitoring requirements will be determined in consultation with MNR.

A contingency plan is required when a significant bird mortality event occurs. A significant bird mortality event is defined to have occurred when bird mortality during a single mortality monitoring survey (as observed in the field on a single day) exceeds:

- 10 or more birds at any one turbine; or
- 33 or more birds (including raptors) at multiple turbines.

*NOTE: These numbers are actual carcasses found (not corrected numbers)*

MNR will be notified within 48 hours if one of the thresholds above is exceeded during a single mortality monitoring survey. MNR will be consulted to determine appropriate contingency plans should a significant bird mortality event occur or if mitigation actions fail.

## 5. Additional Post-construction Commitments

The following significant woodland features will be impacted through vegetation clearing during the construction of the transmission line for the Goshen project:

- WOD-120
- WOD-134
- WOD-180
- WOD-200

Up to 2.6 ha of forest cover will be removed. To compensate for the loss of woodlands, a new area of forest will be established that is equal to the area to be cleared (total area to be determined through a post-construction site inspection). Tree planting and management may be conducted in partnership with a local organization (e.g. in partnership with a local Conservation Authority). Details of the afforestation plan will be prepared in consultation with MNR. A copy of the Compensation Plan will be provided to MNR.

This plan must be prepared and provided to MNR within the first year of operation of the project.

In addition, if construction timing windows for Deer Congregation Area feature DWC-01 or Deer Movement Corridor feature in woodland WOD-331 cannot be adhered to as set out in the NHA and EIS (AECOM, 2013a), then MNR will be consulted and post-construction monitoring may be required.

## 6. Species at Risk

The Species at Risk in Ontario List (O.Reg 230/08) will be consulted to determine species listed as Endangered or Threatened in Ontario. Mortality or injury of an Endangered or Threatened species will be reported to MNR within 24 hours of detection or the next business day.

## 7. Reporting Requirements

### 7.1 Timing of Report Submissions

The MOE will be provided with a report that summarizes the results of the EEMP for all aspects of the project. The MNR will be provided with an annual report that summarizes the results of the post-construction monitoring plan described in this report. MNR will also be provided with results of any outstanding pre-construction surveys and all post-construction surveys. Below is a summary of the anticipated report submission dates and the contents of each report:

#### 7.1.1 Pre-construction Survey Report

- **January 2014** for the following features:
  - Reptile Hibernacula (RH-01, RH-02, RH-03 and RH-05);
  - Colonially-nesting Bird Breeding Habitat (Tree/Shrub) (CNB-01); and
  - Amphibian Woodland Breeding Habitat (AWO-33, AWO-34 and AWO-35).

#### 7.1.2 Post-construction Monitoring Reports for Significant Natural Features:

- **February 2016** - 1<sup>st</sup> year post construction monitoring results for the following features:
  - Bat Maternity Colonies (BMC-189, BMC-229, BMC-249, BMC-326, BMC-342, BMC-358, BMC-372 and BMC-757). Note that pre-construction surveys were not completed because access was not granted for the following features: BMC-249, BMC-358 and BMC-372. As post-construction habitat monitoring cannot occur without access to the habitat and baseline studies for comparison, it is recommended that turbines within 120 m of the assumed significant habitats be included in the subset of turbines selected for mortality monitoring;

- Red-headed Woodpecker Habitat (SCB-03);
  - Reptile Hibernacula (RH-01, RH-02, RH-03 and RH-05 if deemed significant upon completion of pre-construction surveys);
  - Colonially-nesting Bird Breeding Habitat (Tree/Shrub) (CNB-01 if deemed significant upon completion of pre-construction surveys); and
  - Amphibian Woodland Breeding Habitat (AWO-14, AWO -25, AWO-27, AWO-30, AWO-36; also AWO-33, AWO-34 and AWO-35 if deemed significant upon completion of pre-construction surveys).
- **February 2017** - 2<sup>nd</sup> year post-construction monitoring results for the following features:
    - Bat Maternity Colonies (BMC-189, BMC-229, BMC-249, BMC-326, BMC-342, BMC-358, BMC-372 and BMC-757). Note that pre-construction surveys were not completed because access was not granted for the following features: BMC-249, BMC-358 and BMC-372. As post-construction habitat monitoring cannot occur without access to the habitat and baseline studies for comparison, it is recommended that turbines within 120 m of the assumed significant habitats be included in the subset of turbines selected for mortality monitoring;
    - Red-headed Woodpecker Habitat (SCB-03);
    - Reptile Hibernacula (RH-01, RH-02, RH-03 and RH-05 if deemed significant upon completion of pre-construction surveys);
    - Colonially-nesting Bird Breeding Habitat (Tree/Shrub) (CNB-01 if deemed significant upon completion of pre-construction surveys); and
    - Amphibian Woodland Breeding Habitat (AWO-14, AWO -25, AWO-27, AWO-30, AWO-36; also AWO-33, AWO-34 and AWO-35 if deemed significant upon completion of pre-construction surveys).
- **February 2018** – 3<sup>rd</sup> year post-construction monitoring results for the following features:
    - Bat Maternity Colonies (BMC-189, BMC-229, BMC-249, BMC-326, BMC-342, BMC-358, BMC-372 and BMC-757). Note that pre-construction surveys were not completed because access was not granted for the following features: BMC-249, BMC-358 and BMC-372. As post-construction habitat monitoring cannot occur without access to the habitat and baseline studies for comparison, it is recommended that turbines within 120 m of the assumed significant habitats be included in the subset of turbines selected for mortality monitoring;
    - Red-headed Woodpecker Habitat (SCB-03);
    - Reptile Hibernacula (RH-01, RH-02, RH-03 and RH-05 if deemed significant upon completion of pre-construction surveys);
    - Colonially-nesting Bird Breeding Habitat (Tree/Shrub) (CNB-01 if deemed significant upon completion of pre-construction surveys); and
    - Amphibian Woodland Breeding Habitat (AWO-14, AWO -25, AWO-27, AWO-30, AWO-36; also AWO-33, AWO-34 and AWO-35 if deemed significant upon completion of pre-construction surveys).



### 7.1.3 Post-construction Monitoring for Bat and Bird Mortality

- **February 2016** – 1<sup>st</sup> year (May 1-November 30, 2015) post-construction bird and bat mortality monitoring results.
- **February 2017** – 2<sup>nd</sup> year (May 1-November 30, 2016) post-construction bird and bat mortality monitoring results.
- **February 2018** – 3<sup>rd</sup> year (May 1-November 30, 2017) post-construction bird and bat mortality monitoring results.

*Note: Where a single mortality event of 10 birds/turbine or 33 birds (including raptors) at multiple turbines is observed, the event will be documented and reported to MNR within 48 hours of detection.*

### 7.1.4 Other Reporting Requirements:

- **On or before July 2015** – Tree Compensation Plan for Removal of Significant Woodlands

Additional monitoring and reports may be required if:

- a) Mortality thresholds are exceeded and mitigation/contingency measures are implemented, or
- b) Negative effects to significant natural features are observed and mitigation/contingency measures are implemented.

In both cases, reports that detail effectiveness monitoring results will be required. The timing and frequency of these reports will be determined in consultation with MNR.

## 7.2 Data Standards for Annual Mortality Monitoring Reports

All bat and bird mortality monitoring data and associated reports will be submitted to the MOE and MNR, consistent with MNR's procedures and protocols, and satisfy the data standards and requirements of the Wind Energy Bird and Bat Monitoring Database. Submitted bird and bat survey data will be entered into the database, analyzed, reported and used to address knowledge gaps and create public data summaries. Standardized templates available online through the Wind Energy Bird and Bat Monitoring Database (refer to Appendix C and Bird Studies Canada website) will be used to record and report all field data.

Reports will also include maps of areas searched for each surveyed turbine, and raw data for all carcass searches, searcher efficiency trials and carcass removal trials will be required as part of the annual report. A data sheet sample will also be provided with the mortality report.

## 8. References

- AECOM, 2013a:  
Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report.  
Prepared for Goshen Wind, Inc. January 2013.
- AECOM, 2013b:  
Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report  
Addendum. Prepared for Goshen Wind, Inc. January 2013.
- AECOM, 2013c:  
Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Second  
Addendum. Prepared for Goshen Wind Inc. September 2013.
- AECOM, 2013d:  
Goshen Wind Energy Centre Waterfowl (Tundra Swan) Stopover and Staging Areas (Terrestrial) Pre-  
construction Evaluation of Significance Survey Results Letter. Prepared for Goshen Wind Inc. June 2013.
- AECOM, 2013e:  
Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Third  
Addendum. Prepared for Goshen Wind Inc. November 2013.
- AECOM, 2013f:  
Goshen Wind Energy Centre Design and Operations Report. Prepared for Goshen Wind, Inc. January 2013.
- NRSI, 2012:  
Goshen Wind Energy Centre Bat Monitoring Report and Environmental Impact Study, draft. Prepared for  
AECOM.
- NRSI, 2013:  
Goshen Wind Energy Centre Bat Maternity Colony Exit Survey Results Memo. Prepared for AECOM. March  
7, 2013. 21 pp.
- OMNR, 2011a:  
Bats and Bat Habitats: Guidelines for Wind Power Projects. First Edition. Queen's Printer for Ontario, Canada.
- OMNR, 2011b:  
Birds and Bird Habitats: Guidelines for Wind Power Projects. First Edition. Queen's Printer for Ontario, Canada.
- OMNR, 2011c:  
Significant Wildlife Habitat Ecoregion 7E Criterion Schedule Addendum to the Significant Wildlife Habitat  
Technical Guide. DRAFT June 2011. 42 pp.
- OMNR, 2011d:  
Significant Wildlife Habitat Ecoregion 6E Criterion Schedule Addendum to the Significant Wildlife Habitat  
Technical Guide. DRAFT June 2011. 42 pp.
- OMNR, 2010:  
Bats and Bat Habitats: Guidelines for Wind Power Projects. Draft. Queen's Printer for Ontario, Canada.
- OMOE, 2011:  
Technical Guide to Renewable Energy Approvals. Queen's Printer for Ontario, Canada.

# Appendix A

## Detailed Survey Methods

## Appendix A Detailed Survey Methods

The following methods will be used to conduct pre-construction evaluation of significance surveys for candidate significant wildlife habitats located in or within 120 m of the Project Location. These methods will also be used to conduct post-construction surveys according to the monitoring plan described in this report. If these protocols cannot be followed (e.g., because access to properties is not granted), MNR will be consulted.

### Bat Maternity Colonies

Candidate significant bat maternity colonies in the Project Study Area were evaluated by Natural Resources Solutions Inc (NRSI).

NRSI biologists conducted through-the-night acoustic bat monitoring for candidate significant bat maternity colony features BMC-189, BMC-229, BMC-326, BMC-342 and BMC-757 according to the March 2010 guidance document *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR, 2010). In addition to passive acoustic monitoring, active visual and acoustic monitoring was undertaken to establish if any snags monitored may contain bat maternity colonies.

The UTM coordinates of the monitoring stations for these bat maternity colony features are provided in Table 1. A map showing the locations of these monitoring stations is provided in Appendix B; these locations may be subject to change depending on site conditions and/or changes in permission to enter private property.

**Table 1. Locations of Bat Maternity Colony Monitoring Stations**

Bat Maternity Colony Feature	Monitoring Station ID	UTMs of Monitoring Station	
		Easting	Northing
<b>BMC-189</b>	BAT-002	440214	4789670
<b>BMC-229</b>	BAT-011	450641	4792088
<b>BMC-326</b>	BAT-012	449190	4800313
<b>BMC-342</b>	BAT-005	449248	4801612
<b>BMC-757</b>	BAT-010	451084	4803692

Pre-construction surveys were not completed because access was not granted for the following features: BMC-249, BMC-358 and BMC-372. As post-construction habitat monitoring cannot occur without access to the habitat and baseline studies for comparison, post-construction monitoring for disturbance effects will not be completed for these features.

The following description of methods for these surveys was provided in the 2013 Bat Monitoring Report and Environmental Impact Study (NRSI, 2012).

#### Through-the-night Acoustic Bat Monitoring

In accordance with the MNR guidance document (MNR, 2010), monitoring should be conducted in the month of June, beginning at dusk and continuing for 5 hours. On each monitoring night, a Pettersson D240X ultrasound bat detector was paired with a portable computer to record all bat activity. This monitoring system was powered by gel deep cycle batteries and left to record between 2 and 5 nights of data at a time. The portable computer recorded wave files at a moderate sampling rate of 22.2 kHz/sec, which typically provides ample sonogram resolution to identify the call sonograms of Ontario's bat species.

Each passive monitoring station was designed to record both Heterodyne and Time Expansion data simultaneously to allow for a full analysis of activity in the vicinity of monitoring stations. Although Time Expansion records broadband data, the Heterodyne setting typically records narrowband data within approximately 5kHz of the recording frequency. Based on call frequencies of Ontario bat species, a recording frequency of 35kHz was chosen to provide the most accurate representation of bat abundance through the study area. Representative calls of all of Ontario's bat species demonstrate that at least some of the call will overlap with the 30 to 40kHz detectable range. It is possible that some distant or uncharacteristic calls were not picked up by the Heterodyne recordings, however when paired with the broadband recordings of the Time Expansion data, this data is expected to give an accurate representation of the bat activity and species found at each monitoring station.

### Visual Bat Surveys

Active visual and acoustic surveys were conducted at the same locations as through-the-night acoustic monitoring stations. Surveys were conducted between sunset and midnight, and consisted of ten minute surveys at each point count location. During each survey, the observer used the manual trigger setting of the Pettersson D240X ultrasound detector, paired with an audio recorder, to record bat calls while listening to and observing the total number of bat passes during the survey.

The Heterodyne and species data collected from these visual monitoring surveys were analyzed separately from the data collected from through-the-night acoustic monitoring.

## **Reptile Hibernacula**

Four candidate significant reptile hibernacula features (RH-01, RH-02, RH-03 and RH-05) were identified to require three years of post-construction monitoring surveys because they consist of rock piles or old foundations with the potential to extend below the frost line and are located within 120 m of a proposed access road. These features were treated as significant with commitments to complete pre-construction evaluation of significance surveys in spring 2013. If hibernating snakes are present, they may occasionally be seen on the pile/foundation or nearby grass in spring or autumn.

The vicinity of each potential hibernaculum (RH-01, RH-02, RH-03 and RH-05) will be examined on three occasions between mid-April and mid-May. To the extent possible, surveys will be conducted under ideal weather conditions, being calm, clear or partly cloudy and with a temperature in the range of 10 to 20 degrees Celsius. On each visit the potential hibernaculum will be approached slowly and scanned for the presence of snakes with binoculars from several metres back. An area search will be conducted by slowly walking a circle 5 m out from the edge of the pile while scanning the ground for snakes. The hibernaculum will be searched for a minimum of 20 minutes. If large stones or other cover objects (e.g., boards) are present, these will be overturned carefully since snakes may be hiding under them. Any snakes found will be visually identified, approximate length estimated, and visually sexed by amount of tail tapering (if possible). This will be done to identify individuals which will help determine the number of snakes present if other snakes are found on subsequent visits. A field sheet will be prepared to record weather, habitat conditions, location of cover objects, UTM's of observations, details of any encountered snakes as well as time and date.

The UTM's of the hibernacula feature locations are provided in Table 2. Maps showing survey locations are provided in Appendix B; these locations may be subject to change depending on site conditions and/or changes in permission to enter private property. MNR will be consulted if the above survey protocol cannot be followed due to property access constraints to determine an appropriate course of action.

**Table 2. Locations of Reptile Hibernacula Features**

Reptile Hibernacula Feature	UTMs of Hibernacula	
	Easting	Northing
RH-01	451988	4796811
RH-02	454607	4792734
RH-03	446244	4792202
RH-05	453206	4799604

Snake hibernacula used by 5 or more individuals or 2 or more species of snakes, or congregations of 5 or more individuals or 2 or more species of snakes near potential hibernacula are to be considered significant (MNR, 2011c; MNR, 2011d).

**Colonially-nesting Bird Breeding Habitat (Tree/Shrub)**

One candidate significant colonially-nesting bird breeding habitat feature (CNB-01) was treated as significant. Although evaluation of significance surveys were not conducted for this feature because permission to access the property on which this heronry is located was denied, observations made from the fence line of an adjacent property on several occasions over two field seasons suggested that this feature contains at least one active Great Blue Heron nest, located approximately 25 m from the edge of the deciduous forest and north of Turbine 56. As such, pre-construction survey will be conducted in the spring during leaf-off season to gather more information (e.g. number and location of additional nests) about the heronry following the protocol described below.

Surveys will be conducted on two occasions per year, in April and June. At least one vantage point/ listening station will be placed along the fence line north of Turbine 56 and be monitored for approximately 15 minutes. All observed (including heard) colonially-nesting birds will be recorded along with their approximate locations, age and behavior, if possible. The UTM's of the monitoring station for feature CNB-01 are provided in Table 3. A map showing the locations of these monitoring stations is provided in Appendix B; these locations may be subject to change depending on site conditions and/or changes in permission to enter private property.

**Table 3. Location of Colonially-nesting Bird Breeding Habitat (Tree/Shrub) Monitoring Station**

Colonially-nesting Bird Breeding	Monitoring Station	UTMs of Monitoring Station	
		Easting	Northing
CNB-01	1	439932	4789092
	2	440073	4789075

Colonially-nesting bird breeding habitats (tree/shrub) with one or more active Great Blue Heron nests are to be considered significant (MNR, 2011c; MNR, 2011d).

**Amphibian Woodland Breeding Habitat**

Five candidate amphibian woodland breeding habitat features (AWO-14, AWO-25, AWO-27, AWO-30, and AWO-36) were confirmed as significant upon the completion of pre-construction evaluation of significance survey in 2012. An additional three amphibian woodland breeding habitat features (AWO-33, AWO-34 and AWO-35) were treated as significant with commitments to complete pre-construction evaluation surveys. These features were located within 120 m of proposed access roads and had vernal pools or ponds that appeared to be substantial enough during site investigations to support amphibian breeding habitat.

Surveys to target vocalizing amphibians (i.e., frogs) will be conducted using the following protocol. Each feature will be surveyed three times per year between April 1<sup>st</sup> and June 30<sup>th</sup> (preferably April, May and June, but surveys may begin in March in the case of an early spring), with at least 15 days between each survey. Monitoring stations will be established at the edge of vernal pools or ponds that potentially contain breeding amphibians. The UTMs of the monitoring stations for amphibian woodland breeding habitat features are provided in Table 4. Maps showing the locations of these monitoring stations are provided in Appendix B; these locations may be subject to change depending on site conditions and/or changes in permission to enter private property.

**Table 4. Location of Amphibian Woodland Breeding Habitat Monitoring Stations**

Amphibian Woodland Breeding Habitat Feature	UTMs of Monitoring Station	
	Easting	Northing
<b>AWO-14</b>	446610	4793549
<b>AWO-25</b>	451863	4797136
<b>AWO-27</b>	453144	4799733
<b>AWO-30</b>	450793	4805679
<b>AWO-33</b>	472626	4798393
<b>AWO-34</b>	472687	4797664
<b>AWO-35</b>	462696	4795952
<b>AWO-36</b>	443250	4792455

Surveys will be conducted between one half-hour after sunset and 2:00 am and, to the extent possible, during evenings with little wind and minimum night air temperatures of 5°C (41°F), 10°C (50°F) and 14°C (57°F) for each of the three respective survey periods. An effort will be made to conduct the third survey when the minimum night air temperature is 17°C however it is recognized that this may not be possible in all years. To the extent possible, surveys will be conducted on nights that are clear, cloudy, damp, foggy, or have light rain. Moderate to heavy rainfall will be avoided. After waiting one minute upon arrival at a station to allow for amphibians to start calling again after being disturbed, a 3-minute listening survey will be completed at each station. Surveys will be conducted using an unlimited distance semi-circular sampling area in which the estimated distance and direction of calling amphibian species will be recorded, indicating whether calls are originating from within or beyond the defined 100 m area surveyed. Call counts will be recorded using the codes established for the Marsh Monitoring Protocol.

Surveys to target non-vocalizing amphibians (i.e., salamanders) will be conducted using one of the following three protocols:

#### Adult Salamander Survey

Nocturnal surveys may be completed for adult salamanders if the amphibian calling surveys can be done either on, or within two days of a relatively warm rainy night in late March to early April. Adult salamanders will remain in the pond for several days following a warm rain. Headlamps will be used to search waters in the pond and a D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be carefully searched for the presence of salamanders. Any salamanders found will be identified, measured and released.

#### Egg Mass Survey

Egg mass searches will be conducted during daylight hours in early spring with the first visit in March after a relatively warm rain. If eggs are not found on the first survey, a second egg mass survey will be conducted in conjunction with the amphibian call survey in April. Area searches will generally include walking within or along the

perimeter of the vernal pool/wetland looking for egg masses, carefully checking any submerged sticks or shrubs standing in the water to which eggs may be attached. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where egg masses may occur, whichever is less. The number of individuals or egg masses of each amphibian species observed will be recorded and the life stage (e.g., egg mass or adult) noted.

### Larval Survey

Larval surveys may be conducted in May or June to search for presence of larvae of salamanders. A D-ring dipnet will be used to scoop sample leaf litter on the bottom of ponds. Ten representative scoops will be taken at each site. The litter in each scoop will be placed into a bucket and carefully searched for the presence of salamander larvae. Any larvae found will be identified, measured and released. Any other encountered amphibians will be recorded and released. Area searches for adult or transformed salamanders will also be conducted by overturning logs and walking along the perimeter of the vernal pool or wetland. A minimum search effort of 30 minutes will be applied for each station, or a complete check of locations where larvae may occur, whichever is less. Larvae will be identified using a field guide or key (e.g., A Field Guide to Amphibian Larvae and Eggs of Minnesota, Wisconsin and Iowa). Water depth and other relevant characteristics of the vernal pools will be recorded. Logs or debris in the vicinity of the pools will be overturned for the presence of salamanders.

Field sheets will be prepared to record weather, vernal pool conditions, UTM's, and amphibian observations as well as time and date.

Further refinements to the methods for conducting evaluation of significance surveys for candidate amphibian woodland breeding habitat features were made in consultation with MNR (as per email correspondence with Joe Halloran dated May 10, 2013) and subsequent to MNR confirmation of the NHA, as follows:

**Scenario 1:** If no standing water was present and no amphibians were observed during the first round of surveys targeting both vocalizing and non-vocalizing amphibians, the habitat was considered not suitable for breeding amphibians and no further surveys for vocalizing or non-vocalizing amphibians were deemed necessary.

**Scenario 2:** If there was insufficient standing water (less than 30 cm) and no amphibians were observed during the first round of surveys targeting both vocalizing and non-vocalizing amphibians, the habitat was considered unlikely to be Significant Wildlife Habitat for breeding amphibians and no further surveys for vocalizing or non-vocalizing amphibians were deemed necessary.

**Scenario 3:** If the first egg mass survey was completed after April 24 and no egg masses were found, no further surveys for non-vocalizing amphibians (salamanders) were deemed necessary because the first egg mass survey was unlikely to have missed salamander eggs. First, second and third round surveys for vocalizing amphibians would continue as scheduled.

**Scenario 4:** If the first egg mass survey was completed before April 24, no egg masses were found and the habitat was considered not suitable for salamander breeding (i.e., pond is isolated in an agricultural field, or pond has less than 15 cm of water), no further surveys for non-vocalizing amphibians (salamanders) were deemed necessary because the feature is unlikely to support Significant Wildlife Habitat for breeding salamanders. First, second and third round surveys for vocalizing amphibians would continue as scheduled.

Features containing a breeding population of 1 or more of the following species with at least 20 individuals are to be considered significant: Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Chorus Frog, and Wood Frog (MNR, 2011c; MNR, 2011d).



## Red-headed Woodpecker Habitat

One feature (SCB-03) was confirmed as significant habitat for Red-headed Woodpecker, a bird Species of Conservation Concern. Evidence of breeding Red-headed Woodpecker was recorded at one location (SCB-03) and a Red-headed Woodpecker nest was later confirmed within the woodland. As a result, this feature requires post-construction monitoring which will be conducted according to the protocol described for pre-construction surveys completed for this feature as follows.

Breeding bird surveys were conducted in this feature according to the Forest Bird Monitoring Protocol, with additions from the Ontario Breeding Bird Atlas Methods.

Point count stations within woodlands were generally located within the area of disturbance, and at least 200 m from the forest edge, where forest interior existed. Stations within large woodlands were at least 250 m apart. For wooded areas with no forest interior (less than 200 m from edge), point counts were located in the centre of the forest patch. For woodland features crossing roadways, point counts were located 125 m from the right-of-way on each side of the roadway, allowing 250 m between stations. Locations of point count stations were marked on an aerial map, flagged in the field, and UTM data were recorded. The UTMs of the point count station for feature SCB-03 are provided in Table 5. A map showing the location of this point count station is provided in Appendix B; this location may be subject to change depending on site conditions and/or changes in permission to enter private property.

**Table 5. Location of Red-headed Woodpecker Habitat Point Count Station**

Red-headed Woodpecker Habitat	Point Count Station	UTMs of Point Count Station	
		Easting	Northing
SCB-03	1	472602	4798349

Three separate surveys were conducted at each station. Surveys were completed between May 24 and July 10 (pre-construction surveys were conducted in 2012), with at least 10 days between each visit. Surveys were conducted in the morning, between one half hour before dawn and 10:00 a.m., when weather conditions are without precipitation and winds are calm. Weather conditions (temperature, sky conditions, wind speed and direction) at each point count were recorded.

Each point count was composed of two 5-minute intervals. During each point count all signs and vocalizations of birds were recorded as well as the direction from which the call came. The approximate location of the bird species, breeding activity, and flyovers were recorded on station maps. Surveyors also will also assess the distance of the calls, either within a 50 m radius, between 50 to 100 m or greater than 100 m from the point count location. Habitats within 100 m of the point count station were evaluated using the habitat coding system from the Ontario Nest Records Scheme to provide station specific habitat information.

Forest areas identified to contain suitable breeding habitat for bird Species of Conservation Concern were considered to be significant if bird Species of Conservation Concern were identified using the area during the breeding season.

During post-construction surveys, the Red-headed Woodpecker nest should be examined to determine whether it is active. The UTMs of the nest are provided in Table 6 and a map showing the location of the nest is provided in Appendix B. In addition to the nest, trees and utility poles in the vicinity of SCB-03 should also be examined for signs of nesting Red-headed Woodpecker.

**Table 6. Location of Red-headed Woodpecker Habitat Nest**

UTMs of Red-headed Woodpecker Nest	
Easting	Northing
472544	4798330

# Appendix B

## Maps of Survey Locations